

4. Biofuel markets and policy impacts

As discussed in Chapter 3, liquid biofuel development is being driven by a combination of economic and policy factors that are influencing global agriculture – sometimes in unexpected ways. This chapter focuses on biofuel markets and the impact of policies on biofuel and agricultural production and prices. It surveys recent global trends in agricultural commodity markets and examines their links with the expansion of liquid biofuel demand. It then reviews the medium-term outlook for biofuel production and the implications for commodity production and prices, and analyses the potential influence of alternative policy and petroleum price scenarios on how the sector evolves. Finally, it discusses the costs of biofuel policies currently being pursued, as well as some of their market impacts.

Recent biofuel and commodity market developments⁸

Policy support to the production and use of ethanol and biodiesel and the rapid rise in petroleum prices have made biofuels more attractive as substitutes for petroleum-based fuels. Global ethanol production tripled between 2000 and 2007, to reach 62 billion litres (F.O. Licht, 2008, data from the OECD–FAO AgLink-Cosimo database), and the production of biodiesel increased more than ten-fold during the same period, to more than 10 billion litres. Brazil and the United States of America dominate the growth in ethanol production, while the EU has been the major source of growth in biodiesel production. However, many other countries have also begun to increase their output of biofuels.

Agricultural commodity prices have risen sharply over the past three years, driven by a combination of mutually reinforcing factors,

including, among others, the demand for biofuels. The FAO index of nominal food prices has doubled since 2002, and the index of real prices has also risen rapidly. By early 2008, real food prices were 64 percent above the levels of 2002 after four decades of predominantly declining or flat trends. The surge was led by vegetable oil prices, which on average increased by more than 97 percent during the same period, followed by cereals (87 percent), dairy products (58 percent) and rice (46 percent) (Figure 15). Sugar and meat product prices also rose, but not to the same extent.

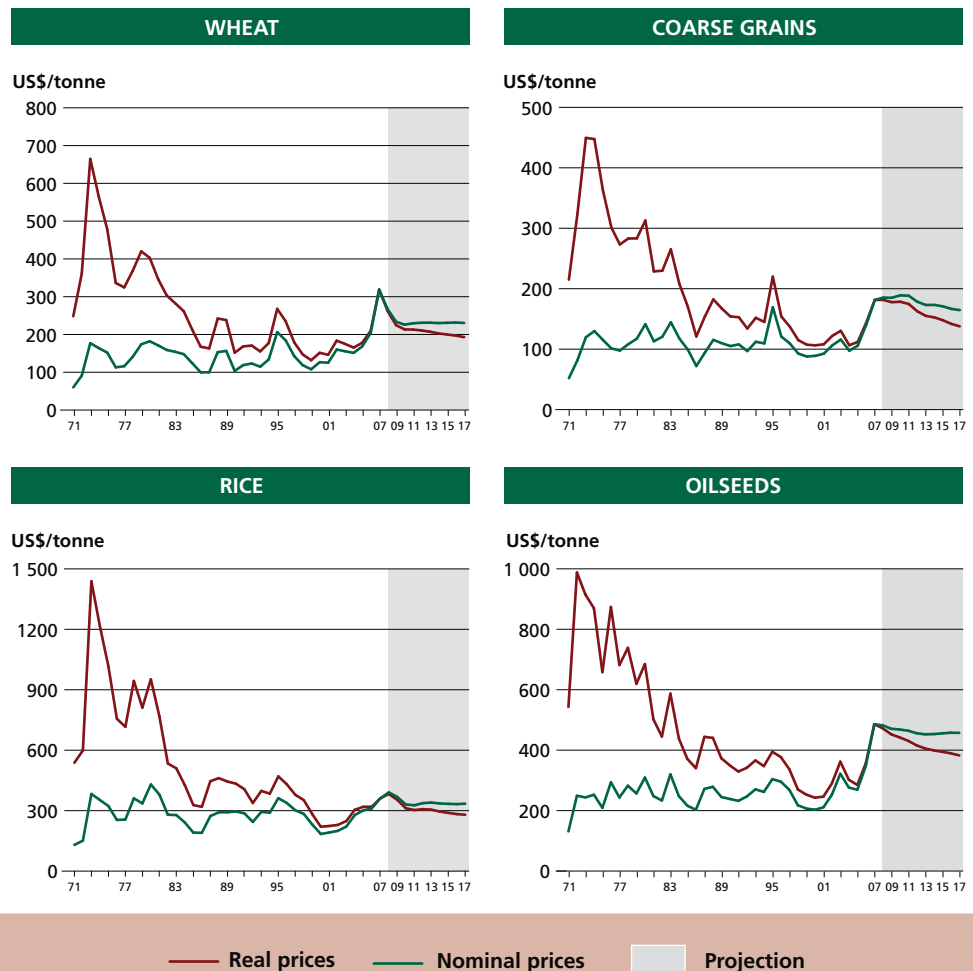
High-price events, like low-price events, are relatively common occurrences in individual agricultural markets, and indeed some commodity prices had begun to retreat by mid-2008 on the strength of higher predicted harvests (FAO, 2008b). What distinguishes the current state of agricultural markets, however, is the sharp increase in world prices not just of a selected few but, as noted above, nearly all major food and feed commodities and the possibility that the prices may remain high after the effects of short-term shocks dissipate, as predicted in the *OECD-FAO Agricultural Outlook: 2008–2017* (OECD–FAO, 2008). Many factors have contributed to these events, although it is difficult to quantify their relative contributions.

High up in the list of possible factors is the strengthening of linkages among different agricultural commodity markets (i.e. cereals, oilseeds and livestock products) as a result of rapid economic and population growth in many emerging countries. Also prominent is the strengthening of linkages among agricultural commodity markets and those of fossil fuels and biofuels, which influence both production costs and demand for agricultural commodities. Closer linkages with financial markets and the depreciation of the United States dollar against many currencies have also played an important role (FAO, 2008a).

The price boom has also been accompanied by much higher price volatility than in the

⁸ For more information about current developments in agricultural commodity markets, see FAO (2008a) and the latest issues of *Food Outlook*.

