Productschap mvo

Market analysis Oils and Fats for Fuel

December 2007

The **Product Board for Margarine, Fats and Oils** (MVO) represents all trade and production companies in the Dutch oils and fats chain. The Product Board promotes a responsible, socially and environmentally sound economic development of the vegetable and animal fats and oils sector. The Board serves the interests of these companies while respecting society's demands. Our main priority is a competitive and innovative sector that brings about safe and healthy products and takes its responsibility towards the environment.

The information in the report has been updated till November 2007.

Rijswijk, December 2007

Content

List of abbreviations

ACEA	:	European Automobile Manufacturer Assocation
ASEAN	:	Association of Southeast Asian Nations
B99	:	Diesel fuel based on a mixture of 99% biodiesel and 1% fossil diesel
BTL	:	Biomass to Liquid
CAP	:	Common Agricultural Policy
CEN	:	European Committee for Standardization
CHP	:	Combined Heat Power plant (Dutch: WKK)
CIF	:	Cost Insurance Freight
CO_2	:	Carbondioxide
DET	:	Differentiated Export Tax
DG	:	Directorate General
EBB	:	European Biodiesel Board
EC	:	European Commission
EIA	:	International Energy Agency
EPFL	:	Ecole Polytechnique Fédérale de Lausanne
EMA	:	Engine Manufacturers Association
ETBE	:	Ethyl Tertiair Butyl Ether
EU	:	European Union
FAEE	:	Fatty Acid Ethyl Ester
FAME	:	Fatty Acid Methyl Ester
FAO	:	(United Nations) Food and Agriculture Organization
FAPRI	:	(US) Food and Agricultural Policy Research Institute
FOB	:	Free on Board
Fosfa	:	Federation of Oils, Seeds and Fats Associations
FQD	:	Fuel Quality Directive
GHG	:	Green House Gas
GMO	:	Genetically Modified Organism
IEA	:	International Energy Agency
IPC	:	International Policy Council
IPTA	:	International Parcel Tankers Organisation
MEP	:	Milieukwaliteit Elektriciteitsproductie (Environmental Quality of Electricity Production)
Mercosur	:	Mercado Común del Sur (Southern Common Market)
Mha	:	Million hectare
MTBE	:	Methyl Tertiair Butyl Ether
MTOE	:	Million Ton Oil Equivalent
Mton	:	Million ton

MVO	:	Margarine, Vetten en Oliën (Margarine, Fats and Oils)
NBB	:	(US) National Biodiesel Board
OECD	:	Organisation for Economic Co-operation and Development
OPEC	:	Oil Producing and Exporting Countries
PPO	:	Pure Plant Oil
REEC	:	(US) Renewable Energy and Energy Conservation Act
RES	:	Renewable Energy Sources
RME	:	Rapeseed Methyl Ester
RSPO	:	Round Table on Sustainable Palm Oil
RTRS	:	Round Table on Responsible Soy
SDE	:	Subsidieregeling Duurzame Energie (Subsidy program for sustainable energy)
TDP	:	Thermal de-polymerization
UNEP	:	United Nations Environmental Program
US	:	United States
USDA	:	United States Department of Agriculture
VROM	:	Volkshuisvesting, Ruimtelijke Ordening en Milieu (Dutch Ministry for Housing, Spatial Planning and Environment
WKK	:	Warmte Kracht Koppeling (CHP: Combined Heat Power)
WTO	:	World Trade Organisation
WWF	:	World Wildlife Fund

Conversions

1000 liter of vegetable oil = 910 kg
1 US gallon = 3.785 liter
1 m.ton of coal = 4.879 barrels of crude oil equivalent = 775.699 liter
1 acre= 0.4 hectares

Currency conversion (24 Oct 2007)

100 UAH = € 13.89 (Ukraine)
100 RUB = € 2.82 (Russia)
100 US$ = € 70.20 (US)

Executive summary

The development of a biofuels industry will continue to have a significant impact on the oilseeds and vegetable oils agribusiness. A high level of political commitment combined with ambitious renewable energy targets that include obligatory biofuel application, are the prime drivers for the establishment of this industry. At this moment, the biodiesel feedstock consists almost entirely of vegetable and animal oils and fats and combined with the global surge in demand for these materials in the food and feed industry, this leads to growing pressure on feedstock availability. While this generates opportunities for the agriculture sector and the supply and processing industries, the food and non-food producing industries, including the biodiesel industry, are affected by shortages in supply and rising prices.

To gain a better insight into the possible extent of these impacts on the vegetable and animal oils and fats industry, the Product Board for Margarine, Fats and Oils (MVO) has issued this report, which is an update from last year's publication. It provides a latest state of play in policy developments in the fields of renewable energy and biofuels. In particular, the development of sustainability criteria for biomass for these applications is discussed. An overview is given of the demand for biodiesel, as well as of the capacity to produce. Furthermore, the production and future supply of feedstock is addressed, as well as the developments in feedstock price and their consequences. Finally, some scenarios for meeting the biofuel targets are presented and the requirements and conditions to reach the objectives are highlighted.

