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Evaluation of the Supporting Nutrition in Pakistan Food Fortification Programme

Midterm Evaluation Report

May 2019

Oxford Policy Management

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Global Alliance for Improved Nutrition

e-Pact is a consortium led by Oxford Policy Management and co-managed with Itad

Acknowledgements

This publication would not have been possible without the collective efforts of a number of people who contributed their time and wisdom to this endeavour. In particular, we would like to acknowledge: the staff and associates of the Food Fortification Programme (FFP), for their support in undertaking this exercise; the team at DFID Pakistan, who provided guidance and review throughout the process; the OPM Pakistan administration and research team, who facilitated all primary data collection activities throughout Pakistan; and the team from Itad, who supported the development of the qualitative methodology and the evaluation's approach to gender and equity. We would also like to thank individual key informants, focus group participants, as well as contributors from the following organisations:

Association of Gender Awareness and Human Empowerment (AGAHE)
Ataula Zia
Bühler Pakistan (Pvt) Ltd.
Civil Society Support Programme (CSSP)
Deputy Commissioner Office, Badin District
Deputy Commissioner Office, District Karachi West
DevCon
Director General Health Office, Hyderabad District
District Headquarters, Sargodha
District Commissioner Office, Gujranwala
District Commissioner Office, Kasur
District Commissioner Office, Sargodha
District Food Department, Districts Karachi East and Malir
District Food Department, Hyderabad District
District Health Department, Hyderabad District
District Health Office (District Korangi Karachi)
District Health Office, Badin District
Food Department, Punjab
InterTek Pakistan
Integrated Reproductive, Maternal, Newborn and Child Health and Nutrition Programme (IRMNCH-NP)
Lady Health Worker Programme Sindh
Ministry of National Food Security and Research
National Fortification Alliance
Pakistan Flour Mills Association
Pakistan Standards and Quality Control Authority
Pakistan Vanaspati Manufacturer's Association
Planning and Development, Punjab
Planning and Development, Sindh
Punjab Food Authority
Punjab Food Authority, Sargodha
Sindh Food Authority
Sindh Fortification Alliance
Sindh Health Department
Sindh Rural Support Organisation, Badin District
Social Welfare Department, Badin District
National SUN Secretariat
Provincial SUN Secretariat, Punjab
Scaling Up Nutrition Civil Society Alliance (SUN-CSA)
Thardeep Rural Development Programme
Various distributors across Punjab and Sindh
Various oil mills across Punjab and Sindh
Various wheat flour mills across Punjab and Sindh
Various wholesalers across Punjab and Sindh
Various traders across Punjab and Sindh
World Food Programme
World Health Organization

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This material has been funded by UK aid from the UK Government; however, the views expressed do not necessarily reflect the UK Government's official policies.

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Executive summary

Context

This document is the midterm report for the evaluation of the Food Fortification Programme (FFP) in Pakistan, funded by the UK Department for International Development (DFID). FFP is a £46 million programme supporting efforts to fortify roller mill wheat flour with iron, folic acid, zinc and vitamin B_{12}, and to fortify edible oil/ghee with vitamins A and D across Pakistan.

There have been several previous efforts to introduce food fortification in Pakistan, which have faced several limitations. Renewed effort is bolstered by a supportive momentum around nutrition programming in Pakistan since the publication of the National Nutrition Survey 2011 results, and the commitment to reducing undernutrition by the new government elected in 2018. FFP is the largest single effort to implement the fortification of wheat flour and oil/ghee in Pakistan and operates through four key components: (i) technical assistance (TA) to federal, provincial, and district governments to support the monitoring and enforcement of food fortification; (ii) TA and incentives to the flour and edible oil/ghee industries to carry out fortification; (iii) public advocacy, media, and communication to raise awareness among various stakeholders, and create demand for fortified foods among consumers; and (iv) targeted studies to improve implementation strategies.

This midterm evaluation (MTE) report highlights the findings of the programme's design and progress to date related to relevance, effectiveness, and sustainability. The report also presents a preliminary value for money (VfM) analysis, lessons learnt from the evaluation, and key recommendations for the programme implementing consortium and for DFID, as key primary users of the evaluation.

Purpose and objectives of the evaluation

The primary purpose of the overall evaluation is summative: to inform DFID and the Government of Pakistan regarding the programme's progress and results, from an independent perspective. At midterm, the evaluation also has a secondary formative purpose: to assess progress to date and provide concrete suggestions to inform potential improvements to the programme design and implementation.

The overall evaluation has five specific objectives:

1. To assess the programme outcomes of improved availability and consumption of fortified food and to model the potential for impact on the micronutrient status of the target population (in particular, women of reproductive age (WRA), children six months to five years of age, and the poor).
2. To understand why, and how, programme interventions do/do not produce intended and unintended changes.
3. To assess the long-term sustainability of the programme, in particular by examining factors that are likely to affect the continuation of food fortification.
4. To assess the relevance of the programme design and implementation.
5. To assess the programme's VfM.

To address these objectives, the evaluation has been structured around nine key evaluation questions, informed by FFP's theory of change (ToC), as revised during the inception phase in collaboration with FFP and DFID. The questions are organised using the six evaluation criteria of

the Organization for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC); specifically: relevance, coverage, effectiveness, efficiency, impact, and sustainability.

Evaluation methodology and evidence base

The evaluation uses a theory-based methodological design. A theory-based approach draws on the programme's ToC to identify key issues the evaluation should address (i.e. evaluation questions); empirically verifies outcomes and assumptions posited along the three impact pathways in the ToC (the private sector pathway, the public sector pathway, and the public awareness pathway); and draws conclusions about whether, and how, the programme contributed to the observed results.

The core evidence base for this midterm report is the following:

- a review of the literature on fortification (from Pakistan, regionally, and globally) and FFP documentation, including reports, operational research, minutes, and workplans (among others);
- a review and analysis of FFP monitoring data, as provided by FFP, including but not limited to those contained in the Fortification Information System (FortIS)[1];
- additional analysis of the 2017 Fortification Assessment Coverage Toolkit (FACT) survey;
- key informant interviews with national and provincial stakeholders (in Punjab and Sindh) covering the implementing partner, DFID, the government, industry associations, actors in the value chains of oil and wheat flour, fortification input suppliers (e.g. premix and microfeeders) and civil society organisations (CSOs) (in total, 71 people were interviewed); and
- a district study in three districts in Punjab, and three districts in Sindh, to conduct interviews and focus group discussions among FFP Food Fortification Officers (FFOs) (6), district government officials (27), oil/ghee mills (19), wheat flour mills (23), individuals in the hotel and catering sector (6), and consumers and intermediaries targeted by the FFP awareness-raising campaign (about 200).

Conclusions and findings

Relevance

The relevance assessment seeks to answer the question of how well FFP is designed and suited in relation to achieving its objectives. The MTE found that FFP's ToC is valid and mostly comprehensive of what is needed for effective fortification. However, in the programme documentation the clarity and consistency with which some elements of the ToC are described could be improved, and several elements of good practice could be made more explicit, such as by highlighting the prioritised target groups, the need for a sustained supply of adequately fortified food, and building enabling structures (e.g. alliances) that will foster partnership among all stakeholder relevant for fortification programmes. The inclusion of the Research and Technical Advisory Group (RTAG), with its global and national expertise, is a strength. However, the approach and the extent of dialogue with the experts has to date been underutilised as regards bringing to the surface and addressing strategic questions, and obtaining support in translating those questions into needed programme adaptations to maximise the potential for impact and sustainability.

[1] FortIS is a management information system (MIS) that can be used to store information and track/report the progress of mill, lab, and supplier registration, fortification, and production, quality control (QC) and monitoring, and advocacy activities.

FFP's activities involving the public sector encompass support for many public sector responsibilities, including advocacy for mandatory fortification and harmonised standards, awareness-raising, TA for monitoring and enforcement, and equipping of public laboratories, among others. All aspects are important, relevant to the context in Pakistan, and in general aligned with good practice. The focus on awareness-raising and technical support, however, falls short as regards fostering trust, collaboration, and joint ownership of fortification among all relevant stakeholder groups – government, industry (millers and miller associations), civil society, and academia. Global evidence shows that a strong enabling environment for fortification, and buy-in across all sectors, with a high level of commitment, is the cornerstone of impactful, and sustained, fortification programmes.

In general, the main components of successful private sector engagement for food fortification have also been incorporated in FFP. The provision of financial incentives for mills is likely an important component to support fortification in the 'build' phase; this is the case for wheat flour, and the use of a conditional premix subsidy is in line with good practice in this context. That said, the programme does not fully recognise that the political economy of oil/ghee and wheat flour differs substantially, and a more adapted approach to each sector may be more effective and efficient.

The personalised attention, follow-up, and opportunity for relationship-building with industry staff through the FFOs is an important strength, and, if well applied, could facilitate the adaptation of targeted technical support to specific mill needs. FFOs' joint role of providing technical support to mills and acting as facilitators of government monitoring and enforcement, however, may create real and/or perceived conflicts of interest.

For the target population, oil/ghee fortification is an appropriate food vehicle to increase nutrient intakes and reduce micronutrient deficiencies of the people of Pakistan. Roller mill flour has the potential to increase nutrient intake and reduce micronutrient deficiency among those who regularly consume it. However, population-level deficiency prevalence rates may not change given that only approximately one-fourth of the population of Pakistan are estimated to regularly consume roller mill flour. In general, raising public awareness of oil/ghee fortification at the national level is appropriate, and has the potential to achieve that objective. Translating that awareness into changes in purchasing behaviour and demand for fortified oil/ghee may require additional efforts, including a stronger focus on reaching decision makers in the home. For fortified wheat flour, however, awareness-raising and demand creation is not an appropriate strategy given the low coverage and utilisation of roller mill flour at the population level. Creating demand for a product that will not be accessible to the majority of the population could put the programme's progress and reputation at risk.

Effectiveness

The evaluation of FFP's effectiveness assesses changes that the programme contributes to at the intermediary outcome level within the different pathways of FFP's ToC. For the private sector pathway, by the end of November 2018 oil/ghee mills were adequately fortifying almost all of their reported production and, based on extrapolated data, it is likely that the programme will already surpass its adequately fortified production targets in 2019. Wheat flour fortification volumes only substantially started to accelerate from May 2018, after which they surpassed fortified production targets (which were revised in 2018) on a monthly basis until November 2018.

FFP's contribution to the increased production of adequately fortified wheat flour by industrial producers is high. The use of premix, access to functional microfeeders, quality assurance (QA) and quality control (QC) capacity, and adequately fortified production was likely limited at the start of the programme. Facilitated by the programme, wheat flour mills increased their use of specified premix, and they are installing high-quality microfeeders, the functionality of which is enabled by

effective support services and QA training. In the case of oil/ghee fortification, FFP has likely strongly contributed to increasing mostly below-standard fortification practices at baseline to the current adequately fortified production, and to increasing the number of mills carrying out fortification. However, fortification was likely already widespread at baseline (particularly among larger mills) and premix consumption was substantial. Overall, the FFP-subsidised premix largely substituted existing commercial premix supply for oil/ghee. However, the engagement with FFOs needs to be more frequent and effective,

Implementation has taken longer than planned. Delays have been partially caused by factors not under the programme's control, yet they have also been influenced by operational decisions made by FFP based on VfM considerations. Mill enrolment has also taken longer than planned because of mill resistance, reluctant support by the industry associations, FFP's weak engagement with the Pakistan Flour Mills Association (PFMA) and Pakistan Vanaspati Mills Association (PVMA)—often transactional in nature, rather than based on partnership principles—and a technocratic-oriented implementation strategy that has not sufficiently taken into account the political economy, varied private sector incentives, and existing value chains. While the programme is achieving its targets of adequately fortified oil/ghee production, value chain analysis indicates that total oil/ghee production reported through FortIS underestimates total national supply. This has impact and equity implications as lower-income groups, which have higher rates of micronutrient deficiency, are likely to consume cheaper 'loose' oil that remains unfortified. Regarding wheat flour, the pattern of fortified production has been irregular, influenced by the tensions between the programme and the industry association, some claims regarding the discolouring effect of fortified flour on baked food items, the absence of government inspection and enforcement due to outstanding mandatory legislation, and consumers not (yet) asking for fortified wheat flour.

Regarding the public sector pathway, FFP has been able to build on the existing political momentum for nutrition and food fortification to deepen government awareness of and reinforce political commitment to food fortification, particularly at provincial level. FFP has been instrumental in bringing about the harmonisation and institutionalisation of revised national fortification standards and provincial regulations, by leveraging existing platforms and coordinating with other fortification partners. However, in the case of wheat flour fortification, provincial governments/Food Authorities do not consider the standards and regulations to be sufficient legal sanction for effective monitoring and enforcement considering the political economy associated with wheat flour. Therefore, provincial governments, with FFP support, are now considering strengthening the wheat flour fortification regime through a dedicated piece of legislation. For oil/ghee there are ambiguities in the legislation which may hinder effective enforcement

Except in Punjab, government capacity to effectively monitor and enforce fortification, especially wheat flour fortification, remains weak. Strengthening of the public QA/QC system still requires further FFP support, both at the provincial and district levels, and efforts are needed to ensure the embedding of this system in government operations through adequate budget allocations. Monitoring and enforcement of wheat flour fortification is currently limited because of the absence of mandatory legislation and there is a need to further align public and private interests and to ensure high-quality laboratories to support QC processes.

The key element of success for the programme is how well it can align the incentives of the millers with those of the public sector. Because of the limited attention in the programme design to creating structures and processes that can foster trust and collaboration among all relevant stakeholders, the programme has yet to be effective in forging public–private relationships that integrate the incentives of the millers and government to come together, resulting in stronger collaboration, commitment, and ultimately compliance.

Consumer awareness and demand would create a strong incentive both for private sector investment in food fortification as well as for further political support for the fortification agenda. Consumer awareness of, and demand for, fortified wheat flour and edible oil/ghee likely remain low. The programme's awareness-raising messages through interpersonal activities have yet to trickle down as expected. The media campaign has limited reach and effectiveness due to a lack of consumer access to, and preference for, the media channels used and the short duration of the campaign. Despite the lack of knowledge of fortified foods, potential acceptance of fortified oil/ghee and roller mill wheat flour appear to be high among most consumers. However, acceptance is contingent on price and taste.

VfM

Overall, in the first two years of the programme, FFP has achieved an adequate level of VfM in its implementation. FFP has generally followed sound procurement practices for key programme inputs. However, operational budgets have been underspent, reflecting implementation challenges and delays. FFP struggled to keep up with the implementation plan in the first 2.5 years of operation due to multiple delays, which impacted most of the efficiency indicators under the reporting period, particularly for the wheat flour-related activities. The programme shows improvement in the later part of the reporting period (Q9 and Q10) on some of the efficiency indicators, which suggests that performance along the efficiency dimensions might improve during the next reporting period.

Sustainability

The initial findings of the sustainability assessment found that the capacity of the provincial and district authorities to effectively and credibly monitor and enforce adequate fortification of wheat flour and edible oil/ghee is critical for FFP's sustainability. This includes the capacity of government staff to perform their respective duties; organisational capacity in terms of clear mandates and data management systems; and institutional capacity in terms of having mandatory legislation that provides a strong legal basis to sustainably monitor and enforce food fortification. FFP's efforts to develop and harmonise standards in several provinces is a major step towards sustainability. However, mandatory legislation has yet to be established for wheat flour, which, considering the political economy, is important for effective, and sustained, monitoring and enforcement of wheat flour fortification. In addition, public sector staff capacity to monitor and enforce remains weak. Although government actors have demonstrated support for the programme and, at national level, the import of premix has been exempted from taxes/duties and the Council of Common Interest (CCI) mechanism has been invoked to harmonise fortification standards across jurisdictions, food fortification has yet to be mainstreamed in regular budgets or integrated into multisectoral nutrition programmes at sub-national level.

The key sustainability factor from a private sector perspective is the business case that fortification offers in terms of its effect on profitability margins, demand, potential cost, and the level playing field that the regulatory environment presents. Oil/ghee mills in Punjab are incentivised to adequately fortify their entire production because of effective enforcement by the Punjab Food Authority. This incentive exists to a lesser degree in other provinces, and for wheat flour legislation requiring mandatory fortification has yet to be put in place.

Consumer demand is also an important factor driving sustained private sector support for adequate fortification but will likely require time to create. Price and taste are the more important factors driving demand. While there is acceptance among consumers of the concept of fortification, and the need to consume healthy foods, awareness and demand likely remain low.

FFP has often selected intervention approaches with sustainability in mind. Sustainability has also been enhanced by the programme's engagement with several key stakeholder groups, and by leveraging some existing coordination platforms. However, the programme has not created engagement processes that nurture partnerships with, and ownership of the programme within, government or industry, or that build multi-stakeholder relationships across the public and private sectors. This presents an important risk to the sustainability of food fortification.

Recommendations

The programme should:

1. strengthen its engagement with the industry associations, PFMA and PVMA;
2. facilitate a dialogue with private and public stakeholders to clarify ambiguities in the scope of mandatory oil/ghee fortification and identify the extent to which oil is being produced/sold that may fall through any existing loophole;
3. assess, in more depth, the private and public sector quantitative testing needs and capabilities to ensure that a high-quality sustainable laboratory network is available to support internal QC and regulatory monitoring now and after the programme ends;
4. better capitalise on FFOs' local presence and their ongoing engagement with the mills;
5. convert the current RTAG into a formal strategic advisory group that regularly reviews results from research and brings to the discussion new evidence from Pakistan and elsewhere, with a timescale and approach that permits strategic input into any needed programme adaptations;
6. strengthen its engagement with the public sector beyond the immediate sector stakeholders;
7. strengthen the focus of its energies on the promulgation of wheat flour fortification legislation;
8. closely align capacity building support to the Food Authorities with their operations, to ensure it remains relevant and sustainable;
9. improve the quality of its engagement at the district level;
10. further expand on its work through multi-stakeholder coordination platforms;
11. develop a comprehensive exit strategy in consultation with the food alliances and their members;
12. operate with more sensitivity to the political economy of the wheat flour and oil/ghee sub-sectors;
13. clarify who the audience for the public awareness campaign is and improve its targeting;
14. make the public awareness-raising and demand-generation into a joint effort involving the private, public, and civil society sectors;
15. review its engagement with local health intermediaries/CSOs to transmit messages and further adapt the programme's approach to their needs, bearing in mind value for money; and VfM; and
16. further assess and re-think its media strategy.

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List of abbreviations

AAP	Accelerated Action Plan for Reduction of Stunting and Malnutrition
AGAHE	Association of Gender Awareness and Human Empowerment
AME	Adult male equivalent
APIP	Accelerated Performance Improvement Plan
CCI	Council of Common Interest
CPEC	China Pakistan Economic Corridor
CSO	Civil society organisation
CSSP	Civil Society Support Programme
DEQ	Detailed evaluation question
DFID	UK Department for International Development
DMAC	District Malnutrition Addressing Committee
DPSA	Delivering Procurement Services for Aid
FACT	Fortification Assessment Coverage Toolkit
FFO	Food Fortification Officer
FFP	Food Fortification Programme
FFQ	Food Frequency Questionnaire
FortIS	Fortification Information System
FY	Fiscal year
GAIN	Global Alliance for Improved Nutrition
HPLC	High-performance liquid chromatography
IEC	Information, education, and communication
IMF	International Monetary Fund
IPC	Interpersonal Communication
IRMNCH-NP	Integrated Reproductive, Maternal, Newborn and Child Health and Nutrition Programme
IST	Iron spot test
IU	International Unit
IYCF	Infant and young child feeding
KEQ	Key evaluation question
KP	Khyber Pakhtunkhwa
LHS	Lady Health Supervisor
LHW	Lady Health Worker
M&E	Monitoring and evaluation
MDD-W	Minimum Dietary Diversity for Women
MDTF	World Bank Multi-Donor Trust Fund

MIS	Management information system
MoU	Memorandum of understanding
MSNS	Multisectoral Nutrition Strategy
MTE	Midterm Evaluation
NaFeEDTA	sodium iron ethylenediaminetetraacetic acid
NFA	National Fortification Alliance
NIFA	Nuclear Institute for Food and Agriculture
NJMI	Nasir Javaid Maqsood Imran (accountants)
NNS	National Nutrition Survey
NSP	Nutrition Support Programme
OECD DAC	Organisation for Economic Co-operation and Development – Development Assistance Committee
OPM	Oxford Policy Management
PASSCO	Pakistan Agricultural Storage and Services Corporation
PFA	Provincial Fortification Alliance
PFMA	Pakistan Flour Mills Association
PKR	Pakistani rupee
PPM	Parts per million
PSQCA	Pakistan Standards and Quality Control Authority
PTI	Pakistan Tehreek-e-Insaf
PVMA	Pakistan Vanaspati Mills Association
QA	Quality assurance
QC	Quality control
RBD	Refined, bleached, and deodorised
RDA	Recommended daily allowance
RDS	Rolling District Study
RTAG	Research and Technical Advisory Group
RTK	Rapid test kit
SES	Socioeconomic status
SHNS	School Health and Nutrition Supervisor
SNIP	Supporting Nutrition in Pakistan
SOPs	Standard operating procedures
SUN	Scaling Up Nutrition
SUN-CSA	SUN Civil Society Alliance
TA	Technical assistance
ToC	Theory of change

UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USC	Utility Stores Corporation
USI	Universal Salt Iodisation
VfM	Value for money
WFP	World Food Programme
WHO	World Health Organization
WRA	Women of reproductive age

1 Introduction

This document is the MTE report of DFID's FFP. FFP is a £46 million programme implemented throughout Pakistan, in which wheat flour is fortified with iron, folic acid, zinc, and vitamin B_{12}, and in which edible oil/ghee is fortified with vitamins A and D. This report highlights the formative findings at FFP's midterm on the programme's relevance, effectiveness, and sustainability. The report also presents a preliminary VfM analysis, lessons learnt from the evaluation, and key recommendations for DFID and FFP.

1.1 Purpose and objectives

1.1.1 Purpose of the evaluation

The primary purpose of the evaluation is summative: to inform DFID and the Government of Pakistan regarding the programme's progress and results, from an independent perspective, to understand whether the programme is being implemented as envisioned, and to assess its sustainability. The evaluation also has a secondary formative purpose, which is to help improve the programme's design and its implementation. Finally, a tertiary purpose is to add to the national and international knowledge base on large-scale food fortification programmes.

1.1.2 Objectives of the evaluation

The evaluation has the following objectives:

- To assess the programme outcomes of improved availability and consumption of fortified food and to model the potential for impact on the micronutrient status of the target population (in particular, WRA, children six months to five years of age, and the poor).
- To understand why and how programme interventions do/do not produce intended and unintended changes.
- To assess the long-term sustainability of the programme, by examining factors that are likely to affect the continuation of food fortification.
- To assess the relevance of the programme design and implementation.
- To assess the programme's VfM.

1.2 Supporting the use and dissemination of the evaluation findings

The MTE offers an opportunity for programme adaptation and improvement; therefore, the evaluation's intended primary audience is DFID and FFP. Both DFID and FFP have participated in a 'sense-check' workshop of the MTE's preliminary findings and have been offered an opportunity to comment and correct errors in the report. The timing of this report has specifically been set to coincide with FFP's annual review cycle, therefore the FFP annual review is explicitly a target audience for this report. To support the use of the evaluation findings, the evaluation team will be available to DFID, FFP, and the annual review team to respond to any queries or to participate in any workshops, as necessary. In addition, the evaluation team will collect responses to, and track actions relating to, each recommendation, and will report back to DFID during the period between the MTE and the endline report.

The findings of this evaluation will also be useful for the government, civil society, and private sector actors in promoting and sustaining food fortification in Pakistan. As such, in the three months following the finalisation of the MTE, the evaluation team will work closely with DFID and FFP to develop a dissemination strategy that is closely aligned to FFP's stakeholder engagement

strategy to ensure the findings, lessons learned, and recommendations are shared appropriately. In collaboration with FFP, the dissemination strategy will start with an identification of 'key users' of the evaluation within government, civil society, and the private sector. The evaluation team will then identify the most appropriate tone, mode, and key messages for dissemination, thus specifically tailoring the dissemination material to each user. The objective of tailoring the dissemination material is not to fundamentally alter the findings themselves, but rather to reduce jargon and simplify the information. Disseminating reports of findings or various communication materials to stakeholders is not sufficient for the immediate application of the information. Therefore, the evaluation team will work with FFP to explore the appropriateness of obtaining stakeholder feedback through discussion forums, to improve both the chances and the quality of utilisation of the evaluation findings. Facilitating conversations among stakeholders can also help avoid miscommunication of the findings, brainstorm strategies for how to implement recommendations, and prevent misuse of the findings. Finally, recognising that users will read, process, and utilise the evaluation findings at their own convenience and not necessarily at the time of initial dissemination, the evaluation team will also aim to make the evaluation report and dissemination materials available online and to archive them for future use.

1.3 Timing of the evaluation

The overall evaluation covers the period from the programme's start date in February 2016 until its planned end date of January 2021. This MTE covers the period from February 2016 to December 2018. The inception period of the evaluation was completed in October 2018 and the MTE was submitted in May 2019. An annual summary with a specific focus on VfM reporting will be submitted in April 2020, and a final evaluation report will be submitted by November 2020.

The timing of the evaluation is organised around key points in the programme's lifecycle:

- **Inception period of the evaluation:** The evaluation inception took place just after the 2018 FFP Annual Review, which recommended an Accelerated Performance Improvement Plan (APIP) be established, including a revised implementation plan, and an update of the programme's ToC, supported by the evaluation team.
- **DFID Annual Reviews:** The MTE has been completed in time to feed into the Annual Review process. A report in 2020 focusing on VfM will be submitted in advance of the 2020 Annual Review.
- **End of the programme:** The end-of-programme evaluation will be completed in time to feed into DFID's project completion report in April 2021.

The overall process that has been followed for the MTE is as follows:

- **December 2018 to January 2019:** The evaluation carried out literature reviews for each pathway component of the evaluation and began the collection and review of key FFP documentation. Details on the documents reviewed are given in Section 3.2.
- **January to February 2019:** The evaluation team conducted primary data collection, consisting of numerous key informant interviews and focus group discussions across Islamabad, and at multiple locations in Punjab and Sindh. Specific details of this data collection are outlined in Section 3.2.
- **March to April 2019:** In this period the evaluation team completed the analysis of primary data collection and began the write-up of the report. The write-up began with a multi-day evaluation workshop and concluded with a draft report being submitted to DFID on 30 April.
- **May 2019:** In this period, DFID and its external QA process provided comments on the report and the MTE report was finalised by the evaluation team.

The evaluation workplan can be found in Annex C.

1.4 Changes from the original technical proposal

Since the original technical proposal, there have been changes to the milestones and to the duration of the evaluation. These have occurred due to:

1. a delay in contracting, which meant that the evaluation commenced nine months later than originally planned; and
2. the removal of the sustainability phase of the evaluation, which was meant to take place three years after the end of the programme but was removed from the current contract as DFID's business case for Supporting Nutrition in Pakistan (SNIP) ends in January 2021.

As a result, one annual report submission was removed, and this contract does not include the sustainability phase milestones. Our understanding from the DFID signed evaluation contract is that, subject to ministerial approval and the evaluation team's performance, there may be an option to extend the evaluation call-down contract by up to two years to allow for delivery of milestones under the sustainability phase.[2] In addition, the evaluation team has also provided DFID with options to disaggregate findings by disability in the endline survey. DFID is still exploring with its procurement and commercial department whether it can proceed with the preferred option, which would require a contract amendment.

1.5 Report structure

This report is comprised of the following sections:

- Section 1 introduces the evaluation, outlining its purpose, objectives, and target audience.
- Section 2 presents an overview of FFP and the context in which it operates.
- Section 3 details the evaluation's methodology and outlines the full list of key evaluation questions and the data sources used to address them, in Table 2. The key evaluation questions pertaining to relevance, effectiveness, efficiency, and sustainability are the focus of this MTE and inform the overarching structure for the three sections that follow.
- Section 4 presents findings on relevance and the associated detailed evaluation questions.
- Section 5 presents findings on effectiveness and the associated detailed evaluation questions.
- Section 6 presents findings on VfM and the associated detailed evaluation questions.
- Section 7 presents findings on sustainability and the associated detailed evaluation questions.
- Section 8 outline the evaluation's conclusions.
- Section 9 highlights specific recommendations for FFP and present generic lessons learned from FFP's experience thus far for the food fortification community of practice.

It is important to note that Sections 4, 5, 6, and 7 begin with a table summarising the MTE's answers to each of the relevant detailed evaluation questions that frame this evaluation.

[2] Call-down contract PO8018.

2 Overview of FFP

2.1 Context

In this section we discuss the general context in which FFP is operating, focusing on the situation, and the significant changes that took place, during the period being covered by the MTE (from June 2016 to December 2018). A more specific and detailed discussion of the contextual factors that affect the design and implementation of the programme are discussed in the next sections, which present the evaluation findings.

2.1.1 Overall problem the programme aims to address

Large-scale food fortification, or fortification of widely consumed foods, is considered a medium- to long-term strategy to increase people's regular consumption of essential nutrients, thus reducing the risk of specific micronutrient deficiencies.[i] **Micronutrient deficiencies are a major public health problem in Pakistan, particularly among WRA and children under five**. The latest available data on micronutrient deficiencies are from the National Nutrition Survey (NNS) of 2011,[ii] which showed that 38% of pregnant women and 44% of children under five were iron-deficient, and that the prevalence of vitamin A deficiency was 49% and 56% among pregnant women and children under five respectively.[3] Not only were iron and vitamin A deficiencies high, the results also showed that there had been no improvements (or in some cases there had been a worsening) in the last 10 years. FFP aims to contribute to the reduction of iron and vitamin A deficiency at the population level, particularly in women and children under five. The potential of the programme to address the micronutrient deficiency problem is discussed in detail in Section 4.2.2.

2.1.2 Policy context of nutrition and food fortification in Pakistan

There has been much momentum around nutrition programming and policy in Pakistan since the publication of the NNS 2011 results. Nutrition strategies have been developed at both the federal and provincial levels.[4,iii]Pakistan is also a signatory to the Scaling Up Nutrition (SUN) movement, which means it is committed to ensuring that all sectors of the government are sensitive to nutrition, and to increasing the coverage of nutrition interventions.[iv] While the progress on implementing nutrition programmes has been slow, there has been some recent progress with the implementation of World Bank-supported multisectoral programmes, such as the Accelerated Action Plan for Reduction of Stunting and Malnutrition (AAP) and the Stunting Reduction Programme in selected districts of south Punjab,[v] and DFID's supporting TA to the SUN Secretariat in the Planning and Development (P&D) department. Reference to nutrition has also been included in government planning documents, such as Vision 2025, and within five-year development plans.

The new government, which took office in August 2018, has shown commitment to reducing undernutrition in Pakistan (e.g. in his inaugural speech, the Prime Minister spoke about the high rates of stunting among children in Pakistan).[vi] The Government of Pakistan has also established a technical committee on reducing undernutrition and stunting, within the Prime Minister's office. Nutrition awareness and behaviour change are priorities in the government's 100-day agenda.[vii]

[3] A new round of the NNS was conducted in 2018 but results from the survey are not available at the time of writing this report.
[4] For example, the Pakistan Integrated Nutrition Strategy in 2011 and various provincial multisectoral nutrition strategies.

Food fortification features in national and provincial-level multisectoral nutrition strategies and within other nutrition-specific interventions.[5] Pakistan has a dedicated National Food Fortification Strategy (launched in 2017), as well as a province-level Food Fortification Strategy in Punjab (launched in 2018). While other provinces do not yet have a strategy solely focused on food fortification, provincial nutrition strategies include food fortification as part of a comprehensive portfolio of interventions to address micronutrient deficiencies, including the provision of micronutrient powder, micronutrient supplementation, and biofortification.[6]

2.1.3 Food fortification programming in Pakistan

Food fortification started in Pakistan in the 1960s with the passing of legislation on the mandatory vitamin A fortification of edible oil under the West Pakistan Pure Food Rules of 1965.[viii] This was followed by salt iodisation programmes, which started in the 1980s, and a National Wheat Flour Fortification Programme in the 2000s. In addition, there have been several smaller fortification programmes, either focused on particular regions or on providing TA to producers or the government. However, food fortification programmes have been donor-driven, and there has been low interest in, and spending on, food fortification by the government across all provinces, leading to breaks in the supply of fortified foods as donor funding has run out.[ix]

Lessons from past food fortification programmes

The salt iodisation programme started in 1989 when the Government of Pakistan launched the National Iodine Deficiency Disorder Control Programme, with the support of the United Nations Children's Fund (UNICEF). However, a national survey in 2005 showed low levels of iodisation, and low capacity and lack of equipment among salt processors.[x] In 2006, this programme was revitalised as the Universal Salt Iodisation (USI) programme, which was supported by the Micronutrient Initiative (now named Nutrition International) and the World Food Programme (WFP), and which had multiple components, including providing TA and equipment to producers, public advocacy for mandatory legislation, building government's regulatory capacity, supporting the supply of potassium iodide, and carrying out public awareness activities.[xi] The programme's success was demonstrated when the NNS 2011 showed considerable reductions in iodine deficiency and increases in the use of iodised salt at the household level. However, USI faced several challenges, such as maintaining the quality of salt iodisation at the production level, sustaining monitoring and QC, especially after the withdrawal of donor funding, inadequate regulatory and enforcement mechanisms arising from an absence of legislation on mandatory iodisation, lack of a consistent supply of premix, and challenges arising from the devolution of health from the federal level (which had provided strong coordination) to the provincial level.[xii]

There have been several regional wheat flour fortification interventions in Pakistan and one national programme.[xiii] The National Wheat Flour Fortification Programme was a national fortification programme that was implemented from 2005 to 2010. It was suspended because of the devolution of the powers of the Ministry of Health at the federal level to the provinces, following the 18th Constitutional Amendment. The programme was successful in developing national standards for wheat flour fortification, but experienced start-up delays partly due to difficulties in the procurement of premix and equipment, and challenges in managing relationships with PFMA.[xiv] An evaluation of the programme questioned its sustainability given an absence of legislation and

[5] For example, programmes for the management of acute malnutrition, micronutrient supplementation programmes, and programmes providing antenatal services for pregnant women and nutrition counselling.
[6] The Khyber Pakhtunkhwa (KP) Multisectoral Integrated Nutrition Strategy (2014) discusses revising the Pure Food Rules, facilitating the procurement of premix, exemption of taxes, encouraging the private sector, and the enforcement of food fortification. Similarly, the Intersectoral Nutrition Strategy for Sindh (2015) aims to enhance production, availability, and access to fortified foods, such as fortified flour and oil, support for legislation on fortification, enforcement through civil society, and QA through the Pakistan Standards and Quality Control Authority (PSQCA).

limited incentives for the wheat mills to continue fortifying once the supply of premix provided by the programme came to an end.[xv]

Recent food fortification interventions

In addition to FFP, in the last three years other fortification initiatives have taken place in Pakistan. Between 2015 and 2017, the Global Alliance for Improved Nutrition (GAIN) provided TA to roller mills exporting wheat flour to Afghanistan; provided support to the government on strengthening policies and regulations on food fortification; and conducted research on fortification costing and compliance.[xvi] Presently, GAIN has smaller TA projects, which include providing support to the Punjab Food Authority on developing fortification standards and regulations; working with CSOs to encourage compliance within the government and private sector; and designing and testing an MIS for fortification.[xvii]

WFP is also active in fortification programming: it provides support to the National Fortification Alliance (NFA) and the Provincial Fortification Alliances (PFAs) to improve their coordination capacities, and it has supported the drafting and launching of the National Food Fortification Strategy and the Punjab Food Fortification Strategy. WFP, along with Nutrition International, is also supporting a fortification programme in Azad Jammu and Kashmir, which is currently active in supporting 11 mills.[xviii] WFP commissioned a study looking at the feasibility of including *chakki* mills[7] in fortification programmes, and based on the study's findings it plans to start a pilot project on *chakki* wheat flour fortification in two districts.[8,xix]

Government agencies responsible for food fortification in Pakistan

The NFA, housed within the Ministry of National Health Services, Regulation and Coordination, is responsible for the coordination of fortification policy and programmes at the national level. In addition to this, each province has its PFA, which is housed in either the Food Department (in the case of Punjab) or the Health Department (in other provinces). Other national government agencies that play a role in food fortification include the Pakistan Standards and Quality Control Authority (PSQCA), responsible for developing national standards; the Ministry of Finance, which influences the customs and taxes levied on fortification inputs; and the Ministry of Planning, Development and Reforms, which is responsible for the national-level nutrition strategy.

Food fortification comes under the category of food safety and quality, which is a provincial subject and is the responsibility of provincial Food Authorities. The Punjab Food Authority is the key government agency in Punjab that is responsible for food fortification initiatives, monitoring, and enforcement, and has been in place since 2012. Since FFP started, Food Authorities have also been established in Sindh (Sindh Food Authority) and in KP (KP Food Safety and Halal Food Authority). In addition to the Food Authorities, each province also has a Food Department, responsible for the procurement of wheat, and for devising regulations, standards, enforcement, and monitoring related to wheat flour.

2.1.4 General social, economic, and political context

Poverty and low human development indicators affect a large number of people in Pakistan. **The latest estimates on poverty in Pakistan show that 30% of the population (approximately 60 million people) live below the national poverty line, with large disparities between urban and rural areas, and across provinces**.[xx] Pakistan has substantially higher fertility rates (3.72 births

[7] Mills (usually small-scale mills) that use traditional stone-grinding technology to produce wheat flour
[8] FFP is also working on exploring the feasibility of *chakki* wheat flour fortification. WFP and FFP will pilot projects in different areas and then jointly feed back on the lessons learned.

per women) compared to neighbouring South Asian countries, and also lags behind in improvements in indicators, such as infant mortality and enrolment rates.[9] [xxi] The main poverty alleviation programme in Pakistan, the Benazir Income Support Programme, is an unconditional cash transfer targeted at poor women and has been in place for over 10 years.

The most significant political change during the period covered by the evaluation (2016–2018) was the transition in power from the incumbent government under Nawaz Sharif's Pakistan Muslim League, which completed its five-year term in May 2018, to the newly elected Pakistan Tehreek-e-Insaf (PTI). The elections in July 2018 not only resulted in victory for the PTI at the national level, the party also took over the Punjab government from the Pakistan Muslim League (N) and retained its government in KP. Following the elections, the new government announced an ambitious 'First 100 Days' agenda, covering a series of social and economic reforms based on the commitments made by the PTI in its election campaign.[xxii]

In 2015/16, Pakistan entered into an investment programme with the support of the Chinese Government, known as the China Pakistan Economic Corridor (CPEC), which focuses on large infrastructure projects in the areas of transport and energy**. In the outgoing fiscal year 2018 (FY18), GDP growth was 5.8%, the highest in the last 13 years, and headline inflation remained low (about 4%). Despite the increase in growth, the country experienced a record current account deficit of $18 billion and a trade deficit over $37.5 billion during this period**.[xxiii] This has led to a balance of payments crisis, depleting foreign exchange reserves and a currency devaluation—during the period covered by the evaluation (June 2016 to December 2018), the rupee depreciated by about 33% (from US$1 = Pakistani rupee (PKR) 104.8 to US$1 = PKR 138.8).[xxiv] Faced with the balance of payments crisis, the current government has used a strategy of approaching responsive countries for loans, and is expected to receive a bailout from the International Monetary Fund (IMF) in 2019.[xxv] The current account and trade balance deficits have a direct relationship with the edible oil sector targeted by FFP. The sector is a considerable contributor to these deficits as it imports billions worth of bulk oils and oilseeds as raw materials. Its prices are subsequently affected by the rupee depreciation (see Annex H for a value chain analysis for edible oil/ghee).

Fiscal deficit increased in the last two fiscal years (FY17 and FY18) due to slow growth in revenue collection accompanied by an increase in recurrent spending. While development spending by the federal government was curtailed in FY18, provinces accelerated their development spending compared to previous years, especially in the months before the national elections.[xxvi] The new government plans to carry out fiscal consolidation and has announced a scale-back of federal development expenditure (excluding government expenditure on CPEC) by PKR 225 billion relative to the budget for 2018/19.[xxvii]

Since the passing of the 18th constitutional amendment in 2010, **Pakistan has had a decentralised government structure whereby provinces are responsible for social services such as health, education, and nutrition, and most of the revenue collected at the federal level is distributed to the provinces**. Local government elections took place in 2015, which were followed by lengthy delays in the transfer of powers and funds from the provinces to local governments. Devolutionary powers were also delegated from the federal government to the provincial governments under the 18th constitutional amendment, and so the level of devolution across the provinces varies, with KP having fully devolved district governments, Sindh having limited devolution, and Punjab being in the midst of indecision about the extent of devolution.[xxviii]

[9] Infant mortality rate in Pakistan was reported in 2016 at 64.2 per 1,000 live birth; net enrolment rate in primary schools is high with no progress: there was an increase from 65% to 67% between 2006 and 2015.

2.2 Overview of FFP

2.2.1 Objectives, scope, and intervention strategy

FFP, which is being implemented by Mott MacDonald and Nutrition International, is a £46 million programme, which is part of DFID's SNIP Programme.[10] **It is a national programme that aims to contribute to improved nutritional status for people in Pakistan, particularly WRA and children, through sustainably improving access to and consumption of fortified wheat flour (with iron, folic acid, vitamin B12 and zinc) and edible oil/ghee (with vitamins A and D)**. This is being achieved through four key technical components, outlined below (the programme's design and activities are described in greater detail later in this section).

1. **TA to federal, provincial, and special area governments**: This involves working with the government to support it to legislate and develop standards and specifications regarding fortification, and to strengthen public sector management and regulatory monitoring systems.

2. **TA to the flour and edible oil/ghee industries**: This involves engaging the wheat flour and edible oil/ghee industries to encourage them to participate in food fortification and the provision of equipment and premix to mills to motivate them to fortify their products, and to strengthen the capacity of mills to undertake fortification and QC.

3. **Public advocacy, media, and communications**, which includes advocacy targeted to policymakers and awareness generation among the public regarding the benefits of consuming fortified wheat flour and edible oil/ghee.

4. **Commissioning targeted research studies to guide the implementation of the programme** and to increase the sustainability of the programme.

Following a four-month inception period, implementation of the programme began in June 2016. At the time of writing this report FFP is about to complete the third year of implementation. FFP experienced challenges in delivery in the first two years of its implementation, and was not able to meet the targets it had agreed with DFID in its logframe.[11] As a result, **at the start of the third year of implementation (in September 2018) the programme was placed on an APIP**, under which monthly targets for the programme were revised across most components to allow an accelerated scale-up; the programme has been reporting to DFID against the APIP.

2.2.2 Target population

The target population for FFP is the group of people who are expected to benefit from and attain outcomes because of the programme. Different target population groups can be defined in terms of the degree of participation in the programme (direct or indirect), or in terms of sub-groups for which the programme aims to achieve different outcomes. In this section we focus on the essential target population, i.e. the group that is expected to attain the ultimate outcome of the programme. In the case of FFP, this ultimate outcome is an improvement in nutritional status through increased availability and consumption of fortified foods.

Following discussions with DFID and FFP during the inception phase, we understand the programme's ultimate target population is as follows:

[10] SNIP also includes a contribution to the World Bank Multi-Donor Trust Fund (MDTF) to support non-health sector nutrition interventions in provinces.
[11] SNIP scored a B in DFID's Annual Review in 2017 and 2018; as per DFID's procedures, FFP was placed under an APIP due to having scored two consecutive Bs.

- **In the first instance, it is the population of Pakistan,** because the programme's main supply-side intervention aims to ensure universal fortification of the targeted food vehicles.
- **Also, WRA, adolescent girls (10 to 14 years), and children less than five years of age are expected to benefit relatively more than other groups,** because evidence suggests that they have the greatest need and lowest intake from other sources. However, they are not specifically targeted by the programme, except through the use of public awareness campaigns, which allow for sub-groups with the highest need, in terms of sensitisation, to be identified for greatest focus.
- **The poor are not specifically targeted by the programme**, except, again, using some channels for the behaviour change component (specifically the interpersonal communication via the Lady Health Worker (LHW) Programme).

2.2.3 Intervention logic and results framework

In this section, we first outline FFP's ToC, which describes the logic of the programme's interventions. This is followed by a description of the key intended results, and the targets, of the programme, which make up its results framework.

2.2.3.1 FFP's ToC

FFP's initial ToC, which was included in its Monitoring and Evaluation (M&E) Framework was revised in October 2018 following a recommendation in the 2018 Annual Review. The revised ToC was a joint effort of the evaluation team, FFP implementation team, and DFID. A summary of the ToC narrative is outlined below. For a more detailed narrative, underlying assumptions, and a visualisation of the ToC see Annex B.

FFP aspires to contribute to the long-term impact of improving the nutritional status of the people of Pakistan, by improving the availability and consumption of adequately fortified wheat flour and edible oil/ghee. This outcome is expected to be achieved through a combination of three impact pathways: a private sector pathway, a public sector pathway, and a public awareness pathway.

1. The **private sector pathway** seeks to bring about a sustainable supply of adequately fortified wheat flour and edible oil/ghee by incentivising and supporting industrial producers to fortify their production according to provincial or national standards. Through engagement, TA, and the training of producers, in combination with a temporary subsidy scheme, equipment provision, and in-factory monitoring, FFP facilitates these private sector actors to acquire and use specified inputs, skills, and QA/QC practices and services to adequately start and continue fortifying their production. In summary, FFP mainly equips, incentivises, and trains the private sector, in particular industrial producers, to fortify wheat flour and edible oil/ghee, with the expectation this will result in the sustained production of adequately fortified foods and improve availability of these foods in the market.

2. The **public sector pathway** aims to support government monitoring, enforcement, and adoption of harmonised standards and regulations to create an enabling environment for the private sector to fortify wheat flour and edible oil/ghee. Through engagement, sensitisation, policy advocacy, TA, and training (in combination with the provision of QC equipment), FFP aims to increase government awareness of, commitment to, and support for food fortification. For wheat flour this is based on the expectation that more provincial and regional governments will make fortification of mandatory, and will adopt, revise, and harmonise standards and regulations accordingly. For edible oil/ ghee, FFP aims to increase compliance with existing mandatory fortification. Provincial and regional governments are therefore assumed to improve the monitoring and enforcement of these standards and

regulations, supported by improved skills, procedures, and access to equipment, which should also result in more sample testing being performed in public labs after producer and market inspections.

3. The **public awareness pathway** outlines the work that the programme expects to conduct on the demand side, aiming to increase the public's knowledge and acceptance of fortified wheat flour and edible oil/ghee, and their health benefits. This is assumed to help maintain or increase demand for industrially produced products after fortification, which in turn is expected to incentivise different private sector actors (producers, dealers, and retailers) in the value chain of the fortified products. FFP aims to implement a multi-pronged communication and awareness-raising campaign, targeting the public directly or via intermediary channels, such as local health staff, district government actors, or market stakeholders (e.g. retailers). The latter, by becoming more aware about food fortification and its benefits themselves, are also expected to support the distribution of the fortified products.

In addition to the three pathways outlined above, FFP also aims to commission a number of studies to better understand specific pathways in the ToC. The evidence, in turn, is expected to inform adaptations to the programme's design and implementation.

2.2.3.2 FFP's results framework

FFP measures impact at the population level through a reduction in micronutrient deficiencies in women and children. Specifically, FFP aims to reduce iron deficiency by 12.3% in WRA and 13.5% in children (6–59 months) and vitamin A deficiency in women, and in children under five by 27% and 35%, respectively. **The programme expects to contribute to nutritional improvements by achieving its overall outcome of 50 million people consuming fortified wheat flour (24% of the population) and 148.6 million people consuming fortified oil/ghee (72% of the population)**.

FFP has five main outputs, which are subdivided into multiple output indicators, each with its own targets. Outputs related to the World Bank MDTF programme (which is part of DFID's SNIP Programme) and those tracking the progress and completion of this evaluation have been omitted from this discussion. The outputs and main targets are summarised below, while detailed information can be found in Annex E. The impact weighting that each output receives in the logframe is added, which indicates the contribution each output is assumed to make towards the achievement of its overall outcome.[12]

1. **FFP ensures a sustainable supply of high-quality wheat flour fortified with iron, zinc, folic acid, and vitamin B12:** FFP aims to enrol 1,082 wheat flour mills, cumulatively through the course of the programme, to produce fortified wheat flour and perform internal QC tests to ensure adequate fortification. FFP expects these mills to produce 4.2 million metric tons of fortified wheat flour annually.[13] (Impact weighting: 36%)
2. **FFP ensures a sustainable supply of edible oil fortified with vitamin A and D:** FFP aims to enrol 102 oil/ghee mills in the programme to produce fortified oil/ghee and perform internal QC tests to produce a total of 1.9 million metric tons of adequately fortified oil/ghee annually.[14] (Impact weighting: 21%)

[12] The impact weightings have been recalibrated excluding outputs related to the World Bank MDTF.
[13] The logframe target for the last year is 2.8 metric tons as the last year covers eight months only
[14] The logframe target for the last year is 1.2 metric tons as the last year covers eight months only.

3. **Increased public awareness of the nutritional benefit of fortified food:** FFP plans to conduct a public awareness campaign in 100 districts by 2021, so that 70% of households in these districts have knowledge of the benefits of food fortification. (Impact weighting: 14%)
4. **Contribution to evidence and research for food fortification:** A benefits incidence analysis will be carried out to provide evidence of the programme's impact on FFP's target groups. Operational research, commissioned by FFP, will produce a minimum of four reports, four briefs, and two peer-reviewed papers which will be disseminated. (Impact weighting: 14%)
5. **Improved government ownership of, and action to support, food fortification:** All provinces will have developed regulations and standards for wheat flour and oil/ghee fortification; 74 production districts will have government focal points appointed; and (cumulatively) 799 wheat flour mills and 102 oil/ghee mills will have undergone annual government inspection. (Impact weighting: 14%)

FFP's logframe has been updated twice since the start of the programme, with changes made at the indicator level and at the target level. Indicators were added to better reflect and capture activities the FFP has been conducting, and non-relevant indicators were dropped. A few key changes are outlined below, with brackets showing when the change took place:

- The impact indicator on reduction in stunting among children under five was dropped (February 2018), with the rationale being that food fortification would lead to a reduction in micronutrient deficiencies rather than a reduction in stunting.
- The impact indicator on reduction in the incidence of neural tube defects in newborns was dropped (October 2018).
- The output 'Improved government commitment, ownership, and action to support food fortification' was part of FFP's own results framework, but not part of DFID's SNIP logframe. This was added to the DFID logframe to reflect FFP's activities related to government engagement and capacity building (October 2018).
- A new output indicator, 'Number of districts where point-of-sale marketing activities and awareness sessions with trade associations conducted each year', was added following the revision of FFP's public awareness strategy (October 2018).
- The output indicator on government ownership was made more explicit by changing the wording from 'number of provinces with mandatory regulations or other motivating legal instruments' to 'number of provinces that have developed regulations and standards for fortification' (October 2018).

With regards to targets, changes were made to annual milestones to account for the delays that the programme has experienced, and some final targets were revised in the light of new data available from the 2017 FACT survey and the first round of the Rolling District Study (RDS). Some of the key changes are highlighted below:

- Reduction in targets for the outcome indicator on the population consuming wheat flour (from 57% originally to 24%), and reduction in targets for the quantity of adequately fortified flour in the last year (from 5.9 million metric tons to 2.8 million metric tons)[15] based on new data on the consumption of wheat flour produced in roller mills.
- Reduction in targets related to the number of wheat flour mills undergoing official government annual enforcement inspection, from 1,082 (100% of roller mills) to 799.

[15] The last year's target covers eight months only – the annual target is reduced from 8.9 metric tons to 4.2 metric tons.

2.2.4 Budget

While **DFID's total budget for the programme is £46 million, the total budget for FFP's implementers (the Mott Macdonald-led consortium) is £41.4 million,** as the remaining budget has been allocated to DFID's Delivering Procurement Services for Aid (DPSA) to procure microfeeders and laboratory equipment for public sector labs, on FFP's behalf, for two years.[16]

Table 1 provides a breakdown of FFP's implementation budget (FFP spent £0.8 million during its inception phase, which has been omitted from the table). **The evaluation team is unable to show the budget allocation by each of FFP's technical components** (discussed in Section 2.2.1). This is because the programme disaggregates its budget according to expenditure category (e.g. fees, equipment etc.) and some expenditures, such as fees and operational categories, are incurred across technical components.

FFP has allocated about 45% of its budget to fees and operational costs. Of the remaining 55%, most of the budget has been allocated to fortification inputs, such as microfeeders and premix that FFP provides to mills (35% of the total budget). A large part of the £4.6 million allocated to DPSA (not included in this table) is also for the procurement of microfeeders. FFP has allocated £2 million (or 5% of its budget) for advocacy and communications, and 7% of its budget for operational research studies.

Table 1 Breakdown of FFP's implementation budget and budget utilised as at November 2018

Type of expense	Budget (£ million)	% of total budget	Budget utilised as at Nov '18	
			£ million	% of budget
Fees and operational costs	18.5	46%	4.7	25%
Fortification inputs	14.4	35%	0.5	4%
Microfeeders[1]	5	12%	0.01	0.2%
Premix	9.4	23%	0.5	6%
QA/QC equipment for mills and cluster labs	1	2%	0.2	17%
QC equipment for public labs[2]	0.5	1%	0	0%
Advocacy and communications	2	5%	0.04	2%
Annual district workshops (includes cost of training, and provincial launches)	1	2%	0.02	2%
Operational research studies	2.8	7%	0.1	3%
Programme monitoring – including costs for M&E and third-party tests	0.5	1%	0.1	12%
Total (implementation)	**40.7**	**100%**	**5.6**	**14%**

Source: Authors' calculations based on data provided by FFP

[1] Phase 1 of microfeeder procurement was carried out by DPSA. FFP took over procurement in Phase 2, starting in October 2018

[2] While FFP procures the main lab equipment for public labs (such as high-performance liquid chromatography (HPLC) and spectrophotometers) through DPSA, it procures supporting equipment for labs directly.

By the end of the first half of FFP's third year of implementation (more than half way through its implementation) the programme has utilised only 14% of the total budget available for implementation. Premix subsidies to the mills make up about a quarter of FFP's total budget, and the programme had spent only 6% of the available budget for premix subsidies by November 2018 (only 1% of the budget available for premix for wheat has been used,

[16] FFP's contract with DPSA is expected to end in March 2019.

compared to 50% of the budget available for premix for oil/ghee). Given that the programme has accelerated roll-out under the APIP, as more mills are registered under the programme, it is likely that the programme's budget utilisation will also increase. Similarly, the programme has only used 2% of the budget available to it for advocacy and communication, which is also likely to increase as the public awareness campaign is rolled out. FFP has been slow to use the budget available for operational research studies (7% of the total budget), having used only 3% of the allocated budget so far.

2.2.5 Key stakeholders

Key stakeholders of the programme are actors that have an influence on, or are intended to be influenced by, the programme, directly or indirectly. Figure 1 visualises FFP's different stakeholders. This stakeholder mapping was implemented by the evaluation team during the inception phase and has been updated based on new data and information collected for the MTE. In the figure, stakeholders are positioned within the programme's sphere of control, influence, or interest, according to the degree of control and influence—direct and indirect—that FFP has over them in terms of changing their capacities and behaviour. Box 1 presents the interpretation of the different spheres. Analysis of the stakeholders according to these different spheres helps to develop the programme's ToC because it identifies the people the programme anticipates working with to effect change.

Box 1 A programme's spheres of control, influence, and interest

Sphere of control: Actors that have direct control over the resources and activities of the programme or are subcontracted to deliver or support activities of the programme.

Sphere of influence: Actors with whom the programme interacts directly, and in relation to whom the programme anticipates having opportunities for influence. The programme collaborates with them to effect change but does not control them. The power to effect change rests with them.

Sphere of interest: Actors whose conditions, behaviour, capacities, attitudes, or knowledge the programme has an interest in changing but which it does not influence directly.

The delineation of the programme's sphere of control and influence depends on the interpretation of what constitutes FFP. If the perspective is taken that the programme is the joint responsibility of all stakeholders (hence, FFP equals food fortification in Pakistan), most stakeholders would be in the programme's sphere of control. This is not the perspective taken for this stakeholder mapping, however, which instead interprets FFP as a project with a budget, workplan, and objectives to influence sustainable food fortification. The FFP implementers are considered to be the main stakeholders within the programme's sphere of control, as they manage the resources and are most accountable for programme delivery.

The stakeholders for the fortification of wheat flour and oil/ghee are not identical: the wheat flour and oil/ghee value chains are not the same (e.g. the microfeeder manufacturer only supplies to wheat flour producers). Nonetheless, the stakeholder map for both products is similar and therefore we have presented just one stakeholder map.

Figure 1 FFP's stakeholder map

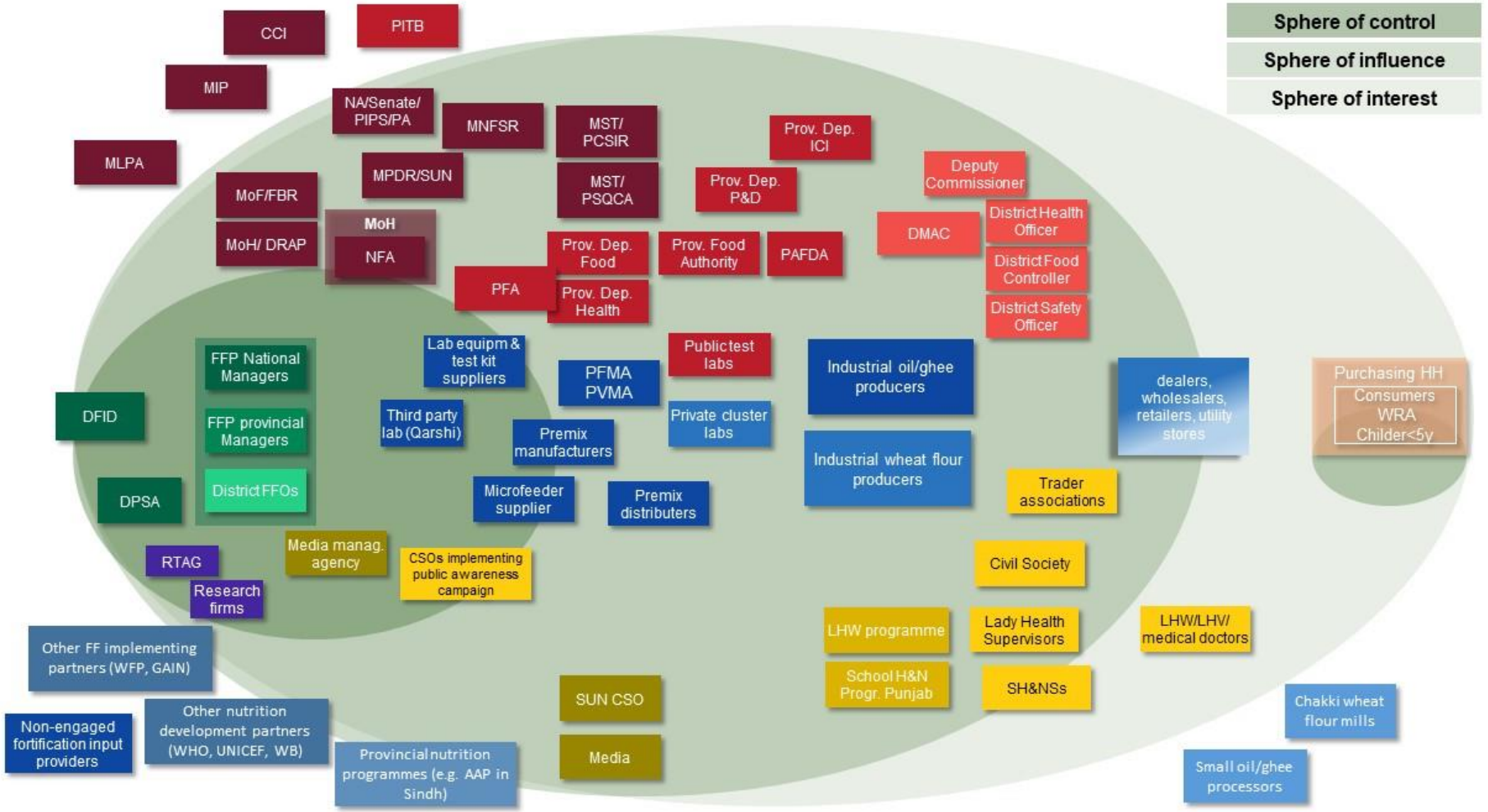


Figure 1 above illustrates the following in relation to FFP's stakeholders:

FFP aims to have direct influence at multiple geographical levels: global, national, provincial, and district/local. The brightness of the colours in Figure 1 indicates the geographical level, with darker colours representing higher geographical levels. Through its provincial offices and contracted FFOs the programme can interact directly at the provincial and district levels.

FFP seeks to interact with a wide range of stakeholders, in both the private and public sectors. Under its first technical component, the programme focuses on providing technical support to private sector stakeholders, i.e. a range of actors in the wheat flour and edible oil/ghee industries (coloured in blue in Figure 1). The second programme component targets government actors (coloured in red). Yellow has been used for the stakeholders that FFP aims to influence as part of its public awareness campaign.

Various stakeholders will have an influence on the programme and its results, though the programme itself does not aim to work through them to effect change.[17] Such stakeholders are considered outside the programme's boundaries. For example, FFP has not targeted the *chakki* wheat flour producers – at least in the period covered by the MTE – although their actions may influence the programme's results.[18] Similarly, other programmes and development partners are supporting food fortification and nutrition in Pakistan (e.g. WFP, GAIN, UNICEF, and other provincial nutrition programmes), which may contribute to FFP's results.

Some stakeholders are situated at the borders of the spheres of control, influence, and interest:

The manufacturers and distributors of fortification inputs (e.g. microfeeders, premix, lab equipment, etc.) work with FFP to deliver specific inputs and services to the wheat flour and oil/ghee producers.[19] On the one hand, they can be considered within the programme's sphere of control, as they are executing agreements entered into with the programme. On the other hand, since FFP aims to establish sustainable input supply chains, they are actors whose behaviour the programme intends to influence beyond the timebound contractual arrangement.

Currently, FFP directly interacts only with selected retailers of wheat flour and edible oil/ghee (e.g. through its memoranda of understanding (MoUs) with utility stores and a large private retailer, Metro Cash & Carry). However, overall, FFP does not intend to interact directly with dealers, wholesalers, or retailers of wheat flour and edible oil/ghee, except through awareness-raising activities.[20] Therefore, FFP's influence in terms of affecting their behaviour to adequately distribute fortified food is mainly indirect, and takes place through sensitisation.

The population or households that are potential purchasers and consumers of fortified foods are the ultimate population of interest for FFP. FFP's interventions in the wheat flour and oil/ghee value chains only indirectly effect the purchasing and consuming population (hence, they are in its sphere of interest). However, some of the interventions of FFP's public awareness campaign, such as TV advertisements, directly target these populations, and therefore are within the programme's sphere of influence for these interventions.

The stakeholder map produced in the inception phase largely remains as is, except for the following changes:

[17] These stakeholders may contribute to FFP's outcomes and FFP may coordinate with them.
[18] FFP is conducting a feasibility assessment of fortifying in large-scale *chakki* mills. However, details of this research study were not available during the MTE.
[19] The procurement of microfeeders and premix has been contractually and financially organised through DPSA, DFID's procurement supplier. However, FFP provides the specifications on what needs to be procured.
[20] FFP intends to engage market stakeholders through district-level food fortification events and by providing them with information, education, and communication (IEC) materials (FFP Communication and Advocacy Strategy, 2018).

The industry associations—PFMA and PVMA—were moved out of FFP's sphere of control as further research during the MTE shows that FFP has little control over them, and these associations have no direct control over programme decision-making. As will be discussed later in the report, programme ownership by the associations is weak.

Mobile network operators are no longer included as programme stakeholders as FFP is not engaging directly with them. The pilot for mobile messaging is being carried out through an existing platform of the IRMNCH-NP in Punjab.

Civil society (at district level) has been added as a separate stakeholder from the SUN CSO platform. FFP engages with civil society members at the district level, by inviting them to the district launches organised as part of FFP's public awareness campaign. FFP has also contracted CSOs to implement the interpersonal communication component of its public awareness campaign.[21]

Along with other food fortification implementing partners (such as WFP and GAIN) and other nutrition development partners (such as UNICEF and the World Bank), we have added provincial nutrition programmes (such as the AAP in Sindh) being implemented by provincial governments as stakeholders: they are outside of the programme's sphere but may contribute to FFP's results.

The Drug Regulatory Authority of Pakistan, which is housed under the Ministry of National Health Services, Regulations and Coordination at the federal level, has been added to the stakeholder map as FFP has engaged with the authority to exclude premix from the list of nutritional products it regulates.

As outlined in Section 2.1.3, other development partners, such as GAIN and WFP, are also active in the area of fortification in Pakistan. FFP is part of the core committee of the WFP-supported PFAs, holds regular tripartite meetings with GAIN and WFP to share documents and updates on the programme, and participates in the quarterly meetings of the Food Fortification Coordination Group, which includes representatives from donors and agencies working on, or supporting, food fortification programmes in Pakistan.

Apart from fortification programmes, FFP maintains links with government departments and programmes on nutrition, such as the SUN Secretariat at the national level, IRMNCH-NP in Punjab, and the District Malnutrition Addressing Committees (DMACs) at the district level.

2.2.6 Cross-cutting issues

The evaluation team reviewed FFP's documents through a gender and equity lens. By gender lens we refer to the process of reviewing differential outputs and outcomes of the programme in relation to women, men, boys, and girls. An equity lens maps outputs and outcomes that affect different socioeconomic groups, such as low-income groups, geographically marginalised groups, and/or persons with disabilities. Below, we outline how FFP addresses the issues of gender and equity in its targeting, implementation, and reporting.

Target population

The 2018 Annual Review states that FFP is compliant with the 2014 Gender Equality Act, as it identifies WRA as an important target group. Programmatically, in FFP's logframe and ToC, the ultimate target population for the intervention is the people of Pakistan although the programme expects to particularly improve the nutritional status of WRA as they are in greater need and therefore likely to benefit more. This is not articulated in the output indicators and is not apparent in the outcome indicators (consumption of fortified foods), which cover the general population (see

[21] These selected CSOs are at the boundary of the sphere of control (as the programme directly contracts them) and the sphere of influence as the programme also expects to influence their programme of activities (related to nutrition) outside of the FFP campaign.

Section 2.2.3). A disaggregation of the outcome indicators by target group is not necessary in the case of this programme because the two food vehicles covered by FFP are staple foods. Unlike other nutrient-rich foods, such as animal source foods, where consumption is likely to be affected by intra-household dimensions (particularly in the case of Pakistan), if staple foods are being purchased and consumed by a household they are likely to reach both women and men within the household.

Implementation

FFP has mainstreamed women into its implementation, primarily through targeting certain public awareness activities to WRA through the LHW Programme; other public awareness activities, such as media campaigns are more universal in nature with regards to gender. With respect to equity, the use of such channels as the LHW Programme and School Health and Nutrition Supervisors Programme ensure that messages related to fortified foods reach rural areas. This is where the LHWs are more concentrated and these are regions where the poor are more likely to attend government schools. To track whether these activities have been effective in reaching target populations, FFP is conducting an effectiveness study, and plans to carry out a knowledge, attitudes and practice survey once the roll-out of the campaign is complete, to understand whether there have been changes in purchasing and intra-household consumption practices. Given that these studies are not yet available, we are unable to comment on whether gender and equity considerations have been or will be examined.

Other technical components of the programme, such as engagement with public sector actors and private sector stakeholders, do not explicitly take into consideration gender and equity.

Reporting

At present, **FFP reports on women, adolescent girls, and children (6–59 months) reached by the programme** (in terms of numbers consuming fortified wheat flour and oil) in its annual reports to DFID. However, these **numbers are calculated using total production of fortified food products and demographic data on proportions of women, girls, and children from the population census**.

To better understand the potential effect of the programme on sub-groups such as women, children, and poor households, FFP conducted a benefits incidence analysis as one of the studies under its operations research component. Benefits incidence analysis projections show that given current consumption patterns there is near universal coverage of fortifiable oil/ghee, implying potential to reach the entire population regardless of wealth status. The coverage of fortifiable wheat flour among the total population is lower but covers all income groups.[22] Given that the poor are more likely to be micronutrient deficient, the benefits incidence analysis concludes that they are expected to benefit more than wealthier groups.

[22] Data from the RDS which covers four districts of Punjab, shows coverage of roller mill flour to be proportionate across income groups. However, data from 2017 FACT (also used by the benefits incidence analysis) shows that wealthier income groups are more likely to purchase roller mill flour.

3 Methodology

3.1 Methodological framework

This section describes the methodological framework used by the evaluation. It begins with a presentation of the evaluation questions and is followed by a discussion of the overarching theory-based evaluation approach.

3.1.1 Evaluation questions

The evaluation has been structured around nine key evaluation questions, which have been organised by six overarching OECD DAC evaluation criteria of relevance, coverage, effectiveness, efficiency, impact, and sustainability. The key evaluation questions have been further subdivided into detailed evaluation questions, which are linked to the different parts and pathways of the ToC. Together they provide an overarching framework for the evaluation, and form the basis of the evaluation design, data collection, and synthesis. The evaluation questions were developed in the inception phase, in consultation with DFID and FFP, and take into consideration DFID's requirement for the evaluation, as stated in the terms of reference[23].

As shown in Table 2, the MTE only covers some of the evaluation questions and for most questions only preliminary findings are presented. We answer the relevance questions (Key Evaluation Question 1 (KEQ1)) in the midterm to a large extent but will revisit these at the endline when more evidence is available. Most of the effectiveness questions (e.g. KEQ4 and KEQ5) and the sustainability questions (KEQ9) have been answered only partially at this stage, based on the evidence available and based on the programme's progress so far. Similarly, as will be discussed in Section 3.2.5, only part of the VfM questions, which come under efficiency, are included in the MTE. Questions related to coverage (KEQ2) and impact (KEQ7) have not been answered in this round of the evaluation and will be dealt with in the endline. A more detailed evaluation matrix in Annex B provides the evaluation criteria against each evaluation question, and what data will be collected to answer each question.

[23] Compared to the terms of reference, we re-organised some of the evaluation questions. This has been documented in Section 4.2 of the inception report.

Table 2 Evaluation questions and data sources

Key evaluation questions (KEQs)	Detailed evaluation questions (DEQs)	Addressed in MTE	Addressed in endline	Data sources used in the MTE
Relevance				
KEQ1: How well is the programme design suited to its objectives, the context, and the needs of its target population?	DEQ1.1: Is the programme's ToC valid and comprehensive relative to what is required for fortification programmes?	●	●	- Participatory review of the ToC (carried out during inception) - Document review: global and national literature on food fortification, NNSs, FFP programme documents, policy documents, FFP-commissioned studies, RTAG meeting minutes - Secondary data: FACT 2017, programme implementation and monitoring data - National and provincial key informant interviews: FFP, RTAG members, public sector actors, private sector actors, other development partners working on fortification in Pakistan
	DEQ1.2: How relevant is the programme to the local public sector and producer context?	●	●	
	DEQ1.3: How relevant is the programme to the needs of the target population sub-groups?	●		
	DEQ 1.4: How successfully has the programme adapted to the context of implementation and newly available evidence?	◖	●	
Coverage				
KEQ2: How well did the programme reach its target population sub-groups?	DEQ2.1: To what extent do households and individuals within those households, in particular WRA and children under five, consume adequately fortified wheat flour and edible oil/ghee with the support of the programme?		●	
	DEQ2.2: To what extent do poor and other vulnerable groups consume fortifiable and fortified wheat flour and edible oil/ghee? Who is excluded and why?		●	
Effectiveness				
KEQ3: To what extent has the programme contributed to an adequate supply of fortified wheat flour and edible oil/ghee?	DEQ3.1: To what extent is adequately fortified wheat flour and edible oil/ghee produced by the industrial producers targeted by the programme?	◖	●	- Document review: FFP programme documents, FFP Annual Reviews, millers incentive study, market and sector studies, fortification literature and evaluations - Secondary data analysis: FortIS data, FFP routine monitoring data, third-party data (e.g. national oil/ghee supply data, premix sales) - National and provincial key informant interviews: private sector actors, FFP staff - District study: FFP staff and private sector actors
	DEQ3.2: What other factors influence the production and distribution of fortified and adequately fortified wheat flour and edible oil/ghee?	◖	●	
	DEQ3.3: To what extent is a sustainable supply of adequately fortified wheat flour and edible oil/ghee available in markets/retail outlets?	◖	●	
	DEQ3.4: What factors influence the sustainable supply of fortified wheat flour and edible oil/ghee in	◖	●	

Key evaluation questions (KEQs)	Detailed evaluation questions (DEQs)	Addressed in MTE	Addressed in endline	Data sources used in the MTE
	markets/retail outlets?			
KEQ4: To what extent has the programme contributed to raising public awareness and acceptance of fortified wheat flour and edible oil/ghee, and its benefits?	DEQ4.1: To what extent has FFP's public awareness activities contributed to raising awareness of fortified wheat flour and edible oil/ghee, and its benefits?	◖	●	- Document review: FFP programme documents, RDS, third-party programme documents, literature on food fortification - Secondary data analysis: FFP routine monitoring data, FACT 2017 - National and provincial key informant interviews: FFP staff, implementing CSOs, public sector actors - District study: public sector actors, local health staff, participants of public awareness activities, consumers
	DEQ4.2: To what extent has FFP's public awareness activities contributed to more acceptance and consumption of fortified wheat flour and edible oil/ghee?	◖	●	
	DEQ4.3: What other factors influence consumers' awareness and acceptance of, and willingness to purchase, fortified wheat flour and edible oil/ghee?	◖	●	
KEQ5: To what extent has the programme contributed to an improvement in public sector management of the fortification of wheat flour and edible oil/ghee in accordance with mandatory legislation and revised standards and regulations?	DEQ5.1 To what extent has the programme contributed to making food fortification mandatory, and to the adoption of revised and harmonised regulations and standards?	◖	●	- Document review: FFP programme documents, policy documents (acts, regulations, standards, policies), party manifestos, fortification literature - Secondary data analysis: FFP routine monitoring data, FFP stakeholder database, FortIS, government monitoring data - National and provincial key informant interviews: FFP staff, public sector actors, development partners - District study: FFP staff, public sector actors (e.g. district government officials), CSOs
	DEQ5.2 To what extent has the programme contributed to the government improving monitoring and enforcement of food fortification regulations and standards?	◖	●	
	DEQ5.3 To what extent has the programme contributed to building awareness of, and political commitment and support for, wheat flour and edible oil/ghee fortification?	◖	●	
	DEQ5.4 What other factors influence political commitment, support, and improved public sector management of wheat flour and edible oil/ghee fortification?	◖	●	
Efficiency				
KEQ6: Is the programme cost-effective and does it offer VfM?	DEQ6.1: To what extent does the programme provide VfM for the resources invested?	◖	●	- Document review: FFP programme documents, FFP progress reports, FFP's financial reports, SNIP business case, DFID's Annual Reviews, FFP's contracts and tenders with input providers and suppliers, DFID's contract with DPSA, FFP-commissioned research studies, literature on costing of food fortification in

Key evaluation questions (KEQs)	Detailed evaluation questions (DEQs)	Addressed in MTE	Addressed in endline	Data sources used in the MTE
				Pakistan - Secondary data analysis: FFP routine monitoring data, FortIS, FFP cost and expenditure data, subsidy data, sample of premix invoices from mills - National and provincial key informant interviews: FFP, DFID, private sector actors, public sector actors
	DEQ6.2: Is the programme cost-effective compared to business-as-usual fortification of wheat flour and edible oil/ghee in Pakistan?		●	
Impact				
KEQ7: To what extent has the programme improved the consumption of adequately fortified foods and estimated nutritional status, particularly of WRA and children under five?	DEQ7.1: To what extent has the micronutrient intake of WRA and children under five increased due to the consumption of adequately fortified wheat flour and edible oil/ghee?		●	
	DEQ7.2: What are the predicted improvements in the micronutrient status of WRA and children under five in different provinces due to the consumption of adequately fortified wheat flour and edible oil/ghee produced?		●	
	DEQ7.3: What are the key factors that facilitate or inhibit the consumption of fortified wheat flour and edible oil/ghee, particularly among WRA and children under five; and how do consumers experience these factors?		●	
KEQ8: How has the programme influenced the market system of wheat flour and edible oil/ghee beyond the supply of fortified wheat flour and edible oil/ghee?	DEQ8.1 To what extent and how has the introduction of fortified wheat flour and edible oil/ghee affected business performance and practices in the value chain?		●	
	DEQ8.2: What effect has the programme had on the prices and perceived affordability of fortified wheat flour and edible oil/ghee?		●	
	DEQ8.3: To what extent did the programme influence the premix and microfeeder market?		●	
Sustainability				
KEQ9: To what	DEQ9.1: What factors are likely to affect the	◖	●	- Document review: FFP

Key evaluation questions (KEQs)	Detailed evaluation questions (DEQs)	Addressed in MTE	Addressed in endline	Data sources used in the MTE
extent is it likely that the programme will lead to a continuation of large-scale food fortification of wheat flour and edible oil/ghee in Pakistan after the programme ends?	continuation of large-scale fortification of wheat flour and edible oil/ghee after the programme ends?			programme documents, literature on food fortification, policy documents, millers incentive study, market and sector studies - Secondary data analysis: FortIS, programme routine monitoring data - National and provincial key informant interviews: FFP staff, public sector actors, private sector actors, public awareness implementers - District study: FFP staff, public sector actors, private sector actors, local health staff and participants of FFP's public awareness activities, consumers
	DEQ9.2: To what extent are factors that are likely to support or inhibit the sustainability of large-scale food fortification put in place or addressed?	◖	●	
◖ = Evaluation question answered partially / formatively ● = Evaluation question answered				

3.1.2 Theory-based evaluation

The evaluation uses a theory-based approach in that it uses FFP's ToC as its conceptual framework to explain whether and how the ultimate outcome is achieved. The ToC discussed above provides a plausible, sufficiently detailed, and commonly understood theory of how the programme intends to achieve its ultimate outcome, and the different pathways used. The ToC is being used by the evaluation as a framework to systematically construct a plausible contribution story to draw causal conclusions about the difference the programme is making to the achievement of the outcomes. In line with the theory-based approach, the evaluation recognises that other factors may have contributed to observed outcomes but does not attempt to estimate the 'net' effect on outcomes solely attributable to the programme. For a more detailed narrative of the ToC, see Annex B.

The evaluation draws upon the ToC to identify evaluation questions under the different evaluation criteria (discussed in Section 3.1.1) and to generate evidence to address these questions. How this happens in the evaluation is summarised below for each of the overarching evaluation criteria.

Relevance questions

- The ToC is used as a unit of analysis to assess the validity and comprehensiveness of FFP's design.
- Outcomes, impact pathways, and intervention processes are assessed for their relevance to the local context and the target population's needs.
- An assessment is carried out of how the ToC is used by stakeholders to adapt the programme to changes in context, and in considering new evidence.

Findings on relevance questions are reported in Section 4.

Effectiveness and impact questions

- The ToC is used to identify and prioritise the outcomes and impacts to be measured as part of the evaluation.
- Impact pathways and assumptions are used to examine causal inference (explaining the causal link between the programme's interventions and the observed changes) by conducting a bottom-up analysis consisting of the following:
    - an implementation process review – reviewing the extent to which key activities have been implemented as expected and actors engaged;
    - results pathway analysis – verifying whether intermediary and final outcomes occurred as expected; and
    - assumption verification – verifying the most salient assumptions identified in the ToC.

Midterm findings on effectiveness are reported in Section 5.

Efficiency questions

- The ToC is used as the basis for the design of the VfM framework to identify criteria, standards, and indicators/evidence relevant to the programme's ToC, ensuring the values embedded in the criteria and standards reflect the programme theory.

Preliminary findings on efficiency can be found in Section 6.

Sustainability questions

- The sustainability analysis uses a specific conceptual framework to assess FFP's sustainability. The conceptual framework hypothesises that sustained supply of, access to, and demand for fortified foods requires the following factors to be in place: sustained resources, capacity, motivation, and linkages. While these factors will be analysed specifically to address the sustainability questions, they are interlinked with the programme's ToC since aspects of them are assumed to be influenced by the programme.

Initial findings on sustainability are presented in Section 7.

3.1.2.1 Complementing impact pathway analysis with a systems perspective through top-down analysis

One of the risks of a theory-based evaluation is that only evidence that is consistent with the ToC is collected.[xxix] There may be factors in the broader context influencing the programme's outcomes beyond those included in the ToC. Therefore, the evaluation examines the broader system, outside of the ToC, by conducting a top-down analysis in addition to the bottom-up impact pathway analysis. This is achieved by examining the wheat flour and edible oil/ghee value chains, and the political economy within which FFP is operating, to understand how these are influencing the ToC impact pathways. This also reduces the risk of self-importance bias in assessing contribution[24], adding to the credibility of the evaluation findings. This is completed through three different approaches, which have been used to collect or analyse evidence:

1. Value chain analysis: a top-down market system lens has been used to analyse the value chains of wheat flour and oil by mapping out the structure of the value chains, focusing on how fortification fits in.

[24] Self-importance bias refers to the tendency of programme stakeholders to overstate their own role and influence in events.

2. Political economy analysis: to better understand the context of public sector management of fortification, a political economy approach has been used to understand the structural features of the government and the incentives of relevant actors.
3. Qualitative consumer study: the evaluation has drawn on the Maestre *et al*. (2017) conceptual framework to understand the factors that influence behaviours and choices of consumers related to consumption of wheat flour and edible oil/ghee[25].

At midterm, the analysis has adopted a descriptive and exploratory approach to gain a better understanding of the systems, and the context in which the programme is operating. Since the programme is already mid-way through its implementation, the evaluation report discusses how system-level factors have influenced the outcomes and impact pathways of the programme so far. At endline, this research will be repeated, and will build on the midterm findings to provide a further explanatory assessment of how system-level factors have influenced the programme's progress and impacts.

3.2 Overview of MTE methods and data sources

To operationalise the theory-based approach, and to generate evidence to answer the evaluation questions, the evaluation draws on different data sources – primary and secondary, including data collected by the programme itself. This allows for the triangulation of evidence and data, which enables a more credible, comprehensive, and in-depth analysis. In this section, specific data collection methods are outlined with reference to the key data sources being used.

3.2.1 Document review and secondary data analysis

The first stage of our data collection process was desk-based, consisting of a document review and secondary data analysis. A preliminary review of documents and data began in the inception phase, and this was followed by a more in-depth analysis for the MTE. Documents were gathered from various sources, including a general internet search supplemented by documents received from DFID and FFP, other stakeholders, such as the government, and other development partners, as well as documents from the evaluation team's own resources. The document review provided a base for designing the study and research tools and was also included in analysis.

The following types of documents were reviewed:

- **Project documents:** DFID's documents for SNIP (e.g. business case and Annual Reviews); FFP's strategy documents and implementation plans (e.g. APIP); FFP's progress reports (quarterly and annual reports) to DFID;[26] MoUs and other agreements that FFP has signed with its stakeholders; and FFP-commissioned studies.
- **Reports and literature on food fortification:** Reports and studies on food fortification in Pakistan conducted prior to or outside of FFP (e.g. related to other wheat flour and oil/ghee fortification programmes and salt iodisation) and the global literature on food fortification (academic literature and best practice guidelines).
- **Policy documents:** Government policy and strategy documents and notifications issued by national and provincial governments and political party election manifestos.

[25] The framework integrates value chains concepts with nutrition, using the consumer as a starting point to understand the following dimensions related to consumption: acceptability, nutrition awareness, availability, affordability, and signalling.
[26] For the MTE, the evaluation team had access to progress reports up to Quarter 10 (or Year 3, Quarter 2) of implementation.

- **Studies commissioned by FFP:** These include studies undertaken as part of FFP's operational research component, such as the RDS, the benefits incidence analysis, and the millers incentives study.

A detailed list of the documents that were consulted during the MTE can be found in the bibliography at the end of the report. The main secondary data sources that were analysed for the MTE are listed below.

- Data on production and consumption volumes for the two food vehicles (wheat flour and oil/ghee) collected by FFP (and reported in FortIS, and other sources such as FAOSTAT[27] and data compiled by industry associations.

- Programme data from FFP, which includes implementation and monitoring data reported in workplans and progress reports, other data compiled by FFP for this evaluation, and budget and expenditure data (analysed for the VfM analysis (see Section 6)).

- FACT 2017 data, which provided baseline information for the programme, as well as data on consumption practices and awareness – the methodology of the survey and the analytical process are explained in more detail below.

FACT 2017 survey

In 2017, GAIN and Oxford Policy Management (OPM) conducted a cross-sectional survey comprising a household assessment in three provinces (Balochistan, Punjab, and Sindh) and a market assessment in four provinces (Balochistan, Punjab, Sindh, and KP) using the FACT survey. While this was completed independently of the evaluation, the survey serves as an important data source for the evaluation and so it is useful to discuss the methodology of the survey in this report. The survey was conducted between July and December 2017;[28] since fortification of oil/ghee under FFP began in selected mills in May 2017, and wheat flour fortification began in November 2017, data from the survey can be used as a baseline for the evaluation.