FIGURE 15
Food commodity price trends 1971–2007, with projections to 2017



Source: OECD-FAO, 2008.

past, especially in the cereals and oilseeds sectors, highlighting the greater uncertainty in the markets. Yet the current situation differs from the past in that the price volatility has lasted longer – a feature that is as much a result of supply tightness as it is a reflection of changes in the nature of the relationships among agricultural markets for individual commodities, as well as their relationships with others.

A critical trigger for the price hikes has been the decline in cereal production in major exporting countries, which, beginning in 2005 and continuing in 2006, declined annually by 4 and 7 percent respectively. Yields in Australia and Canada fell by about one-fifth in aggregate, and yields were at or below trend in many other countries. The

gradual reduction in cereal stock levels since the mid-1990s is another supply-side factor that has had a significant impact on markets. Indeed, since the previous high-price event in 1995, global stock levels have declined, on average, by 3.4 percent per year as demand growth has outstripped supply. Production shocks at recent low-stock levels helped set the stage for rapid price hikes.

Recent increases in petroleum prices have also raised the costs of producing agricultural commodities; for example, the United States dollar prices of some fertilizers increased by more than 160 percent in the first two months of 2008, compared with the same period in 2007. Indeed, the increase in energy prices has been both rapid and steep, with the Reuters-CRB (Commodity Research

Bureau) energy price index more than tripling since 2003. With freight rates doubling within a one-year period beginning in February 2006, the cost of transporting food to importing countries also has been affected.

Rising petroleum prices have also contributed to a surge in demand for agricultural crops as feedstocks for biofuel production. An estimated 93 million tonnes of wheat and coarse grains were used for ethanol production in 2007, double the level of 2005 (OECD–FAO, 2008). This represents more than half of the total growth in wheat and coarse grain use during the period, but probably accounts for less than half of the increase in prices, as other factors were also involved. Most of this growth can be attributed to the United States of America alone, where the use of maize for ethanol rose to 81 million tonnes in 2007 and is forecast to increase by another 30 percent during the current crop year (FAO, 2008b).

While these recent price trends are clearly a source of concern for low-income consumers, they need to be considered from a longer-term perspective. Figure 15 confirms that although real commodity prices have risen rapidly in recent years, they still remain well below the levels reached in the 1970s and early 1980s. In real terms, coarse grain prices are still lower than the peaks reached in the mid-1990s. While this does not diminish the hardship implied for poor consumers, it does suggest that the current crisis is not without precedent and that policy responses should take into consideration the cyclical nature of commodity markets. Some of the factors underlying the current high prices are transitory in nature and will be mitigated as conditions return to more normal patterns and farmers around the world respond to price incentives. Others factors are of a longer-term, more structural nature, and thus may continue putting upward pressure on prices. Long-term projections suggest that agricultural commodity prices will retreat from their current levels and resume their long-term declining trend in the next few years, although prices for coarse grains and oilseeds are likely to remain above the levels that prevailed during the previous decade (see Part II of this report for a more complete discussion of commodity price determinants and potential future trends).

Even when agricultural commodity prices retreat from the current high levels,

however, demand for biofuels is likely to continue its influence on prices well into the future, as biofuel demand serves to forge closer linkages between the energy and agricultural markets. The influence of energy prices on agricultural commodity prices is not a new phenomenon, given the longstanding reliance on fertilizers and machinery as inputs in commodity production processes. Greater use of agricultural commodities for biofuel production would strengthen this price relationship. Future trends in biofuel production, consumption, trade and prices will depend critically on future developments in the energy markets and, more specifically, on crude oil prices.

Long-term projections for biofuel development

The International Energy Agency (IEA, 2007) foresees a significant expansion of the role of liquid biofuels for transport. Nevertheless, when viewed in the context of both total energy use and total energy use for transport, it will remain relatively limited. Transportation currently accounts for 26 percent of total energy consumption, 94 percent of which is supplied by petroleum and only 0.9 percent by biofuels. As briefly indicated in Chapter 2, in its Reference Scenario in *World Energy Outlook 2007*, the IEA foresees an increase of this share to 2.3 percent in 2015 and 3.2 percent in 2030 (see Table 8). This corresponds to an increase in the total amount of biofuels used in the transport sector, from 19 million Mtoe in 2005 to 57 million in 2015 and 102 million in 2030. The Reference Scenario “is designed to show the outcome, on given assumptions about economic growth, population, energy prices and technology, if nothing more is done by governments to change underlying energy trends. It takes account of those government policies and measures that had already been adopted by mid-2007...” (IEA, 2007, p. 57).

Expansion of biofuel production and consumption could be stronger, depending on policies adopted. Under the IEA’s Alternative Policy Scenario, which “takes into account those policies and measures that countries are currently considering and are assumed to adopt and implement” (IEA, 2007, p. 66), the share is projected

TABLE 8
Energy demand by source and sector: reference scenario

	ENERGY DEMAND (Mtoe)						SHARE (Percentage)		
	1980	1990	2000	2005	2015	2030	2005	2015	2030
Total primary energy supply by SOURCE	7 228	8 755	10 023	11 429	14 361	17 721	100	100	100
Coal	1 786	2 216	2 292	2 892	3 988	4 994	25	28	28
Oil	3 106	3 216	3 647	4 000	4 720	5 585	35	33	32
Gas	1 237	1 676	2 089	2 354	3 044	3 948	21	21	22
Nuclear	186	525	675	714	804	854	6	6	5
Hydro	147	184	226	251	327	416	2	2	2
Biomass and waste	753	903	1 041	1 149	1 334	1 615	10	9	9
Other renewable	12	35	53	61	145	308	1	1	2
Total energy consumption by SECTOR	..	6 184	..	7 737	9 657	11 861	100	100	100
Residential, services and agriculture	..	2 516	..	2 892	3 423	4 122	37	35	35
Industry	..	2 197	..	2 834	3 765	4 576	37	39	39
Transport	..	1 471	..	2 011	2 469	3 163	26	26	27
Oil	..	1 378	..	1 895	2 296	2 919	94	93	92
Biofuels	..	6	..	19	57	102	1	2	3
Other fuels	..	87	..	96	117	142	5	5	4

Note: .. = not available. Data presented are subject to rounding.
Source: IEA, 2007.

to increase to 3.3 percent in 2015 and 5.9 percent in 2030, corresponding to an increase in total volume to 78 Mtoe in 2015 and 164 Mtoe in 2030.