Ambitious biofuel targets have been set worldwide. Under the current conditions already the EU proposal to aim for a 10% biofuels share in transport fuel use in 2020 accounts for a 4-fold increase in rapeseed demand in the EU. This illustrates the challenge in meeting future demand for oils and fats. MVO considers this challenge should work as an incentive to explore ways to create sufficient supply that will balance the market. MVO envisages several strategies:

1. *Full employment of all possible feedstock, the so-called 'multi-sourcing' strategy.* This strategy should not only apply to the production of biofuels or bioenergy, which caused the most recent surge in demand in the EU. With the previous and projected increases in demand for food and feed worldwide this strategy would equally apply to the food and feed sector.

2. *Streamlining of adjacent policies to support multisourcing.* This should consist of lifting restrictions in production, use and trade of existing feedstock. This implies amendment of fuel quality and biofuel standards, the application of residual and by-products, frying fat and animal fats as biofuel feedstock and the exploitation of new feedstock for both food and non-food purposes. The speed of procedural handling of applications for authorization of GMO-crops, while retaining the rigour of the risk

assessment and the freedom of choice for consumers, should be improved to safeguard the availability of feedstock that includes GMO-traits. A final challenge is to reach international agreement on trade liberalization. Fully liberalized trade based on the level playing field principle is a precondition for maximal availability of globally produced feedstock.

3. *Improvement of the performance of so-called first generation feedstock.* Production and processing technologies of these commodities should be further improved, in order to expand the acreage as well as yield per hectare.

4. *Intensified research and development should speed up the commercial introduction of new feedstock and biofuels.* While one shares the views on the potential of so-called second generation biofuels, differences of opinion exist as to the question at which point in time this feedstock will start to contribute significantly to the biofuel demand. From the current information, it is expected that a significant contribution of next generation feedstock is not likely to occur before 2020.

The initial implementation phase of the biofuel targets will rest largely on the application of existing technologies and feedstock. This will be the main driver for increasing the production of oilseeds and vegetable oils feedstock. However, this also emphasizes the need for the introduction of sustainability criteria, based on the People, Planet, Profit principle, to avoid negative side-effects. MVO strongly supports the introduction of sustainability criteria. To ensure the effectiveness a framework for testing the sustainability criteria should be directed at the mainstream production and be agreed upon at an international level with the producing countries.

The present price development of oilseeds and vegetable oils is not only caused by the increased demand for food and biofuels. Other determining factors include poor harvests and lowered stock levels. Also, increased speculation in the feedstock markets adds to the price curves. This has negative consequences for the local food prices in the producing countries, as well as for the global market. It also threatens the profitability of biodiesel production and affects the operational management of food producing companies. However, it is highly positive for the oilseeds producers and will work as an incentive to increase production. MVO therefore expects that the market may find a new equilibrium in supply and demand, although the feedstock price may be at a sustained higher level. Governments should not rush to retrace their steps taken to develop a sound biobased fuel economy, since it would not solve the supposed problem. Especially because the biofuel demand is only part of the future global demand for oils and fats.

The build-up of a biofuels industry requires significant investments. Additionally, for both the food, feed, oleochemical and biofuels industries the development and application of new feedstock or production and processing technologies may require unconventional and innovative approaches that demand a high spirit of enterprise. Clear and long-term government policies should therefore be directed at capitalization of this potential and should also create a corresponding investment climate.

1 Introduction

This report is an update of the report published by MVO in July 2006. The first report introduced the existing legislative frameworks and policies. Also, it provided facts and figures on biofuels, its production and feedstock demand and supply. This edition is an update and presents an overview of the latest developments in policy, technology and market. In addition, the update builds upon this information to outline some of the scenarios that might develop concerning the availability of oils and fats feedstock. Latest information on biofuel developments can be found at the MVO website and in MVO's weekly newsletter (Nieuwsbrief Biobrandstoffen) on this issue.

1.1 Background setting

The scope of this report is focused on the market of oil seeds, vegetable oils and animal fats and biodiesel. Only where relevant for this market the influence of other biofuels, like bioethanol, next generation fuels and its feedstock, will be discussed.

1.2 Goal

The goal of this study is to offer insight in the development of the biofuels market and the possible effects on the global oils and fats market. The relevant policies of the most important countries around the globe are presented with a focus on the EU and the Member States. Other important issues such as supply and demand of feedstock, new feedstocks, stakeholders and the introduction of sustainability criteria will be discussed separately to see how these influence the oils and fats market. Another purpose of this report is to make an inventory of production developments in specific biodiesel markets at present and in the future. Finally, an analysis of some of the most likely scenarios is used to assess the availability of oils and fats feedstock until 2020.

1.3 Outline of the report

Chapter 2 introduces the different policy approaches to biofuels around the world, focussing on the EU and The Netherlands. Another part of the renewable energy policy, bio-energy, is discussed in Chapter 3. Chapter 4 deals with the expanding biodiesel production capacity. Chapter 5 deals with the supply and demand of oils and fats and Chapter 6 focuses on the price developments of oils and fats feedstock. The biofuel development gives rise to new stakeholders. The most important stakeholders are introduced in Chapter 7. Chapter 8 assesses some scenarios based on targets which have been and will be developed by the European Commission, which could develop in the future depending on the market developments and policies chosen to guide agricultural production, trade and biofuels. Finally, Chapter 9 draws three main conclusions from this report and presents a view on the way forward in the development of the biofuels market.