The objective of the FACT survey was to provide data on household coverage, consumption, and micronutrient contribution from fortifiable and fortified foods, wheat flour, and oil/ghee among children under five years of age, and WRA, and the availability and quality of those fortified foods in markets. The survey also identified vulnerable populations using various risk factors that are often associated with poor micronutrient intakes (geographical location, socioeconomic status, poverty, dietary diversity, infant and young child feeding (IYCF) practices and food security), and assessed equity in household coverage of fortifiable foods by disaggregating indicators according to these risk factors. A detailed methodology of the 2017 FACT survey, including the sampling strategy, data collection, QA process, and data analysis methods can be found in the survey report[xxx].

The 2017 FACT survey report defined 'fortifiable' wheat flour as industrially processed flour produced by *chakki* mills and other industrially produced flour (e.g. roller mills) but included variables in the dataset to distinguish between industrially produced wheat flour from *chakki* mills and other sources (assumed to be roller mills). For the MTE, additional analysis was carried out to better understand the potential impact of fortified wheat flour produced with the support of FFP (i.e. focusing on wheat flour produced by roller mills only) by estimating and disaggregating coverage and other key indicators of consumption and micronutrient contribution for roller mill flour.

[27] FAOSTAT is a statistical repository of food and agriculture data for countries that is managed by the Food and Agriculture Organisation of the United Nations.
[28] The market component of the survey was completed in July 2017 while the household survey took place between September and December 2017, depending on the province.

Moreover, we disaggregated the results by risk factors to assess equity in coverage, consumption, and micronutrient contribution, as these were not fully covered in the FACT 2017 report.

3.2.2 National and provincial key informant interviews

Key informant interviews with national and provincial-level stakeholders provide evidence across all the components of the MTE (relevance, effectiveness, efficiency, and sustainability). At midterm, the objective of these interviews was to review the relevance of the programme and to understand the design of the programme; to understand the implementation of the programme up to December 2018; to get a sense of future implementation plans; and to conduct a formative assessment of the status of the impact pathways at midterm. The key informant interviews were also helpful in understanding the context within which the programme is situated with regards to the political economy factors that influence fortification, and in mapping the value chains of wheat flour and oil/ghee. As discussed in Section 3.2.5, the VfM analysis also used key informant interviews, particularly with FFP and DFID as data sources.

As part of the inception phase, a mapping of national and provincial-level stakeholders was carried out (described in Section 2.2.5 of this report), which provided the evaluation team with a starting list of stakeholders to interview. This list was expanded as more information was gathered through document reviews and through other interviews. As agreed with DFID in the inception phase, the scope of the midterm's data collection was limited to two provinces (Punjab and Sindh), given that the programme's roll-out in KP was still in its initial stages at the time of the midterm data collection and implementation had not yet begun in Balochistan. The following categories of stakeholders were interviewed at the midterm:

- stakeholders involved in the implementation of the programme at national and provincial levels, which includes FFP itself; this also includes other stakeholders, such as the CSOs implementing the public awareness activities and members of the RTAG;
- public sector stakeholders at the national level (e.g. the NFA) and the provincial level (e.g. Food Authorities, Food Departments, the LHW Programme), with the provincial-level stakeholders covering Punjab and Sindh;
- private sector stakeholders, such as industry associations and other value chain actors, such as input and service providers that operate at the national level examined separately for the wheat flour and oil/ghee value chains; and
- donors, development partners, and advocacy/coordinating networks promoting food fortification or similar interventions.

A full list of national and provincial stakeholders who were interviewed for the MTE is provided in Annex D.

3.2.3 District study

The 'district study' in the MTE evaluation report refers to data collection that was conducted with stakeholders who mainly operate at the district level, with the objective of focusing on a range of stakeholders in purposively selected districts. For the MTE, the district study was formative in nature and was conducted to understand the early uptake of FFP interventions by public sector actors, private sector actors and consumers, and to analyse context-specific enablers and barriers, which influence programme implementation and behaviours among different stakeholders. For this round of the evaluation, the district study was conducted in Punjab and Sindh in six purposively selected districts. It should be noted that for the public awareness pathway, the district study was

restricted to only the four programme districts (defined below) where the public awareness activities had been rolled out.

The following criteria were used to select districts:

- In each province, two districts were selected where FFP interventions, including the public awareness campaign, have been rolled out (referred to as 'programme districts') and one district where the programme had not yet commenced, or where its presence was limited (referred to as 'non-programme districts)[29].
- Among the programme districts, we selected one district that has a higher producer density and markets that are relatively easily accessible (likely to have urban characteristics) and one district with relative low producer density (likely to be more rural)[xxxi].
- The non-programme district was selected due to its being roughly comparable to a programme district in terms of demographic characteristics[xxxii] and geographical location.
- In Punjab, we selected the districts where the 'high-intensity' public awareness campaign was being implemented and we excluded the low-intensity districts.[30]

Using this rationale, we selected Gujranwala and Kasur as programme districts and Sargodha as a non-programme district in Punjab, and Karachi and Badin as programme districts and Hyderabad as a non-programme district in Sindh (see Box 2 for selection criteria).

[29] Data on whether fortification had started in a district was obtained from FortIS as at 4 January 2019.
[30] A 'high-intensity' campaign was implemented in Rawalpindi and Gujranwala, where all components (interpersonal communication activities, media, and mobile messaging) were rolled out; a 'low-intensity' campaign, with only the interpersonal communication activities, was implemented in Lahore and Hafizabad; and in the remaining districts the programme is rolling out all components of the high-intensity campaign except for the mobile messaging. In our selection criteria we refer to these districts as 'regular intensity' districts.

Box 2 District selection criteria

Punjab

Gujranwala and Kasur were selected as programme districts based on the following criteria:

- **Fortification production:** Wheat flour and oil/ghee fortification has started. Gujranwala has a relatively high producer density (68 wheat flour mills, four oil/ghee mills) compared to other districts of Punjab. Kasur (15 wheat flour fills, two oil/ghee mills) can be classified as a low producer density district.
- **Public awareness campaign:** Gujranwala was one of the two high-intensity districts, while Kasur is a regular intensity district.
- **Demographic characteristics:** Gujranwala has a high proportion of population in urban areas (59%) while Kasur is a relatively rural district (75% rural).

Sargodha was selected as a non-programme district based on the following criteria:

- **Fortification production:** While there are 18 wheat flour mills, fortification under FFP had not started by end of 2018.
- **Public awareness campaign:** A public awareness campaign had not been rolled out.
- **Demographic characteristics:** Sargodha is geographically close to Gujranwala and Kasur. Like Kasur, Sargodha has a high proportion of population living in rural areas (70%).

Sindh

Karachi and Badin were selected as programme districts based on the following criteria:

- **Fortification production:** Fortification has started in Karachi, which has a relatively high density of producers (82 wheat flour mills, 26 oil/ghee mills).
- **Public awareness campaign:** By December 2018, the campaign had only been implemented in Karachi and Badin, therefore these are the only two choices in Sindh.
- **Demographic characteristics:** Karachi has high proportion of population in urban areas (98%) while Badin is a relatively rural district (78% rural).

Hyderabad was selected as a non-programme district based on the following criteria:

- **Fortification production:** While there are wheat flour and oil/ghee mills in Hyderabad, fortification under FFP had only started at the time of district selection (December 2018) in one oil/ghee mill and in no wheat flour mills.
- **Public awareness campaign:** A public awareness campaign had not been rolled out in Hyderabad by the end of 2018.
- **Demographic characteristics:** Hyderabad is geographically close to Karachi and Badin. Like Karachi, Hyderabad has a high proportion of population living in urban areas (83%).

The district-level data collection used qualitative methods, such as key informant interviews and focus group discussions, to collect data from stakeholders, which included:

- programme staff at the district level;
- public sector actors, such as District Food Controllers, District Commissioners etc.;
- owners / managers of wheat flour and oil/ghee mills located in those districts;
- other private sector actors, such as retailers;
- participants of FFP's public awareness activities and other intermediaries, such as Lady Health Supervisors (LHSs), LHWs, and trade association members; and
- the general population / consumers of wheat flour and edible oil/ghee.

A complete list of stakeholders is provided in Annex D. For further details on the methodology, sampling strategy, and the data collection and analysis process for the consumer-level district study (which focused on public awareness and consumption) refer to Annex J.

3.2.4 Value chain analysis

To understand the wider context in which the programme is situated, a mapping of the value chains for oil/ghee and wheat flour was conducted, with a particular focus on the production of fortified foods. Recognising that oil/ghee and wheat flour have distinct market structures and processes, the value chain analysis for each food vehicle was conducted separately by different research teams. The value chain mapping examines not only how fortification inputs, processes, and outputs are organised but extends to stages of the value chain that are outside the programme (e.g. inputs such as wheat grain or oil seeds and post-mill activities such as wholesale and retail), and it covers the dynamics in the wider supply chain outside of fortification. This value chain analysis, which can be found in Annexes G and H, is an important data source that has been used to understand and explain the programme's implementation and observed results.

The value chain analysis involved a review of documents on the wheat flour and oil/ghee industries in Pakistan and secondary data (obtained from sources such as previous assessments of the industry, FAOSTAT etc.). However, the bulk of the evidence for the mapping comes from interviews with value chain actors and other supporting actors, including mills (the primary actors), input providers (e.g. equipment suppliers), intermediaries (distributors, traders, brokers, and wholesalers) and retailers (point-of-sale), and supporting actors such as the industry associations and the government. These interviews covered stakeholders both within the programme, as well as those outside the programme.

3.2.5 VfM analysis

The VfM analysis is a standalone study conducted to answer the evaluation questions related to efficiency. The VfM assessment for the evaluation covers five dimensions (referred to as five Es): economy, efficiency, effectiveness, cost-effectiveness, and equity. For the MTE, the assessment is focused on the input- and output-related criteria of 'economy' and 'efficiency' as there is limited information on the programme's outcomes and impact at this stage. The evaluation's approach to VfM draws on OPM's VfM framework, which in turn is based on DFID's guidelines on VfM.[xxxiii]

The following steps were taken to conduct the VfM analysis for the MTE:

- Definitions of explicit criteria (aspects of performance) and standards (levels of performance) for economy and efficiency were developed, which are aligned to FFP's ToC. These criteria and standards, referred to as 'rubrics', help provide an agreed and transparent basis for making VfM judgements. Both FFP and DFID were consulted during this stage.
- Quantitative and qualitative data were collected and compiled from multiple sources, which includes secondary sources (e.g. FFP's financial data, programme implementation data, progress reports, logframe reports and other programme documents) and primary sources (e.g. interviews with FFP national-level managers) and draws upon FFP's own VfM reporting which is done as part of its reporting to DFID.
- The evidence collected was used to create indicators and a narrative, which were used to support the judgements made against each criterion.

Our approach to the VfM assessment is explained in further detail in Section 6.

3.3 Ethics and inclusion

The evaluation team has made its best efforts to include a variety of stakeholders that cut across the different actors involved in the programme, representing different interests related to the

programme. This includes DFID, FFP, government, mills and other value chain actors, and consumers. Data collection was carried at all levels – international (in the case of FFP), national, provincial, district, and community level. The evaluation team has ensured that it provides a balanced view by capturing an appropriate reflection of views of several types of stakeholders. Across all studies, data were collected in an appropriate and respectful manner, with ethical principles taken into consideration. Much of the primary data collection was either led by, or supported by, national researchers, which not only ensured cultural familiarity but also helped minimise language barriers between participants and researchers. Community-level data collection (e.g. focus group discussions with consumers) was completed by interviewers familiar with regional languages and local norms, and it was ensured that women researchers were responsible for carrying out focus group discussions and in-depth interviews with female participants.

All research participants – from consumers to private sector stakeholders to government officials – were provided with an overview of the purpose of the data collection, were asked for their consent, and were given an opportunity to express any concerns they may have had, and were assured that the information they provided will be kept confidential. We have honoured the confidentiality of our participants by anonymising the findings and reporting them at an aggregate level. Furthermore, for the consumer-level qualitative data collection, the evaluation team received ethical approval from OPM's Ethical Review Board: this process entailed a review, through an ethics lens, of the study design, data collection tools, and consent forms.[31]

3.4 Cross-cutting considerations

The evaluation methodology considers cross-cutting issues – such as gender, equity, power relations, and capacity building – that are relevant to the design of the programme and the context of implementation. Examples of how this is achieved are given below:

- During the development of evaluation questions (done at the inception stage), the evaluation matrix was reviewed through a gender and equity lens[32] to ensure that gender and equity concerns are effectively covered in the evaluation.
- Qualitative interviews conducted at the community level explored gendered dimensions of the consumption and purchase of foods, and awareness of food fortification. This was accomplished by asking specific questions around these themes, and by interviewing both women and men in the same household and holding separate focus groups for women and men.
- Equity concerns related to poverty and geography (e.g. rural areas) were considered in the selection of communities where primary-level data collection was conducted (see Annex J). Additionally, our analysis of household survey data from the FACT 2017 disaggregates consumption data by risk factors related to location, socioeconomic status, poverty status, women's diet diversity, child feeding practices, and household food security (Annex I).
- By using a political economy analytical lens to collect evidence on the public sector pathway, the evaluation considers power relations between the private sector and the public sector, the various levels of the government, and different government bodies involved in food fortification.

[31] The study did not involve children and vulnerable groups, clinical trials, the collection of biological samples or anthropometric data, and was not especially sensitive or contentious.
[32] Gender concerns in this evaluation relate to the inequalities arising from strong patriarchal norms at multiple levels of society that collectively influence decisions about access to and consumption of nutritious food, and thus differential nutrition outcomes. Equity concerns relate to equitable access: in other words, how poverty, geography (rural and remote communities), and other forms of marginalisation influence access to and consumption of fortified foods.

- One of FFP's key activities is to provide TA and training to oil/ghee and wheat flour producers and government staff involved in food fortification. FFP's approach to capacity building of private sector actors, government regulators, and labs has been examined by the evaluation from the point of view of programme relevance and effectiveness.

Given that FFP does not include disabled populations as a target sub-group in the programme design, and given the limited scope of the MTE in terms of the evaluation questions being addressed (see Section 3.1.1), this round of the evaluation does not include disability as a cross-cutting consideration. However, during the endline, which will answer the evaluation question on the coverage of fortified foods, we plan to collect data on disability status through a quantitative survey (the endline FACT survey), which will allow us to disaggregate coverage indicators by disability[33].

3.5 Limitations of the evidence

- **The evaluation assesses the programme's causal contribution based on a theory-based approach, rather than by quantifying the net attributable effect of the programme on intended outcomes**. Causal inference is based on principles of generative causation and contribution analysis, rather than quantitative counterfactual comparison, which would allow the measurement of the net attributable effect of the programme on specific outcome variables. Since we consider a counterfactual approach infeasible, we draw causal inference through systematic verification of the programme's impact pathways and potential alternative explanations. The availability of a well-detailed agreed ToC provides a solid foundation for the theory-based approach, which increases the credibility of the approach.

- **Impact pathway analysis relies on access to sufficiently detailed and systematically organised programme data**. The theory-based approach requires a systematic verification of intermediary outcomes and intervention implementation. The evaluation's primary data collection is not exhaustive and therefore the evaluation relies on FFP to provide the necessary detailed data on the programme's implementation and intermediary outcomes. Therefore, the quality of the evaluation is dependant to some extent on these data managed by FFP.

- **The midterm data collection has a formative focus and is limited in scope.** We have collected data to address most evaluation questions in this report; however, we recognise this provides a preliminary assessment of the programme's impact pathways within its broader political economy and value chain context – it is not representative across Pakistan and does not provide a comprehensive assessment of the evaluation questions. Moreover, given the programme is still underway and has experienced delays, some components of the programme, such as public awareness activities, have only recently started and were still at the preliminary stages during the evaluation team's data collection.

- **The qualitative studies conducted at midterm are not intended to be statistically representative**. The district-level research is based on purposeful sampling, and within districts other sampling units (e.g. communities, consumers, programme intermediaries, producers, retailers) have been sampled purposefully. We do not collect representative data (either at the producer, retailer, or consumer level) on the production, availability, or consumption of fortified foods, or awareness of food fortification. Statistically, representativeness was not the aim; rather, we pursued the information-richness of the

[33] As discussed in Section 1.4 the evaluation team has provided DFID with options to disaggregate the findings by disability in the endline survey. DFID is still exploring with its procurement and commercial department whether it can proceed with the preferred option, which would require a contract amendment.

sampled units to address the research objectives. However, at endline we intend to collect data across all four provinces to understand the programme's performance across different contexts in Pakistan, which will strengthen the external validity of the findings.

- **The findings of the MTE are largely limited to evidence of FFP's operations up to December 2018.** Every effort has been made to incorporate data and evidence provided after this date to accommodate a constantly adapting programme.
- **The evaluation was not able to include the role of DFID and its influence or contribution** along the various impact pathways of the ToC, due to time constraints. It is intended for this report to be produced in time to feed into the programme's annual review process, which may be able to take such a macro view.

4 Relevance of FFP

4.1 Introduction

The relevance assessment seeks to answer the question of how well FFP is designed and suited in relation to achieving its objectives. The review will focus on the validity and comprehensiveness of the ToC and the assumptions that underlie it. The review will assess the extent to which these are aligned with current fortification evidence and good practice, and whether the ToC is appropriately adapted to the specific context of implementation in Pakistan (taking into consideration the public and private sector structures and organisations relevant for fortification, as well as the needs of the population sub-groups identified as a priority). Finally, we will review the extent to which the programme is adapting as new evidence and information becomes available. The four detailed evaluation questions to be answered are found in Table 3 and the underlying assumptions are found in Table 4.

The ToC went through various iterations over the initial years of the programme, and we have based our review on the most recent version (October 2018) – reflected in the description in Section 2.2.3.1 Previous versions of the ToC have not been reviewed. That said, the essential elements of the ToC have not changed and thus the consistency of terminology related to core elements of the programme within FFP documentation were reviewed to ensure that the ToC is understood by stakeholders. Primary data sources for the relevance review include published fortification literature and good practice guidance, and the contextual knowledge relevant to fortification in Pakistan, including a literature review, a review of programme documentation, and key informant interviews (see Table 2 for a list of data sources).

The extent to which the relevance review should be considered preliminary, and thus be revisited at endline, or definitive, depends on the likelihood of the local circumstances, and/or the factors that affect the assumptions, changing over time. Where available, evidence to address this question has been included in the review. Given the current state of evidence and the timeframe for the endline, we do not anticipate major changes to the evidence base or fortification good practice guidance from now to endline and so we expect this relevance review will prove to be a good reflection of the programme over its duration.

The relevance review identified specific areas where the ToC can be modified. These proposed modifications are explained in the narrative and are also summarised in Box 4 at the end of Section 4.

4.2 Validity and comprehensiveness of the ToC

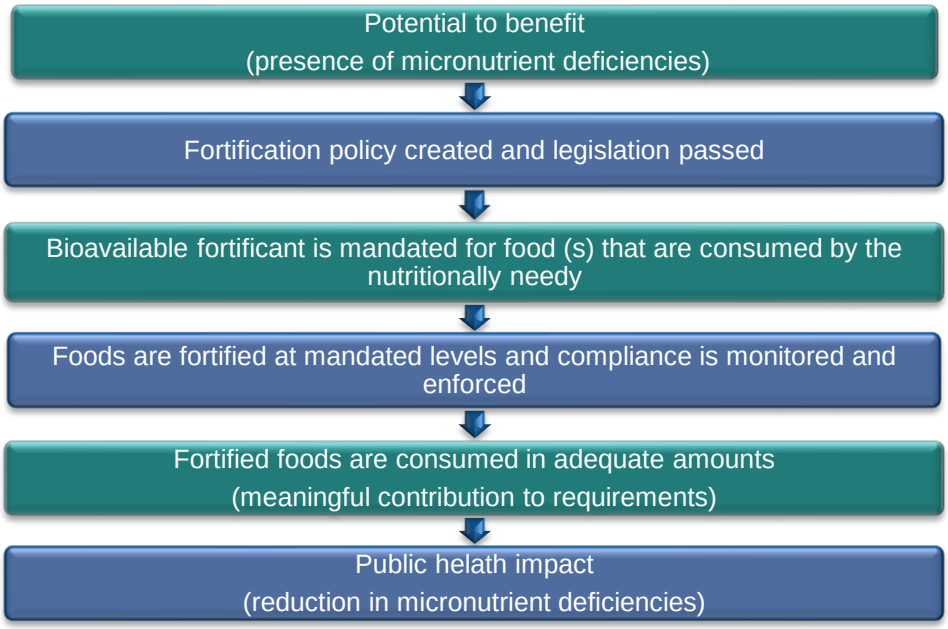
4.2.1 Framework for effective fortification efforts

Fortification – the addition of essential nutrients to staple foods or condiments – is conceptually simple yet reviews of existing fortification programmes have identified several critical elements that must come together for programmes to be effective. These factors have been reviewed and consolidated by experts (see, for example Martorell *et al.* (2015) and Martorell and Lopez de Romana (2017)) and illustrated in a simple impact pathway (reproduced in Figure 2 from Martorell *et al*. (2015)). The first condition for impactful fortification is that there is potential benefit to the population, i.e. there is a deficiency of the nutrients included in the fortified foods. Second, mandatory fortification is needed to ensure a 'level playing field' for industry, with appropriate policy and legislation in place to support it[xxxiv]. Choice of the food vehicle and the type of nutrient added are the third essential element. Not all forms of nutrients used in fortification can be readily

absorbed by the human body, and fortification policy should permit only premix containing nutrients that can be absorbed (i.e. bioavailable forms of nutrients). Similarly, it needs to be known who within the population are most likely to suffer from micronutrient deficiencies, and it is necessary to ensure that the food vehicles chosen are consumed in sufficient quantities to make meaningful contributions to micronutrient intake. This can only happen if foods are continually fortified at the levels mandated. Monitoring and enforcement of fortification are a critical component of effective fortification: this involves ensuring that standards are met consistently and providing 'disincentives' to industry non-compliance[xxxv,xxxvi]. Public health impact can occur only if a sufficient proportion of the population consumes adequately fortified food in a sufficient quantity over time to alleviate deficiencies.

Thus, food fortification programmes require data to inform appropriate design, and close collaboration among public and private sector entities. Successful programmes are those where different sectors hold joint responsibility for success, with clear roles, responsibilities, and accountability.

Figure 2 Simple impact pathway illustrating the elements that must come together for fortification programmes to be effective



Source: Martorell et al. (2015) (reproduced with permission – pending)

Table 3 Midterm summary answers to evaluation questions	
KEQ1: How well is the programme design suited to its objectives, the context, and the needs of its target population?	
DEQ1.1: Is the programme's ToC valid and comprehensive relative to what is required for fortification programmes?	In general, the approach taken by FFP, including public, private, and consumer workstreams and the activities included for each, is valid and aligned with fortification good practice. However, the approach is not comprehensive – it misses some actions needed for effective and sustained food fortification. One important gap is an insufficient focus on strengthening the enabling environment for fortification, bringing together leaders across all relevant sectors (i.e. government, industry, industry associations, civil society, consumer groups, academia) to foster commitment to, and alignment of, goals and approaches.

Table 3 Midterm summary answers to evaluation questions	
DEQ1.2: How relevant is the programme to the local public sector and producer context?	FFP's public sector focus on awareness-raising, knowledge transfer, and skills development, and strengthening of the systems needed for compliance monitoring and enforcement, are relevant. However, the approach is not sufficiently comprehensive to address some of the specific needs within each sector. Several examples: 1) for oil/ghee, there is a need to verify and advocate to ensure the standards are harmonised and any potential legal loopholes that might facilitate industry non-compliance with fortification are closed; 2) whether information and systems requirements of the public sector for sustained compliance monitoring and enforcement are adequately being addressed is underdeveloped within FFP's approach (see recommendations 3 and 8); 3) for producers, the appropriateness of the approach varies by industry (oil/ghee vs. wheat flour), given the nature of that industry and the varying regulatory environment of food fortification; 4) the FFP approach may be more appropriate in the 'build' phase[xxxvii] of fortification, rather than the 'sustain and improve' phase. Some programme activities are inadequately adapted to differences in the oil/ghee vs. wheat flour industry, and the potential for sustained and continual improvement may be constrained. For example, barriers to continued fortification compliance once subsidies are removed may vary by industry; this requires more in-depth understanding and possibly additional actions.
DEQ1.3: How relevant is the programme to the needs of the target population sub-groups?	Oil/ghee fortification has a high potential to reach the people of Pakistan, including WRA and children from six months to five years of age as per the ToC. Some questions remain, however, on the extent to which such benefits will be equitably distributed among all sub-groups, and particularly among those most at risk of deficiency. Further study is needed to understand and potentially address groups that may be missed if loopholes in mandatory fortification legislation exist (i.e. extent of bulk oil sales to consumers and industry). Under mandatory fortification, raising awareness and creating demand for fortification among consumers at national level is appropriate and FFP's approach to doing this follows several good practice principles. For wheat flour, the focus on roller mill flour is unlikely to modify national deficiency rates, given that the approach will not reach more than approximately one-quarter of the population, and evidence suggests the reach could be still lower among those most at risk of deficiency. While awareness-raising and demand creation are even more critical under non-mandated fortification, the population-based approach taken by FFP is not appropriate and may imply some risks for the reputation of food fortification in Pakistan. If effective, FFP may create demand for fortified wheat flour among consumers for whom no supply is anticipated (i.e. *chakki* mill flour consumers), which might turn people's attitudes against fortification. Efforts should be adapted to focus demand creation where supply will be met.
DEQ 1.4: How successfully has the programme adapted to the context of implementation and newly available evidence?	FFP has built and resourced, at the level of design, a learning approach that should permit continual programme improvement, i.e. the well-funded research component and the convening of an expert advisory group, the RTAG. To date, this potential has not been realised due to: 1) gaps in the generation of contextual knowledge to inform the design of several programme components; 2) delays in the initiation / completion of several studies that can provide needed evidence for programme adaptation; and 3) the fact that the approach and extent of dialogue within the RTAG has not fully utilised the expertise in the group to address specific design and implementation challenges.

4.2.2 Review of FFP's ToC in relation to the fortification impact pathway

FFP's ToC incorporates and elaborates on several of these critical elements in the context of Pakistan. **The roles and responsibilities of the public and private sector, as articulated in the ToC, are appropriate, and the programmatic approach outlined by the FFP is, for the most part, valid and aligned with fortification good practice**. However, the clarity and consistency with which elements of the ToC are described in documentation could be improved, and several aspects reflecting good practice could be made more explicit. Below, the key components for impactful food fortification, as illustrated in Figure 3, are divided into four criteria, and the strengths and areas for improvement of FFP related to each of them are described. Where needed, additional details related to the relevance of the public, private, and consumer pathways is provided in the following subsections.

1. Potential to benefit (presence of micronutrient deficiency) and clarity on who may benefit. The prevalence of micronutrient malnutrition in Pakistan was last assessed in the NNS in 2011[xxxviii]. The survey included the status of several micronutrients, including iron, vitamin A, and vitamin D. A high prevalence of deficiency exists among WRA and children under five years of age. Approximately one in four WRA are iron-deficient, one in two are anaemic, close to 40% of WRA have moderate or severe vitamin A deficiency, and over 60% were found to be vitamin D-deficient. Iron and vitamin A deficiencies affect approximately 50% of children less than five years of age, with closer to 60% affected by anaemia and vitamin D deficiency. **The programme has the potential to address these deficiencies through the inclusion of iron in wheat flour, and vitamins A and D in oil/ghee**. The programme seeks to create demand for fortified foods and identifies WRA and children as its primary focus.

   The NNS 2011 provided data disaggregated by urban and rural areas, finding slightly higher prevalence of vitamin A deficiency in children under five years of age and WRA from rural, rather than urban, areas. Iron and vitamin D deficiencies and anaemia, however, tend to be high among women and children in both areas. There was evidence of variability for some indicators by province, but not consistently by nutrient. Data disaggregated by economic status or other potential risk factors for inadequate nutrient intake were not provided by the NNS 2011. Without further disaggregation there are limitations in the ability to determine whether the programme is likely to reach those at risk – this will be addressed further in relation to potential to meet consumer needs. A national nutrition survey is underway, powered to provide district and provincial estimates of deficiency prevalence and determinants. This will provide much-needed updated data related to the magnitude and distribution of the problem, with the granularity needed to inform more targeted efforts.

   Within the documentation, the **terminology could be clearer as regards who may be most likely to benefit from FFP and who is the 'target' of FFP-specific activities, and there could be greater consistency within all ToC and related documentation on who these groups are.** By the very nature of the intervention, food fortification is not a targeted approach; however, specific sub-groups may have greater potential to benefit. Being clear and consistent in this terminology, and appropriately identifying these groups, can help set appropriate expectations for food fortification both within FFP itself and among stakeholders nationally. Fortification should be appropriately framed within a broader strategy to address the nutritional status of the population, and clarity on who may, and may not, benefit from fortification is critical to ensure that additional strategies can be put into place if and when needed. Within the ToC itself, the identification of WRA and children under five years of age is mostly appropriate; however, the prioritised groups with high potential to benefit from fortification are inconsistently identified across FFP documentation. Other groups, including adolescents, adolescent girls, pregnant women, and pregnant and lactating women, are also identified in some documents. Children under six months of age should not be included among those with

the potential to benefit from fortified foods as this may undermine other efforts in Pakistan to protect and promote exclusive breastfeeding. While we recognise that this group is not included in the results, programme demand creation and documentation should also consistently exclude them. Similarly, the high nutrient requirements, specifically iron, during pregnancy and early lactation will not be met through the consumption of fortified foods, and other programmes are in place in Pakistan to address this (iron folic acid supplementation). Again, including pregnancy and lactation within the message related to the potential benefits of fortified foods should be avoided to ensure that these efforts are not undermined.

2. Selection of the food vehicles: mandated fortification with bioavailable fortificant. Consumption of wheat flour and oil/ghee is almost universal in Pakistan. According to the 2017 FACT survey[xxxix] 91% to 100% (depending on province) of households consume wheat flour and 100% of households consume oil and/or ghee. **For oil/ghee, in theory fortification should reach essentially all households in Pakistan**. It should therefore be reaching those most at risk of deficiency, making it an appropriate food vehicle for fortification. **For wheat flour, the FACT survey estimated that approximately 24% of households in Pakistan consume roller mill flour,** and therefore fortifiable flour under FFP, slightly higher in Sindh (33.2%) than Balochistan (16.6%) and Punjab (18.0%). The implications of this for the potential to achieve the programmatic goals is discussed further in the effectiveness section (Section 5).

   Fortification of oil/ghee has been mandated for several decades. The standards published in 2012[xl] apply to all oil/ghee that is packaged (up to 16 litres) and provide full details of required fortificants (vitamins A and D), levels, and packaging specifications. The fortificants for vitamin A[xli] and D[xlii] are aligned with those recommended for oil/ghee fortification. Note that oil that is sold in other presentations and/or quantities does not fall under the current mandatory fortification standard.

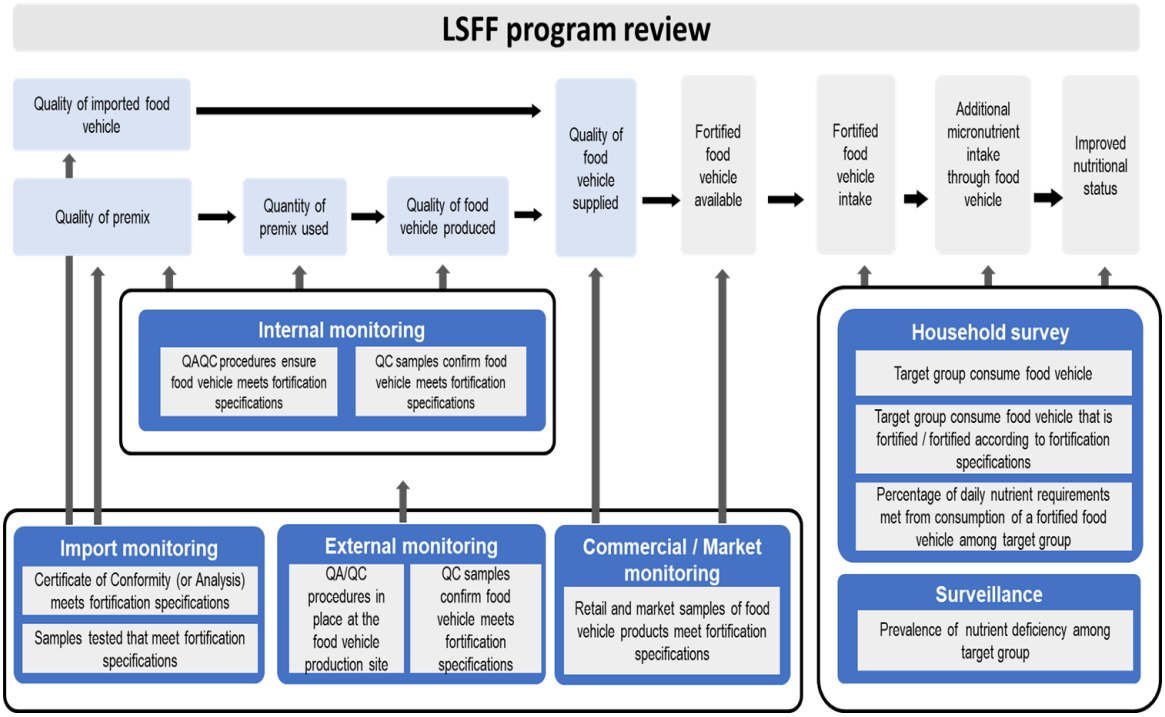
   For wheat flour, the Pakistan Standard Specifications for Fortified Wheat Atta[xliii] indicate the inclusion of iron, folic acid, zinc, and vitamin B12. The standard was published in 2017 and provides specifications for the types and quantities of nutrients to be included. This is particularly important for iron as the bioavailability and cost of nutrient type varies substantially. The standard specifies the use of sodium iron ethylenediaminetetraacetic acid (NaFeEDTA). While often more expensive than other fortificants, NaFeEDTA is considered appropriate due to its high bioavailability, particularly for whole-wheat flours.[xliv]

   Thus, the foundations are set for fortification with appropriate bioavailable nutrients, but there may be several areas for improvement in order to maximise the potential for impact. **Appropriate related activities within the FFP ToC include awareness-raising and technical support** for updating and harmonising provincial standards for oil/ghee, and driving towards mandatory fortification for wheat flour.

3. Continual monitoring and enforcement. Identifying and acting to ensure adequate fortification to standard, through continual monitoring and enforcement, is a critical step in the pathway to impactful programming. The challenges in achieving and sustaining fortification to standards, even under mandatory fortification, are well documented.[xlv] **FFP's ToC addresses several key elements related to monitoring and enforcement, including technical support and the strengthening of processes and laboratories** to standardise and enable the public sector to monitor and enforce food fortification. Many of these activities are well aligned with the required structure for effective monitoring (Figure 3), and with good practice (Box 3). FFP is following many of these good practice elements, supporting both internal (factory-level) and external (government) monitoring through training, on-the-job support, and the provision of materials and laboratory equipment. The focus on laboratories – both cluster labs to support internal monitoring activities, and technical support, training, and equipment to overcome barriers for successful external monitoring – is an additional strength.

However, the first two principles listed in Box 3 – simplicity and use of existing forms and systems – may not be fully met. **The linkage of subsidy payments to programme monitoring data has created an additional level of complexity, and if not managed carefully this could draw attention away from supporting the sustained capacity required for routine monitoring**. The extent to which FortIS can be repurposed when subsidies end to meet the needs for monitoring and enforcement by government authorities is not apparent in FFP's documentation or activities.

Figure 3 Overview of data sources and utilisation for effective fortification monitoring and enforcement



(LSFF = large scale food fortification)

Box 3 Good practice identified to favour effective monitoring and enforcement[xlvi]

1. Simplify the process for compliance data collection and management.
2. Include fortification in existing food safety mandates and inspection forms.
3. Identify and implement effective incentive and penalty schemes for industry.
4. Increase the role of civil society and consumer groups.
5. Establish clear roles, responsibilities, and working environments for government inspectors.
6. Ensure a trained cadre of inspectors.
7. Elevate the public profile of fortification to motivate government to improve compliance.

4. Fortification of food to mandated levels. A sustainable supply of adequately fortified wheat flour and edible oil/ghee is the primary outcome of FFP, as clearly articulated in the ToC. Working with the private sector to achieve this is the central focus of FFP activities. **The ToC clearly articulates several key steps in recruiting and incentivising mills to fortify, covering awareness-raising and the provision of technical support, equipment, and supplies** (i.e. premix on a sliding subsidy scale). These activities are well aligned with those

that are needed to convince and enable mills to initiate food fortification. Given current knowledge and good practice, however, the **ToC does not sufficiently and explicitly refer to activities to ensure the sustained production of adequately fortified foods.** Actions that might be needed to incentivise producers to overcome barriers and adequately fortify food in the long term may differ from those needed to initiate fortification. FFP's activities relating to the private sector are primarily focused on fortification initiation (knowledge of fortification and relief of start-up costs). However, how this will transition to sustained and adequate fortification in time when those start-up barriers are overcome is not articulated in the ToC. This is a complex challenge across most fortification programmes, which has been under-appreciated until recently[xlvii,xlviii]. There is no single best approach to address this and several additional specific comments will be made in the private sector section below.

4.2.3 Critical assumptions missing from the ToC and proposed changes in existing assumptions

The assumptions underlying FFP's ToC are appropriate and comprehensive as regards factors that may influence the potential to achieve results. One minor modification is suggested:

- The assumptions regarding a price increase affecting uptake and competitiveness compared to alternatives refer to the same issue – whether the addition of fortification modifies consumers' willingness to purchase. It is suggested, therefore, to merge these into a single assumption, in the interests of simplicity.

4.2.4 Plausibility of underlying assumptions

Table 4 Plausibility review of ToC assumptions

Assumption	Plausibility	Evidence and justification for assessment
Sufficient amounts of fortified wheat flour and edible oil/ghee are consumed	Wheat flour: Population of Pakistan = very unlikely Consumers of roller mill flour = likely Oil/ghee = likely	Data from FACT 2017 shows that the potential intake of iron from roller mill wheat flour **at the population level within Pakistan is 0%** of the recommended daily allowance (RDA) for iron among **consumers of roller mill flour; adequate fortification can provide approximately 25–30% of the RDA**, an appropriate and potentially impactful contribution intake. Oil/ghee fortification can have a significant impact on the intake of A, including among WRA and children under five years of age, assuming all oil consumed by them is fortifiable [1].
Market share of industrially produced fortifiable food vehicles is as expected	Wheat flour = unlikely for original targets; likely for revised targets Oil/ghee = likely (but requires verification)	FACT 2017 showed that the coverage of roller mill wheat flour is lower than what the programme expected at its onset. However, since data from FACT 2017 and FFP's RDS became available FFP has revised its expectations and targets. For oil/ghee FACT 2017 data identified close to 100% fortifiable consumption – based on a pattern of purchase of industrially produced oil. However, a potential loophole in the mandatory fortification of oil has been identified (i.e. oil sold in bulk). This is recognised by FFP, which has included activities to address this in terms of sale of oil to the food industry. However, the extent to which such oil is directly sold to consumers (for example, in informal markets) requires verification and, if confirmed, innovative approaches are required to close the loophole.
Changes in price of fortified products does not affect uptake	Likely in short term Uncertain in long term	Fortification implies only a small addition to the cost of production of both oil/ghee and wheat flour. For wheat flour, the financial incentives provided to industry (equipment and premix subsidy) likely offset most of these start-up and initial production costs. In the event of a price increase, the extent to which this may affect uptake will depend on the existence, cost, convenience, and acceptability of substitutes. Whether in the event of a price increase

Assumption	Plausibility	Evidence and justification for assessment
		in the long term it is feasible for consumers to shift to, for example, *chakki* flour is unknown at this time without a more comprehensive assessment of the availability and price of alternatives on the market specifically in those markets accessed by roller mill flour consumers. For oil/ghee, similarly, the premix subsidy offsets production costs. In the short term, therefore, there is no anticipated increase in the price of fortified foods. Whether industry is fully willing and able to absorb the cost of fortification, or is likely to pass this along to the consumer, must be re-assessed at endline, particularly as part of the sustainability assessment. Whether FFP is successful in ensuring all fortifiable oil is fortified (i.e. creating a level playing field for oil industry) is likely to be an important determinant of long-term price changes related to fortification.
Fortified products are adequately packaged, stored, and distributed after production	Likely	Wheat flour and oil/ghee are fast-moving consumer goods, therefore there are no anticipated risks of nutrient deterioration during shipping and storage. vitamin stability in oil/ghee is favoured by translucent packaging – whether all industries are compliant with this consideration for all oil types produced and fortified requires further exploration. The extent to which inadequate packaging affects vitamin level depends on the duration of storage and exposure to light; thus further information related to these considerations is needed for the final plausibility assessment.
Fortified products remain competitive compared to substitutes	See price assessment above	
The producers are willing to engage with FFP and sustainably allocate dedicated and relevant staff and resources to support fortification and QA/QC processes	Mixed	FortIS data provide evidence on increasing engagement with industry, with a high proportion of the targeted mills with signed MoUs and a substantial increase in the production of fortified wheat flour and oil/ghee. Progress has been slower than expected however, and the extent to which key components, such as the signing of MoUs, are creating the commitment to a sustained allocation of staff and resources is as yet unclear. FFOs are at the centre of this engagement, which is both a strength (in regard to the potential to provide personalised and continual support) and a risk if their knowledge and skills (both technical and in engagement and advocating) are not fully and consistently developed and applied. The midterm review suggests that there may be some gaps in this regard. Midline interviews suggest some hesitation to engage on the part of mills, in part due to uncertainty regarding whether there will be sufficient demand for fortified foods from consumers. This is particularly of concern for wheat flour. QA/QC processes to date, including the consolidation of data within FortIS, are highly centred on the information and processes needed for subsidy payment, and the extent to which this will translate into lasting processes within industry is unknown at this time. Good practice suggests that this may be unlikely unless a more robust linkage can be built for food control agency monitoring and enforcement activities.
No premix stock-outs occur, and premix price remains as agreed	Likely for quantity available Unlikely for price	FFP works closely with mills to accurately forecast premix requirements. The programme has been successful in maintaining the supply of quality premix despite several factors outside of its control (e.g. the BASF premix plant fire). This has been accomplished by adding a second supplier and requiring minimum stocks to be held in Pakistan. The price of premix for both oil/ghee and wheat flour has increased substantially, in part due to shortages on the market, and due to the fluctuating value of the rupee.
Microfeeder suppliers	Likely	FFP has engaged Buhler, which maintains a sales office in Pakistan

Assumption	Plausibility	Evidence and justification for assessment
provide microfeeders in accordance with agreed timeline		(Lahore), to supply the specified microfeeders. The company has an established process for supplying microfeeders in accordance with the agreement it has with FFP. To date, Buhler has been in a position to supply microfeeders according to plan. (Delays have been minimal and were attributed to delays in getting mills up and ready for installation.)
Cluster and central labs have all relevant resources needed to provide QC services	Likely	The systems set up for QC, including cluster labs for anonymised sample testing, appear to be working well, with no evidence that the results of these tests are being contested by millers. Similarly, the use of private sector labs for external testing is functioning well.
Industry associations are committed to food fortification, supporting member enrolment, coordination, public advocacy, training, monitoring, and QC	Unlikely	Communication between FFP and the industry associations (PVMA, PFMA) has not been sufficient to foster their support and to explore ways in which they can contribute to advancing fortification This is reflected at the level of FFP's ToC in the lack of specific objectives and actions to engage and strengthen the enabling environment for fortification, including leadership from all relevant stakeholders (including millers' associations).
Food regulatory bodies have clearly defined roles and responsibilities	Likely	The roles and responsibilities of food regulatory bodies are well defined and appropriately addressed within FFP's awareness-raising and training activities.
Governments have, allocate, and utilise sufficient resources to monitor and enforce food fortification, and operate/maintain public labs and their equipment	Unlikely	FFP has provided equipment for public sector labs – which should be a critical component for ensuring long-term capacity for monitoring and enforcement. However, the extent to which sufficient resources (both financial and human) will be allocated by the public sector to ensure consistent utilisation and maintenance of the equipment is unclear at this time, as are the structures within the public sector for the collection and management of the resulting data for monitoring and enforcement. FFP has put substantial effort into the development of the FortIS system, but active engagement with government to explore needs and opportunities, and to ensure that the system can be adapted and adopted for its needs on FFP's completion, appear to be absent.
Transfers of government officials do not hamper monitoring and enforcement	Unknown	At this stage, it is too early to determine the extent to which staff turnover and other movements of key stakeholders within government may hamper monitoring and enforcement. This assumption should be re-assessed as government takes on leadership and as the focus of monitoring activities moves away from subsidy payment-tracking.
Effective government-led coordination in support of food fortification takes place	Unlikely	Trust and coordination among the many stakeholders relevant for fortification are the cornerstones of successful and sustainable food fortification programmes. Structures are required that build this trust and empower government to take the leadership role in coordinating these efforts. Often referred to as the enabling environment for fortification, specific objectives and activities for this go beyond specific roles and responsibilities of monitoring and enforcement. Such activities are insufficiently developed within FFP's activities to support the development of, and stakeholder acceptance and alignment with, this coordination.
The public awareness messages reach the right decision makers regarding food purchase and consumption in the household	Mixed	The public awareness activities have several strengths: for example, in their diversity of audience and the diversity of media to reach them. However, the consumer study results highlight the role of men as key decision makers with regards to the purchase of wheat flour and oil/ghee (brand, frequency, location). While men may be exposed to media, the current approach, particularly for wheat flour, may have a negligible impact on their purchasing patterns and a more targeted approach to creating demand among roller mill consumers may be required.
Media and advocacy messages are appropriate and	Mixed	In terms of the media campaign, TV advertisements are well-received according to consumer survey results but the coverage and potential exposure using cable TV channels may have limited

Assumption	Plausibility	Evidence and justification for assessment
meaningful for intended audiences, and are correctly transmitted		reach. Similarly, TV ads are perceived by many as product promotion and thus their appropriateness for broader fortification awareness-raising is uncertain. Results also suggest that mobile messaging may have limited potential due to the high proportion of illiteracy (particularly among those most at risk of deficiency) and the lack of attention paid to text messages in general. The interpersonal communications through LHWs may similarly have limited potential, due to low coverage among potential decision makers and evidence that suggests that messages may not be transmitted further among household members. The messages themselves may also create some confusion by combining information on the fortification of wheat flour and oil/ghee without further information to help consumers understand where and how to access the products. In the case of wheat flour, this could be particularly problematic if demand is created where no supply will be available (i.e. among consumers of *chakki* flour).

1. The 2017 FACT survey did not include KP due to delays in obtaining permissions for fieldwork.

4.3 Relevance of FFP for the public sector in Pakistan

4.3.1 Government involvement

Fortification experience and evidence indicates that successful fortification programmes are those that are mandated, and that have strong political commitment and joint ownership among stakeholders.[xlix,l] For the public sector, and specifically government, primary roles and responsibilities include: the development and passing of legislation and accompanying standards; external monitoring of fortification; and enforcement in line with standards. **FFP's activities within the public sector pathway encompass appropriate activities that are directly relevant to promoting and developing the skills and structures within the government in support of these responsibilities**. These include advocacy for mandatory fortification and harmonisation of standards; awareness-raising; equipping of public laboratories; and TA for effective monitoring and enforcement. The development of a system that enables compliance monitoring and enforcement is one of the critical elements of good practice noted in Box 3. Information needs for the subsidy payments is a high priority now, and FFP has put substantial effort into the development and utilisation of FortIS for this objective. Whether **FortIS can and will be adapted and adopted by government for monitoring and enforcement data collection and management after the programme ends is not clear**. Close engagement with public sector counterparts to fully understand their information needs and systems functionality requirements is needed, and the extent to which this will be prioritised is not apparent within the ToC activities.

Thus, the specific activities are highly focused on raising awareness, knowledge transfer, and skills development, and on strengthening the necessary systems – all critically important for successful fortification. In addition to these, however, partnerships and trust among stakeholders – particularly (but not only) in the private and public sectors – is the cornerstone of successful food fortification. Global experience has also shown that impactful and sustainable programmes are those in which multiple stakeholders have become actively engaged and are champions for fortification – including parliamentarians and other policymakers, private sector leaders (including heads of millers' associations), members of the national scientific and research communities, medical doctors, media leaders, and other communicators, and members of consumer associations.[li] **Specific objectives and related activities explicitly designed to build such an enabling environment are lacking in the FFP ToC and activities**. In order to build such opportunities for engagement and championing, a strong recommendation, based on experience and good practice, is the creation and fostering of a food fortification alliance that engages stakeholders across all

relevant sectors.[lii] This aspect is underdeveloped within the FFP ToC and related activities. Addressing this explicitly at the level of the ToC is particularly important in Pakistan due to: 1) the long history of fortification efforts with mixed success, which may have created some diversity in the openness and support for fortification; and 2) the potential additional layer of complexity of decentralised food legislation and control. For the latter, how FFP's activities and focus will be adapted, and the nuanced manner in which this may need to be captured to assess progress within monitoring indicators for example is not apparent at the level of design.

4.3.2 Civil society and academia

As noted above in relation to global experience, the public sector that is relevant for food fortification engagement goes beyond government and includes CSOs and academia. Several examples of good practice exist of cases where civil society has become a strong partner in advocating for mandatory food fortification and a 'watch-dog' to hold government and industry to account in regard to their respective roles and responsibilities.[liii] FFP has developed a public awareness campaign and is engaging with CSOs on its implementation. **This is an important strength as it could facilitate appropriate adaptation of the awareness-raising activities to the local context in which the CSOs work. Engaging consumer organisations, at the level of senior leadership, to support advocacy efforts and put pressure on the public and private sector, at the level of policymakers and business leaders, to support fortification generally and to drive activities is a missed opportunity.**

Similarly, creating strategic alliances with the research community can foster the prioritisation of decision-focused research needs to inform design/ implementation modifications. A strong example of such collaboration around sugar fortification with vitamin A has been well documented in Guatemala. In this context, a team of researchers worked in continual partnership with the government and the private sector, to identify and resolve specific implementation and decision-focused evidence gaps to improve the quality of the programme. At the same time, they used the evidence to successfully lobby the government to mandate, and enforce, fortification, by showing evidence of the devastating effects of vitamin A deficiency on the population.[liv] A similar model was used to inform improvement of a programme distributing fortified foods, along with many other programme benefits, to women and children in Latin America.[lv] In this model, the research partner worked in continual accompaniment with the programme, in a full partnership, reviewing priorities, progress, challenges, and opportunities to identify and resolve design and implementation issues in a timely manner. Close and continual collaboration helps ensure that recommendations derived from studies are relevant and feasible as programme adaptations. FFP convenes a large group of stakeholders from several organisations working in fortification, and national and international experts, through the RTAG, who provide input to studies implemented as part of the programme. **The approach is valuable as regards receiving inputs and advising on the details of studies, but falls short of the type of 'thought partnership' to develop options collaboratively and jointly for programme improvement** as described in the examples mentioned.

4.4 Relevance of FFP for the private sector

4.4.1 Overall approach – relevant for oil/ghee and wheat flour

In general, **the main components of successful private sector engagement for the initiation of food fortification have been incorporated into FFP.** Specifically, the programme focuses on raising awareness among mills and advocating for fortification; providing start-up incentives, including equipment and premix; and the provision of TA around fortification and QA/ QC-related procedures. One particularly strong feature of the approach used by FFP is the individualised attention, follow-up, and opportunities for relationship-building with mill owners and staff through

the FFOs. Through this approach, FFP goes beyond the 'knowledge transfer' approach often taken in fortification training for millers and creates the opportunity for continual technical support and context-specific problem-solving. Seeking the signature of MoUs with mills is also a vital component as it can foster the high-level support (i.e. of owners and senior management), commitment, and ownership needed among all mill staff engaged in fortification. However, **the dual role that FFOs play (they also facilitate the government compliance monitoring) could undermine that trust, and possibly open the door to perceived or even real conflicts of interest for FFOs**.

Finally, FFP, at the level of its ToC, uses a common approach across the two commodities, oil/ghee and wheat flour, yet the political economy of the commodities differs substantially. In some instances, **an approach specifically adapted to the circumstances of each food industry and the related current state of legislation may have permitted a more effective and efficient approach**. Considerations specific to each commodity are addressed in the following two subsections.

4.4.2 Private sector approach: oil/ghee

Under mandated fortification, a substantial number of mills were already fortifying at least some of their oil/ghee prior to commencement of FFP. At the time of the 2017 FACT survey, household coverage of fortified oil/ghee was 20.2% in Sindh, 31.3% in Punjab, and 39.2% in Balochistan.[lvi] Out of the 149 brands of oil tested, only 19% were fortified within the standard range, an additional 50% were fortified at a level too low compared to standard, and the remaining 31% were not fortified. This highlights that **before FFP began many millers were aware, able to procure premix, and willing to fortify, and many were fortifying**, **with an important gap in compliance with fortification levels**. In this context, and given that mandatory fortification of oil for human consumption is in place, the approach taken by FFP to increase fortification may not be addressing the primary barriers to achieving higher compliance with fortification.

These findings suggest that awareness is unlikely to be a major barrier to oil/ghee fortification, and that fortification start-up is only required in a proportion of mills. For many, efforts are needed to focus on compliance with fortification levels – starting with an understanding of why mills are not fortifying within standard ranges. Experience shows that this may be related to technical capacity, in which case the support from FFP may suffice. However, experience also suggests that there may be other motivational factors needed, including both incentives for adequate fortification (e.g. financial, public recognition, other), as well as disincentives for non-fortification or non-compliant fortification (e.g. fines, public denouncement, other).

As noted above, building the enabling environment with buy-in and dedicated support from millers' associations and other stakeholders may also provide incentives/ disincentives. A **profound understanding of these potential barriers and opportunities, and an intervention design which responds directly to them, was lacking in the design phase of FFP**. Several of these issues have now been addressed in the (flour) millers incentives study but are lacking for oil millers. The results support evidence from elsewhere that under mandatory fortification, incentives and disincentives for adequate and sustained fortification must extend before financial incentives. If these results hold true also for oil/ghee, it may suggest that the approach requires some mid-programme course correction to maximise the potential for long-term commitment to adequate fortification among millers.

4.4.3 Private sector approach: wheat flour fortification

While progress has been made (see Section 5.4), the continued need for fully mandated and enforceable legislation for wheat flour fortification across Pakistan puts wheat flour fortification in a

challenging position. Good practice examples and suggestions exist for 'market-driven fortification'.[lvii] However, the drive to push forward mandatory legislation, and the nature of the food vehicle, leaves wheat flour in Pakistan somewhere in between mandatory and market-driven fortification, with a unique set of challenges. FFP's approach, including support to industry in anticipation of mandatory legislation, is therefore justified. In this environment, the provision of equipment (microfeeders) and the sliding subsidy for premix is based on the assumption that cost is a major barrier to millers beginning to fortify wheat flour. This is not an unreasonable assumption, although the recent millers incentives study did not show a strong preference for such an incentive package over alternatives. As with oil/ghee, it is unfortunate that in-depth information related to incentives and disincentives – including but not limited to financial incentives – was not available at the time of programme design.

Within the current design of FFP, there are several strengths that can be highlighted. First, **the sliding scale of premix subsidy, rather than direct unconditional subsidy, is consistent with good practice**. For the provision of equipment, cost-sharing is considered vital to support buy-in and generate ownership of the programme from mill owners. **By ensuring that mills pay for extended warranty and related fees, FFP has adopted this cost-sharing approach within the procurement policy constraints of the DFID grant**. That said, **the extent to which these activities, supported by the signing of MoUs, will create the ownership of fortification by millers required to sustain and ensure adequate fortification beyond the duration of the subsidy is unclear**. Previous efforts to support wheat flour fortification in Pakistan provided training, equipment, and premix (albeit at a much smaller scale), and it is not evident the extent to which the current design has fully understood previous barriers to the sustained production of fortified wheat flour, and adapted to overcome them. The results of the millers incentives study now provide insights into these potential constraints and opportunities, and can be used to adapt FFP as needed.

4.5 Relevance for population sub-groups

4.5.1 Selection of appropriate food vehicles

As noted previously, appropriate food vehicles for fortification are those that are consumed regularly in sufficient quantity to provide a meaningful contribution to nutrient intake, particularly among those that are most likely to suffer from inadequate micronutrient intake, and thus deficiency. In Pakistan, **oil/ghee is an appropriate food fortification vehicle to increase nutrient intakes and reduce micronutrient deficiencies of the people of Pakistan.** According to FACT results, 100% of the population consume oil/ghee, and almost 100% consume it from industrial production, meaning that almost universal coverage of oil/ghee fortification should be feasible across the country. This implies that oil/ghee fortification should be equally appropriate among those who are at highest risk. Again, the FACT results corroborate this assumption as they show that rural and low-income people, and those living in abject poverty, are equally likely as their urban, higher-income, and non-poor counterparts to consume fortified oil/ghee.

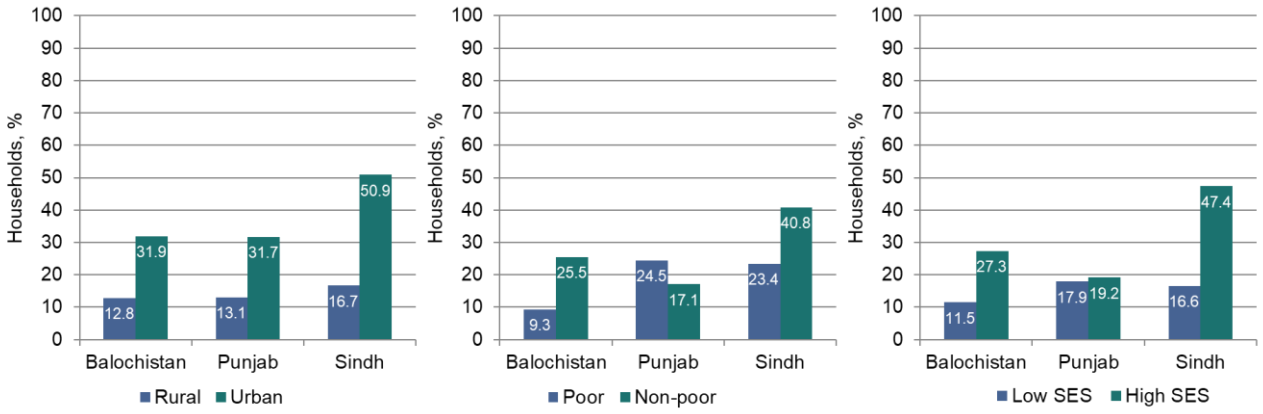
The one potential risk, however, is that, officially, the oil/ghee fortification standard appears to apply to packaged oil,[lviii] creating a potential loophole for non-fortification of any oil that is not sold within those packaging specifications. The sale of loose oil has been banned in Punjab[lix] and sources have noted that there is an effort to ban it in the other provinces as well. The **sale of loose oil on the market poses an important and direct risk for the potential for impact of oil/ghee fortification, particularly among the most at risk of vitamin A deficiency** (i.e. the poor) if the industry takes advantage of this standard loophole to avoid its fortification. FFP has recognised the production of loose oil and has begun dialogue with the industry and with the public sector to push for fortification of all oil intended for human consumption. The extent to which loose oil is sold

directly to low-income consumers requires verification – something that could be done as part of the RDS and the benefits incidence analysis. If the production and sale of unfortified loose oil directly to low-income consumers is corroborated, adaptations to FFP's targets and related activities may be required to achieve its intended impact, and advocacy efforts will need to be redoubled to harmonise standards and rules and close the apparent loophole.

Wheat flour is a staple food in Pakistan, consumed by close to 100% of households across regions according to the 2017 FACT survey. However, wheat flour from roller mills is consumed by a much smaller proportion of households – approximately 24% according to the FACT survey. Among those consumers of roller mill flour, the estimated nutrient contribution based on FACT results is substantial, even among WRA and children from six months to five years of age. However, because this represents only a quarter of the national population, even a reduction in the prevalence of deficiency within this sub-group is unlikely to modify national prevalence estimates. These findings are within the same range as estimated in FFP's benefits incidence analysis.[lx] Thus, **fortification of roller mill flour has limited potential to make a substantial contribution to increased nutrient intake and the reduction of micronutrient deficiencies of the people of Pakistan.**

Based on several risk factors, **those most at risk of micronutrient deficiency may be less likely to consume roller mill flour.** Figure 4 illustrates, using FACT 2017 data, that across the three provinces rural consumers are far less likely to consume roller mill flour than their urban counterparts. Using two measures of economic well-being, in Balochistan and Sindh the poor are less likely to consume roller mill flour. In Punjab those living in abject poverty are slightly more likely than the non-poor to consume roller mill flour, yet they still only represent a quarter of those living in poverty in that province. The differences in tendencies by reported income in the benefits incidence analysis is not entirely surprising. Estimating income in field studies is complex. Many researchers suggest that scales that reflect economic well-being are more accurate, as they do not rely on the memory and/or knowledge of the respondent, and they avoid the potential reporting bias of socially desirable responses. It is for this reason that two indices were used in the FACT survey – one a validated measure of abject poverty (the multidimensional poverty index (MPI)),[lxi] the other a validated methodology to provide a ranked order of economic well-being within the survey sample.[lxii]

Figure 4 Household coverage of fortifiable (roller mill) flour use by province and several risk factors



[1] All values are % as indicated and are weighted to correct for unequal probability of selection.
[2] Fortifiable wheat flour (from roller mills) refers to industrially produced wheat flour from sources other than *chakki* mills. The FACT 2017 survey collected information to distinguish the source of industrially produced wheat flour as being from *chakki* mills or from other sources; roller mills were not specifically included as a response option.
[3] Socioeconomic status defined as low for the lowest two wealth quintiles and high for highest three wealth quintiles.
[4] Defined as poor if MPI ≥ 0.33 and non-poor if MPI > 0.33.
[5] Comparing at risk vs. not at risk, $p<0.01$.

Source: 2017 FACT survey.

4.5.2 Approach to demand creation

In principle, minimal demand creation is required under mandatory fortification, yet demand creation can be a powerful addition as good practice suggests that consumer demand may be an important driver of industry compliance.[lxiii] This is appropriately recognised by FFP as part of the justification for this component. Similarly, raising awareness of fortified foods becomes important in a context like Pakistan where innovative approaches are needed to foster acceptance of fortified foods and dispel distrust among consumers. Within FFP's demand creation approach, the **key messages are aligned with corresponding programme objectives, specifically to promote positive perceptions among consumers towards fortified food.** FFP has identified several primary audiences for its messages, and a multiple-channel approach to reach them. Although some principles of good practice for creating demand for a product – such as the commercial marketing principles[lxiv] of product, placement, price, promotion – are not explicitly outlined, **several aspects of good practice have been applied in the design of the communications approach**. These include the segmentation of audience (including women, men, other decision makers in the household, community leaders etc.) and the identification of appropriate diverse channels to reach them (e.g. mass media, local media, schools, interpersonal communication).

For oil/ghee, the approach, if implemented with high quality, should have the potential to reach the intended audiences. However, in line with good practice, the **messages and materials, and the channels used for their communication, should have been pilot tested to verify the extent to which they are relevant and comprehensible, and the extent to which they are likely to be effective in achieving their demand creation objectives**. The ongoing advocacy effectiveness study should provide some insights into the potential of these approaches, but ideally this should have been completed before roll-out of this component. The study also does not appear to test the messages themselves, and whether some adjustment may be more effective in promoting the desired behaviours.

For wheat flour, FFP has similarly articulated objectives related to raising awareness and acceptance of fortification, with an approach that is similar to that noted above for oil/ghee. The approach is thus subject to similar strengths and weaknesses. However, there is an important additional consideration for wheat flour. FFP has explicitly indicated that the goal is not to seek to change behaviour related to the preference for *chakki* flour. This is reasonable given the national wheat flour market and strong preference for *chakki* flour among a substantial proportion of the population. However, **it draws into question the relevance of a population-based demand creation approach, rather than identifying and purposefully targeting those most likely to be consuming roller mill flour**. In fact, **creating demand at the population level may put the fortification programme at risk by creating demand for a product that will not be available to the majority of wheat flour consumers in Pakistan** (i.e. all those consuming *chakki* flour). Targeted demand creation efforts are feasible, and the greater the ability to characterise the intended target population, the more likely it is that these can be effective – for example, by exploring further the household and geographic characteristics of roller mill flour consumers. An **additional area that could have been explored through studies is the potential to create demand for fortified flour from the food processing industry.** The extent to which fortified foods could reach those at highest risk of deficiency, through processed wheat flour containing foods, has not been adequately addressed to date. Data from the next RDS should provide some indication of consumption patterns.

4.6 Adaptability of the programme

The inclusion of a well-financed research component, with the opportunity to commission targeted studies to inform programme improvements and research results, is an important

strength of FFP's design. Unfortunately, the potential of this component to inform both design and continual improvement has not been realised to date, primarily for three reasons.

First, **the utilisation of local, contextual evidence to inform aspects of design has not been optimised.** As noted in the previous sections, information on potential motivating and demotivating factors for industry compliance with fortification, including financial incentives, should have been obtained prior to designing the specific incentive packages for industry. This should have been prepared separately for oil/ghee and for wheat flour, to explore the extent to which these vary, and the implications for the programme design. Similarly, the demand creation review revealed that formative research and testing to ensure the high potential for impact of messages, audiences, and channels for the demand creation component was sub-optimal.

Several relevant studies have subsequently been designed and implemented, but not in a timely manner, and it is not clear the extent to which the results can lead to a modification of the programme components in a meaningful way at this time. For example, the incentives study showed significant differences in flour industry preferences under mandatory and non-mandatory fortification. It also emphasised that non-financial incentives may have a higher value in regard to motivating compliance than financial incentives, particularly for the oil/ghee industry. These results require, if not modifications, at least additions to the approach taken by FFP, and, if they are not addressed, this may have important implications for programme sustainability once financial incentives are removed. Generating similar evidence for incentives and disincentives – financial and non-financial – for adequate fortification by oil millers is equally important to inform potential programme modifications and to ensure the sustainability of adequate oil fortification post-subsidy. In the case of the advocacy effectiveness study, the results should fill several of the gaps noted above but, given the timing, there may be little scope to implement any needed modifications. Similarly, given that this study starts from what the programme is doing, rather than what else might be done for the audience groups, its utility in regard to assessing and addressing the fundamental issues of whether the appropriate channels were selected upfront may be constrained.

Finally, the inclusion of the RTAG should have created opportunities for continual review of programme progress and challenges, and for opening dialogue to ideate and develop solutions to overcome them. The composition of the group, with both national and international experts, appears appropriate to facilitate both the inclusion of fortification expertise, good practice examples globally, as well as local contextual knowledge for their adaptation to Pakistan. The RTAG has been an effective approach to providing input into planned studies. However, it has been a missed opportunity to reflect on experience with fortification in Pakistan and globally, what has worked, not worked, and why, and to identify evidence gaps that may inform further strengthening of approaches in a specific context. Participation in the RTAG has been sporadic for many members – which is not surprising, given the voluntary nature of that participation. However, several key informants noted that the planning of the meetings could have been improved, including by formalising invitations and scheduling to maximise participation. Several informants also noted that at least an occasional in-person meeting could have fostered commitment and strategic input. As such, the RTAG to date has been an underutilised resource for identifying and addressing strategic questions and for supporting the translation of findings into needed programme adaptations and **continual programme improvement** (as described in Section 4.3.2) to maximise the potential for impact and sustainability.

Box 4 Proposed adjustments to FFP's ToC

1. Ensure that the target groups are mentioned correctly in the ToC and consistently within FFP's documentation, and specifically exclude children under six months.
2. Articulate explicitly in the ToC the actions/results that will be required to ensure sustained production of adequately fortified food post-subsidies.
3. The strengthened enabling environment for fortification – specifically the quality and frequency of engagement among government, the private sector, and civil society fortification stakeholders – should be made explicit. This could be done by adding a box across the bottom at the output level.
4. A caveat should be added to assumption #2 (market share of commodities is as expected) to emphasise the need to attain alignment on the fortification of oil sold in bulk.
5. Assumptions #3 and #5 should be merged into a single assumption related to fortified foods maintaining a competitive price.
6. Assumption #10 (commitment and supportive action from industry associations) should be elevated to an outcome, with related activities aligned to achieve this.
7. With the scope of the research agenda advanced, the points in the ToC where the results of those studies are expected to inform programme improvement, or at minimum understand barriers to further impact, should be made explicit. Similarly, the role of the RTAG in advising FFP and strengthening the use of the research and global evidence in programme improvements could be added – perhaps as part of the strengthened enabling environment box proposed in point #3 above.

5 Effectiveness of FFP

5.1 Introduction

The evaluation of FFP's effectiveness assesses changes that the programme contributes to at the intermediary outcome level within the different pathways of FFP's ToC. This section first examines to what extent the programme has contributed to an adequate supply of fortified wheat flour and edible oil. This is followed by an assessment of the programme's contribution to raising public awareness and acceptance of the fortified foods and their benefits. Finally, the section addresses the programme's contribution to an improvement in public sector management of fortification in accordance with mandatory legislation and revised standards and regulations.

To understand whether the programme has contributed to postulated changes in the impact pathways, one needs to examine to what extent and how the programme has implemented its planned activities. A review of the progress of the implementation of FFP's key programme activities is included in Annex F. The findings presented in this section focus on the progress of expected immediate and intermediate results. The analysis considers how wider value chain and political economy factors influence the results. Annex G and Annex H, respectively, present a value chain analysis of the wheat flour and edible oil/ghee sub-sectors in Pakistan.

Each impact pathway is analysed in turn in the three subsequent sections. At its start, each section presents a summary table that provides midterm answers to each of the evaluation questions related to the section. These are preliminary answers reflecting the midline situation, based on qualitative interviews at various levels (including the district study), a document review, and analysis of available monitoring data (for a list of data sources used for this section, see Table 2). The analysis of the private sector pathway is presented separately for edible oil/ghee and wheat flour, because of their different contexts.

5.2 Adequate supply of fortified wheat flour and edible oil/ghee

Midterm summary answers to evaluation questions	
KEQ3: To what extent has the programme contributed to an adequate supply of wheat flour and edible oil/ghee fortified?	
DEQ3.1: To what extent is adequately fortified wheat flour and edible oil/ghee produced by the industrial producers targeted by the programme?	**Edible oil/ghee sector** FortIS data show that by the end of November 2018 almost all of the targeted oil/ghee mills were adequately fortifying almost all of their reported production, surpassing monthly production targets set in the APIP. When maintaining current fortification volumes FFP will likely surpass its absolute annual fortified production targets for oil/ghee. However, the evaluation team estimates that FFP covers only a little over half of the total national oil/ghee supply produced by the targeted industrial mills. Therefore, the proportion of total national oil/ghee production that is adequately fortified is likely to be lower than reported in FortIS. This may be because not all edible oil/ghee is mandated to be fortified; this needs further clarification. FFP has likely strongly contributed to increasing mostly below-standard fortification practice at baseline to adequately fortified production, and to increasing the number of mills fortifying, although fortification was likely already widespread at baseline (particularly among larger mills). Through FFP's training and follow-up support, the mills—particularly smaller ones and those that did not yet fortify at baseline, or did so

Midterm summary answers to evaluation questions	
	inadequately—improved their understanding and the quality of the fortification process. Most mills are reportedly performing both qualitative and quantitative sample testing according to protocol, aided by improved access to QC equipment/services facilitated by FFP. After a longer than planned premix procurement process mills steadily increased the use of premix facilitated through the programme from May 2017 onwards, reaching a large majority of targeted mills by the end of 2018. FFP's additionality in increasing oil/ghee premix use has likely been relatively strong for smaller producers, but, overall, the FFP-subsidised premix largely substituted existing commercial premix supply. **Wheat flour sector** The enrolment of wheat flour mills in the programme has taken longer than planned and encountered resistance from mills. By the end of November 2018, 465 mills were enrolled in the programme, of which 194 mills were fortifying. Fortification volumes only started to pick up substantially from May 2018, after which they surpassed the fortified production targets established by the APIP on a monthly basis until November 2018. However, the pattern of fortified production has been irregular and dropped from December 2018 onwards, which presents the risk that the targets for May 2019 will not be met. Mills demonstrate erratic behaviour in terms of (i) whether or not they fortify in a given period, and (ii) among the mills that choose to fortify, the proportions of their production that they fortify. The additionality of FFP in increasing fortified production is high. Fortification was likely limited within the wheat flour sector at the start of the programme. FFP is contributing to an increased awareness about food fortification in general and initial QC results hint at improved understanding of the food fortification process itself among the enrolled mills. The training and FFOs' follow-up support assist mills' adherence to QA processes set out in the guidelines promoted by FFP. According to FortIS, most operational mills perform the qualitative mill-level QC testing promoted by FFP, but data are limited to validate internal QC testing. The QC process based on the cluster labs and the PFMA central lab is still largely not yet operational or fully utilised. A minority of mills had microfeeders at the start of the programme; they were mostly not functional or not of optimal quality. Therefore, the microfeeders installed under the programme add value and their quality is positively reviewed by the mills. FFP microfeeders have been installed with considerable delays, but their installation is expanding rapidly, covering most registered mills. Mills' consumption of premix was still small at the end of 2018. It has gradually increased following the installation of the first microfeeders, but with variation over time due to the premix supply interruptions and fluctuating fortification of wheat flour production. FFP's contribution in the emerging increase in procurement and use of the specified premix is likely to be high.
DEQ3.2: What other factors influence the production and distribution of fortified and adequately fortified wheat flour and edible oil/ghee?	• Full enrolment and increasing enrolment, among oil and wheat flour mills, respectively, and the participation of the respective industry associations, PVMA and PFMA, show an interest from the industries in the programme, which is understandable given that the programme delivers tangible financial benefits. Nonetheless, it took a longer time than expected for mills to sign up and some mills showed resistance to enrolling. The fluctuating wheat flour fortification levels indicate that wheat flour mills are hesitant to fortify their entire production. In addition, tensions exist in the relationship between FFP and the industry associations, which threatens the programme's further

Midterm summary answers to evaluation questions	
	engagement with the industries. • The regulatory environment has an important influence on mills' fortification behaviour. Where fortification is effectively monitored and enforced, such as in Punjab for fortified oil/ghee, fortification compliance is generally high. In contrast, in Sindh, where monitoring and enforcement by the recently created Food Authority is still relatively weak, illicit 'loose' oil that remains unreported and likely not fortified is more commonly produced. Because wheat flour fortification is yet to be effectively enforced across Pakistan, mills' fortification levels fluctuate. • Consumer awareness and demand for both fortified edible oil/ghee and wheat flour likely remain low. Therefore, there is not a compelling business case for mills to fortify. Furthermore, where mandatory fortification is not effectively enforced the extra cost of fortification cannot be easily passed on to the consumers as this may put fortifying mills in a disadvantageous competitive position, particularly among those oil mills producing cheaper lower-end brands and among wheat flour mills producing Atta flour, the price of which is fixed by government. • The oil/ghee a sub-sector is highly competitive. Estimates suggest that small mills are operating at a negative margin and medium-sized mills barely break even. Margins are also narrow for producers of Atta flour, for which prices are regulated. Therefore, small producers will be particularly inclined to avoid the relatively small cost of fortification. In the case of oil, this also incentivises the sale of 'loose' oil, as such sales also avoid the more significant costs of packaging and government sales tax. • The initial reliance on a single premix supplier resulted in supply interruption and in the case of oil/ghee may have caused part of the premix price increase. vitamin A supply shortages at BASF at the end of 2017/early 2018, and delayed customs clearance of imported premix, interrupted the supply of oil and wheat flour premix, respectively. • The oil refining process is a highly sophisticated industrial process and the sector is rapidly modernising and professionalising. Fortification QA/QC processes can therefore be relatively easily integrated into existing production processes, particularly among medium-sized and large oil mills. FFP's added value for these mills will be lower compared to small mills. Premix sales before the start of the programme also suggest that the larger and medium-sized oil mills likely already had access to a premix supply chain. • Mills are concerned about sharing their production data. This affects the external fortification monitoring process. FFOs are likely to be unable to select a representative sample of oil mills' total production for third-party compliance testing. • The installation of microfeeders among wheat flour mills started with considerable delays. The procurement of technically suitable microfeeders took longer than planned, as did the negotiations with the industry about the microfeeder service contract. • The number of roller wheat flour mills is tenfold the number of oil/ghee mills. This makes it more challenging to enrol, equip, capacitate, and monitor the wheat flour sub-sector.
DEQ3.3: To what extent is a sustainable supply of adequately fortified wheat flour and edible oil/ghee available in	**Edible oil/ghee sector** With over 50% of oil/ghee produced by industrial mills adequately fortified—and little evidence of informal production—fortified oil is widely available in Pakistan. Although the MTE did not visit remote rural areas

Midterm summary answers to evaluation questions	
markets/retail outlets?	for the value chain analysis, the distribution networks for oil/ghee mills are extensive and exist nationwide. **Wheat flour sector** Fortified wheat flour is not widely available in markets/retail outlets in Pakistan. Qualitative research in a limited number of districts found that fortified wheat four is only available in a few retail outlets, although distributors/wholesalers in Lahore and Karachi indicate that both fortified and unfortified wheat flour is being sold. Overall, there is a lack of awareness about the distinction between fortified and unfortified wheat flour.
DEQ3.4: What factors influence the sustainable supply of fortified wheat flour and edible oil/ghee in markets/retail outlets?	• The availability of fortified oil in retail markets appears to reflect the regulatory effectiveness of the provincial Food Authorities. Oil/ghee mills selling into the Punjab market are aware that the Food Authority enforces fortification standards and so is reluctant to sell unfortified oil into this important end market. In Sindh, however, the Food Authority is very new and is not yet effective, and mills face little prospect of being sanctioned for supplying unfortified oil. • In the case of wheat flour, as customers are not asking for 'fortified flour' and fortification is not yet enforced, retailers/ sellers are not particularly encouraged to make this product available in their stores. Some of them trade fortified flour because the product is sold at the same price as the non-fortified variety. • The supply of oil/ghee is determined by the price. The retail price of oil/ghee is determined by the market and, while this market is highly price competitive below the premium brands, there is no regulatory barrier to mills increasing prices to cover the costs of fortification. • Demand for edible oil/ghee and wheat flour is ubiquitous across Pakistan and across income groups. Other than buying cheaper brands of oil, the only way the poor can save money on their oil purchases is to substitute packaged and fully refined oil/ghee for 'loose' oil or partially refined ghee, which is currently unlikely to be fortified. In the case of wheat flour, coverage of industrially produced roller mill flour is mostly lower across poorer households, except in Punjab, where poor households are more likely to consume roller mill wheat flour compared to the non-poor.

5.2.1 Fortification of edible oil/ghee

This section assesses the status of the intermediary outcomes outlined in the private sector impact pathway in the ToC. It builds on an implementation review of the progress of FFP's planned activities, which are meant to contribute to the intermediary outcomes (see Annex F).

Increased awareness about food fortification among oil/ghee mills

Awareness about food fortification was already widespread among oil/ghee mills at baseline. FFP's Communication and Advocacy Strategy (2018) indicates that while awareness about food fortification among producers is growing, the majority of the milling industry had largely been unaware of food fortification and its benefits. This likely underrates the actual extent of baseline awareness within the oil/ghee industry. Given that a 2016 market assessment found that more than half of the producers were already fortifying some of their brands[lxv], at least a majority of mills must have been aware of food fortification at the start of the programme. This is also plausible

given that mandatory oil/ghee fortification has been in place since 1965 and food fortification support, advocacy, or coordination has been provided over the past decade.[34]

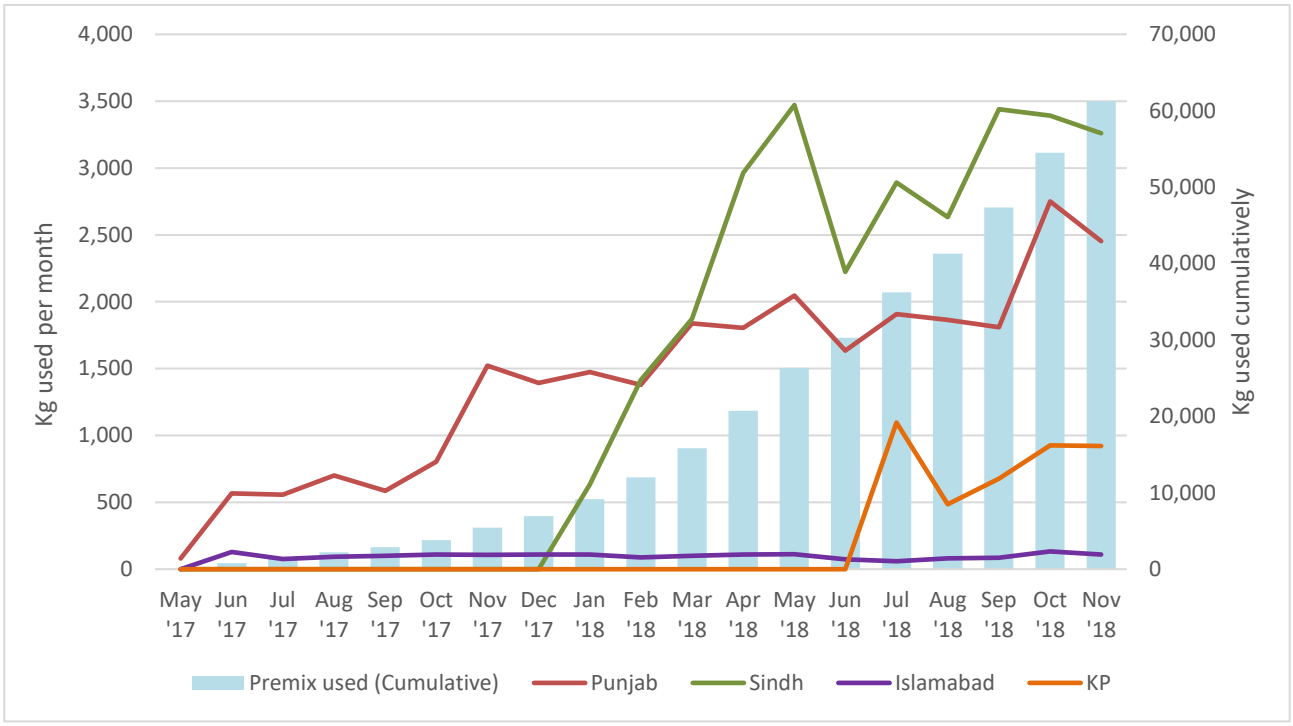
Understanding of fortification processes has improved, particularly among smaller mills and those that did not yet fortify at baseline, or that did so inadequately. Several studies have recommended raising awareness and understanding of food fortification within the oil/ghee value chain, particularly on how to improve the quality of the food fortification process, and on the storage and transportation conditions required to achieve fortification at standard.[lxvi] In line with these studies, the FFP team found weaknesses in the weighing, diluting, and mixing process of premix, and based on this assessment supported mill staff to address these issues. The high fortification adequacy level of reported fortified production by December 2018 indicates that many mills now have the level of understanding about the fortification process required to overcome these weaknesses.[35] As detailed in the implementation review in Annex F, interviews with mills confirm that mills, particularly smaller ones and those that did not yet fortify at baseline, or that did so inadequately, appreciated gaining a better understanding about the good fortification practices through FFP's support.

Increased supply, procurement, and use of specified premix

Mills steadily increased their use of premix facilitated through the programme from May 2017 onwards, and a large majority of targeted mills were reached by the end of 2018. After FFP signed the first MoUs with mills in May 2017, and after it negotiated a premix supply agreement with BASF, some mills in Punjab and Islamabad started procuring and using the premix facilitated by the programme in the months thereafter. Mills in Sindh and KP followed in January and July 2018, respectively, as visualised by the lines in the graph in Figure 5, which represent monthly premix use per province. While provincial monthly premix use at times demonstrates strong variations—in line with variations in fortified production reported under the programme and changes in the number of mills operational—the blue column bars in Figure 5 demonstrate the gradual cumulative increase in the use of the FFP-facilitated premix as more mills enrolled. FortIS reports that by December 2018 81 mills were operational and therefore likely to be using FFP-facilitated premix, which represents 79% of the target number of mills to be enrolled.[36,37] Figure 5 indicates that a premix supply shortage around the end of 2017 and early 2018 (see Annex F for detail) did not interrupt the overall steady increase in premix use. This was addressed by the delayed roll-out in Sindh and a stabilisation of the number of mills enrolled in Punjab.

[34] One informant who has worked in the sector for a long time mentioned that already in 1999 there was a big push for vitamin A fortification of ghee that was supported by UNICEF.
[35] FFP's Quarterly Report from December 2018 indicates that 85% of the 520,463 metric tons oil/ghee produced during September–November 2018 was adequately fortified. Furthermore, a subsidy sheet for the month of October 2018 from Nasir Javaid Maqsood Imran (NJMI) Accountants shows that 73% of the mills that received a subsidy or did not qualify due to failing lab results attained 100% adequacy level.
[36] The FFP Quarterly Report December 2018 indicates that the number of mills operational and providing fortified edible oil/ghee through FFP was 84 during September–November 2018. The quarterly report data therefore slightly overestimate the data compared to FortIS.
[37] Since the evaluation team does not have access to the premix use data at mill level, we cannot verify whether all mills classified as operational are actually using the premix in a given month. It can be assumed, though, that the mills that are fortifying are using the FFP premix.