Recent and projected increases in biofuel feedstock production are substantial in relation to current agricultural production. Production increases can be achieved by extending the area devoted to producing biofuel feedstocks – either via shifts from production of other crops on land already in cultivation, or by converting land not already in crop production, such as grassland or forest land. Alternatively, production can be increased by improving the yields of biofuel feedstocks on land already in production.

To achieve their long-term biofuel production scenarios, the IEA projects an increase in the share of cropland devoted to biofuel feedstocks from 1 percent in 2004 to 2.5 percent by 2030 under the Reference Scenario, 3.8 percent under the Alternative Policy Scenario and 4.2 percent

under a scenario where second-generation technologies become available (Table 9) (IEA, 2006, pp. 414–416). Land used directly for biofuel production under these various scenarios would increase to between 11.6 and 15.7 percent of cropland in the EU and 5.4 and 10.2 percent in the United States of America and Canada, but would remain below 3.4 percent in other regions (although it could be higher in individual countries, such as Brazil). The environmental implications of area expansion *vis-à-vis* intensification are discussed further in Chapter 5.

Medium-term outlook for biofuels⁹

The *OECD-FAO Agricultural Outlook 2008–2017* includes a full set of projections for

⁹ The analysis in this section is based on OECD-FAO (2008). Permission to use this material is gratefully acknowledged.

TABLE 9
Land requirements for biofuel production

COUNTRY GROUPING	2004		2030					
			Reference scenario		Alternative policy scenario		Second-generation biofuels case	
	(Million ha)	(Percentage of arable land)	(Million ha)	(Percentage of arable land)	(Million ha)	(Percentage of arable land)	(Million ha)	(Percentage of arable land)
Africa and Near East	–	–	0.8	0.3	0.9	0.3	1.1	0.4
Developing Asia	–	–	5.0	1.2	10.2	2.5	11.8	2.8
European Union	2.6	1.2	12.6	11.6	15.7	14.5	17.1	15.7
Latin America	2.7	0.9	3.5	2.4	4.3	2.9	5.0	3.4
OECD Pacific	–	–	0.3	0.7	1.0	2.1	1.0	2.0
Transition economies	–	–	0.1	0.1	0.2	0.1	0.2	0.1
United States of America and Canada	8.4	1.9	12.0	5.4	20.4	9.2	22.6	10.2
World	13.8	1.0	34.5	2.5	52.8	3.8	58.5	4.2

Note: – = negligible.

Sources: FAO, 2008a; IEA, 2006.

future supply, demand, trade and prices for ethanol and biodiesel, which are summarized in this section. The projections are based on a linked model of 58 countries and regions and 20 agricultural commodities. The model includes ethanol and biodiesel markets for 17 countries. It allows an integrated analysis of energy and agricultural markets and supports the analysis of alternative policy scenarios. The baseline projections reflect government policies in place as of early 2008 and are based on a consistent set of assumptions regarding exogenous factors such as population, economic growth, currency exchange rates and global petroleum prices.

The outlook for ethanol

Figure 16 shows the OECD/FAO baseline projections for global ethanol production, trade and prices. Production is projected to more than double by 2017, reaching 127 billion litres compared with 62 billion litres in 2007. Both figures include ethanol produced for uses other than fuel, whereas the 52 billion litres reported in Table 1 (page 15) included only biofuel ethanol. According to the projections, global ethanol prices should rise during the early years of the projection period before retreating to levels around US\$51 per hectolitre, as

production capacity expands. As a result of increases in mandated blending of transport fuels in OECD countries, international trade in ethanol is expected to grow to almost 11 billion litres, most of it originating in Brazil. However, traded ethanol will continue to account for only a small share of total production.

Brazil and the United States of America will retain their positions as the largest ethanol producers through to 2017, as shown in Figure 17, but many other countries are expanding production rapidly. In the United States of America, ethanol production is expected to double during the projection period, reaching some 52 billion litres by 2017, corresponding to 42 percent of global production. Total use is projected to increase more rapidly than production, and net imports are expected to grow to about 9 percent of domestic ethanol use by 2017. Ethanol production in Brazil is also expected to continue its rapid growth, reaching 32 billion litres by 2017. With sugar cane remaining the cheapest of the main ethanol feedstocks, Brazil will remain highly competitive and is expected to almost triple its ethanol exports to 8.8 billion litres by 2017. By that year, 85 percent of global ethanol exports are projected to originate from Brazil.

BOX 6

Main sources of uncertainty for biofuel projections

The projections presented in this section give some indication of the possible future direction of world biofuel production, trade and prices. However, it is important to emphasize that the projections are subject to a number of uncertainties. Most importantly, they assume that basic agricultural commodities will continue to represent the bulk of feedstocks for ethanol and biodiesel throughout the next decade and that the technical and economic constraints that currently limit the production and marketing of biofuels based on other feedstocks will remain prohibitive. In particular, it is assumed that second-generation ethanol produced from cellulose and biomass-based diesel fuels will not become economically viable on any meaningful scale during the projection period.

However, numerous countries are engaged in research aimed at overcoming existing constraints and, although prospects for success remain uncertain, it is not impossible that the first commercial production plants for second-generation biofuels could become operational during the next decade. This would significantly change the relationship between biofuel production and agricultural markets, especially with regard to the extent that feedstocks for these fuels would come from either crop residues or energy crops grown on land not suitable for food production.