2 Biofuels policy

The recent interest for promoting the use of biofuels is based on three arguments: it is seen as part of the measures to comply with the Kyoto protocol, it will reduce the dependency on fossil fuel and it should serve as an economic incentive for the agricultural sector. It totally depends on the considered country's or region's social and political issues which argument is the main driver. For the EU as a whole, and also for The Netherlands, climate change is the leading issue, while for Germany and France employment in the agricultural sector is anadditional driver. Energy security is the main driver for the US. The latest policy developments to meet the objectives of the biofuels policy are discussed in this Chapter.

2.1 EU biofuels policy

2.1.1 EU Biofuels Directive

EU Directive 2003/30 is the legal basis for the current EU biofuels policy. The directive urges Member States to promote the use of renewable fuels for transport by taking measures which help to overcome market barriers. Member States should ensure that a minimum proportion of biofuels and other renewable fuels is placed on their markets, and they are therefore obliged to set national indicative targets. The indicative targets set by the European Commission are 2% in 2005 en 5.75% in 2010. Member States are obliged to report annually about the progress of the implemention of the Directive, while the Commission has to review the progess bi-annually, starting in 2006.

In January 2007 the Commission published a first evaluation report. The report assesses the progress made by the Member States up to 2006 towards the Directive's objective. It outlines measures taken by Member States, the effect of these measures as well as the developments influencing the fuel market. Tax exemptions, based on EU Directive 2003/96, restructuring the Community framework for the taxation of energy products and electricity, are a longstanding form of support for biofuels. In 2005 and 2006 several Member States announced the introduction of a new form of support: biofuel obligations. These are legal instruments requiring fuel suppliers to include a specific percentage of biofuels in the total amount of fuel they place on the market. Some Member States are using obligations as a complement to tax exemptions, others as an alternative. Furthermore, the progress report discusses why biofuel needs to be promoted and under which conditions.

► Accompanying document to the Biofuels Progress Report

Total biofuels consumption in the EU-27 reached 5.4 million tons of oil equivalent in 2006, up 80% from 2005 (EurObserv'ER 2007). Biofuels accounted for approximately 1.8% of the total consumption of fuels used in transport, compared with 1% in 2005. In 2006 biodiesel represented 71.6% of the energy content of transport biofuels, far out ahead of bio-ethanol

(16.3%) and other biofuels (12.1%). For 2010, 19 countries have already defined the targets that shall increase the incorporation target of biofuels in these states to 5.45%, which means 0.3% below the directive objective. Taking the experience of 2005 into consideration, the Commission suggests that the incorporation rate would instead be near 4.2% in 2010.

Germany, France and Sweden are leading in the process of implementing biofuels, with higher percentages due to fiscal measures and obligations, while other Member States are lagging behind. Germany, France and Italy have since long strong support systems for biodiesel and are therefore the frontrunners for this type of biofuel. Due to budget reasons Germany decided in 2006 to replace the full tax exemption with a biofuels obligation. The full tax exemption has been replaced by a scheme under which the tax exemption will decrease gradually over the next years. The sales of pure plant oil are also supported financially. Comparing the ambitions and achievements of the Member States, the Commission concludes that the biofuels Directive's target for 2010 is not likely to be achieved. According to the report a proposal for revision of the Directive needs to send a signal of the EU's determination to reduce its dependence on oil use in transport and move to a low carbon economy, set minimum standards for the share of biofuels in 2020 (10%), and last but not least ensure that the use of poor-performing biofuels is discouraged while the use of biofuels with good environmental and security of supply performance is encouraged.

The proposal to agree on a binding target of 10% biofuels in 2020, as well as a binding target of a 20% share of renewable energy in the overall energy consumption, was supported by the Ministers of the Member States during the Spring Summit. This would mean that Member States have the opportunity to spread the increase in biofuel use over more than 12 years. In order to achieve the target it was also agreed to amend the Fuel Quality Directive to allow for adequate levels of blending (see Chapter 2.1.2).

The evaluation report states that changing the fuel mix in transport is important because the European Union's transport system is almost entirely dependent on oil. Most of this oil is imported, much of it from politically unstable parts of the world. Oil is the energy source that represents the most severe security of supply challenge for Europe. However, the evaluation report does not really elaborate much on the economic benefits biofuels have given in terms of increasing security of supply, since it is difficult to place a monetary value on this benefit. Although the report states that biofuels contribute to short-term security of energy supply by reducing the need to keep oil stocks to protect against disruptions, this might not be that wise from a strategical point of view. It is not the amount of oil that is important but the amount of feedstock for processing into necessary products and energy. If the mix of fuels is changed also it strategic stocks should also be changed. In this connection it should also be noted that Europe is heavily diesel deficient. The use of diesel outweighs the gasoline use. This leads to import of diesel fuel from Russia, currently 30 million ton, and export of gasoline to the US.