Figure 5 FFP-facilitated oil premix used, per province and cumulative (in kg)



Source: FortIS

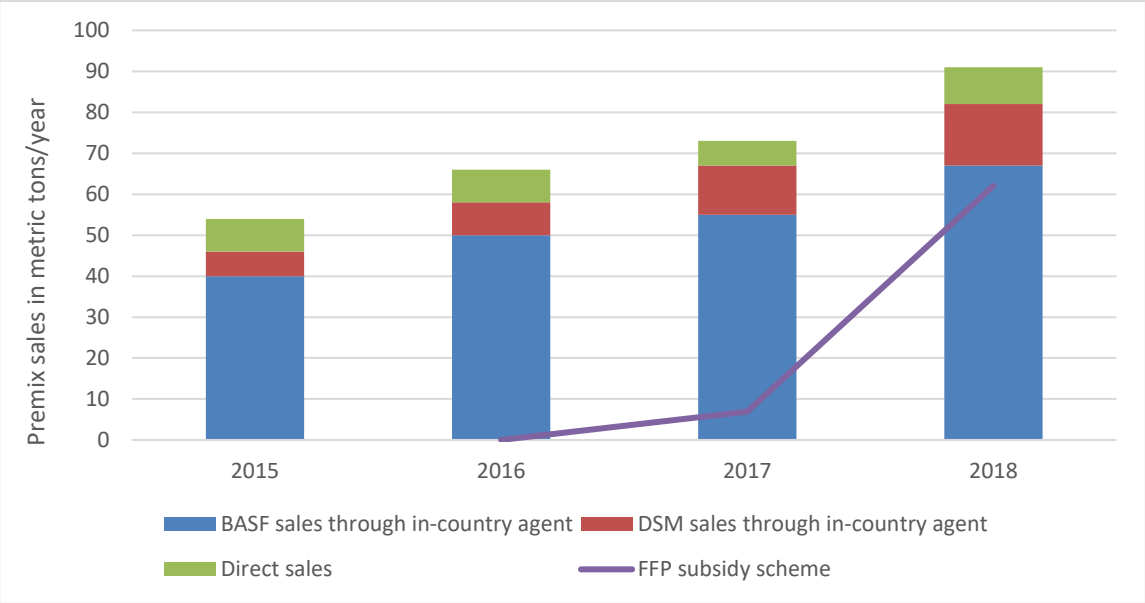
FortIS data suggest use of premix volumes as expected, given the volume of fortified oil/ghee reported. In November 2018, the 81 operational mills were using on average 83 kg of premix per mill. These averages vary by province, with higher averages in Sindh and KP, in line with higher reported production averages per mill in those provinces. Based on FortIS data, over the entire period until December 2018, mills used on average 43 g of premix per metric ton of reported adequately fortified oil/ghee. This is within the fortification standard, which specifies a range of 33–45 g per metric ton of oil, particularly since some of the premix will have been used to produce non-adequately fortified oil/ghee.

FFP's additionality in increasing oil/ghee premix use has likely been strong for smaller producers, but, overall, the FFP-subsided premix largely substituted the existing commercial premix supply. BASF, through its local distributor Haameen, has been a key supplier of oil/ghee premix in Pakistan for several years. FFP therefore was able to build on this existing international supply chain. As discussed in Annex F, FFP further engaged with DSM in 2018 to diversify the supply chain of premix. Figure 6 brings together the estimates of BASF and DSM premix sales in Pakistan, and the premix provided under the subsidy scheme reported by FFP. The figure shows that substantial premix distribution already existed before the start of FFP, i.e. 54 metric tons in 2015 and 66 metric tons in 2016.[38] Therefore, while FFP has contributed to increased supply, procurement, and use of premix, particularly for smaller mills that were less connected to BASF's existing supply chain, Figure 6 indicates that the programme's additionality should not be overstated as premix sales to particularly larger mills were substantial. The growth trend from 2015 to 2017 would suggest that premix sales of about 70 to 80 metric tons would have been achieved without FFP. It was only during 2018 that FFP began to make a significant contribution to premix sales. Stakeholder interviews within the premix supply chain confirmed the finding that the positive impact of FFP, in terms of starting to fortify, was concentrated on the

[38] Sales data of similar magnitude were confirmed by Haameem, as well as BASF Pakistan. Communication in April 2019 between FFP and both manufacturers (BASF and DSM) provides import data of the same magnitude for BASF, and lower for DSM before 2017 (5 metric tons in 2016) but higher in 2017 and 2018 (27 metric tons and 31 metric tons, respectively).

smaller mills, which were least likely to be fortifying before the programme and needed the greatest support. The additionality for the larger mills, which were often fortifying before FFP, has been to improve compliance around the fortification standard, and the (temporary) reduction in premix prices (although the impact of this has been muted by the rapid increase in premix prices in PKR terms).

Figure 6 Estimated sales and use of oil/ghee premix by suppliers and FFP



Source: BASF and DSM estimates provided by local distributor; FFP premix use based on FortIS.

2018 premix sales already cover FFP's logframe target of fortified edible oil/ghee, but this likely underestimates the total national oil/ghee consumption. In 2018, the 61.8 metric tons of premix subsidised through FFP could fortify around 1.55 million metric tons of edible oil/ghee. Including all estimated 91 metric tons of premix imported into Pakistan in 2018, this could fortify around 2.28 million metric tons of oil. While this already surpasses the ca. 2 million metric tons of fortifiable supply from the formal sector assumed in FFP's 2018 revised logframe, the evaluation team, based on its value chain analysis, estimates that this only covers a part of the total national supply of edible oil/ghee, which the evaluation team estimates at 4.2 million metric tons in 2018 (see Annex H for the estimates of total national consumption). However, since not all of this production may be distributed in packaged containers, it is currently unclear whether it is mandatory to fortify all of it (see below).

The finding that premix sales accelerated from 2017 to 2018, at a time when the rupee-denominated price of premix at mill level doubled (even including the subsidy effect), suggests that **oil mills have a low price elasticity of demand for oil premix**. This is consistent with the finding from the FFP millers incentives study that it is the regulatory environment, rather than the price of premix, which determines whether mills fortify their output.

Improved QA/QC processes performed by the oil/ghee mills

FFP aims to improve mills' internal QC processes by promoting at least two daily qualitative tests at the mills (using either FFP– Nuclear Institute for Food and Agriculture- (NIFA-) developed rapid test kits (RTKs) or BASF-provided test kits) and fortnightly quantitative tests at the cluster labs with iCheck equipment.[lxvii] In the area of QA, FFP seeks to strengthen mills' capacity to procure premix in a timely way, ensure adequate addition of premix to the oil/ghee production process, improve record-keeping, and introduce fortification logos on oil/ghee packages. FFP is supporting this by providing qualitative test kits, establishing cluster labs, and training/coaching staff in the QA/QC

processes. In addition, FFP has added a layer of third-party monitoring linked to the subsidy payments and to its own programme monitoring.

FFP has contributed to improved quality of the fortification process. An assessment, conducted in 2016 within the wheat flour and oil/ghee industry found that QA/QC protocols were uniformly weak, though some facilities were slightly better than others.[lxviii] Some level of QA/QC was being carried out, but the producers would have had a difficult time proving this to an outsider as record-keeping was assessed as abysmal. Similar to FFP's early assessment the 2016 assessment mostly found problems in the premix dilution process. The issue of adequate dilution and blending was also found in an industry assessment in 2015.[lxix] FFP progress reports indicate that mills have taken on board their recommendations for improvement of the mixing and dilution process, and some mills have installed premix dilution tanks with mixers for homogenous mixing.[lxx] In addition, FFP has assisted in record-keeping, with mills reportedly placing registers at the key control points to maintain records of important processing steps. The adequacy rate of fortification, which reportedly varied between 85% and 90% over the five quarters before December 2018, suggests that the quality of the fortification process has improved, and it is plausible to assume that improved QA processes contributed to this. These findings are corroborated by the mill interviews conducted as part of the MTE. Among the smaller mills, FFP has often engaged at a basic level, building up awareness of fortification and explaining the fortification process in detail. In the larger mills, many of which were fortifying before FFP, the challenge has been to improve strict compliance with the fortification standard. In several mills, the MTE team were shown the fortificant dilution tanks on which FFP had advised.

Most mills are reportedly performing both qualitative and quantitative sample testing according to protocol, which FFP has likely contributed to by improving access to QC equipment/services and QC training, particularly for smaller mills. However, systematic monitoring data are not available to properly assess the reports. Regarding QC processes, previous assessments indicate that oil/ghee mills were already performing testing for vitamin A to some degree. The assessment conducted by Randall and Anjum (2014) found that all oil refineries visited carried out qualitative testing for vitamin A (using simplified Carr Price tests) and had basic laboratory equipment, but that technical staff lacked capacity to adequately perform QC testing. The assessment by Altai Consulting also confirmed that almost all refineries visited were equipped with an internal laboratory, and that qualitative vitamin A tests (Carr Price test) were conducted. However, baseline data about the quantity and quality of the mill-level testing are not available. FFP progress reports indicate that the first 12 FFP-assisted mills started performing and reporting on qualitative tests using the BASF vitamin A test kit in July 2017. This steadily increased with the enrolment of more mills. In February 2018, the mills also started using the RTK produced NIFA. Furthermore, since the last quarter of the programme Year 2, mills in Punjab have started submitting samples for quantitative testing with iCheck equipment at cluster labs. Such tests were recommended by both of the earlier mentioned studies, and therefore signify a clear added value in the mills' QC processes. FFP reports that by the end of November 2018 84 mills were performing both qualitative and quantitative sample testing according to protocol. At the time of writing this report, FortIS does not provide QC data. Separate monitoring data provided by FFP suggest that qualitative testing at mills and quantitative testing at cluster labs are taking place. The RTK testing data are not systematically processed for reporting, so they are difficult to assess. The cluster lab data suggest that a high number of tests per mill are conducted on average per month at the cluster labs (12 tests per month/mill – much higher than the fortnightly testing), but not all operational mills are using the cluster labs. Test results indicate high fortification adequacy rates.

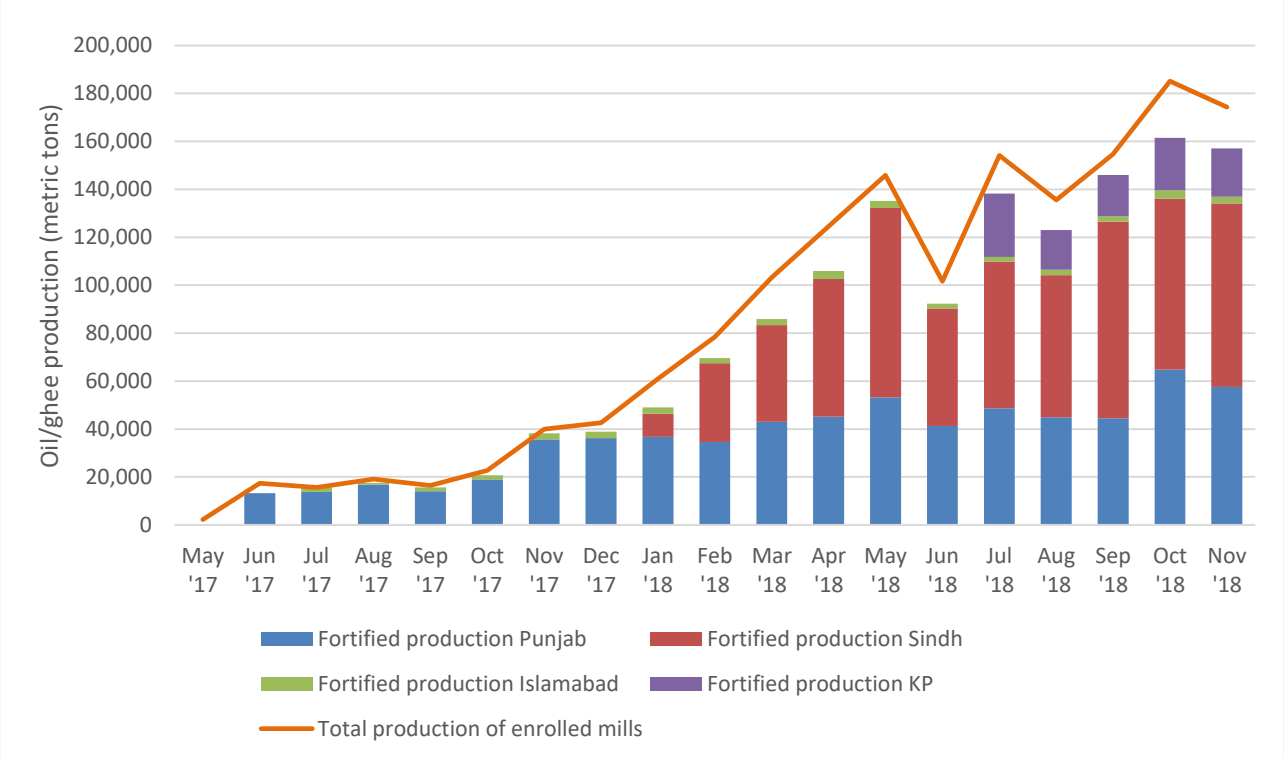
Increased production of adequately fortified edible oil/ghee

FFP's main intermediary outcome in the private sector pathway is for the targeted industrial mills to increase their production of adequately fortified edible oil/ghee. The logframe sets a target of 102

registered mills producing 1.93 million metric tons annually in total, which is assumed to represent some 75% of the 2.7 million metric tons national supply. It is assumed that a 50% level of fortification is reached in the first year of FFP and that this increases to 75% thereafter.

FortIS data show that by the end of 2018 almost all of the targeted mills were fortifying almost all of their production, surpassing monthly production targets set in the APIP. In November 2018, 81 out of the 98 enrolled mills were fortifying oil/ghee production under the programme. As reported in FortIS, they adequately fortified 157,061 metric tons, out of a total reported production of 174,310 metric tons in that month (among enrolled mills), which represents a fortification adequacy rate of at least 90% (taking into account that some enrolled mills may not yet have been fortifying). While fortified production was delayed compared to original plans, due to slower mill enrolment, Figure 7 shows a steady increase in monthly production from the start in June 2017 until May 2018, with the programme initially covering Punjab and Islamabad, followed by Sindh from January 2018 onwards. In June 2018, fortified production dropped sharply due to overstocking during Ramadan (mid-May to mid-June 2018) and Eid (in August), after which the programme expanded to KP and fortified production grew at a further moderate pace. In November 2018, the programme surpassed the monthly target of 120,000 metric tons fortified production agreed in the APIP.

Figure 7 Adequately fortified provincial production and total oil/ghee production of enrolled mills



Source: FortIS

If current fortification volumes are maintained FFP will surpass its absolute annual fortified production targets for oil/ghee. When using the latest FortIS monthly production figures for February 2019, i.e. 177,299 metric tons of adequately fortified oil/ghee (which covers production of 93 operational mills), the annual extrapolated fortified production equals 2.1 million metric tons. This will further increase once all 102 targeted mills become operational. This indicates that FFP will likely achieve its current logframe target of 1.9 million metric tons of adequately fortified production. However, this also illustrates the inaccuracy of the logframe targets, which are based on total oil production (whether fortified or not) figures from 102 operational mills being 1.93 million metric tons per year. As discussed in detail in Annex H, the assumptions about the total national

edible oil/ghee consumption and the share of formal industrial mills in this production that were used to calculate the logframe targets are likely underestimations of reality.

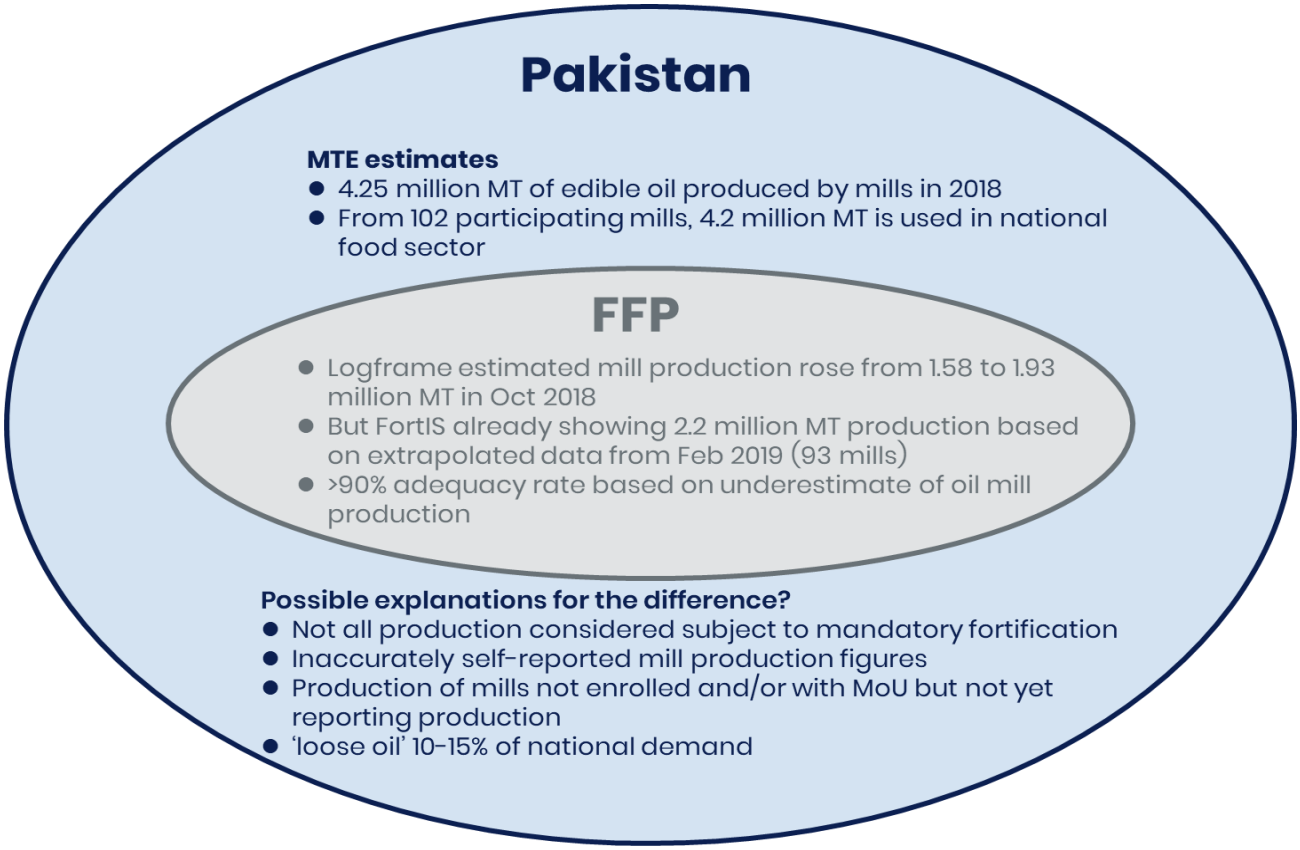
FFP has built on widespread, but mostly below-standard, fortification practices at baseline, to increase adequately fortified production. FFP's logframe starts with a zero-baseline quantity of adequately fortified edible oil/ghee produced by the 102 targeted mills. However, baseline fortification levels were likely above zero. FFP's Year 2 progress report refers to 13.6% fortification compliance among 44 oil and ghee samples tested as part of the study by Randell and Anjum in 2014, which also found that 70% of the samples indicated the presence of vitamin A. A more recent and extensive market assessment, conducted by GAIN in 2016, covering 115 brands of oil and Vanaspati ghee from 49 producers and two unbranded oils from an unknown producer, concludes that two-thirds of brands were fortified to some degree, 9% were adequately fortified based on a strict standard of 33,000 international units (IU)/kg–45,000 IU/kg ±10% assay variation, and 37% were adequately fortified when allowing for 30% measurement uncertainty and variation of 10% around the standard itself.[39] Of the 49 Pakistani producers, 22 producers did not fortify at all. These were mainly located in Sindh and KP. The study estimated that 70% of market volume of the producers, which according to the study represented itself 70% of the total market volume, was fortified to some extent. These findings indicate, in line with the considerable premix sales before the start of the programme, that oil/ghee fortification was already taking place on a large scale before FFP started providing fortification support.[40] However, the large majority of producers were not fortifying accurately to the standard. Therefore, it seems that FFP's largest contribution lies in shifting the large mills' production from inadequate to adequate fortification.

FFP covers only part of the total national oil/ghee supply, which raises potential equity issues. Based on February 2019 FortIS data, the annual extrapolated edible oil/ghee production reported to FFP corresponds to 2.2 million metric tons, produced by 93 mills. Once this increases, when all registered mills become operational under the programme, FFP's logframe assumes that this will cover most of the edible oil/ghee supply of the formal sector or registered mills in Pakistan. However, the evaluation's value chain analysis (see Annex H) indicates that this is likely to be a significant underestimation of the total national supply of these mills. The evaluation team arrives at an estimate of 4.25 million metric tons of edible oil/ghee produced in 2018 by PVMA's registered members. Different estimates exist for total oil/ghee production or consumption in Pakistan, which explains the assumptions used by FFP. However, both top-down analysis using PVMA import data and extraction rates, as well as bottom-up analysis of demand components, indicate a substantially higher national supply. While some of this production is exported and some is used by non-food industry, such as the paint industry,[41] FortIS data do not seem to capture the entire oil/ghee production of the FFP-registered mills destined for national food consumption. As mentioned above, it is possible that mills only report their packaged oil/ghee because PSQCA standards seem to apply only to packaged oil (although provincial food regulations seem to suggest that all edible vegetable oil is subject to mandatory fortification). This warrants further discussion and clarification. However, it is also plausible that some mills are reluctant to report their total production, particularly if they distribute 'loose' oil. The narrow to negative margins in the oil industry could be driving such behaviours, particularly in contexts where food safety enforcement is still weak (e.g. in Sindh). This would also help explain producers' reluctance to share production data in the first place. The sale of loose oil or any underreported packaged oil, if it remains unfortified, poses an important and direct risk to the potential for impact of oil/ghee fortification, particularly among

[39] The study assessed the samples against a standard of 33,000 IU of vitamin A per kg, allowing for 10% variation.
[40] The FACT 2017 survey found household coverage of fortified oil/ghee to be 31% in Punjab, 20% in Sindh, and 39% in Balochistan. Fortified within standard range was defined as ≥33,000 to 45,000 IU/kg).
[41] While it is challenging to arrive at an accurate expert estimate, the evaluation team estimates export volumes to be around 60,000 metric tons annually, and the use by the paint industry to be 40,000 metric tons annually.

lower-income groups that have higher levels of micronutrient deficiency and are likely to consume the cheaper 'loose' or packaged oil.

Figure 8 Difference between the amount of oil produced under FFP mills and total national supply



Distribution and retailing of adequately fortified edible oil/ghee

Fortified oil/ghee is widely available in markets/retail outlets in Pakistan; however, the availability is affected by enforcement by Food Authorities and competitive market prices. As over 50% of oil/ghee produced by industrial mills is adequately fortified and there is little evidence of informal production, fortified oil is likely to be widely available in markets/retail outlets in Pakistan.[42] Although the MTE did not visit remote rural areas for the value chain analysis, the distribution networks of the oil/ghee mills are extensive and exist nationwide. However, it is important to note that the availability of fortified oil in retail markets depends on the regulatory effectiveness of the provincial Food Authority. In Punjab, as the Punjab Food Authority is active in enforcing standards the oil/ghee mills selling into the Punjab are reluctant to sell unfortified oil. In Sindh, however, the Food Authority is very new and is not yet fully effective, therefore the mills face little prospect of being sanctioned for supplying unfortified oil. As a result, availability of loose oil is a major concern in Sindh.

Additionally, the supply of oil/ghee is determined by the price. The retail price of oil/ghee is determined by the market and, while this market is highly price competitive below the premium brands, there is no regulatory barrier to mills increasing prices to cover the costs of fortification. However, it is important to note that it is not possible to measure this price effect directly because the cost of fortification is very low – about $2.75 per metric ton of edible oil, or about $0.002 per litre of oil/ghee (or 0.16% of the retail price). Among premium oil brands there is clear evidence of the mills controlling the downstream value chain, using in-house distributors and warehouses, and

[42] No quantitative data collection and sample testing was planned for midterm. Therefore, the MTE has not been able to verify this based on market test results.

seeking to control the retail price. In the mainstream market, the mills sell on credit and so their main interest is to target markets with adequate demand to generate sales. As oil is a fast-moving consumer product there is little evidence of fortified products deteriorating between production and retailing.

From MTE interviews the team gathered that poor households purchase oil on a daily basis and mostly in loose form as it is about 10% cheaper than packaged oil and is almost always unfortified (it is unpackaged and so cannot be traced back to a specific mill). The team found that there is no demand among consumers for fortified oil/ghee, although there is an acceptance of the need to consume healthy foods (see Section 5.3 for further discussion about the acceptance of fortified foods).

5.2.2 Fortification of wheat flour – progress of results

Similar to the edible oil/ghee value chain, this section assesses the programme's intended results in the wheat flour sector, as outlined in the programme's ToC. A review of FFP's activities targeted at private sector actors in the value chain for wheat flour is included in Annex F.

Increased awareness about food fortification among wheat flour mills

In-depth understanding about the food fortification process is limited. FFP's Communication and Advocacy Strategy (2018) indicates that while awareness about food fortification among producers was growing at this time, the majority of the milling industry were largely unaware of food fortification and its benefits. An industry assessment in 2014 suggests that this may have been more the case for smaller mills as awareness about food fortification was already widespread among the mostly medium- and large-sized wheat flour mills visited during the study (56 out or 86 of mills visited (65%) were aware or had knowledge of food fortification).[lxxi] This awareness is likely due to the several earlier wheat flour fortification initiatives that have been rolled out in Pakistan (see Section 2.1.3). However, the same study concluded that despite wheat fortification being trialled in Pakistan anything above even the most basic knowledge of the fortification process itself was missing.

FFP is contributing to an increased awareness about food fortification in general and initial QC results hint at improved understanding about the food fortification process itself among the enrolled mills. Given FFP's growing enrolment of mills in the programme, awareness about food fortification is likely be further increasing. This is confirmed by PFMA, which asserts that, with its support, mills have become aware of and are on board with food fortification.[43] Interviews with FFP-supported mills validate the finding that mill managers and owners have a good understanding of the programme and the food fortification process. The limited QC test results available further hint at mill staff having gained a good comprehension of the fortification process as test results demonstrate high fortification adequacy.[44]

[43] The enrolment of mills in the programme has taken longer than planned. The first mill signed up in August 2017, later than planned, after which mill enrolment increased rapidly: first in Punjab and Islamabad, next in Sindh from quarter December 2017–February 2018 onwards. By December 2018, 465 wheat flour mills across Punjab and Sindh provinces and Islamabad federal territory were enrolled in the programme, of which 194 mills were fortifying. See Annex F for a review of mill enrolment.

[44] This is based on the subsidy payment sheet for wheat flour fortification of October 2018 – the only sheet shared with the evaluation team. 75% of the 131 mills to be paid for that month achieved 100% adequacy of fortification; the remainder achieved 60% to 70% adequacy. The adequacy rate refers to the proportion of the mills' total fortified production that is considered adequate as per criteria set by the subsidy scheme. FortIS provides very limited data on the laboratory tests performed and their results.

Installation of microfeeders

A minority of mills had microfeeders at the start of the programme. They were mostly not functional or not of optimal quality. Several wheat flour industry assessments before or at the start of FFP found microfeeders installed at visited mills.[45] The previous assessment overall concluded that microfeeders were not functional, were of substandard quality, or were not installed. Specific issues identified were the feeder's dosing capacity not matching the requirements of the wheat flour production process, the microfeeder not being properly calibrated, or trained staff not being present. In addition, when mills had damaged equipment, they could not have it repaired. Of the 20 mills that were interviewed by the evaluation team, four mills reported to have been engaged in previous fortification programmes and therefore had microfeeders already installed. However, according to these mills, these microfeeders are not being used at all.

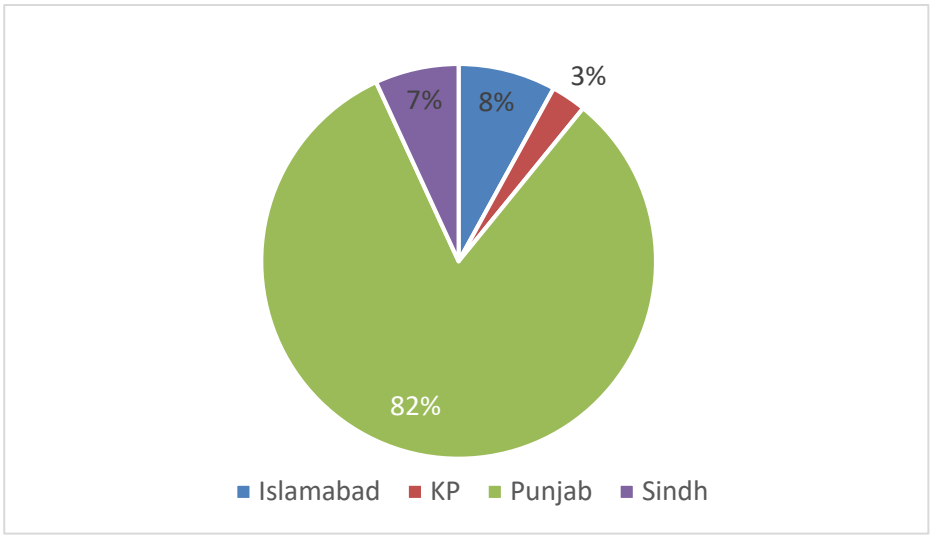
FFP microfeeders have been installed with considerable delays, but their installation is expanding rapidly, covering most registered mills. Almost all microfeeders are reported to be functional. Installation of microfeeders under FFP started in September–November 2017 – behind the original schedule, but in line with the 2017 revised workplan. Delays were the result of a longer than expected microfeeder procurement process, extended negotiation with the wheat flour industry about the MoUs and microfeeder service contracts, and ongoing resistance from some mills to signing up. By December 2018, 1,046 microfeeders had been installed, against a target of 871 microfeeders, according to FFP reports.[46] A FortIS microfeeder report from 1 April 2019 counts 1,150 microfeeders installed among 433 mills, which shows that FFP is nearing its target of 1,350 microfeeders installed by the end of its third implementation year.[47] The number of mills with installed microfeeders also represents almost all of the 449 FFP-registered mills reported by FortIS in March 2019. 98% of the 1,150 microfeeders are reported to be functional according to FortIS; and most microfeeders have been installed in Punjab, followed by Islamabad and Sindh, as shown in Figure 9. The mills, understandably, welcome the fact that the microfeeders are provided to them free of charge by the programme. However, some of the mills interviewed, particularly the larger mills, noted that they would have been in a position to procure the microfeeders themselves. They explained that while the cost of the microfeeders may be substantial for smaller mills, larger operators can more easily bear this capital cost.

[45] Randall and Anjum (2014) found microfeeders at 22 mills among 86 mills visited. A GAIN assessment (2017) among mostly medium- to larger-sized mills exporting to Afghanistan identified 51 mills among 109 mills visited that had microfeeders installed, of which 39 had functional microfeeders; only 18 mills were using them at the time of the visit. A study by Altai Consulting (2015) concluded that there were around 300 micro-feeders available in Pakistan, based on estimates of GAIN having distributed 125 microfeeders during 2008–2010 and mills having bought 174 microfeeders themselves.

[46] The data reported by FFP deviate from data reported in FortIS. The indicator reports presented in FortIS indicate that 470 microfeeders were installed nationally by the end of the second quarter of 2018–2019.

[47] This is also consistent with what was reported by Buhler to the evaluation team: a total of 1,145 microfeeders have so far been installed across FFP mills. The vast majority of these—i.e. a total of 1,117 microfeeders—were installed during the first phase of Buhler's engagement, or during the period ending in December 2018.

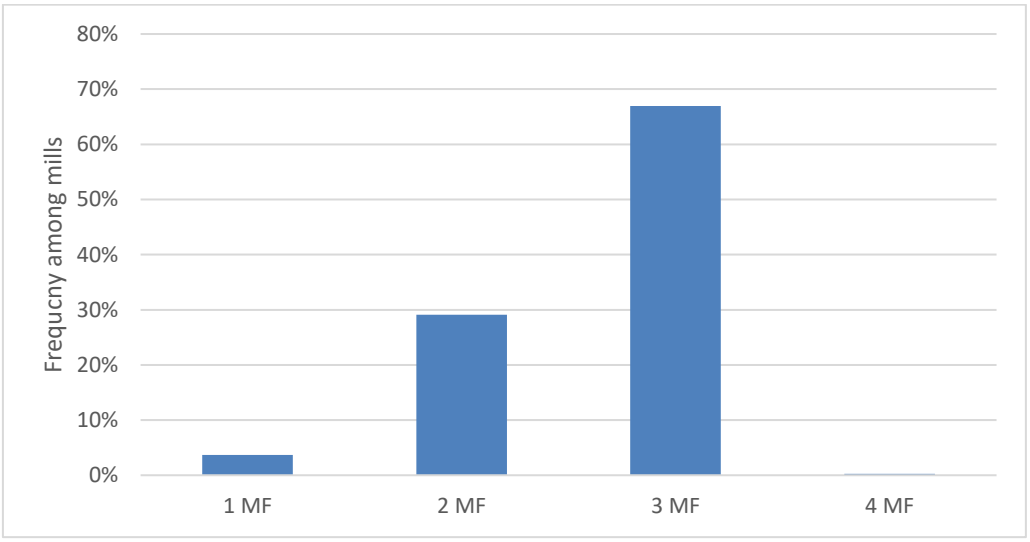
Figure 9 Microfeeders installed by province and Islamabad Capital Territory (% of total)



Source: FortIS Microfeeders summary report 01 April 2019.

In line with the recommendations of previous studies, the installation of microfeeders has been adjusted to the mills' production processes. FFP's initial programme design assumed that most mills would require one microfeeder and about 35% of the mills would require two microfeeders.[lxxii] Mill assessments during the programme inception phase concluded that mills would require up to three microfeeders to cover multiple production lines and allow them to be calibrated to the different wheat flour categories produced by Pakistani mills. Previous studies had similarly recommended to adjust microfeeders to mill production lines and premix dosing requirements, which vary by type of wheat flour.[lxxiii] Figure 10 demonstrates that among 433 mills that had microfeeders installed two-thirds had three microfeeders installed, followed by two microfeeders in 29% of mills. A few mills received one microfeeder, and, in an exception, one mill was provided with four devices. This is in line with the estimates for larger districts made in the inception report.[48] 40%, 34%, and 26% of microfeeders are installed on Atta, Maida, and Fine wheat flour production lines, respectively.

Figure 10 Frequency of mills with different numbers of microfeeders installed



Source: FortIS Microfeeders summary report 01 April 2019.

[48] During inception FFP estimated that in larger districts around 30% of mills would require the installation of two microfeeders, while the remaining 70% would require three microfeeders. In smaller districts, the programme expected that the majority of the flour mills would require two microfeeders (FFP Inception Report).

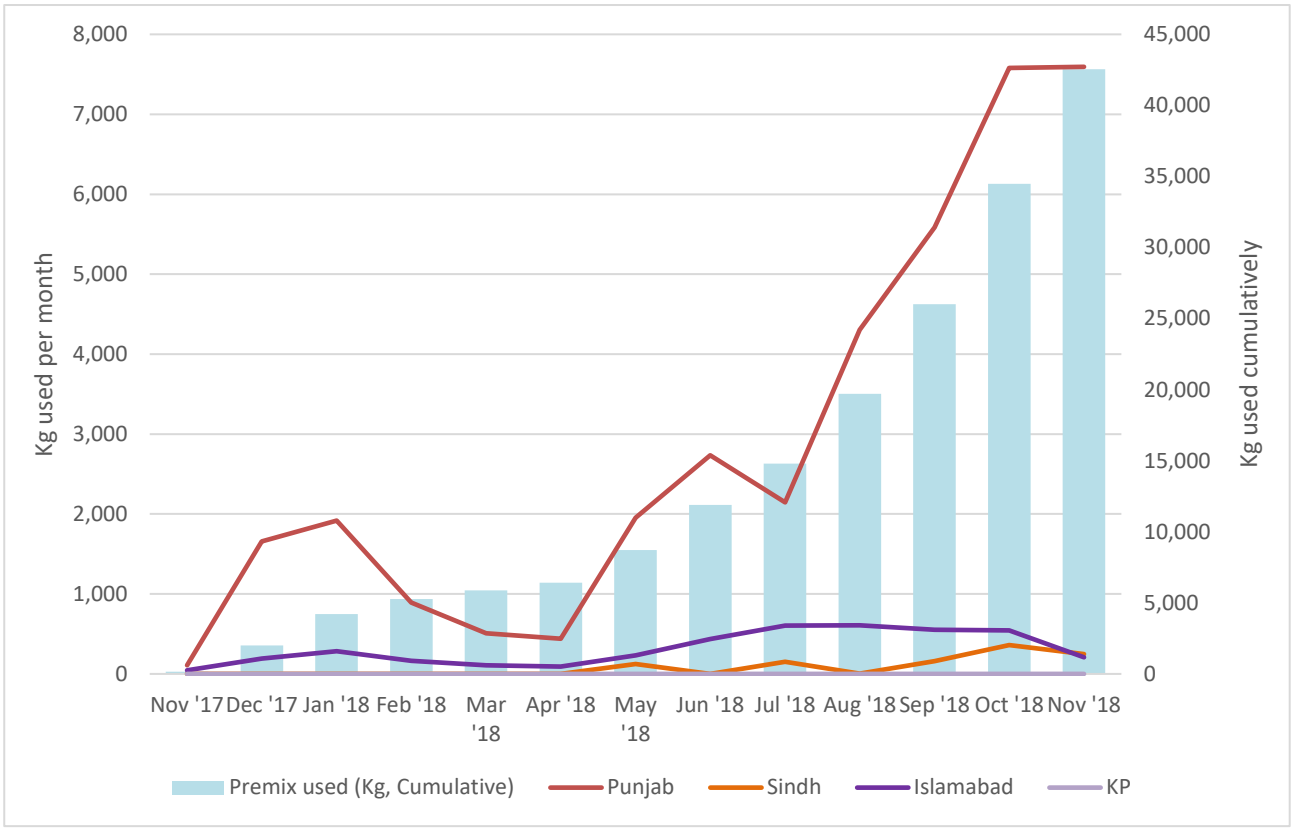
All of the FFP mills that were interviewed in this study gave positive reviews of the microfeeders they received, as well as of the TA provided. Those that have participated in other previous fortification programmes noted that they consider the Buhler microfeeder provided by FFP to be of a superior quality compared to microfeeders from other manufacturers.[49] The feedback on the installation process and the quality of after-sales service that mills received from Buhler (e.g. to address any technical queries or adjustments that may have been necessary, especially immediately following installation) have also been positive.[50] Mills reported that they are able to communicate with Buhler representatives via a hotline, and, where necessary, an engineer is dispatched by the company to inspect and see how technical problems can be resolved. The mills reported that they did not need to hire additional specialist staff to handle or operate the microfeeders. Existing mill staff, along with the mills' owners/managers, received training and orientation on the use of the microfeeders from Buhler. The machine is calibrated in such a way that the tasks that mill staff need to undertake when using the equipment are straightforward. Mills describe the process as 'very simple' – it does not need any specialist skills.

Increased supply, procurement, and use of specified premix

Mills' consumption of premix was still small at the end of 2018. It has gradually increased following the installation of the first microfeeders, but with variation over time – due (among other things) to the premix supply interruptions. Wheat flour mills started procuring and consuming the FFP-facilitated premix in the period September–November 2017, around the same time that the first microfeeders were installed. As presented in Figure 11, by December 2018 a total of 42.5 metric tons of premix had been used, 88% of which had been consumed by mills located in Punjab, which is in line with Punjab being the location of around 90% of the total mills fortifying with FFP support at that time. The gradual increase in premix use is therefore mostly driven by Punjabi mills. In November 2018 mills consumed a little over 8,000 kg of premix, against a reported total wheat flour production of 238,028 metric tons, of which 41,092 metric tons was adequately fortified, based on FortIS data.[51] Monthly premix consumption dropped during February–April 2018 because of a supply chain interruption in that period following customs clearance issues in relation to the stock of premix supplied by DSM.[52] The consumption of premix also decreased at the end of 2018: the dropping to 5,375 kg in December 2018. This was driven by a reduction in the number of mills that fortified production during this period (from 194 mills in November 2018 to 125 mills in December 2018). It is not clear what drove this reduction in the number of mills fortifying during this month, although some stakeholder interviews suggest that this may likely be related to some mills interrupting fortification given claims or concerns raised regarding the effect of the premix on the colour of baked food items (e.g. naan) when fortified wheat flour was used.[53]

[49] Mills that have participated in other previous fortification programmes noted that they still have the microfeeders that these programmes also provided them free of charge. However, these are not currently in use.
[50] The extended (four-year) warranty on the equipment ensures that mills are able to access technical support from Buhler as and when this is needed. Of the mills interviewed during the MTE, one mill (in Karachi) reported experiencing a malfunction in one of its microfeeders. The problem was reported to Buhler (using the hotline) and the mill received instruction from a Buhler engineer on the phone on how to fix the equipment. This mill expressed being generally satisfied with the services provided by FFP and Buhler on the use of the microfeeders, but on account of this experience, also expressed interest to receive training on 'trouble-shooting' the microfeeder, over and above the training they get on how to use the equipment.
[51] This is consistent with the proportion of premix that is added to wheat flour: for every metric tons of wheat flour, 200 grams of premix is consumed.
[52] The FFP Year 2 Annual Report mentions that premix remained out of stock for almost 2.5 months.
[53] This is being investigated by FFP.

Figure 11 FFP-facilitated wheat flour premix used, per province and cumulative (in kg)



Source: FortIS

FFP's contribution to the emerging increase in the procurement and use of the specified premix is likely to be high. Compared to the oil premix, available evidence suggests that the commercial supply of wheat flour premix was limited at the start of the programme. Previous studies conclude that premix was being supplied mainly as part of previous wheat flour fortification initiatives and its import and use were limited.[54] Interviews with the local premix distributors (agents) as part of the MTE confirm that they did not import or supply premix in Pakistan prior to their engagement with FFP. Mills that participated in previous or indeed other ongoing fortification programmes were supplied with premix by the programmes and not through local distributors (agents). Furthermore, as premix specifications were adjusted following the enactment of national fortification standards in 2017, the premix that FFP-enrolled mills were supplied with from the start of the programme was different from that which some mills were supplied with under previous fortification programmes. Therefore, mills' emerging use of the specified premix is likely to mainly have been influenced by their enrolment in the programme.

In November 2018 the 194 operational mills were using on average 42 kg of premix per mill. [lxxiv] **However, there is significant variation in the amount of premix used, likely due to variation in the proportion of wheat flour production that is fortified by different mills**. Mills in Sindh were consuming considerably less (25 kg per mill), while mills in Islamabad were consuming somewhat below average (34 kg per mill). Average monthly premix consumption also varies considerably over time (with a maximum of 78 kg consumed on average per mill in October

[54] The Scoping Study by MQSUN (2014) found that no domestic supply of iron and folic acid premix for wheat flour fortification was available – it needed to be sourced internationally. Altai Consulting (2015) concluded that the distribution of premix was an issue in Pakistan as only very few commercial local importers and distributors of premix operated in the country. Pakistani millers mostly relied on GAIN, Micronutrient Initiative, and the WFP to have access to premix to fortify their products. GAIN's 2017 assessment of wheat flour exporters to Afghanistan found only 10 with premix available, out of 109 mills visited. GAIN's 2017 assessment of premix distribution in Pakistan further concluded that the import of premix for wheat flour fortification was mostly limited to various fortification programmes being implemented at that time.

2018 in Islamabad and a minimum of 13 kg on average in April 2018 in the same territory). It is not possible for the evaluation team to assess the reasons for this variation across the mills, given available data, such as what is presented in FortIS. While the differences in the average consumption of premix across the provinces could reflect the production of non-adequately fortified wheat, it is more likely that this reflects differences in the proportions of production that different mills (within provinces) choose to fortify. Some mills interviewed by the evaluation team, for example, report fortifying 100% of their production, while others choose to fortify only 20–30% of their production. When the consumption of premix is assessed against the reported total volume of fortified flour that is produced, the average volume of premix consumed hovers relatively consistently around 200 grams per metric ton of fortified flour produced, which is the standard for using premix.[55]

Improved QA/QC processes performed by the wheat flour mills

Similar to the edible oil/ghee sector, FFP aims to improve wheat flour mills' QA/QC capacity by training mill staff and improving access to QC equipment and services.

Most mills perform the qualitative mill-level internal QC process promoted by FFP, but data are limited to validate and further examine RTK use. FFP distributed RTKs to the mills for qualitative testing. According to FortIS, in November 2018 185 out of 194 operational mills were performing internal QC tests. This is a strong achievement considering that the APIP had acknowledged challenges at mills in maintaining regular QC testing independently and mills' inability to maintain records (which was the reason why it had set a conservative target of 125 mills performing and reporting internal QC tests as per protocol during the first half of FFP's third implementation year).[lxxv] However, data on internal QC are not consistently reported to validate FortIS data.[56] Neither are data available to verify how often the RTK are used. Interviews with mills confirm that mills received the test kits and are well aware of how to use them. Mills describe the process as 'easy'. Relevant staff at mills visited by the evaluation team were able to demonstrate use of the RTKs and reported using them every time the mill produces a batch of fortified flour.

The QC process involving the cluster labs and the PFMA central lab is still largely not yet operational or fully utilised. By the end of November 2018, two cluster labs had been set up. In April 2019, FFP reported that this had increased to six cluster labs, and that four of these were operational or fully functional (one in Faisalabad, two in Rawalpindi, and one in Islamabad). Although iCheck equipment has been delivered to these cluster labs and staff have been trained, mills appear to be hardly using these cluster labs (i.e. for fortnightly testing of fortified wheat flour), even a year after wheat flour fortification has started. FortIS reports that, at the time of data collection for the MTE in February 2019, 15 cluster lab tests have been carried. According to additional monitoring data provided by FFP, in January 2019 (the only month for which data are

[55] Only in March 2018 was it reported that a significantly higher volume of premix was consumed against the reported total volume of fortified flour produced (241 grams/metric ton), suggesting that some mills may have consumed more premix than needed or that there may have been some underreporting of the total volume of fortified flour produced by some mills during this period

[56] In contrast to the edible oil/ghee sector, FFP indicator reports do not provide data on the number mills performing and reporting internal QC tests as per protocol. APIP progress reporting has also eliminated the indicator. FFP Quarterly Reports do not report on QC testing consistently.
Determining the frequency of use or how regularly the RTKs are being used by the mills (given the protocol) on the basis of the total number of RTKs distributed and the number of operational mills in a given period does not show the true picture of what is practised. Mills do not only behave differently in terms of the proportions of their wheat flour production that they choose to fortify each period, some mills also choose not to consistently fortify within a given period. (For example, a mill could fortify a batch of wheat flour one week and not fortify at all the following week.) Thus, in a given month, some mills may be producing fortified flour at each production run, while others would not be consistently doing so. The latter group of mills would still be classified as 'operational mills', given that they have fortified some of their production for the period, but they would not be undertaking internal QC using the RTKs with the same frequency as those mills that produce fortified flour at each production run.

available for each of the four operational labs) 38 samples were tested across the 144 mills linked to the labs. In that month 19 mills had submitted one sample every two weeks. Furthermore, the central PFMA lab is also not operational because the loss of (trained) laboratory staff has meant that investments made by the programme have yet to yield the results intended. Moreover, stakeholder interviews suggest that while enabling the PFMA central laboratory to perform quantitative testing is helpful, where capacity strengthening for PFMA could be more pronounced is in the provincial offices, where the laboratory facilities – e.g. in KP and Baluchistan – are largely non-existent.

FFP is also collecting samples for third-party lab testing as part of the subsidy management scheme. Given that subsidies are being paid, this element of the QC process is taking place. According to FFP, samples of fortified flour are collected by the FFOs from individual mills on a weekly basis. These samples are then coded and sent to the Provincial Manager, who then sends the samples to the third-party lab for testing.[57] The samples collected by FFOs must be from each product line. The evaluation team is unable to verify the extent to which samples are indeed drawn from the appropriate batches of fortified flour produced by mills. The process of third-party lab testing usually takes a period of no more than two weeks from collecting samples until the result of the third-party lab test is shared with the mill. The mills interviewed by the evaluation team indicated that they were informed of the results and have not encountered any issues, such as there being discrepancies between what the mills claimed or reported and the results from third-party lab tests.[58]

FFOs are supporting mills with QA of the fortification process. The interviews with mills suggest that mills are able to adhere to these processes and operate according to the guidelines promoted by FFP. The APIP progress reporting indicates that support is ongoing with regard to checking and calibrating the microfeeders and record-keeping on internal QA. The latter is important since a previous evaluation had pointed out that no reports were available to assess the performance in terms of QA/QC.[lxxvi] Mill interviews by the evaluation team indicate that the record-keeping procedure is clear to mills and is standardised across all FFP mills. These mills were also able to demonstrate (to the evaluation team) understanding of how the premix must be stored, use of the premix according to the different product lines (i.e. the adequate dosage of premix), that feeders are periodically maintained, and how fortified flour is stored, packaged, and labelled (separate from the non-fortified variety in the case of those mills that produce both fortified and non-fortified flour). However, FFP does not report monitoring data on the implementation of the QA processes that mills were trained on, which makes it difficult to adequately assess mills' performance (over and above those that the evaluation team managed to visit and interview as part of the MTE).

Increased production of adequately fortified wheat flour

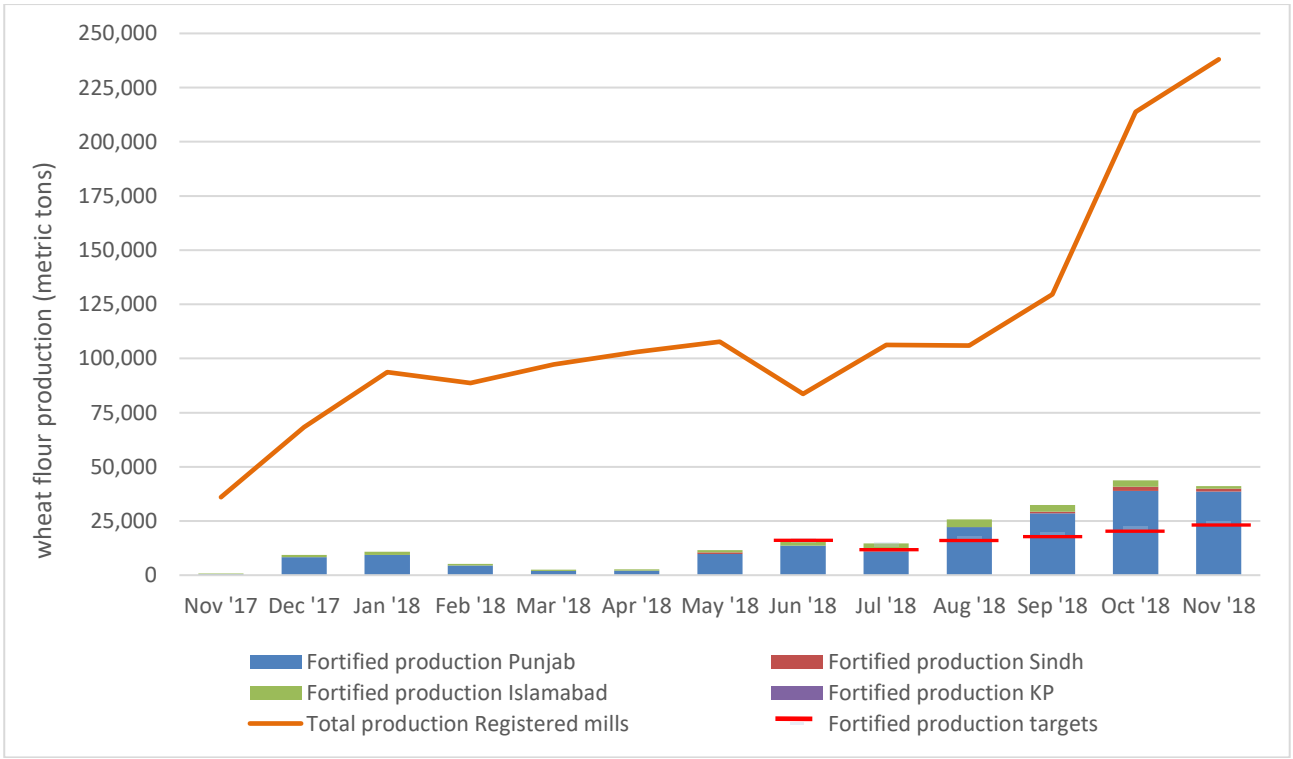
FFP's main intermediary outcome in the private sector pathway for wheat flour is that the targeted industrial mills increase their production of adequately fortified wheat flour. The 2018 revised logframe sets a target for 1,082 registered mills to produce 4.2 million metric ton annually of adequately fortified wheat flour, which is assumed to represent 24.75% of the 17.8 million metric ton of national supply. It is assumed that mills enrolled in the programme at a specific time start with 25% adequately fortified production during the first trimester, followed by 50% during the next

[57] Out of the four samples sent, one for each week, two are randomly selected for testing by the lab.
[58] However, FFP acknowledges that there have been a few instances of discrepancies between third-party lab test results and claims by the mills, but these have been easily resolved as the QC process in place includes other parameters that help to verify conclusions from third-party lab tests and indeed show where the problems may lie. These include considering the results of the RTK tests (done by the mill and reported to the FFO), and the volume of premix that a mill has ordered, has in stock and has consumed, which is also cross-checked against invoices and sales records for premix from the local agents supplying premix to mills.

three months, 90% in the following six months, and reaching full capacity after one year of operation under the programme.[59] As referenced in Section 2.2.3, the fortified production targets were reduced in 2018 based on new data on the market share of wheat flour from the targeted roller mills, compared to more *chakki* mill flour. The value chain analysis in Annex G provides further details on *chakki* mills.

After limited increase of adequately fortified production during the first six months after fortification started, mills surpassed fortified production targets on a monthly basis until November 2018. However, the pattern of fortified production has been irregular and has dropped from December 2018 onwards, which presents a risk that the targets for May 2019 will not be met. In November 2018, 194 out of the 452 registered mills were fortifying wheat flour production under the programme. As reported in FortIS, they adequately fortified 41,092 metric tons, out of a total reported production of 238,028 metric tons in that month. The fortified amount surpassed the monthly target of 23,752 metric tons set in the APIP. Figure 12 shows that between the start of fortification in November 2017 and the end of FFP's second implementation year in May 2018, adequately fortified production remains at a level of approximately 10,000 metric tons per month. Subsequently, the monthly volume of adequately fortified production quadrupled until November 2018. From August 2018 onwards, fortified production surpassed targets set by the APIP each month in a row. While this represents a positive trend, the total and average volumes of fortified flour rise and fall, regardless of the total production volume – some mills may fortify this month but then cease to do so next month. The trend after November 2018 illustrates this further (although this is not shown in the figure below). The number of operational mills dropped to 125 mills in December 2018 and remained at only 133 in January 2019. This reduced the monthly volume of adequately fortified production to approximately 32,000 metric tons in January 2019. These steep variations risk undermining the steady increase of fortified production assumed in order to reach the aspired target of 523,533 metric tons by the end May 2019.

Figure 12 Adequately fortified provincial production and national wheat flour production (metric tons)



Source: FortIS

[59] While 100% fortification at mill level is pursued, the programme assumes 95% fortification efficiency.

Mills demonstrate erratic behaviour in terms of (i) whether or not they fortify in a given period, and (ii) among the mills that choose to fortify, the proportions of their production that they fortify. Increasing the volume of adequately fortified wheat flour produced will be helped if more mills are enrolled into the programme (which is partly what the programme is aiming for). The increasing total production among registered mills shown in Figure 12 testifies to this. However, in November 2018 only 17% of total reported wheat flour production was adequately fortified (and this rate fell to 14% in January 2019); and, as mentioned above, only 194 out of 452 registered mills were fortifying. While this reflects the pace at which new mills are enrolled in the programme (and microfeeder installation having to catch up), and the recognised gradual increase of mill-level fortification (assumed to start at 25%), it also includes fluctuations in registered mills that fortify and the erratic pattern in fortification even within a given period. Mill interviews carried out as part of the MTE indicate that while mills receive incentives such as microfeeders and a subsidy for the premix they consume, these incentives are not motivating the mills enough to continue, or indeed increase, fortification. This is also in line with the conclusions of the recent millers incentives study, which point to the importance of government regulation and enforcement, peer producer behaviour, and consumer demand as the main drivers of producer behaviour, rather than the subsidy. If mills are not convinced that fortification will soon become consistently enforced and/or there continues to be very low or no demand for fortified flour among consumers, the proportion of total production that is fortified is expected to at best remain as is, if not decline. Box 5 further summarises the factors driving the fortification behaviour of the mills, based on interviews and value chain analysis.

Box 5 Factors driving fortification behaviour among mills

There are a number of factors driving this observed behaviour among mills (based on interviews with mills and the analysis of the value chain):

- From the mills' perspective, there is no compelling business case for them to produce fortified flour. Consumers are not (yet) asking for fortified flour and in some cases customers have misgivings about fortified flour. For example, there are some claims (although still considered unfounded) that the use of fortified flour results in the discolouration of some baked food items, such as naan. Moreover, fortifying flour is also not (yet) perceived as mandatory across Pakistan; and while regulations for mandatory fortification exist they are not (yet) enforced.
- Some small and medium-sized mills express concern over the additional burden of the cost of fortification, even if this is very small relative to all other costs of production. These particular types of mills tend to be more vulnerable, given that they are less likely to produce the volumes required to remain profitable, or indeed given the fact that they can choose to produce higher volumes of Maida/Fine flour where the per unit margins are higher (compared to Atta). As such, these firms are much more sensitive to any additional costs that would reduce (even slightly) the margins they are able to generate per unit of flour sold, especially considering that the retail price of Atta is regulated (specified) by the government.
- Despite the fact that there is no compelling business case for producing fortified flour and fortification is not yet seen as mandatory, some mills have nevertheless started fortifying because they believe that fortification is soon going to be mandatory. They therefore want to be ready when this happens. As such, they participate or enrol in FFP, which enables them to start fortification. In some cases, participating mills claim that they fortify all (100%) of their production; others fortify only a proportion (e.g. 20–30%) of their production, which is consistent with mills that are fortifying on an 'experimental basis'.
- Of these mills (that have started fortifying under FFP), some continue to fortify – whether all or only a proportion of their wheat flour production. The reasons they do so include the following:
  - they continue to be convinced that in the medium to long term mills will be required to fortify their

Box 5 Factors driving fortification behaviour among mills

wheat flour production, so they might as well continue;

- these mills also tend to be those that have not had any experience of receiving negative feedback from their customers regarding fortified flour, although some of them may have heard of negative experiences or claims made by other mills; and
- some of these mills have relationships with customers and retailers that are asking for fortified flour.

- Some of the mills that have previously produced fortified flour may temporarily stop fortifying (for a period) or completely cease fortifying. The reasons they do so include the following:
  - Wheat flour production for some mills go down (e.g. some mills do not get their wheat quota or lose customers to other mills).
  - This would also apply to some (small) mills that temporarily close – because business has been bad. They could re-open after a few months.
  - Some mills consider it too risky to fortify their production on account of either their own experience or having heard rumours about the effect of fortification on baked food items (discolouration). These mills do not want to risk having to pull their stock in the event that their customers complain.
  - And lastly, although the cost of fortifying is minimal (especially given the support that mills receive under FFP), and mills have already fortified in previous periods, some mills do not see any additional benefit to producing fortified flour: their margins remain the same, the demand for the products they trade remains unchanged (i.e. there are no additional buyers/customers for fortified flour), and there is no cost to their non-compliance. Hence, these mills choose to stop fortifying. Some of them may resume fortifying if, for example, they are pressured to do so.

The additionality of FFP in increasing fortified production across all roller mills is high. While FFP has been able to build on widespread, although below-standard, fortification in the edible/ghee sector, wheat flour fortification was likely limited within the wheat flour sector at the start of the programme. All the studies referenced previously come to this conclusion, although some fortification was going on under specific programmes (for example, mills producing wheat flour for WFP's fortification programme). The limited availability of premix and functional microfeeders validate this. Furthermore, the FACT 2017 and FFP's RDS both point to low coverage of fortified food.[60] Therefore, the levels of fortification production observed are highly likely to be attributable to the programme. This finding is also supported by the qualitative interviews with mills carried out as part of the MTE. None of the mills interviewed reported receiving any other fortification support beyond FFP, and while some mills participated in previous fortification programmes, none of these (interviewed) mills were fortifying before the start of the programme.

Distribution and retailing of adequately fortified wheat flour

Fortified wheat flour is not widely available in markets/retail outlets in Pakistan. The supply is affected by demand and price. MTE interviews conducted in the districts found that fortified wheat four is only available in a few retail outlets. In interviews with a wholesaler in Karachi and a distributor in Lahore they remarked that both fortified and unfortified wheat flour are being sold. However, retailers interviewed in Badin and Gujranwala commented that fortified wheat flour is not available in their outlets. The consumers are not aware of the distinction between fortified and unfortified wheat flour, and thus are not demanding fortified wheat flour. As customers are not

[60] While the 2017 FACT survey found low consumption of fortified wheat flour among consumers (1% in Punjab, 10% in Sindh, and 5% in Balochistan), many interviewed households were not able to report a brand name and as a result there was a high proportion of households with unknown fortification status. Therefore, estimates of consumption of fortified foods are likely an underestimate.

asking for ‘fortified flour’, retailers/sellers are not particularly encouraged to make this product available in their stores. Some of them trade fortified flour because the product is anyway sold at the same price as the non-fortified variety (price matters).

As discussed above, FFP’s interventions have been largely focused on stimulating the supply of fortified wheat flour by encouraging its production by mills. Efforts to create demand for fortified wheat flour focusing on its distribution and retailing are more recent. These include recent engagements with the Utility Stores Corporation (USC) of Pakistan and with Metro Cash & Carry. Stakeholder interviews (with both mills and the PFMA) indicate that this is an area of work private sector actors such as mills consider vital. At the moment, mills are being encouraged to fortify their production in an environment where fortification is not enforced. Beyond that, there is also hardly any demand for fortified flour among consumers or customers of mills, which weakens the case for fortifying wheat flour. Understandably, this makes some mills reluctant to fortify their production – or at best, they fortify only a very small proportion of their production. Of the mills interviewed in this evaluation, only one mill reported that after the mill expressed its reluctance to fortify (initially, at the start of its engagement with FFP), the FFO working with the said mill sought an opportunity to address the problem of limited or no demand for fortified flour in order to encourage the mill to fortify. The said FFO engaged a large retailer convinced the retailer to purchase fortified flour; thereafter, they facilitated a relationship between the retailer and the (reluctant) mill. Interestingly, this not only encouraged the mill to fortify production – these efforts also helped the FFO to establish a fully functional relationship and a sense of partnership with the said mill. This sort of intervention and approach does not appear to happen widely across the programme, nor is it currently within the remit of FFOs (given their job descriptions) to seek opportunities where demand is created and thereby effectively encourage mills to fortify. But considering that mills note overwhelmingly the importance of creating demand for fortified wheat flour to push mills to fortify their production, this particular case offers some useful suggestions on what can be done to increase the demand for fortified wheat flour and effectively encourage fortification even among reluctant mills.

5.3 Raised public awareness and acceptance of food fortification and its benefits

Midterm summary answers to evaluation questions	
KEQ4: To what extent has the programme contributed to raising public awareness and acceptance of fortified wheat flour and edible oil/ghee and its benefits?	
DEQ4.1: To what extent has FFP's public awareness activities contributed to raising awareness of fortified wheat flour and edible oil/ghee and its benefits?	FFP's public awareness sessions (interpersonal activities) have increased the awareness of fortified foods and its benefits among those who attended these sessions (i.e. the local health and market intermediaries). However, messages about fortified foods and their benefits have not trickled down to the targeted groups as expected due in part to: a lack of motivation of local health and market intermediaries; it not being viewed as part of their responsibilities; and the limited intensity of the programme's engagement with the intermediaries. The dissemination of messages through other programmes offers synergetic opportunities. FFP's media campaign has had limited reach and effectiveness due to a lack of consumer access to and preference for the media channels that were used and the short duration of the campaign. Because of the limitations in the reach of the public awareness campaign, awareness of fortified wheat flour and edible oil/ghee and its benefits among consumers is likely to remain low, in line with the 2017 FACT baseline data. This was also confirmed as part of qualitative research.
DEQ4.2: To what extent have FFP's public awareness activities contributed to more acceptance and consumption of fortified wheat flour and edible oil/ghee?	Despite the lack of knowledge of fortified foods, potential acceptance of fortified oil/ghee appears to be high among most female and male consumers. However, acceptance is contingent on price and taste. Fortified wheat flour preferences for *chakki* flour are strong and therefore acceptance of fortified wheat flour will be low among *chakki* flour consumers. Given the limited reach and effectiveness of FFP's public awareness activities, it is likely that these findings cannot be attributed to FFP's activities.
DEQ4.3: What other factors influence consumers' awareness and acceptance of, and willingness to purchase, fortified wheat flour and edible oil/ghee?	Enabling factors include: • the fact that there is acceptance of the concept of fortification and the need to consume healthy foods; and • the fact that there is a willingness among a few consumers to pay a bit more for quality and health benefits. Constraining factors include: • the fact that preferences for *chakki* flour are strong among those who consume it; • the non-availability of fortified foods in the market, particularly fortified wheat flour, which constrains the trickle down of messages and their uptake; • the fact that most consumers, particularly among the poorest, are sensitive to price; • the fact that there are some concerns about whether the taste of fortified foods remains the same if vitamins are added; and • the lack of indicators of fortification on food packaging (words or logo), which makes it difficult to identify. The qualitative research did not find any gendered differences in awareness, acceptance and willingness to purchase fortified foods. Risk factors, such as poverty, influence the type of wheat flour and oil/ghee that consumers purchase. Coverage of roller mill wheat flour is generally lower among the most vulnerable. 'Loose' oil is likely to be more

	frequently purchased by poorer households.

This section assesses the status of the intermediary outcomes outlined in the public awareness impact pathway in the ToC. FFP's ToC postulates that the general public's knowledge and acceptance of fortified foods and market stakeholders' commercial behaviour will be influenced by raising awareness among intermediaries, such as local health staff (LHSs and School Health and Nutrition Supervisors (SHNSs))[61], district government actors, and representatives of market stakeholders. Therefore, the section first presents a discussion of the awareness of fortified foods and its benefits among these intermediaries. Next, it reviews the main intermediary outcome of the public awareness pathway, i.e. change in the knowledge and acceptance among consumers. A final subsection presents midterm findings about access to and consumption of fortified foods among consumers. This includes the qualitative consumer-level findings from the district study and further analysis of the FACT 2017 survey.

FFP aims to achieve raised public awareness and acceptance of food fortification and its benefits through two categories of interventions. First, FFP seeks to spread fortification messages by integrating them in the communication of other programmes and existing curricula, such as training curricula of health staff. FFP's activities as part of this intervention category take place mostly at provincial levels. Second, FFP has rolled out public awareness-raising activities at district level, which can be divided into interpersonal activities, on the one hand, and a media campaign, on the other hand. A review of the implementation of these activities is presented in Annex F.

Awareness of fortified foods and its benefits among intermediaries

There is awareness of fortified foods among intermediaries who attended FFP's public awareness sessions, but with varying levels of recollection and understanding. The MTE district study found that while a few intermediaries had existing knowledge of fortified foods, for most respondents, knowledge about fortified foods increased after attending FFP's public awareness session. However, the study found misinformation among intermediaries about the availability of fortified oil/ghee in the market. For example, a few of the study respondents were aware of, and in fact even consumed, oil/ghee with added vitamin A and D, but they were unable to recognise that the fortified oil/ghee they were told about in the awareness sessions was the same. A reason for this is that both fortified wheat flour and oil/ghee had been presented as products to be newly introduced in the market.

The messages have not trickled down as expected. Only half of the interviewed LHSs had shared the messages with the LHWs who they supervise and who are meant to pass on the messages to the households they visit. Only one of five interviewed members of trader associations who had attended a session planned to further transmit the messages. For the most part they do not view this as part of their responsibilities, they do not have time, or they do not consider that they have enough information. There are also challenges with the messages transmitted in those cases where LHWs had been informed by their supervisors. Like the LHSs, the LHWs confused non-availability of fortified wheat flour with general non-availability of fortified foods. Furthermore, the fact that fortified wheat flour is not yet available in the market makes LHSs and LHWs question the usefulness of discussing fortified foods with their communities as they themselves have not consumed fortified foods or have not received enough information about its price or availability. Additionally, the limited reach of the media campaign, as discussed below, resulted in missed opportunities to create synergies across awareness-raising activities as attendees of the public awareness sessions were not aware of the broader media campaign. The trickle down of messages may still happen later, as their reinforcement through the LHW curricula kicks in. However, overall the engagement with the intermediaries seems not sufficiently intense to support this. This will affect the gender and equity impact of the programme as the communication

[61] SHNSs operate in Punjab.

through the LHWs is the main intervention specially targeting WRA and the poorer populations in rural areas.

Knowledge and acceptance of fortified foods and its benefits among consumers

Knowledge of fortified foods and its benefits among consumers remains low. The 2017 FACT survey indicated low awareness of fortified foods among WRA at the FFP baseline (i.e. only 9% of women in Balochistan, 11% of women in Punjab, and 8% of women in Sindh reported having heard about fortified foods). While consumer awareness will again be quantitatively measured during the endline evaluation, qualitative interviews carried out as part of the MTE's district study validate the finding regarding continued limited awareness. Among the women and men in the MTE sample, there was no knowledge about the term 'fortified foods'; however, the study did find a few people who were familiar with the idea of vitamins being added to oil/ghee.

The current limited reach of the public awareness campaign is unlikely to have brought about any change in consumers' knowledge. The MTE's qualitative district study found the reach of the media campaign was limited. In a sample of over 200 people (with an almost equal number of women and men) who participated in the qualitative research[62], only one man in Karachi had a vague recollection of watching the TV advertisement, and he was unable to remember on which channel he saw it or what the advertisement was about; otherwise, no respondent reported watching the advertisement on TV. This is because the TV channels on which the advertisement were aired are not widely accessible or preferred by consumers.[63] Furthermore, the limited intensity of the campaign—TV ads for only one month and one billboard in an entire district—likely limited consumers' exposure to the campaign. Nonetheless, in an interview setting the TV advertisements are positively received by most sampled men and women. Regarding the mobile messaging, none of the consumers interviewed in Gujranwala remembered receiving the message, which is likely because of the low literacy of both male and female respondents, who tend to use their phones for calls only and reported that they do not pay much attention to messages they receive on their phone as they are considered to be promotional texts sent by mobile network operators. The effectiveness of mobile messaging which is targeted to women is also likely to be low due to the lower levels of mobile phone ownership among women.

Acceptance of fortified products is generally high but contingent on price and taste. Preferences regarding wheat flour are strong. Consumers of *chakki* mill flour are unlikely to switch to fortified roller miller flour based on its nutrient value. Despite the lack of knowledge of fortified foods, the qualitative study did not find an overt aversion or suspicion about the consumption of fortified foods,[64] and some consumers (both women and men) voiced a willingness to try these products when they become locally available. There is a widely held concern among men and women about the quality of foods, including many mentions of adulteration of food such as the addition of chemicals to food, and a widespread acceptance of the need to consume healthy foods, such as meat, vegetables, fruit, and milk for improved health. This acceptance comes about through the influence of health workers and doctors, but also through peer knowledge transfer. While the sample is not representative, this is an interesting finding because one of the concerns that FFP has is the spread of misinformation surrounding fortified foods among the general

[62] Respondents were selected purposively for the qualitative study and as such are not statistically representative of the targeted population. Nonetheless, all were selected from the districts where the media campaign had been rolled out, and were among the target group of the media campaign (WRA or men), and most had a TV in their house (except for some households in rural communities). See Section 3 for further details on the sampling.
[63] The qualitative research found no gender difference in access to the TV channels that FFP airs its advertisements on. The channels that most people said they normally watched were national TV channels, such as Geo and ARY, with males preferring to watch news channels and sports while women prefer to watch television dramas. Some communities in our sample did not have access to cable TV but instead used a dish antenna.
[64] Indeed, only one respondent (a man in rural Badin) said that he would not buy these foods because they are unfamiliar: '*It's not about liking or not liking, it's a new thing and I don't know how it will be.*'

population. However, the research also indicates that this willingness would be reduced if the fortified products cost more than their currently used brands, or if the taste and quality are different. Furthermore, contingent on price and taste, those who currently consume roller mill flour are more willing to try the fortified wheat flour than consumers of *chakki* mill flour. Preferences for *chakki* flour are strong among those who consume it, as *chakki* flour is considered nutritious and there is limited incentive to switch to fortified roller mill flour based on nutrient value. For those who have their own wheat or can buy wheat at harvest and get it grinded it does not make economic sense to purchase fortified flour. FFP is already aware of this phenomenon, as the targets of the programme reflect this. However, the programme's public awareness campaign does not explicitly target the subset of roller mill wheat flour consumers, but this is not reflected in FFP's approach to public awareness. There are no apparent differences in the acceptance of fortified foods according to gender or location.

Access to and consumption of fortified foods among consumers

Purchasing of foods, especially staple foods like wheat flour and oil/ghee that are bought as part of monthly or weekly groceries, is gendered. Except for a few cases where men are not available in the household, wheat flour and oil/ghee are purchased by men as the mobility of women, especially younger women, is restricted. While women have a role to play in decision-making about what is consumed (and therefore purchased) in the household due to the significant role they play in cooking, they consider the preferences of other family members. Most of the time, women do not play a role in deciding which brand to purchase as that decision is made by the actual purchasers of the food.

Fortified oil/ghee[65] was widely available the among retailers visited, while few sold fortified wheat flour. Neither the retailers selling fortified food (i.e. mostly oil/ghee) nor the consumers purchasing it were aware that it was fortified. Within all the communities selected as part of the qualitative district study, fortified oil/ghee was available in the retail outlets visited.[66] Fortified wheat flour was sold by one retailer in rural Badin, Sindh. While not a statistically representative sample, nor based on fortification validation, this nonetheless points to the wide availability of fortified edible oil/ghee and the limited availability of fortified wheat flour. Neither the retailers selling this oil/ghee nor the consumers purchasing it knew that it was 'fortified', although few retailers and consumers were aware that this oil/ghee had increased vitamins in it. Similarly, the one retailer selling fortified wheat flour was not aware that this was fortified, or that it was different in any way to other brands of flour.

Although the district study did not find any evidence of an increase in prices of foods due to fortification[67] the perceived price of fortified foods is a concern for people, particularly among the poorest. These findings hold true for both women and men. While a few respondents indicated a willingness to pay more for food with increased health benefits, most were only willing to purchase fortified foods if they cost the same as their currently used brand. This was especially true for poorer respondents, such as daily wage earners. Nonetheless, in the case of wheat flour taste and habit of consuming a particular flour (e.g. *chakki* flour versus roller mill flour), and whether the household lives in a wheat-growing area, are crucial factors that influence consumer behaviour. In areas where wheat is commonly grown, those who can afford it purchase a stock of wheat at the time of harvest, which they store for the entire year and get it grinded as needed. The

[65] Here fortified oil/ghee and wheat flour are referred to as that which has either a logo or text stating that the oil/ghee is fortified. There was no testing done to determine whether the food was actually fortified.
[66] The evaluation team selected eight communities across four FFP districts in Punjab and Sindh, within which two retail outlets were selected purposefully (key informants in the community were asked to identify retail outlets where most people in the community purchase household groceries). See Section 3.2.3 for further detail about the methodology of the district study.
[67] This does not include unpackaged or unbranded oil/ghee, which is priced lower than packaged oil/ghee.

poorest, usually those who earn daily wages, are unable to spend a large amount of money at one time, and therefore cannot afford to purchase wheat crop. They generally purchase roller mill flour, which is cheaper than flour sold at *chakkis* and can be bought throughout the year. The poorest also tend to consume 'loose oil' (especially in Sindh, where the sale and consumption of this oil is common) as this can be bought in smaller quantities and is cheaper than packaged and sealed oil.

Coverage of roller mill flour is low among households, and is generally lower among the most vulnerable. Additional analyses of the 2017 FACT survey data conducted for the MTE revealed low household coverage of fortifiable roller mill flour. For example, only 19% of households in Punjab and one-third of households in Sindh (the largest provinces) purchased and consumed roller mill wheat flour. Coverage of roller mill flour was lower across most 'at-risk' households (e.g. rural, poor, low socioeconomic status) compared to not at-risk households (see Figure 4). A notable exception, however, was Punjab, where poor households were more likely to consume roller mill wheat flour compared to the non-poor.[68] FFP's RDS found a similar trend in the four districts of Punjab it surveyed, whereby coverage of roller mill flour was 25% among all households and roughly similar in the bottom four incomes quintiles (25%), and lower among the richest households (15%). This confirms the finding from the qualitative research that in wheat-growing areas (mostly located in Punjab), households that can afford to purchase large stocks of wheat or use the wheat they have grown get their wheat flour grinded from a *chakki*. This option is less likely to be available for poorer households, who are unable to purchase or retain large stocks of wheat at harvest and therefore buy cheaper roller mill flour. The evaluation team will assess changes in coverage of fortified wheat flour from baseline at endline.

Coverage of fortifiable oil/ghee is universal among households, yet consumption of fortified oil/ghee is considerably lower.[69] The 2017 FACT survey reported that fortifiable (i.e. industrially produced) oil/ghee was consumed by 98% of households in Balochistan, 99.6% of households in Punjab, and 99.8% of households in Sindh. While fortified oil/ghee was consumed by only 39% of households in Balochistan, 31% of households in Punjab, and 20% of households in Sindh. Additional analyses conducted for the MTE explored differences in amounts of fortified oil/ghee consumed by risk factors (see Annex I). Results revealed that the amount of fortifiable oil/ghee consumed among WRA and children under five years of age was lower among individuals from 'at-risk' households (e.g. rural, poor, low socioeconomic status) compared to those from not at-risk households, but the magnitude of the differences was small. Changes in consumption from baseline will be assessed at the end of the evaluation through a FACT survey.

[68] Similarly, with regards to socioeconomic status, there was a small difference (about 1 percentage point) in coverage of roller mill flour between high and low socioeconomic status households.
[69] Based on FACT survey results, which did not survey KP province.

5.4 Improved public sector management of food fortification

Midterm summary answers to evaluation questions	
KEQ5: To what extent has the programme contributed to an improvement in public sector management of the fortification of wheat flour and edible oil/ghee in accordance with mandatory legislation and revised standards and regulations?	
DEQ5.1 To what extent has the programme contributed to making food fortification mandatory, and to the adoption of revised and harmonised regulations and standards?	At the national level, PSQCA approved revised national standards for wheat flour and edible oil/ghee fortification in 2017. FFP contributed to the revisions through extensive TA and advocacy, in partnership with other stakeholders, effectively using the NFA as a coordination platform. FFP further assisted the provincial food regulatory bodies, particularly in Punjab and Sindh, to adopt the revised standards in its regulations, which, when read in conjunction with the Food Authorities Acts, have made fortification mandatory in Punjab, Sindh, and KP. However, in the case of wheat flour fortification, provincial governments/Food Authorities do not consider this to be a sufficient legal sanction for effective monitoring and enforcement. Therefore, provincial governments in Punjab and Sindh, with FFP's support, have started discussions and have started to prepare drafts for separate mandatory legislation, which will provide a stronger legal basis and the necessary political support for the wheat flour fortification agenda and ensure the sustainability of the mandatory food fortification.
DEQ5.2 To what extent has the programme contributed to the government improving the monitoring and enforcement of food fortification regulations and standards?	In collaboration with the NFA/PFAs, FFP has provided training on food fortification and QA/QC to national and provincial regulatory staff, field monitoring staff at provincial and district level, and provincial government lab personnel. Furthermore, FFP strengthened the sample testing infrastructure at public labs in Punjab and provision of support for the establishment of a public laboratory in Sindh is underway. Overall, provincial QC capacity remains weak and the credibility of provinces' QC procedures need to be strengthened. Sample testing by public reference labs is just starting. The Punjab Food Authority has been effectively monitoring and enforcing adequate oil/ghee fortification. Government inspection of oil/ghee mills has reportedly also started in Sindh, and PSQCA is also monitoring oil/ghee fortification. External government monitoring of fortified wheat flour appears not to have started in earnest due to what the provincial governments perceive to be the weaker legal basis for fortification. Progress appears to have been constrained by the political economy of the wheat flour sub-sector. Annual government enforcement inspections of oil/ghee and wheat flour mills under the programme are just starting, meeting APIP targets. FFP has developed and operationalised a fortification information system, FortIS. However, its integration in government systems and alignment with their MIS has yet to be undertaken. External government monitoring is not well integrated in FortIS.
DEQ5.3 To what extent has the programme contributed to building awareness of, political commitment to, and support for wheat flour and edible oil/ghee fortification?	FFP had been able to leverage the supportive political narrative and momentum on malnutrition and food fortification to deepen government awareness of, and reinforce political commitment to, food fortification, particularly at provincial level. Government actors have demonstrated dedicated support for food fortification. Differences in government commitment appear to exist between provinces due to differences in provincial authorities' receptiveness to the fortification agenda, FFP's engagement approach, and the political

Midterm summary answers to evaluation questions	
	economy environment. Government awareness of and political commitment for food fortification seems to be relatively strong in sectoral ministries/departments; however, engagement with the central ministries/departments, like finance and planning—essential to sustain the agenda—does not appear to have been prioritised. District government understanding is weaker and a strategic commitment to food fortification is lacking. In Punjab, FFP has been able to leverage the DMACs as a platform for multi-stakeholder engagement but their limited functionality constrains their effectiveness.
DEQ5.4 What other factors influence political commitment to, support for, and improved public sector management of wheat flour and edible oil/ghee fortification?	• Government commitment to and support for wheat flour fortification is heavily influenced by the political economy of wheat distribution and wheat flour production. Provincial governments and wheat flour mills are interdependent, due to a system of wheat quotas and wheat price regulations. The wheat flour industry wields substantial political power. Therefore, provincial governments are cautious to enforce regulations without broad-based political backing and industry buy-in. • There has been strong momentum around nutrition programming and policy in Pakistan since the publication of the NNS in 2011. National and provincial food alliances are in place and are supported by multiple development partners. Similarly, existing Multisectoral Nutrition Strategies (MSNSs) provide enabling frameworks for food fortification. Multiple development partners have funded these. GAIN and WFP are particularly providing support to food fortification. • Transfer of government officials at district level and the limited functionality of DMACs in Punjab constrain FFP's engagement with district governments. • Mandates and roles/responsibilities within Pakistan's devolved government system are not fully clear. In the case of oil/ghee fortification, the issue of harmonisation of standards was resolved by the CCI, a constitutional body mandated to resolve disputes among the federating units. The in-vogue division of fortification monitoring responsibilities among provincial Food Authorities, provincial food departments, and PSQCA adds further complication. Additionally, the situation at district level is complicated by the varying levels of devolution to the districts across provinces.

This section assesses the status of the intermediary outcomes outlined in the public sector impact pathway in the ToC. FFP's ToC postulates that to achieve sustainable supply of adequately fortified wheat flour and edible oil/ghee government needs to make adequate fortification a legal requirement, and to effectively monitor and enforce food fortification according to standards and regulations. To this end, the programme has as intermediary outcomes that: a) governments increase their awareness, political commitment, and support for food fortification; b) more provincial and regional governments make fortification of wheat flour and edible oil/ghee mandatory; c) national, provincial, and regional governments adopt, revise, and harmonise standards and regulations for the fortification of these food vehicles; and d) governments at different levels have improved skills, procedures, and access to QC equipment in line with the standards and regulations. The different intended results are discussed below. An implementation review in Annex F assesses the progress of FFP's activities that are meant to contribute to these results.