Other uncertainties relate to future developments in the markets for fossil energy and agriculture. Feedstock prices

represent a large share of total biofuel production costs and have a significant impact on the economic viability of the sector. Prices for coarse grains and vegetable oils are projected to remain at relatively high levels (when expressed in United States dollars) compared with the past, despite some decline in the short run, while sugar prices should increase after 2008. Production costs for most biofuels are thus likely to remain a significant constraint over the projection period. The baseline projections assume that petroleum prices will increase slowly throughout the projection period, from US\$90/barrel in 2008 to US\$104/barrel by 2017. These price assumptions are a major source of uncertainty for the projections; for example, the previous OECD–FAO baseline assumed that petroleum prices would remain in the range of US\$50–55 during the 2007–16 projection period (OECD–FAO, 2007), while actual petroleum prices exceeded US\$129/barrel in May 2008.

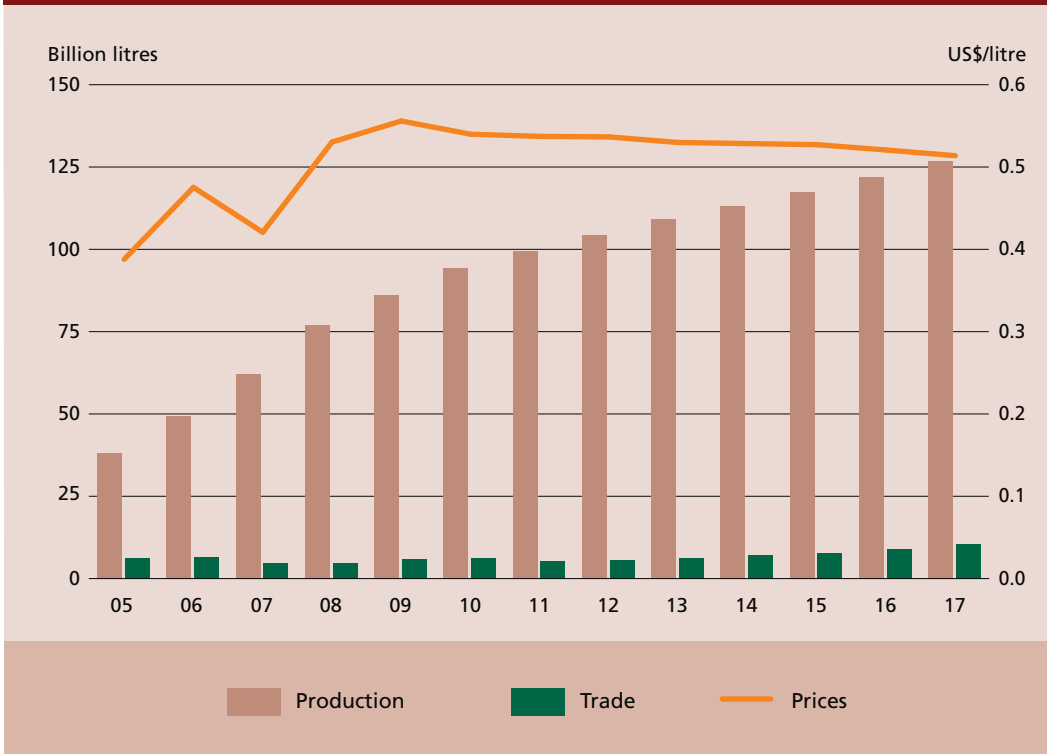
Finally, it must be borne in mind that, in most countries, biofuel production remains heavily dependent on public-support policies and border protection, as discussed in Chapter 3. The debate on the potential and actual benefits that derive from supporting biofuel production and use continues. Support schemes are developing rapidly and their future course is impossible to predict. Recent policy changes that are not accounted for in the projections include the new United States Energy Act signed into law in December 2007 and the 2007 Farm Bill approved by Congress in May 2008 (see Box 4 on pp. 30–31).

In the EU, total ethanol production is projected to reach 12 billion litres by 2017. As this is still well below the projected consumption of 15 billion litres, net ethanol imports are expected to reach around 3 billion litres. A strong increase in blending obligations, which can only partially be met by EU production, will be the main driver behind EU ethanol imports.

Ethanol production in several other countries is projected to grow rapidly, led by

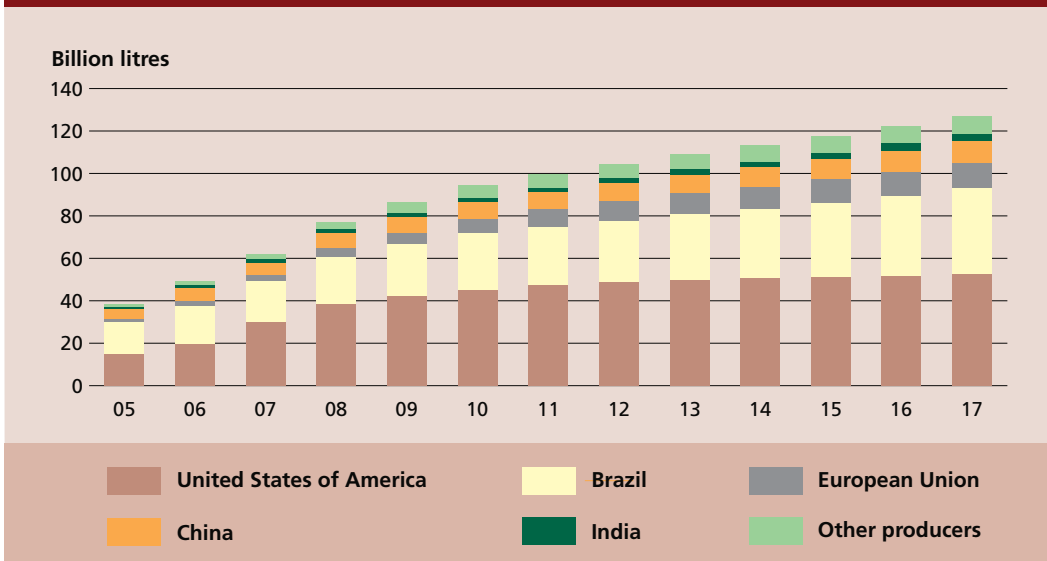
China, India, Thailand and several African countries. China is projected to more than double its consumption by 2017, which will exceed domestic production. Strong production growth is forecast for India and Thailand. The Indian Government is supporting the development of an ethanol industry based on sugar cane. Production is thus set to increase to 3.6 billion litres by 2017, while consumption is projected to reach 3.2 billion litres. In Thailand, production is

FIGURE 16
Global ethanol production, trade and prices, with projections to 2017



Source: OECD-FAO, 2008.