In addition to the evaluation, the Energy and Transport Directorate-General of the European Commission issued a public consultation excerise asking for feedback from stakeholders on the Commission's views on possible future legislation. Main feedback from Product Board MVO is that for the introduction of sustainability criteria the Commission should take into account that the supply chain of production, processing and trade has international dimensions. Therefore, any consensus on the development and implementation of sustainability criteria should be achieved at international level together with the producing countries. Broad support from all parties involved, including the producing countries, is a precondition for ensuring the effectiveness of such policy. The

development and implementation of sustainability criteria should be consistent with international trade agreements (WTO) and a clear, solid and long-term policy is required to allow full exploitation of industrial development and investments. When developing a sustainability system it should be kept in mind that all parties in the chain need to make an effort to comply with the requirements. All parties should be given a realistic amount of time to self audit and develop activities in order to comply (for palm oil e.g., the RSPO upon adoption of the Principles and Criteria for sustainable palm oil launched a two years trial period to implement, audit and review the criteria This last view is supported by The Commission Blok which assessed on request of Essent the use of palm oil for the production of renewable energy. Another important aspect of a sustainability framework should be that the principles of the system should be applied equally to different types of biomass regardless of their origin.

The European Commission will use the outcomes of the evaluation and public consultation to draft a proposal for amendment of the Biofuels Directive. Publication is expected in January 2008, which will then come up for discussion in Council and European Parliament. Political agreement is likely to take about one year.

2.1.2 EU Fuel Quality Directive

The goal of the EU Fuel Quality Directive (FQD) (98/70/EC) is to guarantee engine performance and to minimize environmental impact. Due to its current specifications rapeseed is the feedstock of choice and only limited amounts of other oils can be used. In January 2007 the European Commission published a proposal to amend the FQD. The revision of the FQD aims to set new standards for transportation fuels in order to reduce air pollution (sulphur and poly aromatic hydrocarbons) and greenhouse gas emissions from road and non-road fuel use. It also helps to implement the Community strategies on air quality and on climate change. In addition, the Commission proposes a CO_2-performance monitoring obligation entering into force in 2009, while a reduction target would be introduced two years later. These obligations would apply to all transport fuels, both biofuels and fossil fuels. The FQD would thus become one of the instruments to fight climate change. Most important issue regarding the CO_2 performance monitoring will be the CO_2-calculation methodology. It is quite likely that the final proposal of the European Commission will be influenced by the work done by, among others, the Dutch and British government. While Directive 2003/30 aims at reducing GHG emissions by introduction of biofuels the FQD offers carmakers other opportunities to achieve this goal like increasing fuel efficiency.

2.1.3 EU biofuel standards

EU fuel standards like the EN590 (diesel) and the EN14214 (biodiesel) aim to set specifications for fuels in order to ensure motor performance. At this moment the EN590 limits the use of biodiesel to 5% on the condition that the fuel meets the specification of the EN14214. One critical parameter in these standards is the use of the iodine value as a parameter to assess the oxidation stability of the biodiesel. However, this parameter is under discussion in a European standardization working group (CEN/TC 19/WG 24)[►] to decide whether the iodine value can be replaced by another parameter, which is more accurate. Iodine value is a feedstock related property. The current cut-off value of 120 is based on the use of rapeseed oil, limiting the use of other oils (i.e. Soya bean oil) with a higher iodine value. Oxidation can be prevented by adding additives. An appropriate oxidation stability which is not feedstock related would make the iodine value obsolete. At this moment European Committee for Standardization (CEN) working group 24 is investigating if it is possible to replace the current parameter for oxidation stability (iodine value) in order to give way to the use of different feedstock without compromising

► Technical Committee 19 (TC 19) of the European Committee for Standardization is responsible for gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin. Working group (WG) 24 is a sub group of TC 19 responsible for diesel specifications.

performance. At this moment the European Commission has commissioned a report that studies the iodine value, which should be ready by the end of 2007. The results of the report will be discussed in TC19/WG24. When appropriate the working group will forward its proposal to amend the EN14214 to TC 19.

WG 24 recommended that the climate dependent requirements set out in EN 14214 do not apply when the FAME is used as a blend component in EN 590 diesel fuel. The choice of cold flow additive technology should be a contractual matter between the fuel blender and the biodiesel supplier taking into account the climatic dependent requirements of the finished EN 590 diesel fuel. The proposed change of the EN590 will be combined with an official change of other issues. The TC does not consider this issue important enough to only vote for this issue.