Government awareness of, political commitment to, and support for food fortification

FFP has been able to build on the existing political momentum for nutrition and food fortification to deepen government awareness of, and to reinforce political commitment to, food fortification, particularly at a provincial level. As discussed in Section 2.1, there has been strong momentum around nutrition programming and policy in Pakistan since the publication of the NNS 2011 results. Food fortification features in national and provincial-level MSNSs, the development of which predates the programme. The notification of the national and provincial food alliances in 2015 and 2016, respectively, reflect government awareness of and commitment to food fortification. Therefore, government awareness of and commitment to food fortification at national and provincial levels was already being raised before the start of the programme. Nonetheless, FFP has built on this to expand the public sector understanding of food fortification through its trainings, TA, and advocacy. The MTE interviews with provincial government staff confirm that they understand the need for, and importance of, food fortification as a public health issue, and the required enabling environment, such as making it mandatory through appropriate legislative cover, enforcement, and QA/QC processes. The FFP Stakeholder Engagement Database also indicates that FFP, through its advocacy, has been able to reinforce the commitment of provincial authorities in Punjab, Sindh, and KP to food fortification, as manifested by ministerial backing for mandatory legislation to be put in place. In Sindh, the Minister of Food has requested FFP to provide suggestions on the monitoring of mandatory food fortification to be included in the by-laws of the new Food Authority.[lxxvii] At the national level, FFP lobbied for the inclusion of food fortification in party manifestos during the 2018 elections. While none of three targeted political parties included food fortification in their manifestos, tackling malnutrition and stunted growth in general has been an agenda item for most political parties.[70][lxxviii] For example, tackling malnutrition was part of the manifesto of PTI.[lxxix]

Government awareness of and political commitment to food fortification seems to be concentrated in sectoral ministries/departments; however, engagement with the central ministries/departments—essential to sustain the agenda—does not appear to have been prioritised. Differences between provinces exist. The food fortification agenda in Pakistan, including in provinces, is typically spearheaded by sectoral ministries/departments, such as of health or food, where awareness and commitment is relatively high, although stakeholder interviews indicate that there are varying levels of commitment across provinces. Commitment to the fortification agenda is more broad-based in Sindh, compared to Punjab, partially because of FFP's more broad-based government engagement in Sindh (see above) and because the Sindh government has shown itself more receptive to legislation and adoption of national food standards. Furthermore, the political economy is different in the two provinces. In Punjab, which is the most important wheat-producing province, the government is more sensitive to any negative response from the wheat flour sector, and the Food Authority falls under the Food Department. Awareness among powerful central ministries/departments of planning and finance is low because they have been less engaged; although FFP is part of central arrangements within provincial governments, such as the MSNS steering committee in the case of Punjab and AAP in Sindh, and the P&D Department in Sindh, seemed more aware of the programme when interviewed. No engagement with the provincial Finance Departments was undertaken. Such engagement is important to ensure the financial sustainability of the food fortification efforts. In general, commitment from the central departments is important because their convening power ensures inter-departmental coordination

[70] According to FFP Stakeholder Engagement Database Year 2 Quarter 3, FFP had advocacy meetings with the Awami National Party, Pak Sarzameen Party, and Pakistan People's Party. According to FFP's Year 2 Annual Report the Vice President of the Pakistan People's Party and the General Secretary of the Pak Sarzameen Party verified that advocacy messages were included in their manifestos. At the provincial level FFP has secured the support of the Chairman of the Pakistan People's Party for mandatory fortification in Sindh.

takes place, and because there is then a push for the agenda from the central structure of the state.

Beyond expressed commitment, government actors have demonstrated concrete support for the programme, although sustaining this level of support will depend on multiple factors, such as mandatory legislation, industry influence, and fiscal space. Following FFP's lobbying efforts, and in collaboration with other fortification partners, the Federal Board of Revenue exempted customs duties on imports of premixes and also included exemption of sales tax on microfeeders and premixes in the federal budget 2018–2019, ratified in the Finance Act 2018.[lxxx] In support of the FFP agenda the provincial departments have used informal approaches to push mill owners towards fortification. For example, during Ramazan last year, the Punjab Food Department linked the distribution of additional wheat quota to fortification; consequently, most mills in Lahore fortified wheat flour for that period in order to obtain the government quota. Provincial departments have also written to non-compliant mills advising them to start fortification. Furthermore, the Food Department of Punjab has indicated that the increased price of wheat flour may either be added to the government sector subsidy or can be added in the final retail price. However, any such change will come after new legislation has been enacted, as stakeholder interviews indicate that the promulgation of separate legislation is required to ensure sustained government support. Provincial government actions to support food fortification are further influenced by several factors. First, government behaviour is influenced by the anticipated reaction of the private sector, especially in the case of wheat flour, which has a strong lobby (PFMA), through a credible threat of disrupting the supply of flour in the market. Second, the capacity of the regulatory and monitoring bodies, in particular the Food Authority, plays a key role in regard to government taking concrete action and ensuring compliance with food safety standards. Since the Food Authorities in Sindh and KP have only recently been created their impact on food fortification in Sindh and KP is more constrained, because of the capacity constraints. Third, the 2018 elections resulted in the PTI, which is most vocal on stunting and malnutrition, making the national government.[71] Fourth, concrete government support depends on public sector fiscal space, which is tightened and therefore may reduce government appetite to continue supporting a food fortification initiative. However, the national government is developing a PKR 100 million PC-I for health and nutrition, which suggests financial support for the sector is still present.

District government understanding is weaker and district governments do not have a strategic commitment to food fortification. Interviewed district officers that had been engaged by the programme all understand the basic idea of fortification and the harmful effects of micronutrient deficiencies, although consultations in Punjab suggest that the understanding of the importance of food fortification at the district level varies from person to person. Frequent transfers and postings at the district level have impacted the understanding of and support for food fortification. In the visited districts FFOs focus on their engagement with the mills and mostly approach the district government in case of continued non-compliance. While district officials are interested and supportive—for example, Deputy Commissioners issued letters of support for the awareness campaign and fortification—district champions for the cause of food fortification are generally missing. For example, in one district in Punjab, where at the time of the district visit a minority of mills were fortifying wheat flour, the district government had no plans in place to address the issue, and the involvement of a food controller also proved ineffective in resolving the issue. This is primarily due to a lack of legislative control. Nonetheless, in Punjab the DMACs provide a platform to further reinforce the fortification agenda and coordinate government support. FFP is a member of the DMACs and through the committees has been able to galvanise district support to address bottlenecks in programme implementation. However, as mentioned before,

[71] The PTI government has constituted a task force on nutrition and a request for proposal has been published for the creation of a national centre of excellence on health/nutrition.

DMACs have limited functionality across the province.[72] A lack of engagement by FFP with the P&D Department has also limited efforts to make DMACs effective partners in the food fortification agenda. The programme relies heavily on support from the offices of district commissioners, which has suffered from transfers, as highlighted above. Additionally, the situation at district level is complicated by the various levels of devolution to the districts across provinces. For example, while KP has fully devolved district government, the outgoing political government in Punjab fragmented the district governance structure, with significant authority recentralised to the province (and this seems to be changing yet again under the new government). Whichever way the local authority structure eventually settles, it is important for the programme to develop and maintain relationships with the central authority of the district commissioner and relevant sector officials, to ensure a sustained push for effective FFP enforcement and monitoring.

Adoption, revision, and harmonisation of fortification standards and regulations

PSQCA has approved revised national standards for wheat flour and edible oil/ghee fortification, supported by TA and advocacy by FFP. PSQCA is the legitimate regulatory body as regards devising and certifying product standards and specifications in Pakistan. In 2016, FFP supported the development of recommendations for the revision of edible oil/ghee fortification standards to include vitamin D, and of wheat flour fortification standards in line with the World Health Organization (WHO) guidelines.[73] FFP advocated for the revisions at PSQCA Technical Committees and FFP advisers prepared a justification paper for the revision of standards for wheat flour fortification.[lxxxi] After PSQCA Technical Committees approved the revisions in 2016, PSQCA's National Standards Committee approved them during the first half of 2017. The National Standards Committee further agreed to include fortified wheat flour in the mandatory list of the items monitored by PSQCA, and PSQCA also issued a notification in July 2018 to all edible oil producers to share with them the revised standards, and reiterated the requirement to adequately fortify their products with vitamins A and D.[lxxxii] Interviewed national and provincial fortification stakeholders appreciated the revisions and the harmony created between national and provincial governments.

The revision of the standards took place in partnership with other stakeholders, using the NFA as a coordination platform. FFP has been able to work with the NFA in developing a justification paper regarding the revision of the wheat flour fortification standards and has jointly advocated for the revision of the standards towards PSQCA.[lxxxiii] Other fortification partners, such as GAIN, WFP, and industry associations, all members of the NFA, were also involved in the advocacy process and jointly with FFP recommended the revisions at the PSQCA Technical Committees. Therefore, the NFA fulfilled its role as coordinating platform, as assumed in FFP's ToC. At the national level, FFP effectively collaborated with fortification stakeholders, which resulted in the harmonisation of standards. This seems a significant achievement keeping in view the political economy challenges in Pakistan.

Punjab, Sindh, and KP have adopted provincial standards for oil/ghee and wheat flour that are in line with national standards. During FFP's second implementation year the Punjab Food Authority approved the revised standards for wheat flour fortification and agreed to harmonise its standards for edible oil/ghee fortification with the national standards set by PSQCA, after having first adopted a higher minimum standard for vitamin A fortification, which it revised later on through the intervention of the CCI and advocacy by FFP and other partners.[74] In Sindh, the revised

[72] In the districts visited (Sargodha, Kasur, and Gujranwala) only one DMAC meeting had taken place in Kasur and Gujranwala, and none in Sarghodha.
[73] It was recommended to increase the level of iron for wheat flour fortification from 10 parts per million (ppm) to 15 ppm and revise the level of folic acid from 1.5 ppm to 1.0 ppm. In addition, it was recommended to add 30 ppm of Zinc and 0.008 ppm of vitamin B12 to wheat flour fortification.
[74] It is to be noted that the involvement of the CCI was not the result of the FFP intervention but came about due to the need to resolve the dispute between various federating units. It goes on to demonstrate the high-level ownership of the

standards on wheat flour and oil/ghee fortification have been adopted through the Sindh Food Authority Act 2017, which FFP also offered support to. In KP, the Food Safety and Halal Food Authority had also revised the fortification standards of edible oil/ghee and wheat flour by the end of FFP's second implementation year, following TA provided under the DFID-funded Technical Assistance for Nutrition project in collaboration with FFP.[lxxxiv]

Introduction of mandatory fortification of wheat flour and oil/ghee

FFP has followed a two-pronged approach to making the fortification of wheat flour and edible oil/ghee with specified micronutrients mandatory in different provinces. On the one hand, it promotes the introduction of mandatory legislation where the environment is receptive. On the other hand, the programme seeks to support government to include in legislation provisions of mandatory fortification through rules and regulations and setting standards. FFP considers the latter approach to lie more within the control of the programme. In the case of oil, where mandatory legislation already existed, it has sought to improve the fortification standards and add the missing vitamin.

Provincial governments have adopted the revised standards through regulations that, when read in conjunction with the Food Authority Acts, make enforcement of fortification according to these standards mandatory. **However, provincial authorities do not consider this sufficient for effective monitoring and enforcement of wheat flour fortification, as regulation is liable to be revoked much more easily compared to when such a mandate comes directly from the legislature**. Following the national-level revisions of the standards on wheat flour and edible oil/ghee fortification (see above), FFP reported that the Punjab Food Authority and the KP Food Safety and Halal Food Authority have made fortification of wheat flour and edible oil/ghee mandatory through regulations during FFP's second year of implementation. In Sindh, oil/ghee fortification was reportedly made mandatory in the same year, while wheat flour fortification was mandated in the third year. Provincial governments amended their respective food regulations to include the revised standards, and by virtue of their prescription under these regulations they have become mandatory. The provincial Food Authority Acts empower Food Authorities to impose punishments for violations of these regulations. This is a significant change compared to the start of the programme, particularly for wheat flour fortification, since no regulations on mandatory fortification existed, but also for edible oil/ghee, since fortification with vitamin D has now been mandated through this instrument. However, the MTE interviews with Food and P&D Departments and Food Authorities highlight that they consider such a regulatory approach insufficient for effective enforcement. While the legal basis seems to exist for Food Authorities to enforce the regulations, they seem to favour a direct endorsement of wheat flour fortification by the provincial legislatures in the form of a dedicated law, which, in the process, will also ensure broad-based political ownership of mandatory fortification. This is important in light of the sensitive political economy of the wheat flour sector, where the mills wield considerable power and are in a position to resist compliance when the mandate only comes through a regulation. A direct legislative mandate for wheat flour fortification would be more difficult to roll back, and in the presence of such a mandate Food Authorities would be better able to stick to the enforcement action.

Provincial governments, with FFP's support, have started discussions about, and have started to prepare drafts for legislation on mandatory fortification. Such mandatory fortification will be more difficult to change and will add a layer of accountability for food fortification, as the assemblies could hold the provincial departments to account for progress on

issues of coordination in standard setting. See the links below: https://www.thenews.com.pk/print/372297-federal-body-on-food-standards-on-the-cards,
https://en.dailypakistan.com.pk/headline/pm-imran-to-chair-first-cci-meeting-today-with-key-issues-on-agenda/
www.technologytimes.pk/cci-develop-food-standards/

wheat flour fortification. By the end of 2018, no new laws on mandatory fortification had been promulgated in any of the provinces. Nonetheless, in Sindh, a draft of the Sindh Food Fortification Law has been prepared to introduce mandatory wheat flour fortification. This was submitted to the provincial assembly for approval in February 2019. In Punjab, FFP has supported the development of draft bill that mandates wheat flour fortification. The Food Department still has some reservations on both the content of the draft law as well as its implementation arrangements. A legal review has now been sought from the Law Department.

Government QC capacity

Provincial QC capacity has been supported with equipment and training but remains overall weak. As discussed in the implementation review in Annex F, FFP has strengthened provincial QC testing capacity through the provision of laboratory equipment and training of laboratory personnel. By December 2018, this had happened for the Lahore laboratory of the Punjab Food Authority and the Joharabad laboratory of the Punjab Food Department, to test oil/ghee and wheat flour samples, respectively. Under an MoU with FFP, the Punjab Food Authority agreed to accept the cost of oil/ghee testing following FFP's support for the first two years.[lxxxv] However, testing capacity is constrained by lab staff shortage at the Punjab Food Authority. Interviewed representatives of the Punjab Food Authority and Food Department reported that samples were also being tested in private labs (mostly samples of wheat flour at Qarshi lab), which also indicates the limited QC capacity of the government, and that more training is needed to make sure that lab staff know how to fully operate the equipment. Furthermore, interviewed wheat flour producers doubted the credibility of the test results from the Joharabad laboratory, which is critical for effective compliance and enforcement. In Sindh, there are no public labs for QA/QC, although the recently established Sindh Food Authority is planning to set up a lab in Karachi. FFP will provide iron and vitamin A testing equipment once the lab is established. Up to now the Sindh Food Authority has used private international laboratories for testing; interviewed representatives of the Food Authorities value the work of these laboratories because of the transparency and credibility that they offer. In order for it to add value over and beyond using private labs it will be important for the public sector lab capacity that is being created to achieve the same credibility and transparency.

Sample testing by public reference labs is just starting (in line with the expected start of government mill inspection in FFP's third year of implementation). Monitoring data are limited to assessing public lab performance, but sample testing is reportedly affected by capacity weaknesses in Punjab. FFP reported that during its second implementation year, the programme worked with the Punjab Food Authority to establish a mechanism for sample collection and analysis with the HPLC equipment. The programme further reported that the Punjab Food Authority had started using HPLC and RTKs to determine oil fortification.[lxxxvi] This is not corroborated by FortIS data, which do not report any oil/ghee samples tested in the reference labs. However, the APIP reporting does suggest that oil/ghee inspection had started by August 2018, although it is not clear where or how samples were tested. In the case of wheat flour, FFP reported that by December 2018 the first samples were tested through FFOs in the Joharabad lab of Punjab Food Department.[lxxxvii] FortIS data confirm that 12 and eight wheat flour tests were conducted in reference labs in September and December 2018, respectively. However, government staff have yet to start taking and testing wheat flour samples as they consider this to be conditional upon the passing of fortification legislation by the provincial assembly. In general, monitoring data on public lab performance are limited and therefore it is difficult to assess current performance. Interviews with provincial government stakeholders in Punjab confirm that FFP has provided samples to test, but sample testing has been affected by the limited number of staff to undertake lab test, doubts about the accuracy of lab tests, and insufficient hands-on training to operate lab equipment.

Government monitoring and enforcement of food fortification

A key intermediate outcome of the programme is improving government monitoring of fortified wheat flour and edible oil/ghee as it is vital to detect and act against non-compliance with standards and regulations. The focus of FFP support is on external monitoring by provincial authorities at the production site, although FFP has also trained PSQCA staff in QA/QC of food fortification, and is planning to support commercial monitoring at retail level as well.[lxxxviii] The FFP logframe sets as a target annual mill inspection, which is assumed to begin in the year after mills become operational. Building on government monitoring, FFP aims to help establish an enforcement regime at provincial and district level.[lxxxix] Government monitoring and enforcement systems will need to be differently tailored for the oil/ghee and wheat flour sectors, given their different legal, market, and political economy contexts.

Annual enforcement inspections by government of fortified edible oil/ghee under the programme are starting, but regulatory authorities, particularly the Punjab Food Authority, have been conducting ongoing periodic inspection. FortIS currently does not report on government monitoring visits to the mills, which makes it difficult to assess change in this key outcome. A distinction needs to be made between comprehensive annual government enforcement inspections—included as an indicator in FFP's logframe—and more routine government monitoring in the market or of the mills. Regarding the latter, according to FFP progress reports, the Food Safety Officers of the Punjab Food Authority were performing quarterly inspections of all oil/ghee mills in close collaboration with the programme by the end of FFP's second implementation year. Interviewed representatives of the Punjab Food Authority reported that Food Safety Officers inspect the oil/ghee mills twice a year, in accordance with their inspection regime (which was in place before the programme began).[75] According to FFP's APIP progress report at the end of 2018, government inspection of oil/ghee mills was also ongoing in Sindh at this time. Besides provincial Food Authorities, PSQCA is undertaking monitoring visits to oil/ghee mills and collecting data in marketplaces, although according to FFP this is not frequent.[76] Regarding annual enforcement inspections, FFP reports that by the end of 2018 10 oil/ghee producers had undergone inspection.[xc] This is in line with the target set in the APIP, but slightly behind the target of beginning inspections in the year after mills become operational, since one year earlier (by the end of December 2017) 18 oil/ghee mills had been operational according to FortIS.

External monitoring of fortified wheat flour has yet to take off as the government does not feel confident about taking enforcement action in the absence of a direct mandate from legislation, rather than from the subordinate, weaker instrument of regulation. APIP progress reports indicate that annual enforcement inspection of flour mills has started—11 mills reportedly underwent inspection by the end of 2018, which is ahead of the APIP target but somewhat behind the target of inspecting mills one year after becoming operational (32 mills were operational in December 2017). However, stakeholder interviews carried out as part of the MTE seem to contradict this, asserting that monitoring fortification of wheat flour has yet to commence. Presumably the latter refers to more standard, periodic government monitoring.[77] According to the stakeholders consulted, the inspection of wheat flour mills is constrained by the absence of mandatory legislation. Without legislation, government fears that monitoring and enforcing of wheat

[75] Reports of the inspection and testing of edible oil and fats during two monitoring campaigns (in February and July 2018) are published on the website of the Punjab Food Authority. According to the FFP Year 2 Annual Report the inspections were conducted at mill level and included vitamin A testing. FFP provided additional data on regulatory monitoring visits to mills in 2018, which indicate that the Punjab Food Authority undertook 151 inspections at 55 premises in Punjab, during which 159 samples were taken.
[76] FFP Quarterly Report September 2017 estimates that PSQCA visits occur once or twice a year. The representatives of PSQCA interviewed as part of the MTE reported that visits take place quarterly. Two oil/ghee mills interviewed also confirmed quarterly inspection.
[77] Unlike monitoring for oil/ghee fortification in Punjab

flour fortification by public sector officials may be resisted by mill owners, thereby limiting the effectiveness of such action.

The independence and credibility of the monitoring procedures are considered to be critical. Interviewed stakeholders stressed that monitoring needs to be conducted randomly by independent assessors. Some interviewees voiced doubts about the independence of the sample collection by the FFOs because the performance of the programme is seen to be linked to showing adequately fortified flour. Furthermore, the randomness of the inspection is questioned. In general, interviewed stakeholders seem to favour monitoring in the marketplace, to draw random, independent samples. Fortification literature highlights that commercial monitoring in the marketplace and external monitoring at mill-level have different objectives, and therefore should not be seen as substitutes.[xci] This suggests that more sensitisation and discussion needs to take place among government actors regarding the emphasis and objectives of the external monitoring regime.

External monitoring is complicated by a lack of clarity regarding roles and responsibilities. A common challenge in implementing effective regulatory monitoring for food fortification is a lack of clarity regarding the roles of government authorities in monitoring and enforcement. [xcii] The role of PSQCA versus that of the Food Authorities regarding external monitoring is not fully clear, as both are conducting monitoring visits to oil/ghee producers. In the case of wheat flour, the situation is further complicated by the role of the Food Department in QC and sample testing. According to the FFP's logframe, it is assumed that government monitoring of fortified wheat flour is conducted by officials of the Food Department or PSQCA. However, the FFP Quarterly Report December 2018 suggests that the monitoring of flour mills may also be the competency of the Food Authorities, as FFP met with the leadership of the Punjab, Sindh, and KP Food Authorities regarding monitoring of flour mills on wheat flour fortification. If the Food Authorities conduct the wheat flour inspection a linkage with the Food Department's laboratory, where iron testing equipment has been installed, needs to be established as this liaison seems to be missing according to interviewed staff at the Punjab Food Authority. In general, the MTE stakeholder interviews point to the Food Authorities being mandated to enforce non-compliance and to license food businesses that produce for the Pakistani market. Monitoring roles for fortified foods could be clarified in the standard operating procedures (SOPs) used by monitoring staff. According to interviews, monitoring procedures have been established for oil/ghee but not for wheat flour.[78] The fact that legislation governing wheat flour fortification continues to be outstanding is affecting the development of such procedures.

External monitoring is not well integrated with MISs. Good practice recommends that external monitoring is recorded in a food fortification MIS, which can then be the basis for enforcement. While the FortIS manual states that the system has the capability to record mill, lab, and market monitoring, it is unclear whether government routine monitoring is actually recorded in FortIS.[79] We have not found any evidence that FortIS is used as a tool to facilitate follow-up on inspection results. Furthermore, FortIS is currently not integrated with provincial MISs, which limits the ability to efficiently obtain external monitoring data.

Enforcement of oil/ghee fortification is taking place and has led to compliance by producers. However, enforcement of wheat flour fortification is much weaker due to the absence of a broad-based political support and an express legal basis under a law passed by the provincial legislature. Government action is currently limited to the issuing of letters to wheat flour mills requesting compliance. While different government agencies have issued

[78] The evaluation team do not have documentary evidence to substantiate this.
[79] FFP has provided data on routine regulatory inspection conducted in Punjab and KP but it is not clear whether this is systematically captured in FortIS for easy use.

instructions to oil/ghee and wheat flour mills to fortify their respective products in accordance with relevant standards[80], the evaluation team did not find evidence of the establishment of a structured enforcement regime for food fortification, as indicated in the APIP. FFP's Year 2 Annual Report indicates that district administrations in Punjab and Islamabad have started to enforce food fortification, and it indicates that in Sindh discussions have started with the districts. However, FortIS does not provide any data to support this. Interviews confirm that in the case of oil/ghee fortification, the Food Authorities are actively undertaking enforcement action.[81] As mentioned above, in the case of wheat flour fortification, provincial regulatory bodies do not consider themselves to have a sufficient legal and political basis to monitor and enforce fortification. Enforcement is attempted only by the issuing of letters/instructions by different tiers of the government, such as Secretary Food, Deputy Commissioners, and Food Controllers in the district. The interviews also reveal that for wheat flour a more collaborative approach would be required for enforcement after new legislation comes into force, as the legislation would apparently clash with the government's policy of ensuring steady and affordable provision of wheat flour. However, on the other side, the government's commodity operations, in which it issues wheat quotas to flour mills, may strengthen its hand in negotiating the enforcement of wheat flour fortification by the mills that receive government-issued wheat quotas. As an interim incentive, the Punjab Food Department did link the issuing of subsided wheat quota for wheat flour mills during the last Ramazan to the installation of microfeeders and the placement of premix procurement orders. Interviews also revealed that the existing strength of public sector inspectors will not be sufficient to adequately monitor food fortification, given the size of the wheat flour sub-sector and their existing responsibilities for monitoring other food sub-sectors.

[80] For example, the Sindh Food Authority issued a notification on 17 July 2018 to all oil/ghee mills in Sindh province to work closely with FFP to ensure adequate fortification of oil/ghee (FFP Quarterly Report September 2018). The Director Operations KP Food Authority also issued notifications to flour mills in Peshawar and Mardan to start fortification in accordance with the new standard (FFP Quarterly Report December 2018). The Punjab Food Authority has instructed resistant oil/ghee mills to cooperate with mandatory fortification (FFP Quarterly Report September 2018).

[81] Additional data provided by FFP in April 2019 on the food regulatory visits in Punjab also indicate that 71 improvement notices were issued to oil/ghee mills in 2018 across almost all of the districts, six mills were fined, and four premises were sealed.

6 VfM of FFP

Midterm summary answers to evaluation questions	
KEQ6: Is the programme cost-effective and does it offer VfM?	
DEQ6.1: To what extent does the programme provide VfM for the resources invested?	FFP has generally followed sound procurement practices for key programme inputs. However, average fee rates for short-term and long-term TA exceeded the budgeted amounts, while operational budgets were underspent, reflecting implementation challenges and delays. There is an indication that these costs may be trending towards expected values as implementation progresses. As the costs partially reflected challenges in the operating environment, are currently trending positively, and have not materially exceeded benchmarks in recent months, a judgement of 'adequate' is reached for the economy dimension of the VfM analysis, as set out in Section 6.2.2. FFP has struggled to keep up with the implementation plan in the first 2.5 years of operation, due to multiple delays, which impacts most of the efficiency indicators considered within the reporting period, particularly for wheat flour-related activities. FFP shows improvement in the later part of the reporting period (Q9 and Q10) on some of the efficiency indicators, which suggests that performance along the efficiency dimensions might improve during the next reporting period. Overall, in the first two years of the programme, FFP has achieved an adequate level of VfM in its implementation, as set out in Section 6.2.2 for economy and in Section 6.2.3 for efficiency. FFP has shown efforts to keep programme costs low but significant delays in implementation have resulted in challenges to keep the programme running efficiently. In assessing performance as adequate, we have considered that these delays had multiple causes and are not the sole responsibility of the implementer.

6.1 Introduction

The FFP VfM analysis seeks to respond to the main evaluation question regarding to what extent FFP provides VfM for the resources invested. The VfM analysis for the evaluation covers five dimensions: economy, efficiency, effectiveness, cost-effectiveness, and equity. The midterm VfM assessment focuses on the input- and output-related criteria of 'economy' and 'efficiency'. The information collected and analysed in this report will be updated as part of the endline assessment, which will additionally cover effectiveness, cost-effectiveness, and equity.

The MTE covers a period of two and a half years: from June 2016 until the second quarter of Year 3 of the programme. The focus is on programme implementation. This means that decisions made prior to implementation—in particular relating to the design of the programme itself—are outside the scope of a VfM assessment. The assessment of economy and efficiency considers whether a given programme design is implemented in a way that provides VfM. It does not ask whether the design of the programme represents VfM. However, it is acknowledged that achieving VfM depends on having a sound programme design to achieve the intended objectives.

A VfM framework has been applied, which sets out explicit criteria (aspects of performance) and standards (levels of performance) for each of the VfM dimensions. The criteria and standards are aligned with FFP's ToC. Annex K presents the VfM framework in more detail. The criteria and standards are presented below. Compared to the inception report, the framework was adapted to better reflect the reality of the programme's implementation. The economy criteria on sound procurement practices have been expanded to reflect additional key programme inputs that underwent a procurement process.[82] The assessment criteria were discussed with DFID and the FFP implementation team.

The VfM assessment is undertaken from a donor perspective: the focus is on the use of DFID funds and the results agreed between the programme implementers and DFID. The VfM assessment focuses on the role of the implementers in the implementation of FFP, but also touches upon VfM issues relating to the relevance of the intervention and the role played by DFID in the implementation.

The VfM assessment makes use of routinely collected data as part of the FFP M&E system, as well as quarterly and annual reports to DFID and the Annual Review processes. This includes a mix of quantitative indicator-based measurement and qualitative contextual evidence. In addition, the analysis draws on qualitative interviews conducted with FFP and DFID, as well as qualitative information collected by other evaluation workstreams. Annex K presents in detail the data sources used for each indicator used in the VfM assessment. in this section.

It is important to note that there are some limitations to the midterm VfM assessment analysis and reporting, which are outlined below.

1. **Some of the data sources presented limitations for our analysis**. These limitations arose either because FFP deemed that some of these data were confidential or because there was not enough time to obtain them.

    - FFP's quarterly report to DFID and expenditure data as at November 2018: We only had access to the accompanying financial report and logframe for the last quarter (Q10). These detailed data were deemed confidential and required processing on the FFP side. This prevented us from looking at the trend of some dynamic efficiency indicators, such as the cost of subsidy per metric ton of output produced over time.

[82] Additionally, the definitions of some indicators, or the level of disaggregation that this VfM assessment was able to report on, have been amended in order to provide a valid VfM assessment within the constraints of the available data.

- Samples of invoices issued by premix suppliers to mills: We only had access to two examples for oil as these documents were deemed confidential and would be challenging for FFP to gather all the invoices and anonymise. This prevented us from looking more broadly at whether mills are paying the FFP agreed price for oil premix.
- Sample of mill premix stock-reporting to FFP: We only had access to one example for oil as these documents are similarly difficult for FFP to gather as there are many of them and all stock-reports need to be anonymised to protect the confidentiality agreed between FFP and mills. This prevented us from looking more broadly at whether mills are paying the FFP agreed price for oil premix.
- FortIS monitoring reports: We only had access rights to some of the monitoring indicators. Having access to a larger set of indicators could have helped us in understanding how the M&E system is used for adaptive management.

It is also important to note that we did not have access to the original data sources used to calculate indicators in the FFP VfM reporting, therefore we were not able to recalculate or independently verify those indicators and accordingly we report the indicators as calculated by FFP. While this is not a limitation on its own, we express some concerns throughout this report about how some indicators are calculated in the FFP VfM analysis, which might have implications for our findings.

2. **Lack of disaggregated data**. The evaluation team was not able to access some data disaggregated at the appropriate level, therefore limiting the extent to which certain aspects of the VfM assessment could be explored and expanded upon. For example, being able to separate the programme cost by type of food vehicle fortified (oil/ghee vs. wheat flour) would have given a better understanding of the relative cost of, and emphasis put on, each component. Additional disaggregation will strengthen the VfM assessment in the next iterations. However, the feasibility of obtaining these data will need to be discussed with FFP to make this an actionable recommendation.
3. **The wheat fortification component is still at an early stage.** By the time of the MTE, fortification of wheat flour had just started to pick up. This means that this report mostly covers the preparation of the key activities and only covers the start of the fortification process in a limited way.
4. **Lack of trend data**. For a lot of the cost data there is only one data point, which prevents us from being able to comment on trends. As per point 2 above, the feasibility of obtaining these data will need to be discussed with FFP to make this an actionable recommendation.
5. **Moving benchmarks.** Continuous re-designs and re-planning due to the changing nature of the programme and evolving context raises a question regarding what the appropriate benchmark should be for some VfM indicators.

6.2 Main findings

This section provides a systematic analysis of the VfM of the programme against the criteria of economy and efficiency. For each criterion, a definition and set of standards is provided, then the evidence is summarised, leading to judgements of the programme's performance against the two criteria individually, and VfM for the two criteria together. The section starts by providing an overall midterm VfM judgement.

6.2.1 Overall midterm judgement on VfM

Overall, in the first two years of the programme, FFP has achieved an adequate level of VfM in its implementation of the programme. FFP has shown efforts to keep programme costs low but large delays in implementation have resulted in challenges to keep the programme running efficiently. In assessing performance as adequate, we have considered that these delays had multiple causes and are not the sole responsibility of the implementer. Sections 6.2.2 and 6.2.3 summarise the findings and Annex L.1 and Annex L.2 detail the evidence supporting this judgement for the economy and efficiency dimensions.

Table 5 Overall VfM judgement

VfM dimension	Evaluative judgement	Summary of judgement
Economy	Adequate	FFP has generally followed sound procurement practices for key programme inputs. However, fee rates for short-term and long-term TA exceeded the budgeted amounts, while operational budgets were underspent, reflecting implementation challenges and delays. There is an indication that these costs may be trending towards expected values as implementation progresses. If the economy criteria are strictly applied, a judgement of 'poor' economy would be reached. However, as the costs partially reflect challenges in the operating environment, are trending positively, and have not materially exceeded benchmarks in recent months, a judgement of 'adequate' is reached for economy, overall.
Efficiency	Adequate	FFP has struggled to keep up with the implementation plan in the first 2.5 years of operation due to multiple delays, thus impacting most of the efficiency indicators under the reporting period, particularly for the wheat flour-related activities. FFP shows improvement in the later part of the reporting period (Q9 and Q10) on some of the efficiency indicators, which suggests that performance along the efficiency dimensions might improve during the next reporting period.
Midterm VfM judgement	**Adequate**	

6.2.2 Economy

According to DFID (2011) economy is concerned with the cost and value of inputs:

> Are we or our agents buying inputs of the appropriate quality at the right price? (Inputs include things such as staff, consultants, raw materials, and capital that are used to produce outputs).[xciii]

The following definition of economy is used in the VfM assessment: FFP uses resources economically, buying inputs of the appropriate quality at the right price, and following good programme management practices.

When evaluating FFP's performance against the economy criterion, the following sub-criteria are used:

1. Whether FFP is meeting agreed benchmarks or targets for TA and programme management costs.

2. Whether FFP shows sound procurement practices in respect of microfeeders and premix, and other key inputs as required.
3. Whether FFP shows effective negotiations of prices of premix, and other costs as required.

Performance standards for the economy sub-criterion are defined as follows:

Performance	Criteria
Excellent	• Programme demonstrates significant value[83] of good procurement of premix and/or microfeeders and/or other key inputs in terms of negotiated quality and/or price (Sub-criteria 2 and 3). • And meets all criteria under 'good' performance.
Good	• Unit costs for TA and operational costs of the managing agent generally[84] meet agreed benchmarks, or any significant departures from benchmarks can be justified in terms of VfM at efficiency level or higher (Sub-criterion 1). • Programme comprehensively[85] follows sound procurement practices for premix, microfeeders, and/or other key inputs and meets expectations for quality and price (Sub-criteria 2 and 3). • And meets all criteria under 'adequate' performance.
Adequate	• Unit costs for TA and operational costs of the managing agent do not consistently or materially[86] exceed agreed benchmarks (Sub-criterion 1). • Programme generally[87] followed sound procurement practices for premix, microfeeders, and/or other key inputs (Sub-criteria 2 and 3).
Poor	• Unit costs for TA or operational costs of the managing agent consistently and materially exceed agreed benchmarks or targets without reasonable justification (e.g. excessive prices are paid for inputs or inputs of inferior quality are bought cheap) (Sub-criterion 1). • Programme does not follow sound procurement practices for premix or microfeeders and/or other key inputs (Sub-criteria 2 and 3).

Judgement: based on available evidence, FFP meets the definition of 'adequate' in the standards above for economy.

In summary, the evidence was gathered to address three sub-criteria and 10 indicators: five indicators for Sub-criterion 1; three for Sub-criterion 2; and two for Sub-criterion 3. Annex K details how each indicator is measured, the benchmark, and the data source. We have referenced in parenthesis the source of evidence that is used to evaluate each of the economy dimensions; details of these can be found in Annex L.1, which presents a summary of the evidence for each indicator.

The evidence supporting this judgement suggests that average daily fee rates have been significantly higher than budgeted but seem to be trending downwards as the programme scales up its wheat fortification activities (Indicators 1.1 and 1.2). Operational costs have been well below the budgeted amount (probably related to implementation delays) but seem to be increasing with the scale-up of fortification activities (Indicator 1.3). If the criteria for unit costs of TA are strictly applied, a judgement of 'poor' economy would be reached. However, as the costs may reflect

[83] For these purposes, *significant value* must be justified with supporting rationale – e.g. the value secured is significant in proportion to the programme's overall budget for the VfM assessment period, or leads directly to significant gains in efficiency, effectiveness, or higher levels of the results chain.
[84] For these purposes, *generally* means for the most part, allowing for reasonable exceptions.
[85] For these purposes, *comprehensively* means consistently and to a high standard.
[86] For these purposes, *consistently or materially* means even if costs do not meet benchmarks, they do not remain excessively out of range.
[87] For these purposes, *generally* means for the most part, allowing for reasonable exceptions.

challenges in the operating environment, are trending positively, and have not materially exceeded benchmarks in recent months, performance against this sub-criterion is nudged up to 'adequate'.

FFP did not procure premix and microfeeders directly in the first 2.5 years of the programme but it played a key role in securing premix supply and prices on the Pakistan market. FFP competitively selected premix suppliers and effectively negotiated price ceilings for premix, and secured them through MoUs (Indicator 1.5). However, the decision to contract out only one supplier for each type of fortificant was proved to be a risky one when the supply of those producers was disrupted in 2017. This led an increase in the price of the oil fortificant in 2017 and a shortage of premix, which delayed fortification activities (Indicators 1.6 and 1.9). FFP competitively procured microfeeders through DPSA, despite reticence from PFMA regarding microfeeders being procured internationally (Indicator 1.7). Delays in contracting DPSA, in competitively assessing the suppliers, and the negotiations with PFMA mean that there were large delays in the procurement of microfeeders, though these were only to some extent within the control of FFP. RTKs were procured competitively, and their price was negotiated for two years. Sound procurement practices were followed for the procurement of services provided by CSOs; however, this report comes too early to obtain evidence of price negotiations (Indicator 1.8) as the public awareness campaign being implemented by CSOs has only recently begin. Therefore, we suggest that the 'Programme generally followed sound procurement practices for premix, microfeeders, QC equipment and CSOs' (i.e. Sub-criteria 2 and 3 were deemed 'adequate').

Therefore, the programme performance under the economy criteria is adequate.

6.2.3 Efficiency

According to DFID (2011) efficiency is concerned with the relationship between inputs and outputs:

'How well do we or our agents convert inputs into outputs?' [xciv]

In keeping with good M&E practice, this level of VfM assessment focuses on what the FFP teams deliver. As noted in DFID's (2011) VfM framework, outputs are within the control of FFP. It is worth noting that the 'outputs' defined in the FFP logframe are, for the most part, intermediary outcomes, which involve some action on the part of external stakeholders (private sector, public sector, or consumers), and are within the influence, but not direct control, of FFP. Intermediary outcomes will be evaluated at the effectiveness level within the VfM framework. Meanwhile, the assessment of efficiency will track delivery against the implementation plan, together with additional contextual information.

The following definition of efficiency is used in this VfM assessment: FFP produces the intended quantity of deliverables at the required quality, on time, and within budget.

DFID's definition of efficiency is aligned with the concept of technical efficiency (maximising the delivery of output for a given level of input/resources). This is one important aspect of using resources efficiently. However, in complex programmes it is also relevant to consider allocative efficiency (the right mix of inputs) and dynamic efficiency or adaptive management (reallocating resources to reflect evolving circumstances and opportunities).

In evaluating FFP's performance against the efficiency criterion, the following sub-criteria are used:

1. **Technical efficiency**
    a. **Implementation plan**: Delivery according to the FFP implementation plan (at required quality and quantity, on time, and within budget), allowing for reasonable exceptions like changes to deliverables agreed in advance with DFID, changes due to adaptive programming, to capitalise on opportunities and/or to manage risks.

b. **Subsidy scheme**: A performance-linked subsidy mechanism is effectively in place – verifying that the provision of subsidies to millers is linked to performance—that is, it is applied when the production of fortified foods meets agreed standards.

2. **Allocative efficiency**

a. **Allocative efficiency of TA resources**: The allocation of TA resources across intervention pathways in appropriate proportion – that is, reflecting the relative priority given and associated costs.
b. **Allocative efficiency of key inputs**: The allocation of microfeeders and premix orders reflect an appropriate balance of resources across provinces according to the staged implementation plan and priorities.

3. **Dynamic efficiency**

a. **Adaptive learning and management**: The appropriate use of operations research and M&E findings to support adaptive management (corresponds to logframe Output 4). For example, there may be significant 'emergent strategy' stories, such as instances where parts of the intended strategy or workplan were dropped, and/or new/additional approaches were adopted, in response to emergent learning, opportunities, technologies, or other changes in context).

b. **Maintaining or improving efficiency over time:** This is measured through trend analysis of selected efficiency indicators, together with contextual analysis in order to understand the reasons for trends. Potential indicators from FFP's VfM framework include average subsidy cost per unit of fortified product; extender costs per mill; and programme management cost per mill. It is to be expected that these costs will be higher initially and will reduce over time as the subsidy phases out, and as production processes and economies of scale bed in.

Performance standards for the efficiency sub-criteria are defined as follows:

Performance	Criteria
Excellent	• Implementation plan for the year is substantially exceeded[88] with regard to quantity, quality, or timeliness, within the allocated budget (allowing for emergent strategy) (Sub-criterion 1a). • Programme can demonstrate it has enhanced programme performance and better results, significantly through adaptation, learning, and reallocation of resources within overall budget (Sub-criteria 2 and 3a). • Significant improvements in the average cost per relevant output over time (sub-criterion 3b). • And meets criteria for 'good'.
Good	• Implementation plan for the year is delivered with regard to quantity, quality, and timeliness, and within the allocated budget (allowing for emergent strategy) (sub-criterion 1a). • TA resources are allocated across intervention pathways/ microfeeders and premix are allocated across provinces, in appropriate proportion, reflecting relative priority and associated costs (Sub-criterion 2). • Programme can demonstrate some examples of enhanced programme performance and better results through adaptation, learning, and reallocation of resources within overall budget (Sub-criteria 2 and 3a). • Some improvements in the average cost per relevant output over time (Sub-criterion 3b). • And meets criteria for 'adequate'.
Adequate	• Implementation plan for the year is predominantly or nearly delivered[89] with regard to quantity, quality, timeliness, and budget (allowing for emergent strategy) (Sub-criterion 1a). • Sound processes are in place to support adaptive management, learning, and reflection – including documenting, disseminating, and acting on what is learned from operations research and M&E (sub-criterion 3a). • Programme can demonstrate subsidies are only provided if agreed standards are evidenced (Sub-criterion 1b). • No unexplained material increases in the average cost per relevant output over time (sub-criterion 3b).
Poor	• **Implementation plan for the year is substantially not delivered with regard to quantity, quality, timeliness, or budget (Sub-criterion 1a).** • **Conditions for 'adequate' are not met.**

Judgement: based on available evidence, FFP meets the definition of 'adequate' in the standards above for efficiency in the current reporting period.

In summary, the evidence was gathered using three sub-criteria and 19 indicators: nine indicators for Sub-criterion 1; two for sub-criterion 2; and eight for sub-criterion 3. Annex K details how each indicator is measured, the benchmark, and the data source, and Annex L.2 presents a summary of the evidence. We reference in parenthesis the source of evidence used to evaluate each efficiency dimension that can be found in Annex L.2.

The evidence on the technical efficiency of the implementation plan suggests that FFP has struggled to keep up with the initial workplan and milestones due to major delays in the implementation programme, and workplans and targets have been amended regularly to reflect new information and challenges (Indicator 2.1). These delays relate to the procurement of microfeeders, disruptions in the supply of premix, and delays in signing up mills to start fortification

[88] For these purposes, a judgement of substantially exceeded means over-delivering in a consequential way, requires justifying rationale, and may include, for example, providing an extra deliverable (not specified in the workplan) to meet an emergent need, exceeding quality expectations (e.g. providing more senior consultants at no additional cost), or delivering substantially ahead of time.

[89] Predominantly or nearly met means that although the workplan was not fully delivered, it fulfils bottom-line expectations or shows satisfactory progress overall.

production, which affected half of the milestones set for 2017–18 (DFID Annual Review, 2017–2018) (Indicator 2.2).[xcv] FFP was put on an APIP as at July 2018 and new logframe targets for wheat flour production were agreed between DFID and FFP. FFP was showing efforts to meet those new targets as at December 2018, which, if continued, would improve FFP's rating at the next assessment (Indicator 2.2). Many of the risks highlighted in the programme risk register (as well as some risks that had not been identified) materialised over the last 2.5 years, suggesting inadequate mitigation strategies and weaknesses in adaptive management (Indicator 2.3). Technical efficiency in relation to the subsidy management system has been adequate and implemented in line with SOPs (Indicator 2.8 and 2.9). While under technical efficiency FFP has largely underperformed in the first two years of the programme under the wheat flour component, it has improved its performance compared to the newly agreed targets in October 2018. FFP has also performed as expected along the oil component, and has been meeting targets on other components (research, engagement with stakeholders) (Indicators 2.4, 2.5, 2.6, 2.7). Therefore we suggest that the 'Implementation plan for the year predominantly or nearly delivered with regard to quantity, quality, timeliness, and budget (allowing for emergent strategy)' (Standard on Sub-criterion 1a: **adequate**) and that the 'programme can demonstrate subsidies are only provided if agreed standards are evidenced' (Standard on Sub-criterion 1b: **adequate**).

The allocative efficiency of TA resources and key inputs across provinces has been affected by delays in the timeline. The project budget is currently largely underspent along key implementation components, such as wheat flour subsidy or advocacy campaign, but sees large spending on operational costs (including fees), reflecting protracted efforts to launch all components of the programme (Indicators 2.4, 2.5, 2.10). Staged roll-out of the programme based on priorities and needs has been affected by the delays in implementation such that programme roll-out had to be simultaneously launched in multiple provinces and districts to make up for lost time (Indicator 2.11). The sub-criteria (2a and 2b) of 'TA resources are allocated across intervention pathways/ microfeeders and premix are allocated across provinces, in appropriate proportion, reflecting relative priority and associated costs' are not met. These sub-criteria are part of the definition of 'good' efficiency. Although these sub-criteria are not met, they do not form part of the requirement for a judgement of adequate performance.

Dynamic efficiency indicators show limited evidence of how M&E and operational research findings are employed to ensure adaptive learning. However, efficiency indicator trends over the first 2.5 years are encouraging and suggest gains in efficiency over time as more mills register with the programme and more of the programme components are rolled out (Indicators 2.13, 2.14, 2.15, 2.16, 2.17, and 2.18). We find that FFP has been to some extent using findings from the operations research studies, for example to amend logframe targets, but we currently lack convincing evidence regarding FFP 'acting on what is learned from [its] M&E' findings (Indicator 2.12). Overall, we suggest that 'Sound processes are in place to support adaptive management, learning, and reflection – including documenting and disseminating operations research studies and M&E" (Standard for Sub-criterion 3a: **adequate**). The evidence also shows 'no unexplained material increases in the average cost per relevant output over time' (Standard for Sub-criterion 3b: **adequate**).

Therefore, under the efficiency criteria overall, FFP's performance in the current reporting period is adequate. FFP has struggled to keep up with the implementation plan in the first 2.5 years of operation, thus impacting most of the efficiency indicators in the reporting period, particularly for the wheat flour-related activities. FFP shows improvement in the latter part of the reporting period (Q9 and Q10) on some of the efficiency indicators, which suggests that performance along the efficiency dimensions might improve in the next reporting period if these trends continue.

7 Sustainability of FFP

Midterm summary answers to evaluation questions	
KEQ9: To what extent is it likely that the programme will lead to a continuation of large-scale food fortification of wheat flour and edible oil/ghee in Pakistan after the programme ends?	
DEQ9.1: What factors are likely to affect the continuation of large-scale fortification of wheat flour and edible oil/ghee after the programme ends?	Successful fortification programmes have support at the highest level from stakeholders across all relevant sectors – government, industry, industry associations, civil society, and academia. At this time, structures that foster this level of commitment and joint strategy develop are weak in Pakistan and insufficient attention is being given to fostering this joint commitment. The capacity of the provincial and district authorities to effectively and credibly monitor and enforce adequate fortification of wheat flour and edible oil/ghee is critical for the sustainability of fortification. This refers to: (i) the individual capacity of regulatory, monitoring, and lab staff to perform their respective duties; (ii) the organisational capacity in terms of clear mandates for the public entities that will perform the monitoring and enforcement activities, and the data systems to enable the linkage of monitoring to enforcement activities; and (iii) the institutional capacity of government in terms of having mandatory legislation in place that provides a strong legal basis and the necessary political support to sustainably monitor and enforce food fortification, particularly wheat flour fortification, in light of its complex political economy. This needs to be backed by the necessary resources, coordination platforms, and functional Food Authorities, which requires ongoing government ownership of and political support for the fortification agenda, fiscal space, and the involvement of the central government departments of planning and finance. An effective regulatory system and enforcement mechanism need to ensure that all producers are on a level playing field, i.e. none has the possibility to cheat, and producers integrate fortification in their business model, particularly in a context of limited public awareness and demand. Consumer demand is an important factor driving sustained private sector support for adequate fortification but will likely require time to create; price and taste are the most important factors driving demand for oil/ghee and wheat flour. Public awareness-raising needs to particularly mitigate the risk of negative perceptions of fortified foods. Producer capacity and resources to fortify appear relatively less of a challenge for sustained fortification, particularly among the larger mills. In general, the mills are capable of adequately fortifying if access to the required inputs is maintained. The key sustainability factor from a private sector perspective is the business case that fortification offers in terms of its effect on profitability margins, demand, potential cost, and the level playing field that the regulatory environment presents. Within the political economy of wheat flour and edible oil/ghee production and regulation, the industry associations wield considerable power. Therefore, their commitment to food fortification, and how industry and government authorities jointly address any challenges, affects sustainability.
DEQ9.2: To what extent are factors that are likely to support or inhibit the sustainability of large-scale food fortification put in place or addressed?	The harmonisation of standards, and the adoption of mandatory regulation in several provinces, provide a major step towards sustainably institutionalising oil/ghee and wheat flour fortification in the regulatory environment. However, mandatory legislation has yet to be established for wheat flour. This is particularly needed for effective and sustained monitoring and enforcement of wheat flour fortification, and to incentivise wheat flour mills to adequately fortify.

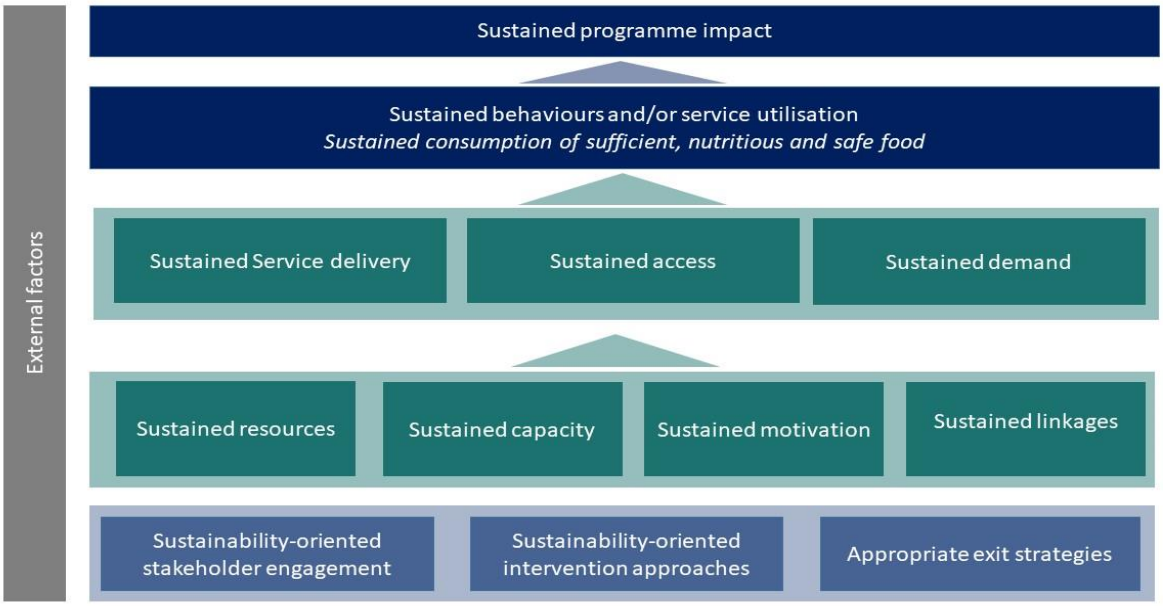
Midterm summary answers to evaluation questions	
	The technical capacity of staff in the private and public sectors is being built and standardised equipment has been provided. This generally seems to be sufficient to provide the mills with the capacity to fortify adequately. Public sector staff capacity to monitor and enforce remains weak, but this may be improved once monitoring and enforcement expands, and when the overall capacity of the provincial Food Authorities beyond Punjab grows. Government actors have demonstrated support for the programme. At the national level, the import of premix has been exempted from taxes/duties and the CCI mechanism has been invoked to harmonise fortification standards across jurisdictions. However, government ownership of the programme, especially at sub-national level, remains weak. Food fortification has yet to be mainstreamed in regular budgets or integrated in multisectoral nutrition programmes; this can be influenced by building stronger linkages with planning and finance departments. Oil/ghee mills in Punjab are incentivised to adequately fortify their entire production because of effective enforcement by the Punjab Food Authority. This incentive exists less in other provinces – particularly for wheat flour fortification, as mandatory legislation on this has yet to be put in place. While there is acceptance among consumers of the concept of fortification and the need to consume healthy foods, awareness and demand likely remain low. Creating demand for wheat flour fortification nationally when supply of fortified wheat flour (even if fully implemented) will only reach approximately one-quarter of households poses a potential reputational risk to the programme. Profitability margins in the oil/ghee and wheat flour sub-sectors are generally narrow, particularly for smaller mills. For wheat flour, Atta provincial governments have yet to integrate the cost of fortification in the regulated market price. In the case of oil/ghee, for which the price is determined by the market, monitoring and enforcement still needs to be improved and fortification requirements further clarified to create a comprehensive level playing field that encourages all mills to fortify their entire production. Consolidation and professionalisation in the oil/ghee sub-sector will likely contribute to sustained fortification. The programme has engaged a wide variety of stakeholders, often leveraging food alliances as an enabling platform. Stakeholder engagement has been oriented towards providing high-quality technical inputs and achieving outputs against tight timelines and targets. In these mostly technocratic delivery processes the programme has often selected intervention approaches with their sustainability in mind. However, the programme has not created engagement processes that nurture partnership and ownership of the programme within government or industry, or that build multi-stakeholder relationships across the public and private sectors. This presents an important risk to the sustainability of the programme.

7.1 Introduction

Sustainability is considered critical to FFP's success. The evaluation uses a specific conceptual framework to assess the sustainability of the programme, based on a model developed by Rogers and Coates (2015). The conceptual model hypothesises that sustained delivery of, access to, and demand for fortified foods requires four key factors to be in place: resources, capacity, motivation, and linkages. Furthermore, the model argues that a programme needs to take measures to promote sustainability by (i) putting in place exit strategies, (ii) engaging stakeholders in way that promotes sustainability, and (iii) including intervention design elements or approaches that promote sustainability. Finally, the conceptual model recognises that sustainability can be affected by external factors that are not under the programme's control. Figure 13 presents a schematic overview of the model.

The sustainability assessment will mostly be carried out at the evaluation's endline. At midterm, the evaluation identifies and refines the factors that are likely to affect the continuation of large-scale fortification of wheat flour and edible oil/ghee after the programme ends. These factors are summarised in the table in Section 7.2. The subsequent section presents a midterm review of FFP's sustainability-oriented approaches and stakeholder engagement, and ascertains whether any exit strategies are being developed. This section draws upon various data sources, a list of which can be found in Table 2.

Figure 13 Sustainability conceptual framework



Source: Authors' development, based on Rogers and Coates (2015)

7.2 Factors likely to affect the continuation of the programme

Table 6 provides a synthesis of the factors that are likely to affect the continuation of large-scale fortification of wheat flour and edible oil/ghee after the programme ends. Specific factors relevant to FFP are organised according to dimensions included in the above conceptual model. Besides identifying the factors, the table indicates the midterm status of the factors based on evidence available.

Table 6 Factors likely to affect the continuation of the programme

Factor category	Factors	Midline status
Resources	**Public sector** • National and provincial governments fund public management of food fortification • Tax exemptions and duty rebate on equipment and premix is provided • Provincial governments adjust regulated wheat flour price to reflect additional cost of fortification **Private sector** • Producers absorb the premix cost and sufficient quantities of premix required to fortify at standard after the end of the subsidy • Producers invest their own resources in maintaining fortification equipment • Producers are willing and able to allocate staff to conduct QA/QC processes • Producers and PFMA/PVMA fund the operationalisation of the cluster labs **Consumers** • Fortified products remain affordable for consumers	**Public sector** • At the national level, the Planning Commission is working on the PKR 100 million PC-I for nutrition improvement across Pakistan over the next two to three years, including TA to provinces for food fortification. • FFP's support for the preparation of provincial PC-I has been delayed. The cost of managing fortification (e.g. monitoring and enforcement) is not yet clear to provincial governments. Food fortification has yet to be mainstreamed in regular budgets or integrated into multisectoral nutrition programmes (e.g. AAP in Sindh). • In an MoU, the Punjab Food Authority agreed to take on the cost of testing vitamin A for oil/ghee after two years. • FBR exempted custom duties on the imports of premixes and gave exemption of sales tax on microfeeders and premixes in the federal budget 2018–2019, ratified in the Finance Act 2018. • The MoU with the Punjab Food Department includes passing on the cost of fortification to consumers, but there is no evidence that this has actually happened. **Private sector** • Premix procurement is steadily increasing, but oil/ghee mills are not procuring premix to fortify their entire production and procurement by wheat flour mills fluctuates considerably. Mills are pre-paying for premix purchases. • By December 2018, 465 wheat flour mills had a signed a service contract with Buhler, including paying for the cost of the extended warranty microfeeder contract. • Some mills, particularly large mills, report having the capacity to take on capital costs. • Mill staff are available and capable of conducting QA/QC. However, quantitative testing in cluster labs is currently dependent on FFOs for sample collection and dissemination of results. • In MoUs, PFMA/PVMA/mills have agreed to ensure funding for the recurrent costs of QC/laboratories after two years. There is no evidence that PFMA/PVMA are creating a funding mechanism. **Consumers** • There is no evidence at midterm to assess whether fortified products remain affordable. There is no indication that prices have increased due to fortification. Atta wheat flour prices are fixed, and provincial governments have not adjusted prices because of fortification. The retail price of oil/ghee is

Factor category	Factors	Midline status
	• Public/private/civil society actors allocate resources to continue public awareness campaign	determined by the market. However, it is hard to measure any price effect of fortification because of its relatively small additional cost, particularly in the light of mills being confronted with a much more substantial increase in the cost of mostly imported raw materials due to the rupee depreciation. In general, households, particularly the poor, are sensitive to the cost of wheat flour and edible oi/ghee. • The national PC-I for a nutrition programme is in preparation, which includes national awareness-raising on food fortification.
Capacity	**Public sector** • Relevant public sector departments have sufficient human resources to manage food fortification • Staff of relevant public sector entities have the necessary skills to conduct monitoring and enforcement • Sample testing at public reference labs is credible • Roles and responsibilities among different government entities for monitoring and enforcement are clear and well institutionalised • Data systems are available and used to facilitate and coordinate monitoring and enforcement systems	**Public sector** • National and provincial regulatory staff and district field monitoring staff all understand the basic idea of fortification and staff have been trained on QC to test processes have been built. They indicate a need for refresher training and hands-on experience in order to be able to sustainably perform QC tasks. • Two public labs in Punjab have been equipped with high-quality equipment and staff have been trained, to act as reference labs. Sample testing by public reference labs is just starting. Overall, provincial QC testing capacity remains weak and is affected by staff shortages (at Punjab Food Authority). The Sindh public reference lab has yet to be established, but Sindh regulatory authorities have access to well-functioning private labs. • Monitoring and enforcement capacity in the case of fortified oil/ghee in Punjab is likely to be available at Punjab Food Authority, but annual enforcement inspections are only starting. Sindh Food Authority capacity is under development. • Monitoring and enforcement capacity in the case of wheat flour has yet to take off and is constrained by the absence of mandatory legislation. Refresher training will likely be needed for provincial and district staff once inspections become regular. Given the size of the wheat flour sector, sufficient resources need to be budgeted to support effective monitoring and enforcement. • External monitoring is complicated by a lack of clarity regarding roles and responsibilities. • Third-party monitoring of mills relies on FFOs and is mainly geared towards facilitating subsidy payments. • A fortification MIS has been established but is highly programme-dependent for data collection and management. It is not integrated into government systems and is not supporting government monitoring and enforcement.
	Private sector • Mill staff have the technical skills and procedures needed to adequately fortify and perform in-house QA/QC	**Private sector** • FFP training and follow-up support has strengthened the capacity of oil/ghee mill staff to fortify according to standards, particularly among smaller mills. Large, modern mills—which are financially most sustainable—have highly qualified staff and sophisticated equipment to adequately fortify and conduct QA/QC. High fortification adequacy rates among enrolled oil/ghee mills suggest QA

Factor category	Factors	Midline status
	• Mills have access to external QC services if needed • Mills are able to forecast premix requirements and procure premix directly **Consumer** • Consumers are able to recognise/identify fortified wheat flour and edible oil/ghee based on its logo	procedures are in place. • FFP training and follow-up support has built the capacity of enrolled wheat flour mill staff. Technical staff and mill managers/owners are well informed about QA/QC processes. Mills are able to adhere to QA/QC processes and operate according to the guidelines promoted by FFP. • 11 cluster labs for fortified oil/ghee testing and four cluster labs for wheat flour testing are functional, with uniform equipment and trained staff. Their functioning currently depends on FFP for sample collections and consumables. MoUs with PFMA/PVMA stipulate that industry associations will set up a mechanism for sustainable supply reagents. Self-governing mechanisms and mechanisms for sustainable supply have yet to be set up. • The central PFMA lab has been equipped but trained staff have left. Therefore, the lab is not functional. • Premix forecasting is working effectively. Mills have the capacity to forecast, but coordination is dependent on FFP. **Consumer** • Not all fortified products (particularly oil/ghee) have the logo on the packaging, which makes it difficult to identify fortified foods. MoUs with oil mills stipulate the introduction of the logo. • Consumers and intermediaries are not aware that some brands are fortified.
Motivation	**Public sector** • There is awareness and commitment among senior policymakers and bureaucrats to support food fortification • Fortification is made mandatory, mandatory legislation exists, and regulations are adopted • Public awareness and demand underpin political support for food fortification	**Public sector** • Provincial governments in Punjab, Sindh, and KP are on board with the food fortification agenda, and have adopted national fortification standards as prescribed by PSQCA. • Government commitment to the fortification agenda is more broad-based in Sindh compared to Punjab. • District government understanding is weaker and misses a strategic commitment to food fortification. • Legislation for mandatory fortification of wheat flour does not exist yet. Provincial government stakeholders perceive this to be necessary in order to monitor and effectively enforce compliance with standards. Provincial legislation would also demonstrate broad-based political ownership of the fortification agenda. Furthermore, legislation would institutionalise the roles and responsibilities of monitoring and enforcement by government entities (i.e. the role of the Food Department in monitoring and enforcing wheat flour fortification). Finally, fortification regulations and standards would be more difficult to change if legislation is in place, and if accountability for progress on fortification is institutionalised. Mandatory legislation is currently being drafted in Punjab and Sindh. • Potential acceptance of fortified oil/ghee appears to be high among most consumers, but demand and

Factor category	Factors	Midline status
		awareness are likely to be low.
	Private sector • All mills are monitored, and regulations/standards are effectively enforced by regulatory bodies across all mills (or mills expect effective monitoring and enforcement is forthcoming) • Consumer demand for fortified wheat flour and oil/ghee exists • Profit margins are maintained (particularly for smaller mills) • Industry associations are supportive of food fortification • Monitoring data are treated as confidential	**Private sector** • Oil/ghee mills in Punjab believe the Punjab Food Authority effectively monitors and enforces regulations, and therefore they are incentivised to fortify. The Sindh Food Authority's capacity to monitor and enforce is still under development. A considerable proportion of oil/ghee production remains unfortified, which indicates that monitoring and enforcement still needs to be improved and fortification requirements further clarified/communicated (e.g. fortification of unpackaged oil/ghee). • Because regulations and standards of wheat flour fortification are not effectively monitored and enforced, wheat flour mills do not feel compelled to fortify. However, some mills expect that the requirement to fortify is forthcoming and therefore they have started fortifying a proportion of their production. • Most consumers are not (yet) asking for fortified flour and edible oil/ghee, and in some cases customers have misgivings about fortified flour. Therefore, from the perspective of most mills, there is no compelling business case for them to produce fortified flour and edible oil/ghee, particularly in a context where mandatory fortification has yet to be enforced. • Profit margins among small and medium-sized oil/ghee mills and mills producing relatively small volumes of Atta wheat flour are very small to negative. Even though the cost of fortification is small this affects the profitability of the mills with already small to negative margins if the cost cannot be passed on to the consumer. The cost of fortification can be relatively easily absorbed by larger mills. • Despite having signed MoUs with the programme and engaging with its implementation, PFMA and PVMA provide reluctant support and tensions exist that threaten the programme's further engagement with the industry and some individual mills. • FFP has promised the confidentiality of the fortification and production data of individual mills. This is acknowledged in the MoUs signed with the mills. FFP has also put in place a process of anonymisation of samples to be tested at cluster labs. It is not clear how this mechanism will be maintained once cluster labs become less dependent on FFP. Some mills have shown resistance to sharing production data. A considerable part of oil production remains unreported and untested.
	Consumers • Consumers recognise the importance of consuming fortified wheat flour and edible oil/ghee • Price and taste influence purchase and consumption behaviour	**Consumers** • There is acceptance among consumers of the concept of fortification and the need to consume healthy foods. Awareness and demand in general likely remain low, although there is a demand for nutritious and healthy foods among consumers who can afford them (but whether this translates into demand for fortified products remains to be seen). • For consumers of *chakki* flour there is little motivation to switch to fortified flour as *chakki* flour is

Factor category	Factors	Midline status
	• Intermediaries, such as local health staff and market stakeholders, feel motivated to promote fortified foods	considered nutritious and healthy and preferences regarding the taste of *chakki* flour are quite strong. • Most consumers, particularly among the poorest, are sensitive to price. • There are some concerns about whether the taste of fortified foods remains the same if vitamins are added. • LHWs/LHSs show limited motivation to include awareness of fortification products in their activities without an incentive being provided to them. • Members of trader associations mostly do not view it as part of their responsibilities to transmit messages, do not have time to do so, or do not consider that they possess enough information to do so.
Linkages	**Public sector** • NFA and PFAs, or similar coordination forums, work effectively to ensure coordination and communication about food fortification between different government agencies, the private sector, and development partners • Fortification standards are harmonised across provinces and federal government • Public and private sector actors are effectively linked to promote fortification in partnership • Central government departments/ ministries responsible for cross-government coordination, planning, and financing are engaged	**Public sector** • NFA/PFAs are functional. They have provided effective platforms to coordinate about standard harmonisation, the introduction of mandatory legislation, and duty exemption for microfeeder imports, among other things. FFP has engaged extensively with these platforms. • Standards for wheat flour and edible oil/ghee fortification have been harmonised across provinces with the support of FFP. FFP has facilitated the harmonisation of the Punjab oil/ghee standards with the national standards. • Food alliances offer a platform to facilitate public–private partnership for food fortification, as both government actors and PFMA/PVMA are members. However, the public–private partnership is weak and FFP is not doing enough to build this partnership, which is needed in order to sustain the programme. On the one hand, provincial government actors see the programme as a private sector supply-side programme that works directly with mills, with limited government involvement. On the other hand, the industries (particularly the wheat flour industry) question FFP's approach to mobilising government to enforce mill enrolment in the programme. They feel that the industry has not sufficiently been brought on board in the implementation of the programme. The capacity of the industry is not leveraged to raise public awareness. Opportunities are insufficiently created for public and private sector actors to jointly and strategically review programme progress, with a focus on ultimate objectives and addressing implementation challenges. • Interviewed government stakeholders repeatedly requested that different development partners and donors adopt a joint and harmonised approach towards food fortification and seek further operational synergies with government efforts at provincial and district level. • Through its membership in MSNS committees and platforms, FFP is able to engage with multiple government departments and programmes. However, the involvement of provincial and Finance Departments in the food fortification agenda is relatively weak, although their support is needed to

Factor category	Factors	Midline status
		mainstream fortification in government planning and budgets.
	Private sector • Wheat flour mills have access to technical support to troubleshoot issues with microfeeder operations • Mills have sustained access to a premix supply chain • Mills have sustained access to QC equipment and services	**Private sector** • The programme facilitated the creation of a service contract and extended warranty between Buhler and the wheat flour mills. Wheat flour mills can effectively draw on TA from Buhler as part of this contract to troubleshoot issues with microfeeder operations. A feasibility study on local manufacturing of microfeeders has been contracted. • An effective premix supply chain that directly links the mills with private sector premix suppliers is operational for oil/ghee and wheat flour. Particularly for wheat flour premix, FFP has enabled the establishment of a contractual relationship between mills and premix in-country distributors of international premix suppliers. After interruptions in this supply chain the number of suppliers has been expanded to avoid reliance on the monopoly position of one supplier. Further diversification of the number of suppliers has been considered but no evidence is available that this has happened. The price of oil premix has doubled in local currency but at this point does not seem to affect demand. FFP plays an important coordinating role in the supply chain by organising the premix forecasting. It has yet to be clarified who will take over this role after the programme ends. • FFP has facilitated mills' access to RTKs from international suppliers, as well as a local supplier, NIFA. The local manufacturing and supply of the RTKs will enhance sustained access. Cluster labs have been equipped with high-quality test equipment and related consumables to enable oil/ghee and wheat flour quantitative testing. The industry associations are meant to organise the governance of the labs and ensure their sustainability. However, currently the labs are highly dependent on FFP for their functioning. In the case of wheat flour, few labs are yet operational. In the case of oil/ghee, larger mills have their own laboratories that are self-reliant.
	Consumers • Fortification messages are integrated into other programmes • Civil society, government, and the private sector are jointly involved in public awareness-raising	**Consumers** • FFP has been able to integrate fortification messages in the curricula of local health staff, such as LHWs and SHNSs, in Punjab, Sindh, and KP. FFP has held coordination meetings with other nutrition programmes (e.g. the Nutrition Support Programme (NSP) in Sindh) but no evidence indicates that messages were also integrated into these programmes. • Through SUN-CSA FFP has contracted local CSOs to implement the district-level interpersonal awareness-raising activities. Since these activities have only started recently it is too early to assess whether these CSOs will continue to spread the messages beyond their contract. • In general, there has been weak involvement of core public sector stakeholders (e.g. the fortification alliances) and core private sector actors (e.g. the industry associations) in the development and implementation of the public awareness campaign, apart from as participants in district awareness

Factor category	Factors	Midline status
		sessions.
External factors	• Public management of food fortification considers the political economy of wheat flour production • General political support for nutrition interventions remains • Overall capacity of the provincial Food Authorities is further developed • Fiscal space of national and provincial governments enables them to fund food fortification activities • Competitiveness leads to consolidation in the oil/ghee industry	• Government commitment to wheat flour fortification and support for its monitoring and enforcement is heavily influenced by the political economy of wheat distribution and wheat flour production. The programme has underestimated the influence of the industry on government, and of the industry association on its membership. The programme will need to forge a stronger partnership with the industry and government to jointly ensure adequate fortification. The mandatory fortification through regulations may be sufficient from a legal technocratic perspective, but is insufficient to create consensus around a functioning legal framework that would enable effective and sustainable enforcement of wheat flour fortification. • Therefore, provincial governments are cautious about enforcing regulations without broad-based political backing and industry buy-in. • The 2018 elections resulted in the PTI party making the national government, which is most vocal on stunting and malnutrition. • The Punjab Food Authority has established a relatively strong reputation for the enforcement of food safety regulations. This has an incentivising effect among oil mills to fortify according to the standard. In Sindh, the Food Authority has recently been established. The overall capacity and resourcing of this newly created Food Authority will likely influence fortification and its enforcement in the future. • The current balance of payments crisis in Pakistan is putting pressure on government budgets, which may result in a fiscal squeeze that may affect the funding available for adequate public management of food fortification. • The oil/ghee sub-sector is highly competitive. Small and medium-sized mills operate at very small to negative margins. This discourages these mills from adding the even small cost of fortification and encourages them to underreport production to avoid taxes or/and sell loose oil. In the short term this may make fortification of the entire production challenging. However, the competition will likely lead to a consolidation of the sector towards larger, modern mills in the future. For these mills, the additional cost of fortification is marginal, QA/QC capacity is high, and brand reputation is relatively important. This will likely contribute to sustained oil/ghee fortification.

7.3 Sustainability-oriented implementation

7.3.1 Stakeholder engagement

FFP has extensively engaged with a wide variety of public and private actors at international, national, provincial, and local levels; directly or through coordination platforms. This has been based on extensive, in-depth stakeholder mapping and analysis. It has included engagement with decision makers with a high degree of influence, such as ministers and departmental secretaries. In addition, FFP has coordinated with other development partners and programmes at national level.

Engagement has been oriented towards providing high-quality technical inputs and achieving outputs against tight timelines and targets, rather than creating processes that nurture partnership and ownership across government and industry and other relevant stakeholders (industry organisations, civil society, academia). The programme has been able to deliver a variety of generally high-quality TA, training, equipment, and subsidies across private and public sector actors. The quality specifications, VfM, timelines, and targets of the programme have been important considerations in a strongly technocratic process. Building partnership and ownership of the programme among public and private sectors has been of secondary importance or has received limited attention. The industry associations have been involved in the programme with specific outputs in mind, as outlined in the MoUs. However, the evaluation team has seen no evidence of systematic and regular joint planning, progress reporting, discussion of challenges, learning, or mutual accountability. While the industry associations do not control their members they nonetheless have substantial influence. They do not have a sense of ownership over the programme or the fortification agenda, and, during interviews, they have shown limited enthusiasm for the programme.[90] Government actors support the fortification agenda, but generally consider FFP a private sector programme that is focused foremost on working directly with industry. FFP has underestimated the political economy and power dynamics in the fortification reform process. While FFP has effectively engaged the fortification alliances to achieve specific results (e.g. revise standards, realise duty exemption), the programme has not implemented sustainability-oriented engagement processes, such as joint work planning sessions (which NFA has with other actors).

While the programme has been able to create linkages among public sector actors and among private sector actors, this is not based on a multi-stakeholder relationship-building across all relevant stakeholders. As discussed in Section 7.2 the programme has been able to facilitate contractual linkages among the mills and suppliers, and has effectively leveraged existing coordination platforms to achieve programme outputs. The programme has also achieved harmonisation of regulations across provincial actors. However, it has not systemically invested in building relationships among all relevant stakeholders to share information and arrive at a jointly agreed approach to addressing challenges, including prioritisation of agile decision-focused research. On the contrary, the programme has sometimes antagonised public and private partners by mobilising government support to pressure mill enrolment. However, it should also be acknowledged that the programme has reportedly facilitated public–private engagement, such as when the Punjab Food Authority was set to start enforcing wheat flour fortification when the industry was not yet ready. The programme does not have an institutionalised structure in place (for example, a steering committee or reference group) that systematically brings together the implementing partner, DFID, private actors, and public actors to jointly report and account for programme progress, learn, and discuss actions to address challenges. The RTAG, which could have played this role of reviewing progress in the context of evidence generated by FFP and

[90] In the case of PFMA this may be influenced by a dispute between PFMA and FFP that was ongoing at the time of the interviews.

beyond and informing programme improvement, has been effective in providing input to specific proposed research studies but these as yet have not been timely to inform programme improvement.

7.3.2 Sustainability-oriented intervention approaches

The programme has often selected intervention approaches with their continuation or the sustainability of results in mind:

- The sliding subsidy scale considers earlier experiences that a full subsidy approach entails high sustainability risk. Furthermore, by linking the subsidy to QC testing processes a culture of QA/QC was meant to be cultivated. However, it is not clear whether the latter is actually being considered in subsidy pay-outs to mills.
- Staggered microfeeder procurement was initially designed with sustainability in mind as it was intended to allow the exploration of procurement options such as introducing domestic production of microfeeders using local capacity.[xcvi] However, a feasibility study of local microfeeder manufacturing was only contracted at midterm, when the second phase of microfeeder procurement had already been contracted.
- The four-year extended warranty and after-sales services, for which the mills signed a separate contract directly with Buhler, is an important mechanism for preserving the functionality of the microfeeders in the medium-term. The mills' financing of this contract supports ownership. It is not clear what type of support mechanism will be available in the long term.
- The current premix supply mechanism was selected because forging direct relationships among mills and suppliers was considered the most sustainable option. As discussed above, in the case of oil premix this supply chain was already in place. Nonetheless, piggybacking on this existing supply chain rather than setting up a parallel premix procurement mechanism is the more sustainable option. However, an interviewed government stakeholder expressed concern about the future cost of the premix provided through international suppliers and suggested further exploration of the possibility of local production through Pakistan's pharmaceutical industry. Although the FFP inception report acknowledged that 'local production capacity for premix […] would lead to the greatest chance for a sustainable procurement and distribution system', and a capacity assessment study for future local production of premix was planned for the first implementation year, this was not pursued further after discussions among the experts in the RTAG, who assessed that promoting local premix production at adequate standard was not feasible under the programme, taking into account the time and investment required.
- The programme engaged a local supplier of RTKs to ensure continued local access to QC tests.
- The programme has leveraged existing platforms, such as the NFA and PFAs, to coordinate critical interventions. Similarly, FFP is engaging with DMACs to coordinate fortification activities at district level. Alignment with existing platforms is a more sustainable option than setting up new parallel structures.
- FFP's advocacy for mandatory legislation approved by the provincial assemblies is partially motivated by the desire to sustainably embed fortification in the provincial legislative architecture and create a system of accountability towards the assemblies as regards food fortification.

- By leveraging existing programmes and structures to disseminate fortification messages the programme is embedding public awareness-raising in the health and nutrition system. Furthermore, the creation of a logo and promotion of the logo among the producers can have lasting effects, although it will depend on the continued buy-in from industry.

- The MoU with the Punjab Food Authority stipulates that the Authority will support FFP in strengthening the capacity of the Food Authorities in other provinces. This network-building is important for sustainability. However, no evidence is available as to whether this is actually happening.

- FFP is investing in operational research that can support the sustainability of some of the interventions: for example, the feasibility study on local microfeeder manufacturing, advocacy effectiveness study. However, the studies have not been designed and implemented in a timely fashion to inform design and implementation improvements. Overall, FFP's operational research component is underused as a mechanism for forging joint learning among public and private partners about how to improve and sustain the programme.

However, there are several programme elements that can cause sustainability problems and that will require well-defined exit strategies, such as the following:

- FortIS has been designed and is currently operated by FFP. Its data collection/entry /validation processes are highly programme-dependent. Its systems are not integrated with government systems in terms of server hosting environment, procedures, staffing, and usage. Furthermore, alternative systems are under development, with little cross-system alignment.

- The premix supply mechanism is dependent on coordinated forecasting. Furthermore, the favourable supply conditions (e.g. premix price and in-county stock) have been negotiated by the programme based on the aggregated negotiating power of the programme. These conditions may change when the programme ends. It is currently not clear who will take on this role of negotiator and broker. The MoU between FFP and PVMA stipulates that the industry association will facilitate forecasting, but there are no further specifications of PVMA's future role. Furthermore, beyond any MoU stipulations, any future role of the industry associations will need to be based on ownership of and commitment to the fortification agenda, which has not been sufficiently pursued.

- The cluster labs are meant to be self-governing, facilitated by the industry associations. These are also meant to set up a mechanism for the sustainable supply of reagents after two years, to keep the labs functional. There is no evidence that self-governing or funding mechanisms have been set up.

- Government testing capacity is still weak and monitoring and enforcement capacity are nascent (except at the Punjab Food Authority). While FFP created a cohort of government master trainers who can continue to provide the necessary training, it is doubtful that they will have the full technical capacity and operational resources to provide follow-up training.

- Public awareness-raising and demand-generation will require ongoing effort. While the programme has created some sustainability-oriented mechanisms (see above), the mass media campaign and interpersonal activities are events that are of limited duration. Their continuation needs to be clarified. Similarly, there may also be some risks associated with generating demand for fortified wheat flour at a national level given the relatively small scale of roller mill flour availability.

Furthermore, as discussed in the previous section, industry and government ownership is generally weak and activities to develop high-level support across all related stakeholder groups which could foster such ownership are also weak. This will affect what exit strategies are feasible.

7.3.3 Exit strategies

As discussed above, some components of FFP have been designed with sustainability in mind. Other components will require exist strategies to ensure their continuation or the sustainability of their results. At the time of the MTE, the programme had yet to develop a comprehensive exit strategy. To facilitate this process, it contracted a sustainability review in early 2019.

The MoUs that have been signed with various actors include some clauses which stipulate the actors' responsibilities after programme support ends. While this can offer a first step in the discussion about how to sustain certain interventions, it is likely not to be sufficient to ensure these actors' willingness or capability to take up these roles. An effective exit strategy will need to include provisions on how to strengthen the public and private sectors' sense of ownership of the programme across all relevant sections, mechanisms of mutual accountability and reporting, and mechanisms to raise the necessary resources to continue activities (e.g. purchase of reagents for labs).

An exit strategy will need to address the underlying weak enabling environment for food fortification and the different factors identified in Section 7.2. The necessary resources and capacity will need to be maintained to sustain the programme. Motivation and incentives to adequately fortify need to be sustainably established. Linkages will need to be preserved and further strengthened. And fortification of wheat flour and edible oil needs to be embedded in the political and economic systems in order to weather changes in external factors.

8 Conclusions

Relevance

The design of FFP is, in general, well grounded in fortification good practice and for the most part adapted to meet the needs of food fortification in the context of Pakistan. The ToC lays out appropriate roles and responsibilities of the key fortification stakeholders. Their efforts focus on ensuring the supply of adequately fortified foods from mills, the enforcement of fortification by government, and the creation of demand for fortified foods among consumers. FFP's approach has several important strengths, which, if fully implemented, can result in increased supply of fortified food as per the programme's ToC. There are also a few important gaps that may constrain the scope and scale of the programme's success, and the potential to fully achieve FFP's stated impact at national level. Finally, various aspects of the approach could be strengthened to align with good practice and fully adapt to the context.

Previous efforts to support food fortification in Pakistan have had limited success, either in scope and/or duration, and several of FFP's project components have been well designed to address previous limitations, particularly the facilitated access to high-quality equipment and a sustained supply of high-quality premix. The provision of these, with some level of co-financing for equipment (within contractual procurement constraints), and the sliding scale of premix subsidy, linked with fortification quality, are aligned with fortification good practice. Similarly, the focus on skills development, with personalised and continuous attention from FFOs within mills and government monitoring bodies, rather than the more limited 'knowledge transfer' approach often taken in fortification, has a high potential for lasting capacity development. The FFO approach, if well implemented, has the additional strength of building in the flexibility required to adapt to the specific needs of mills.

This same technical and transactional focus of FFP activities falls short in terms of building the trust, collaboration, and mutual accountability that are the cornerstones of effective and sustainable national food fortification programmes. While FFP does have an advocacy strategy, the primary focus on awareness-raising falls short of the type, and level, of engagement that is needed to create this enabling environment. There is no 'silver bullet' approach to achieving this, and several factors, including the decentralised governance of fortification, likely add an important layer of complexity. That said, programme experience outside of Pakistan provides concrete examples of approaches to achieving high-level support for fortification among all relevant stakeholders. FFP has identified the relevant stakeholders in Pakistan, but additional clarity is needed within the ToC, and within specific activities, to proactively create the structures and processes that can foster trust, collaboration, and commitment.

At impact level, FFP's ambition is to reduce the deficiency of micronutrients among the people of Pakistan, and particularly those most vulnerable to inadequate intakes (WRA and young children). This is an appropriate ambition given what was known about the magnitude and distribution of micronutrient malnutrition at the time of programme design.[xcvii] Evidence subsequently generated[xcviii] confirms that oil/ghee is an appropriate choice of vehicle to address this deficiency, with high potential to reach most households in Pakistan. In this context, demand creation at the population level is an appropriate approach. However, some inconsistencies in available information, related to the continued sale of unpackaged ('loose') oil, and ambiguity regarding the full remit of the current mandatory legislation for oil/ghee, may call this conclusion into question. This is a critical area for clarification and action, to ensure that the goal of reaching the people of Pakistan, and particularly those most vulnerable to micronutrient malnutrition, can be met.

The potential for impact among consumers of roller mill flour – approximately one-quarter of the national population – is high if adequate fortification of all roller mill wheat flour is achieved. However, the programme will not achieve its ambition of reducing the national prevalence of deficiency, assuming the phrase 'the people of Pakistan' is to be interpreted as referring to the nation as a whole, simply because the proportion of the population covered is insufficient for it to do so. Demand-creation efforts should be targeted to roller mill flour consumers, to provide clear and consistent messaging, and to avoid creating demand where no corresponding supply is intended (i.e. among *chakki* flour consumers).

Monitoring and enforcement is appropriately at the centre of FFP's public sector approach, and is critical to providing incentives to business to fortify. Based on FFP's design, it is likely that the capacity and structures needed for food sample testing will be developed and implemented. However, government-owned and industry-trusted data systems are essential for sustainable monitoring and enforcement activities. Achieving this ownership and trust requires engagement with industry, industry associations, and government in the development of such systems, and transparency in the collection, consolidation, and utilisation of data. It is not apparent that such engagement has been incorporated into the development and utilisation of FortIS, potentially limiting its utility beyond the duration of the sliding subsidy scheme.