FIGURE 17
Major ethanol producers, with projections to 2017

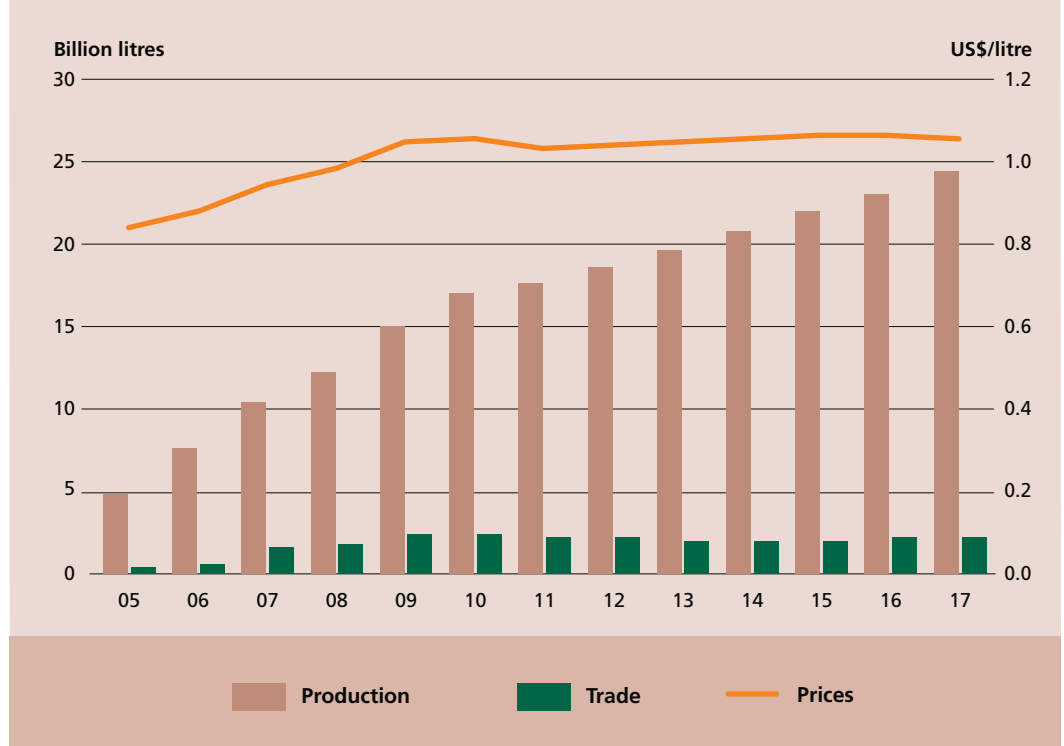


Source: based on data from OECD-FAO, 2008.

projected to reach 1.8 billion litres by 2017, while consumption is projected at 1.5 billion litres. Growth in production and consumption is underpinned by the government objective

of reducing reliance on imported oil. Thus, the energy share of ethanol in petrol-type fuel use is assumed to increase from 2 percent to 12 percent between 2008 and 2017.

FIGURE 18
Global biodiesel production, trade and prices, with projections to 2017



Source: OECD-FAO, 2008.

Many African countries are beginning to invest in the development of ethanol production. Developing a biofuels/bioenergy sector is seen as an opportunity to promote rural development and reduce dependence on expensive imported energy. Export opportunities for some least-developed countries could be considerably enhanced by the Everything But Arms initiative, which would allow these countries to export ethanol duty-free into the EU, taking advantage of a high tariff-preference incentive.

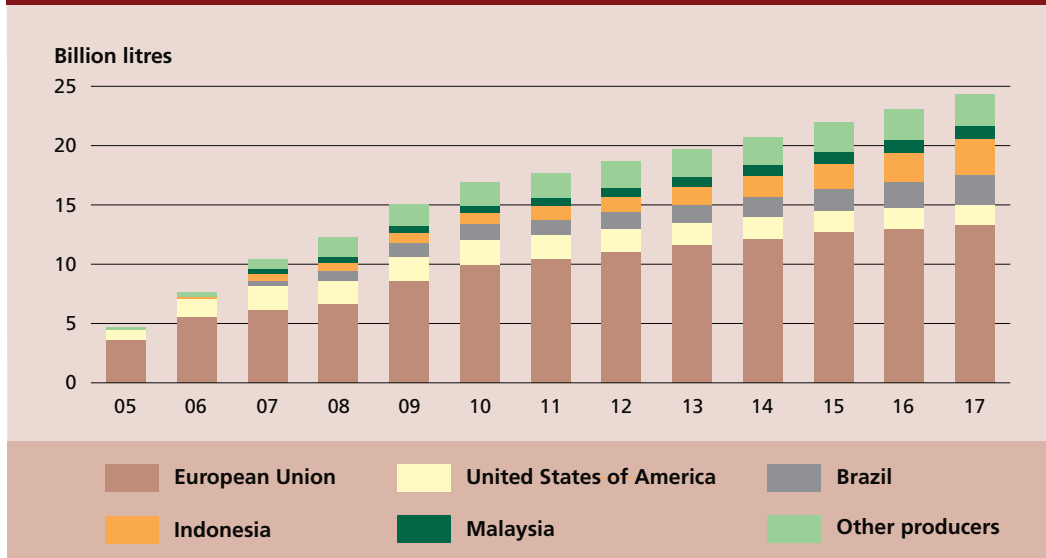
The outlook for biodiesel

Global biodiesel production is set to grow at slightly higher rates than those of ethanol – although at substantially lower levels – and to reach some 24 billion litres by 2017 (Figure 18). Mandates and tax concessions in several countries, predominantly in the EU, are driving the growth in biodiesel projections. World biodiesel prices are expected to remain well above the production costs of fossil diesel, in the range of US\$104–106 per hectolitre, for most of the projection period. Total

trade in biodiesel is expected to grow in the early years of the projection period but change little in following years. Most of the trade is projected to originate in Indonesia and Malaysia, with the EU as the main destination.