► CFPP: Cold Filter Plug Point

► Letter clarifying the climate dependent requirements of EN 14214 when used as a blending component in EN 590 Diesel fuel

To further facilitate the introduction and use of alternative fuels the European Commission has given a mandate to the European Committee for Standardization (CEN) to develop a European standard for B10 (a blend of 10% methylester and 90% mineral diesel) and 100% FAEE (Fatty Acid Ethyl Ester). CEN TC 19 did not yet reach an agreement to accept the mandate given by the European Commission to develop such a standard. Car manufacturers and their suppliers are very reluctant to increase the percentage of biodiesel over 5% as can be read in their official statements. The European Commission has taken the initative to develop a global biofuel standard. On 27-28 February 2007 DG TREN of the European Commission organised an International Conference on Biofuels Standards in collaboration with the Brazilian and US governments to facilitate the development of a global biofuels specification. Such world performance standards should facilitate worldwide trade of biofuels. One of the challenges is the application of indigenous feedstock in different parts of the world that has to be taken into account creating local differences of the global standard.

► Common Position Statement Diesel Fuel Injection Equipment Manufacturers, Technical statement on the use of biodiesel fuel in compression ignition engines of the Engine Manufacturers Association and ACEA Position on the use of bio-diesel (FAME) and synthetic bio-fuel in Compression ignition engines

2.2 Dutch biofuels policy

The Dutch government introduced legislation implementing EU Directive 2003/30 that entered into force 1 January 2007. It includes mandatory targets for biofuels:

► Besluit Biobrandstoffen 2007

- 2% in 2007, of which minimum 2 % in diesel and minimum 2 % in gasoline
- 3.25% in 2008, of which minimum 2.5% in diesel and minimum 2.5% in gasoline
- 4.50% in 2009, of which minimum 3.0% in diesel and minimum 3.0% in gasoline
- 5.75% in 2010, of which minimum 3.5% in diesel and minimum 3.5% in gasoline

The target is on macro level: no obligation to blend exactly 2% in each liter of mineral fuel. The 2% is energy content based which means that 2.13 liter of biodiesel has to be sold per 100 liter of conventional diesel. The obligation applies to fuel distributors. There is no excise duty exemption.

While the Dutch government wants to promote biofuels use because of its potential to contribute to greenhouse gas reductions, it is also concerned with the possible negative impacts of large-scale feedstock production. In fact, the Dutch Decree on Biofuels contains a provision (article 4.3) allowing the government in the future to set sustainability criteria biofuels should comply with. To develop a framework for this, the government mandated a Commission, chaired by the current Minister of Environmental Affairs Mrs. Cramer, to advise on the development of sustainability criteria.

Six themes were identified:

- Greenhouse gas emissions,
- Competition with food and other local applications,
- Biodiversity,
- Environment,
- Prosperity and
- Social well being.

These were elaborated into 9 principles, criteria and indicators. The final recommendations have been put forward in the report Testing framework for sustainable biomass. In a formal statement (letter to Parliament) on the report the Dutch government reiterated that sustainability is a condition for the use of biomass as biofuel or for biomass. For implementation of the sustainability framework several items were identified to be of importance:

Transparency
In order to increase insight into the production process and trade of biomass, companies will be obliged to report on the sustainability of their feedstock, in accordance with the 'Cramer criteria'. This obligation will start in 2009. For biofuels this may be formalized by law in due time, for bioenergy it will be integrated into the provisions of a new subsidy program (SDE; see Chapter 3.2). A handbook is developed to serve as a reporting format. To test the feasibility and ability to retrieve the required information pilot projects have been initiated.

Greenhouse gas calculation tool
Tools for the calculation of greenhouse gas performance are developed for biofuels and bioenergy, based on the methodology that was developed by a separate working group of the Commission Cramer. They are expected to be ready by the end of 2007 and the required information will be part of the reporting obligation. The collected data and experiences gained should be used to further improve the tool to ensure a robust, objective and feasible tool to calculate the greenhouse gas performance of biomass as fuel or for energy production.

► The Greenhouse gas calculation methodology for biomass based electricity, heat and fuels and Greenhouse gas calculator for biofuels, presentation C. Hamelinck GAVE marktdag 18 June 2007

► Technical specification: greenhouse gas calculator for biofuels, March 2007, PBIONL062632, Ecofys 2007

International coordination
The government collaborates with some EU Member States on the reporting obligation and aims for integration of a sustainability framework in the upcoming European Commission proposals for a Renewable Energy Directive. It has also indicated to collaborate with biomass producing countries. Concerning private initiatives like the Roundtables for sustainable palm oil (RSPO) and responsible soy (RTRS), the government concludes that these deserve to be further promoted as they create an opportunity to implement extensive sustainability criteria. This would be an alternative to a legal framework that may find its limitations in existing trade agreements. Recently, the Dutch government informed the Parliament on the outcomes of a legal assessment of the sustainability criteria for biomass production. While the introduction of greenhouse gas performance criteria into national legislation would be possible, most other sustainability criteria are likely to meet legal objections or are considered to be in breach with existing EU or WTO legislation.

► Eindrapport met bijlagen:
1 Beleidsopties voor implementatie duurzaamheidseisen biomassa
2 WTO/EG-rechtelijke toetsing van de door de projectgroep duurzame productie van biomassa opgestelde duurzaamheidscriteria
3 consultatie duurzaamheid-eisen biomassa

The Cramer Commission also concluded that not all criteria can be evaluated at company level. Themes like competition with food, land use change, prosperity and social well-being can only be assessed on a regional or even national level. For these themes monitoring and reporting should be the prime responsibility of the government. The government indicated it will inform in due time how it will approach these items.