As is normal for large-scale programmes, several aspects of FFP's design and implementation require adjustment and course correction to fully adapt to the context and emerging evidence. FFP was designed with a research component that should have facilitated this continual learning and quality improvement. The potential of this approach, as currently implemented, is unlikely to result in the real-time course correction required to adapt and adjust in order to maximise potential for impact and sustainability. The studies currently underway address fundamental design questions – it would therefore have been better if they had been carried out before finalising the design (i.e. pre-testing the demand-creation approach before roll-out, or gaining an in-depth understanding of millers' motivations and constraints on adequate fortification before designing the incentives structure). While these studies can inform future fortification investments, a redesign and repurposing of the RTAG could still provide needed input for real-time programme adaptations.

Effectiveness

In the first half of its implementation (June 2016 – November 2018), the programme has proven to be effective in procuring, delivering, and facilitating access to high-quality fortification inputs with favourable conditions, enabling industrial producers to adequately fortify edible oil/ghee and wheat flour. Facilitated by the programme, oil and wheat flour mills have increased their use of specified premix, and wheat flour mills are installing high-quality microfeeders, the functionality of which is enabled by effective support services and QA training, based on lessons learned from previous programmes. Most mills are reportedly performing internal qualitative QC testing, following FFP's support in the form of training and equipment. The cluster labs, for quantitative oil/ghee testing, are partially functional (mostly for oil/ghee testing). However, their functioning is currently dependent on the programme, rather than being self-governed by the industry.

Implementation has taken longer than planned and milestones were subsequently adjusted. Delays have been partially caused by factors not under the programme's control, yet they were also influenced to some extent by operational decisions made by FFP based on VfM considerations. Mill enrolment has also taken longer than planned because of mill resistance, reluctant support by the industry associations, FFP's weak engagement with these associations—often transactional in nature, rather than being based on partnership principles—and a technocratic-oriented implementation strategy that has not sufficiently taken into account the political economy, varied private sector incentives, and existing value chains. Nonetheless, by the end of November 2018, FFP had enrolled almost all oil/ghee mills (close to its final 2021 target), of

which most were fortifying. While this is an achievement, it is also not unexpected given that the programme provides tangible benefits to the industry, which is already mandated to comply with fortification standards. Among the targeted wheat flour mills, a little less than half were enrolled by the end of 2018 (ahead of the adjusted APIP targets), of which a minority were fortifying, although this was expanding rapidly. Wheat flour mill enrolment, and continued fortification, has been particularly affected by protracted negotiations and tensions between the programme and the industry, and the complex political economy of wheat flour production and regulation.

By the end of November 2018, oil/ghee mills were adequately fortifying almost all of their reported production and, based on extrapolated data, it is likely that the programme will surpass its adequately fortified production targets in 2019. A very significant proportion of total national edible oil/ghee production likely remains unfortified and unreported. This may be because of the ambiguity within current standards and regulations as to the scope of mandatory oil/ghee fortification (i.e. all oil for human consumption, packaged oil, oil for food industry). While regulations and stakeholders indicate that the sale of loose oil is not permitted, the MTE revealed the continuation of this practice in some regions. The narrow to negative margins in the sub-sector create incentives for some mills to underreport and avoid regulatory costs in contexts where government enforcement is weak and/or legal loopholes within standards and regulations can be identified. This is important from an equity and impact perspective because lower-income groups, which have higher rates of micronutrient deficiency, are likely to consume the cheaper oil that remains unfortified.

Wheat flour fortification volumes only substantially started to accelerate from May 2018, after which they surpassed fortified production targets established by the APIP on a monthly basis, until November 2018. The pattern of fortified production has been irregular, influenced by the tensions between the programme and the industry association, some claims about the discolouring effect of fortified flour on baked food items, the absence of government inspection and enforcement due to outstanding mandatory legislation, and consumers not (yet) asking for fortified products. Some mills are therefore fortifying on an experimental basis in expectation of mandatory legislation and its enforcement.

FFP's contribution to wheat flour industrial producers increasing their adequately fortified production is high. The use of premix, access to functional microfeeders, QA/QA capacity, and adequately fortified production were likely all limited at the start of the programme. In the case of oil/ghee fortification, FFP has likely strongly contributed to increasing mostly below-standard fortification practices at baseline to adequately fortified production, and to increasing the number of mills fortifying, but fortification was likely already widespread at baseline (particularly among larger mills) and premix consumption was likely substantial. Overall, the FFP-subsidised premix has largely substituted existing commercial premix supply for oil/ghee. The subsidy scheme is reducing the cost of the premix, which is important, especially for smaller mills, and the linkage to the promotion of and capacity development for appropriate QA/QC processes is likely a major contributor to the shift from inadequate to adequate fortification. It is unclear, however, whether this approach will overcome the existing barriers to fortification that affect the production of oil/ghee across all mills. The extent to which the decision not to fortify is enabled by legal loopholes within the mandatory legislation requires confirmation, and if this is confirmed, advocacy and specific action to address it.

The roles and responsibilities of FFOs are extensive and may generate some tensions between the technical support and monitoring aspects of these tasks. The third-party monitoring process, which is part of the subsidy scheme, absorbs a lot of the FFOs' time. Whether this is the most effective use of their time as regards promoting sustained food fortification in mills should be assessed against alternative supportive actions, which could be appropriately tailored to the individual mill context. It is exactly that potential for tailored support which is the design strength of

the FFO approach, a strength that it is likely is underutilised at this time. The FFOs are also the main source of FFP's FortIS, which is not integrated with any government or industry systems. FFP is insufficiently supporting the entire regulatory monitoring system as regards ensuring that data reporting, accountability, and follow-up actions are transparent and objective.

FFP's engagement with government has been extensive and persistent, although engagement with the central ministries/departments, like finance and planning—essential in order to sustain the agenda—does not appear to have been prioritised. All provinces have demonstrated support to the food fortification agenda and have adopted national fortification standards as prescribed by PSQCA. FFP has been instrumental in generating the harmonisation and institutionalisation of these fortification standards and regulations, leveraging existing platforms and coordinating with other fortification partners. Punjab, KP, and Sindh have up and running Food Authorities, though they still face capacity challenges. Provincial governments, with FFP support, are now considering strengthening the wheat flour fortification regime through a dedicated piece of legislation (wheat flour fortification is currently covered through a subordinate regulatory instrument, while for oil/ghee the legislative mandate has existed since 1960). Coordination mechanisms are in place at the federal and provincial levels to support the implementation of the food fortification agenda. However, cooperation with the respective industry bodies, especially for wheat flour, is weak. District governments' understanding of the fortification agenda are weaker, and a strategic commitment is lacking. In Punjab, FFP has been able to leverage the DMACs as platforms for multi-stakeholder engagement, but their limited functionality constrains their effectiveness.

Except in Punjab, government capacity to effectively monitor and enforce fortification, especially wheat flour fortification, remains weak. Strengthening of the public QA/QC system still requires further FFP support, both at the provincial as well as at the district level, and efforts are needed to ensure the system is embedded in government operations through adequate budget allocations. The Punjab Food Authority has proven itself to be effective in monitoring and enforcing standards and regulations where it is mandated to do so (for example, for oil/ghee fortification). Government monitoring of oil/ghee fortification in Sindh is beginning, given the incipient capacity of the recently established Sindh Food Authority, which will be key to achieving adequate fortification of the entire oil/ghee production as most oil/ghee mills are located in Sindh. External government monitoring of fortified wheat flour appears not to have started in earnest due to what the provincial governments perceive to be a weaker legal basis for fortification and a need to further align public and private interests.

The key element that will enable the success of the programme is how well it can align the incentives of the millers with those of the public sector. In the case of wheat flour, as the government is a big operator in the wheat market, and to a major extent controls the market price of wheat and wheat flour, the industry is already largely regulated in terms of price. With additional fortification regulation the costs are going to increase, and the government and millers need to be aligned towards a common goal to ensure a smooth transition to a regulated regime. Because of the limited attention in the programme design to creating structures and processes that can foster trust and collaboration among all relevant stakeholders, the programme has yet to be effective in forging public–private relationships that integrate the incentives of the millers and government, resulting in stronger collaboration, commitment, and, ultimately, compliance. More intense engagement with a broader stakeholder group, including millers' associations, academia, and civil society, at a high level, can foster further commitment from both industry and government.

Consumer awareness and demand would create a strong incentive for both private sector investment in food fortification as well as for further political support for the fortification agenda. Consumer awareness of, and demand for, fortified wheat flour and edible oil/ghee likely remains low. The programme's awareness-raising messages through interpersonal activities have yet to trickle down as expected. The media campaign has limited reach and effectiveness due to a lack of

consumer access to, and preference for, the TV channels used, and due to the short duration of the campaign. Lower phone ownership among women and a general low level of literacy are also likely to limit the effectiveness of the mobile messaging campaign.

Consumer demand-generation is faced with a 'chicken and egg' situation, where effective awareness and demand-generation requires the fortified foods to be available and identifiable in the market, while private actors along the value chains are only incentivised to make the foods available following the existence of demand. Adequately fortified edible oil/ghee is likely to be already widely available in the market, but neither retailers nor consumers are aware that it is fortified, while fortified wheat flour is unlikely to be widely available. Intermediaries who are meant to disseminate fortification messages are also not very aware of the current availability of fortified oil/ghee in the market and market availability will need to exist before they will be in a position to spread fortification messages. This conundrum could be solved by more strongly involving the private sector actors, starting with the producing industries, in the demand-generation campaign, so that they have a credible expectation and voice in effective demand-generation. Demand will be sensitive to taste and price. Again, the private sector needs to be involved in how to manage any related risks, in partnership with government actors, given price regulations in the wheat flour markets.

Efficiency

FFP has generally followed sound procurement practices for key programme inputs. However, fee rates for short-term and long-term TA exceeded budgeted amounts, while operational budgets were underspent, reflecting implementation challenges and delays. There is an indication that these costs may be trending towards expected values as implementation progresses. As the costs partially reflected challenges in the operating environment, are currently trending positively, and have not materially exceeded benchmarks in recent months, a judgement of 'adequate' is reached for the economy dimension of the VfM analysis.

FFP has struggled to keep up with the implementation plan in the first 2.5 years of the operation due to multiple delays, thus impacting most of the efficiency indicators considered within the reporting period, particularly for wheat flour-related activities. FFP shows improvement in the later part of the reporting period (Q9 and Q10) on some of the efficiency indicators, which suggests that performance along the efficiency dimensions might improve in the next reporting period.

Overall, in the first two years of the programme, FFP has achieved an adequate level of VfM in its implementation. FFP has shown efforts to keep programme costs low but significant delays in implementation have resulted in challenges to keeping the programme running efficiently. In assessing performance as adequate, we have considered that these delays had multiple causes and are not the sole responsibility of the implementer.

Sustainability

FFP recognises sustainability as critical to the success of oil/ghee and wheat flour fortification in Pakistan. The programme has often selected intervention approaches with sustainability in mind. Sustainability has also been enhanced by the programme's engagement with several key stakeholder groups, and by leveraging some existing coordination platforms. Furthermore, the programme has worked, with varying effectiveness until now, on addressing key factors that affect the sustainability of the programme, such as: improving mills' capacity to adequately fortify and facilitating their access to high-quality fortification inputs; reinforcing political commitment; harmonising and developing a regulatory regime; building government monitoring/QC capacity; and initiating consumer awareness-raising and demand.

Wheat flour producers have yet to fully integrate fortification into their business model. Mills are mostly experimenting with adequate fortification ahead of mandatory legislation, which could trigger effective government monitoring and enforcement and enable the incremental cost of fortification to be passed on to the consumer. However, the complex political economy makes the enactment of such legislation during the lifetime of the programme uncertain. The current ambiguity within current standards and regulations as to the scope of mandatory oil/ghee fortification, and illicit sale of loose oil, means there is no comprehensive level playing field within the oil/ghee sub-sector required for sustainable adequate fortification. However, the consolidation in the sub-sector that is occurring relatively rapidly may help solve this problem, as would increasing enforcement capacity across all provincial Food Authorities.

The programme has not created engagement processes that nurture partnership with, and ownership of the programme, within government or industry, or that build multi-stakeholder relationships across public and private sectors. This presents an important risk to the sustainability of the programme. Because of its technocratic-oriented approach, the programme has insufficiently engaged public and private stakeholders with the objective of aligning interests based on a comprehensive understanding of the political economy and the respective industry value chains. Public sector management costs of wheat flour and oil/ghee fortification have yet to be mainstreamed in regular government budgets or integrated in multisectoral nutrition programmes. Other stakeholder groups (consumer groups, academia, millers' associations, others), which can advocate for and put pressure both on industry and government for effective fortification programmes, have not yet been adequately engaged.

The programme has yet to develop a comprehensive exit strategy. An effective exit strategy will need to address the underlying weak enabling environment for food fortification and include provisions on how to strengthen the ownership and partnership of the programme across all relevant sectors. Several programme elements that can cause sustainability problems will need specific exit action plans. Data systems that facilitate and coordinate monitoring and enforcement systems and enable mutual accountability across stakeholders are also critical.

9 Recommendations and interim lessons

9.1 Recommendations

The recommendations below are intended to set out the main areas of action that need to be taken to responds to the findings of the MTE. It is anticipated that they will form the basis of a response from, or plan of action by, FFP, which will provide specific detail on possible implementation.

1. **The programme needs to strengthen its engagement with the industry associations PFMA and PVMA**. It needs to institutionalise a mechanism of ongoing dialogue, programme progress reporting, and joint reflection on challenges and corrective actions. PVMA/PFMA's commitment should be elevated from an assumption in the ToC to an intermediate outcome. The engagement with the associations should be captured in the stakeholder database, with the objective of FFP and DFID periodically reviewing it based on data and follow-up actions. The industry associations should be involved in the operational research to facilitate joint learning and add to the credibility of FFP as a programme based on an in-depth understanding of the sub-sectors. Such stronger engagement with the industry associations needs to happen in dialogue with government stakeholders and food alliances, to emphasise the joint partnership and align interests. Furthermore, by involving government (national and provincial) influence over the industry will be leveraged. DFID can add additional donor influence by more actively supporting this engagement. A reformed RTAG could provide a platform for such dialogue (see below).

2. **The programme needs to facilitate a dialogue with private and public stakeholders to clarify ambiguities in the scope of mandatory oil/ghee fortification, and to identify the extent to which oil is being produced/sold that may fall through any existing loophole**. Where needed, it should advocate for, and assist in, adjusting the regulatory regime, which ensures adequately fortified edible oil/ghee equitably covers the entire target population. The sale of oil that is slipping through mandatory fortification has potential direct implications for the equity in the programme if confirmed. This should be brought to the top of the research agenda, and an approach to resolution agreed with all relevant stakeholders.

3. **The private and public sector quantitative testing capability and its sustainability requires more in-depth assessment**. The need, functionality, effectiveness, and sustainability of the private sector cluster labs, and public sector reference labs, should be further examined and action plans for their sustained functionality (if needed and if they offer good VfM) should be developed in partnership with the relevant stakeholders. Their functionality and resulting QC data should be periodically reviewed among all relevant stakeholders. FFP's engagement on providing support for setting up a public sector reference lab in Sindh should be informed through a high-level stakeholder debate focusing on the benefits and potential risks associated with this approach versus continuing engagement with the existing private sector labs (i.e. determining the cost-effectiveness, sustainability, risk assessment).

4. **The programme needs to better capitalise on FFOs' local presence and their ongoing engagement with the mills**. It should review their scope of work to:

    (i) separate the role of supporting the mills from support provided to government for compliance monitoring (ruling out any potential for real or perceived conflicts of interest);

(ii) enable them to provide support to mills in a more adaptive manner to address their diverse constraints (in some instances just facilitating the mobilisation of more specialised technical support); and

(iii) help build trust, dialogue, and mutual accountability between the programme and the private sector.

This will likely require reducing FFOs' caseload and adding to their training (e.g. going beyond technical skills, developing facilitation skills and private sector development competencies). Furthermore, it could involve scheduling periodic reflection and learning sessions among FFOs, joined by industry representatives, to address specific challenges.

5. **The current RTAG should be converted into a formal strategic advisory group,** which regularly reviews programme progress based on more regularly shared monitoring data, including QA/QC data, and which manages a more agile operational research agenda that responds to immediate evidence needs. This group can build on models of quality improvement (see for example[xcix]) to establish an agile cycle to adjust implementation in response to programme progress. All relevant stakeholders need to be represented, including industry and government, food fortification alliances, and other food fortification partners. The group needs to have a good balance between national and international expertise and presence. Under its umbrella, a strategic research partner (a single organisation or small research team) should be engaged to support the advisory group with identifying evidence needs (through review and or primary data) and to conduct action-oriented research with the participation of the relevant stakeholders (balancing, on a case by case basis, the possible need for independent research with the need to foster joint learning).

6. **FFP needs to strengthen its engagement with the public sector beyond the immediate sector stakeholders** – food departments and health authorities. At the provincial level, it should leverage its presence on the MSNS committee in Punjab to deepen ownership of the fortification agenda in the P&D department and seek supportive action from sister nutrition programmes. Preferably with support from P&D, its current institutional counterpart, FFP should engage with provincial finance departments to create awareness about food fortification and, based on a costed plan, secure their commitment to funding the enforcement and monitoring operations in each province.

7. Given that the current regulatory framework, as it relates to the fortification of wheat flour, is based on subordinate legislation (Pure Food Regulations) and does not engender enough confidence in provincial governments to proceed with its enforcement, **FFP should strengthen the focus of its energies on the promulgation of wheat flour fortification legislation**. This will require the deployment of strategic engagement and consensus-building skills directed at both political and senior bureaucratic leadership, as well as PFMA, leveraging food fortification alliances and mobilising support among all fortification partners.

8. **Capacity building support to the Food Authorities should be aligned closely with their operations to ensure it remains relevant and sustainable**. Capacity building should not involve only one-off events, but should be followed up with periodic refreshers. On wheat flour, while any genuine public sector enforcement action is on hold, the capacity building efforts need to be targeted to those government entities that are likely to be mandated to monitor and enforce wheat flour fortification. There seems to be some ambiguity about this, which the programme needs to clarify as soon as possible, but the enforcement responsibility will likely rest with the Food Authorities. In Sindh, the focus should specifically be on sensitising and developing the capacity of the Food Authority on oil/ghee fortification, including for loose oil, because of the size of such operations in Sindh. This will require

moving beyond mill-based testing to open market sample testing (as is done in Punjab), and, accordingly, having sampling and testing procedures and capacities in place. This is as much a function of capacity as it is of top-level political commitment – an aspect that should receive due attention from FFP's public sector engagement and advocacy strategy.

9. **FFP should improve the quality of its engagement at the district level**. Essentially, this means senior provincial FFP leadership periodically engaging with district administrations to supplement the more junior-level engagement by FFOs, who are currently mostly busy with the mills. Making productive use of its presence on the MSNS steering committee in Punjab, FFP should mobilise the support of the Planning and Development Department to strengthen the engagement of DMACs on the fortification agenda in the districts where DMACs are operational. For other districts, FFP should seek the Planning and Development Department's help to formalise its district-level engagement with a smaller group of stakeholders – a committee consisting of the Deputy Commissioner, District Food Controllers, District Health Officers, and the Food Safety Officers, reviewing the progress of the food fortification at least once a quarter. This latter arrangement should also be put in place in other provinces.

10. **FFP should further expand on its work through multi-stakeholder coordination platforms.** The programme should promote the use of the fortification alliances and other coordination platforms to harmonise donor support to federal government and provinces in the area of food fortification and nutrition, to garner synergies and avoid duplication. FFP should complement this with direct engagement with such programmes, like with the MSNS in Punjab and with NSP and AAP in Sindh. Joint periodic reviews of their programmes, and better still, prior joint work planning, would go a long way to ensuring this.

11. **FFP needs to develop a comprehensive exit strategy in consultation with the food fortification alliances and its members,** and to facilitate an agreement on concrete actions and commitments. The exit strategy should at least address the following:

    (i) specific strategies to ensure the continuation of programme elements that are currently dependent on FFP support (e.g. premix procurement brokering);

    (ii) engagement with government and industry to explore whether FortIS, as developed, can meet the data consolidation and storage needs for monitoring and enforcement, or adapt as needed;

    (iii) provisions to maintain the necessary resources and capacity across private and public actors to sustain adequate fortification (strengthening the capacity of the industry associations to continue providing technical support to their members is an option that should be assessed); and

    (iv) provisions to strengthen and sustain a supportive enabling environment for wheat flour and oil/ghee fortification, covering coordination, trust, alignment of public–private incentives, and any outstanding regulatory and legislative reform, while fostering transparency, collaboration among all fortification stakeholders, and providing support to the NFA or to another coordinating mechanism. The release of the new NNS could provide renewed momentum and a platform for driving this agenda forward.

12. **FFP needs to operate more sensitively to the political economy of the wheat flour and oil/ghee sub-sectors**. For wheat flour legislation, Sindh (and to some extent KP), being less sensitive to public sector wheat operations compared to Punjab, can be more easily brought around to supporting the legislation (as evidenced by the placement of the draft law before the Sindh assembly). FFP should accordingly focus its engagement with political leadership

and other senior political and bureaucratic stakeholders in Sindh and leverage that to engage other provinces. Mandatory legislation in any of these jurisdictions, would positively impact the incentive alignment in Punjab. For the oil sector, FFP should again focus on Sindh leadership, making a case for more comprehensive oil/ghee inspections, including loose oil from the market, as Punjab has done quite effectively. This is not necessarily the same as FFP changing its own sampling strategy and moving from mill-based to market sample testing, but, rather, involves getting the Sindh Food Authority to do it.

13. **FFP should clarify who the audience for the public awareness campaign is and improve its targeting**. This includes the following elements:

    (i) Having an improved understanding of the different types of consumers of wheat flour and oil/ghee (e.g. *chakki* vs roller miller flour consumers, consumers who buy by the kilo and those who buy branded/packaged products), and of the key decision makers within the household.

    (ii) Separating demand creation for fortified oil/ghee (which should continue on a national scale – and should be strengthened by empowering consumers to identify fortified oil through, among others, a brand-neutral fortification logo) from fortified wheat flour (which requires some additional information to determine the potential for a more targeted approach to ensure demand is created where supply is available – this should be a high priority for the research component).

    (iii) To avoid undermining other programmatic efforts for specific target groups in Pakistan, the promotion of food fortification should be focused on WRA and children six months to five years of age; pregnant and lactating women should not be singled out as their nutrient requirements are higher than those that can be met through fortification, and other programmes in Pakistan address this (iron folic acid supplementation).

    (iv) More effort to sensitise and motivate men to demand fortified foods, as they are the main purchasers of wheat flour and oil/ghee for the household.

14. **The programme needs to make public awareness-raising and demand-generation a joint effort involving the private, public, and civil society sectors**. The programme should involve the industry associations in the design and roll-out of the public awareness-raising campaign, exploring synergies with mills' marketing and distribution capabilities, and further mobilise their support to improve the visibility of fortification. Government champions can be further mobilised to publicly advocate for fortification and local government officials can follow up on fortification in the markets to sensitise retailers, with programme support. Consumer organisations can advocate for fortification and be empowered to serve as watch-dogs to identify where unfortified products are being sold in markets.

15. **The programme should review its engagement with local health intermediaries/CSOs to transmit messages and further adapt its approach to their needs, bearing in mind VfM.** This could include further clarifying the messages and expectations about their transmission, conducting follow-up monitoring, strengthening synergies with the media campaign, and addressing transmission constraints faced by local health staff.

16. **The programme should further assess and re-think its media strategy**. The present method of using cable TV channels, although less costly, is likely to have limited reach and effectiveness. Similarly, the use of the mobile messaging targeted towards women is likely to have low effectiveness due to the lower mobile phone ownership among women and a general low level of literacy among the population. The current proposal of the advocacy

effectiveness study could be revisited to ensure that these questions can be directly addressed.

9.2 Lessons learned

Lessons of potential relevance to the wider food fortification community of practice that can be identified so far are the following:

1. Articulate a detailed ToC that is specific to the political economy of the programme.
    - A detailed ToC is needed, with sufficiently detailed activities to match the complex operating environment in which the food fortification programme is implemented. For example, activities to initiate fortification should be outlined as distinct from those intended to sustain the production of adequately fortified foods.
    - Distinguish and explain how change is expected to take place for each food vehicle being fortified, given that substantial differences may exist in the political economy of each industry and the related current state of legislation.
2. Develop appropriate standards and establish an effective regulatory environment considering the political economy.
    - Appropriate standards specific to each food vehicle should be based on international best practice. In the case of decentralised governments, it is important to harmonise these standards across provinces.
    - Even when the legal basis may technically exist for Food Authorities to enforce the regulations, endorsement of fortification by provincial legislatures, in the form of a dedicated law, is needed to ensure broad-based political ownership for mandatory fortification. This is important in contexts of sensitive political economy in the sector of the food vehicle, such as the wheat flour sector in Pakistan, where the producers wield considerable power and are in a position to resist compliance when the mandate only comes through a regulation. A direct legislative mandate is also more difficult to roll back.
3. Incorporate a strong understanding of the barriers and opportunities to food fortification into the design of any intervention, based on a thorough analysis of the food vehicles' value chains.
    - A thorough understanding of millers' incentives as to why they are or are not fortifying within standard ranges is required before programme design. This understanding should guide the design of the food fortification programme, addressing a technical gap in capability, a lack of incentives for adequate fortification, or weak disincentives for non-fortification or non-compliant fortification.
    - A thorough analysis of the private sector value chain is needed to map out the total supply of the food vehicle in the national market, which makes it possible to understand and monitor what proportion of production is fortifiable and what proportion is actually fortified.
4. Build strong political commitment and engage multiple stakeholders to create a strong enabling environment.
    - The activities of the programme should be directly relevant, to promote and develop the skills and structures within the government in support of these responsibilities. These

include advocacy for mandatory fortification and harmonisation of standards, awareness-raising, equipping of public laboratories, and TA for effective monitoring and enforcement.

- Find opportunities to engage multiple stakeholders – including policymakers, private sector leaders (including heads of millers' associations), members of the national scientific and research communities, medical doctors, media leaders and other communicators, members of consumer associations, and civil society – to create an enabling environment to sustain the programme's efforts.
- The activities of the programme should aim to identify and effectively engage critical industry partners, such as millers' associations. Their engagement should not be taken as given and may require joint learning and specific platforms for dialogue to generate trust and promote sustainability. Equally, clear terms of engagement across all stakeholders could be useful to mitigate any potential conflicts of interest causing any bias of alignment.

5. Engage more than one premix supplier to mitigate the risk of making the supply reliant on the dominant market position of this provider.
   - Relying on more than one premix supplier can be help to diversify the supply of the premix to the mills and mitigate supply interruptions caused by the supply of one supplier being affected by emergencies, customs delays, or any other unforeseen circumstances. Furthermore, it can avoid one supplier using its dominant market position to increase prices.
6. Use targeted research studies to understand incentives, disincentives, political economy, and context to inform programme design and its adaptation over time.
   - Targeted research studies can inform a programme's design but only if they are implemented in a timely manner – i.e. before significant design decisions are made or implemented (after which course correction is no longer feasible).
7. Use communication channels that are known to be accessed by the target population.
   - Given the large number of communication channels that could be deployed to reach the target population with programme messaging it is important to invest only in those that have been proven to be accessed by the target population. For example, if using television as a communication channel it is important to realise that not all networks, channels, or stations are equally accessed or accessible to the intended target population.
   - An understanding of intra-household dynamics and gender considerations is also essential when choosing communication channels. It is important to know who within a household makes decisions related to purchasing, so that communications can be targeted appropriately. Moreover, access to communication channels may be different for different individuals within a household.
   - It is equally important to consider the duration of exposure that each communication channel offers in judging their relative effectiveness and value to the programme's objectives.

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Annex A Inception report and original terms of reference

A.1 Inception report

Due to the length of the inception report, this has been submitted as an accompanying document to this midterm report.

A.2 Original terms of reference

The original terms of reference have also been submitted as an accompanying document to this midterm report.

Annex B Summary Evaluation Framework

B.1 FFP's ToC Narrative

Impact – Final outcome level

The long term impact of FFP is to improve the nutritional status of people of Pakistan by enhancing the levels of micronutrients vitamin A, vitamin D, iron, zinc, folic acid and vitamin B12, thereby reducing micronutrient deficiencies. This will contribute to the reduction of undernutrition in Pakistan, and whilst FFP ultimately targets the general population, it is expected to be advantageous to WRA, and children under five.

The FFP aspires to contribute to this long-term impact by improving the target population's availability and consumption of adequately fortified wheat flour and edible oil/ghee;[91] its final intended outcome. It is expected that if the target population has greater availability of the fortified food vehicles, and it improves its consumption of the fortified food vehicles, then its nutritional status will improve because the intake of micronutrients increases.

Furthermore, it is assumed that if the target population has better availability of these fortified vehicles, then their consumption will increase because a) if mass fortification achieves the covering of the entire industrial production, no change in purchase or consumption behaviour is required to the extent that consumers already purchased and consumed industrially produced wheat flour and edible oil/ghee, and b) consumers understand the health benefits of fortified food, therefore are motivated to maintain (and potentially even increase) their acquisition/purchase and consumption of the food vehicles.

The above mechanisms are expected to work under the conditions that (assumptions):

- Sufficient amounts of fortified wheat flour and edible oil/ghee are consumed to make a meaningful contribution to micronutrient requirements, particularly by those householder and household members with the most micronutrient deficiencies. This also assumes that intra household consumption patterns allow women and children to consume a sufficient share of the fortified foods.
- Price changes of fortified wheat flour and edible oil/ghee does not affect uptake. (This has also been supported through FFP's RDS that consumers are ready to pay for nominal increase in price of fortified products). Whilst FFP tries to keep any cost of fortification low for producers (e.g. through reduction of import taxes on premix), it recognises that producers may increase prices to pass any cost increase to consumers. However, it is assumed that producers pass on the benefit of the subsidy and any reduction of input costs (e.g. import taxes) to retailers and consumers.
- The market share/coverage of industrially produced fortifiable food vehicles, particularly wheat flour, amongst households is as expected. This is assumed to be a minimum of 24% and 75% for industrially produced wheat flour, and registered oil producers respectively, during FFP's lifetime.

Private sector supply-side pathway

FFP's core impact pathway to achieve improved availability and consumption of adequately fortified wheat flour and edible oil/ghee is to promote a sustainable supply and adequate

[91] Adequately fortified food means foods are fortified according to the standards set by government.

fortification of industrially produced wheat flour and edible oil/ghee across Pakistan. The programme expects that if all producers adequately fortify at least 95% of their total production of a) maida, atta and fine wheat flour with iron, folic acid, zinc and vitamin B12 and b) edible oil and ghee fortified with vitamin A and D, then supply and availability of adequately fortified wheat flour and edible oil/ghee in the market will improve, because a) industrial producers are able to channel their fortified products to the retail markets in Pakistan and b) the demand for the fortified food vehicles by consumers and retailers remains stable, or even increases due to heightened awareness.

This is conditional on (assumptions):

- Fortified wheat flour and edible oil/ghee is adequately packaged, stored, and distributed after its production, so there is no quality loss in the supply chain up to point of purchase, and even up to the consumption; and
- Industrial, fortified wheat flour and edible oil/ghee remains competitive compared to substitutes.

It is assumed that if industrial producers a) increase the procurement and use of specified premix as part of their production process, b) install and use specified microfeeder equipment where needed (only needed for wheat flour producers), c) adequately perform quality assurance and quality control during the production process and d) have staff trained in the fortification process, then production is assumed to be adequately fortified. Industrial producers are assumed to be incentivised to do this because of:

a) FFP's engagement with the producers and their industry associations;

b) a subsidy that enables to temporarily reduce the fortification cost and incentivises (through conditionality) adequate fortification and QC;

c) government makes fortification of industrially produced wheat flour and edible oil/ghee legally mandatory;

d) government monitors and enforces mandatory fortification;

e) the demand remains stable, or even increases due to heightened awareness; and

f) the cost of inputs for the fortification process is limited and their supply facilitated.

Adequate fortified production refers to a) the producer documents the use of, and uses, the certified premix in relation to total production, and b) fortification levels meet standards set by the PSQCA and/or Provincial food regulators (as measured through laboratory analysis of vitamin A in oil samples and of iron in wheat samples).

Procurement of specified premix increases if an uninterrupted supply of sufficient and specified premix by nominated premix suppliers takes places, which is facilitated by a) FFP's TA (e.g. contracting, premix forecasting), b) setting premix price ceilings, c) government support by waiving import taxes and duties, d) premix suppliers keeping a buffer stock in Pakistan, and e) the subsidy being conditional on adequate premix procurement. Furthermore, the increased producer demand for premix is expected to incentivise a sustainable supply of specified premix in Pakistan.

Specified premix refers to premix that a) has micronutrient content and ratio in accordance to specification, and b) is accompanied by a certificate of analysis.

Producers install microfeeder equipment according to specification (feeders for fortification of atta, fine atta and maida production line) if/because a contracted supplier delivers the equipment and

the installation services according to specification, facilitated by FFP. The producers will be able to use the equipment throughout the programme's lifetime because of the expected life of the equipment, extended equipment warranty, and after-sales support services provided by the supplier.

More producers are expected to adequately perform QA (i.e. monitoring/documenting that fortification process—premix procurement, production, storage happens in line with procedures) and QC (sample testing to verify fortification at standard) if a) they have staff trained in QA/QC and b) have better access to QC equipment to conduct internal qualitative QC and better access to QC services provided by cluster/central lab. This is because of a) the subsidy mechanism that incentivises QA/QC, b) training provided by FFP in collaboration with industry associations, c) FFP providing QC equipment, and d) setting up, equipping and training cluster labs and a central lab (in case of wheat flour) in collaboration with industry associations.

The above mechanisms are expected to result in adequately fortified production under that conditions that (assumptions):

- the producers are willing to engage with FFP and allocate dedicated, and relevant staff and resources to support fortification and QA/QC processes;
- no premix stock outs occur, and premix price and currency exchange rates remain stable;
- microfeeder suppliers provide microfeeders in accordance to agreed timeline;
- cluster & central labs have all relevant resources to provide QC services; and
- industry associations are committed to food fortification, supporting member enrolment, coordination, public advocacy, training, monitoring and QC.

Public sector pathway

A key supporting pathway to achieve sustainable supply and production of adequately fortified wheat flour and edible oil/ghee is for the government to make adequate fortification a legal requirement for industrially produced wheat flour and edible oil/ghee, and to monitor and enforce food fortification according to standards and regulations

It is assumed that if a) more provincial and regional governments make fortification of wheat flour and edible oil/ghee mandatory, b) national, provincial and regional governments adopt, revise and harmonise standards and regulations for fortification of these food vehicles, c) governments at different levels have improved skills, procedures (e.g. SOPs) and access to QC equipment in line with the standards and regulations, then provincial and regional governments improve their monitoring and enforcement of adequate fortification of the respective food vehicles; supported by nominated public laboratories performing more tests of fortified wheat flour and oil/ghee samples.

The main reason this can be assumed is that government actors become more aware, and have better understanding, of the steps needed to ensure sustained and mass fortification following FFP's sensitisation and research evidence provided. In combination with FFP advocacy amongst government decision makers, this is expected to increase political commitment and government support for fortification of wheat flour and edible oil/ghee.

Improvements in monitoring are mostly expected in the form of provincial and regional governments conducting inspection and food sample selection at producer and market level (only in Islamabad the local government is responsible for monitoring). Selected samples are then tested at better equipped and trained public labs, which relay test results back to the appropriate

government actors; which provincial and regional governments will use for the application of penalties for producers, if needed, as outlined in the regulations.

The following assumptions underlie this pathway:

- Food regulatory bodies have clearly defined roles and responsibilities.
- Governments have, allocate, and utilise sufficient resources (budget, staff, space) to monitor and enforce food fortification, and operate public labs and maintain lab equipment.
- Transfers of government officials does not hamper monitoring & enforcement.
- Effective government-led coordinate in support of food fortification takes place.

Public awareness pathway

FFP intends to influence the demand and consumption of fortified wheat flour and edible oil/ghee through a public awareness pathway. The programme will expand the knowledge and acceptance of fortified wheat flour and edible oil/ghee and their health benefits amongst the public in Pakistan, in particular WRA and school children. Consumers perceive fortified foods as desirable normal products they can trust because they understand the benefits of fortified foods, understand that fortified foods are not harmful or inferior, and believe that other people are buying fortified products.

As market stakeholders, district government actors and local health staff become more aware of fortifications and its benefits and use marketing materials to promote fortification of wheat flour and edible oil/ghee, this will contribute to increased awareness amongst the public.

The general public's awareness is expected to increase if/because a) the implementation of a media campaign through adverts, billboards and mobile messaging across 100 districts in Pakistan, b) consumers routinely see fortified wheat flour and edible oil/ghee in places where they shop, c) local health staff (Lady Health Workers, Lady Health Visitors, Lady Health Supervisors, and School Health and Nutrition Supervisors) disseminate fortification messages and IEC materials and become more aware themselves of fortification and its benefits, d) market stakeholders (retailers, wholesalers, utility stores, trader associations) promote fortified wheat flour and edible oil/ghee by using distributed marketing materials and become more aware about fortification and its benefits, and e) district government actors (such as Deputy Commissioner and relevant district departments) become more aware of food fortification.

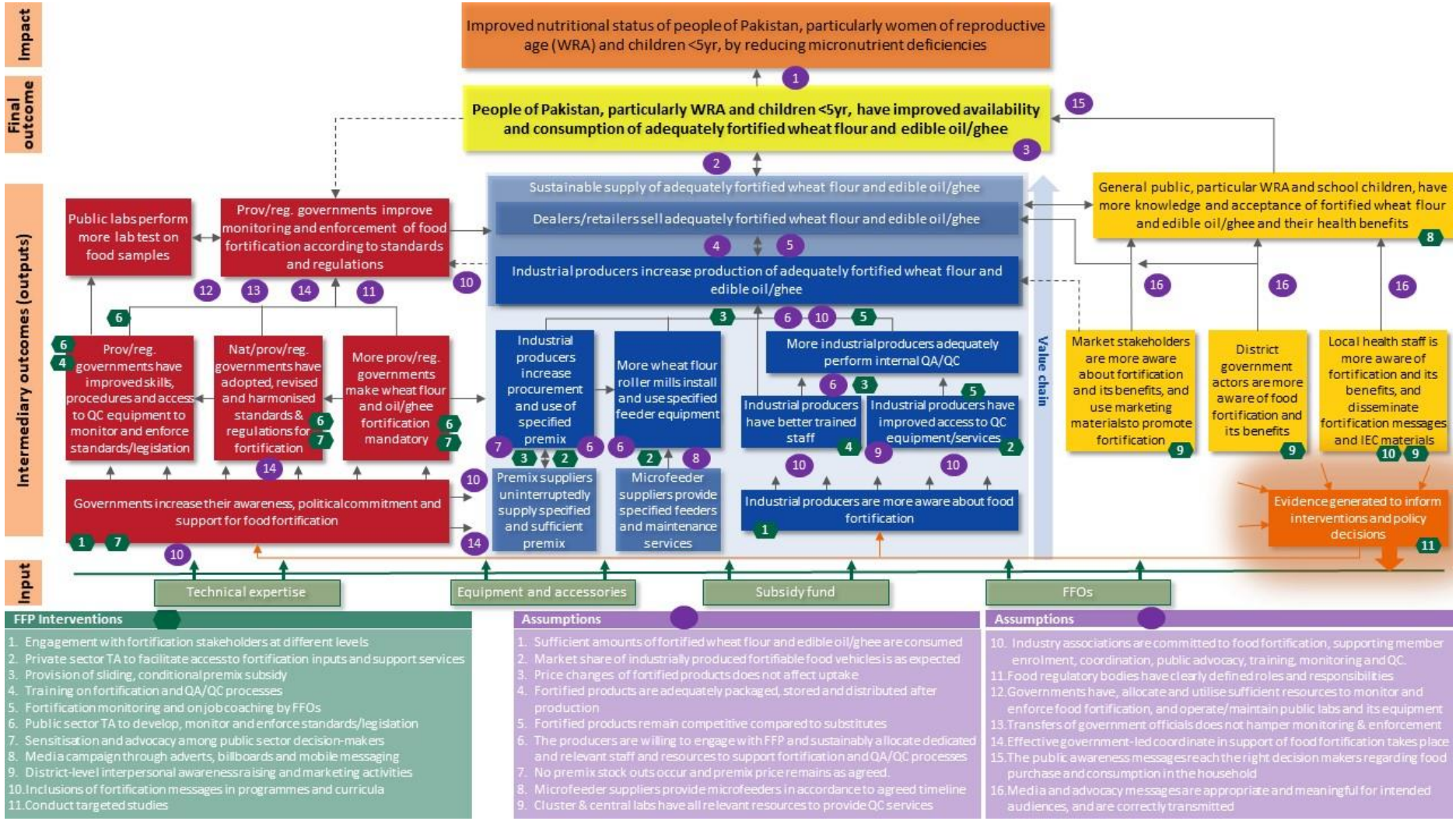
Increased awareness amongst market stakeholders is also expected to influence their behaviour in terms of selling and distributing fortified wheat flour and edible oil/ghee; at least to continue supply or potentially increase it.

Increased awareness amongst district government actors is also expected to support monitoring and enforcement of fortification standards and regulations at district level.

The pathway is assumed to work conditional on (assumptions):

- The public awareness messages reach the right decision makers regarding food purchase and consumption in the household.
- Media and advocacy messages are appropriate and meaningful for intended audiences and are correctly transmitted.

Figure 14 FFP ToC diagram



B.2 Evaluation questions

In this section, we present the evaluation questions and criteria, and explain their rationale.

The evaluation is structured around 9 KEQs, which have been organised by six overarching evaluation criteria (based on OECD DAC criteria) of relevance, coverage, effectiveness, efficiency, impact and sustainability (see Table 7). The KEQs have been further subdivided into DEQs, which are linked to the different part and pathways of the ToC (private sector pathway, public sector pathway, public awareness pathway, and outcomes/impact). Together KEQs and DEQs provide an overarching framework for the evaluation, and form the basis of the evaluation design, data collection and synthesis.

The evaluation questions take into consideration DFID's requirements for the evaluation, as outlined in the ToR's (see Annex A). However, we have reframed, or reorganised, several of the evaluation questions, as compared to the ToR, which are as follows:

- Relevance is included as an evaluation criterion. Since the ToR's asked to assess the validity of the programme's ToC, we propose to assess the programme's relevance in terms of appropriateness of its programme design. Besides a review of the internal logic of the programme's ToC, we include an assessment of its relevance to the local context, its adaptive ability and its relevance to the needs of the target population. We have already started answering some of the relevance questions in the inception phase with our close work with FFP on revising and updating their ToC.
- We propose to assess efficiency by conducting two separate but related pieces of analyses – cost-effectiveness analysis and a value for money analysis.
- Effectiveness and impact questions have been reorganised in line with the levels in the theory of change. The effectiveness criterion covers questions related to the intermediary outcomes in the different intervention pathways, whilst the higher-level final outcome and impact related to changes in household consumption and individual nutrition are mapped to questions under the impact criterion.
- In line with the ToR's, we have split changes at the household-level between the coverage and impact criteria. We understand coverage to refer to the binary outcome of the household members consuming, or not consuming, adequately fortified food, whilst impact questions seek to unveil whether, how, why and for whom, this will likely improve their micronutrient status.
- Besides the household/consumer level effects, we have also considered impacts as changes in the wider market system beyond the specific components of the value chains in which FFP intervenes. As part of the impact criteria we will also pay attention to unintended effects.

In addition to the EQs, we have identified a guiding set of criteria, which specify the attributes or dimensions based on which the EQs will be answered and evaluative judgments will be made. They have been formulated on our understanding of FFP's ToC, programme activities, stakeholder interviews and a review of national and international literature on food fortification (see Table 7). These criteria are used to direct the data collection of the evaluation. However, they should not be seen as a fixed set of indicators or benchmarks, but rather items that provide further focus to the evaluation. Potentially new criteria for investigation will be added once the evaluation team's understanding of the programme grows, or the programme adapts. Similarly, some criteria may become less important, or related data is not feasible to collect.

Gender and equity – two key cross-cutting issues being addressed in the evaluation have been considered in the development of both the EQs and the evaluation criteria. Emphasis is placed on

understanding the effect of the programme on vulnerable groups, such as WRA, poor households, and households living in remote/rural areas, and the evaluation questions and criteria reflect this.

The EQs have been developed in consultation with DFID and FFP. An initial set of evaluation questions and criteria was shared with both stakeholders for feedback. The feedback was subsequently taken on board as part of the revision of the EQs and criteria following the finalisation of the ToC.

The evaluation questions will be answered at two points of the evaluation – the midterm and the endline. Not all questions will be answered in both phases. Questions related to the coverage (KEQ2) and impact at consumer-level, particularly impact on nutritional status (KEQ7), and unintended outcomes at market system level (DEQ8.4) will be addressed only at endline when the programme has reached scale. Most questions, however, will be answered at both points in time with the endline building upon the evidence already collected and analysed in the midterm phase. Questions related to effectiveness (KEQ3 to KEQ5), programme impact on the market system (KEQ8) and sustainability (KEQ9) will at midterm be examined in a formative manner, reviewing the current status based on evidence available, pointing out possible bottlenecks related to the impact pathways, political economy and value chains/market system. They will, however, be more fully and summatively addressed at endline. Aspects of efficiency (KEQ6) will be addressed at different time during the evaluation, while relevance (KEQ1) will receive most attention at midterm.

Table 7 Evaluation Matrix

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
KEQ1: How well is the programme design suited to its objectives, context and needs of its target population?				
DEQ1.1: Is the programme's ToC valid and comprehensive relative to what is required for fortification programmes?	- The programme's ToC articulates well-sequenced, coherent and clear causal pathways and makes explicit the most critical assumptions - The underlying assumptions in the ToC are plausible based on available evidence - FFP's interventions are consistent with the programme's intended outcomes and impact - FFP interventions are consistent with good practice, and build on previous experience of what has worked and not in fortification programmes in Pakistan and globally - Key common bottlenecks and barriers to fortification (initiation of fortification, fortification to standard, consumer acceptance) are addressed as part of the programme activities	Impact pathway analysis	- Desk-based and participatory ToC review - Review of global literature on food fortification including evaluations of food fortification programmes and fortification good practice documents - Review of literature on food fortification in Pakistan and documentation on past food fortification programmes - Review of FFP documents and strategies - National and provincial key informant interviews with FFP, DFID, public sector stakeholders, industry associations, Pakistan nutrition/food fortification experts).	Inception (2018) Midterm (2019) Endline (2020)
DEQ1.2: How relevant is the programme to the local public sector and producer context?	- The programme aligns with national and provincial government priorities and policies - The programme understands the wheat flour and edible oil/ghee market system and adapts to these systems as needed - The programme's objectives and interventions are supported by key market actors and government agencies	Political economy analysis Value chain analysis Impact pathway analysis	- Review of FFP's documents including strategies and quarterly and annual reports - Review of public policy documents (policies, strategies, speeches etc.) and market & sector studies - National and provincial key informant interviews with public and private sector stakeholders, FFP and sector experts	Midterm (2019) Endline (2020)
DEQ1.3: How relevant is the programme to the needs of the target population sub-groups?	- Latest available evidence on consumption and dietary intake patterns supports potential for impact of the programme's proposed approach (by modelling contribution of micronutrients from consumption of fortified foods as a % of EAR[92] or RDA[93]) on the target population and (WRA, children under 5) including those in low income households	Assessment of final outcome and impact	- FACT 2017 survey - FFP's Benefits Incidence Analysis - Document review of public policy documents	Midterm (2019)

[92] EAR = Estimated Average Requirements

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
	- The programme aligns with policy priorities related to addressing the special needs of rural and low-income households, particularly of women and girls - Households that consume flour from chakki mills also consume fortifiable flour produced by roller mills			
DEQ 1.4: How successfully has the programme adapted to the context of implementation and newly available evidence?	- FFP adequately monitors programme implementation, results and the market & policy context, and makes information accessible - The programme takes into account new evidence (monitoring data, operational research findings, external evidence) on effectiveness of programme activities and implements programme adjustments accordingly - FFP operational research studies are relevant to the programme and inform programme adaptation - The programme's theory of change is periodically reviewed and adjusted when needed to emerging evidence about how the theory holds in practice	Impact pathway analysis	- Review of programme documents, strategies and quarterly and annual reports and DFID's Annual Reviews - Review of programme implementation and monitoring data - Review of FFP-commissioned research studies - National key informant interviews with FFP, DFID, chair of FFP's Research and Technical Advisory Group (RTAG), public and private sector stakeholders	Midterm (2019) Endline (2020)
KEQ2: How well did the programme reach its target population sub-groups?				
DEQ2.1: To what extent do households and individuals within those households, in particular WRA and children under five, consume adequately fortified wheat flour and edible oil/ghee with support of the programme?	- Households consume fortifiable, fortified and adequately fortified wheat flour - Households consume fortifiable, fortified and adequately fortified edible oil/ghee - WRAs consume fortifiable, fortified and adequately fortified wheat flour - WRAs consume fortifiable, fortified and adequately fortified edible oil/ghee - Children under five consume fortifiable, fortified and adequately fortified wheat flour and edible oil/ghee - Children under five consume fortifiable, fortified and adequately fortified edible oil/ghee	Assessment of final outcome and impact	- FACT surveys: FACT 2017 (for Punjab, Balochistan, Sindh) and repeated FACT survey at endline (all provinces) - Review of FFP's District Rolling Study	Endline (2020)
DEQ2.2: To what extent do poor and other vulnerable groups	- Fortified wheat flour and edible oil/ghee are available to poor households and vulnerable groups	Assessment of final	- FACT surveys: FACT 2017 (for Punjab, Balochistan, Sindh) and repeated FACT	Endline (2020)

[93] RDA = Recommended Daily Allowance

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
consume fortifiable and fortified wheat flour and edible oil/ghee, who is excluded and why?	- Poor households and vulnerable groups consume fortified and adequately fortified wheat flour and edible oil/ghee	outcome and impact Qualitative consumer study	survey at endline (all provinces) - In-depth interviews and Focus group discussions with consumers (district study) - Market level data collection (district study) - Review of FFP's Benefits Incidence Analysis	
KEQ3: To what extent has the programme contributed to an adequate supply of wheat flour and edible oil/ghee fortified?				
DEQ3.1: To what extent is adequately fortified wheat flour and edible oil/ghee produced by the industrial producers targeted by the programme?	- All targeted producers fortify most of their production of wheat flour/oil/ghee - Large proportions of wheat flour/oil/ghee produced is fortified adequately - The 2-year pre-mix subsidy has been provided as planned to the producers and contributed to changes in production of fortified and adequately fortified wheat flour and edible oil/ghee - All targeted producers perform and report on internal Quality Assurance/Quality Control (QA/QC) processes as per protocol - The targeted producers have and use the necessary equipment provided by FFP to conduct internal QA/QC processes adequately - The targeted producers access external QC services as planned - The private cluster/central labs provide adequate external QC services with support of FFP - Producer and cluster lab staff improved their technical skills to conduct the QA/QC processes adequately with support of FFP - Producers have processes and systems in place for acting on results of QA/QC assessments - All targeted wheat flour producers have specified microfeeder installed - All targeted wheat flour producers maintain functioning microfeeder throughout the programme's lifetime - Microfeeder suppliers provide specified microfeeders and maintenance services	Impact pathway analysis	- Document review, among others, of programme documents, manuals and research (including Producer incentive study) - Secondary analysis of data from FortIS, subsidy database and FFP implementation monitoring - National and provincial key informant interviews with private sector actors - Key information interviews with producers and FFOs, and market level data collection, including interviews with market stakeholders/retailers (district study)	Mostly at Endline (2020) Partially and formatively at Midterm (2019)

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
	- All targeted producers increase procurement of specified premix - All targeted producers maintain sufficient stock of premix and use premix as planned throughout the programme's lifetime - Premix suppliers uninterruptedly supply specified and sufficient premix - Targeted producers are more aware about food fortification - FFOs monitor and provide job coaching support to producers as planned - FFP's training and TA activities to support producers and cluster labs were implemented according to plan and context			
DEQ3.2: What other factors influence the production and distribution of fortified and adequately fortified wheat flour and edible oil/ghee?	- Targeted producers are willing to engage with FFP - Targeted producers allocate dedicated and relevant staff and resources to support fortification and QA/QC processes throughout the programme's lifetime - No premix stock outs occur, and premix price remains as agreed - Microfeeder suppliers provide microfeeders in accordance to agreed timeline - Cluster & central labs have all relevant resources to provide QC services - Industry associations are committed to food fortification, supporting member enrolment, coordination, public advocacy, training, monitoring and QC. - The regulatory environment has contributed to changes in fortified production - Government support in the form of tax waivers has contributed to fortified production - Producers gained access to premix, equipment, and support services through other means (e.g. other programmes) - Market demand incentivises production and distribution of fortified and adequately fortified products - Manufacturing, distribution and commercial factors (e.g.	Impact pathway analysis Value Chain analysis	- Document review, among others, of market and sector studies, fortification studies/reviews, programme documents and research, government policies and regulations - Secondary analysis of data from FortIS, subsidy database and FFP implementation monitoring data - National and provincial key informant interviews with private sector actors and experts of the wheat flour/oil/ghee value chains - Key information interviews with producers, market stakeholders/retailers and FFOs (district study)	Mostly at Endline (2020) Partially and formatively at Midterm (2019)

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
	integration of distribution channels, packaging, storage space) influence production and distribution choices			
DEQ3.3: To what extent is a sustainable supply of adequately fortified wheat flour and edible oil/ghee available in markets/retail outlets?	- Fortified wheat flour is available in market/retail outlets including in rural or remote areas - Fortified wheat flour available in market/retail outlets is adequately fortified - Fortified edible oil/ghee is available in markets/retail outlets including in rural or remote areas - Fortified edible oil/ghee available in market/retail outlets is adequately fortified	Impact pathway analysis	- Document review, among others, of programme research (e.g. RDS) - Market level data collection, including key information interviews with market stakeholders/retailers (district study)	Mostly at Endline (2020) Partially and formatively at Midterm (2019)
DEQ3.4: What factors influence the sustainable supply of fortified wheat flour and edible oil/ghee in markets/retail outlets?	- Price changes influence retailer supply and demand patterns of fortifiable wheat flour and edible oil/ghee - Fortified wheat flour and edible oil/ghee remain competitive compared to other substitutes - Fortified products are adequately packaged, stored and distributed after production - Consumer demand incentivises distribution of fortified and adequately fortified products - Other value chain factors (e.g. marketing and promotion) influence retailer supply and demand patterns - Other fortification programmes have contributed to the availability of fortified wheat flour and edible oil/ghee in markets/retail outlets	Impact pathway analysis Value Chain analysis	- Document review, among others, of market and sector studies, fortification studies/reviews, programme documents and research, government policies and regulations - National and provincial key informant interviews with private sector actors and experts of the wheat flour/oil/ghee value chains (including government actors responsible for pricing policy) - Key information interviews with producers and FFOs, and market level data collection, including interviews with market stakeholders/retailers (district study) - Secondary analysis of price data from FortIS (once available)	Mostly at Endline (2020) Partially and formatively at Midterm (2019)
KEQ4: To what extent has the programme contributed to raising public awareness and acceptance of fortified wheat flour and edible oil/ghee and its benefits?				
DEQ4.1: To what extent has FFP's public awareness activities contributed to raising awareness of fortified wheat flour and edible oil/ghee and its benefits?	- Public awareness messages have been delivered to the intended audience - Consumers have heard about fortified wheat flour and edible oil/ghee through the programme's public awareness activities - Market stakeholders and local health staff used FFP's marketing/IEC materials and disseminated FFP's messages	Impact pathway analysis	- FACT surveys: FACT 2017 (for Punjab, Balochistan, Sindh) and repeated FACT survey at endline (all provinces) - Document review, among others, of FFP programme documents related to public awareness activities, FFP's KAP surveys and District Rolling Study	Mostly at Endline (2020) Partially and formatively at Midterm (2019)

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
	- Consumers have more knowledge about fortified wheat flour and edible oil/ghee and its availability, including in rural areas and among low income households - Consumers have more knowledge about the benefits of consuming fortified wheat flour and edible oil/ghee - The programme's public awareness activities have reached household members responsible for food purchases - FFP's public awareness activities have contributed to more awareness about fortified wheat flour and edible oil/ghee and its benefits among market stakeholders, local health staff and district government actors		- Secondary analysis of data from FortIS and FFP's implementation monitoring - In-depth interviews and Focus group discussions with consumers (district study) - Key informant interviews with market stakeholders and intermediaries of public awareness activities, e.g. local health staff (district study) - National or provincial key information interviews with actors involved in implementing the public awareness activities	
DEQ4.2: To what extent have FFP's public awareness activities contributed to more acceptance and consumption of fortified wheat flour and edible oil/ghee?	- The public awareness activities and messages have been well-received by the intended audience - Exposure of consumers to the programme's public awareness activities has had a positive influence on perceptions of fortified wheat flour and edible oil/ghee, including in rural areas and among low income households - Exposure of consumers to the programme's public awareness activities is perceived by consumers and market stakeholder to have contributed to more demand and consumption	Impact pathway analysis Qualitative consumer study	- In-depth interviews and Focus group discussions with consumers (district study) - Key informant interviews with market stakeholders and intermediaries of public awareness activities, e.g. local health staff (district study) - FACT surveys: FACT 2017 (for Punjab, Balochistan, Sindh) and repeated FACT survey at endline (all provinces) - Review of FFP's KAP surveys	Mostly at Endline (2020) Partially and formatively at Midterm (2019)
DEQ4.3: What other factors influence consumer's awareness, acceptance, and willingness to purchase fortified wheat flour and edible oil/ghee?	- The public are aware of fortified foods as they are available in the market - Purchasers can identify fortified wheat flour and edible oil/ghee - FFP's media and advocacy messages are appropriate for intended audiences, and are correctly transmitted - Other programmes have influenced the public's awareness about nutrition and fortified foods - Social and cultural norms influence acceptance of fortified foods - Socio-economic factors influence the willingness to	Qualitative consumer study Impact pathway analysis	- In-depth interviews and Focus group discussions with consumers (district study) - Document review, among others, of FFP programme documents related to the public awareness activities, documents of other nutrition awareness programmes - National or provincial key informant interviews with actors involved in the public awareness activities	Mostly at Endline (2020) Partially and formatively at Midterm (2019)

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
	purchase fortified foods			
KEQ5: To what extent has the programme contributed to an improvement in public sector management of fortification of wheat flour and edible oil/ghee in accordance with mandatory legislation and revised standards and regulations?				
DEQ5.1 To what extent has the programme contributed to making food fortification mandatory and the adoption of revised and harmonised regulations and standards?	- Food fortification of wheat flour and edible oil/ghee is mandatory in all provinces and regions through promulgating legislation or other directives - National, provincial and regional food fortification standards and regulations are revised, harmonised and adopted - Stakeholders understanding of legislation and regulations regarding food fortification of wheat flour and edible oil/ghee is clear - FFP's policy advocacy and TA activities to support changes in legislation, regulation and standards were implemented according to plan and context - FFPs policy advocacy strategy and TA has contributed to changes in national, provincial and regional food fortification legislation, regulations and standards	Impact pathway analysis	- Document review, among others, of FFP programme documents and government documents (e.g. strategies, regulations, legislation, SOPs) - National and provincial key informant interviews and Focus group discussions with public sector actors - Secondary analysis of data from FFP's stakeholder engagement database and FFO's implementation monitoring	Mostly at Endline (2020) Partially and formatively at Midterm (2019)
DEQ5.2 To what extent has the programme contributed to the government improving monitoring and enforcement of food fortification regulations and standards?	- Government officials are designated at the provincial/regional and district level with responsibility to conduct monitoring and enforcement of food fortification of wheat flour and edible oil/ghee - Enforcement and monitoring procedures have been established in all provinces/regions - Provincial/regional government have improved access to QC equipment and services with the support of FFP - FFP's training and TA have increased technical skills in all provinces/regions to conduct monitoring and enforcement of food fortification as per approved regulations and standards - Governments inspect wheat flour and edible oil/ghee producers and markets according to standards and regulations in all provinces/regions. - Provincial/regional governments enforce regulations related to food fortification - Provincial/regional governments have a management	Impact pathway analysis	- Document review, among others, of FFP programme documents and government documents (e.g. strategies, regulations, SOPs, equipment specifications) - National and provincial key informant interviews and Focus group discussions with public and private sector actors - Secondary analysis of data from FFP's stakeholder engagement database and FFO's implementation monitoring - Key informant interviews with district government actors, producers and FFOs (district study)	Mostly at Endline (2020) Partially and formatively at Midterm (2019)

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
	information system (MIS) in place to effectively monitor food fortification with the support of the programme - Provincial/regional governments use fortification MIS data for decision making and planning - FFP's TA has contributed to improving government monitoring and enforcement.			
DEQ5.3 To what extent has the programme contributed to building awareness, political commitment and support for wheat flour and edible oil/ghee fortification?	- There is increased awareness about food fortification among key policy makers in the national and provincial/regional assemblies and governments - Key policy makers in the national and provincial/regional governments prioritise food fortification regulation and enforcement - Governments provide exemption on duties and taxes on food fortification related equipment and inputs (import of micro feeders and pre-mixes) - The National Fortification Alliance and the Provincial Fortification Alliances hold meetings on a regular basis and are attended by senior government representatives	Impact pathway analysis Political economy analysis	- Document review, among others, of FFP programme documents and government documents (e.g. strategies, regulations, SOPs, equipment specifications) - National and provincial key informant interviews and Focus group discussions with public and private sector actors - Secondary analysis of data from FFP's stakeholder engagement database and FFO's implementation monitoring	Mostly at Endline (2020) Partially and formatively at Midterm (2019)
DEQ5.4 What other factors influence political commitment, support and improved public sector management of wheat flour and edible oil/ghee fortification?	- Food regulatory bodies are in place at national and sub-national level and have clearly defined roles and responsibilities - Governments allocate and utilise sufficient resources to coordinate, monitor and enforce food fortification, and operate and maintain public labs and its equipment - Industry associations are committed to coordinate and advocate in favour of food fortification - There are institutional structures in place for national and sub-national (provincial and district level) coordination on food fortification - Government agencies coordinate effectively among themselves and with non-government stakeholders about standards, regulation, monitoring and enforcement of food fortification - Transfers of government officials does not hamper monitoring & enforcement - Donors continue supporting government for achieving food	Impact pathway analysis Political economy analysis	- Document review, among others, of FFP programme documents and government documents (e.g. strategies, notifications, documents of coordination meetings, budget data) - National and provincial key informant interviews and Focus group discussions with public and private sector actors	Mostly at Endline (2020) Partially and formatively at Midterm (2019)

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
	fortification objectives - Changes in governance arrangements (like devolution or its roll back) influence public sector management of food fortification - Wider political economy factors of food fortification (e.g. wheat flour and edible oil / ghee sector industrial associations, perceive political risk of enforcement, public sector inter-jurisdictional issues, government's organisational culture, etc.) influence public sector management of food fortification - Other food fortification programmes influence public sector management of food fortification			
KEQ6: Is the programme cost-effective and does it offer value for money?				
DEQ6.1: To what extent does the programme provide value for money for the resources invested?	- FFP performs well against the Value for Money sub-criteria and standards identified and agreed upon: - On economy: FFP uses resources economically, buying inputs of the appropriate quality at the right price, and following good programme management and procurement practices. - On efficiency: FFP delivers accordingly to its implementation plan at the required quality, quantity, on time and within budget, and with an appropriate allocation of resources. - On effectiveness: The FFP achieves its intended outcomes within the available resources. - On cost-effectiveness: The outcomes and impacts of FFP are commensurate with expectations for the level of costs invested. - On equity: FFP reaches its intended target sub-groups, including WRA and children under five in poor households.	VfM analysis	- Indicator data from FFP's VfM framework and FortIS - FFP's data on fee rates for programme staff/consultants and operational costs - FFP's budget/target and actual prices paid for premix and microfeeders; - Qualitative evidence of procurement policies and procedures (including effective negotiations with premix suppliers) from FFP procurement documentation, MOUs with premix suppliers, FFP quarterly reports, and KIIs with FFP - Evidence of delivery against implementation plan and within budget from FFP's financial reports quarterly/annual reports to DFID, MIS/VfM indicators, and KIIs with FFP - Operational evidence that subsidy mechanism linked to performance is in place from FFP's subsidy management documentation and KIIs with FFP - Narrative evidence of appropriate use of operations research and M&E findings to support adaptive management from FFP's	Midterm (2019) covering economy and efficiency Annual report (May 2020) covering economy, efficiency and some components of effectiveness and equity Endline (2020) covering all 5 criteria

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
			quarterly/annual reports - Logframe output indicator data vs milestone targets from FFP's quarterly and annual reports - Accumulated findings from wider evaluation, particularly in relation to KEQs on coverage, effectiveness, impact, sustainability, and cost-effectiveness.	
DEQ6.2: Is the programme cost-effective compared to business-as-usual fortification of wheat flour and edible oil/ghee in Pakistan?	- Incremental cost per person and per unit weight of fortified flour and edible oil/ghee compares favourably to other fortification programmes of same food vehicles globally - The assessment of the incremental costs and health benefits of the programme expressed in 'costs per DALYs averted' is less than the cost-effectiveness threshold identified in Woods et al (2016) for similar economies - The assessment of the incremental costs and health benefits of the programme expressed in 'costs per DALYs averted' compares favourably to other food fortification programmes and programmes focused on reducing micronutrient deficiencies (e.g. supplements/ biofortification/home fortification) in South Asia	Cost-effectiveness study	- Costs: (i) Incremental programme costs: FFP actual cost data by categories and years of implementation; (ii) Incremental costs for the private and public sector, i.e. additional costs they incur due to the FFP from primary data collection with public sector and private sector stakeholders (iii) cost estimations of business-as-usual fortification in the private sector based on literature and KIIs with experts - Outputs: Production data on fortified wheat flour and edible oil/ghee from FortIS - Outcomes: Programme coverage and effectiveness (in terms of reduction of micronutrients deficiencies) from assumptions found in focused literature review and impact modelling done for the evaluation - Review of literature and other data sources for assumptions needed for modelling DALYs averted (e.g. disease-specific incidence rates, mortality rates, disability weights, life expectancy, etc.) - Consultation with experts for assumptions needed for modelling DALYs averted - Comparators: Woods et al (2016) and focused literature review on food fortification programmes globally and other ways of reducing micronutrient deficiencies, particularly in South Asia	Evaluability assessment of data at midterm (2019) Final study at endline (2020)

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
KEQ7: To what extent has the programme improved consumption of adequately fortified foods and estimated nutritional status, particularly those of WRA and children under five?				
DEQ7.1: To what extent has micronutrient intake of WRA and children under five increased due to the consumption of adequately fortified wheat flour and edible oil/ghee?	- WRA and children under five consume sufficient quantities of adequately fortified wheat flour and edible oil/ghee leading to increased measured nutrient contribution to dietary intake (as a % of requirements)	Assessment of final outcome and impact	- FACT surveys: FACT 2017 (for Punjab, Balochistan, Sindh) and repeated FACT survey at endline (all provinces)	Endline (2020)
DEQ7.2: What are the predicted improvements in the micronutrient status of WRA and children under five in different provinces due to the consumption of adequately fortified wheat flour and edible oil/ghee produced?	- WRA and children under give improve their modelled micronutrient status (iron, vitamin A) based on identified nutrient gap and micronutrient status	Assessment of final outcome and impact	- FACT surveys: FACT 2017 (for Punjab, Balochistan, Sindh) and repeated FACT survey at endline (all provinces) - National Nutrition Survey 2018	Endline (2020)
DEQ7.3: What are the key factors that facilitate or inhibit consumption of fortified wheat flour and edible oil/ghee particularly among WRA and children under five; and how do consumers experience these factors?	- There is acceptance of fortified foods among all households across provinces and population sub-groups - WRA and children under 5 in all households are able to consume fortified wheat flour and edible oil/ghee - Any perceived organoleptic differences between fortifiable and fortified wheat flour and edible oil/ghee are accepted by the population - Social, cultural and gender norms influence the consumption of fortified wheat flour and edible oil/ghee, particularly among WRA and children under 5	Qualitative consumer study	- In-depth interviews and Focus group discussions with consumers (district study) - Key informant interviews with market stakeholders and intermediaries of public awareness activities, e.g. local health staff (district study)	Endline (2020)
KEQ8: How has the programme influenced the market system of wheat flour and edible oil/ghee beyond the supply of fortified wheat flour and edible oil/ghee?				
DEQ8.1 To what extent and how has the introduction of fortified wheat flour and edible oil/ghee affected business performance and practices in the value chain?	- Distributors and retailers show a preference to purchase and stock fortified wheat flour and edible oil/ghee - Packaging and storage practices are adapted where needed to ensure adequate fortification - A market of QC services has emerged and linkages between supply and demand strengthened - Producers use QA/QC information to improve the	Value chain analysis Impact pathway analysis	- Document review, among others, of market and sector studies - National and provincial key information interviews with actors in the value chains - Key informant interviews with producers, distributors and retailers at district level	Mostly at Endline (2020) Partially and formatively at Midterm (2019)

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
	fortification process - Producers and retailers perceive fortified products as competitive to substitutes		(district study)	
DEQ8.2: What effect has the programme had on prices and perceived affordability of fortified wheat flour and edible oil/ghee?	- Government regulates the price of fortified foods - Prices of fortified foods are perceived to change (or not) as expected - Perceived price changes influence (or not) supply and demand in the value chain of fortified foods - Perceived prices changes have (or not) an effect on the purchasing power of the poor with respect to fortified foods	Value chain analysis Qualitative consumer analysis	- Document review, among others, of market and sector studies and public pricing policies - National and provincial key information interviews with public and private actors and other experts related to the value chains - Key informant interviews with producers, distributors and retailers at district level (district study) - In-depth interviews with consumers	Mostly at Endline (2020) Partially and formatively at Midterm (2019)
DEQ8.3: To what extent did the programme influence the premix and microfeeder market?	- The volume of pre-mix imported is sufficient for fortification of wheat flour and edible oil/ghee at standards - Premix and microfeeder suppliers strengthen their distribution function and linkages with mills in Pakistan - Contracts between input suppliers and mills are perceived as mutually beneficial, even without subsidy, based on a transparent contracting process - The enabling environment (policies, regulations, taxes, infrastructure) is supportive of the supply of premix and microfeeder equipment - The supply of premix and microfeeder equipment has diversified to enable uninterrupted access to specified premix and microfeeders in Pakistan	Value chain analysis Impact pathway analysis	- Document review, among others, of FFP programme documents (e.g. MoUs/contracts related to premix and microfeeders), government documents related premix/feeder distribution, other studies (e.g. assessment of pre-mix distribution in Pakistan (GAIN, 2017)) and any data from premix/feeder suppliers - National key information interviews with FFP, premix/microfeeder suppliers and distributors, and other relevant public/private stakeholders	Mostly at Endline (2020) Partially and formatively at Midterm (2019)
DEQ8.4. Has the programme had any unintended effects on the market system of wheat flour and edible oil/ghee?	- There are (no) unintended effects in core market functions of the markets of fortified and non-fortified wheat flour and edible oil/ghee - There are (no) unintended effects in supporting functions of the markets of fortified and non-fortified wheat flour and edible oil/ghee - There are (no) unintended effects in the enabling environment of the market of fortified and non-fortified wheat flour and edible oil/ghee	Value chain analysis	- Document review, among others, of FFP programme documents and studies - National key information interviews with FFP, private sector actors in the value chains, and experts - Key information interviews with producers, market stakeholders and FFOs (district study)	Endline (2020)
KEQ9: To what extent is it likely that the programme will lead to a continuation of large-scale food fortification of wheat flour and edible oil/ghee in Pakistan after the				

Evaluation questions *What do we want to know?*	**Criteria to answer the questions** *What matters?*	**Research studies/ analyses** *How will we know?*	**Data sources and methods** *What data will we collect?*	**Timing** *When will we gather the data and report*
programme ends?				
DEQ9.1: What factors are likely to affect the continuation of large-scale fortification of wheat flour and edible oil/ghee after the programme ends?	- Public and private sector actors allocate the necessary resources to sustain food fortification - Public and private sector actors have the technical capacities to sustain food fortification - Public and private sector actors have the motivation to sustain food fortification - Linkages between different private and public actors in the food fortification process promote sustainability - There is demand for fortified wheat flour and edible oil/ghee among consumers	Sustainability review	- Document review of policy documents, strategies and government budget data - KIIs with private and public sector stakeholders - Consumer-level qualitative research - FACT survey 2020 - Data analysis of FortIS data and stakeholder engagement data base	Mostly Endline (2020) Partially Midterm (2019)
DEQ9.2: To what extent are factors that are likely to support or inhibit the sustainability of large-scale food fortification put in place or addressed?	- The factors indicated in DEQ9.1 have been put in place or are addressed - FFP engages with stakeholders in a sustainability-oriented way - FFP applies intervention approaches that promote sustainability - FFP has exit strategies in place for how to withdraw its resources while ensuring that achievement of project outcomes is sustained	Sustainability review	- Document review of policy documents, strategies and government budget data - KIIs with private and public sector stakeholders, FFP, DFID and other partners supporting food fortification - Consumer-level qualitative research - FACT survey 2020 - Data analysis of FortIS and stakeholder engagement database	Mostly Endline (2020) Partially Midterm (2019)

Annex C Updated evaluation workplan

Table 8 Evaluation workplan

Workplan activity	Workstreams				Timeline
	Private	Public	Consumer	VFM and CEA	2018: 10 11 12 | 2019: 1 2 3 4 5 6 7 8 9 10 11 12 | 2020: 1 2 3 4 5 6 7 8 9 10 11 12
Data collection activities					
Document review	●	●	●	●	
Secondary data analysis (FortIS etc.)	●	●	●	●	
National and provincial level data collection	●	●	●		
District study	●	●	●		
FACT household and market survey	●		●		
VFM key informant interviews				●	
Costing study data collection				●	
Analysis activities					
Private sector impact pathway analysis	●				
Public sector impact pathway analysis		●			
Public awareness impact pathway analysis			●		
Value chain analysis	●				
Political economy analysis		●			
Assessing outcomes and impacts			●		
Qualitative consumer study			●		
VFM anlaysis				●	
Cost-effectivness analysis				●	
Sustainability review	●	●	●	●	
Reports					
Communications Strategy					
Midterm evaluation report and workshop	●	●	●	●	
Annual summary				●	
End of programme evaluation report and workshop	●	●	●	●	

Annex D Stakeholder interviews

Designation	Organisation
FFP	
National level	
Project Director	FFP
Project Manager	FFP
Team Leader	FFP
Technical Director	FFP
National Advocacy and Communications Manager	FFP
M&E Manager	FFP
National Oil/Ghee Fortification Manager	FFP
National Wheat Flour Fortification Manager	FFP
Provincial / district level	
Provincial Manager (oil/ghee) – Punjab	FFP
Provincial Manager (wheat flour) – Punjab	FFP
Advocacy and Awareness Consultant – Punjab	FFP
Provincial Programme Manager (oil/ghee) – Sindh	FFP
Programme Manager Wheat flour – Sindh	FFP
Advocacy and Awareness Consultant – Sindh	FFP
FFO – Gujranwala	FFP
FFO – Kasur	FFP
FFO – Lahore	FFP
FFO – Hyderabad	FFP
FFO (two) – Karachi	FFP
Public sector stakeholders	
Federal level	
Chief of Nutrition and SUN Government Focal Point	SUN Secretariat, Ministry of Planning, Development and Reform
Convenor and Founder SUN-CSA	Nutrition International
Joint Secretary	Ministry of National Food Security and Research
Director Nutrition Programme	NFA, Ministry of National Health Services, Regulations and Coordination
National Coordinator	NFA, Ministry of National Health Services, Regulations and Coordination
Director Quality Control Centre	PSQCA
Provincial level	
Director Head	Punjab Food Authority
Deputy Director Standards and Accreditation	Punjab Food Authority
Public Analyst in District Food laboratory	Punjab Food Authority
Director Technical	Punjab Food Authority
Acting Director General Operations	Punjab Food Authority
Deputy Director Laboratory	Planning and Development Department, Punjab
Senior Chief Health	Planning and Development Department, Punjab

Designation	Organisation
Chief Economist	Planning and Development Department, Punjab
Secretary Food	Food Department, Punjab
Assistant District Coordinator	LHW Programme, IRMNCH-NP
Additional Programme Director	LHW Programme, IRMNCH-NP
Programme Manager – Nutrition	IRMNCH-NP
Coordinator	Sindh Fortification Alliance
Programme Coordinator	Sindh Health Department (NSP and Sindh AAP)
Director Operations	Sindh Food Authority
Deputy Director Operations	Sindh Food Authority
Chief Economist	Planning and Development Sindh
Former Project Director	Sindh LHW Programme
District level	
Executive District Officer, Finance and Planning (acting charge of DMAC)	District Commissioner Office, Gujranwala
District Food Controller	District Commissioner Office, Gujranwala
Assistant Food Controller	District Commissioner Office, Gujranwala
District Commissioner	District Commissioner Office, Kasur
Additional Food Controller	District Commissioner Office, Kasur
Deputy Director Social Welfare	District Commissioner Office, Kasur
District Information Officer	District Commissioner Office, Kasur
CEO Health	District Commissioner Office, Kasur
CEO Education	District Commissioner Office, Kasur
District Commissioner	District Commissioner Office, Sargodha
Deputy Director Technical Sargodha Division	District Commissioner Office, Sargodha
Deputy Director	Punjab Food Authority, Sargodha
Chief Executive Officer Health/ District Health Officer	District Head Quarters, Sargodha
Additional Deputy Commissioner	Deputy Commissioner Office, Badin
District Health Officer	District Health Office, Badin
Deputy Director	Social Welfare Department, Badin
District Health Officer	District Health Office (Korangi Karachi)
Additional Deputy Commissioner	Deputy Commissioner Office, Karachi West
District Food Controller	District Food Department, Karachi East and Malir
Deputy Director Food	District Food Department, Hyderabad
Focal Point for Fortification	Director General Health Office, Hyderabad
Field Supervisor Medical Officer, District Nutrition Focal Point	District Health Department, Hyderabad
LHW Coordinator, Gujranwala	LHW Programme IRMNCH-NP
LHW Coordinator, Kasur	LHW Programme IRMNCH-NP
LHW Coordinator, Karachi East	Sindh LHW Programme
LHW Coordinator, Karachi Malir	Sindh LHW Programme
LHW Coordinator, Badin	Sindh LHW Programme
Edible oil and ghee stakeholders	
Director Trading and Finance	Importer of oil seeds, crude oil, oil extraction machinery, Karachi

Designation	Organisation
General Manager Trading	Importer of oil seeds, crude oil, oil extraction machinery, Karachi
Director	Haameen (supplier of vitamin A and D premix)
Business Development Manager	InterTek (a multinational commercial laboratory)
Secretary General	Pakistan Vanaspati Manufacturers' Association
Manager	Oil seed development project
Managers and/or directors	Oil/ghee mills – Lahore (six in total)
Managers and/or directors	Oil/ghee mills – Karachi (seven in total)
Managers and/or directors	Oil/ghee mills – Hyderabad (two in total)
Managers and/or directors	Oil/ghee mills – Kasur (three in total)
Managers and/or directors	Oil/ghee mills – Gujranwala (one in total)
Owner / manager	Traders (five in total)
Owner / manager	Wholesaler (two in total)
Owner / manager	Bakery / confectionary stores (three in total)
Owner / manager	Distributors (three in total)
Owner/manager/worker	Hotel sector and catering sector (six in total)
Wheat flour stakeholders	
Team Manager	Buhler
Technical Director	Local premix supplier
Chairman, Central	PFMA
Managers and/or owners	Wheat flour Mills – Lahore (seven in total)
Managers and/or owners	Wheat flour Mills – Karachi (five in total)
Managers and/or owners	Wheat flour Mills – Hyderabad (three in total)
Managers and/or owners	Wheat flour Mills – Kasur (four in total)
Managers and/or owners	Wheat flour Mills – Gujranwala (four in total)
CSOs	
CEO	Thardeep Rural Development Programme
Coordinator Human Resource Development	Thardeep Rural Development Programme
CEO	AGAHE
Project Coordinator	AGAHE
CEO	DevCon
District M&E Officer	Sindh Rural Support Organisation, Badin
Executive Director	CSSP
Senior Programme Manager	CSSP, Hyderabad
Other stakeholders	
Senior Responsible Officer	DFID
Economist	DFID
Head of Nutrition and Team	WFP
National Professional Officer (Maternal, Newborn, Child, and Adolescent Health)	WHO
Member of FFP's RTAG	Various (four in total)

Annex E FFP's results framework

Impact/Outcome/Output	Indicator	Target (2021)
Impact: Reduction in undernutrition with a focus on micronutrient deficiencies in women and children	**Impact indicator 1**: % iron deficiency in children between 6–59 months	13.5% reduction in iron deficiency
	Impact indicator 2: % vitamin A deficiency in children under five	35% reduction in vitamin A deficiency
	Impact indicator 3: % iron deficiency in women	12.3% reduction in iron deficiency
	Impact indicator 4: % vitamin A deficiency in women	27% reduction in vitamin A deficiency in women
Outcome: Improved access and consumption of nutritious food for WRA and children to improve nutrition status	**Outcome indicator 1**: Number of people consuming fortified wheat flour	50,028,686
	Outcome indicator 2: Number of people consuming fortified edible oil/ghee	148,611,764
Output 1: FFP to ensure a sustainable supply of high-quality wheat flour fortified with iron, zinc, folic acid, and vitamin B_{12}	**1.1:** Quantity of adequately fortified wheat flour produced in metric tons (number of enabled mills including those performing internal QC tests as per protocol)	2,801,606 (1,082)
	1.2: Cumulative number of microfeeders installed nationally for wheat flour fortification (number of mills)	2,430 (1,082)
	1.3: Number of wheat flour mills with MoUs signed per year with FFP (cumulative)	(1,082)
	1.4 Number of wheat flour mills continuing to purchase premix after subsidy is phased out	458
Output 2: FFP to ensure a sustainable supply of edible oil fortified with vitamin A and D	**2.1** Quantity of adequately fortified edible oil produced in metric tons (number of mills enabled including those performing internal QC tests as per protocol)	1,287,465 (102)
	2.2 Number of edible oil mills with MoUs signed with FFP	102
	2.3 Number of oil producers continuing to purchase premix after the subsidy is phased out	85
Output 3: Raised public awareness of the nutritional benefit of fortified food	**3.1** Number of districts where public awareness campaign has been conducted with target beneficiaries including district government, local health staff and other market stakeholders – yearly targets (cumulative)	100
	3.2 Percentage of households in target districts with knowledge of benefits of food fortification (cumulative number of districts)	70% in 53 districts (100)

Impact/Outcome/Output	Indicator	Target (2021)
	3.3 Number of districts where point-of-sale marketing activities and awareness sessions with trade associations have been conducted each year (cumulative)	(100)
Output 5[94]: Contribution to evidence and research for food fortification	**5.1** Delivery of approved operational research studies that are responsive to programme needs	(i) New body of quality operational research evidence available on food fortification programme implementation; (ii) Findings available via a minimum 4 reports and briefs and 2 peer-reviewed papers
	5.2 Number and types of dissemination exchanges (meetings/workshops/seminars etc.) at local and provincial levels	(i) Four dissemination and stakeholder exchanges at local and provincial levels to share relevant evidence to inform policymaking; (ii) Consistent reporting (75% of stakeholders over time) of high quality and with programme relevance
	5.3 Benefits incidence analysis provides evidence of FFP's beneficiaries	i) Provincially representative endline completed ii) Economic costing analysis completed
Output 6: Improved government ownership and action to support food fortification	**6.1** Number of provinces/regions that have developed regulations and standards for fortification each year for wheat flour fortification (cumulative)	Four
	6.2 Number of provinces/regions that have developed regulations and standards for fortification each year for oil fortification (cumulative)	Four
	6.3 Number of districts with local project office and official government focal points – yearly target (cumulative)	74
	6.4 Number of wheat flour mills undergoing official government annual enforcement inspection – yearly target (cumulative)	275 (799)
	6.5 Number of oil/ghee producers undergoing official government annual enforcement inspection – yearly target (cumulative)	102 (100%)
Source: FFP Logframe, revised 16 October 2018; the table excludes indicators that are not part of FFP's results framework – this includes the output indicator related to this evaluation, and indicators related to the World Bank MDTF component of the SNIP programme		

[94] Output 4 is not included in the table as it is not related to FFP but to the World Bank MDTF component of the SNIP programme

Annex F Implementation review

F.1 Implementation review of fortification of edible oil/ghee

This section reviews the progress of FFP's activities targeted at private sector actors in the value chain for edible oil/ghee. The following intervention categories, included in the programme's ToC, are reviewed in turn: 1) FFP's engagement with fortification stakeholders at different levels, in particular the producers and their industry associations; 2) TA for producers to facilitate their access to fortification inputs and support services; 3) the provision of a sliding, conditional premix subsidy; 4) training of mill technical and laboratory staff on fortification and QA/QC processes; and 5) fortification monitoring and on-the-job coaching by FFOs.