Production is dominated by the EU, followed by the United States of America, with significant growth also projected for Brazil, Indonesia and Malaysia (Figure 19). Biodiesel use in the EU is driven by blending mandates in several countries. While production costs remain significantly above the net costs of fossil diesel (see Figure 9 on page 35), the combination of tax reductions and blending obligations helps stimulate domestic use and production. Although EU biodiesel use is projected to decline in relative terms, it will still account for more than half of global biodiesel use in 2017. This strong demand will be met by both increased domestic production and growing imports. Production margins are projected to improve considerably compared with those of the very difficult year 2007, but to remain tight.

FIGURE 19
Major biodiesel producers, with projections to 2017



Source: based on data from OECD-FAO, 2008.

Biodiesel use in the United States of America, which tripled in both 2005 and 2006, is projected to remain largely unchanged throughout the projection period, as biodiesel remains expensive compared with fossil diesel. Biodiesel production in Brazil, which began in 2006, is projected to expand rapidly in the short term in response to increased biodiesel prices and hence improved production margins. In the longer run, however, production expansion should slow down and remain limited to supplying domestic demand, which is projected to grow to some 2.6 billion litres by 2017.

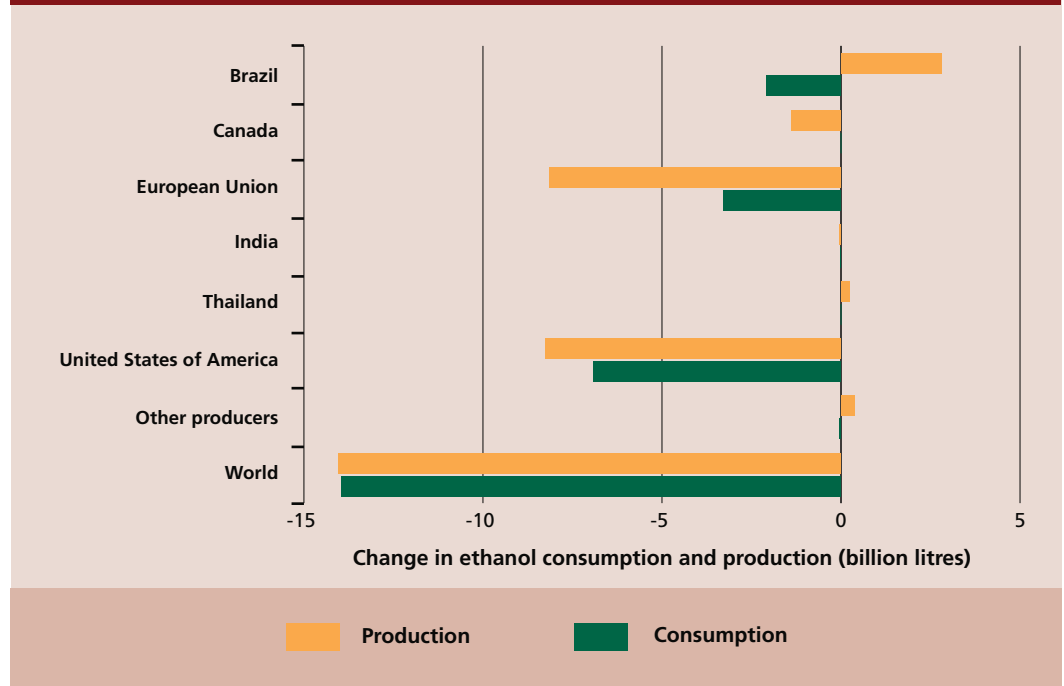
Indonesia is expected to emerge as a major player on the biodiesel market. The Indonesian Government reduced and then eliminated price subsidies on fossil fuels in 2005, allowing the biofuel industry to become economically viable. Biodiesel production on a commercial scale started in 2006 and had expanded to an annual production of about 600 million litres by 2007. Fuelled by domestic palm-oil production, the industry enjoys a competitive advantage, which will propel Indonesia towards becoming the second-largest producer in the world, with annual production rising steadily to reach 3 billion litres by 2017. Based on the consumption targets established by the government,

domestic demand is expected to develop in parallel with production.

Malaysia is the second largest palm-oil producer in the world, which also places the country in a prime position to play a major role in the world biodiesel market. Commercial biodiesel production began in 2006 and grew to an annual production of about 360 million litres by 2007. Steadily expanding domestic palm-oil production will provide the basis for a rapid growth of the biofuel industry during the coming decade. Production is projected to increase at a rate of about 10 percent annually, reaching 1.1 billion litres by 2017. In the absence of consumption mandates, domestic use is not expected to increase significantly. The industry will be predominantly export-oriented, with the EU as its target market.

In some African countries and in India there has also been some investment directed towards stimulating biodiesel production from *Jatropha curcas* on marginal lands. High biodiesel prices and an interest in developing the rural economy and reducing dependence on imported oil, which is costly to transport to interior locations with poor infrastructure, lay behind these investments. It is extremely difficult to establish projections for *jatropha*-based production, as experience with commercial production of this crop is limited. In this projection, preliminary estimates

FIGURE 20
Total impact of removing trade-distorting biofuel policies for ethanol,
2013–17 average



Source: FAO, 2008c.

were made for Ethiopia, India, Mozambique and the United Republic of Tanzania, which indicate a total production of between 60 000 and 95 000 tonnes in each of these countries. For African countries, it is assumed that all biodiesel production will come from jatropha seed.

Impacts of biofuel policies

The joint OECD-FAO AgLink-Cosimo modelling framework was used to analyse alternative policy scenarios for biofuels (FAO, 2008c). As discussed in Chapter 3, countries use a range of policy instruments to support the production and consumption of biofuels. The policy scenario reported here simulates the effects of removing domestic subsidies (tax concessions, tax credits and direct support for the production of biofuels) and trade restrictions in OECD and non-OECD countries, while retaining mandatory blending and use requirements.