MVO has been supportive of the development of sustainability criteria to ensure the responsible production of feedstock, irrespective of its end use. To reach any significance in meeting the objectives, efforts should be directed at the mainstream of biomass feedstock. MVO has therefore stressed the importance of coordinating closely with the producing countries for the implementation of national frameworks. These should also recognize and complement existing international frameworks, like the RSPO.

During an information meeting in June 2007 a representative of the Dutch Ministry of Environmental Affairs (VROM) stressed that, in order to realize its high ambitions on renewable energy the government is willing to support niche markets, including the development of applications with high blends of biofuels and fossil fuels. MVO is currently discussing with VROM how this could be materialized for promising developments and ideas in the oils and fats sector. To increase the availability of biofuels to consumers the Ministry of Transport, Public Works and Water Management (V&W) develops a subsidy program to support the introduction of fuel pumps that sell biofuels. Biofuels based on pure or blended biodiesel are not considered in this program at this moment, according to V&W, due to its putative low CO_2 reduction potential.

2.3 Biofuels policy rest of the world

Also in other regions of the world biofuels are promoted to decrease the dependency on fossil oil, to battle greenhouse gas emissions and/or to promote its local agriculture. The regional policies are generally based on indigenous oil crops, soybean oil in the Americas, palm oil and Jatropha oil in Asia and Africa, ethanol from sugar cane in Brazil.

The 2006 MVO Market analysis Oils and Fats for Fuel included a detailed overview of existing biofuel policies and plans to further develop these. IEA Task 39 recently published an overview of biofuel and bioenergy policy and its results of 15 countries around the world (10 EU countries, Brazil, Canada, China, South Africa and US). The report concludes that successful policy measured in terms of biofuel production capacity can have many forms, like mandates or tax exemptions, but is equally depending upon external factors which include feedstock availability, an active industry, and competitive energy prices. It is important that governmental policies set clear long term goals allowing a strong market to develop.

► IEA Bioenergy Task 39 'Commercializing 1st- and 2nd-Generation Liquid Biofuels from Biomass' is a global network dedicated to the development and deployment of biofuels for transportation fuel use

In this paragraph, the focus is on the US, Canada, the Ukraine and Russia. These countries may play an increasingly important role in the EU production and future supply of oils and fats feedstock, especially rapeseed and soybeans. Chapter 5 outlines the production figures of these countries. Other countries, like India, Brazil and Argentina, will be dealt with in more detail in Quick Scan reports that MVO will publish in the near future.

2.3.1 United States of America

National biofuel targets

In the US, the primary political drivers for introduction of biofuels are related to the economy and to energy security. In 2005 the Bush administration set a biofuel target at 5% in 2012. In 2007 this has been updated to 15% replacement of fossil fuel by biofuel in 2017. Some states have higher targets supporting this measure with different fiscal incentives. Since the use of diesel is limited to trucks, biodiesel use in the US is rather limited. The IEA Task 39 overview offers a complete overview of US State tax exemptions for E10. Some states, especially the ones with environmental concerns or those which are home to soybean growers, also have targets for biodiesel consumption.

B99

At present, in the frame of US Federal measures adopted in 2004 to promote biodiesel,US biodiesel producers are eligible for a subsidy of 1 US dollar per gallon of biodiesel blended with any amount of mineral diesel (the so-called B99 biodiesel). Due to the setup of this subsidy foreign producers can also at this moment apply for subsidy even if biodiesel is shipped out of the US again. As a result this biodiesel is shipped to the EU with a competitive advantage of roughly € 180/ton when compared to EU produced biodiesel. This has serious consequences for the competitiveness of the European biodiesel industry. The European Biodiesel Board (EBB) has sent a letter to EU Commissioner for trade Mandelson to protest against this practice. The two main Dutch biodiesel producers of this moment SunOil and Biodiesel Kampen have written a letter to Dutch parliament to ask for support to end this situation. EBB announced in July 2007 that it will prepare a countervailing duty complaint to be introduced against what they consider a violation of international trade rules. The US National Biodiesel Board acknowledges this use of the subsidy program is undesirable. It has reported that the draft Renewable Energy and Energy Conservation Act of 2007 includes a proposal to close the so called 'splash and dash' loophole. Extension of the tax measure is foreseen until 2010.

2.3.2 Canada

Although policies promoting domestic bio-ethanol production and consumption have been in place since the 1980's, the Canadian biofuels industry remains in its infancy. In December 2006 the government of Canada decided to implement a national strategy that should result in a significant increase in biofuels production capacity in this country. The Canadian government has notified its intent to mandate a 5% renewable fuel content in gasoline by 2010. To meet this mandate the current capacity (of 700 million liters) would require an expansion to 1.9 billion liters. Part of this biofuels strategy is that for all diesel sold in 2012 at least 2% must be biodiesel.