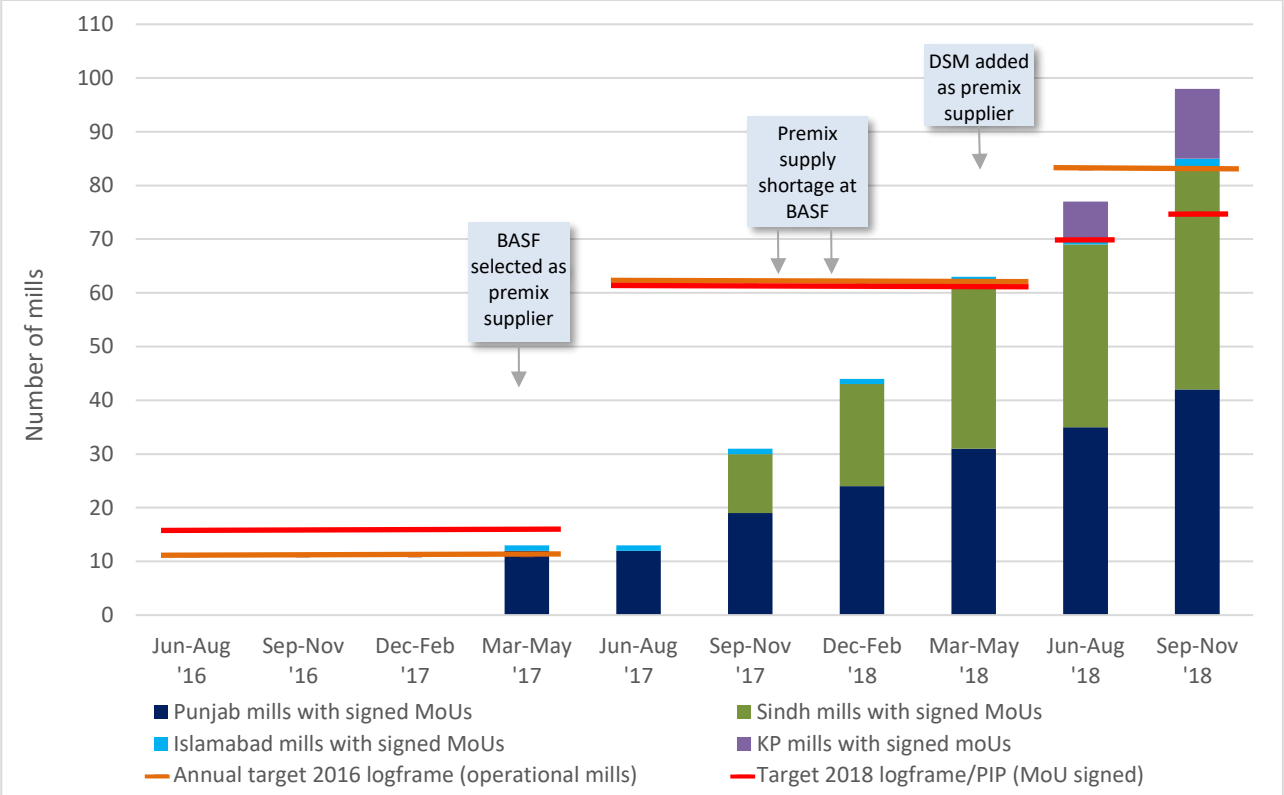
Engagement with private sector fortification stakeholders at various levels

By the end of November 2018, FFP had enrolled 98 mills (close to its final target) across Punjab, Sindh, KP, and Islamabad, of which 81 were fortifying. FFP aims to engage with 102 edible oi/ghee producers that are members of the industry association PVMA. PVMA has around 127 members in total.[95] Value chain analysis reveals that 102 operational mills produce almost all of Pakistan's oil production, but that about one-quarter of the total population of mills are shut at any one point in time. Therefore, the programme may miss production at a given point of time if it does not engage with the total membership of PVMA. This seems to be already happening since 114 mills were enrolled in the programme in March 2019 according to FortIS. FFP's engagement is institutionalised in MoUs signed with each mill, once they are enrolled in the programme. By December 2018, 98 mills had signed MoUs with FFP, most of which are located in Punjab and Sindh provinces. The first MoUs were signed in May 2017, although accelerated expansion only took off from September 2017. FFP started recruiting mills in the Punjab and only moved significantly into Sindh—where most of Pakistan's oil is produced—in early 2018. While counter-intuitive, this strategy had value because, with an effective Food Authority in Punjab (unlike in Sindh, where the Authority is much less effective since it was only established quite recently), Punjab's regulatory environment is stronger and therefore an easier place for FFP to gain early traction. Fortification took off soon after mills enrolled: in June 2017, nine out of the 12 mills that had signed the MoU a month earlier were reported as operational according to FortIS. By December 2018, 81 mills out of 98 mills enrolled were fortifying. Reasons for not fortifying are that some mills are closed, non-functional, or are reluctant to collaborate with the programme.

Mill enrolment took longer than planned but caught up with targets by the end of 2018. In the first two years of FFP, the programme made somewhat slower progress than logframe targets in expanding oil/ghee mill enrolment because of a longer than expected premix procurement and negotiation process, a global premix supply interruption around the end of 2017 (because of a fire at a plant owned by BASF, the premix manufacturer),[96] and the longer time required for some mills to sign up. Stakeholder interviews also suggest that mills and PVMA were apprehensive about engaging fully with the programme, mainly because of the requirement for them to disclose production data and subject themselves to rigorous in-mill QA/QC. Therefore, the programme was slightly below its 2016 logframe target for operational mills at the end of both first years.[97] However, by the end of 2018 the programme surpassed its targets, which were lowered during the 2018 logframe revision and in the APIP, at the recommendation of the Annual Reviews.

[95] According to PVMA it has 127 members, of which 102 are operational. Three or four mills are not members. Proceedings of the Pakistan Edible Oil Conference in January 2019 list 123 general members – a slightly lower number.
[96] Because of the premix supply shortage FFP decided to postpone its expansion to Sindh by a few months.
[97] FFP's initial logframe from 2016 did not have the number of signed MoUs as an indicator but rather the number of producers operational and providing fortified oil /ghee. In May 2017 none of the 12 enrolled mills were operational. In May 2018, 58 mills were fortifying, out of 63 enrolled mills (according to FortIS).

Figure 15 Actual and planned number of MoUs signed with edible oil/ghee mills (cumulative)



Source: FFP-provided mill lists; FFP logframes; FFP APIP

FFP recognises PVMA as a critical partner and PVMA has provided support to the enrolment of its members. However, engagement is weak, transactional, and based on reluctant support. FFP needs close collaboration with PVMA to strengthen coordination with and buy-in from the mills.[98] FFP Quarterly Reports suggest that FFP's engagement with PVMA was relatively extensive during its first year of operations, when implementation modalities had to be validated with the industry.[99] FFP and PVMA signed an MoU by the end of FFP's second year. By then, PVMA had become less actively engaged—FFP's Stakeholder Management Database does not refer to a single meeting with PVMA between July 2017 and November 2018 (when most mills were signed up) and references to PVMA engagement are few in FFP Quarterly Reports. The Executive Committee of PVMA established a special Fortification Promotion Committee in 2016 to support fortification within the industry, but there is no further reference in FFP's reporting to indicate that this Committee is active or that FFP engaged with it.[c] Our stakeholder interviews within the oil industry indicate that PVMA itself is a reluctant partner because of insufficient industry ownership of the programme and doubts about its sustainability, effectiveness, and VfM. It is striking how divergent the association's estimates of total annual production of edible oil/ghee of its operational members are (4.34 million metric tons in 2018)[100] compared to FFP's estimates of 1.9 million metric tons in its 2018 revised logframe, and that there is no evidence of engagement and joint assessment taking place about this divergence, which illustrates the disjuncture between the programme and its key interlocutor. Nonetheless, FFP delivers tangible support (for example provision of subsidised pre-mix, training on fortification etc.) to the membership of the association, which may explain PVMA's participation. This points to an *ad hoc* transactional engagement rather than active participation and ownership.

[98] In the MoU between FFP and PVMA, the latter agrees to facilitate the signing of MoUs, the collection and sharing of data, the forecasting of premix requirement for individual mills, the establishment and sustainability of cluster laboratories, and the organisation of trainings.
[99] For example, PVMA was consulted about the subsidy mechanism, premix supply chain, and FortIS.
[100] Total consumption of 4.5 million metric tons of edible oil, minus the 176,000 metric tons of imported already packaged cooking oil.

FFP started engaging with the private sector at retail level. FFP initially did not aim to directly engage with the downstream value chain actors, such as retailers, beyond targeting them indirectly via trader associations as part of FFP's public awareness campaign (see below). However, at the end of 2018 FFP met with two large chain stores—USC and Metro Cash & Carry—with the aim of promoting point-of-sale marketing of fortified foods and securing the sale of fortified foods at the stores. FFP signed terms of reference with USC and intends to sign an MoU with Metro C&C.[101] However, given its current financial problems and mills halting supply due to lack of payment, USC may prove to be an unreliable partner to effectively promote fortified foods.[102]

Within the private sector FFP also engages with input suppliers, such as premix suppliers and the Chambers of Commerce and Industry. Their engagement is discussed below.

Private sector TA to facilitate access to fortification inputs and support services

FFP planned to provide TA to oil/ghee producers in two main areas: a) establishing and facilitating a reliable supply chain of premix, and b) supporting private sector QA/QC services with the provision of test equipment and facilitating their use through the formation of self-governing clusters of mills. This section reviews both in turn.

FFP made some improvements to the existing BASF premix supply chain, with provisions for uninterrupted supply and a (temporary) price discount. Before FFP, oil mills were importing significant quantities of BASF premix through an in-country distributor (ca. 50 metric tons in 2016).[ci] FFP opted to continue facilitating premix provision under the programme via direct private sector distribution, for sustainability reasons. BASF was chosen as the preferred premix supplier under the programme. FFP negotiated a discount on BASF's prices for supplies to Pakistan due to the purchasing power of the programme (augmented by the import tax and duties waiver that the industry enjoys due to GAIN lobbying, to which FFP probably also contributed). FFP also required an in-country stock with the aim of providing an uninterrupted supply of premix. The system for mills ordering premix based on FFP-facilitated forecasts appears to be working well. Premix procurement began after the first MoUs were signed with the mills and steadily increased with the enrolment of new mills. In 2018, FortIS indicated that 62 metric tons of premix was consumed under the programme and an in-country distributor estimated 91 metric tons of premix sales to oil mills in Pakistan in total. Therefore, while most of the current premix imports passes through FFP's subsidy scheme, a substantial part of premix supply does not. Interviewed mills reported that they can access premix with a lead time of a few hours.

The reliance on a single premix supplier resulted in supply interruption and may have resulted in part of the premix price increase. While FFP was able to negotiate an initial price discount and an in-country stock, selecting a single commercial producer of premix for an entire national market is inherently risky as it makes supply reliant on this single provider and prices subject to the dominant market position of this provider. These risks appear to have materialised. The cost of premix to mills has roughly doubled from the level set in the April 2017 MoU between FFP and BASF of PKR 5,150 per kg to PKR 9,561 at the end of 2018.[cii] About one-half of this price increase can be attributed to the sharp devaluation in the external value of the rupee during 2018, but the other half is because BASF raised its dollar-denominated unit price and sustained it after a short-term supply shock.[103] This significant price increase must have been approved by FFP because the MoU states: 'Any variation in international price … will have to be discussed and

[101] The terms of reference with USC aim at promoting point-of-sale and purchase marketing of fortified wheat flour and edible oil/ghee at utility stores throughout the country. The MoU with Metro Cash & Carry Pakistan covers the sale and purchase of only fortified wheat flour and edible oil at their stores (FFP Quarterly Report, December 2018).
[102] Current news indicate losses, declining sales, and vendors stopping supplying goods to USC. One of the mills interviewed during the MTE confirmed that USC had stopped making payment for oil/ghee supplies.
[103] BASF Germany had a fire at its plant in October 2017, which resulted in a production shortage of vitamin A and interrupted the supply of AD3 premix until March 2018 (FFP Quarterly Report, December 2017).

agreed with FFP prior to effecting any revision in the price of the premix'.[ciii] While it can be imagined that FFP could be pressured into accepting premix price increases as the cost of uninterrupted supply, it is not clear why FFP would depart from the price provisions in the MoU so rapidly and so significantly. The premix supply shortage between the end of 2017 and early 2018 also affected programme roll-out, constraining the enrolment of new mills in Punjab and Sindh. To counteract the reliance on a single supplier and the premix supply shortage, FFP engaged a second supplier, DSM. However, entering the market late and being itself a high-cost supplier, DSM has struggled to gain market share and thus influence BASF's premix pricing. During 2018 in-country distributors estimate that DSM premix sales through its in-country agent contributed 15 metric tons to the total 91 metric tons of imports, so just under a 16% share of the premix market. This is confirmed by FFP data, which indicate that under the programme DSM imported 18% of the total premix in 2018, although it only had a market share of 12% of the premix sold.[104]

QC cluster labs have been established in three provinces. Their functioning is dependent on FFP. In consultation with PVMA, FFP planned to provide one iCheck Chroma 3 test kit per cluster of six to eight mills to quantitatively test vitamin A in fortified oil/ghee. These 'cluster labs' are managed through a self-governing group of equipment-sharing mills.[105] FFP Quarterly Reports suggest that cluster labs were first established in Punjab and next in Sindh during March–May 2018. By the end of November 2018, 11 cluster labs were reportedly set up across Punjab, Sindh, and KP provinces, and all enrolled mills were reportedly performing the fortnightly testing at the labs. FortIS has yet to report on fortified oil/ghee testing at cluster labs, but separate monitoring data provided by FFP indicate that 10 labs in Punjab and Sindh are operational. In these two provinces, 70 out of 97 registered mills (by the end of March 2019) were linked to a cluster lab (between five to 10 mills per cluster lab). It is not clear why not all mills are linked to a cluster lab. Several of the oil mills interviewed confirmed, though, that cluster labs had been set up. The cluster lab QC mechanism is highly dependent on FFP staff, who collect the samples from different mills, deliver them to the cluster lab, and get the results back to the specific mills. FFP's workplan does not set clear targets for the establishment of cluster labs. Hence, it is not clear whether their roll-out has happened according to plan. However, by quarter March–May 2018 58 mills were fortifying, which indicates that the timelines of fortification and QC service provision were misaligned.

Provision of sliding, conditional premix subsidy

A key intervention of FFP is the provision of a premix subsidy to the enrolled oil/ghee mills. The subsidy aims to incentivise adequate fortification and reduce the cost of premix as a barrier to fortification. FFP's subsidy arrangement is meant to ensure a fair selection of mills for the subsidy and links the subsidy to adequate fortification. Box 6 presents an overview of FFP's oil/ghee premix subsidy arrangement. The subsidy arrangement is part of the MoUs signed with the mills and has been developed in consultation with PVMA.

Box 6 Overview of the oil/ghee premix subsidy

Subsidy calculation formula

- The subsidy is a reimbursement of a percentage of the premix cost based on the actual monthly premix quantity used (as monitored by the FFO) at the price agreed between FFP and the supplier.
- The subsidy is provided for two years from the date the mill signs the MoU. A sliding scale over time is

[104] However, communication between FFP and both manufacturers in April 2019 suggests that DSM's share of premix imports in 2018 may be around 30%.

[105] According to the MoU between FFP and PVMA, FFP will support PVMA to set up cluster labs, and provide the iCheck equipment and reagent vials/consumables for two years. PVMA will nominate mills to set up cluster labs and set up a mechanism for sustainable supply of reagents after two years and to keep the lab functional. The PVMA and mills hosting the iCheck take on responsibility for the repair and maintenance of the equipment.

Box 6 Overview of the oil/ghee premix subsidy

applied: a 20% slab during the first six months after signing and 10% during the remaining 18 months.

- Subsidy payment is conditional on compliance with fortification according to standard and QC processes. The subsidy is adjusted according to subsidy management criteria, which have the following weightage of various aspects of the quality in the premix slabs:
  - 60% (of the total subsidy slab) paid out when two fortnightly samples are approved by third-party lab[106]; if only one sample is approved then the percentage is reduced to 30%; if no sample is approved, no subsidy is paid;
  - 30% (of subsidy slab) paid out when the quantity of premix consumed during the month is in correct proportion to the reported monthly oil/ghee production (at the rate of 40 grams per metric ton – so 1 kg fortifies 25 metric tons, which approximates the mid-point in the 33,000 to 45,000 IU/kg in the fortification standard and a ±15% variance accepted);
  - 5% (subsidy slab) paid out when samples tested at the cluster lab are found to be within the acceptable range of fortification; this is based upon the mill clearing two tests per month at the cluster labs (2.5% for one positive test and 5% for both tests being positive); and
  - 5% (subsidy slab) paid out when the sample tested at the government lab is found to be adequately fortified as per standard.

Subsidy payment process

- The FFO visits mills on a weekly basis for providing mentoring/technical support to mills and randomly collects samples. The samples collected by the FFO are coded and sent to Qarshi Laboratories for third-party testing. The Provincial Manager randomly selects two out of four samples and informs the lab which two samples will be tested by Qarshi lab. The minimum testing frequency is one sample fortnightly per mill based on random selection by the Provincial Manager.
- For cluster lab testing, the FFO collects the samples from the mills, assigns codes, and performs/co-performs tests in the presence of cluster lab staff to ascertain the adequacy. The FFO then decodes the results and they are shared with the respective mills for record and course correction, if necessary.
- The FFO records the monthly premix consumption provided by the miller and verified by the FFO based on physical records, observation, premix invoices and purchase orders, and oil/ghee production data provided by mills.
- FFP's provincial and national managers review and approve the data.
- The third-party subsidy management firm NJMI calculates the subsidy based on the criteria mentioned above and prepares a cross cheque in the name of the mill for subsidy payment.
- FFP Islamabad office approves disbursements, and organises payment delivery via FFOs; the office keeps acknowledgement of all cheques.

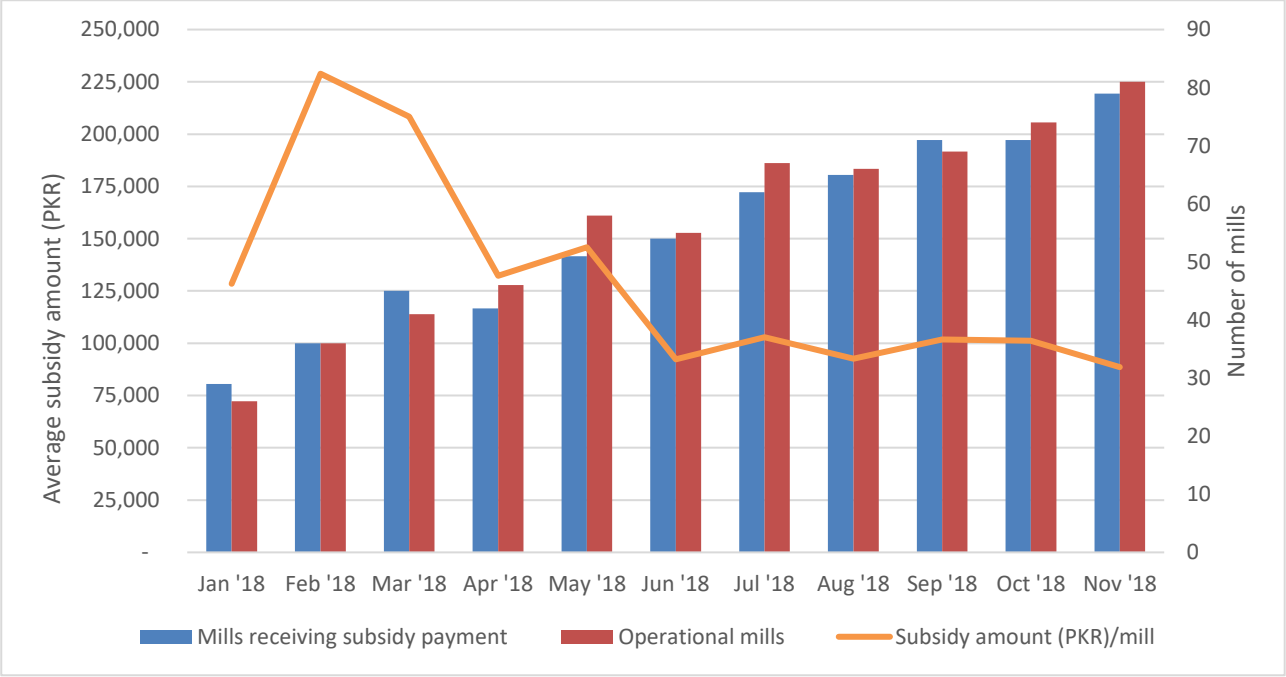
Source: FFP, SOP for subsidy management – edible oil component; communication with FFP

By the end of November 2018, almost all operational mills were benefiting from the subsidy scheme. The first subsidy payments were made in January 2018 to 29 mills, more than half a year after the first mills started using premix.[civ] By the end of November 2018, £450,936 had been paid out, which represents 50% of the amount originally budgeted.[107] Figure 16 shows that in November 2018 subsidies were paid out to 79 mills, almost equal to the number of operational mills in that month. No mills have graduated out of FFP's subsidy regime yet. 12 mills signed MoUs in May

[106] Minimum vitamin A value needs to be 33,000±19% IUs/kg and maximum vitamin A value needs to be 45,000±19% IUs/kg.
[107] FFP reported that the oil premix budget was £900,000.

2017 so will graduate out of subsidy by May 2019. Over the period January to November 2018 on average mills received a monthly subsidy of PKR 129,204 (or ca. £800). As Figure 16 shows, the subsidy amount peaked in February–March 2018, when it was decided that the programme would compensate 50% of the premix price increase due to the supply shortage in the market. From mid-2018 onwards the average monthly subsidy amount stabilised at around PKR 95,000 per mill (or ca. £600 considering the further depreciation of the rupee). Data are not accessible to assess whether all participating mills benefit in the same way or what conditionality criteria are causing payment refusals and for whom.

Figure 16 Average subsidy amount per mill and number of mills receiving subsidy (January–November 2018)



Source: FFP data

The subsidy is reducing the cost of premix as planned but is not covering the entire oil/ghee production, nor all premix used. On average, the subsidy per kg premix is £7.34 per kg considering 61 metric tons of premix consumed until December 2018. Over this period the wholesale price of premix has risen from $50 to $60 per kg – this implies a rate of subsidy on the full price of about 16%. This is what would be expected with the current oil premix subsidy regime offered to mills: 20% for the first six months reducing to 10% for the next 18 months and no subsidy thereafter. However, despite the price rebate that the subsidy offers it is not incentivising oil mills to fortify all of their production. As will be discussed below, we estimate that the mills' total oil/ghee production is higher than the reported production under the subsidy scheme. Also, the total premix import estimate of 91 metric tons during 2018 indicates that not all premix used is subsidised.

Training on fortification and QA/QC processes

Under the MoU with the producers, FFP committed to training mill staff on fortification and QA/QC processes, including qualitative and quantitative testing of the oil/ghee samples at the production level. The mills agreed to nominate dedicated and relevant staff for training (two per mill).

Trainings were organised successively as the mills signed up. After developing training manuals early on during the programme and an initial master training in early 2017, a first cohort of technical staff of recently enrolled mills were trained in May 2017. Additional training sessions were held in September 2017 and January 2018, in Punjab and Sindh, respectively, and on a bimonthly

basis from May 2018 onwards. By December 2018 132 staff had been trained through the programme on edible oil/ghee fortification and QA/QC.[108] In addition, by December 2018 24 mill staff had been trained on the use of iCheck Chroma 3 by its supplier, with training taking place in August 2017 and May 2018.[cv]

The training has added value, particularly for mills with limited fortification capacity, and required further follow-up to improve quality. Many of the mills interviewed as part of the MTE referred to the FFP training adding value in two contexts. First, some of the smaller mills that were not fortifying before FFP appreciated the awareness-raising and the technical dimensions of the training. Mill management responded positively to the role that mills can play to improve the level of nutrition in Pakistan as promoted by FFP. Second, some of the mills that were fortifying before FFP but not meeting the fortification standards appreciated gaining a better understanding about how to dilute premix and add the diluted premix to the oil. The training has resulted in greater compliance with fortification standards, as reported by mills. However, other mills, typically the larger and more sophisticated plants, saw the training as a necessary quid pro quo to access the subsidised premix, without it adding much value to already available expertise. The training, together with the provision of equipment and premix, required follow-up to ensure adequate fortification at mill level.[cvi] FFP reports that programme managers and FFOs worked intensively with the first registered mills to diagnose problems and provide support in order to improve the quality of the outputs.

Fortification monitoring and on-the-job coaching by FFOs

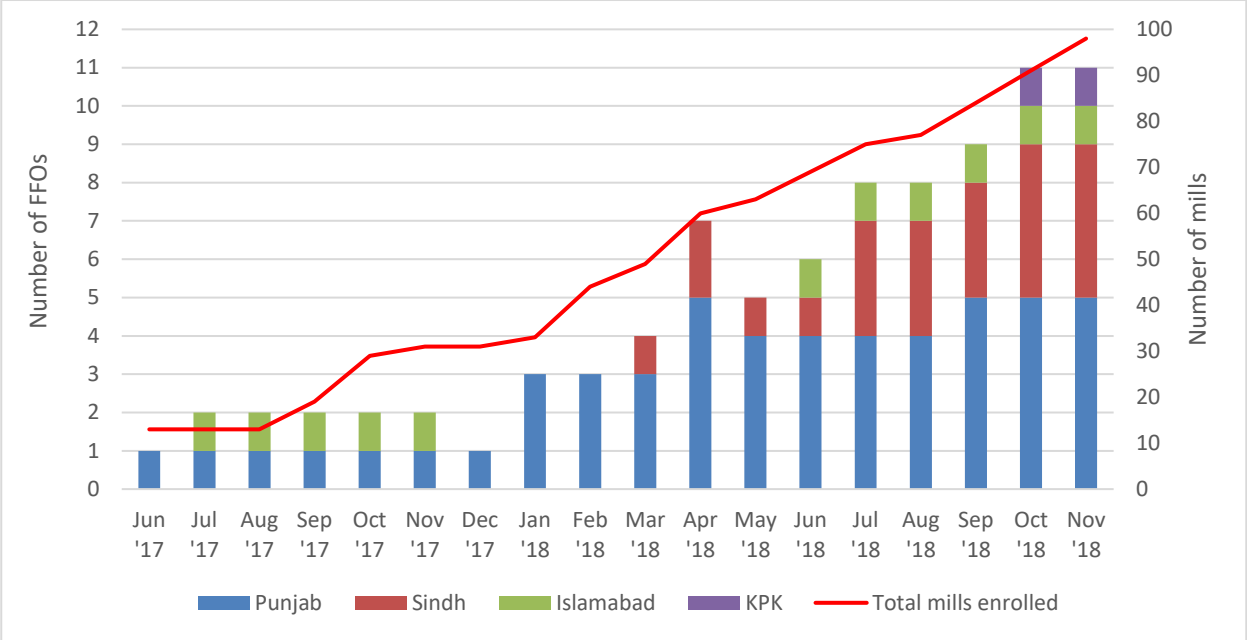
The regular visits by a cadre of district-level FFOs to the mills is key to FFP's ongoing capacity building of the mills, to the smooth functioning of the supply processes of fortification inputs, such as premix, and to the QC of fortified edible oil/ghee samples.

FFOs have been deployed in line with the expansion of the programme – covering on average nine mills per person in November 2018. The first FFO for oil/ghee started in June 2017 in Punjab; the same month the first mills started fortifying under the programme (see Figure 17). Additional FFOs were successively recruited as a function of the expansion to additional districts and the enrolment of more mills. In November 2018, 11 FFOs were monitoring and providing support to 98 mills enrolled in the programme, of which most were operating in Punjab (five FFOs) and in Sindh (four FFOs), with one each in Islamabad and KP. By that time, each FFO covered on average nine enrolled mills, with limited variation across provinces (except in Islamabad, where the FFO covers two mills).

The programme's monitoring and on-the-job coaching approach has helped mills improve compliance with the fortification standards. The regular external testing of fortified samples linked to the subsidy scheme, almost from the moment the MoU is signed, incentivises mills to fortify to meet standards expeditiously. At the same time, after unsatisfactory early fortification levels were detected through the monitoring system, FFP supported mills to optimise their fortification process, in particular the premix measuring, dilution, and mixing process.[cvii] In addition, FFP reports that it worked with mills to improve their record-keeping, recommending the placement of registers at the key control points to maintain records of important processing steps, such as utilisation of premix during processing.

[108] Data are not available about the mills that the staff are located in, to allow us to assess whether all enrolled mills have been reached.

Figure 17 Number of FFOs operational per month by province



Source: FFP monitoring data; FortIS

The monitoring model is largely driven by the need to account for the premix subsidy. The FFP teams have tried to flexibly accommodate the monitoring process to the mills' working schedule. For example, FFP introduced a flexible working pattern for FFOs whereby they can vary the number of days worked in any particular week in order to accommodate their mill visits.[cviii] However, the monitoring approach is labour-intensive, intrusive (according to the mills), and appears to absorb much of the time of provincial staff, driven by the subsidy scheme, which requires that FFOs collect samples from each mill on a weekly basis.[109]

The on-the-job coaching role of the FFOs can be better tailored to the mill context and risks being undermined by their engagement in external monitoring processes. Our stakeholder interviews indicate that the reconciliation of production and premix supply figures is perceived as intrusive, and has reportedly raised concerns among mills about the use of information and data confidentiality.[cix] While FFP's inception report recognised that FFOs should not assist government inspectors in conducting legal inspections, in order to avoid any conflict of interest, FFOs' subsidy compliance role and their responsibility for supporting the capacity building of food inspectors risks undermining a trusted relationship with the mills. Including the number of government enforcement actions (Output Indicator 5.5) as targets in the FFP logframe highlights this ambiguity for the programme. Furthermore, FFO-based support is not sufficiently tailored to the context of the mills. Highly qualified technical staff of large industrial mills that have been fortifying for years see relatively little benefit from the support provided by FFOs, who often have little industry experience. This support adds more value—when using appropriately qualified and experienced FFOs—to the smaller, less sophisticated, and late-adopting mills that are open to, and would benefit from, external support.

The monitoring process does not capture the mills' total production. As detailed below, a considerable part of mills' unfortified oil production is not recorded in FortIS. This may be because, officially, the oil/ghee fortification standard appears to apply only to packaged oil,[cx] and therefore FFO production reporting and sample collection only covers this packaged oil. However, it is also plausible that FFO's production recording process and sampling protocol does not allow it to

[109] This is not in line with FFP's M&E Framework, which indicates that FFOs will visit each mill at least on a monthly basis. FFP's Stakeholder Analysis and Engagement strategy also establishes only monthly visits by FFOs, to establish positive working relationships.

capture a representative picture of mills' total production because some mills have an incentive to underreport. Therefore, while the monitoring system enables efficient subsidy payment based on premix consumption verification, it may not provide a comprehensive picture of the proportion of adequately fortified production.

F.2 Implementation review of fortification of wheat flour

This section reviews the progress of FFP's activities targeted at private sector actors in the value chain for wheat flour. The same intervention categories are reviewed as for the edible oil/ghee sector.

Engagement with private sector fortification stakeholders at various levels

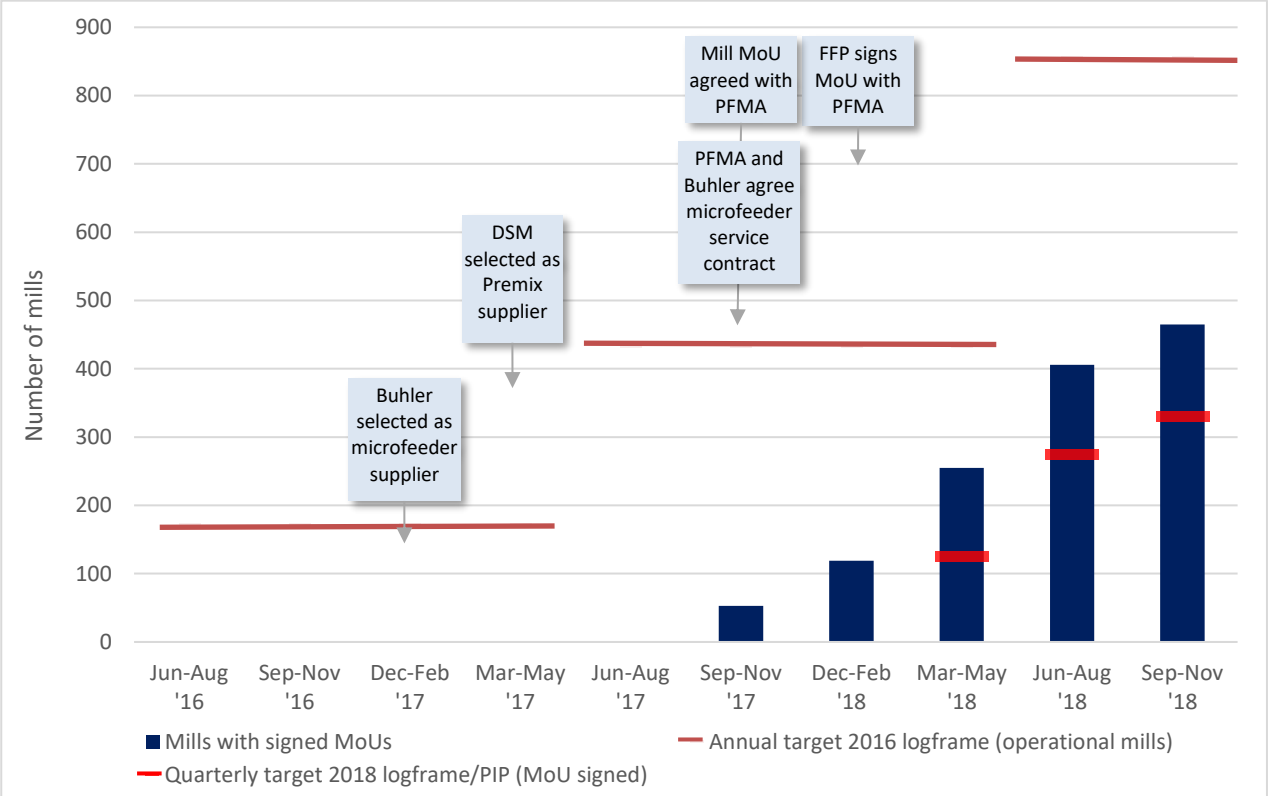
By December 2018, 465 wheat flour mills across Punjab and Sindh provinces and Islamabad federal territory were enrolled in the programme, of which 194 mills were fortifying.[110] FFP aims to engage with 1,082 wheat flour producers that are members of the PFMA. Similar to the oil/ghee producers, this engagement is institutionalised in MoUs. In addition, wheat flour mills sign service contracts with Buhler, the supplier of the microfeeder equipment.[111] By December 2018, 465 wheat flour mills had signed MoUs with FFP and a service contract with Buhler. The first mill signed up in August 2017, after which mill enrolment increased rapidly (see Figure 18): first in Punjab and Islamabad, and next in Sindh from quarter December 2017–February 2018 onwards. By December 2018, wheat flour mills had yet to be registered in KP (although FFP had expanded to this province by then). While mill registration started in August 2017, actual fortification only commenced in November 2017, and by December 2018, based on FortIS data, only 194 mills were operating under the programme. This suggests that the lead time from enrolment to fortification is relatively long compared to the oil/ghee sector—given the time required to organise microfeeder installation and procure premix. Moreover, some mills may also not be fortifying despite having the capacity to do so; i.e. even if a mill has a microfeeder installed, it does not necessarily follow that the mill does, or will, fortify.

The enrolment of mills in the programme has taken longer than planned and has encountered resistance from mills. According to the 2016 FFP logframe, 170 mills were meant to be fortifying with FFP's support by the end of May 2017, and the milestone target for May 2019 was 854 operational mills. Because of delays in the procurement of microfeeders and premix, and extended negotiation with the wheat flour industry about the MoUs and microfeeder service contracts, mill enrolment did not proceed as originally planned. Producer enrolment milestone targets were subsequently adjusted at the recommendation of Annual Reviews and embedded in the APIP. However, the programme exceeded these new, albeit substantially lower, targets (red lines in Figure 18) during the last three quarters. FFP has encountered ongoing resistance from some mills to sign up, given mills' reluctance to share production data as agreed in the MoU, the potential pressure on margins from the additional fortification cost in highly competitive markets,[112] and the risk of lagging or adverse demand.[cxi][113] FFP has been able to mobilise support from

[110] This refers to 'operational mills', which are defined by FFP as those mills that meet the following criteria: (i) the mill has signed an MoU with FFP; (ii) the mill has signed a service contract with Buhler (for the microfeeder/s installed in the mill); (iii) the mill has undergone and completed training with FFP; and (iv) the mill must have produced fortified flour at least once during the period.
[111] Under the service contract Buhler provides extended warranty for four years and after-sales services at a price of PKR 30,000 (around $215) per microfeeder paid by the mill.
[112] As explained in the wheat flour value chain analysis in Annex G, margins for wheat flour production, particularly Atta wheat flour, are very narrow. Even if the cost of fortification is low (relative to the total cost of production), this could affect the profitability of especially small producers and put them in a competitively disadvantageous position when competing mills are not fortifying.
[113] Stakeholder interviews carried out as part of the MTE confirm recent FFP reports (FFP Quarterly Report December 2018) that some mills are concerned about the possible impact of fortification on the colour of dough and naan, and have therefore stopped fortification.

provincial and district governments to persuade mills to enrol; however, this has raised concerns within the industry about government pressuring mills to sign up.[cxii]

Figure 18 Actual and planned number of MoUs signed with wheat flour mills (cumulative)



Source: FFP quarterly and annual reports; FFP logframes; FFP APIP

FFP has engaged with the wheat flour industry association, PFMA, as a key intermediary to promote and coordinate fortification among its members. FFP Quarterly Reports indicate that FFP has consulted PFMA on mill enrolment and key programme interventions, such as the microfeeder provision and service contracts, premix supply, the subsidy mechanism, and the establishment of cluster labs. In addition, FFP sought PFMA's buy-in for the notification of new fortification standards during its first year of operation, and has mediated between PFMA and the Punjab government about fortification enforcement.

However, tensions exist in the relationship between FFP and the PFMA that threaten the programme's further engagement with the industry and some individual mills. According to FFP reports, PFMA has expressed its support for the programme although the association has also expressed its concern about FFP engaging government to accelerate mills' enrolment. FFP has sought PFMA's assistance in following up with resistant mills, although the programme seems to have turned to using government pressure as a more effective strategy. The stakeholder interviews confirmed that PFMA does not consider this approach appropriate: the association expressed that it was under the impression FFP would work in partnership with the association and the mills, rather than behave as a regulator of mills. Thus, where FFP has turned to using government pressure when dealing with mills that are reluctant to join the programme or to fortify, this has created tensions between the programme and the PFMA. FFP and PFMA signed an MoU in February 2018, when the delivery of QC equipment to PFMA required such agreement. While the association acknowledges the importance of, and declares its support for, fortification, there is no sense of partnership or collaboration between FFP and the PFMA.

FFP has started engaging with the private sector at the retail level. FFP's interventions have been largely focused on encouraging the production of fortified flour by mills (only). More recently,

however, the programme has engaged with retailers (in 2018) – for example, an agreement was signed with USC of Pakistan, and the programme hopes to conclude a MoU with Metro Cash & Carry Pakistan in 2019 to facilitate the sale and purchase of fortified wheat flour.[cxiii]

Within the private sector, FFP also engages with input suppliers, such as premix and microfeeder suppliers, and the Chambers of Commerce and Industry. Their engagement will be discussed below.

Private sector TA to facilitate access to fortification inputs and support services

FFP planned to provide TA to wheat flour producers in three main areas: a) provision and installation of microfeeders, b) establishing and facilitating a reliable supply chain of premix, and c) supporting private sector QA/QC services with the provision of test equipment and facilitating their use through the formation of self-governing clusters of mills. This section reviews these in turn.

Despite delays in and challenges to identifying suppliers that are capable of fulfilling the needs of the Pakistan wheat flour sector, FFP has established a functional supply chain of specified microfeeders. By December 2018, FFP completed the delivery of a first contract of 1,117 microfeeders, in collaboration with DFID's procurement supplier DPSA.[cxiv] The procurement took longer than planned due to the indirect procurement arrangements through DPSA, the additional time needed to identify and negotiate the provision of technically suitable microfeeders, and the protracted negotiations about the microfeeder service contract. By the end of 2017, Buhler had been selected. The company offers the capability of supplying three distinct categories of microfeeders that allow adequate fortification of the different varieties of wheat flour produced in Pakistan. Furthermore, the programme has facilitated tax and import duty exemption and forged direct linkages between the mills and Buhler through a service contract agreed with PFMA. The single supplier arrangement provides Buhler with a monopoly position. The 2018 Annual Review therefore suggested to explore alternatives. FFP has acknowledged the risk of Buhler increasing its price of equipment under single supply conditions.[cxv] Nonetheless, Buhler has been maintained as the preferred supplier for the second phase of microfeeder procurement for technical, VfM, and consistency reasons.[114] This second phase of microfeeder procurement will be directly managed by FFP to avoid delays in supply, and a feasibility study on local manufacturing of microfeeders has been contracted.

FFP has managed to set up a supply chain of specified premix, with provisions for uninterrupted supply and price discounts. In response to the supply interruptions experienced at the start of wheat flour fortification, the programme slowed down mill enrolment and expanded the number of suppliers. By the end of its first implementation year FFP was able to establish a wheat flour premix supply chain that connected the supplier directly with the mills based on mills' premix demand forecasts facilitated by the programme and in-country stocks maintained by the supplier.[115] DSM was in the first instance selected as a single supplier. Similar to oil premix, FFP was able to negotiate a favourable premix price with the supplier.[116] The premix producer price has nonetheless increased due to exchange rate depreciation (increasing from PKR 850 per kg in November 2017 to PKR 1,086 per kg in December 2018). Despite in-country stock provisions, DSM's local supplier ran out of stock in February 2018 because of delays in customs clearance, causing knock-on delays in microfeeder installation.[117,cxvi] Following lessons

[114] FFP and DFID accepted the recommendation to continue to use the Phase 1 microfeeder supplier to avoid any differences in standards and resistance from second-phase mill owners joining the programme (FFP Quarterly Report, December 2018).
[115] According to the MoU signed with the supplier, the supplier must maintain a minimum inventory of 90 days' buffer stock of premix at a secure central distribution point in Pakistan.
[116] The negotiated price is more than 20% below the cost of imported premix estimated in a study by Altai Consulting in 2015.
[117] It is necessary for premix to be available at the mills during the microfeeder installation to calibrate and test equipment.

learnt also in the oil premix supply chain, FFP signed an MoU with a second international supplier, Mühlenchemie GmbH, in April 2018. The programme is assessing the introduction of a third supplier, taking into consideration interests from other suppliers and the demand available.

While the evaluation team has not been able to access wheat flour premix supply data from before the start of the programme, we estimate that this supply was small. A 2017 wheat flour industry assessment by GAIN, covering a sample of 109 mills in Punjab, Islamabad, KP, and Balochistan, found premix available in only 9% of sampled mills, of which most were located in KP and were mills exporting wheat flour to Afghanistan. An industry assessment by Altai Consulting (2015) concluded that those millers fortifying their production mostly relied on GAIN, WFP, or the Micronutrient Initiative (now known as Nutrition International) to obtain access to premix. The provision of premix under these other fortification programmes does not make use of local suppliers, as is done under FFP (Box 7). It is also important to note that as national fortification standards were revised and took effect in 2017, the premix specifications for wheat flour were adjusted (to reflect WHO guidelines). Previously, only folic acid and iron were among the micronutrients included; the new premix specifications now include (in addition to folic acid and iron) zinc and vitamin B_{12}. These changes took place around the time FFP started implementation. While the programme initially accounted for a different premix (given the old specifications), by the time the programme initiated procurement of premix, the supply of premix was made on the basis of the new specifications (consistent with the newly enacted national fortification standards).

Box 7 Overview of the wheat flour premix supply chain

The premix for fortifying wheat flour in Pakistan has largely been supplied under various fortification programmes – including those implemented by GAIN, WFP, and FFP. A study commissioned by USAID and GAIN in 2017 noted that only one local trader in Karachi had previously imported a small quantity of premix in 2015 for millers who expressed an interest in producing fortified flour under their high-end brands.[cxvii] However, this was done on an experimental basis, and as the stock of premix expired given low demand from mills, the supply of premix by this or indeed other local traders or suppliers was discontinued.

Under the fortification programmes run by institutions such as GAIN and WFP, the supply of premix in Pakistan does not involve private sector actors, such as local traders or suppliers. In the case of GAIN, for example, it uses the GAIN Premix Facility, a facility managed centrally by GAIN, and GAIN has prequalified vendors for premix supply. GAIN then directly imports the premix from one of the prequalified vendors – it currently sources the premix from a manufacturer in India. The premix, once imported into Pakistan, is then distributed to the mills engaged by GAIN, which in the current programme are those mills exporting fortified wheat flour to Afghanistan. The premix is provided to mills at cost, in the first instance. In the succeeding round, the premix supply is provided to PFMA (for free or on a grant basis), which PFMA then sells to the (exporting) mills. The revenues that PFMA receives from this round are intended to serve as 'working capital' or a revolving fund, which can be used for procuring the next batch of premix.

Under FFP, the model of procuring and distributing premix is different from what has been developed and implemented in previous or indeed other ongoing fortification programmes. The supply chain involves international manufacturers of premix (i.e. the suppliers of premix to Pakistan) and local suppliers or traders, who are tasked with importing the premix and distributing this to participating mills.

- FFP has an MoU with the international manufacturers of premix (such as DSM International (Singapore)). Under this agreement, the specifications and price of the premix to be supplied are laid out.

- The international premix manufacturers use local suppliers or traders in Pakistan—who then import the premix from the specified manufacturer. Orders placed are based on forecasts of premix requirements, as determined by the participating mills, and carried out in cooperation with FFP.

Box 7 Overview of the wheat flour premix supply chain

Stocks are then stored in a central facility in Pakistan. Under the agreement with FFP, these local suppliers must be able to deliver premix supplies to mills within two days of orders having been placed by the mills. Local traders have not previously imported and distributed premix to mills; however, they have previously supplied the industry with other products, such as gluten enhancers, etc., and are therefore familiar with the process of importing goods (for the wheat flour industry) and have previously engaged with international manufacturers such as Mühlenchemie.

FFP has successfully managed to procure QC equipment locally or internationally at stable, negotiated prices. While the equipment has also been distributed its use has been limited. FFP planned to support PFMA to set up self-governing cluster labs for quantitative testing of iron in fortified wheat flour by providing one iCheck test kit per cluster of 25 mills, training laboratory staff and supplying supplementary items (e.g. reagents).[cxviii] FFP Quarterly Reports indicate that by the end of November 2018, 12 iCheck devices had been imported based on an intensely negotiated price fixed for four years.[118] However, by that time only five cluster labs had been set up (in three out of 16 districts where fortification was taking place). [119] Two were operational in November 2018. This increased to four operational cluster labs by April 2019.[cxix] The number of mills linked to each cluster lab is much larger compared to the cluster labs in the oil/ghee sub-sector: between 20 to 49 mills are linked to one cluster lab. In accordance with the MoU between FFP and PFMA, the programme also expanded PFMA's QC capacity by equipping its existing national laboratory with a spectrophotometer used for quantitative testing of iron in fortified wheat flour. The MoU envisages the testing of up to 60 samples of wheat flour per month by the national laboratory. According to FFP, this facility has yet to be used to test samples collected from FFP enabled mills. PFMA laboratory staff have been trained by FFP but have since left the job. Finally, FFP was able to locally procure RTKs for qualitative iron testing. During each of the first two quarters of its third year of implementation, FFP reportedly distributed 8,000 RTKs among wheat flour mills.[120]

Provision of sliding, conditional premix subsidy

The subsidy mechanism is designed considering the context of fortification in the wheat flour sector. Analogous to the oil/ghee sector, FFP provides enrolled wheat flour producers with a sliding subsidy as a rebate on their premix purchase, conditional on fortification at standard verified by a third-party laboratory. Box 8 presents an overview of the features of the wheat flour subsidy scheme. The context of the wheat flour subsidy is different from that for edible oil/ghee. First, no mandatory legislation was in place for wheat flour fortification at the start of the programme. This is the reason the subsidy percentage for wheat flour fortification has been set higher. Second, premix purchase and fortification were much more limited in the wheat flour sector compared to the oil/ghee sector. This has translated into a subsidy mechanism that accepts lower initial targets of fortified production and foresees that mills will achieve full fortification of their production gradually over time.

Box 8 Overview of the wheat flour premix subsidy

The subsidy payment process is the same as for edible oil/ghee fortification (see Box 6) The subsidy is similarly provided for the duration of two years starting from the date the mills commission the

[118] In addition to the iCheck equipment 43 consumable test kits and five units of centrifuge machines have been procured.
[119] Two cluster labs were set up in Lahore (in Quarter 1 of Year 3), two in Rawalpindi, and one in Islamabad (in Quarter 2 of Year 3). FortIS data indicate that in November 2018 wheat flour fortification through the programme was taking place in 16 districts. By mid-April 2019, one other cluster lab had been established in Faisalabad (interview FFP).
[120] The RTKs are provided by the programme, free of charge, for the two years that mills are engaged. Each RTK is good for 15–20 tests and they cost around $2 per kit.

microfeeders.

The subsidy calculation formula is different to the oil/ghee premix subsidy in the following ways:

- The subsidy is paid to those mills that achieve the following fortified production targets:
  - 25% of total production is fortified in Quarter 1
  - 50% of total production is fortified in Quarter 2
  - 100% of total production is fortified from Quarter 3 onwards
- The sliding subsidy scale starts with high subsidy percentages that reduce gradually over time: 70% subsidy during the first six months, followed by 50%, 25%, and 10%, respectively, over the next semesters.
- The subsidy payment is also conditional on compliance with fortification according to standard and QC processes. The subsidy is adjusted according to the same criteria as the oil/ghee premix subsidy, but more weight is placed on the correct quantity of premix consumed:
  - 50% paid out when fortnightly samples are approved by a third-party lab; if only one sample is approved then the percentage is reduced to 25%; if no sample is approved, no subsidy is paid
  - 40% paid out when the quantity of premix consumed during the month is in the correct proportion to reported monthly wheat flour production (up to ±10% variance accepted)
  - 5% paid out when samples tested at the cluster lab are found to be within the acceptable range of fortification
  - 5% paid out when samples tested at the government lab are found to be adequately fortified as per the standard

Source: FFP, SOP for subsidy management – WFF component

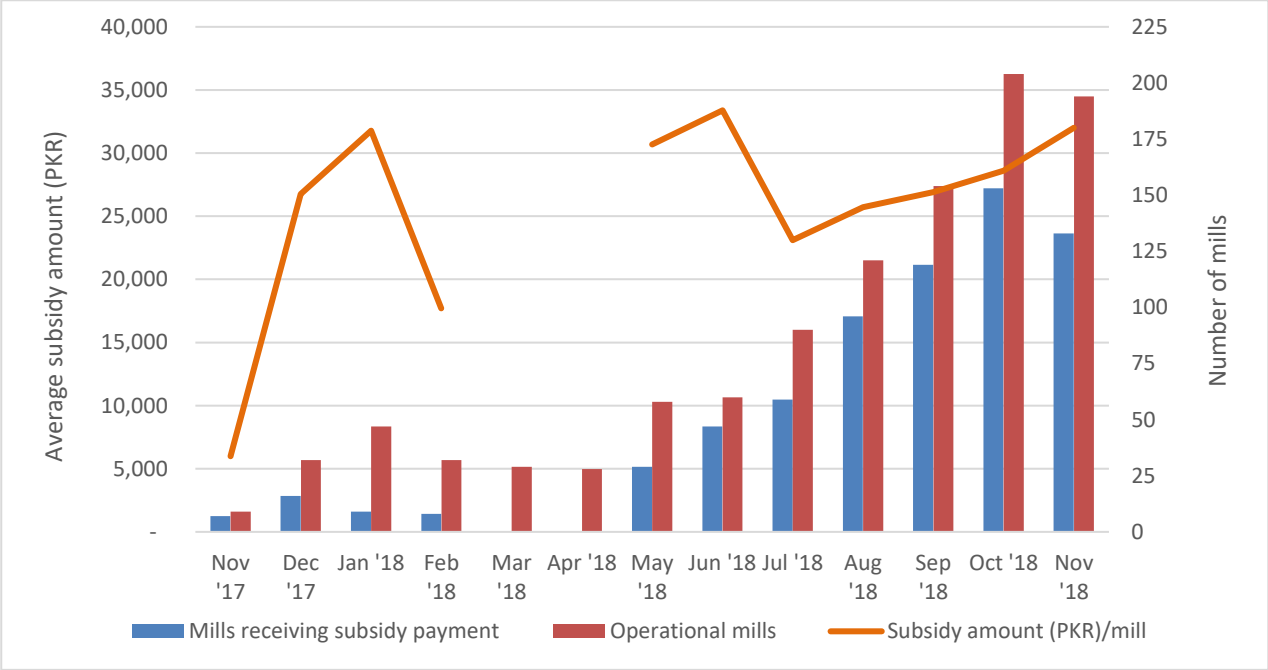
In November 2018, 133 mills received a subsidy payment, which is 65% of the mills that were operational in the previous month. The first subsidy payments were made in November 2017, to seven mills, in the same month that the first mills started using premix. As Figure 19 demonstrates the number of mills receiving subsidies increased gradually over time, mainly starting from mid-2018. The number of mills receiving subsidy payment lags behind the number of mills fortifying and using premix.[121] One reason for this is the time required to go through the different steps of the subsidy management process. While the evaluation team does not have subsidy data to estimate the turnaround time of the subsidy payments, interviews with mills suggest that the period takes between four and six weeks. FFP has explained the subsidy management process well and interviewed mills were well aware of the steps that were required. Nonetheless, some mills expressed concern about what they considered to be delays in subsidy payments. The fact that the number of mills receiving the subsidy in November 2018 represents only 65% of operational mills the month before also suggests that the subsidy payment process can take more than a month (although in previous months this proportion was 100%). Other explanations are that mills procuring premix do not necessarily use it immediately—actual fortification varies from one month to another (see below)—and that not all mills comply with the subsidy criteria. Subsidy payments for October 2018 indicate that 75% of 131 mills to be paid for that month achieved 100% adequacy of fortification, while the lowest adequacy rate was 60%, suggesting that most mills seem to be complying with the criteria, although the evaluation team does not have the data to verify this exactly.

By December 2018 total subsidy payments amounted to £86,243, which is a fraction of what was initially budgeted but on track with the APIP. Compared to an original budget of £8,448,709, subsidy payments have been minimal.[cxx] This is a consequence of the delays in the procurement of the microfeeders and premix, and the more extensive time required to enrol the

[121] This seems to be in contrast to the situation with the oil/ghee mills, for which the number of mills receiving subsidies in a given month in 2018 was generally larger than the number of operational mills.

mills. However, during the first two quarters of FFP's third implementation year, subsidy payments had surpassed the adjusted targets set by the APIP by 41% and 118%, respectively.[cxxi] Over the period November 2017 to November 2018 on average mills received a monthly subsidy of PKR 25,695 (or ca. £140). As Figure 19 shows, the average subsidy amount per mill varies from one month to another, which is likely to be a result of mills fortifying varying levels of their production, as well as of the reducing subsidy scale.

Figure 19 Average subsidy amount per mill and number of mills receiving subsidy (November 2017–November 2018)



Source: FortIS; data provided by FFP

Training on fortification and QA/QC processes

In the same way as for oil/ghee mills, FFP committed to training staff of wheat flour mills on fortification and QA/QC processes, while the mills agreed to nominate dedicated and relevant staff for training (two per mill).

Trainings were organised successively as mills enrolled and installed microfeeders. FFP initially conducted a master training on wheat flour fortification and QA/QC processes in August 2017, including five staff from mills nominated by PFMA, to assist with arranging and conducting training of the technical staff from flour mills.[cxxii] Subsequently, training of mill staff on the food fortification process has coincided with the installation of the microfeeders and has been conducted by Buhler, with support from the FFOs. A first cohort of staff of 20 Punjabi mills was trained in November 2017, when the first microfeeder installations took place. By December 2018, 772 staff from 386 mills had been trained (91% Punjab, 7% Sindh, and 25% KP), which amounts to two staff per mill.[cxxiii] By then, 465 mills had been enrolled and 287 mills had been operational. In addition, laboratory staff of five cluster labs and the PFMA central lab have been trained in the QC processes using iCheck equipment. Finally, an important capacity building task is carried out by the programme FFOs, who train mill staff in QA/QC processes at the mills.

The mills interviewed by the evaluation team expressed satisfaction with the training/guidance they have received under FFP. The training they have received covers the use of the microfeeder, technical guidance on the combinations of premix to be added (which vary between the different varieties of flour), and how to carry out internal quality checks on the fortified flour that they produce. Internal quality checks involve a simple process—an iron spot test (IST)—

whereby a sample of the wheat flour (with premix) is taken and placed on a dish (a small, portable circular plastic material with a sheet of paper placed on it) that then detects the presence or absence of added iron in flour.[122] Guidance on how to implement this test is provided by FFOs. Testing kits are also provided by the programme to the mills.

Existing staff at mills (who received training) are able to carry out tasks associated with fortifying the wheat flour they produce. The owners/managers of mills interviewed by the evaluation team are also fully informed of these processes; hence, these owners/managers expressed that they do not think there is a risk of losing any capacity built if they were to lose or replace staff who have received training from FFP on the fortification process. That said, what appears to be lacking is the monitoring and measurement of the 'capacity that has been built' (outcome) within these mills.

Fortification monitoring and on-the-job coaching by FFOs

The regular visits by a cadre of district-level FFOs to the mills is key to FFP's ongoing capacity building of the mills, to the smooth functioning of the supply processes of fortification inputs (such as premix), and to the independent QC of fortified wheat flour samples for subsidy payment.

FFOs have been recruited and deployed in line with the expansion of the programme. Given the delay in mill enrolment the recruitment of FFOs was accordingly postponed until June–August 2017, a few months before the installation of the first microfeeders. Additional FFOs were successively recruited as a function of the expansion to new districts and enrolment of more mills. By December 2018, 31 FFOs had been contracted, of which most were operating in Punjab (24 FFOs) and the remainder in Sindh (four FFOs), Islamabad (one FFO), and KP (two FFOs).[cxxiv]

On average, each FFO covers 14 enrolled mills, as well as a number of mills yet to be signed up in the programme (on average, five additional 'new' mills according to FFP). The number of mills covered per FFO varies considerably, between six and 36 mills, depending on geography.[123] FFP staff confirmed that while FFOs visit mills ideally on a weekly basis, visits in practice happen at least three times per month for the mills that are producing fortified flour.[124] The frequency of the visits is driven by the needs of the mills. Considering the FFO's broad scope of work, which goes beyond merely collecting samples for third-party testing (see above), this seems like a heavy caseload. FFP interviews confirm that this can be challenging in locations where mills are geographically dispersed; this is also why mills are organised into clusters for assignment to FFOs.

F.3 Implementation review of public awareness-raising activities

FFP aims to raise awareness, knowledge, and acceptance of fortified foods and their health benefits among the general public through two categories of interventions. First, FFP seeks to spread fortification messages by integrating them in the communication of other programmes and existing curricula, such as training curricula of health staff. FFP's activities as part of this intervention category take place mostly at provincial levels. Second, FFP has rolled out public awareness-raising activities at district level, which can be divided into interpersonal activities, on the one hand, and a media campaign on the other hand. While some of FFP's public awareness activities, such as the TV advertisements, are universally targeted, others, such as awareness-

[122] The IST can be used with all types of flours and is not affected by the extraction rate of wheat flours. With the IST, the appearance of 'red spots' after the application of a solution indicates the presence of added iron. The IST detects almost all forms of iron currently used in fortification. It is a simple procedure and costs very little to execute – which is why the IST is commonly used at mills for quality control to ensure that iron, and thus the micronutrient premix, has been added to flour.
[123] The calculations are based on lists of enabled flour mills in Punjab, Islamabad, and Sindh provided by FFP in March 2019 (covering 371 mills that had joined the programme up to December 2018).
[124] Monitoring data are not available in FortIS to verify the number of visits per mill.

raising through LHWs and mobile messaging, are targeted to WRA. This section reviews the implementation and roll-out of each intervention category in turn.

Inclusions of fortification messages in programmes and curricula

Key messages on fortification and its health benefits were developed and included in the provincial-level health and nutrition curricula in KP, Sindh, and Punjab. In Year 1 of the programme, FFP developed key messages on the benefits of fortification in general and specifically for the LHW curriculum in KP and the SHNSs curriculum in Punjab. In Year 2, these messages were included in the LHW curriculum in Sindh and in the Nutrition Module for facility-level healthcare in Punjab (this covers LHWs, LHSs, and medical doctors). The potential reach of these interventions during the lifetime of the programme depends on the actual use of the curricula. While training on the new curriculum has started in Punjab, it has not yet begun for the LHWs in Sindh, and therefore has not reached the LHSs or LHWs.[125]

FFP has created synergies with other programmes and partners to disseminate fortification messages, but FFP's engagement with other programmes has remained limited. It is commendable that FFP pursued synergies with other programmes and leveraged the revision of the curricula promoted by other organisations. This is efficient and promotes partnerships. For example, FFP worked together with the Punjab Health Department and other DFID-funded health programmes, such as the Technical Resource Facility.[cxxv] Engagement with other programmes has focused on a few programmes that the implementing partners had the immediate opportunity to collaborate with.[126] Given that nutrition is currently high on the political and development agenda in Pakistan, multiple nutrition programmes are supported, sometimes with a behavioural change communication element.[127] While FFP has held initial meetings with some of these programmes (e.g. FFP met with the NSP in Sindh during its stakeholder mapping exercise), the engagement has not been continuous. More opportunities to integrate fortification messages likely exist. In this regard, an interviewed stakeholder suggested that FFP could leverage existing platforms to engage with a wider range of nutrition actors and programmes. Furthermore, as will be further discussed below, FFP's weak engagement with the LHW Programme, through its interpersonal activities at district level, risks the messages not trickling down to the target population.

District-level interpersonal awareness-raising and marketing activities

Phase 1 of the district-level public awareness campaign has been completed, with the interpersonal activities being rolled out in 10 districts between November and December 2018. The interpersonal activities of FFP's district public awareness campaign include a launch event and one-off awareness sessions with LHSs, SHNSs, and market stakeholders in each district where FFP supports fortification, as well as in some districts where mills are not supported. The activities are implemented by CSOs contracted by FFP in each province and supported by FFP staff.[128] The sessions are designed to introduce the participants to fortified foods and their benefits, and to provide IEC materials to be distributed further. Roll-out was meant to start in Punjab by the end of the first year. However, because of the delays in fortified production implementation started in November 2018, following a new intensified roll-out plan, which is part of the APIP. By the end of December 2018, interpersonal activities had been carried out in 10 districts in Punjab, Islamabad, and Sindh, in accordance with the new plan.[129] Table 9 presents the number of participants in district awareness sessions from districts where the public awareness campaign

[125] For the MTE, we did not carry out stakeholder interviews in KP and therefore are unable to confirm the progress of training on the new LHW curriculum in the province.
[126] For example, the TRF+ is also a programme implemented by Mott MacDonald.
[127] For example, in Sindh the NSP launched a behaviour change mass media campaign.
[128] The CSOs are part of SUN-CSA, which works on nutrition advocacy. In Punjab, AGAHE is implementing activities in all districts, while in Sindh the activities are being implemented by a consortium led by the Thardeep Rural Development Programme. Other members include DevCon and CSSP.
[129] Apart from a minor delay in the districts of Karachi, where some activities spilled over from December to January.

was rolled out in November. While these data show a snapshot of the reach of the campaign, they do not provide any insights into who the participants were or, for example in the case of LHSs, whether this includes all the LHSs in that district. Our district-level study validates the finding that all events reported were held in the sampled districts.

Table 9 Number of participants in district awareness sessions, by district

District	District launch	Market stakeholders	LHS	SHNS
Punjab				
Lahore	166	25	91	41
Hafizabad	139	19	44	25
Rawalpindi	60	32	67	64
Gujranwala	77	27	70	64
Islamabad	120	15	11	NA

Source: Annex 7, FFP Quarterly Report Y3Q2

The low intensity of the interpersonal activities, and the limited scope of the programme's engagement with the local health staff within the context of their other duties, limits the spread of messages among the target groups. The objective of the awareness-raising events with LHSs and SHNSs is that the information provided is passed on to LHWs and trickles down to WRA and children. Of the six LHSs interviewed as part of the MTE's district study, only three had shared food fortification messages and IEC material with their supervised LHWs. There is low motivation among the LHSs and LHWs to include fortification messaging in their activities. Many of them do not perceive this to be part of their duties. They related this partly to the nature of the awareness session, which was not seen as a 'training' of the kind they are usually used to with other programmes. These trainings are usually for longer periods and may involve monitoring. LHSs suggested there should be more sessions and more intensive engagement, which their district-level LHW coordinators also recommended, as well as sessions with LHWs themselves.[130] Those LHW coordinators who had participated in FFP's events found them to be informative but generally assessed FFP's engagement with the LHW Programme to be weak, and many were unhappy about the programme because it did not provide any incentives for already overburdened LHWs.[131] Compared to the LHSs, the interviewed SHNSs had more positive views of the FFP awareness sessions. They were supportive of the idea of passing on the fortification messages to schools. However, the transmission had been limited in the three months since the training. Some SHNSs had not yet started, while other SNHSs had conducted sessions at only two to three schools out of the 15 to 20 schools that come under their catchment area. The reasons given for this included being busy with other duties, such as a polio campaign.

A district-level media campaign, including billboards, TV advertisements, and mobile messaging on the benefits of consuming fortified foods, was developed and implemented in selected districts. FFP developed the media campaign content (i.e. the messages to be delivered) and hired an advertising agency to produce the billboards, TV advertisements, and mobile messaging. FFP additionally hired a media management company to manage the billboards and cable TV

[130] LHW coordinators are the district heads of the LHW Programme.
[131] Given the range of activities, a common complaint within the LHW Programme is that LHWs are overburdened (Zhu *et al*. 2014). FFP also recognises this as a challenge in its quarterly report for September–November 2019. One of the respondents said that given that LHWs are already over-burdened with other duties, programmes such as FFP should be implemented by NGOs directly in the communities.

advertisements, while the mobile messaging is being implemented free of charge as part of the existing IRMNCH-NP in selected districts in Punjab. By December 2018, the campaign had been rolled out as expected, with billboards in selected districts[132], TV advertisements on in-house channels of selected cable TV providers in selected districts (except for Lahore and Hafizabad), and mobile messaging in Gujranwala and Rawalpindi.

The reach and effectiveness of the media campaign are limited, which is likely due to a lack of consumer access to, and preference for, the media channels used, as well as the short duration of the campaign. The MTE's qualitative district study found the reach of the media campaign to be limited. In a sample of over 200 people (with an almost equal number of women and men) who participated in the qualitative research[133], only one man in Karachi had a vague recollection of watching the TV advertisement and was unable to remember on which channel he saw it or what the advertisement was about; otherwise, no respondent reported watching the advertisement on TV. This is because the TV channels on which the advertisement was aired are not widely accessible or preferred by consumers.[134] Furthermore, the limited intensity of the campaign—TV ads for only one month and one billboard in an entire district—has likely limited consumers' exposure to the campaign. Nonetheless, in an interview setting the TV advertisements are positively received by most sampled men and women. Regarding the mobile messaging, none of the consumers interviewed in Gujranwala remembered receiving the message, which is likely to be because of the low literacy level of both male and female respondents, who tend to use their phones for calls only and reported that they do not pay much attention to messages they receive on their phone as they are considered to be promotional texts sent by mobile network operators. The effectiveness of mobile messaging which is targeted to women is also likely to be low due to the lower levels of mobile phone ownership among women.

There has been weak involvement of core public sector stakeholders (e.g. the fortification alliances) and the core private sector actors (e.g. the industry associations) in the development and implementation of the public awareness campaign, apart from as participants in district awareness sessions. Among public sector stakeholders, the NFA has been involved in approving and endorsing the media campaign but there has been no involvement of other government bodies that play an active role in fortification, such as the provincial Food Authorities. Although the mills find demand-generation to be an important motivator in regard to fortifying their products, FFP takes on the responsibility of creating demand for fortified foods[135] and mills have not been part of the marketing activities, apart from being encouraged to put the FFP-designed fortification logo on their products.[136] FFP's marketing material (such as TV ads and brochures) refer to the logo as a way to distinguish fortified products from non-fortified ones.[137] However, our research with retailers found that although several brands of oil/ghee mention that the product is fortified on their packaging (either through text or their own logos), only a few had the FFP-designed logo. As part of the MoUs that FFP signs when registering oil/ghee mills, it is the mills' responsibility to use the logo. To further encourage mills in doing so, FFP is working with the regulatory authorities (food departments and PSQCA) to instruct mills to use the logo. While some mills have not been

[132] Advertising billboards were not put up in districts where the campaign took place in December 2018 due to a Supreme Court injunction on construction on billboards.
[133] Respondents were selected purposively for the qualitative study and as such are not statistically representative of the targeted population. Nonetheless, all were selected from the districts where the media campaign had been rolled out, and were among the target group of the media campaign (WRA or men), and most had a TV in their house (except for some households in rural communities). See Section 3 for further details on the sampling.
[134] The qualitative research found no gender difference in access to the TV channels on which FFP airs its advertisements. The channels that most people said they normally watched were national TV channels, such as Geo and ARY, with males preferring to watch news channels and sports while women preferred to watch television dramas. Some communities in our sample did not have access to cable TV but instead used dish antenna.
[135] In the MoUs that FFP has signed with mills and industry associations, awareness-raising activities to increase consumer demand for fortified foods are listed as one of FFP's responsibilities.
[136] FFP designed the logo for fortified oil/ghee and is using an existing logo from a previous fortification programme for wheat flour. The logos have been approved by the NFA.
[137] For example, FFP's TV adverts explicitly say 'Remember to look for the fortification logo'.

able to use the logo, as packaging is ordered in bulk and a change in design comes with a lead time, there are mills that prefer to use their own logos to differentiate their brand from others. FFP does not have similar provisions regarding the use of the logo in agreements it signs with wheat flour mills.

F.4 Implementation review of public sector programme activities

This section reviews the progress of FFP's activities targeted at public sector actors. The following intervention categories, included in the programme's ToC, are reviewed in turn: 1) FFP's engagement with public sector stakeholders at different levels; 2) sensitisation and advocacy among public sector decision makers; 3) the provision of TA to public sector actors to develop, monitor, and enforce standards/legislation; and 4) training on fortification and QA/QC processes.

Engagement with fortification stakeholders at various levels

FFP's engagement strategy is based on extensive, in-depth stakeholder mapping and analysis. FFP's engagement spans all tiers of the government in Pakistan, from federal to provincial to district. The programme engages with public sector stakeholders directly as well as through multi-stakeholder platforms, such as national and provincial fortification alliances. To understand the multisectoral stakeholder landscape, FFP conducted extensive mapping and analysis of national, Punjab, Sindh, and KP food fortification stakeholders, and their role and influence in food fortification. This formed the basis of an engagement plan, which was complemented with a communication and advocacy strategy.

FFP has extensively engaged with coordination and advocacy forums working on food fortification at the national and provincial levels. FFP is a member of the NFA and PFAs in all four provinces. FFP recognises the alliances to be important coordination and advocacy platforms, and sees PFAs as pivotal in establishing mandatory food fortification regimes.[cxxvi] FFP has focused its engagement on the PFAs because food fortification legislation, regulation, and enforcement are provincial subjects after the 18th constitutional amendment, while it engages with the NFA for national-level advocacy purposes. PFAs have facilitated FFP to engage with the government (especially the food departments, health departments, and Food Authorities) and private sector (especially millers' associations). However, FFP has not used PFAs to widen its engagement with other strategic stakeholders, like the finance departments – for example, to enlist their support for ensuring continued budget support for monitoring and enforcement action at the district level. Other platforms that FFP engages with are the coordinating structures of the multi-sector nutrition strategies or action plans at national and provincial level. For example, FFP is a member of the Punjab MSNS steering committee.[138] This engagement is less developed, as evidenced by key stakeholders of these structures not being aware of key interventions supported by FFP in their provinces.

FFP has engaged with government and relevant institutions at national level to mobilise public sector support for food fortification. FFP coordinated with PSQCA to revise the fortification standards for wheat flour and edible oil/ghee, and to harmonise them across provinces. FFP was also able to successfully advocate with the Federal Board of Revenue on exempting microfeeder imports from customs duties and taxes. FFP also held regular meetings with the SUN Secretariat on engaging government on key public sector initiatives on fortification, such as the PKR 100 million PC-I the government is preparing for nutritional improvement (which includes TA to provinces and awareness-raising at the national level).

FFP has engaged with key provincial government agencies in Punjab, Sindh, and KP in a staggered manner. Provincial engagement started first in Punjab during the first year of

[138] The evaluation team does not have monitoring data to verify the intensity of actual engagement with the committee.

implementation, followed by Sindh in the second year, and KP in FFP's third year of operations. As summarised in Table 10, FFP has institutionalised its provincial engagement through focal points at different departments and the signing of MoUs.[139] FFP's engagement with different provincial departments varies by province, in accordance with their mandates in each province. For example, in Punjab enforcement of wheat flour fortification is the responsibility of the Food Department, oil/ghee fortification is the responsibility of the Food Authority and overall malnutrition and MSNS is coordinated at the Planning and Development Department level. In general, FFP has more strongly engaged with sectoral agencies, such as Food Authorities and food and health departments, compared to central departments such as Planning and Development Departments or Finance Departments. Given their mandates, this makes sense from a programme effectiveness perspective (e.g. achieving the set targets) but involving central ministries is a proxy for political commitment, as it then ensures a regular flow of funding and a better accountability environment, leading to the sustainability of the programme interventions. Overall, FFP has increased its presence at the provincial and district levels. However, most interviewed stakeholders still view FFP as a private sector supply-side programme focused foremost on working with mills directly and providing them with fortification inputs. Provincial differences exist – for example, in Punjab the public sector stakeholders had a less enthusiastic view of the programme, whereas in Sindh stakeholders were more appreciative. The evaluation team attributes this in part to FFP's more broad-based engagement approach in Sindh, with stronger engagement of the political leadership, working with several government departments[140] and engaging with several other nutrition/health programmes.[141]

Table 10 Overview of FFP's engagement at provincial and district level

Province	Provincial engagement	District engagement
Punjab	• Identified focal points in sector departments and PFA, but did not get them officially notified by the government • FFP and Punjab Food Authority signed MoU on strengthening external monitoring and enforcement of edible oil/ghee • FFP is a member of provincial steering committee of MSNS	• Focal persons identified in 25 districts • DMACs are active in 11 districts of south Punjab, where FFP district staff are attending meetings
Sindh	• Identified focal points in relevant sector departments and PFA, but not officially notified • FFP and Sindh Food Authority signed MoU on wheat flour and edible oil/ghee fortification • FFP has discussed MoU with Food Department (under discussion in the department)	• Focal persons identified in three districts (Karachi, Hyderabad, and Sukkur) • There are no DMACs in Sindh; FFP directly works with district departments and mills
KP	• Focal person identified by FFP at KP Food Safety and Halal Authority[142] • FFP and KP KP Food Safety and Halal Authority signed MoU on wheat flour and oil/ghee fortification • KP Food Safety and Halal Authority allocated space for FFP provincial managers	• Focal persons identified in five districts (performing activities in Peshawar only) • There are no district-level institutional arrangements

Source: FFP progress reports; key informant interviews

[139] However, since the focal persons are not officially notified their status is a private arrangement. It is not clear whether the government entities recognise this arrangement.
[140] For example, Food Department, Health Department, and Planning and Development Department (through the AAP).
[141] AAP and Sindh Nutrition Programme.
[142] FFP commented that notifications for the nomination of focal persons are available in the form of a government official document. However, the evaluation team has not been able to confirm this.

FFP engagement in districts is running with a slight delay against initial plans but ahead of APIP targets. In Punjab FFP seeks to leverage DMACs as a platform for multi-stakeholder engagement but their limited functionality constrains their effectiveness. By December 2018, FFP had rolled out its district-level government engagement, with the support of provincial authorities, to 25 districts in Punjab, three in Sindh, and five in KP. The roll-out was delayed in line with the revised timeline of mill engagement in the districts. FFP is ahead of the milestones agreed in the APIP, which set a target of 26 districts with a project office and official government focal points by the end of November 2018. In Punjab, FFP coordinates with the Deputy Commissioner as the focal point for DMACs, [143] which FFP leverages to promote food fortification. However, the Punjab P&D Department clarified that DMACs are only functioning regularly in 11 districts in south Punjab, which limits their effectiveness as a platform for engagement. DMACs do not exist in other provinces. In Sindh, FFP focuses its district engagement through departmental focal points, not using government capacities available in the districts through NSP and AAP.

FFP's coordination with other development partners and programmes at national level was found to be satisfactory following ongoing engagement and information-sharing. One example of strong coordination at national level is the working group formed between FFP, GAIN, and WFP, which meets monthly. However, the effectiveness of coordination as one moves down the government tiers decreases. This coordination and discussion of roles and responsibilities should help dissipate challenges and tensions among organisations working in the same space. The frequency of programme-level engagement at the provincial level is less than that at the national level.

Sensitisation and advocacy among public sector decision makers

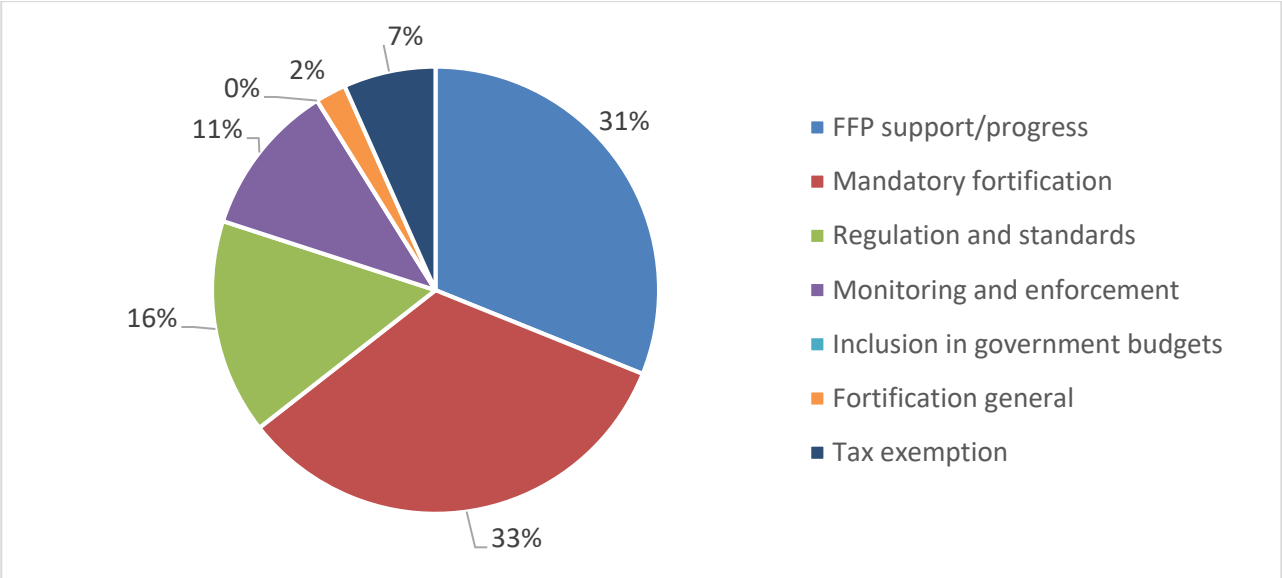
FFP has set out a multi-pronged sensitisation and advocacy strategy to influence public sector decision makers at various levels. FFP's Communication and Advocacy Strategy, which is complemented by its advocacy benchmarks, sets the focus of its sensitisation and advocacy among public sector decision makers. The main advocacy areas are: the adoption of legal provisions for mandatory fortification; amendments of fortification regulation and standards; government support for monitoring and enforcement (including support for enforcement mechanisms such as linking the subsidised wheat flour quota to adequate fortification); exemption of fortification inputs (e.g. microfeeders) from duties and taxes; and the absorption of the cost of fortification in government budgets. FFP's strategy outlines a series of tactics, covering both direct meetings with decision makers, more indirect interaction via coordinating platforms (such as NFA/PFAs), as well as influencing via policy briefs, research, and launch events.

FFP has concentrated its advocacy at a provincial level, with an emphasis on creating the legislative and regulatory framework for food fortification. Figure 20 presents the key areas covered during 32 meetings with public sector stakeholders included in FFP's stakeholder database during five programme quarters (in the second and third years of programme implementation).[144] While it is not ensured that meeting topics captured in the database cover all areas discussed, the database nonetheless provides an indication of the relative intensity of FFP's advocacy relating to specific areas. The main two areas of advocacy were the legislation of mandatory fortification and the preparation or amendment of related regulations, rules, and standards. In addition, FFP often advocated for support for the programme and fortification in

[143] DMACs are constituted to help address malnutrition in the districts. DMACs are chaired by the Deputy Commissioner and consist of representatives from the Food Department, the Food Authority, Departments of Health, Education, Agriculture, and Public Health Engineering, local NGOs, and representatives from flour and edible oil mills and salt units (FFP Annual Report Year 2, June 2018).
[144] The evaluation team only had access to the database covering quarters Y2Q1, Y2Q2, Y2Q3, Y3Q1, and Y3Q2. The categorisation into areas was based on data on the outcomes and purpose of the meetings.

general, which was also supported by programme-supported events.[145] Most advocacy meetings are concentrated at provincial level, which makes sense given the mostly devolved mandate on fortification.[146] At a national level, the programme successfully advocated for tax exemption for the import of microfeeders and at the time of the elections engaged the main political parties to add food fortification to their manifestos. Figure 20 points to relatively limited advocacy effort being dedicated to the area of making fortification financially sustainable, which suggests a programme focus on achieving agreed outputs. However, it is likely that the database does not provide the full picture, as FFP progress reports indicate that Punjab and Sindh Food Departments have been engaged to discuss revisions of the price of fortified wheat flour (which the Secretary Food in Punjab agreed to) and the Punjab Food Department showed willingness to take up the cost of monitoring and enforcement in its budget. However, this needs to be followed up with the Finance or P&D Department to ensure that such intentions are supported by funding commitments.

Figure 20 Areas covered during advocacy meetings with public government decision makers during Y2Q1, Y2Q2, Y2Q3, Y3Q1, and Y3Q2 (N = 47 areas from 32 meetings)



Source: Stakeholder Management Database Reports

District launch events have been rolled out as planned, putting food fortification in the spotlight, but their influence has been diluted due to insufficient follow-up. The stakeholder engagement database does not cover any advocacy meetings at district level. The MTE district study found that the district launch events create a strong image of the programme and help in engaging stakeholders and informing them about FFP activities and food fortification as an issue. However, they lack follow-up and there is weak networking with relevant stakeholders, which dilutes their influence. Furthermore, the programme has not been able to leverage the existing public sector initiatives and activities, which can be a more influential medium for creating awareness.

Public sector TA to develop, monitor, and enforce standards/legislation

FFP has provided extensive TA in the area of standard harmonisation, drafting of provincial legislation for mandatory fortification, and the amendment or preparation of rules and regulations. Through a consultative process in 2016, FFP effectively supported the revision of the national standards of edible oil/ghee fortification and wheat flour fortification by the National

[145] The FFP organised a national programme launch event in September 2016, followed by a Punjab province launch event in October 2017. FFP also supported World Food Day events organised by the Punjab Food Department in October 2016 and 2017.
[146] Of the 32 meetings included in the database available to the evaluation team 22 meetings were at provincial level, while 10 meetings were at national level.

Standards Committee of PQSCA.[147] In addition, FFP assisted the food regulatory bodies in Punjab, Sindh, Islamabad, and KP to adopt the revised standards in provincial regulations. FFP was able to align the edible oil/ghee standards adopted by the Punjab Food Authority with the national standards, after the Food Authority had introduced small deviations from the national standards. In 2018, FFP also started providing legal TA for the drafting of legislation on the mandatory fortification.[cxxvii]

FFP has strengthened sample testing infrastructure at public labs in Punjab and is providing support for the establishment of a public laboratory in Sindh, which is underway. Following public lab capacity gap analysis, FFP has provided TA in the procurement and provision of lab equipment for public labs in Punjab. In the course of 2018, HPLC equipment was installed in the laboratory of the Punjab Food Authority in Lahore and a spectrophotometer in the Punjab Food Department laboratory at Joharabad.[148] These labs are to serve as provincial-level reference labs for vitamin A testing in oil/ghee and iron testing in wheat flour samples, respectively. In early 2018 an assessment of capacity and equipment needs in Sindh was also completed but by December 2018 equipment had still not been procured.[149] Consultations with the Sindh Food Authority on establishing a public lab are underway. Stakeholder interviews reveal that the equipment provided to public labs is state-of-the-art; however, it requires much detailed training and capability building.