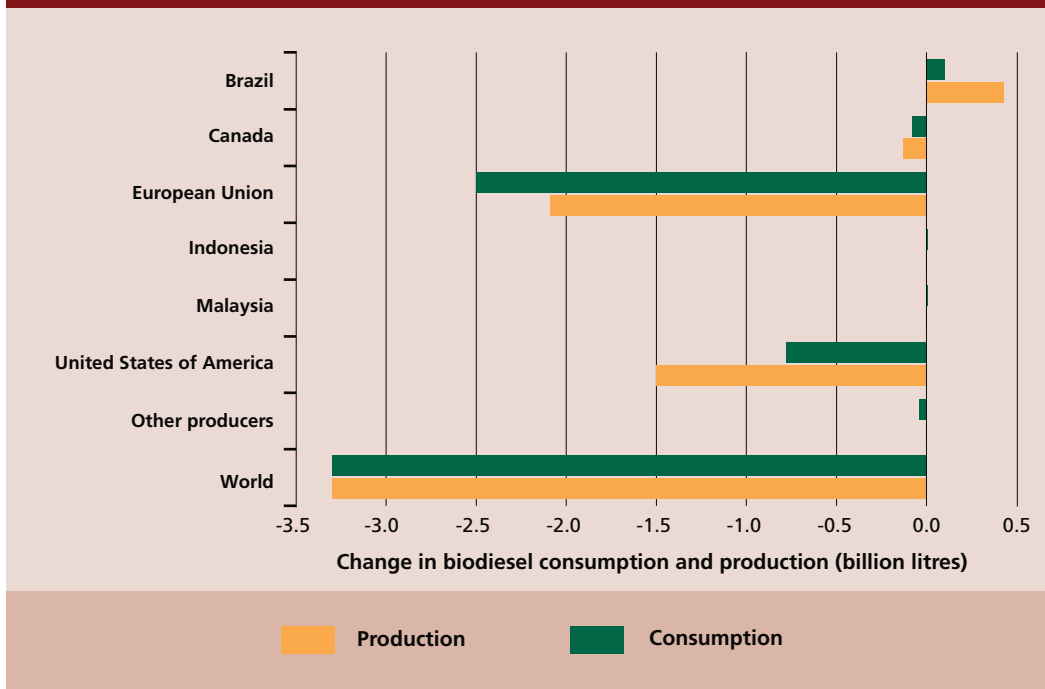
This scenario broadly mimics the “full liberalization” scenarios that are frequently conducted for agriculture in which trade

restrictions and trade-distorting domestic subsidies are eliminated but non-trade-distorting policies such as environmental measures are allowed to remain. Any number of scenarios could be defined, and it should be emphasized that the results are highly dependent on the precise scenario and model specification. As such, they should be taken as broadly suggestive – not precisely predictive – of the effects of removing existing subsidies and trade barriers. The 2007 United States Energy Independence and Security Act and the proposed new EU Bioenergy Directive are not considered in this scenario.

Figure 20 summarizes the total impacts on ethanol production and consumption that would result from the removal of all trade-distorting biofuel policies in OECD and other countries. The removal of tariffs and subsidies would lead to a decline in global ethanol production and consumption, of about 10–15 percent. The largest reductions would occur in the EU, where ethanol support measured in per litre terms is very high (see Chapter 3), and in the United States of America, the largest ethanol producer.

FIGURE 21

Total impact of removing trade-distorting biofuel policies for biodiesel, 2013–17 average



Source: FAO, 2008c.

Consumption in both would also fall, but by a lesser amount because mandated use targets would remain in place. Imports would increase significantly in currently protected markets, while production and exports from Brazil and some other developing-country suppliers would increase.

Figure 21 summarizes the results of the same scenario but for biodiesel. At the global level, the impacts of removing trade barriers and trade-distorting domestic support would be somewhat larger in percentage terms than for ethanol, with reductions in production and consumption of around 15–20 percent. Most countries would see major declines because the industry currently depends heavily on subsidies to achieve competitiveness with petroleum-based diesel.

The elimination of current biofuel trade-distorting policies would have implications for ethanol and biodiesel prices and for agricultural commodity prices and output. Global ethanol prices would increase about 10 percent because production in several heavily subsidized countries would decline more than consumption, thereby increasing

the demand for exports. Global biodiesel prices, in contrast, would fall slightly as the reduction in EU consumption would translate into a decline in import demand. Agricultural commodity feedstock prices would also be affected by the elimination of biofuel subsidies. Vegetable oil and maize prices would decline by about 5 percent and sugar prices would rise slightly compared with the baseline. Global crop area devoted to the production of coarse grains and wheat would decline slightly, by about 1 percent, while sugar-cane area would increase by about 1 percent.

Historically, biomass and biofuel trade flows have been small, as most production has been destined for domestic consumption. However, in the coming years, international trade in biofuels and feedstocks may escalate rapidly to satisfy increasing worldwide demand. Policies that liberalize or constrict the trade of biofuel products are likely to have a strong impact on future production and consumption patterns, and international trade rules will thus assume critical importance for biofuel development internationally (see Box 7).

Many countries impose tariffs on biofuel imports, as discussed in Chapter 3, with the EU and the United States of America being the most important because theirs are the largest markets. Biofuels are governed by several WTO agreements; moreover, both the EU and the United States of America provide preferential market access to an extensive list of partners under a variety of other agreements (see Box 8).

Implications of the analysis

The FAO–OECD analysis and the estimates of the subsidies by the Global Subsidies Initiative discussed in Chapter 3 highlight the impacts, as well as the direct and indirect costs, of policies supporting biofuels in OECD countries. The direct costs are expressed by the subsidies,

which are borne either by taxpayers or by consumers. The indirect costs derive from the distorted resource allocation resulting from selective support to biofuels and mandated quantitative targets. Agricultural subsidies and protection in many OECD countries have led to misallocation of resources at the international level – with costs to their own citizens as well as to agricultural producers in developing countries. Agricultural trade policies and their implications for poverty alleviation and food security were discussed in the 2005 edition of *The State of Food and Agriculture* (FAO, 2005).