The diesel renewable fuel content is not limited to transport fuel because a significant share of the diesel pool is not used for this aim. This will require a fivefold increase of the current biodiesel production capacity to 520 million liters. If only canola was used, 1.3 million tons would be needed. A recent USDA report on the Canadian biofuel market states that canola oil use would remain mainly for food and may be used mainly as an additive to biodiesel. The Canola Council estimated that with government mandates and incentives, domestic biodiesel production could create an annual demand for rapeseed of up to 1 million tons by 2015 (Public Ledger August 2007). The mandate for 2% of all diesel in the country to come from renewable sources does not come into effect until 2012. thus, there there is still some time to build the plants. Without the production incentives and additional support being provided by both the federal and provincial governments, it is unlikely that the renewable fuel target will be met by the Canadian biofuels industry.

On this account as of 1 April 2008 Canada will impose production incentive rates of $0.10 and $0.20 per liter for respectively ethanol and biodiesel for the first three years, declining in the 6 years thereafter (see table 2.1). This regulation replaces the excise tax exemptions of $0.10 per liter ethanol and $0.04 per liter biodiesel, which were intended to stimulate consumption. This has been laid down in the "ecoENERGY for biofuels" program.

Table 2.1 Supply-side incentives for ethanol and biodiesel in Canadian dollars per liter

Fiscal year *	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Ethanol	0.10	0.10	0.10	0.08	0.07	0.06	0.05	0.04	0.04
Biodiesel	0.20	0.20	0.20	0.16	0.14	0.12	0.10	0.08	0.06

** From 1 April to 31 March*

The “ecoENERGY for biofuels” program is not yet finalized and approved but the government is targeting completion for later this year. The government allocates 1.5 billion Canadian dollars to this program, based on the establishment of a volume limit of 2 billion liters of ethanol and 500 million liters of biodiesel. The Canadian government launched also several programs to support Canadian companies in the development and expansion of (also second generation) bio-energy production capacity and infrastructure. The government considers the development of next-generation fuels such as cellulosic ethanol as being the ultimate goal since this would bring about the greatest benefits to the environment. Unlike the United States, energy security is not a factor behind the recent and projected growth in Canada’s biofuels industry. Canada has the world’s second largest proven reserves and is one of the top 10 oil exporting countries in the world. At this moment the provinces in Canada apply different (or no) biofuels mandates and incentives. The result is barriers to trade flows and the possibility of distorting the market for renewable fuel by encouraging production in areas where this activity is not well suited. Increasing levels of ethanol production may require inputs of corn beyond Canada’s historic production levels. Canada’s decreasing livestock industry, untapped corn growing potential in Quebec and Ontario, and the ability to use feed substitutes such as barley and wheat, may mitigate this impact.

2.3.3 Ukraine

According to vice-president Viktor Slauta, the Ukraine has great potential for biofuel production. This country has a scientific and industrial base for manufacturing renewable energy, but the quality and reliability of existing technologies have to be improved. Use of renewable energy sources is one of the key priorities of the Ukrainian government. In 2005 biomass energy had only a 1% share in the total energy consumption of the Ukraine. According to the Ukrainian Energy Strategy for the period till 2030 (adopted In March 2006) this share has to increase to 3%. This strategy puts major emphasis on the development of nuclear power plants. The alternative scenario of this strategy (excluding nuclear energy) indicates a share of 8.4. The main current constraint to the expansion of renewable energy sources (RES) is comparatively high costs. Direct and hidden subsidies for traditional energy hamper also the development of these RES. The Ukraine has various sources of biomass including agricultural residues, targeted production of energy crops and wood (waste).

Table 2.2 Energy potential of biomass in the Ukraine

Type of biomass	Million tce*/year
Residues of agricultural crops	10.3
Wood and wood wastes	7.1
Liquid fuels from biomass (bio-diesel/ethanol)	2.2
Biogas from manure, sewage and landfill	2.1
Total	**24.2**

** Ton Coal Equivalent*
Source: Ukrainian Institute for Economic Research and Policy Consulting 2007

Ukraine's parliament has approved a law on biofuels which allowes private firms to produce them and giving producers of biofuels and equipment for this industry tax breaks during 5-10 years. Besides, according to the law, biofuel is proposed to be listed as non-excise produce setting zero excise rate for it. The law proposes to change the State Budget for 2008, providing 50% subsidizing of the credit rates for investment projects in the biofuels industry. President Viktor Yushchenko has yet to sign this law, which also

orders the use of biofuels in big cities and helps imports of production technology. The Ukrainian parliament wants that executive authorities of 9 cities with a population of more than 0.5 million inhabitants as well as the owners of transportation means guarantee that in 2008 50% of the vehicles will be converted to run on environmentally friendly biofuels, rising to 100% in 2009. The law also mandates obligatory bioethanol blending in motorfuel by petrol producers. In 2008 bioethanol should account for at least 2% of the fuel, rising to respectively 3%, 5% and 10% in 2009, 2010 and 2011. The expectation is that the new parliament passes the law without changes. In December 2006 the Cabinet of Ministers approved also the “Program for the Development of Biodiesel in 2007-2010”. The program’s objective is to build at least 20 biodiesel plants with an annual output of 5,000-100,000 tons, leading to a combined capacity of at least 623,000 tons in 2010. The Ukrainian Agrarian Confederation (UAC) sees the need to improve biofuel production standards and introduce its mandatory use.