FFP has developed and operationalised a fortification MIS. However, its integration in government systems and alignment with their MIS has yet to be undertaken. During its first year of implementation, FFP developed FortIS after consultation with provincial and national stakeholders. FortIS is an MIS that can be used to store information and track/report the progress of mill, lab, and supplier registration, fortification and production, QC and monitoring, and advocacy activities.[cxxviii] FortIS became functional in FFP's second implementation year, although several of the data functionalities were not yet operational or available for use at the time of the MTE.[150] FortIS is hosted on an independent, third-party server but FFP has indicated that the system can be shifted to government-owned servers after the programme concludes. However, interviews indicate that there does not appear to be a meaningful awareness and ownership of FortIS within government as it has not been properly socialised among government counterparts. FFP expects the provincial governments to take on the system's operating cost before the end of the programme, which will require the government to develop more ownership of the system.[cxxix] While FFP reported that initial discussions have been held to hand over the system to government, it has yet to be decided how this will be operationalised. One complicating factor is that the producers are highly sensitive to the sharing of mill-level data, which is likely to make handover of reliable data challenging. Furthermore, there is fragmentation and potential duplication in the management of information about food fortification. GAIN Pakistan is supporting the development of a fortification MIS in collaboration with NFA, and food fortification is monitored separately by the SUN Secretariat at the national level, and for the MSNS in Punjab.

Support for effective enforcement regime, especially for wheat flour, is hindered by a complex political economy environment. According to FFP's workplan, another area of public sector TA is supporting provincial governments in the enforcement of food fortification. While FFP has engaged provincial authorities to ensure fortification compliance by oil mills somewhat satisfactorily, the efforts to ensure compliance by wheat flour mills through the Punjab Food Department is largely ineffective, due to the lack of a directly legislated mandate, as the indirect mandate through food regulations is considered a weaker substitute. It is not clear how the

[147] The addition of vitamin D was included in the fortification of edible oil/ghee. In the case of wheat flour fortification, the level of iron and folic acid was harmonised with WHO guidelines. Furthermore, the addition of zinc and vitamin B12 was included.
[148] Supporting equipment, glassware, and reagents were also provided.
[149] In Y3Q2 FFP started negotiations with AECOM on the procurement of additional lab equipment.
[150] For example, QC data are only available to a limited extent, i.e. data on third-party lab tests and use of RTKs are not available. Data on advocacy activities are also not available. Supplier information is also not accessible.

programme is supporting the enforcement of sanctions for non-compliance, which requires a strategy to muster necessary political support. This requires political and people management skills, over and above any technical competencies, to create a consensus around a functioning legal framework that would enable effective enforcement of wheat flour fortification. The environment, however, is very challenging as, even after fresh legislation is enacted, any effective enforcement will require managing a complex political economy where government will be locked in a seemingly conflictual relationship with the wheat flour industry: the government would simultaneously want to subject the industry to compulsory food fortification but at the same time not interrupt regular wheat flour supply through potential industrial action. Effective monitoring by the government will also require clarity on which of the government entities is responsible for enforcing this. The dominant view among the stakeholders is that PFAs would be a reasonably effective enforcement agency. However, as mentioned, the mills have the collective power to resist enforcement of the wheat flour fortification. This is complicated by the government's policy of ensuring an uninterrupted supply of wheat flour to consumers through the sale of government-procured wheat stock to flour mills, though this leverage could potentially be used to secure better compliance. Therefore, FFP's actions of effective fortification enforcement will need to adapt to this complex political economy as the government is unlikely to engage in activities that may risk disrupting the supply of wheat flour – and this may well lead to the programme missing the timelines and targets.

Training on fortification and QA/QC processes

FFP has provided training to three categories of public sector staff: national and provincial regulatory staff, field monitoring staff at provincial and district level, and lab personnel. According to FFP progress reports, FFP started training master trainers from the national and Punjabi governments on edible oil/ghee fortification and QA/QC in February 2017—in advance of the start of oil/ghee fortification at the mills—followed by step-down training of field monitoring staff from the first three production districts during mid-2017.[151] As district roll-out expanded, field monitoring staff of more districts in Punjab were trained, as well as staff from the Sindh Food Authority, KP Food Safety and Halal Authority, and PSQCA. A master training on wheat flour fortification and QA/QC took place in August 2017 in Punjab, when the first microfeeder was installed. The training of local food monitors from the Punjab Food Department followed with some delay, in February 2018.[152] Monitoring staff of the Punjab Food Department from another five districts were trained during the first half of FFP's third implementation year. In addition to the training of regulatory and monitoring staff, FFP trained staff of the laboratories of the Punjab Food Authority and Food Department, where the HPLC and spectrophotometer equipment were installed. The master trainings of the public sector staff were implemented in collaboration with the NFA/PFAs, which was effective in ensuring the full participation of federal and provincial government departments, regulatory bodies, PFMA, and fortification partners.[cxxx]

There is a need for follow-up capacity support, particularly if there is a gap between the timing of the training and fortification monitoring. The evaluation team does not have access to the numbers of trained staff, nor their district, to verify the alignment between training and production roll-out. It is nonetheless important that training takes place around the time that local monitoring staff start monitoring fortified production. District government staff interviewed as part of the MTE acknowledged that the training was useful, but some pointed to the need for continuous refreshers and first-hand experience, as the skill risks falling away when the QC tasks are not performed in the field. Interviewed provincial government actors also expressed that the amount of training provided to the laboratory staff is not sufficient. The evaluation team did not find any evidence of any follow-up to ensure the sustainability of capabilities.

[151] For edible oil/ghee the trained field monitoring staff were Food Safety Officers of the Punjab Food Authority.
[152] FFP trained Food Grain Inspectors and Food Controllers of the Food Department.

Annex G Value chain analysis for wheat flour

The wheat flour value chain is mapped out in Figure 21 below. The different actors involved in the production and distribution of wheat flour in Pakistan are described in terms of the roles they play and their interrelationships in three key stages, namely:

- the production and post-harvest handling of wheat;
- the processing of wheat into flour; and
- the marketing and retailing of wheat flour.

Production and post-harvest handling of wheat

It is estimated that around **80% of farmers in Pakistan grow wheat,** on a total of about 9 million hectares. This is close to 40% of the country's total cultivated land. Wheat is Pakistan's largest food crop and is grown in both rain-fed and irrigated farms throughout the country; it is planted after other crops, such as cotton, rice, sugarcane, and sorghum. Punjab and Sindh account for around nine-tenths of the total harvest (Ansari *et al*., 2018). The crop is grown by small (0.5 to 5.0 hectares) and medium-scale (5 to 10 hectares) farmers, whose livelihoods depend on it.

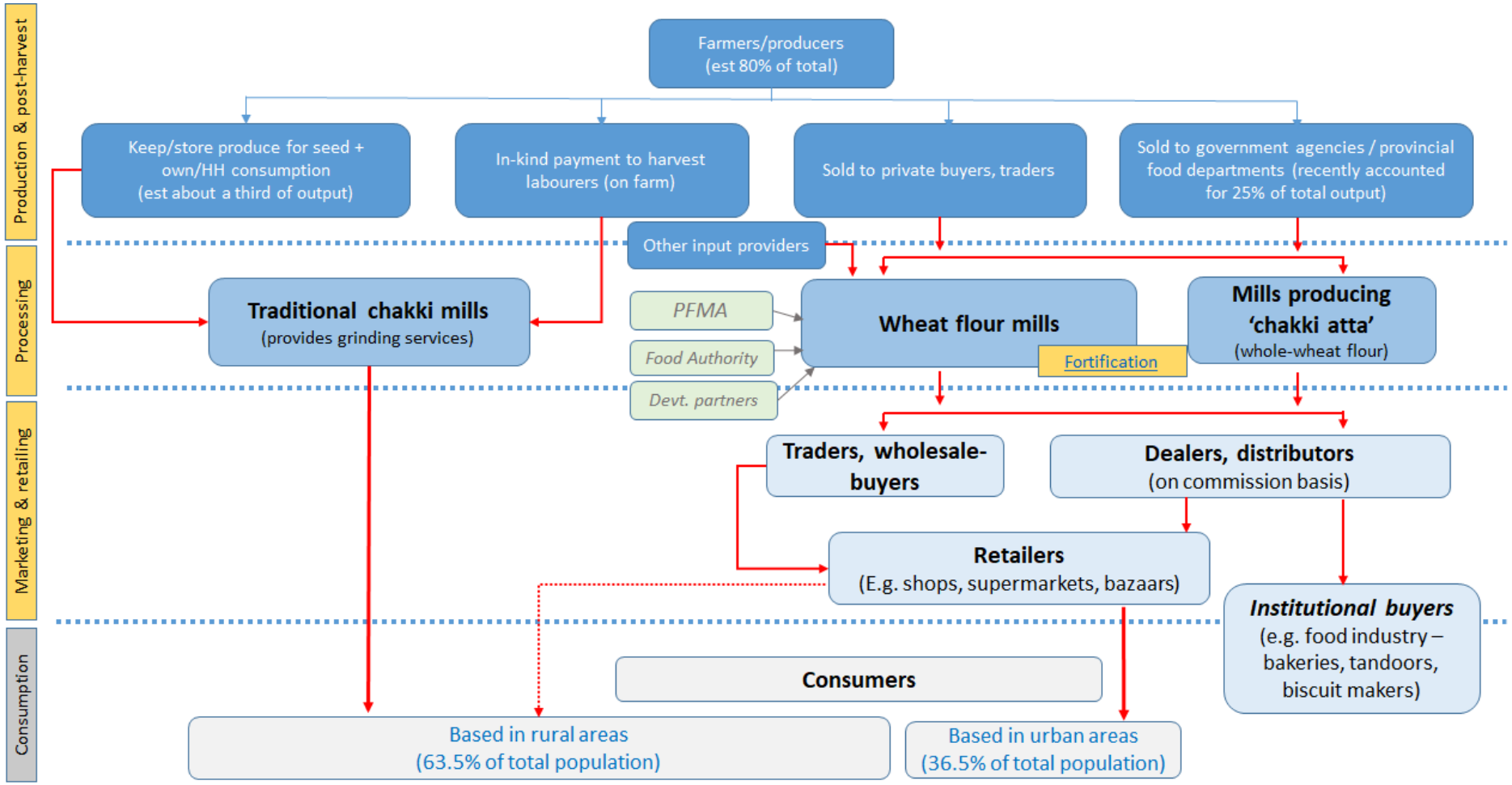
In recent years, Pakistan's wheat production has reached between 22 and 26 million metric tons per year, indicating a bumper harvest. According to the State Bank of Pakistan (Annual Report 2017–18), wheat production reached 25.5 million metric tons in FY 2018.[153] While wheat production was down by 4.4% from the previous year (FY 2017), the volume produced was nonetheless more than sufficient to meet domestic demand.

As depicted in Figure 21 below, **wheat harvests are used by, and/or distributed to, four key actors**:

- **Farmers** in Pakistan retain about one-third of their wheat production for seed and household food consumption.
- Some of the wheat produced is also used as in-kind payments to **farm labourers** (who then use it mainly for household consumption).
- **Private traders and mills** directly buy wheat from farmers. This is referred to as the 'open market' for wheat in the sections below. There are no robust estimates of the volume of wheat purchased and traded in the open market; estimates point to anywhere between 15 and 25% of the total harvest being purchased and traded in the open market.
- **The government (i.e. Provincial Food Authorities)** acts as a buyer, and maintains stocks of wheat, which it then later sells to the market (i.e. mainly domestic flour mills).[154,155] The government is a significant player in the sector, with actual volumes of government procurement reaching 25–30% of total production. In FY 2018, out of 25.2 million metric tons of wheat harvested, the government procured close to 6 million metric tons, bringing wheat stocks to around 10.7 million metric tons (given surplus from the previous year). Following procurement of wheat by the government between April and May (when harvests take place), the government stores the wheat in its own or rented private go downs (horizontal or flat-shed storage facilities) or in open-air *ganjis* (under tarpaulins or other covers). The government usually releases the wheat to flour mills from October until the next harvest in April/May.

[153] This is consistent with the estimates provided by PFMA, which note that around 26 million metric tons of wheat were harvested in the last year.
[154] This role of the government as buyer of wheat and in maintaining wheat stocks is driven by both food security and market intervention objectives. The system aims to protect farmers from price fluctuations and ensure a minimum return to farmers and encourage wheat production. The Government of Pakistan, through the provincial food departments and the federal Pakistan Agricultural Storage and Services Corporation (PASSCO), procures wheat from farmers at the 'support price' and then releases wheat for sale to flour mills at the government's fixed issue price.
[155] The government also exports wheat from time to time, more so in the last 10 years – mainly to neighbouring countries, such as Afghanistan – when government-held stocks are deemed to be above optimal reserve levels.

Figure 21 Wheat flour value chain in Pakistan



Processing of wheat into flour

The processing of wheat into flour in Pakistan is performed by three types of 'mills':

- **Traditional '*chakki* mills'**: These are typically small-scale, village-based operators that provide grinding services to individuals or households who wish to convert their wheat grains into flour (often using a traditional grinding apparatus (stone)). The flour that is produced by traditional *chakki* mills is whole-wheat. In some cases, traditional *chakki* mills may also hold wheat in stock themselves and retail out flour to customers. As Figure 21 above shows, farmers and farm labourers, who retain wheat for household consumption, will typically turn to nearby traditional *chakki* mills for grinding of their wheat. Given the informal nature of traditional *chakki* mills, it is difficult to determine their exact number: estimates by various informants (e.g. the PFMA, GAIN) point to anywhere between 50,000 and as much as 70,000 individual operators throughout the country. Traditional *chakki* mills are predominant in wheat-growing rural areas of Punjab and Sindh.
- **Industrial flour mills**: These are (typically) registered businesses that procure grain from the open market, as well as from government stocks at subsidised prices. Some mills—e.g. larger operators (those with monthly production capacity of more than 1,000 MT)—will have storage facilities for grain that they procure at different times of the year. Nearly all the grain procured by the government eventually ends up being processed by licensed flour mills (Ansari *et al*., 2018). Unlike traditional *chakki* mills, industrial flour mills use more modern equipment that not only grinds the wheat grain, but also separates the different component parts of the wheat grain, thereby allowing these mills to produce different varieties of flour, namely: Atta, Maida/Fine, and Bran.[156] According to PFMA, there are a total of 1,400 functional flour mills across the country.
- **Mills that produce a specific variety of flour, i.e. '*chakki-atta*' or whole-wheat flour**: These mills are similar to industrial flour mills in terms of typically being formally registered business entities that produce flour at a greater scale (compared to traditional *chakki* mills). They also tend to use more sophisticated or modern equipment (compared to traditional *chakki* mills) and are situated in urban areas. However, unlike industrial flour mills, these mills are specialised, in that they produce specific types of flour, e.g. whole-wheat flour (and in some cases, other types, such as corn flour, barley flour, etc.). These products cater to the higher end of the market, mostly urban-based consumers who are willing to pay a premium for whole-wheat flour given health considerations.

The first step in the process of producing wheat flour is the procurement of wheat grain – from the open market and/or from government. In most cases, mills purchase from both of these sources and use them at different points during the year. Some mills can buy wheat directly from farmers, but most of the time the purchase is made through private sector buyers or agents (aggregators) who trade wheat grain. Starting in September until March, the supply of wheat grain in the open market drops and the government releases the wheat (it has held/stored) to flour mills.

There is a difference in price between these two sources: in Karachi, for example, at the time of the evaluation interviews in February 2019,100 kg of wheat was traded at PKR 3,125 by the government, vs. PKR 3,300 from open market sources. The lower price of government-held wheat may seem attractive to mills, but among the mills interviewed in this study, there was a stronger preference for wheat purchased from the private sector (open market). Many of them pointed out that the quality of grain from government-held stock tends to be poorer as it contains a lot of

[156] Atta flour is typically retailed to individual consumers (households use it to prepare rotti, chapatti). Maida/Fine flour is targeted at the food industry—e.g. bakeries, tandoors, biscuit makers—who often require the finer variety. Bran, on the other hand, is sold as animal feed. In addition to these three varieties, some industrial flour mills also produce 'Sooji' (semolina).

impurities and the moisture content of the grain is lower. Moreover, some mills (notably the small to medium operators the evaluation team interviewed) expressed a preference for the terms they are able to obtain when transacting with private sector buyers and traders: in particular, mills are able to purchase wheat from private sector sources on credit, whereas they need to pay in advance when buying from the government. Even if the price of wheat from government-held stock is lower, mills also have to incur the additional costs of hauling their purchase from government storage facilities.

The cost of the wheat grain represents the most significant cost component of wheat flour. The industrial flour mills (interviewed in this study) reported that this ranges from 80% to as much as 90% of the total cost of producing wheat flour. There are important factors to consider when looking at the price of wheat in Pakistan.

- **The government sets a price floor.** As noted above, the government's role in the procurement of wheat influences market prices, creating an effective price floor in the domestic wheat market. The Government of Pakistan, through the provincial food departments and PASSCO, procures wheat from farmers at the support price and then releases wheat for sale to flour mills at the government's fixed issue price.
- **Mills are discouraged from procuring wheat from other cheaper sources**, e.g. by importing wheat. It is important to note that the domestic price of wheat is significantly higher: according to PFMA, the price of Pakistan's wheat can range between $310 and $320 per metric ton, compared to the average international price of $220 per metric ton.[157] To close the gap between Pakistan's domestic wheat prices and international prices, the government imposes regulatory duties and tariffs on the importation of wheat, which can range from 20% to 40%. This means mills have no other recourse but to procure wheat domestically.[158]

[157] Over the last year (FY 2018), the international price of wheat peaked at US$237 per metric ton, in August 2018. (See FAO's Food Pricing and Monitoring Analysis: www.fao.org/giews/food-prices/international-prices/detail/en/c/1180325/.)
[158] Multiple factors drive the significantly higher price of wheat in Pakistan; other studies discuss these in greater detail. In summary, the disparity between local and international prices can be explained in terms of the higher levels of productivity and more efficient market systems surrounding the production of wheat in other countries that are able to trade wheat in the international market. This is driven by a range of factors, such as availability of irrigation, level of mechanisation, investments in research and development (e.g. on seeds and farming practices), etc. – which can substantially reduce per unit costs and increase supply. Moreover, studies also point to the structure of ownership of local wheat-growing farms in Pakistan and their relationship with policymakers (or, indeed, how some of these owners may be policymakers themselves), which creates a situation where vested interests influence public policy decisions.

Box 9 The role of PFMA

PFMA plays an important role in the wheat flour sector, by negotiating wheat prices with provincial governments, on behalf of industrial flour mills. As the representative trade body of the flour milling industry, the association's aim is to champion and advocate for the interests of flour mills, and in particular its members. The association also engages with the government on the setting of prices for wheat flour, which, once agreed, are communicated to and coordinated with individual flour mills. The set price of wheat flour does not differentiate whether flour is produced using government-supplied grain or grain acquired from the open market. This price is set taking into account processing costs and other margins, which are negotiated between the government and the mills.

Following the procurement of wheat grain, producing wheat flour entails a process that involves the washing, cleaning, drying, and grinding of the grain. For industrial flour mills, the production process includes a step that separates the three main components of the wheat grain: bran (which is the skin or husk), the wheat germ, and the starchy endosperm. Machines are used to open the individual grains, as well as to separate, scrape, and grind each component. This process of separating the different components of the wheat grain allows mills to produce different varieties of flour, such as Atta, Maida/Fine, and Bran.

The ability to produce these different varieties of flour is central to the business model of industrial flour mills.

- Even if most of the flour that a mill produces is Atta (which is retailed to individual consumers), a proportion of its production will still include Maida/Fine (which mills sell to the food industry, such as bakeries, tandoors, and biscuit makers). The extent to which a mill can produce Maida/Fine flour depends on the kind of processing machines it has. For example, some larger mills in Pakistan (including those that were interviewed in this study) have machines that allow higher extraction rates, i.e. up to 70% of the grain can be used to produce Maida/Fine, compared to only 25–30% in the case of mills that use less sophisticated machinery.
- There are advantages to producing and trading Maida/Fine flour vs. Atta:
    - Atta is subject to government price regulation, whereas 'fine' qualities with low bran content, such as Maida flour, are not. The Food Department (under the provincial government) sets a price ceiling for Atta, which in Lahore was PKR 738 per 20 kg bag in February 2019.
    - This price regulation, along with the degree of competition in the market, influences the price that mills are able to charge. Maida/Fine flour fetches a very different price—significantly higher—compared to Atta. For example, mills in Lahore reported that a 20 kg bag of Atta flour is sold by mills at PKR 710 (as at February 2019), whereas Maida/Fine flour would sell for around PKR 800. Considering the cost of production, the estimated margin (per unit) for Atta—detailed in Table 11—therefore appears very narrow (between PKR 5 and PKR 7 per unit, given prevailing wholesale prices).
- This cost and pricing structure have implications for how and what types of mills can remain competitive and profitable (or indeed survive).
    - It is a game of volumes: the low margins (per unit) that mills are able to generate from producing and trading Atta only make business sense if mills are able to produce and trade high volumes of the product. Smaller operators struggle, given their low production capacity. If the cost of production rises even slightly (e.g. if the price of wheat grain, which can represent about 90% of the total cost of production, rises) and mills are unable to increase production, and indeed sales, of Atta, then mills face the risk of reduced

profitability or indeed the risk of incurring losses (which some mills reported experiencing at certain times of the year).

- Mills can offset such losses (from producing and trading Atta) by producing and trading Maida/Fine flour. A higher proportion of the mill's production going to Maida/Fine flour would therefore be very attractive to mills. However, the ability to increase production of Maida/Fine flour requires better machinery/equipment, which also favours larger (better capitalised) mills.

Table 11 Estimated margin for every 20 kg bag of Atta

Cost components	Cost/value (per 20 kg bag), PKR	% of overall cost
Cost of raw material (wheat grain)	650.00	92%
Cost of utilities and overheads (including manpower) [a]	48.00-50.00	7%
Cost of packaging [b]	5.00	1%
Estimated total cost (per bag) [c]	**705.00**	100%
Wholesale price (by mill) [d]	710.00	
Estimated margin per unit	**5.00-7.00**	

[a] This per unit estimate assumes that: (i) 100% of the mill's production goes to Atta; (ii) the mill incurs utilities and other overhead costs of PKR 1.5 million per month (which is at the lower end of estimates provided by mills that were interviewed in this study); and (iii) the mill produces and sells (only) 30,000 bags (20 kg each) of Atta per month (i.e. the mill can be classified as small to medium-sized).

[b] This represents the per unit cost of food-grade packaging used by mills. Some mills reported that the cost of packaging is PKR 7 per bag.

[c] This does not include the cost of depreciation of machinery/equipment and other assets.

[d] On top of the wholesale price, PKR 10–15 is added, which goes to distributors. The product would then sell (at retail) for PKR 725 per 20 kg bag.

Source: Own calculations based on estimates provided by mills interviewed in Lahore (as at February 2019)

It is also important to note that industrial flour mills are assigned quotas according to their processing capacities. Their supply of government-procured grain is determined by this quota. Mills are also required to produce a requisite quantity of Atta against the supply of grain. The allocation of the wheat grain quota, and when wheat grain stock is released by the government (according to quotas allocated to mills), not only influences the price of wheat traded by private sector actors, but also in part explains patterns in the volume of production by industrial flour mills. When the wheat quota is released to mills, there is often a surge in production in the following month.

Box 10 Fortifying wheat flour

The fortification of wheat flour involves adding essential vitamins and minerals – aimed at addressing the micronutrient deficiencies of individuals who consume wheat flour. In Pakistan, fortification involves adding the nutrients folic acid, iron, vitamin B12 and zinc to wheat flour – in particular, to Atta, Maida and Fine flour varieties. The process therefore requires two inputs (in addition to the standard wheat flour production process): the micronutrient premix and a microfeeder (equipment).

Past and current fortification interventions in Pakistan work with industrial flour mills, given that these value chain actors in the wheat flour market are regarded as those that produce what many international organisations refer to as '*fortifiable wheat flour*'. The premise behind this approach is that a large proportion of the flour consumed in the country is milled industrially, and there is scope to leverage existing public–private partnership between the government and licensed mills.

Fortifying wheat flour produced via traditional *chakki* mills

As virtually all the wheat grain that is retained (by farmers) for household consumption, including that which is earned by farm labourers as in-kind payment, goes through local traditional *chakki* mills, some stakeholders in the wheat sector have contemplated whether fortification efforts should target traditional *chakki* mills (rather than, or alongside, industrial flour mills). This is especially driven by how development programmes that support fortification efforts – in Pakistan and elsewhere – are geared towards achieving positive changes in the lives of those who are poor and the majority of the population who are based in rural areas of the country. In Pakistan, most of the wheat flour that is consumed by the majority of the population is produced not industrially but via traditional *chakki* mills, which are especially predominant in wheat-growing rural areas in Punjab and Sindh. Not only do traditional *chakki* mills provide grinding services for individuals and households who wish to convert their wheat grain stock into flour, some of these *chakki* mills also buy grain from the market, which they grind and sell to individual consumers (typically in loose form).

In Pakistan, some attempts have been made to encourage fortification via traditional *chakki* mills. However, these faced challenges associated with working with a large number of individual mills, most of which are very small in scale, and are informal / unregistered entities. A significant amount of work is needed prior to working with these organisations – not least to develop ways of aggregating or organising them.

Some similar attempts have been made in other countries, such as in Nepal – e.g. a programme funded by the Asian Development Bank on 'small-mill fortification'. The programme's premise was that commercial roller mills process only about 20% of Nepal's wheat flour consumption, while 10,000 small water mills and electric *chakki* mills serve the poor, those based in rural areas, and the most vulnerable populations. As such, small-mill fortification of wheat (and maize and millet) flour presented the 'best hope' for significant population-wide reductions in iron and folic acid deficiency in Nepal. However, the programme faced a range of challenges, including the lack of appropriate technologies, and supply and QA systems – within the small mills themselves and the relevant institutions that the programme needed to work with. Even as the project offered the opportunity to accelerate pilot testing of new technology and innovative approaches to help develop small mills, the capacity constraints proved to be too difficult to overcome within the context of a programme aimed at encouraging flour fortification. The project experienced significant delays beyond the timeline set in the project implementation schedule due to what was described as a complex project design, and the project demonstrated a lack of ownership and poor management capacity of the implementing agencies. As such, the special administration mission (conducted in June 2012) concluded that the delays and challenges would be insurmountable even with the restructuring and extension of the project. The Asian Development Bank and the executing agency therefore agreed not to continue with the project.

The wheat flour production process culminates in packing flour ready for distribution in the market.

Marketing and retailing of wheat flour

Wheat flour is distributed by flour mills via the following four main channels:

- **Dealers or distributors**: These are either individual operators or business entities that provide trading services to flour mills. They are, however, distinguished from traders and wholesale-buyers in that they do not purchase the wheat flour stock of mills but receive a commission on the wheat flour they are able to sell. The majority of industrial flour mills interviewed in this study reported that this is the main channel through which they market wheat flour.
- **Traders and wholesale-buyers**: These are either individual operators or business entities that purchase wheat flour from mills and then sell these onward to other buyers.
- **Retailers (e.g. shops, supermarkets):** In some cases, flour mills have established direct relationships with retailers, who purchase directly from mills (i.e. without the involvement of dealers or traders). Some mills are also situated within close proximity to bazaars and other retail markets, which facilitates a more direct interaction between mills and local retailers.
- **Institutional buyers** (e.g. food industry – bakeries, tandoors, biscuit makers): Some flour mills—notably those that produce significant quantities of Maida/Fine flour—have established direct relationships with a range of food industry actors, such as bakeries.

The price of wheat flour (and, in particular, Atta) increases by about 2% when it is distributed via dealers and traders. For example, in Lahore, the retail price of wheat flour (Atta) would be between PKR 730 and 735 per 20 kg, which includes the mill's price of PKR 710, the PKR 10–15 commission or mark-up that goes to dealers and traders, and the remaining mark-up that accrues to the retailer. In some locations where retailers (e.g. in bazaars) are able to procure directly from mills, the retail price of wheat does not differ substantially from the price charged by retailers who procure through dealers and traders. In other words, a direct-buying arrangement between some retailers and mills does not always create advantages for the end-consumer – retailers end up absorbing additional margins.

The structure of the supply chain suggests that **most of the Atta produced by flour mills ends up catering to individual consumers in urban areas**. This is especially the case during those months in the year when rural-based consumers maintain stocks of wheat grain within the household and get their wheat flour by securing the (grinding) services of traditional *chakki* mills (as discussed above). It is not clear to what extent flour that is produced by industrial flour mills reaches rural-based consumers (who comprise about two-thirds of the population). PFMA explains, however, that as household stocks of wheat grain dwindle (around December each year), rural-based consumers turn to industrially produced flour, which is sold at outlets in rural areas.

Box 11 Consumption of wheat flour in Pakistan

Wheat is Pakistan's dietary staple. Wheat flour is a staple ingredient used in many baked food items, such as roti (chapatti), naan, and biscuits. Pakistan has a variety of traditional flat breads that different households tend (and prefer) to prepare themselves. Wheat flour currently contributes more than 70% of Pakistan's daily caloric intake, with per capita wheat consumption of around 124 kg per year, one of the highest in the world (AgroChart Market Review).

According to the Pakistan Household Integrated Economic Survey (2010–11), on average (across all household quintiles) around 15% of household consumption expenditure goes to wheat and wheat flour. Almost 23% and more than 19% of household consumption expenditure among Quintiles 1 and 2 (the poorest), respectively, goes to wheat and wheat flour – by far the largest proportions of spending for these two quintiles among all food items being purchased.

In urban areas and among more affluent households, consumer preference is shifting more and more towards whole grain, wholemeal, or whole-wheat flour. These consumers prefer what is referred to as 'chakki-atta', which is produced by some (specialised) mills.

How do different segments of consumers source the wheat flour they use for household consumption? What role does flour from industrial flour mills play? The FACT 2017 survey revealed the following:

- 18.9% of households in Punjab and 33.2% in Sindh consume 'fortifiable wheat flour', or flour that comes from mills other than traditional *chakki* mills.
- 13% of those living in rural areas in Punjab consume flour from mills other than traditional *chakki* mills. A much higher proportion (32%) of those living in urban areas do so. In Sindh province, the difference is much more significant: 16.7% of those living in rural areas vs. 50.9% of those in urban areas consume flour from mills other than traditional *chakki* mills.
- If we consider the poverty status of households, a higher proportion (24.5%) of those classified as poor in Punjab purchase flour from mills other than traditional *chakki* mills, compared to only 17% of those classified as non-poor who do so. However, in Sindh province, a significantly higher proportion (40.8%) of those who are non-poor purchase flour from mills other than traditional *chakki* mills, compared to only 23.4% of those classified as poor who do so.
- If we consider the socioeconomic status of households in Punjab there is little difference in the purchase of flour from roller mills by the different socioeconomic groupings: 18% of households with low socioeconomic status (SES) purchase roller mill flour, compared to 19% of high SES households who do so. However, in Sindh province, a significantly higher proportion (47.4%) of households with high SES purchase flour from mills other than traditional *chakki* mills, compared to only 16.6% of low SES households who reportedly do so.

Even given expectations that consumers may gradually shift towards more dairy, meat, and other higher-value food products in their diet (given rising incomes and the emergence of a stronger middle class), wheat flour is expected to retain its importance in the diet of households in Pakistan.

Annex H Value chain analysis for edible oil/ghee

H.1 Total demand and supply of edible oil in Pakistan

It is important to start this analysis with an assessment of total demand for edible oil in Pakistan, and the contribution to this from the 102 operational industrial mills, as estimates vary significantly and influence the assumptions underlying the targets set by the programme. The FFP logframe is based upon the assumption that total edible oil demand in Pakistan is 2.7 million metric tons per year and 75% of this, or 1.93 million metric tons, is fortifiable, i.e. produced by the 102 industrial mills. However, PVMA estimates that in 2018, 4.5 million metric tons of edible oil was consumed in Pakistan, all of which was produced by the association's members (the industrial mills), except for 176,000 metric tons of oil, which was imported already packaged and ready for retail sale.

It is also important to note that, officially, the oil/ghee fortification standard appears to apply to packaged oil, creating a potential loophole for non-fortification of any oil that is not sold within those packaging specifications; the revised provincial regulations do not specify whether mandatory fortification only applies to packaged oil.[159] Furthermore, the sale of loose oil has been banned in Punjab and sources have noted that there is an effort to do this in the other provinces as well.

The given figures below are based on best estimates, based on the evidence available. It should be noted that statistically representative data are not available to calculate all components, which would make it possible to estimate national supply. To cross-check our estimates, we have assessed them using both a top-down as well as a bottom-up approach.

Top-down assessment

PVMA has detailed data on all imports relating to the edible oil supply chain because the association approves all of these transactions. Given the high level of taxes and duties paid on imports by its members, the association has no obvious motive for exaggerating these import figures. The analysis provided below is based on these data and interviews with oil mills.

In 2018, Pakistan imported 3,077,611 of bulk oils. The value chain diagram (Figure 23) outlines the components of this trade: it is dominated by palm olein (55% by weight) and refined, bleached, and deodorised (RBD) (30% by weight), which are both semi-refined palm oil products. This semi-refined status results in refining losses to produce edible oil to around 1% to 1.5%. Imported soya bean oil comprises 4% of bulk oil imports. Only about 6% of imports are crude palm oil, which can have refining losses up to 6%. It is therefore reasonable to expect that 3.1 million metric tons of imported bulk oils generate at least 3 million metric tons of edible oil after refining losses.

In addition to bulk oil, Pakistan also imported 3,182,459 metric tons of oil seeds in 2018, from which 0.76 million metric tons of oil was extracted, and this complemented the 503,000 metric tons of oil produced from indigenous oil seeds. Almost one-third of Pakistan's edible oil is produced from oil seeds and two-thirds from bulk oil.

Excluding the 175,876 metric tons of imported cooking oil in 2018 (packaged and ready for retail sale), this indicates that PVMA members processed 4.38 million metric tons of oil from the 4.55 million metric tons of oil inputs in 2018. Mills reported refining losses of 1% to 3.5%, depending upon the mix of bulk oils to seed oils (or 'soft' oils) used, so, even assuming average refining losses of 3%, **this implies production of at least 4.25 million metric tons of edible oil produced from the 102 operational mills in 2018**.

[159] For example, the 2017 Punjab Pure Food Regulations state that it is mandatory for all vegetable fats and oils, including margarines and shortenings, and cooking oils/blends, used for edible purposes to be fortified.

Bottom-up assessment

An alternative approach to estimating edible oil production is to estimate the total demand for edible oil based on its components. The below estimates are based on the evaluation team's own analysis of average consumption by different main consumer categories, representatives of which were interviewed as part of the MTE, and documents with average consumptions that were consulted. In addition, we consulted with experts from GAIN, FFP, and PVMA to discuss the estimates – based on which, estimates were adjusted. While the data are not based on an extensive demand-side survey, and there is not always overt agreement on estimate details, we think they provide credible crude estimates as they add up to the same estimates as are given by the top-down assessment.

Demand in the household: The FFP benefit incident analysis of September 2018 is based upon a large-scale survey undertaken in 2017 (the FACT survey) and the RDS. This revealed an average consumption of 5.8 kg of edible oil per household per month (4.4 kg ghee and 1.8 litres of edible oil—weighing about 1.4 kg—on average across all areas and all income groups), or 70 kg per household per year. The Pakistan 2017 Census indicated 32.2 million households, which suggests total consumption at the household level (including packaged and 'loose' oil) of about 2.25 million metric tons of edible oil per year in 2017. Applying a 3.5% annual rate of growth, this would approximate to 2.3 million metric tons in 2018, or 54% of total edible oil demand.

Hotels, restaurants, and canteens: There is a major source of edible oil demand in Pakistan outside the home, the largest components being Pakora and Samosa and fries stalls (370,000 MT); road-side hotels and restaurants (225,000 MT); and small Dhaba and tea shops with paratha (220,000 MT). Based upon interviews with experts from the Horeca and oil/ghee industry, we estimate that this sector used at least 0.9 million metric tons of edible oil in 2018, or 21% of total demand.

Industrial buyers are a major user of edible oil, with biscuit factories (112,000 metric tons), confectionary factories (105,000 metric tons), and other types of bakeries using oil, ghee, margarine, and shortening (543,000 metric tons). Demand from chips, Nimko, and other savoury snacks is 60,000 metric tons. Paint manufacturers are estimated to consume a maximum of 40,000 metric tons of oil. We estimate the industrial sector consumed 0.86 million metric tons of oil in 2018, or 20% of total demand.

Exports to Afghanistan: This is a difficult activity to estimate because production is generally from refineries in relatively unregulated KP province and across a porous border into a country with limited rule of law. There is also a direct financial incentive for millers to inflate the scale of exports, because this allows the refunding of duties and taxes paid to import inputs into Pakistan. However, the industry is regulated by granting quotas to six mills that produce for the Afghan market and PVMA estimates only 43,000 metric tons of exports. Examining time-series data in discussion with GAIN we have increased this estimate to 60,000 metric tons for 2018, just 1.4% of total demand.

Institutional demand comprises the army (100 g ration per solider per day), police, schools, and hospitals. We estimate total institutional demand to have been 0.1 million metric tons in 2018.

From this bottom-up analysis of the components of demand, we estimate that Pakistan used some 4.22 million metric tons of edible oil in 2018. This aligns closely with the top-down estimate of 4.25 million metric tons and **we have chosen a total demand estimate of fortifiable oil (total demand minus the paint industry) of 4.2 million metric tons per year for this analysis**.

Review of FFP logframe estimates and other data sources

The 2018 revised FFP logframe assumes that the national edible oil supply is 2.7 million metric tons, of which 1.93 million metric tons is expected to be produced by the 102 targeted commercial mills. This is a significant underestimate of a more realistic estimate of slightly over 4.2 million metric tons. During interviews, FFP recognised that this is likely to be an underestimate. FFP already raised its assumption from an estimated total 2.2 million metric tons national supply in its logframe from early 2018 to 2.7 million metric tons in its logframe revised in October 2018. Also, by late 2018, FortIS was reporting monthly mill production figures (despite the fact that there are mills still to recruit, and some mills with MoUs were not yet reporting their production) that exceed the estimate of total oil demand in the logframe.

The 2018 logframe estimate of 2.7 million metric tons total supply is based on an industry assessment by Randall and Anjum (2014), which is repeated in Anjum's (2017) assessment of availability of edible oil and ghee brands in Pakistan and their compliance with fortification standards. An assessment of premix distribution in Pakistan by Ghauri (2017) similarly estimates total demand of edible oil/ghee at 2.68 million metric tons. The latter does not reference the source of its estimate, but the former is based on a bottom-up assessment of an average annual consumption of 15–16 kg per person.[160] Therefore, it is plausible that these estimates focus on household demand and do not include other demand components. The National Bank of Pakistan's Industry and Economic Bulletin 2018, on the other hand, estimates a national consumption of 4.0 million metric tons.

The FFP logframe also assumes that the targeted 102 operational commercial mills only contribute 75% of total edible oil demand. Our analysis of total demand above is based purely on the 102 operational industrial mills that are PVMA members (and that closely matches estimated national demand). This was corroborated by data collection at retail level, which found no evidence of any production being sold which did not originate from the industrial mills. It is possible that some oil produced by artisanal plants is being consumed in some rural areas, but the evaluation team found no evidence for this and believe it is unlikely that this could account for more than 5% of total edible oil demand. Therefore, the estimate of only 75% of national consumption being fortifiable because the remainder is produced by unregulated informal mills is likely an underestimate of what the PVMA members actually produce.

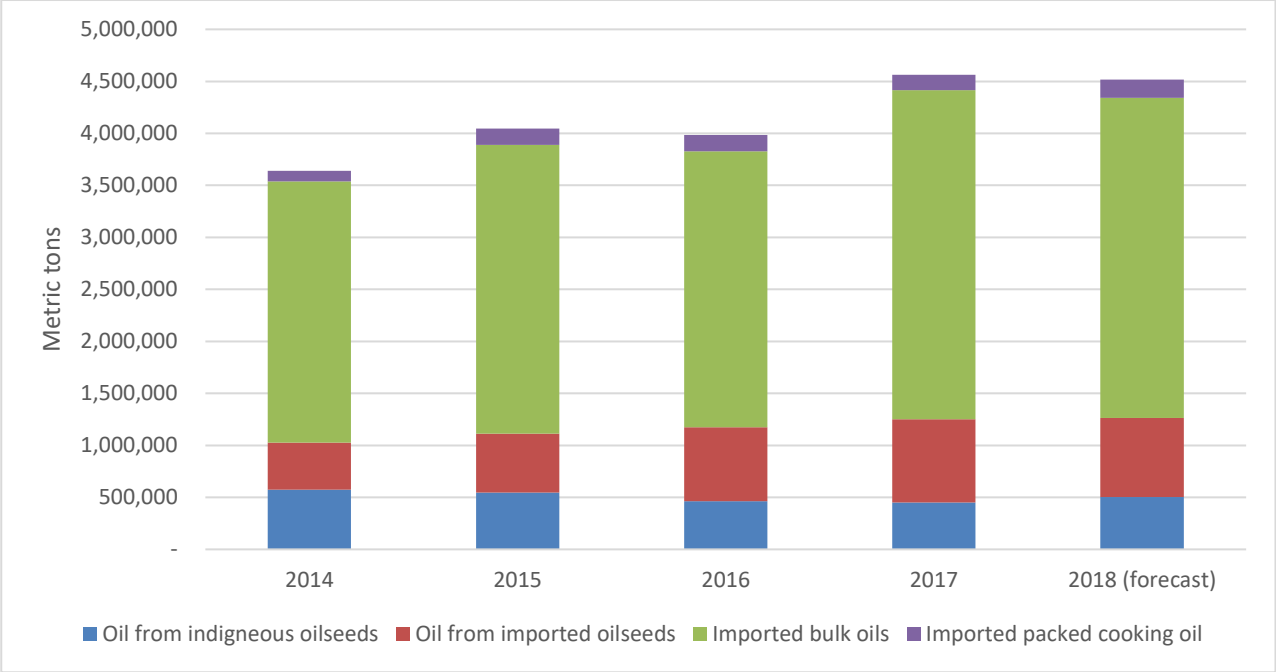
H.2 Analysis of the steps in the value chain

The striking feature of the edible oil/ghee value chain in Pakistan is how a food that is so universally consumed in Pakistan is so highly dependent upon imports of bulk oil (96% comprising different types of palm oil from Malaysia and Indonesia) and seeds (mainly soya bean from the US, Argentina, and Brazil) to feed the extraction plants based in Pakistan. Only 11% of total oil is generated from seeds grown in Pakistan.[161] Figure 22 illustrates recent trends in the inputs of edible oil.

[160] The source of this consumption average is not referenced.

[161] The consequences of this pattern of sourcing oils affects the affordability of edible oil for Pakistani consumers as the local currency has lost 40% of its purchasing power against the US dollar, the currency in which edible oil imports are priced. In addition, it contributes to Pakistan's current account deficit and therefore affects Pakistan's macro-economy.

Figure 22 Trends in inputs for edible oils/ghee in Pakistan (2014 to 2018)

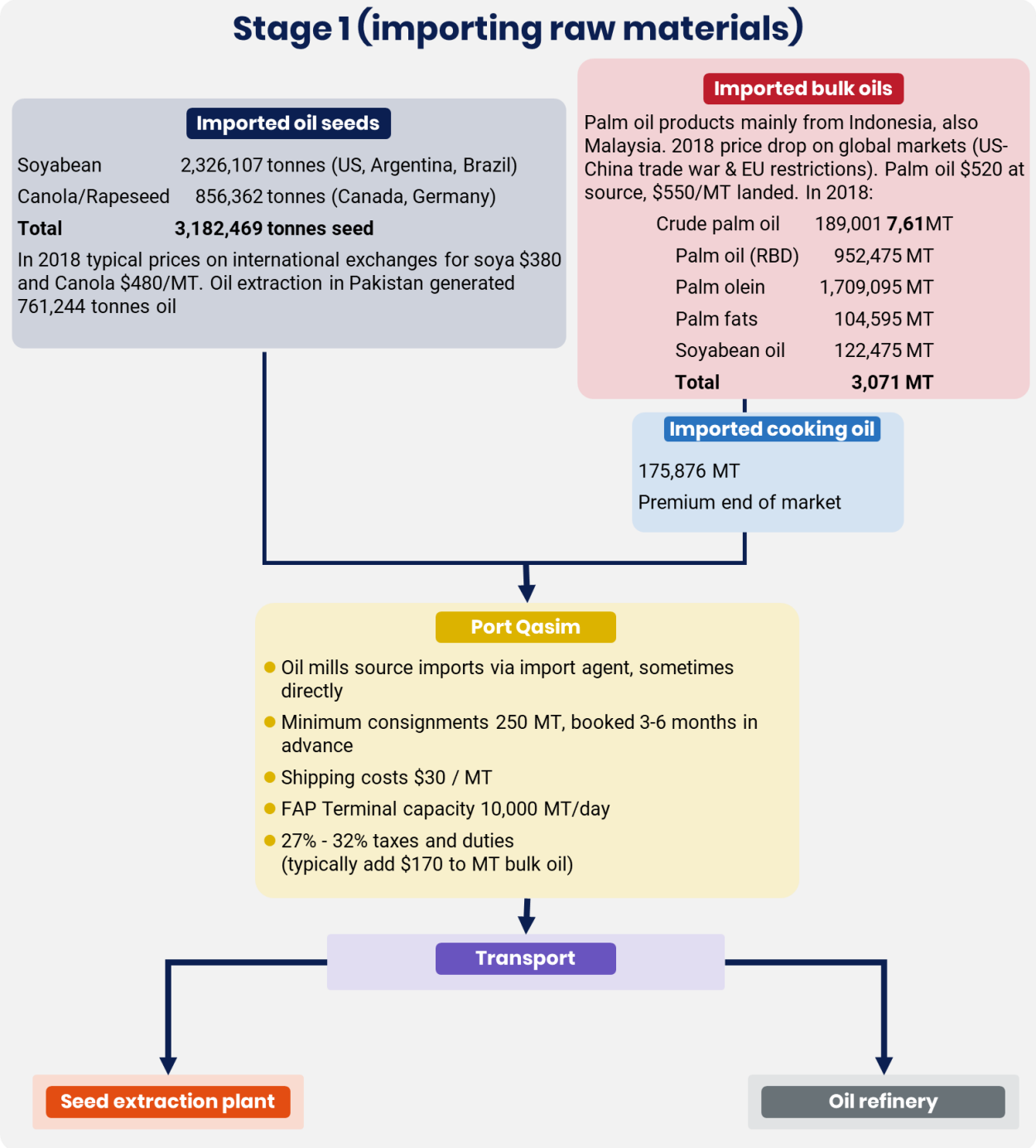


Source: PVMA (2019)

Figure 23 visualises the import and transport chain up to the factory gate, which can be the oil refinery or seed extraction plant. Bulk oil and seeds arrive in Pakistan at Port Qasim in Karachi. Some of the larger mills have direct relationships with exporters of bulk oil in Southeast Asia and the commodity exchanges in the Americas and book a consignment on ships to import the goods and can gain competitive advantage. There are some mills in Pakistan, which are joint ventures between Southeast Asian suppliers and Pakistani manufacturers. Smaller mills, which do not have the physical or cash-flow capacity to order large consignments in advance, work through brokers based in Pakistan and pay higher unit prices for their inputs as a result. The power of brokers to shape the market should not be underestimated. For instance, Pakistan currently has seed extraction capacity for 7 million metric tons of seed per year, but imports are less than half this level. Brokers interviewed by the evaluation team clearly have a powerful position in the oil/ghee market because they are the intermediary between global commodity markets and most of the mills – which are unable to directly organise imports of oil seeds and bulk oil. There is some evidence that the volume oil seed imports may be restricted by some brokers.

Oil source imports are subject to a series of import taxes and duties, which amount to about 30% of the landed cost of bulk oil. This increases the cost of 1 metric ton of palm oil, purchased for $520 from Indonesia and landed for ca. $550, to about $700. The bulk oil is then transported to the oil mill or refinery and the seeds are transported to the extraction plant.

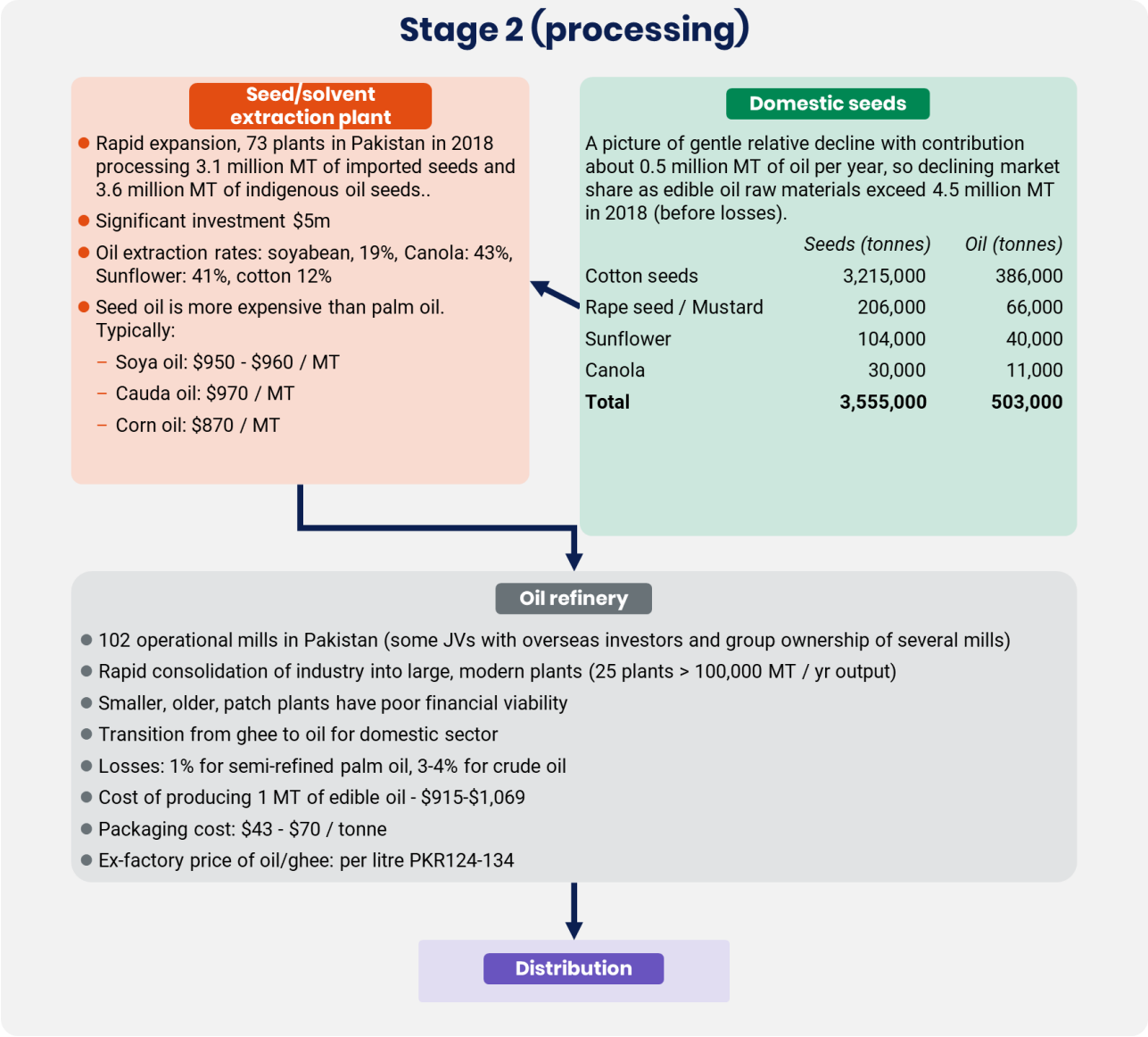
Figure 23 Oil/ghee value chain map: import of raw material



Source: Evaluation team's analysis and calculations based on: import data from PVMA (2019) Pakistan edible oil conference; price data from key informant interviews with brokers, oil mills, and support organisations (MT = metric tons)

Figure 24, below maps out the value chain at the production level of seed extraction and oil refineries.

Figure 24 Oil/ghee value chain map: production



Source: Evaluation team's analysis and calculations (2019) based on: oil refinery and solvent extraction plant numbers and details of feedstock from PVMA, 2019; and crude oil prices from broker and mill key informant interviews (MT = metric tons)

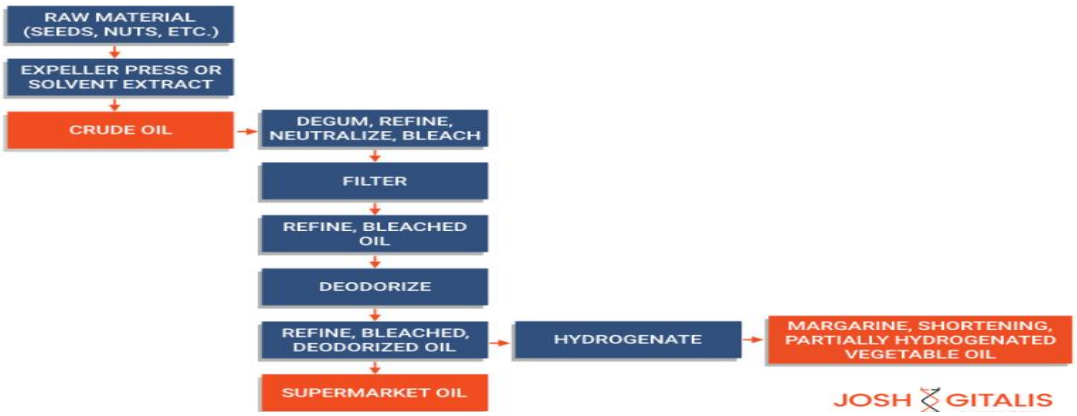
There are 74 members of the All Pakistan Solvent Extractors' Association, which extract oil from oil seeds in Pakistan (PVMA, 2019). Around 60% of the oil produced from seeds in Pakistan is from imported seeds and 40% from indigenous oil seed production, the latter being a declining source in relative terms (with an annual contribution to edible oils of 450,000 to 573,000 metric tons over the past five years in a context of growing edible oil demand). The small indigenous oil seed contribution is overwhelmingly sourced from the cotton sub-sector, a by-product of Pakistan's textile sector. The reason that the local oilseed sector has been unable to respond to the buoyant demand from the edible oil sector is the price support for other parts of the agricultural sector in Punjab, priced recently by World Bank at $1.02 billion per year (World Bank 2019). This support bypasses the oilseed sector entirely, which makes oilseed cultivation by farmers commercially unattractive. Given concerns about the financial sustainability of the price support from government it may be reduced in the future, although it has generated its own complex political economy. If this occurs, it is possible that the relative attractiveness of the oilseed sector will increase.

The economics of seed extraction are interesting because the revenue gained from 10 kg of soya bean processed come from meal (assuming 7.3 kg meal, which is sold at PKR 65 per kg = PKR

474, or $3.43) and oil (20% by weight so 2 kg of oil sold at PKR 140/kg = PKR 280 or $2). So, 63% of the gross revenue from an extraction plant is not oil but the meal from the cake by-product of oil extraction, which provides feed for Pakistan's burgeoning poultry sector.

Seed extraction plants sell crude oil to the 102 operational oil refineries or mills in Pakistan – PVMA has 123 to 127 members, depending on the source, but, given the precarious financial position of many of the mills, particularly the smaller ones, on average at any one point in time only 102 mills are operational. There are only a handful of industrial mills that are not members of the association. Several of the extraction plants are owned by oil mills, an example of vertical integration. Some mills integrate even further upstream into agriculture production and downstream into poultry production and food retailing. The Dalda Agricultural Project is an example of one of Pakistan's premium oil mills that is seeking to vertically integrate beyond its extraction plant into the oilseed cultivation sector.[162]

Figure 25 The production process of vegetable oil and fats



Source: Josh Gitalis (www.joshgitalis.com)

The crude oil is processed into oil, ghee, margarine, and shortening. Margarine and shortening are mainly destined for industrial buyers in the bakery and food processing sector. For the domestic sector, Pakistan is rapidly making the transition from the dominance of ghee. In 2008 about 80% of edible oils were in the form of ghee. Today, ghee and oil comprise only just over half of edible oils (55% to 60%) and most interviewed mills anticipate cooking oil dominating the edible oil sub-sector in the near future, driven mainly by increasing affluence and health concerns. The only difference in the production of edible oil compared with ghee is in the feedstock (edible oils require more expensive oil seeds as inputs, rather than palm oil) and ghee is hydrogenated. Interviews with mills revealed a very low level of losses, about 1% for semi-refined palm oil and up to 3% for crude seed oil.

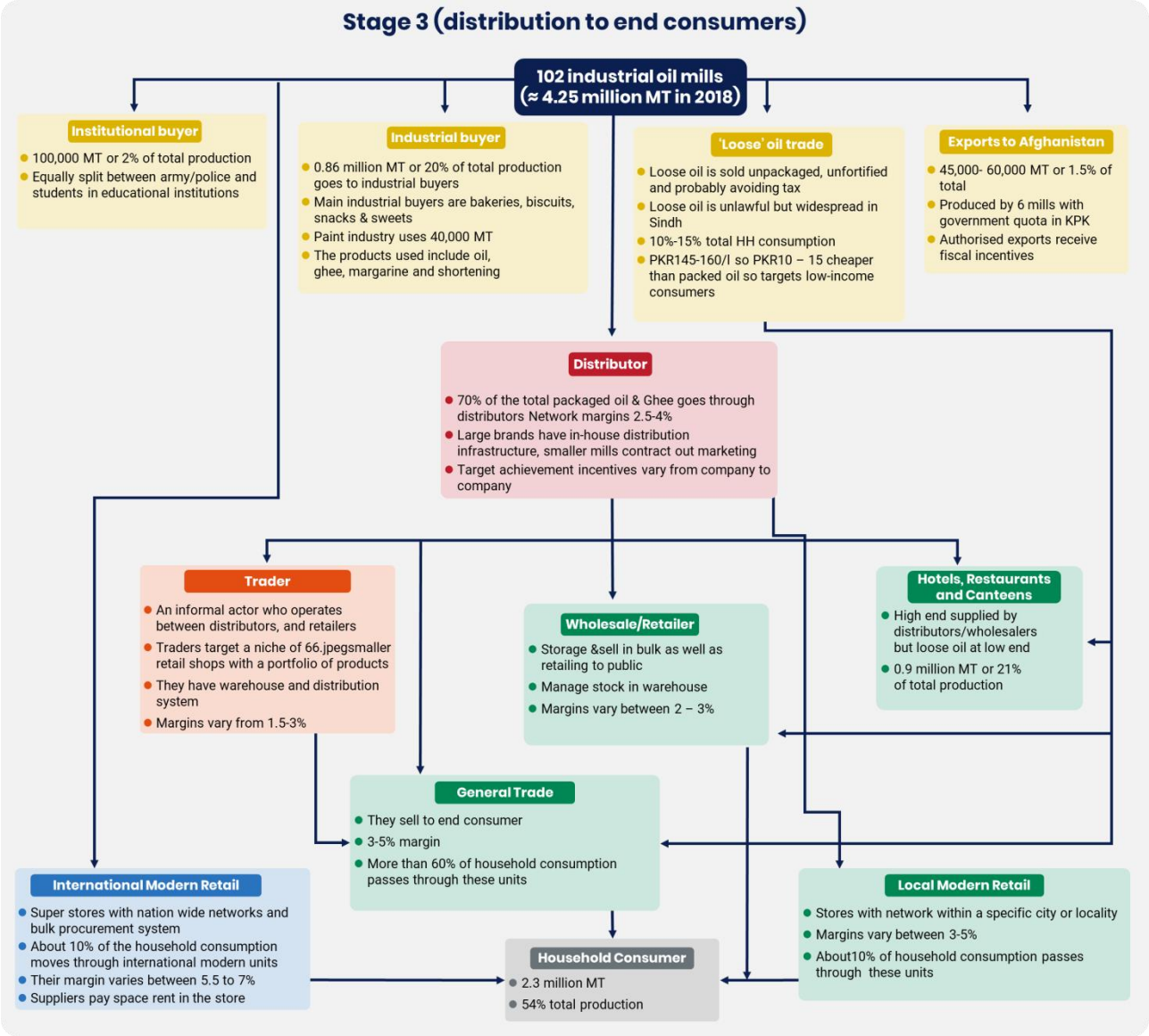
The oil refining process is a highly sophisticated industrial process. The equipment for a medium-sized refinery costs $6 million without land and building costs, and the industry is rapidly consolidating, with a small number (currently 25) of very large (100,000 metric tons + per year) plants working on a continuous basis, displacing the smaller, older, and less efficient batch-production plants. This rapid modernisation, capitalisation, and professionalisation of the edible oil sub-sector may help explain the virtual disappearance of artisanal production in Pakistan.

Figure 26 visually details the downstream distribution process of edible oil/ghee. The MTE team's analysis of the oil/ghee value chain downstream of the mills found that most of the output of packaged oil/ghee passes on to a distributor network, which transports the product to the different

[162] The main focus of the project is to increase sunflower yields from the current 360 kg per acre to 750 kg per acre. At this yield a farmer should be able to gain $300 gross revenue per acre (PKR 55 per kg of sunflower seeds), with costs of about $94 per acre (PKR 13,000 for 2 kg seeds, fertiliser, and labour) – generating a net return of $206 per acre.

regional retail markets around Pakistan. Several issues with important fortification implications emerge.

Figure 26 Oil/ghee value chain map: distribution



Source: Evaluation team's analysis and calculations (2019) based on key informant interviews with mills, downstream actors (distributors, wholesalers, retailers, industrial users, 'loose' oil depots), PVMA, and GAIN

Household demand is the largest user of edible oil in Pakistan. This, combined with the finding that there is almost ubiquitous usage of edible oil and very similar usage by people irrespective of geography and income, and that almost all the oil/ghee consumed is produced by a small number of large operational industrial oil mills, is evidence that FFP is using an effective food vehicle and has chosen the correct entry point to the edible oil value chain.

The issue of 'loose' oil is important in two respects:

- First, although the volume of this trade is reducing according to market stakeholder interviews, it remains a significant share of the market. Accurately estimating the size of this illicit trade is challenging, but the FACT survey in late 2017 found about 15% of the households interviewed reported purchasing oil/ghee that was not in its original packaging, which includes the 'loose' oil (although some households purchase a small quantity of edible oil decanted from a large package from the retailer). The use of unpackaged oil is focused on urban and rural Sindh (in

urban Sindh more households reported using unpackaged than packaged oil), although it remains an issue in Balochistan; it is almost completely absent in Punjab (only one household interviewed in Punjab reported purchasing oil not in its original package). Interviews with oil mills in Sindh—the main source of 'loose' oil—confirmed this: interviewees estimated that this type of oil distribution accounts for ca. 15% of the total distribution, and suggested that 'loose' oil is sold to the household sector and also to lower-end restaurants and industrial users. This finding is consistent with the hypothesis that effective regulation by Food Authorities can stop the distribution of 'loose' oil. Effective regulation by the Food Authority had effectively stopped the distribution of loose oil in Punjab by late 2017, but the same mills in Sindh are actively selling 'loose' oil destined for outlets in Sindh province.

- Second, the issue of 'loose' oil is important for a fortification project because it is plausible to assume that almost all 'loose' oil is unfortified (because when oil/ghee is unpackaged it is not possible to trace the source of production, and, because it serves the bottom of the pyramid, market price competition would preclude adding any unnecessary costs, like fortification), and it is plausible to assume that it targets the low-income population, who would benefit most from fortification. 'Loose' oil retails for PKR 10–15 less than packaged oil and interviews with retailers confirmed that the target market for this product is the less well-off. Therefore, it is possible that 'loose oil' is preventing the bottom one or two quintiles on the income distribution benefiting from fortification.

Figure 26 clearly illustrates the size of the non-household market—comprising hotels and restaurants, industrial buyers, institutional purchasers, and exports to Afghanistan—which, collectively, consume almost half (46%) of the 4.25 million MTs of edible oil/ghee produced in Pakistan, based on MTE interview data.

H.3 Competitiveness and profitability in the edible oil/ghee market

The oil/ghee sub-sector is highly competitive. Producing a ubiquitously consumed food item for which almost 90% of raw materials are imported in the context of a rapidly devaluating local currency in 2018 leads to customer affordability pressures, which are reflected back upon producers. Table 12 presents estimates of the cost structure and commercial performance of small, medium, and large oil mills in Pakistan. These figures are based upon information received from the key informant interviews and should be regarded as estimates only. Aspects of this analysis are corroborated by the National Bank of Pakistan sector review of FY 2016-17.[163] After the decline in palm oil prices on international markets in 2016, and before the devaluation of the rupee in early 2018, the aggregate profitability of the sector was on the rise and was estimated to be 3.5% before tax and 2.3% after tax in FY 2016-17. For the brand leaders in the sector, the larger mills producing for the premium end of the consumer market, margins grew by 12% from FY 2015 to FY 2016.

Table 12 Estimated cost structure and commercial performance of oil mills

Assumption	Large modern mill	Medium-sized mill	Small mill
Average annual output of edible oil (metric tons)	102,750	31.286	13,800
Cost of producing 1 metric ton of edible oil $	915	1,005	1,069
Cost of producing 1 litre of edible oil PKR	118	130	138
Retail price PKR per litre	**190**	**180**	**175**

[163] National Bank of Pakistan (2018) 'Industry and Economic Bulletin – 2018 Quarterly economic update followed by comparative sectoral research and ratings to rank industry performance, opportunities and risks with recommendations on strategic sectoral posturing'.

Margin for distributors, wholesalers, retailers – 12% PKR	22.8	21.6	21
Government sales tax @ 17% paid by mill PKR	32.3	30.6	29.75
Max. ex-factory price for oil received by mill PKR	134.9	127.8	124.25
Mill production margin %	**12%**	**-2%**	**-11%**

Source: Evaluation team's calculations (2019) based on key informant interviews

Larger mills have a seemingly small competitive incremental advantage compared with a smaller facility at each stage of the process, through better bargaining power and vertical integration in the areas of bulk oil and seed oil acquisition, transportation costs, processing costs, packaging costs, and higher retail prices for their higher quality branded and marketed products. These have a significant impact on the viability of the operation of mills of a different size. The estimates suggest that small mills are operating at a negative margin and medium-sized mills are barely breaking even. Hence, large commercial mills, by operating at volume and rigorously controlling costs, can make a reasonable return producing edible oils. However, smaller mills are squeezed between higher costs and lower revenue and cannot make a reasonable commercial return without adopting creative solutions to cutting costs.

Unlike the wheat sector, which has government intervention on prices throughout the chain, there is no government control of any prices at any point in the oil/ghee supply chain. Raw material prices are determined by global bulk oil and seed commodity exchange prices. Mills negotiate their ex-factory prices with distributors, wholesalers, retailers, or large non-household buyers. Large public sector institutions tend to procure oil/ghee through competitive tender.

The rapid concentration of the edible oil/ghee sector is a manifestation of this differential viability of mills of a different scale. Several interviewees noted that a decade ago, large mills produced only 20% of Pakistan's edible oil/ghee. Today the figure, according to the evaluation team's analysis based on interviews with mills and other market actors, is almost 70% and, in five years' time, many informants believe no small or medium mills will exist in Pakistan.

Oil/ghee is clearly a non-perishable product and one that is traded in large volumes. However, what is also notable at the downstream end of the oil/ghee value chain are the very tight distributor, wholesaler, and retail margins, particularly for the general traders who dominate the retail market in Pakistan.

The high competitiveness in the edible oil/ghee sector has the following consequences:

- The sale of 'loose' oil is a distribution channel for mills to avoid the relatively small costs of fortification ($2 per metric ton), and the more significant costs of packaging (typically PKR 6/kg for pouches of oil and PKR 10/kg for cans of oil) and government sales tax at 27%. This market is large-scale and unregulated, and the benefit for consumers is that they can purchase a litre of oil for PKR 160, a saving of PKR 10–15 on packaged and branded products. The benefit of 'loose' oil sales for mills is that, although retail prices are lower, the savings on tax, packaging, and fortification more than compensate for this.
- There are persistent rumours, but perhaps understandably no robust evidence, of mills adding cheaper materials to their edible oil and ghee. One mill owner reported a visit from someone offering these products.
- Small mills are being squeezed out of the market and may not continue to exist in the future.
- There are health issues in the edible oil sector that are possibly even more significant than fortification. For instance, the evaluation team found examples of edible oils in the retail market

where mills appear to have omitted steps in the production process which are essential for human health – in order to save costs.

Box 12 The potential dangers of consuming ghee in a market with weak regulation

Interviews with retail outlets found ghee products that are made from palm oil and palm olein, known as 'Karachi Quality', that appear to have no hydrogenation, bleaching, neutralisation, filtration, or blending with other soft oils. What appears to be happening is that mills are directly packaging the RBD or olein, without incurring most of the processing costs or the blending with the more expensive seed oil to achieve the correct melting point. This practice is known as 'RBD filling'. These products are likely to be seriously damaging for health, with excess fatty acids.

Annex I Additional FACT 2017 analysis

I.1 Introduction

In 2017, a cross-sectional survey, comprising a household assessment in three provinces (Balochistan, Punjab, and Sindh) and a market assessment in four provinces (Balochistan, Punjab, Sindh, and KP), was implemented using the FACT. The objective of the survey was to provide data on household coverage, consumption, and micronutrient contribution of fortifiable and fortified foods (i.e. wheat flour, oil/ghee, and salt) among children (under five years of age) and WRA, and the availability and quality of those fortified foods from markets.

The 2017 FACT survey report[164] defined 'fortifiable' wheat flour as industrially processed flour produced by *chakki* mills and other industrially produced flour (e.g. roller mills) but included variables in the dataset to distinguish between industrially produced wheat flour from *chakki* mills and other sources (assumed to be roller mills but not explicitly defined as such in the questionnaire). Throughout the MTE report, the key indicators (i.e. the household coverage of fortifiable wheat flour and the subsequent consumption and micronutrient contribution coming from fortifiable wheat flour) are presented based on this definition of fortifiable wheat flour. Only the indicator on household coverage of fortifiable wheat flour (among households that reported consuming fortifiable wheat flour) was disaggregated into these two categories (*chakki* flour and roller mill flour). Additionally, the survey report identified vulnerable populations using various risk factors that are often associated with poor micronutrient intakes, and assessed equity in household coverage of fortifiable foods by disaggregating the indicators. The report included the indicators on household coverage of fortifiable foods disaggregated by the risk factors, but not the results on consumption and micronutrient contribution from fortifiable wheat flour and oil/ghee.

To better understand the potential impact of fortified wheat flour produced with the support of the programme (i.e. roller mills only), secondary analyses, which estimated and disaggregated the coverage indicators (among all households) and other key indicators of consumption and micronutrient contribution in the dataset, aree conducted. Additional analyses, which disaggregated the results of fortifiable wheat flour (from roller mills) and oil/ghee by risk factors were also conducted to assess equity in coverage, consumption, and micronutrient contribution. To better understand the total daily wheat flour intake and top food items contributing to wheat flour consumption, further analyses of the consumption indicators based on the Food Frequency Questionnaire (FFQ) method and typical sources of each food item in the FFQ were conducted.

I.2 Methods

The same methods and indicator definitions described in the 2017 FACT survey report were applied in the MTE report, except for the definition of fortifiable wheat flour. The 2017 FACT questionnaire collected information to distinguish the source of industrially produced wheat flour as being from *chakki* mills or from other industrially produced sources (roller mills were not specifically included as a response option but are assumed to be the main source of other industrially produced flour). In the analysis conducted for the MTE, fortifiable wheat flour was defined as industrially produced wheat flour from sources other than *chakki* mills, which is assumed to come from roller mills.

[164] GAIN and OPM (2018).

I.3 Results

Household coverage of wheat flour by province and risk factors

Figure 27 shows the household coverage of wheat flour, i.e. the proportion of households which consume wheat flour (in general), the proportion of households which consume a fortifiable form of wheat flour (i.e. industrially produced from roller mills), and the proportion of households which consume fortified wheat flour (from roller mills).

In Balochistan, 100% of household consume wheat flour, while only 17% of households consume fortifiable wheat flour (from roller mills), and only 2% consume fortified wheat flour (from roller mills). In Punjab, 100% of household consume wheat flour, while only 19% of households consume fortifiable wheat flour (from roller mills), and only 1% consume fortified wheat flour (from roller mills). In Sindh, 91% of household consume wheat flour, while only 33% of households consume fortifiable wheat flour (from roller mills), and only 1% consume fortified wheat flour (from roller mills).

Figure 27 Household coverage of wheat flour and roller mill wheat flour in Pakistan

All values are % and are weighted to correct for unequal probability of selection.
Fortifiable wheat flour (from roller mills) refers to industrially produced wheat flour from sources other than *chakki* mills.

Table 13 presents the household coverage of fortifiable wheat flour (from roller mills), disaggregated by the following risk factors that are often associated with poor micronutrient intakes: households living in rural residences; households at risk of poverty; households with low SES; households with WRA not meeting minimum dietary diversity (MDD-W); households with poor IYCF practices; and households with food insecurity.

There were statistically significant differences in the consumption of fortifiable wheat flour (from roller mills) between at-risk and not at-risk households for all risk factors in all provinces apart from IYCF practices in Balochistan.

In most of the comparisons, fewer at-risk households consumed fortifiable wheat flour compared to not at-risk households. The notable exceptions where the reverse trend was seen were poverty status in Punjab, dietary diversity in Balochistan, IYCF in Punjab, and household food security in Balochistan and Punjab. The risk factors that contributed to the greatest differences between groups were region of residence, poverty status, and SES, whereby fewer households that were rural, at risk of poverty, and had low SES consumed fortifiable wheat flour compared to households that were urban, not at risk of poverty, and had high SES.

Table 13 Household coverage of fortifiable wheat flour (from rollers mills) by risk factors[1, 2]

	Balochistan		Punjab		Sindh	
Risk factor[3]	At risk[3] % (N)	Not at risk[4] % (N)	At risk % (N)	Not at risk % (N)	At risk % (N)	Not at risk % (N)
Region of residence	12.8 (568)[a]	31.9 (136)[a]	13.1 (480)[a]	31.7 (210)[a]	16.7 (314)[a]	50.9 (394)[a]
Poverty status	9.3 (406)[a]	25.5 (298)[a]	24.5 (154)[a]	17.1 (536)[a]	23.4 (288)[a]	40.8 (420)[a]
SES	11.5 (496)[a]	27.3 (208)[a]	17.9 (166)[a]	19.2 (524)[a]	16.6 (298)[a]	47.4 (410)[a]
Women's dietary diversity	21.8 (441)[a]	9.8 (242)[a]	18.5 (433)[a]	19.5 (253)[a]	32.6 (604)[a]	39.3 (96)[a]
IYCF	16.4 (505)	16.9 (199)	20.9 (531)[a]	12.4 (159)[a]	31.5 (646)[a]	48.8 (62)[a]
Household food security	18.0 (34)[a]	16.5 (670)[a]	26.1 (27)[a]	18.6 (663)[a]	25.2 (10)[a]	33.3 (698)[a]

[1] All values are % or N, as indicated, and are weighted to correct for unequal probability of selection.
[2] Fortifiable wheat flour (from roller mills) refers to industrially produced wheat flour from sources other than *chakki* mills. The FACT 2017 questionnaire collected information to distinguish the source of industrially produced wheat flour as being from *chakki* mills or from other sources; roller mills were not specifically included as a response option.
[3] Defined as: rural residence, MPI ≥ 0.33, lowest two wealth quintiles, women's dietary diversity score < 5 out of 10 food groups the previous day, IYCF index score < 6, household hunger score >1, respectively.
[4] Defined as: urban residence, MPI < 0.33, highest three wealth quintiles, women's dietary diversity score ≥ 5 out of 10 food groups the previous day, IYCF index score = 6, household hunger score ≤ 1, respectively.
[a] Comparing at risk vs. not at risk, p<0.01.

Table 14 presents, for each risk factor, the distribution of households included in the survey. Results are presented for each province among the total surveyed population and the subset of the population who are from households that reported consuming fortifiable wheat flour (from roller mills).

Table 14 At-risk groups, by province and population group, Pakistan 2017

	Total population			Consumers of roller mill flour		
Risk factor	Balochistan % (N)	Punjab % (N)	Sindh % (N)	Balochistan % (N)	Punjab % (N)	Sindh % (N)
Region of residence: Rural	81.0 (704)	70.0 (690)	44.0 (710)	62.1 (110)	47.6 (114)	26.1 (243)
Poverty status: At risk of poverty[1]	55.0 (704)	23.6 (690)	43.9 (710)	30.7 (110)	30.6 (114)	30.8 (243)
SES: Low SES[2]	68.0 (704)	24.2 (690)	46.3 (710)	47.2 (110)	22.9 (114)	23.1 (243)
Women's dietary diversity: Did not meet MDD-W[3]	59.2 (683)	64.2 (686)	86.7 (702)	76.3 (108)	63.1 (113)	84.4 (243)
IYCF: Poor IYCF[4]	76.2 (704)	90.1 (690)	70.1 (710)	69.6 (110)	84.4 (114)	85.3 (243)
Household food security: Moderate or severe hunger[5]	3.5 (704)	4.1 (690)	1.3 (710)	3.8 (110)	5.6 (114)	1.0 (243)

[1] MPI ≥ 0.33
[2] Lowest three wealth quintiles
[3] Women's dietary diversity score less than 5 out of 10 food groups the previous day
[4] Infant and child feeding index score less than 6
[5] Household hunger score > 1

Consumption of fortifiable wheat flour by province

Table 15 presents the daily apparent consumption of fortifiable wheat flour (from roller mills) among children in four age groups (six to eight months, nine to 11 months, 12–23 months, and 24–59 months) and WRA in each province, based on a household assessment using the Adult Male Equivalent (AME) method. Results are presented for the total surveyed population and the subset of the population who are from households that reported consuming fortifiable wheat flour (from roller mills). Among the total population, the mean daily apparent consumption of fortifiable wheat flour ranged from 3.3 to 25.9 g/day among children and 30.9 to 60.7 g/day among WRA in all provinces. Among the subset of consumers of fortifiable wheat flour, mean daily apparent

consumption of fortifiable wheat flour was substantially higher, from 35.4 to 106.1 g/day among children and 180.1 to 192.2 g/day among WRA in all provinces.

Table 15 Daily apparent consumption of fortifiable wheat flour (from roller mills) based on household-level assessment using AME method by population group and province, Pakistan 2017

	Total population					Consumers of roller mill flour				
	Children				Women	Children				Women
	6–8 months	9–11 months	12–23 months	24–59 months	18–49 years	6–8 months	9–11 months	12–23 months	24–59 months	18–49 years
Balochistan										
Fortifiable wheat flour, g/day[1,2]	10.5 (8.1, 21.1)	9.0 (6.2, 11.8)	18.0 (14.8, 21.1)	12.8 (11.7, 13.9)	30.9 (28.7, 33.2)	-[3]	-[3]	-[3]	88.5 (88.0, 89.0)	182.9 (181.5, 184.2)
N	26	29	123	485	683	7	5	19	75	108
Punjab										
Fortifiable wheat flour, g/day[1,2]	3.3 (1.9, 4.6	7.1 (4.7, 9.4)	15.6 (13.5, 17.6)	21.8 (20.5, 23.2)	40.3 (38.3, 42.4)	-[3]	-[3]	-[3]	106.2 (106.1, 106.4)	218 (217.7, 218.3)
N	31	30	128	429	685	1	5	19	78	112
Sindh										
Fortifiable wheat flour, g/day[1,2]	25.5 (24.2, 26.1)	27.9 (24.4, 31.5)	21.8 (20.1, 23.5)	25.9 (24.7, 27.2)	60.7 (58.6, 62.8)	[3]	51.2 (50.9, 51.5)	66.2 (65.9, 66.5)	98.5 (98.2, 98.8)	194.8 (194.3, 195.4)
N	23	36	144	444	701	10	22	48	133	242

[1] All values are mean (95% confidence interval) unless otherwise indicated and are weighted to correct for unequal probability of selection.
[2] Fortifiable wheat flour (from roller mills) refers to industrially produced wheat flour from sources other than *chakki* mills.
[3] Estimates could not be calculated due to small sample size (N<20).

Among the total population, mean daily consumption of fortifiable wheat flour from foods made outside the home ranged from 5.8 g/day to 37.0 g/day among children and 20.3 to 38.8 g/day among WRA in all provinces. The consumption of wheat flour from these foods was highest in Punjab, followed by Sindh and then Balochistan.

The top contributing food item to wheat flour intake from the full list of 31 food items was roti among both children and WRA, followed by biscuits, paratha, then rusk among children, and paratha then halwa among WRA. Apart from biscuits and rusks, these foods are most commonly prepared at home.

Potential micronutrient contribution from fortified wheat flour by province

Table 16 presents the potential micronutrient contribution from the consumption of fortified wheat flour (from roller mills) (as a percentage of the RDA) among the total population and among the subset of the population who are from households that reported consuming fortifiable wheat flour (from roller mills).

These estimates are based on actual consumption estimates of fortifiable wheat flour (from roller mills) assessed using the AME method and a modelled fortification level using the theoretical target average iron content that was estimated from the minimum national standard requirement at production level (assuming 20% variation and 90% compliance).

Among the total population in all provinces, fortified wheat flour (from rollers mills) was estimated to potentially contribute 0% of the RDA for iron when modelled to assume the fortification standard was met. This is due primarily to the low intake of fortifiable wheat flour (from roller mils) at the population level.

Among the subset of consumers of fortifiable wheat flour (from roller mills) in all provinces, fortified wheat flour (from rollers mills) was estimated to potentially contribute 23.8% to 30.0% of the RDA for iron among children 24–59 months, and 23.6% to 33.9% among WRA when modelled to assume the fortification standard was met.

Table 16 Potential iron contribution from consumption of fortified wheat flour (from roller mills) as a percentage of RDA by population group and province, Pakistan, 2017

	Total population					Consumers of roller mill flour[4]				
	Children				Women	Children				Women
	6–8 months	9–11 months	12–23 months	24–59 months	18–49 years	6–8 months	9–11 months	12–23 months	24–59 months	18–49 years
Balochistan										
Fortifiable wheat flour, g/day[1,2,3]	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	-[5]	-[5]	-[5]	23.8 (16.3, 30.2)	23.6 (17.9, 40.3)
N	26	29	123	485	683	7	5	19	75	108
Punjab										
Fortifiable wheat flour, g/day[1,2,3]	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	-[5]	-[5]	-[5]	30.0 (23.5, 36.7)	33.9 (22.0, 52.2)
N	31	30	128	429	685	1	5	19	78	112
Sindh										
Fortifiable wheat flour, g/day[1,2,3]	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	-[5]	-[5]	19.7 (13.3, 25.5)	27.3 (17.7, 37.8)	32.2 (20.3, 50.8)
N	23	36	144	444	701	10	22	48	133	242

[1] All values are median (25th, 75th percentile) and are weighted to account for unequal probability of selection.
[2] Based on actual consumption estimates assessed at the household level using the AME method and a fortification content where actual uses the measured iron content for wheat flour found in the market assessment and modelled uses a theoretical target average iron content estimated from the minimum national standard requirement at production level.
[3] Fortifiable wheat flour (from roller mills) refers to industrially produced wheat flour from sources other than *chakki* mills.
[4] Defined as those from households that reported using roller mill wheat flour at home to prepare foods.
[5] Estimates could not be calculated due to small sample size (N<20).

Consumption of fortifiable wheat flour and potential iron contribution by risk factors

Table 17 and Table 18 present the daily apparent consumption of fortifiable wheat flour (from roller mills) and its potential iron contribution among children and WRA, respectively, in each province by risk factors. Results are presented only for the subset of consumers of fortifiable wheat flour (from roller mills).

There were statistically significant differences in consumption of fortifiable wheat flour (from roller mills) between at-risk and not at-risk households for almost all risk factors in all provinces for both children and women. In nearly all the comparisons in Balochistan and Punjab (apart from SES in both provinces and residence in Punjab), consumption was lower in at-risk households compared to not at-risk households, whereas in Sindh the reverse was true for all risk factors.

Where there were statistically significant differences between at-risk and not at-risk households, potential iron contribution was lower among those from not at-risk households compared to at-risk households in most comparisons.

Consumption of fortifiable edible oil/ghee and vitamin A contribution by risk factors

Table 19 and Table 20 present the daily apparent consumption of fortifiable edible oil/ghee and its potential vitamin A contribution among children and WRA, respectively, in each province by risk factors.

The results were similar to those for fortifiable wheat flour (from roller mills) whereby among the total population there were statistically significant differences in the consumption of fortifiable edible oil/ghee between at-risk and not at-risk households for almost all risk factors in all provinces for both children and women. In nearly all the comparisons, fewer at-risk households

consumed fortifiable edible oil/ghee compared to not at-risk households. However, the magnitude of the differences between groups was relatively smaller compared to the differences in fortifiable wheat flour consumption.

Where there were statistically significant differences between at-risk and not at-risk households, potential vitamin A contribution was lower among those from not at-risk households compared to at-risk households in most comparisons.