Current support policies to biofuels risk repeating past mistakes in the field of agricultural policies. Future development of an economically efficient biofuel sector at

BOX 7

Biofuels and the World Trade Organization

The World Trade Organization (WTO) does not currently have a trade regime specific to biofuels. International trade in biofuels falls, therefore, under the rules of the General Agreement on Tariffs and Trade (GATT 1994), which covers trade in all goods, as well as other relevant WTO Agreements such as the Agreement on Agriculture, the Agreement on Technical Barriers to Trade, the Agreement on the Application of Sanitary and Phytosanitary Measures and the Agreement on Subsidies and Countervailing Measures. Agricultural products are subject to the GATT and to the general rules of the WTO insofar as the Agreement on Agriculture does not contain derogating provisions.

Key trade-related issues include the classification for tariff purposes of biofuel products as agricultural, industrial or environmental goods; the role of subsidies in increasing production; and the degree of consistency among various domestic measures and WTO standards.

The Agreement on Agriculture (AoA) covers products from Chapters 1 to 24 of the Harmonized System, with the exception of fish and fish products and the addition of a number of specific products, such as hides and skins, silk, wool, cotton, flax and modified starches.

The discipline of the AoA is based on three pillars: market access, domestic subsidies and export subsidies. One of the main features of the AoA is that it allows Members to pay subsidies in derogation from the Agreement on Subsidies and Countervailing Measures.

The Harmonized System classification affects how products are characterized under specific WTO Agreements. For example, ethanol is considered an agricultural product and is therefore subject to Annex 1 of the WTO AoA. Biodiesel, on the other hand, is considered an industrial product and is therefore not subject to the disciplines of the AoA. Paragraph 31(iii) of the Doha Development Agenda has launched negotiations on “the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services”. Some WTO Members have suggested that renewable energy products, including ethanol and biodiesel, should be classified as “environmental goods” and therefore subject to negotiations under the “Environmental Goods and Services” cluster.

Source: based on FAO, 2007b and GBEP, 2007.

the international level will depend on the establishment of appropriate non-distorting national policies as well as trade rules that encourage an efficient geographic pattern of biofuel production.

In addition to being costly, current biofuel policies may have unintended consequences, especially to the extent that they promote excessively rapid growth in biofuel production from an already stressed natural resource base. Some of these consequences of rapid policy-induced biofuel development are examined further in the following two chapters: Chapter 5 discusses the environmental impacts of biofuels, while the socio-economic and food-security impacts are the focus of Chapter 6.

Key messages of the chapter

- Growing demand for liquid biofuels is only one of several factors underlying the recent sharp increases in agricultural commodity prices. The exact contribution of expanding biofuel demand to these price increases is difficult to quantify. However, biofuel demand will continue to exercise upward pressure on agricultural prices for considerable time to come.
- Biofuel demand and supply are expected to continue to increase rapidly, but the share of liquid biofuels in overall transport fuel supply will remain limited.

BOX 8

Biofuels and preferential trade initiatives

For developing countries, the challenges associated with producing bioenergy for the international market are particularly acute. Trade opportunities may be reduced by measures that focus exclusively on enhancing production in developed countries, or by protectionist measures designed to limit market access. Tariff escalation on biofuels in developed-country markets can restrict developing countries to exporting feedstocks, such as unprocessed molasses and crude oils, while the actual conversion into biofuels – with its associated value-added – often occurs elsewhere.

A number of European Union (EU) and United States preferential trade initiatives and agreements have been introduced that offer new opportunities for some developing countries to benefit from the increasing global demand for bioenergy. Preferential trade with the EU for developing countries falls under the EU's Generalised System of Preferences (GSP). In addition, the Everything But Arms (EBA) initiative and the Cotonou Agreement contain provisions of relevance to the bioenergy sector. Under the current GSP, in effect until 31 December 2008, duty-free access to the EU is provided to denatured and undenatured alcohol. The GSP also has an incentive programme for ethanol

producers and exporters who adhere to sustainable development principles and good governance. The EBA initiative provides least-developed countries with duty-free and quota-free access to ethanol exports, while the Cotonou Agreement provides duty-free access for certain imports from African, Caribbean and Pacific countries. The Euro-Mediterranean Association Agreements also contain provisions for preferential trade in biofuels for certain countries in the Near East and North Africa. In the United States of America, ethanol may be imported duty-free from certain Caribbean countries under the Caribbean Basin Initiative, although there are specific quantitative and qualitative restrictions depending on the country of origin of the feedstocks. Provisions for duty-free ethanol imports have also been proposed in the US-Central America Free Trade Agreement negotiations.

However, while such preferential access can provide opportunities for beneficiaries, it also creates problems of trade diversion, to the disadvantage of the developing countries not benefiting from the preferential access.

Source: based on FAO, 2007b.

However, the projections are surrounded by a high degree of uncertainty mainly because of uncertainties concerning fossil fuel prices, biofuel policies and technology developments.

- Brazil, the EU and the United States of America are expected to remain the largest producers of liquid biofuels, but production is also projected to expand in a number of developing countries.
- Biofuel policies have significant implications for international markets, trade and prices for biofuels and agricultural commodities. Current trends in biofuel production, consumption and trade, as well as the global outlook, are strongly influenced by existing policies, especially those implemented in the EU and United States of America, which promote biofuel production and consumption while protecting domestic producers.
- The biofuel policies of OECD countries impose large costs on their own taxpayers and consumers and create unintended consequences.
- Trade policies *vis-à-vis* biofuels discriminate against developing-country producers of biofuel feedstocks and impede the emergence of biofuel processing and exporting sectors in developing countries.
- Many current biofuel policies distort biofuel and agricultural markets and influence the location and development of the global industry, such that production may not occur in the most economically or environmentally suitable locations.
- International policy disciplines for biofuels are needed to prevent a repeat of the kind of global policy failure that exists in the agriculture sector.