Table 17 Daily apparent consumption of fortifiable wheat flour (from roller mills) based on household-level assessment using AME method and potential micronutrient contribution among children (under five years of age) by risk factor[1,2,3]

	Residence		Poverty status		SES status		Minimum dietary diversity for WRA		IYCF practices	
	Rural	Urban	Poor	Non-poor	Low SES	High SES	Did not meet	Met MDD-W	Poor IYCF	Good IYCF
Balochistan										
	N=68	N=38	N=35	N=71	N=51	N=55	N=84	N=20	N=80	N=26
Fortifiable wheat flour [consumers[5]], g/day[4]	79.2 (78.4, 80.1)[b]	80.8 (79.5, 82.2)[b]	78.8 (77.8, 79.9)[b]	80.2 (79.5, 81.0)[b]	81.1 (80.2, 82.0)[a]	78.7 (77.8, 79.6)[a]	71.8 (71.2, 72.4)[a]	106.2 (105.2, 107.3)[a]	74.6 (74.0, 75.1)[a]	92.6 (91.3, 94.0)[a]
Modelled iron from wheat flour [consumers[5]], % RDA[6]	21.0 (12.3, 30.0)	18.3 (15.3, 28.2)	23.6 (15.7, 30.2)	19.3 (14.8, 30.0)	20.9 (15.0, 30.)	18.8 (14.1, 28.5)	18.8 (13.8, 27.9)[a]	27.7 (19.4, 37.9)[a]	19.4 (15.0, 30.0)	24.2 (10.9, 30.5)
Punjab										
	N=55	N=48	N=26	N=77	N=24	N=79	N=65	N=37	N=89	N=14
Fortifiable wheat flour [consumers[5]], g/day[4]	102.6 (102.4, 102.8)[a]	92.3 (92.0, 92.5)[a]	96.2 (95.9, 96.5)[a]	98.1 (97.9, 98.3)[a]	105.2 (105.0, 105.5)[a]	95.1 (95.0, 95.3)[a]	99.8 (99.7, 99.9)[a]	99.4 (99.2, 99.6)[a]	95.1 (94.9, 95.2)[a]	114.6 (114.3, 114.8)[a]
Modelled iron from wheat flour [consumers[5]], % RDA[6]	31.5 (23.5, 31.5)[a]	24.6 (17.4, 33.6)[a]	29.4 (20.2, 35.3)	28.4 (18.8, 34.6)	33.0 (19.9, 39.3)[c]	25.8 (19.5, 34.3)[c]	28.4 (20.9, 35.4)	29.4 (22.8, 34.6)	28.4 (19.5, 35.0)	27.8 (24.0, 39.3)
Sindh										
	N=63	N=150	N=66	N=147	N=56	N=157	N=177	N=36	N=187	N=26
Fortifiable wheat flour [consumers[5]], g/day[4]	104.1 (103.6, 104.6)[a]	77.2 (76.9, 77.6)[a]	97.8 (97.2, 98.4)[a]	78.5 (78.3, 78.8)[a]	106.0 (105.5, 106.5)[a]	77.4 (77.0, 77.7)[a]	84.8 (84.4, 85.1)[a]	82.2 (81.8, 82.5)[a]	86.7 (86.4, 87.0)[a]	71.0 (70.7, 71.2)[a]
Modelled iron from wheat flour [consumers[5]], % RDA[6]	25.5 (16.9, 37.3)[a]	20.7 (12.2, 30.7)[a]	25.3 (16.0, 39.0)[b]	20.9 (13.0, 30.7)[b]	26.4 (16.0, 37.8)[a]	21.0 (13.0, 30.7)[a]	21.2 (13.9, 33.3)	22.6 (18.7, 31.3)	23.0 (15.8, 33.7)[a]	14.9 (9.7, 23.0)[a]

[1] All values are weighted to account for unequal probability of selection.
[2] Fortifiable wheat flour (from roller mills) refers to industrially produced wheat flour from sources other than *chakki* mills.
[3] Micronutrient contribution is based on actual consumption estimates assessed at the household level using the AME method and a fortification content where actual uses the measured micronutrient content for wheat flour found in the market assessment and modelled uses a theoretical target average iron content estimated from the minimum national standard requirement at production level for wheat flour (assuming 20% variation and 90% compliance).
[4] Values are mean (95% confidence interval). Includes children 6–59 months of age.
[5] Base population is the subset of the population who are from households that reported consuming fortifiable wheat flour (from roller mills).
[6] Values are median (25^{th}, 75^{th} percentiles). Includes children 6–59 months of age.
[a] p<0.01, [b] p<0.05, [c] p<0.1 when comparing residence, poverty status, SES, MDD-W, IYCF practices.

Table 18 Daily apparent consumption of fortifiable wheat flour (from roller mills) and micronutrient contribution based on household-level assessment using AME method among women (18–49 years of age) by risk factor[1,2,3]

	Residence		Poverty status		SES status		MDD-W		IYCF practices	
	Rural	Urban	Poor	Non-poor	Low SES	High SES	Did not meet	Met MDD-W	Poor IYCF	Good IYCF
Balochistan										
	N=69	N=39	N=34	N=74	N=54	N=54	N=88	N=20	N=82	N=26
Fortifiable wheat flour [consumers[5]], g/day[4]	180.2 (179.1, 181.3)	179.9 (176.0, 183.9)	161.4 (159.5, 163.4)[a]	188.1 (186.3, 189.9)[a]	174.3 (172.5, 176.0)[a]	186.0 (183.6, 188.4)[a]	163.4 (162.3, 164.4)[a]	238.9 (236.1, 241.7)[a]	164.9 (163.7, 166.2)[a]	220.3 (217.7, 222.9)[a]
Modelled iron from wheat flour [consumers[5]], % RDA[6]	26.8 (18.5, 42.6)[b]	21.5 (16.1, 27.9)[b]	23.1 (17.7, 32.2)	24.8 (18.3, 41.3)	24.8 (17.7, 40.3)	23.0 (18.3, 33.7)	23.1 (17.3, 40.3)	29.4 (21.5, 33.7)	22.0 (17.3, 33.6)[b]	29.6 (21.5, 41.3)[b]
Punjab										
	N=60	N=52	N=30	N=82	N=27	N=85	N=72	N=40	N=97	N=15
Fortifiable wheat flour [consumers[5]], g/day[4]	225.7 (225.3, 226.1)[a]	205.9 (205.4, 206.3)[a]	209.5 (208.9, 210.1)[a]	219.1 (218.7, 219.5)[a]	224.8 (224.2, 225.5)[a]	213.3 (213.0, 213.6)[a]	214.7 (214.4, 215.0)[a]	218.2 (217.7, 218.6)[a]	211.9 (211.6, 212.2)[a]	240.9 (240.3, 241.5)[a]
Modelled iron from wheat flour [consumers[5]], % RDA[6]	36.8 (25.3, 52.2)[b]	27.0 (19.6, 50.1)[b]	25.9 (21.6, 58.7)	36.8 (22.3, 51.0)	30.0 (22.6, 58.7)	35.2 (21.2, 50.1)	33.9 (22.1, 52.2)	33.2 (20.9, 51.8)	33.2 (21.6, 49.5)[c]	49.1 (44.3, 58.7)[c]
Sindh										
	N=71	N=171	N=76	N=166	N=61	N=181	N=202	N=40	N=212	N=30
Fortifiable wheat flour [consumers[5]], g/day[4]	246.2 (245.3, 247.1)[a]	172.6 (171.9, 173.2)[a]	222.9 (221.8, 224.0)[a]	178.6 (178.1, 179.0)[a]	240.3 (239.3, 214.2)[a]	177.4 (176.8, 178.0)[a]	192.0 (191.4, 192.6)[a]	193.6 (192.9, 194.3)[a]	193.2 (192.6, 193.8)[a]	186.6 (186.0, 187.3)[a]
Modelled iron from wheat flour [consumers[5]], % RDA[6]	42.5 (29.1, 66.2)[a]	28.3 (17.4, 42.3)[a]	37.8 (28.6, 57.9)[a]	27.8 (17.4, 46.2)[a]	40.9 (28.6, 66.2)[a]	30.0 (19.6, 46.2)[a]	31.0 (19.6, 50.1)	34.7 (20.3, 54.9)	31.6 (19.6, 50.0)[c]	32.2 (20.8, 62.5)[c]

[1] All values are weighted to account for unequal probability of selection.
[2] Fortifiable wheat flour (from roller mills) refers to industrially produced wheat flour from sources other than *chakki* mills.
[3] Micronutrient contribution is based on actual consumption estimates assessed at the household level using the AME method and a fortification content where actual uses the measured micronutrient content for wheat flour found in the market assessment and modelled uses a theoretical target average iron content estimated from the minimum national standard requirement at production level for wheat flour (assuming 20% variation and 90% compliance).
[4] Values are mean (95% confidence interval).
[5] Base population is the subset of the population who are from households that reported consuming fortifiable wheat flour (from roller mills).
[6] Values are median (25^{th}, 75^{th} percentiles).
[a] $p<0.01$, [b] $p<0.05$, [c] $p<0.1$ when comparing residence, poverty status, SES, MDD-W, IYCF practice.

Table 19 Daily apparent consumption of fortifiable edible oil/ghee based on household-level assessment using AME method and micronutrient contribution among children (under five years of age) by risk factor[1,2]

	Residence		Poverty status		SES status		Minimum dietary diversity for WRA		IYCF practices	
	Rural	Urban	Poor	Non-poor	Low SES	High SES	Did not meet	Met MDD-W	Poor IYCF	Good IYCF
Balochistan										
	N=533	N=123	N=381	N=275	N=465	N=191	N=407	N=228	N=466	N=190
Fortifiable oil/ghee consumed, mL/day [total population][3]	15.6 (15.2, 15.9)[a]	14.5 (14.0,14.9)[a]	14.5 (14.1, 14.9)[a]	16.5 (16.1, 16.9)[a]	15.0 (14.7, 15.4)[a]	16.1 (15.6, 16.5)[a]	13.6 (13.3, 13.9)[a]	18.4 (17.9, 18.9)[a]	14.7 (14.4, 15.0)[a]	16.9 (16.3, 17.5)[a]
	N=488	N=113	N=346	N=255	N=426	N=175	N=363	N=218	N=432	N=169
Actual vitamin A from oil/ghee, % EAR [total population][4]	42.4 (20.6, 65.7)	36.3 (17.3, 57.8)	39.6 (15.3,60.6)	44.3 (24.2,64.7)	43.0 (21.5, 64.3)	37.4 (15.3,61.2)	36.4 (17.3,58.3)	46.8 (20.1,74.2)	40.9 (20.6,61.1)[b]	44. (12.5,69.7)[b]
Modelled vitamin A from oil/ghee, % EAR [total population][4]	71.5 (49.4, 99.3)	64.1 (43.6, 96.7)	66.0 (43.6, 92.8)[a]	76.4 (54.2, 103.3)[a]	69.2 (47.8,98.0)[c]	72.0 (49.4, 103.3)[c]	62.4 (42.4, 84.4)[a]	86.9 (59.5, 112.7)[a]	66.7 (45.3, 90.8)[a]	79.8 (58.0, 112.2)[a]
Punjab										
	N=424	N=186	N=135	N=475	N=148	N=462	N=377	N=229	N=461	N=149
Fortifiable oil/ghee consumed, mL/day [total population][3]	16.7 (16.5, 16.9)[b]	17.2 (16.8, 17.5)[b]	16.2 (15.8, 16.5)[a]	17.0 (16.8, 17.3)[a]	15.4 (15.0, 15.8)[a]	17.3 (17.1, 17.5)[a]	16.5 (16.3, 16.8)[a]	17.4 (17.1, 17.7)[a]	16.8 (16.6, 17.0)	17.0 (16.6, 17.4)
	N=384	N=166	N=128	N=422	N=138	N=412	N=342	N=205	N=424	N=126
Actual vitamin A from oil/ghee, % EAR [total population][4]	57.3 (36.9, 75.0)	55.4 (43.3, 74.4)	55.4 (34.2, 71.9)	56.2 (39.6, 75.7)	48.7 (26.9, 70.1)[a]	57.4 (41.3, 78.1)[a]	54.3 (36.9, 73.3)[c]	59.6 (40.7, 80.7)[c]	55.9 (37.9, 74.2)	57.8 (40.7, 79.2)
Modelled vitamin A from oil/ghee, % EAR [total population][4]	76.6 (56.0, 103.9)	75.9 (61.5, 97.3)	72.3 (52.8, 98.7)[b]	78.7 (60.5, 103.9)[b]	68.1 (49.3, 94.6)[a]	79.6 (62.7, 104.2)[a]	73.7 (56.0, 103.9)[b]	79.8 (65.9, 99.5)[b]	76.0 (59.1, 102.3)	78.7 (60.5, 103.0)
Sindh										
	N=290	N=348	N=259	N=379	N=275	N=363	N=546	N=84	N=588	N=50
Fortifiable oil/ghee consumed, mL/day [total population][3]	14.7 (14.4, 14.9)[a]	15.4 (15.1, 15.8)[a]	14.1 (13.8, 14.3)[a]	15.7 (15.5, 16.0)[a]	14.4 (14.1, 14.7)[a]	15.6 (15.3, 15.9)[a]	14.9 (14.7, 15.1)[a]	15.9 (15.3, 16.5)[a]	15.2 (15.0, 15.4)[a]	13.3 (12.5, 14.1)[a]
	N=533	N=123	N=237	N=343	N=251	N=329	N=494	N=78	N=549	N=31
Actual vitamin A from oil/ghee, % EAR [total population][4]	28.5 (11.2, 51.5)	34.1 (14.0, 55.7)	29.5 (12.4, 53.2)	32.0 (11.2, 53.9)	29.3 (12.9, 51.4)	33.6 (11.2, 56.0)	30.1 (10.7, 53.4)	34.4 (16.6, 59.9)	30.6 (10.7, 54.0)	28.5 (16.6, 45.1)
Modelled vitamin A from oil/ghee, % EAR [total population][4]	67.6 (50.1, 88.9)[c]	65.3 (48.9, 96.1)[c]	64.3 (46.5, 85.5)[a]	69.3 (51.1, 98.4)[a]	64.4 (48.0, 88.0)[a]	68.6 (50.3, 97.0)[a]	67.6 (48.9, 89.9)[b]	67.9 (51.5, 101.7)[b]	67.6 (49.4, 91.0)	67.5 (50.2, 103.6)

[1] All values are weighted to account for unequal probability of selection; [2] Micronutrient contribution is based on actual consumption estimates assessed at the household level using AME method and a fortification content where actual uses the measured micronutrient content for oil/ghee found in the market assessment and modelled uses the target average vitamin A content according to the fortification standards for oil/ghee. [3] Values are mean (95% confidence interval). Includes children 6–59 months of age; [4] Values are median (25th, 75th percentiles). Includes children 12–59 months of age.
[a] p<0.01, [b] p<0.05, [c] p<0.1 when comparing residence, poverty status, SES, MDD-W, IYCF practices.

Table 20 Daily apparent consumption of fortifiable oil/ghee and micronutrient contribution based on household-level assessment using AME method among women (18–49 years of age) by risk factor[1,2]

	Residence		Poverty status		SES status		Minimum dietary diversity for WRA		IYCF practices	
	Rural	Urban	Poor	Non-poor	Low SES	High SES	Did not meet	Met MDD-W	Poor IYCF	Good IYCF
Balochistan										
	N=543	N=131	N=387	N=287	N=472	N=202	N=438	N=236	N=480	N=194
Fortifiable oil/ghee consumed, mL/day [total population][3]	33.6 (32.9, 34.2)[a]	31.7 (30.7, 32.7)[a]	31.3 (30.5, 32.1)[a]	35.7 (34.9, 36.5)[a]	32.3 (31.6, 33.1)[a]	35.1 (34.2, 35.9)[a]	29.9 (29.3, 30.5)[a]	38.8 (37.8, 39.9)[a]	32.1 (31.4, 32.7)[a]	35.9 (34.7, 37.1)[a]
Actual vitamin A from oil/ghee, % EAR [total population][4]	28.1 (13.1, 47.3)	28.3 (12.9, 47.0)	23.9 (10.7, 45.6)[b]	30.9 (15.0, 53.1)[b]	28.1 (12.9, 46.5)	28.3 (13.8, 53.8)	24.9 (11.9, 41.4)[a]	34.2 (14.1, 56.9)[a]	27.7 (13.6, 46.5)[a]	30.8 (11.0, 52.0)[a]
Modelled vitamin A from oil/ghee, % EAR [total population][4]	50.5 (32.7, 73.1)	47.5 (32.4, 77.4)	44.5 (30.3, 68.7)[a]	56.0 (36.4, 81.2)[a]	47.8 (31.6, 69.1)[a]	57.6 (36.4, 84.3)[a]	43.3 (30.0, 63.3)[a]	62.2 (41.2, 87.1)[a]	47.5 (31.3, 69.1)[a]	60.3 (39.6, 87.1)[a]
Punjab										
	N=468	N=206	N=149	N=525	N=163	N=511	N=426	N=248	N=517	N=157
Fortifiable oil/ghee consumed, mL/day [total population][3]	36.1 (35.7, 36.6) [a]	38 (37.4, 38.7)[a]	33.5 (32.8, 34.3)[a]	37.7 (37.3, 38.1)[a]	32.0 (31.3, 32.7)[a]	38.2 (37.8, 38.6)[a]	35.8 (35.3, 36.2)[a]	38.3 (37.7, 38.9)[a]	36.4 (36.0, 36.8)[b]	37.6 (36.8, 38.5)[b]
Actual vitamin A from oil/ghee, % EAR [total population][4]	37.0 (21.4, 57.3)	42.3 (27.3, 57.5)	34.6 (18.9, 57.3)[b]	38.9 (26.2, 58.6)[b]	31.4 (17.1, 52.9)[a]	41.0 (26.4, 58.4)[a]	36.9 (22.5, 55.5)[b]	39.7 (25.8, 62.9)[b]	38.3 (23.7, 58.9)	37.2 (23.2, 55.4)
Modelled vitamin A from oil/ghee, % EAR [total population][4]	53.2 (35.8, 76.4)	56 (40.9, 81.1)	49.2 (28.9)[a]	56.0 (39.7, 78.9)[a]	47.0 (26.8, 68.1)[a]	56.9 (39.7, 81.0)[a]	53.7 (36.3, 73.9)[b]	57.1 (39.4, 83.0)[b]	56.6 (38.4, 80.4)	51.8 (38.3, 68.9)
Sindh										
	N=306	N=385	N=283	N=408	N=291	N=400	N=598	N=93	N=630	N=61
Fortifiable oil/ghee consumed, mL/day [total population][3]	31.8 (31.3, 32.2)[a]	34.5 (33.9, 35.1)[a]	30.4 (29.8, 30.9)[a]	35.2 (34.6, 35.8)[a]	30.7 (30.2, 31.2)[a]	35.1 (34.5, 35.7)[a]	32.8 (32.4, 33.2)[a]	34.8 (33.8, 35.8)[a]	33.0 (32.6, 33.4)	33.2 (31.8, 34.7)
Actual vitamin A from oil/ghee, % EAR [total population][4]	20.4 (7.1, 37.7)	24.0 (8.2, 41.9)	20.0 (7.3, 37.7)[b]	23.9 (8.0, 39.6)[b]	20.4 (8.0, 33.6)[a]	24.0 (6.8, 43.5)[a]	20.5 (6.8, 38.3)	25.6 (13.4, 40.1)	22.3 (7.1, 41.6)	20.0 (10.0, 27.2)
Modelled vitamin A from oil/ghee, % EAR [total population][4]	44.2 (29.9, 63.8)[b]	45.1 (30.7, 67.3)[b]	40.9 (27.3, 59.2)[a]	50.0(33.8, 70.9)[a]	40.9 (27.3, 60.0)[a]	49.5 (33.5, 69.2)[a]	43.4 (29.5, 65.1)[c]	54.8 (37.7, 70.2)[c]	46.7 (31.2, 66.9)[b]	39.5 (27.2, 56.9)[b]

[1] All values are weighted to account for unequal probability of selection; [2] Micronutrient contribution is based on actual consumption estimates assessed at the household level using the AME method and a fortification content where actual uses the measured micronutrient content for oil/ghee found in the market assessment and modelled uses the target average vitamin A content according to the fortification standards for oil/ghee.
[3] Values are mean (95% confidence interval).
[4] Values are median (25^{th}, 75^{th} percentiles). Values exclude children under 12 months.
[a] $p<0.01$, [b] $p<0.05$, [c] $p<0.1$ when comparing residence, poverty status, SES, MDD-W, IYCF practice.

Annex J Methodology for the consumer-level district study

J.1 Community selection criteria

District selection

For the consumer-level district study, the district selection criteria for the overall district study (which encompassed stakeholders along other pathways, such as private sector and public sector pathways) were used. These selection criteria are detailed in Section 3.2.3 of the report. To summarise, in each province (that is, Punjab and Sindh) two 'programme districts' were selected where FFP is active: i.e. it is engaging with the district government; fortification is taking place among wheat flour and oil/ghee production; and public awareness activities are being implemented. Unlike the larger district study, the consumer-level district study was restricted only to 'programme districts', to examine the activities implemented along the public awareness pathway. Additional criteria included ensuring one of the districts selected had better market access and producer density (likely has urban characteristics), and ensuring the second district had comparatively less market accessibility (likely more rural/remote).

Table 21 shows the districts where the public awareness activities were being conducted by the end of December 2018, and the specific activities carried out in each district. To examine the implementation of the public awareness activities, we selected at least one high-intensity district and excluded the low-intensity districts in Punjab, as the full scale of activities were not implemented there. We selected Gujranwala, as it was one of the two high-intensity districts, while Kasur is a regular-intensity district (i.e. where all activities but mobile messaging were conducted). In Sindh, as the public awareness campaign had only been implemented in Karachi and Badin (at the time of data collection), these were the only two choices for programme districts.

Table 21 Public awareness activities conducted in each district in the first phase of FFP's public awareness campaign (November–December 2018)

Districts	Date of implementation	IPC activities[1]	Billboards	Cable TV adverts	Mobile messaging
High-intensity: Gujranwala, Rawalpindi (Punjab)	November 2018	●	●	●	●
Low-intensity: Lahore, Hafizabad (Punjab)	November 2018	●	●		
Islamabad	November 2018	●	●	●	
Faisalabad, Gujrat, Kasur (Punjab) Karachi, Badin (Sindh)	December 2018	●		●	

1 - IPC activities = Awareness campaigns with market stakeholders, district stakeholders, LHSs, SHNSs

Community selection

In each district, two communities were purposively selected. A community is defined as a village (in the case of rural areas) or a *mohalla* or neighbourhood (in the case of semi-urban or urban areas). In the two rural districts (i.e. Badin and Kasur), two rural communities were selected, while in Karachi and Gujranwala, two urban or semi-urban communities were selected. Therefore, in total, we had four urban or semi-urban communities and four rural communities.
Given that FFP's public awareness pathway interventions take place at the district level, all communities in a district are equally target communities for the programme. However, the following criteria were taking into consideration when selecting communities:

- low-income communities / neighbours, given that equity is an important cross-cutting consideration and the poor are a group of interest for FFP; and
- the presence of an active LHW.

The district LHW coordinator and the FFP CSO implementer partners were asked to help identify communities that matched our criteria.

J.2 Research activities

Table 22 lists the different research activities conducted for the study, and the number of interviews conducted per district or community, and in total. This includes key informant interviews with public awareness intermediaries (LHSs, LHWs, SHNSs etc.), focus group discussions with consumers (men and women), and in-depth interviews at the household level.

Table 22 Qualitative research activities conducted in each district

Research activity	Respondent	Number per community or district	Total
Key informant interviews	LHW district coordinator	1 / district	5[1]
	Representative of trader associations	1 / district	5[1]
	LHS	1 / district	5[1]
	LHW	1 / community	8
	SHNS	1 / community	4
	Market retailer	2 / community	16
Focus group discussions	Women	2 / community	16
	Men	2 / community	16
In-depth interviews	Women	3 / community	24
	Husband / male household head	3 / community	24

1 – While Karachi is considered to be one district by FFP and the evaluation, Karachi is actually divided into six districts. For the evaluation, the communities selected in Karachi belonged to different districts and therefore two 'district-level' interviews were conducted in Karachi.

Focus group discussions

In each community, we conducted focus group discussions with two groups of men and two groups of women, with each group having between six and nine participants. For the focus group discussions with women, we selected married WRA (18–49 years) as they are within the LHWs' target group. The focus group discussions were divided according to food vehicle, with one focus group discussion focusing on wheat flour purchase and consumption while the second focused on oil/ghee purchase and consumption.

The overall purpose of the focus group discussions was to:

- understand perceptions about nutrition and food consumption;
- examine decision-making norms about food purchase and consumption in households;
- understand consumer behaviour and preferences around the purchase and consumption of wheat flour and oil/ghee;
- examine perceptions of fortified foods, including local availability, perceived affordability, and acceptance;
- examine access to channels used by the public awareness campaign; and

- conduct a practical review of campaign materials (particularly TV advertisements) to test perceptions and interpretations.

In-depth interviews

In-depth interviews were conducted at the household level. In each community, three case study households were selected, and within each household a female and a male member were interviewed. Respondents were selected to ensure that they would have knowledge about purchasing and consumption decisions made in the household. The overall purpose of these interviews was to collect detailed information specific to the respondent and to their household. The objectives were to understand the following:

- intra-household dynamics that influence decision-making on food;
- whether the household consumes wheat flour, oil or ghee that is fortified, and the reasons behind this;
- potential barriers and challenges around the consumption of fortified foods;
- access to the dissemination channels being used by FFP's public awareness campaign; and
- perceptions about food fortification and messaging related to food fortification.

At the start of the study we had aimed to select two households where fortified foods are consumed (one household where fortified oil/ghee is consumed and one household where fortified wheat flour is consumed), and one household where fortified foods are not consumed. This identification was to be done with the support of community-level key informants, such as retailers and the LHW.

However, given the non-availability of fortified wheat flour in most of our research communities, and the general lack of awareness of fortification, we were not strict in applying these criteria. We instead aimed to interview at least one household that consumes fortified oil/ghee (irrespective of whether they are aware of it or not), one household that consumes roller mill flour, and one household that consumes *chakki* flour.

J.3 Data collection and analysis

Separate research tools were prepared for each type of research activity, with the tools used for men and women being the same. These tools were drafted in English and then translated into Urdu. The qualitative data collection was undertaken by experienced field researchers simultaneously in Punjab and Sindh. Each research team consisted of four researchers – two women and two men – and was supervised by members of the evaluation team in person and/or remotely. Before the start of data collection, the eight field researchers were trained in Islamabad, with the training covering a general introduction to qualitative research methods, the FFP, the research tools prepared for this study, ethics, and safeguarding. The training included a pre-test of research tools, which allowed us to fine-tune the tools and gave field researchers practical experience of using these tools. This pre-test was conducted in Rawalpindi, which is one of FFP's programme districts.

The interviews were conducted in Urdu and in the local language (whichever was more appropriate). The research team ensured that focus groups discussions and in-depth interviews with women in the community were carried out by women researchers. Recordings and notes were used to transcribe the interviews in Urdu (and translated if a language other than Urdu was used). Given the limited time, and to prevent the loss of nuanced information through translation, the notes were not translated into English. The Urdu transcripts were read and analysed by the evaluation team. The disadvantage of not translating notes into English was that we were unable to utilise qualitative analysis software to analyse our notes. Instead, notes were summarised according to thematic areas and these summaries were used by the evaluation team to write up the findings of the research.

Annex K VfM framework

K.1 Objectives

When we ask if something represents VfM, it is an evaluative question about the merit, worth, or significance of resource use – that is, how well resources are being used, and whether the resource use is justified.[cxxxi] The UK Government's National Audit Office defines VfM as being 'the optimal use of resources to achieve intended outcomes'. DFID defines VfM in its programmes as 'maximising the impact of each pound spent to improve poor people's lives' (DFID, 2011). Importantly for FFP, this definition acknowledges that it is likely to be more expensive to reach the most vulnerable people and places, and that achieving VfM is about finding the best combination of inputs to deliver results for the most vulnerable.

The SNIP VfM analysis seeks to respond to the main evaluation question of 'to what extent does FFP provide VfM for the resources invested?'

In particular, the VfM assessment has three main objectives:

1. To provide a judgement on the VfM of the programme to DFID and other stakeholders on an annual basis.
2. To provide recommendations on how VfM can be strengthened on an annual basis in regard to the aspects of economy and efficiency, and at the end of the programme in regard to all the other results-focused dimensions of effectiveness, cost-effectiveness, and equity.
3. To provide recommendations on how VfM can be continued without support from the programme, or maximised in similar future programmes funded by DFID or other donors.

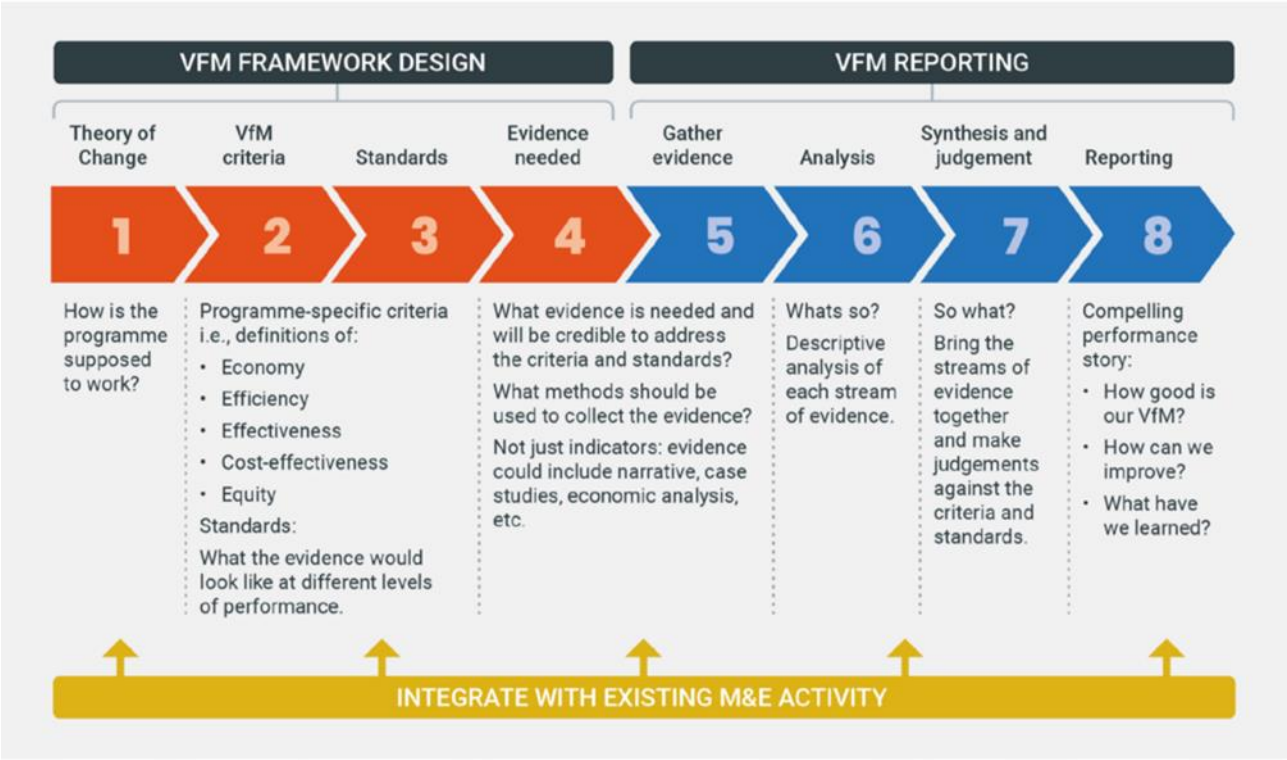
K.2 Analytical framework

The FFP VfM framework follows the DFID guidelines on VfM and OPM's VfM approach.[cxxxii] This VfM framework involves developing definitions of explicit criteria ('what matters') and standards ('what good performance looks like') along the 'Four Es' of **E**conomy, **E**fficiency, **E**ffectiveness, and **E**quity, also incorporating a fifth cost-**e**ffectiveness dimension to provide an agreed and transparent basis for making VfM judgements. The steps in our VfM analysis are outlined in Figure 28, with the first step being the development of a framework that is aligned with the FFP ToC.

The criteria and standards ('rubrics') used to assess economy and efficiency are presented in Section 6. The initial criteria defined as part of the evaluation inception reports were reviewed during the MTE process in consultation with FFP and DFID. The criteria and standards to judge effectiveness, cost-effectiveness, and equity are included in the evaluation inception report and will be reviewed during the preparation of the endline evaluation.

The criteria draw on the FFP ToC and have been selected based on their ability, collectively, to cover the most important aspects of VfM. The standards show the dimensions of performance for each criterion that indicate excellent, good, adequate, and poor performance. For this exercise, 'adequate' performance is considered to be just good enough in terms of VfM, and 'poor' performance represents a 'fail' in terms of VfM.

Figure 28 Overview of our evaluation process for VfM framework design and reporting



Source: King and OPM (2018)

K.3 Indicators and data sources

For each of the criteria used as part of the VfM assessment, indicators were defined to support the assessment of the criteria. In addition, benchmarks were defined to come to a judgement. Table 23 provides an overview of the indicators and benchmarks. It also includes the data sources for the measurement of the indicators.

Table 23 Matrix of indicators and data sources

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
Economy criterion: The FFP uses resources economically, buying inputs of the appropriate quality at the right price, and following good programme management practices					
Sub-criterion: FFP is meeting agreed benchmarks or targets for TA and programme management costs					
1.1	**Long-term programme staff costs (weighted average) meet agreed benchmark**	Quantitative (monetary)	Average daily fee rate= total value billed divided on days (i.e. number of days*fee rate)/days billed	FFP budget- average fee rate over the entire duration of the project	Actual: FFP VfM (from invoices billed to DFID) Benchmark: FFP budget
1.2	**Short-term programme staff costs (weighted average) meet agreed benchmark**	Quantitative (monetary)	Average daily fee rate= total value billed divided on days (i.e. number of days*fee rate)/days billed	FFP budget- average fee rate over the entire duration of the project	Actual: FFP VfM (from invoices billed to DFID) Benchmark: FFP budget
1.3	**Operational costs of managing agent (Mott MacDonald)**	Quantitative (monetary)	Average operational costs per quarter for managing agent. These costs will cover rent, utilities, maintenance and other operational costs	FFP budget	Actual: FFP VfM (from invoices billed to DFID) Benchmark: FFP budget
1.4	**Prices paid for microfeeders**	Quantitative (monetary)	Actual costs paid (all microfeeders have the same price) vs. Snip business case	SNIP Business case	Actual: Contract between DPSA and Buhler (for the first 2 years of programme) Benchmark: SNIP business case

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
1.5a	**Cost of premix procured by millers (oil)**	Quantitative (monetary)	Actual costs paid by millers vs. MOU MOU vs. Business case	MOU and business case	Actual: Invoices from millers to FFP Benchmark: MOU between FFP and premix suppliers AND Business case Benchmark: FFP budget
1.5b	**Cost of premix procured by millers (wheat)**	Quantitative (monetary)	Actual costs paid by millers vs. MOU MOU vs. Business case	MOU and business case	Actual: Invoices from millers to FFP Benchmark: MOU between FFP and premix suppliers AND Business case Benchmark: FFP budget
Sub-criterion: : FFP shows sound procurement practices of microfeeders, QC equipment, premix and CSOs suppliers					
1.6	**Operational evidence of procurement policies and procedures being documented and followed (consistent with DFID guidelines and international best practice) for premix**	Qualitative- document review	Evidence of competitive tendering and multiple quotes for microfeeders and premix suppliers	DFID guidelines International best practice & Procurement policy of FFP	Actual: Procurement option paper MoUs with premix supplier, FFP quarterly reports to DFID and annual reports to DFID, Key informant interviews Benchmark: DFID guidelines on procurement OR Procurement policy of FFP
1.7	**Operational evidence of procurement policies and procedures being documented and followed (consistent with DFID guidelines and international best practice) for microfeeders**	Qualitative- document review	Evidence of competitive tendering and multiple quotes for microfeeders suppliers	DFID guidelines International best practice & Procurement policy of FFP	Actual: Procurement option paper MoUs with microfeeder supplier, FFP quarterly reports to DFID and annual reports to DFID, Key informant interviews Benchmark: DFID guidelines on procurement OR Procurement policy of FFP
1.8	**Operational evidence of procurement policies and procedures being documented and followed (consistent with DFID guidelines and international best practice) for other relevant key inputs**	Qualitative- document review	Evidence of competitive tendering and multiple quotes for RTKs suppliers, CSOs	DFID guidelines International best practice & Procurement policy FFP	Actual: Procurement option paper MoUs with RTKs supplier and CSOs, FFP quarterly reports to DFID and annual reports to DFID, Key informant interviews Benchmark: DFID guidelines on procurement OR Procurement policy of FFP

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
Sub-criterion: : FFP effective negotiations of prices of microfeeders and premix, and other cost as required					
1.9	**Narrative evidence of effective negotiation, documented and followed policies and procedures to manage risks of price increases or delays in premix distribution**	Qualitative- document review	Examples of effective negotiation, policies and procedures in place to manage risk of price increases or delays in premix distribution	DFID guidelines International best practice	Actual: MoUs with premix supplier, FFP quarterly reports to DFID and annual reports to DFID, key informant interviews Benchmark: DFID guidelines on procurement
1.10	**Evidence of one-off cost savings secured through negotiations**	Qualitative- document review	Example of cost saving secured through negotiations	None	Key informant interviews, annual reports, quarterly reports
EFFICIENCY CRITERION: The FFP produces the intended quantity of deliverables at the required quality, on time and within budget.					
Sub-criterion: Delivery according to FFP implementation plan					
2.1	**Changes in implementation timeline**	Qualitative- document review	Whether there has been any changes to the implementation timeline, whether those were agreed in advance, whether those were justified	Implementation timeline agreed with DFID at inception	Actual: Original contract for original milestone schedule Addendum to the contract (if any) Annual report, 2016-2017 and 2017-2018 DFID project review Benchmark: Implementation timeline at inception
2.2	**Change in milestones and deliverables**	Qualitative- document review	Whether there have been any changes to the implementation timeline, whether those were agreed in advance, whether those were justified	Deliverable schedule agreed with DFID at inception	Actual: Original contract for original milestone schedule Addendum to the contract (if any) Annual report, 2016-2017 and 2017-2018 DFID project review Benchmark: Deliverables schedule at inception

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
2.3	**Risk register is updated and comprehensive and programming adequately responds to risks. Risks are identified ahead of time.**	Qualitative- document review	Whether risks are identified, reported and acted upon	Risk reporting	Project risk register
2.4	**Expenditure on cost-centre on budget** **1. Wheat flour fortificant subsidy** **2. Oil fortificant subsidy** **3. TA (management, FFOs, travel and per diems, office support, etc.) (excluding fees)** **4. TA- fees** **5. QA/QC** **6. Monitoring and evaluation (M&E)** **7. Advocacy (broken down by key subcategories)** **8. Studies** **8. Other costs**	Quantitative (monetary)	For each cost centre: total spent/total budget for this cost centre as a % of total budgeted for this cost centre by the time of the evaluation	50% of budget allocated to this cost centre (as November 2018 is mid-way through the project)	Actual: FFP financial reports, FFP reports Benchmark: Original budget
2.5	**Adherence to schedule of total budget**	Quantitative (monetary)	Expenditure to date vs. 50-% of budget expenditure (as November 2018 is mid-way through the project)	FFP budget	Actual: FFP expenditure reporting Benchmark: Original budget
2.6	**Operational vs. registered mill (wheat)**	Quantitative	Number of operational mills/ numbers of registered mills	All mills registered are operational	FORTIS
2.6	**Operational vs. registered mill oil)**	Quantitative	Number of operational mills/ numbers of registered mills	All mills registered are operational	FORTIS
2.7	**Key logframes achievement are on track**	Quantitative	Achievement against logframe targets of key outputs	APIP	Actual: Logframe reporting/APIP Benchmark: Logframe
Sub-criterion: Performance-linked subsidy mechanism is effectively in place					
2.8	**Evidence that subsidy is designed in a transparent and effective way to enable**	Qualitative- document review	Whether the subsidy mechanism was thought through to be structured in the most efficient	DFID guidelines on funding the private sector	Actual: FFP subsidy documentation

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
	VfM.		way		Evidence of fortification reporting Evidence of payment based on fortification reporting KIIs to contextualise findings Benchmark: DFID guidelines on funding the private sector
2.9	**Evidence that payment is made on performance and following criteria outlined in subsidy management SOPs**	Qualitative- document review	Whether payment is matching performance	FFP subsidy payment guidelines	Actual: Evidence of fortification reporting Evidence of payment based on fortification reporting KIIs to contextualise findings Benchmark: FFP guidelines on subsidy payment
Sub-criterion: Allocation of TA resources across intervention pathways in appropriate proportion, that is, reflecting the relative priority given and associated costs.					
2.10	**Expenditure on cost-centre follows original budget allocation** **2. Wheat flour fortificant subsidy** **3. Oil fortificant subsidy** **4. TA (management, FFOs, travel and per diems, office support, etc.) (excluding fees)** **5. TA- fees** **5. QA/QC** **6. Monitoring and evaluation (M&E)** **7. Advocacy (broken down by key subcategories)** **8. Studies** **8. Other costs**	Quant (monetary)	For each cost centre: total spent on cost centre/total spent to date	Budget allocation on cost centre- assumption so far matches total budget allocation on cost item	Actual: FFP financial reports + FFP special reports Benchmark: Original budget
Sub-criterion: Allocation of microfeeders and premix orders reflect appropriate balance of resources across provinces according to staged implementation plan and priorities					
2.11	**Microfeeders by province is allocated according to needs and priorities**	Qual	Whether microfeeders were provided in priority to provinces that were ready to deploy/have shown interest/needed more support	Rational for implementation plan and any deviation from it	Actual: Actual allocation of microfeeder through KII and FORTIS (CHECK)

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
					Benchmark: Original roll-out plan and KII
Sub-criterion: Appropriate use of operations research and M&E findings to support adaptive management					
2.12	**Narrative evidence of use of operations research and M&E to support adaptive management and learning**	Qualitative- document review & KIIs interviews	Whether programme is showing proof of adaptive management	Some programme generated evidence is being used	Actual: FFP quarterly and annual reports, M&E reports, DFID annual review, OR reports, any evidence of action taken after M&E and OR findings
2.13	**Narrative evidence of adaptive management to ensure delivery to price, quality and quantity**	Qualitative	Evidence that programme generates learning (outside of M&E and OR) and that these are used to improve implementation (e.g. additional study needs to be carried out)	Learning is generated and used	Annual and quarterly reports, key informant interviews
Sub-criterion: Maintaining or improving efficiency over time					
2.14	**Project cost per adequately fortified metric ton of wheat flour and edible oil**	Quantitative (monetary)	Total metric tons of adequately produced food/ total programme cost, over time (monthly)	Trend- assumption that these are high initially and decreasing over time	Actual: FFP VfM report Q10 Benchmark: KII for direction of the trend
2.14	**Cost per adequately fortified metric ton of oil**	Quantitative (monetary)	Total metric tons of adequately produced food/ total programme cost, over time (monthly)	Trend- assumption that these are high initially and decreasing over time	Actual: FFP VfM report Q10 Benchmark: KII for direction of the trend
2.14	**Cost per adequately fortified metric ton of fortified product**	Quantitative (monetary)	Total metric tons of adequately produced food/ total programme cost, over time (monthly)	Trend- assumption that these are high initially and decreasing over time	Actual: FFP VfM report Q10 Benchmark: KII for direction of the trend
2.15	**Operational cost per mill**	Quantitative (monetary)	Programme operational cost/ number of mills in the programme over time (monthly)	Trend assumption increasing as the programme roll out to a new district and to new mills, then decreasing.	Actual: FFP VfM report Q10 Benchmark: KII for direction of the trend
2.16	**Average subsidy cost per metric ton of fortified product (wheat flour).**	Quantitative (monetary)	Subsidies provided/total numbers of fortified products produced (broken down by oil, flour etc.) (average)	Trend- assumption that these should be decreasing over time since the subsidy is gradually phased out	Actual: FFP VfM report Q10 Benchmark: KII for direction of the trend
2.16	**Average subsidy cost per metric ton of fortified product (oil).**	Quantitative (monetary)	Subsidies provided/total numbers of fortified products produced (broken down by oil, flour etc.) (average)	Trend- assumption that these should be decreasing over time since the subsidy is gradually phased out	Actual: VfM reporting from subsidy and third-party records Benchmark: Logframe
2.16	**Average subsidy cost per metric ton of fortified product (all)**	Quantitative (monetary)	Subsidies provided/total numbers of fortified products produced (broken down by oil, flour etc.) (average)	Trend- assumption that these should be decreasing over time since the subsidy is gradually phased out	Actual: VfM reporting from subsidy and third-party records Benchmark: Logframe
2.17	**Fortified flour output (metric ton) per microfeeder provided**	Quantitative (trend)	Average=total fortified flour output/number of microfeeders (monthly)	Constant over time or decreasing	Actual: FFP VfM Q10 Benchmark: Logframe metric ton target/microfeeder target

Indicator	Indicator	Type of data	How is the indicator measured	Benchmark	Source
2.18	**FFO costs per mill (flour)**	Quantitative (trend)	Average= number of mills per extender/costs of extender	Trend- should be high when a new district is added then decrease until all districts are added	Actual: FFP VfM report Q10 Benchmark: KII for direction of the trend
2.18	**FFO costs per mill (oil)**	Quantitative (trend)	Average= number of mills per extender/costs of extender	Trend- should be high when a new district is added then decrease until all districts are added	Actual: FFP VfM report Q10 Benchmark: KII for direction of the trend
2.19	**Programme cost per beneficiary**	Quantitative (trend)	% of total costs of project out of estimated number of populations consuming fortified products (breakdown by oil, flour etc.) (monthly)	Constant over time or decreasing	Actual: VfM reporting/ FORTIS Benchmark: Logframe

Annex L VfM evidence tables

This annex contains the evidence tables used for the VfM analysis presented in Section 6 for the economy and efficiency indicators.

L.1 Economy indicators

Sub-criterion	Indicator	Summary of evidence
Sub-criterion 1: FFP is meeting agreed benchmarks or targets for TA and programme management costs	1.1 Average fee rate of long-term staff	The daily fee rate of long-term staff as at November 2018 was[165]: • average: £281; • lowest monthly average: £186 (Sept-18); and • highest monthly average: £488 (June-16). **The average fee rate of long-term staff is on average 51% above the budgeted average fee rate[166] (£191) during the reporting period.** However, the average fee rate in Q9 and Q10 reaches benchmark. This coincides with the scale-up of the fortification activities. The decline in the average fee rate may be due to higher involvement of senior staff at the start of the project, compared to fortification staff with relatively lower fee rates involved in implementation activities.
	1.2 Average fee rate of short-term staff	The daily fee rate of short-term staff as at November 2018 was[167]: • average: £647; • lowest monthly average: £440 (Nov-18); and • highest monthly average: £825 (April-17,18 and July-18)]. **The average fee rate of short-term staff is 13% above the budgeted average fee rate (£571)[168].** No real trend is apparent in the data, as the trend is flat during Years 1 and 2, although there was a decrease in Q10. No trend is to be expected as short-term staff are brought in for specific pieces of work as required by the implementation and research on an *ad hoc* basis (Stakeholder interview, 2019). Due to the delays in implementation, FFP has had to call on short-term staff skills over a longer period of time to support the design and launch of the activities.
	1.3 Operational cost of operating agent (Mott McDonald)[169,170]	The monthly operational costs as at November 2018 were: • average: £21,534; • lowest monthly cost: £10,954 (March-16); and • highest monthly cost: £46,258 (Oct-18). **Operational costs are 52% below the average monthly budgeted operational costs[171].** Costs are increasing over time and reached their highest point in Q10. Operational costs are, as expected, increasing over time with the acceleration of activities. In future VfM assessments we expect to see these costs level off or decrease once operations are fully rolling.

[165] Average fee rate taken from the FFP VfM report for Q1–Q10 as part of the quarterly report September–November 2018.
[166] Budgeted average fee rate calculated over the entire project duration as monthly/quarterly/yearly disaggregation was not available.
[167] Average fee rate taken from the FFP VfM report for Q1–Q10 as part of the quarterly report September–November 2018.
[168] Budgeted average fee rate calculated over the entire project duration as monthly/quarterly/yearly disaggregation was not available.
[169] We are unable to disaggregate between different operational costs as we did not have access to these data.
[170] Average operational cost taken from FFP VfM report for Q1–Q10 as part of the quarterly report September–November 2018.
[171] Budgeted average fee rate calculated using FFP's budget over the entire project duration as monthly/quarterly/yearly disaggregation was not available.

Sub-criterion	Indicator	Summary of evidence
	1.4 Price paid for microfeeders	**Microfeeders: Microfeeder prices are within the microfeeder price range outlined in the DFID business case.** FFP procured microfeeders through DPSA at a cost of $3,470.2 a unit[172]. A costing study had quoted prices between $3,000 and $10,000[cxxxiii].
	1.5a and 1.5b Cost of premix procured by millers for oil and wheat flour	• **Oil premix**: According to the MoU with BASF in 2017, the price of oil premix had been agreed at PKR 5,150 per kg originally. In 2018, FFP signed an MoU with an additional supplier, DSM, and agreed on a price of PKR 10,050 per kg. The higher price reflects general higher prices in the oil premix market following the fire at the BASF production plant in 2017 (Annual Report 2017–2018). The price was re-evaluated in December 2018 due to the devaluation of the Pakistan rupee and was set to PKR 9,561 per kg for BASF and DSM also agreed to provide premix at this rate until December 2019 (Note for the Record, 20 December 2018). A random spot check of subsidy claims for October 2018 shows that oil mills are buying oil premix at PKR 8,940 and PKR 9,070 per kg. Two examples of premix invoices from mills show a price of PKR 9,561 per kg. This is within the price ceiling agreed between oil premix suppliers and FFP. • **Wheat premix supplied is within the negotiated price**: MoUs with wheat premix suppliers agreed a price ceiling of PKR 850 per kg. Recurrent devaluations of the Pakistan rupee have affected the distribution price of wheat premix: in February 2018, it was agreed that the price would be PKR 896 per kg, in May 2018 this was revised to PKR 937 per kg, in June 2018 it was revised to PKR 988.20 per kg, in August 2018 it was revised to PKR 1,007 per kg, and in October 2018 it was revised to PKR 1,087 per kg. • A random spot check of subsidy claims by mills for October 2018 shows a price of wheat premix between PKR 900 and PKR 1,050 per kg, which is within the agreed price (depending on which batch mills bought).

Sub-criterion 2: FFP shows effective procurement of microfeeders and premix, and other key inputs as required	1.6 Operational evidence of procurement policies and procedures being documented and followed (consistent with DFID guidelines and international best practice) for **premix**	• **Overall, sound procurement practices were followed for premix, following DFID's guidelines on procurement.**
		  ○ A procurement option paper was produced during the inception period and made the VfM and sustainability case for premix to be directly purchased by mills from private sector suppliers (FFP Procurement Options Paper, 2016). FFP held early market engagement discussions with large suppliers of premix to gauge interest and potential conditions for partnership.
		  ○ Invitations to tender were sent to 10+ providers for the procurement of oil and wheat premix through the GAIN Premix Facility and interested companies were invited to submit a proposal to supply fortificant at a competitive price on the Pakistan market. FFP received limited responses to the invitation to tender due to high stocks (nine months' worth of fortificant was asked from companies). The Annual Report (2016–2017) only notes three responses to the tender invitation – two for oil premix and one for wheat flour premix. FFP evaluated the proposals with the help of a committee made up of GAIN and WFP.
		• **Only two suppliers met the quality and quantity requirements set out by FFP. It is recognised by FFP and DFID that selection of one supplier for each premix creates a monopolistic situation of producers being able to choose from only one provider, which entails risks to regular supply and price-taker status.**
		  ○ When the fire hit BASF's plant in Germany the volume of premix supplies declined dramatically, raising prices, which increased the premix-related costs of the programme (Annual Report 2017–2018). Since the BASF plant incident, FFP has added DSM to procure the oil premix in response to the materialisation of risks.
		  ○ FFP and DFID report constantly looking into adding additional suppliers as the fortificant market expands in Pakistan (Quarterly Report September to November 2018). There is currently limited evidence on alternative suppliers that would be able to meet the programme expectations at the right quality, quantity, and price.

	1.7 Operational evidence of procurement policies and procedures being documented and followed (consistent with DFID guidelines	• Based on the evidence available we can only make a part judgement on this indicator as FFP did not procure microfeeders in the first two years of the programme. Therefore, we do not allocate a high weight to this indicator in the final economy judgement. • **Due processes were followed, with FFP providing technical requirements to DPSA and DPSA proceeding with the tendering and selection process (Annual Report 2016–2017).** • A procurement option paper was produced during the inception period and made the VfM and sustainability case for microfeeders to be procured through DFID's procurement framework – DPSA (FFP Procurement Options Paper, 2016).

[172] Price quoted in the contract between DPSA and Buhler Limited.

Sub-criterion	Indicator	Summary of evidence
	and international best practice) for **microfeeders**	• Stakeholder interviews (March 2019) indicate that sector stakeholders have recommended local procurement of microfeeders. After performing fortification tests using various equipment, FFP concluded that locally sourced microfeeders were not adequate to provide the quality of fortification required (Annual Report 2016–2017). Therefore, DPSA and FFP decided to procure microfeeders internationally. FFP received two responses (A Turkish company and Buhler Limited) and Buhler Limited was selected as the most competitive supplier. • Selection of one provider for microfeeder risks creating a monopoly supplier**.** This is noted by DFID in the Annual Review (2018, p. 3). FFP and DFID are constantly looking into adding new suppliers which can produce at quality, quantity, and the expected price to minimise the risk linked with a single provider situation (Quarterly Report, Y3 Q2, 2018). • FFP will be directly procuring microfeeders during the second phase of the programme to enable FFP to fully manage the risk and responsibility of microfeeder procurement and installations, and any associated delays or successes.

	1.8 Operational evidence of procurement policies and procedures being documented and followed (consistent with DFID guidelines and international best practice) for **other relevant key inputs**	• **Early market engagement was held for RTKs in the third quarter of Year 1**, along with NIFA as they were the ones who procured spot check kits for Nutrition International, GAIN, and WFP in the past. An invitation to tender was circulated to five companies.
		• **Media campaign: Due processes were followed by FFP in contracting media campaign agencies**. FFP issued an RFP for the media campaign in the second quarter of Year 2 for both the content creation of the campaign and the overall management of the campaign.
		  ○ Campaign content: Four firms responded to the tender. Proposals were evaluated by the FFP team and their team of external consultants. The contract was awarded to AdGroup (Pvt), a Pakistan-based company. Stakeholder interviews (2019) reveal that the firm was selected very carefully because of the sensitivity of the content and of the target population, so that additional weight was put on firms having run awareness campaigns in the past.
		  ○ Media management agency: Four firms responded to the tender. Proposals were evaluated by the FFP team and their team of external consultants. The contract was awarded to Adetude (Pvt), a Pakistan-based company, on the grounds of it having experience in running media campaigns in Pakistan, having a good district coverage, and being the cheapest provider.
		• **CSOs for interpersonal activities: Due processes were followed by FFP in the contracting of the CSOs to carry out the interpersonal activities.** In September 2018, FFP sent an RFP to 19 organisations pre-selected with the help of SUN. 13 out of 19 organisations responded to the RFP. Two bids were received in Sindh, four bids in KP, and three bids in Balochistan. FFP proceeded with the evaluation of those organisations. They received only one incomplete bid in Islamabad and two incomplete bids in Punjab. As at November 2018, FFP was still trying to obtain full bids from those organisations and offered to DFID to hire some consultants for a brief period of time should the CSO not submit a full bid.

Sub-criterion 3: FFP shows effective negotiations of prices of microfeeders and premix, and other key costs as required	1.9 Narrative evidence of effective negotiation, documented and followed policies and procedures to manage risks of price increases or delays in premix distribution	• **Oil and wheat flour premixes were negotiated with suppliers at the onset of the project and a capped price (ceiling) was agreed upon** in MoUs with premix suppliers, negotiated by FFP **– showing effective negotiation of prices.** It was agreed that price would be re-evaluated after two years. Provision in the MoUs include the possibility of re-negotiating the price in case there are large fluctuations in the price of inputs due to changes in the exchange rate or changes in the overall market (which happened in 2017 and 2018). • **FFP overall met expectations of quantity and price for premix supply for wheat flour.** As mentioned above, premix suppliers were chosen based on the in-country stocks that they could secure, and a fixed negotiated price range has been maintained over the current lifetime of the programme. As far as quantity is concerned, wheat flour premix was out of stock between February and April 2017 due to a dispute between the Pakistan Customs Service and the premix supplier, slowing down the roll-out of the programme to mills. We note that this was largely outside the control of FFP. • **FFP faced some challenges in the supply of oil premix in the first 2.5 years of the programme.** Premix suppliers were chosen based on the in-country stocks that they could secure, and a fixed negotiated price range was originally negotiated with oil premix suppliers. **Oil premix supplies have been faced with delays and negotiated prices increased substantially in 2017 (see Indicator 2.1 above for price changes).** While the decision to contract only one supplier for oil and wheat premixes is justified in FFP's documentation by the fact that no other suppliers could guarantee enough in-country supplies for the scale of the programme, the one supplier strategy carried risks for the supply of premix that have materialised. **The reliance on BASF only for oil premix led to limited availability of premix supply following the fire at the BASF warehouses for two months, leading to delays in oil fortification activities.** It also resulted in a significant increase in price of the oil fortificant (due to the fact that the supplier has a very large market share). When the prices of premix spiked, FFP (with the support of DFID) had to cover 50% of the increase in price. This has added additional financial burden to the project. We note, however, that due to the market share of BASF in the oil premix market, prices would have increased regardless of whether FFP had contracted more suppliers.
	1.10 Evidence of one-	• **Overall, FFP tried to make cost savings the first two years.**

Sub-criterion	Indicator	Summary of evidence
	off cost savings secured through negotiations	○ Through Nutrition International, FFP negotiated an exemption on the import tax of premix, which substantially lowered the price of imported premix (Inception Report, 2016). Lower import prices meant that FFP could negotiate a lower price for the premix with suppliers and in turn reduce the cost of the subsidy for the programme. ○ FFP negotiated a warranty and maintenance cost of $250 per microfeeder to be paid by the wheat flour mills to the supplier. According to FFP (key informant interview, February 2019), this is a cost saving that has been secured for the mills, although not directly for the programme. ○ Although not originally planned, FFP has covered the installation charges of the microfeeders. This has been an additional cost for the programme. However, this is due to reluctance on the part of the microfeeder supplier to issue an extended warranty without cost. As compensation for mills to pay this cost of $250 per microfeeder as well as the post-installation monitoring visit from the manufacturer, FFP has taken on the installation charges. This met PFMA's expectation of contributions from the mills that would be acceptable to millers. It also allowed compliance with programme requirements of quality.

L.2 Efficiency indicators

Table 24 Efficiency Indicators[cxxxiv]

<table>
<tr><th>Sub-criterion</th><th>Indicator</th><th>Summary of evidence</th></tr>
<tr><td rowspan="2">Sub-criterion 1a:

Technical efficiency – implementation plan: Delivery according to FFP implementation plan (at required quality, quantity, on time, and within budget), allowing for reasonable exceptions like changes to deliverables agreed in advance with DFID, changes due to adaptive programming, to capitalise on opportunities, and/or to manage risks</td><td>2.1 Changes in implementation timeline</td><td>There was a 1.5-year delay in implementation due to issues in the procurement and delivery of key equipment for the programme. In particular, there were clear delays in the production of fortified wheat flour, and subsequently delays in the start of advocacy activities.
○ According to DFID, delays in microfeeder procurement, disruptions in the supply of premix, and delays in signing up mills to start fortification production affected half of the milestones set for 2017–18 (DFID Annual Review, 2017–2018).
○ FFP was put on an APIP in July 2018 as a result of the delays (DFID Annual Review, 2017–2018)

However, FFP has put efforts in the last 2.5 years into establishing the processes needed to effectively implement the remainder of the operation once the equipment issues are solved, and to create an adequate enabling environment for fortification in Pakistan. Annex F of this report provides a detailed implementation of review of the programme up to the first quarter of 2019.</td></tr>
<tr><td>2.2 Change in milestones and deliverables</td><td>FFP has undergone various revisions to the milestones and deliverables plan.
1. A first logframe was agreed upon between DFID and FFP in June 2016, after inception.
2. A second version was agreed upon between DFID and FFP in January 2018. New evidence generated by the FACT survey and the RDS meant that targets had been overestimated and needed to be revised to be in line with the new evidence.
3. Finally, in July 2018, after DFID Annual Review, FFP was put on an APIP, which included large revisions in logframe targets. Examples of key revisions are given in the table below:
<table>
<tr><th>Indicator</th><th>Logframe target for May 2019 (2016)</th><th>Logframe target for May 2019 (January 2018)</th><th>Logframe target for May 2019 (October 2018) (APIP)</th></tr>
<tr><td>Number of microfeeders installed (number of mills)</td><td>1,852 (813)</td><td>1852 (813)</td><td>1,003 (399)[173]</td></tr>
<tr><td>Metric ton of fortified wheat flour produced</td><td>6,639, 744</td><td>3,361,967</td><td>523,533</td></tr>
<tr><td>Number of wheat flour mills signed up (cumulative)</td><td>1,082</td><td>813</td><td>399 (524)</td></tr>
<tr><td>Metric ton of fortified oil produced</td><td>1,270,007</td><td>1,439,379</td><td>1,439,379</td></tr>
<tr><td>Number of oil mills signed up</td><td>83</td><td>85</td><td>85</td></tr>
<tr><td>Delivery of approved operational research</td><td>4</td><td>At least one new</td><td>Two innovative</td></tr>
</table></td></tr>
</table>

[173] The APIP says 1,003 (399), as approved in the October 2018 logframe, while the October 2018 logframe says 1,350 (524). We have kept the APIP value in this table as the last APIP reporting was completed in December 2018.

Sub-criterion	Indicator	Summary of evidence			
		studies which are responsive to programme needs		**study a year completed**	**studies completed**
		Number of district governments with programme MoUs, local project office, and official government focal points (cumulative)	**76**	**36**	**36 (48)**
		Number of target districts where public advocacy and education campaigns have been conducted	**47**	**47**	**47**
		Number of provinces/ regions that have developed regulations and standards for fortification each year for wheat flour fortification (cumulative)	**4**	**4**	**1 (3)**
	2.3 Risk register is updated and comprehensive and programming adequately responds to risks. Risks are identified ahead of time	A risk register is updated quarterly but has proven to be insufficiently used. **Risks were not sufficiently identified – some examples are given below:** • Risks related to a monopoly of premix suppliers, for example, are not listed under the risk matrix in the 2016–2017 annual report but were introduced in 2017–2018 due to materialisation of these risks. • Risks related to the reticence of provincial stakeholders to engage with FFP (e.g. PFMA) were not listed but were acknowledged as a source of delays and challenges for the wheat fortification activities. • Risks related to millers not willing to fortify unless demand for fortified products has been established and evidenced were not listed. This has been quoted by wheat flour mills as one of the most important factors slowing down production of fortified products. **Risks were identified but still materialised, suggesting an inadequate mitigation strategy. Some examples are given below:** • Risk 24 related to microfeeders being installed in mills that either do not produce or refuse to fortify. Mitigation measure include visiting and assessing mills prior to installation but there was still no corrective action taken for this during the reporting period. • Risk 30 outlines the risk of delays in the procurement and installation of microfeeders. Mitigation measures around monitoring of the procurement process have been proven to be insufficient. • Risk 18 on mills not performing QA/QC: there are still reports of this not adequately happening at the mill level despite mitigation measures.			
	2.4 Expenditure on cost centres is within budget	**All cost centres to date are underspent compared to what would have been expected to be spent at this point in time of the project (i.e. 50% into implementation)[174]. Only spending on oil premix subsidy was on track as at November 2018.** ○ Spending on wheat premix was only 2% of expected spending by November 2018**.** ○ Operational costs were 66% of expected spending and fees were 50% of expected spending by November 2018. ○ M&E spending was 14% of expected spending by November 2018.			

[174] To estimate the expected spending by November 2018 (50% into implementation), we multiply the budget of each cost centre by 50%. It is recognised that not all cost centres should be spent in a linear way across implementation but in the absence of more detailed information this gives an indication of how spending has been progressing up to this date.

Sub-criterion	Indicator	Summary of evidence
		○ Studies were only at 6% of expected spending by November 2018. ○ QA on wheat flour was at 21% of expected spending but QA on oil was much higher than expected spending (153%) by November 2018. ○ QC on wheat flour was at 36% of expected spending and QC on oil was at 16% of expected spending by November 2018. ○ iCheck equipment was at 40% of expected spending by November 2018. ○ Advocacy was at 4% of expected spending by November 2018. ○ The annual district workshop was at 0% of expected spending by November 2018.
	2.5 Adherence to schedule of total budget	**The budget schedule was behind track as at November 2018[175].** 31% of the programme budget was spent from June 2016 to November 2018. Since 50% of the programme duration has elapsed, we would have expected this spending to be higher, particularly as high-cost equipment would have been purchased at the beginning, and as the subsidy structure is degressive over time, with a higher subsidy level at the start of production. The heavy underspend reflects large delays in implementation.
	2.6 Number of FFP-registered mills that are operational	**Only two-thirds to four-fifths of the registered mills are operational[176] (i.e. mills where microfeeders have been installed, training has been received, and premix is being ordered and received).** In Q10, 66% of registered wheat flour mills were operational. For oil mills, 80% were operational. However, in 2018, up to 82% of wheat mills and up to 85% of oil mills have been operational, compared to a target of 100%. This is due to the fact that mills open and close or halt production on a regular basis in Pakistan, and also due to the fact that some signed-up mills are still reluctant to produce fortified food products despite agreement with FFP.
	2.7 Key logframe achievements are on track: 1. number of microfeeders installed 2. number of beneficiaries reached 3. quantity of fortified product produced 4. research produced 5. meetings held	In 2018, FFP was put on an APIP due to delays in implementation. The APIP revised targets for the programme. **Key revised achievements are on track with or exceed these revised targets.** **As at December 2018, and compared to the logframe targets for December 2018[177]:** 1. 723 microfeeders were installed, against a revised target of 606 for December 2018; 2. 340 MoUs were signed with wheat flour producers, against a revised target of 309 for December 2018; 3. 100 MoUs were signed with oil producers, against a revised target of 85 for December 2018; 4. 198,693 metric tons of fortified wheat flour was produced, against a revised target of 144,656 metric tons for December 2018; 5. 979,990 metric tons of fortified oil was produced, against a target of 825,000 metric tons for December 2018; 6. 10 public awareness campaigns had been conducted, against a target of 11 for December 2018; 7. no new research had been produced so far, against a target of two innovative studies by December 2018; and 8. 32 project offices had been opened, against a target of 26 by December 2018.
Sub-criterion 2: **Technical efficiency – subsidy scheme**:	2.8 Evidence that subsidy is designed in a transparent and	**Evidence shows that the subsidy was designed using DFID's regulation on engaging with the private sector (Procurement Option Paper, 2016).** SOPs for the management of oil and wheat flour subsidies show many levels being involved to calculate subsidy all the way to

[175] This is calculated by dividing total spent as at November 2018 by total FFP budget for the 2016–2021 period.
[176] Figures taken from Fortis on 12 March 2019.
[177] FFP APIP reporting in December 2018.

<table>
<tr><th>Sub-criterion</th><th>Indicator</th><th>Summary of evidence</th></tr>
<tr><td rowspan="2">Performance-linked subsidy mechanism is effectively in place, verifying that provision of subsidies to millers is linked to performance – that is, it is applied when production of fortified foods meets agreed standards</td><td>effective way to enable VfM</td><td>the release of funds (FFO, Provincial Manager, NJMI, National Manager, Senior Finance Officer, and Technical Director) – showing levels of accountability.
SOPs also shows triangulation of evidence to make payment on premix utilisation (stocks report, invoice against premix), production (monthly production data, achieving minimum fortification production targets) and fortification (third-party lab tests – two samples taken a month, iCheck and external quality check using HPLC). There is additional provision to not reward over-fortification.</td></tr>
<tr><td>2.9 Evidence that payment is made based on performance and following criteria outlined in subsidy management SOPs</td><td>Overall, SOPs on payment are followed.
According to SOPs on subsidy payment, the level of the subsidy to be paid back to the producer is: the cost of premix consumed for fortification × level of subsidy for the semester. The cost of premix consumed for the semester is calculated as: premix consumed (in kg) for fortification × price of premix × % of production adequately fortified. The subsidy payment calculation from NJMI shows the quantity of fortified product produced per mill; amount of premix purchased; cost of premix for both oil and wheat flour fortification; level of subsidy for the semester; and adequacy of fortification. Invoices show differing levels of fortification and levels of subsidy, depending on the mill. Note that invoices do not show: 1. A calculation of the adequacy of fortification (e.g. fortification compliance criteria); and 2. the price per kg of the premix used. A broad estimate, however, shows the range of the price paid for premix to be within the range stated in the MoUs between FFP and the premix providers. Additionally, the evaluation was provided with laboratory evidence of fortification for oil/ghee (but not for wheat flour as wheat flour production had just started). Reports of stocks at mill level and invoices of mills show that FFP gathers this information for a large list of mills.</td></tr>
<tr><td>Sub-criterion 2a:

Allocative efficiency of TA resources: Allocation of TA resources across intervention pathways in appropriate proportion – that is, reflecting the relative priority given and associated costs</td><td>2.10 Expenditure on cost centre follows original budget allocation</td><td>Spending so far, out of the £6 million spent as at November 2018, has been allocated as follows. The first five categories represent a greater proportion of actual expenditure than of budgeted expenditure:
<table>
<tr><th>Cost centre</th><th>Breakdown of actual spending to November 2018 by cost centre[178]</th><th>Breakdown of project budget by cost centre[179]</th></tr>
<tr><td>Fees</td><td>63% [£4,001,431]</td><td>39% [£16,007,690]</td></tr>
<tr><td>Inception</td><td>12% [£758,140]</td><td>2% [£758,140]</td></tr>
<tr><td>Operational costs (excluding fees)</td><td>11% [£672,126]</td><td>2% [£1,002,351]</td></tr>
<tr><td>Oil premix subsidy</td><td>7% [£430,936]</td><td>2% [£900,000]</td></tr>
<tr><td>iCheck equipment</td><td>2% [£109,560]</td><td>1% [£543,660]</td></tr>
<tr><td>Wheat premix subsidy</td><td>1% [£86,243]</td><td>20% [£8,448,709]</td></tr>
<tr><td>QC</td><td>1% [£56,588]</td><td>1% [£461,850]</td></tr>
<tr><td>QA</td><td>1% [£33,774]</td><td>Less than 1% [£125,592]</td></tr>
</table></td></tr>
</table>

[178] This is calculated by dividing the total spent in each cost centre by the overall total spent as at November 2018 (and as reported by FFP on 04 March 2019).
[179] This is calculated by dividing the total budget in each cost centre by the overall total budget for the period 2016–2021.

<table>
<tr><th>Sub-criterion</th><th>Indicator</th><th>Summary of evidence</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Advocacy</td><td>1% [£44,063]</td><td>5% [£2,000,000]</td></tr>
<tr><td>studies</td><td>1% [£83,386]</td><td>7% [£2,835,000]</td></tr>
<tr><td>M&E</td><td>Less than 1% [£23,804]</td><td>1% [£350,000]</td></tr>
<tr><td>Wheat fortificant subsidy (microfeeders)</td><td>Less than 1% [£10,500]</td><td>12% [£5,004,609]</td></tr>
<tr><td>Other (including annual workshop, government lab subsidy)</td><td>0% [£19,309]</td><td>4% [£1,465,358]</td></tr>
<tr><td>TOTAL</td><td>100% [£6,350,263]</td><td>100% [£41,419,259]</td></tr>
</table>

It is important to note that it is not expected to see cost centres' spending reach their budget allocation spending until close to the end of the programme. However, the proportion of budget spent to date on various cost centres gives an indication of the progress of different activities compared to each other.
There has been high allocation of spending on fees and operational costs but also of iCheck equipment procurement and oil premix subsidy. High spending on fees and operational costs is linked to the extended set-up period of the programme.
Little was spent on wheat fortification subsidy, advocacy, and studies during the first 2.5 years of the programme. This is because wheat fortification was delayed and it was decided that advocacy would be launched once fortified products are available on the market for consumers to buy (stakeholder interview, 2019).
Similarly, microfeeder subsidy only started in November 2018, which explains the current low allocation.

</td></tr>
<tr><td>Sub-criterion 2b:

Allocative efficiency of key inputs: Allocation of microfeeders and premix orders reflect appropriate balance of resources across provinces according to staged implementation plan and priorities</td><td>2.11 Microfeeders by province are allocated according to needs and priorities</td><td>Provision of microfeeders was not on track as at November 2018 (DFID Annual Review, 2017–2018). Following the APIP, activities have accelerated to meet revised targets for 2019. The DFID Annual Review for 2017–2018 talks about 'an accelerated roll-out plan to make up for lost time' (p. 2).
The original roll-out plan was designed so that districts with higher density and intensity of production would be prioritised (stakeholder interview, 2019). The original roll-out plan therefore planned to roll out first to Punjab, as it produces wheat for most of the country, to minimise cost and maximise impact. Delays in microfeeder procurement and installation meant that this phased approach was to some extent no longer possible as provinces and districts needed to be rolled out at the same time. This acceleration is reflected in the logframe figures for microfeeders/mills reached.
While the gradual roll-out did not happen, provinces and districts with higher density and intensity did get reached first – in line with the original rationale of the roll-out plan. It is also to noted that larger mills were prioritised for advocacy to also help with reaching targets and to set an example for smaller mills (p. 35 in Quarterly Report June–August 2017).</td></tr>
</table>

Sub-criterion	Indicator	Summary of evidence
Sub-criterion 3a: **Dynamic efficiency** – **adaptive learning and management**: Appropriate use of operations research and M&E findings to support adaptive management	2.12 Narrative evidence of use of operations research and M&E to support adaptive management and learning	**FFP uses operations research to some extent to inform programme targets and strategy.** An RTAG was set up. Two studies have been commissioned and completed to date. These are: 1. the RDS; and 2. a benefits incidence analysis. The programme has used the findings of the RDS, along with the FACT 2017 survey data, to revise targets, as the studies found that consumption of roller mill flour has been lower than expected. The study findings have also been used to motivate further research, such as examining the feasibility of targeting large *chakki* mills for fortification. The RDS study also informs FFP's public awareness strategy. However, as noted in Section 2 , the potential of this component to inform both design and continual improvement has not been realised to date, primarily for three reasons: 1. The utilisation of local, contextual evidence to inform aspects of design has not been optimised. In particular, information on potential motivating and demotivating factors for industry compliance with fortification should have been prepared separately for oil/ghee and wheat flour, to explore how the incentives vary across those industries and the implications for programme design. The demand-creation review should have also taken place early enough to design the consumer engagement strategy. 2. Several relevant studies have subsequently been designed and implemented, but not in a timely manner, and it is not clear the extent to which the results can modify programme components in a meaningful way at this time. For example, the incentives study showed significant differences in industry preferences under mandatory and non-mandatory fortification. It also emphasised that non-financial incentives may have greater value in relation to motivating compliance than financial incentives, particularly for the oil/ghee industry. These results require, if not modifications, at least additions to the approach taken by FFP; and if they are not addressed this may have important implications for programme sustainability once financial incentives are removed 3. The approach taken with the RTAG has limited it to light-touch input on specific research studies, rather than expert accompaniment for continual programme improvement. M&E activities are captured by FFOs in the MIS, called FortIS. FortIS is functional and operational and tracks key progress indicators entered by field staff on a regular basis. **There is limited information on how FortIS is used for the purposes of adaptive learning.**

Sub-criterion	Indicator	Summary of evidence
	2.13 Project cost per adequately fortified metric ton of wheat flour and edible oil	**Project cost per adequately fortified metric ton of wheat flour is significantly above project budget calculation**[180]. This was around £14.70 in November 2018,[181] compared to a project benchmark of £3.69. This is consistent with the fact that wheat fortification started in the second half of 2018, meaning there were high upfront costs but little production up to that point (stakeholder interview, 2019). This is also reinforced by the fact that compliance remains limited in many FFP-subsidised mills at this stage. **Project cost per adequately fortified metric ton of oil is within project budget calculation**[182]**.** This was around £3.63 in November 2018,[183] compared to a project benchmark of £3.95. This is expected as most mills have now been signed up to the programme and oil fortification was already mandatory at the beginning of FFP, and therefore many mills in the programme fortify to the adequate level. Overall, in November 2018 project cost per adequately fortified metric ton of food vehicle in FFP-supported mills was £5.82 per metric ton, compared to a project budget calculation of £3.81. Note: we do not have data for the programme cost over time (month, quarter, or year). We cannot therefore comment on the trend of this indicator. This analysis will be done at the next iteration of the VfM analysis, if the necessary data are made available.
Sub-criterion 3b: **Dynamic efficiency – maintaining or improving efficiency over time,** measured through trend analysis of selected efficiency indicators	2.14 Operational cost per mill	**Operational costs per mill were initially high but decreased over time in the period under review as the programme expanded.** This is moving as expected as regards the nature of the programme: high set-up costs (district offices, FFOs) and few operating mills at the beginning but costs decreasing as more mills are added into the programme. FFP expects operational costs per mill to flatten once all targeted mills have been signed up to the programme – about six months before the end of the programme (stakeholder interview, 2019). The operational cost per mill as at November 2018 was[184]: • average: £444; • lowest monthly average: £51 (July 2018); and • highest monthly average: £2,193 (August 2017). Note: FFP VfM data do not disaggregate between oil and wheat flour mills for this indicator, therefore we do not disaggregate either.
	2.15 Average subsidy cost per metric ton of fortified product	**The average subsidy cost per unit of fortified product is significantly lower than expected for wheat flour but slightly higher for oil. There is a large variation month on month, but it is expected that the average cost per unit of fortified product will flatten out as more mills join and as compliance increases.** • The average cost of subsidy per fortified wheat flour is £0.34 per metric ton (using data from November 2018), compared to a project budget benchmark of £1.50 per metric ton[185]. It is expected that the average cost of subsidy per fortified metric ton of wheat flour will increase as mills scale up production and fortification. ○ Lowest monthly average: £0.09 (June 2018).

[180] This is calculated by dividing 50% of the total FFP budget by the cumulative logframe target for wheat flour production over the project duration until May 2021.
[181] This is calculated by dividing the total spent by FFP in November 2018 by the cumulative production of fortified wheat flour in FortIS as at November 2018.
[182] This is calculated by dividing 50% of the total FFP budget by the cumulative logframe target of oil production over the project duration until May 2021.
[183] This is calculated by dividing the total spent by FFP in November 2018 by the cumulative production of fortified oil in FortIS as at November 2018.
[184] Value taken from FFP VfM report for Q10 quarterly report.
[185] This is calculated by dividing the total subsidy envelope in the FFP budget by the cumulative logframe target for wheat flour production over the project duration until May 2021

Sub-criterion	Indicator	Summary of evidence
		○ Highest monthly average: £0.66 (July 2018). ○ There is also a large variation month on month, with no clear trend. The average cost of subsidy per oil/ghee is at £0.26 per metric (using data from November 2018), compared to a project benchmark of £0.17 per MT[186]. ○ Lowest monthly average: £0.06 (November 2017). ○ Highest monthly average: £0.66 (April 2017). ○ There is also a large variation month on month, with no clear trend. Monthly variation in the average cost of subsidy per metric ton of fortified product could be explained by the fact that FFP has set minimum production targets for the mills to be able to claim subsidies (25% in the first semester, 50% in the second, and 100% in the third trimester and onwards) to reflect the fact that mills might only gradually scale up production and fortification (stakeholder interview, 2019 and SOPs on subsidy management for oil and wheat flour). Therefore, payments in the first three quarters reflect the combination of the level of subsidy payment that a mill is eligible for and the level of fortified production that the mill produces. Any variation in the amount of fortified production from one month to another will lead to variation in the average subsidy cost per metric ton produced. There have also been increases in the price of oil and wheat flour premix over the course of the programme, which means that the subsidy cost per metric ton produced has also been increasing over the last 2.5 years (see economy Indicator 2.1). Some of the changes in prices happened within a few months of each other so, depending on the batch of premix purchased by the mills, mills would claim a different subsidy amount for the same level of fortification.
	2.16 Fortified flour output (metric ton) per microfeeder provided	**Fortified output per microfeeder has increased substantially since 2017, due to good progress on operationalisation of wheat flour mills by November 2018.** Fortified flour output per microfeeder went from 19.4 metric tons per microfeeder in November 2017 to 40.5 metric tons per microfeeder in November 2018 – which is a 108% increase over the last two years. The fortified output per microfeeder as at November 2018 was[187]: • average: 33.12 metric tons per microfeeder; • lowest monthly average: 9 metric tons per microfeeder (April 2018); and • highest monthly average: 44.5 metric tons per microfeeder (October 2018).
	2.17 Operational cost of FFO per mill	**FFO costs per mill have fluctuated over time in the period under review – in a way that is expected during programme expansion.** The operational cost per FFO as at November 2018 was[188]: • average: £322 for wheat flour and £239 for oil; • lowest monthly averages: £165 (June 2018) for wheat flour and £78 (December 2017) for oil; and • highest monthly averages: £1,084 (November 2018) for wheat flour and £369 (November 2018) for oil. • FFO costs per mill should be decreasing over time then become flat when all mills have been enrolled into the programme. However, when the programme expands to a new district all FFOs are hired, as they help with mill registration. Therefore, FFO costs per mill are higher as soon as FFP expands to a new district as the number of enrolled mills is originally low in a new district. Periodically in the period of expansion, we should expect a decrease in the cost as the programme enrols more mills up until it expands to a new district. This is what we observe in the data

[186] This is calculated by dividing the total subsidy envelope in the FFP budget by the cumulative logframe target for oil production over the project duration until May 2021.
[187] Value taken from FFP VfM report for Q10 quarterly report.
[188] This is taken from FFP's VfM reporting as at November 2018.

Sub-criterion	Indicator	Summary of evidence
		(stakeholder interview, 2019).
	2.18 Programme cost per beneficiary	**Programme cost per beneficiary is higher than expected for wheat flour but around the expected value for oil. There is a lot of variation in the programme cost per beneficiary for both wheat flour and oil.** The programme cost per beneficiary as at November 2018 was[189]: • average: £3.72 for wheat flour and £0.08 for oil – overall, £1.60; • lowest monthly averages: £0.62 (December 2017) for wheat flour and £0.01 (March–May 2017) for oil; and • highest monthly averages: £13.05 (November 2017) for wheat flour and £0.15 (August 2017 and 2018) for oil. The business case estimates that over the duration of the programme the average cost per beneficiary for wheat flour will be £0.48 per beneficiary for wheat flour, £0.08 for oil, and £0.40 overall.

[189] This is taken from FFP's VfM reporting as at November 2018.

Annex endnotes

[c] FFP (2017) 'FFP Annual Report, Implementation Year 1, June 2017'.

[ci] Interview with pre-mix distributor in Pakistan.

[cii] Price data provided by FFP; confirmed by mill interviews.

[ciii] MoU between FFP and BASF SE, April 2017.

[civ] Oil/ghee premix subsidy data provided by FFP.

[cv] FFP (2018) 'FFP Quarterly Report, March 2018'.

[cvi] FFP (2017) 'FFP Quarterly Report, September 2017'.

[cvii] FFP (2018) 'FFP Annual Report, Implementation Year 2, June 2018'.

[cviii] FFP (2017) 'FFP Quarterly Report, September 2017'.

[cix] FFP (2017) 'FFP Quarterly Report, March 2017.

[cx] PSQCA (2012)

[cxi] FFP (2018) 'FFP Annual Report, Implementation Year 2, June 2018'.

[cxii] FFP (2018) 'FFP Quarterly Report, December 2018'.

[cxiii] Stakeholder Management Database Report, September–November 2018.

[cxiv] FFP Quarterly Report.

[cxv] FFP (2018) 'FFP Annual Report, Implementation Year 2, June 2018'.

[cxvi] FFP (2018) 'FFP Quarterly Report, March 2018'.

[cxvii] Ghauri (2017) 'Assessment of premix distribution in Pakistan: Option Analysis'.

[cxviii] MoU between FFP and PFMA.

[cxix] FFP monitoring data received on 24 April 2019.

[cxx] Information provided by FFP.

[cxxi] FFP (2019) 'Progress sheet against APIP 31 December 2018;.

[cxxii] FFP (2017) 'FFP Quarterly Report, September 2017'.

[cxxiii] Training data provided by FFP.

[cxxiv] FFO data provided by FFP.

[cxxv] FFP (2017) 'FFP Annual Report, Implementation Year 1, June 2017'.

[cxxvi] FFP (2016) Stakeholder Analysis and Engagement Plan.

[cxxvii] FFP (2018) 'FFP Quarterly Report, December 2018'.

[cxxviii] FFP (n.d.) 'FortIS User Guide'.

[cxxix] FFP (2017) 'FFP Annual Report, Implementation Year 1, June 2017'.

[cxxx] FFP (2017) 'FFP Quarterly Report, September 2017'.

[cxxxi] King, J. (2017) 'Using Economic Methods Evaluatively', *American Journal of Evaluation* 38(1), 101–113.

[cxxxii] King, J. and OPM (2018) *OPM's approach to assessing value for money: a guide.* OPM, Oxford. www.opml.co.uk/files/Publications/opm-approach-assessing-value-for-money.pdf?noredirect=1

[cxxxiii] Gaffey, M. *et al*., (2014) 'Pakistan food fortification scoping study', PATH, Washington DC.