2.3.4 Russia

As one of the world's leading producers and exporters of oil and gas, domestic interest and demand for biofuels remains limited in Russia. The abundant resources of petroleum and natural gas, as well as subsidized gas prices have removed most incentives for the development of renewable energy sources. While alternative energy has entered Russian consciousness, there was no activity at the federal level regarding biofuels until 25 August 2007. On that day the Chairman of the Russian State Duma Boris Gryzlov presented a proposal to develop a national biofuels program. The biofuels industry in Russia is suffering from a lack of national biodiesel legislation, policy and technology investment. Only in December 2006 draft legislation was prepared to lift the excise taxes on motor fuel containing less than 10% ethyl alcohol. It has only little chance of becoming law this year because of health concerns that bio-ethanol could be illegally consumed as drinking alcohol. Another national incentive was the introduction of subsidized credits for the processing of high protein oilseeds for biofuels (and feeds) at the end of 2006. High taxes and bureaucracy are obstructing plans by companies to launch production of bio-ethanol. At this moment the production costs of biodiesel remain too high to compete with traditional diesel. Russia also doesn’t have a unified standard for biodiesel production, which may stifle development.

2.4 Sustainability criteria for feedstock production

Together with the increasing demand for food and feed, concerns were raised on the conditions of large scale feedstock production. Deforestation, monoculture side-effects and social conditions are major subjects in these discussions. As a consequence, both industry and politics have developed an agenda to address these concerns. For palm, soy and several other commodities, the industry in collaboration with social and environmental organisations have founded so-called Roundtable initiatives to define and implement sustainability criteria in the fields of environment, social and economic conditions.
The introduction of biofuels re-emphasized the need to contain the negative side-effects of large-scale production. As indicated in Chapter 2.2 the sustainability of production of any feedstock to be used as biomass for fuel or energy is a serious concern of the Dutch government. Product Board MVO has been closely involved in the discussions on this national sustainability framework. It has always insisted to link up with existing international initiatives for the development of criteria, most notably for palm oil and soy (RSPO and RTRS respectively). These provide appropriate platforms to collaborate with all stakeholders, including the producing countries, to define and implement sustainability criteria. MVO considers these as preconditions towards making the mainstream of bulk commodities more sustainable. A national framework should not lead to a niche market that would leave the real sustainability problems unaddressed.

2.4.1 Roundtable initiatives

Private initiatives to develop criteria for different feedstock have progressed to different extents. In 2003 the Round Table on Sustainable Palm Oil (RSPO) was founded by stakeholders in the food sector. The ambition of the RSPO and the oils and fats industry is to bring RSPO certified palm oil on the market early 2008. To achieve this, work is now being carried out to create a system for verifying the Principles and Criteria. The aim is to adopt that system in November 2007 during the next RSPO Round Table meeting (20-22 november 2007).

Similarly for soy, a Round Table on Responsible Soy (RTRS) was founded. On 9 May 2007 the first General Assembly of the Round Table on Responsible Soy confirmed the nine Principles for responsible soy production, paving the way for a working group to elaborate the corresponding criteria and indicators for responsible soy production. The working group is expected to conclude its task in 2008. Product Board MVO participates in this working group providing input from its expertise with the RSPO and as a representative of the Dutch soy processing industry, united in the Task Force Responsible Soy. The Task Force has drafted a factsheet explaining its objectives and activities and launched a website.

In analogy with these Roundtables a similar initiative was launched for biofuels by WWF in 2006 (see also Chapter 9.1.6). The World Wildlife Fund (WWF) which has acted as a stakeholder in this issue for a long time, stated in July 2007: WWF believes that a global approach is needed for bioenergy certification, but considers a harmonised certification system for Europe a critical step towards making this happen. A "Harmonised Biomass Certification Scheme" was elaborated by consultancy Ecofys for WWF, with the aim to inspire policy-makers. WWF, therefore, initatiated the Round Table on Sustainable Biofuels (see 12.3).

2.4.2 Compatibility with trade law

The introduction of sustainability criteria raises questions on the compatibility of such measures with existing international trading rules. In October 2006 the International Policy Council (IPC) published the report WTO Disciplines and Biofuels: "Opportunities and Constraints in the Creation of a Global Marketplace" This paper is the first to explore the opportunities in which way sustainability criteria can be introduced without the risk to be considered a trade barrier. As this is a topic that has not yet been addressed in great detail, the examination should be viewed as an exploratory one. The paper sets forth the range of WTO issues that could usefully be clarified in a debate on how international trade rules apply to the biofuels sector as such:

- How should biofuels be classified in the WTO: as agricultural, industrial, or environmental goods? What are the implications of each for WTO members' obligations? What are the options for reaching a more uniform classification and for possible trade liberalization?
- How should subsidies to promote the production or consumption of biofuels be considered from the perspective of existing or any planned WTO rules? How should possible "cross-subsidization" (the increase in by-products as a result of subsidies to biofuel production or consumption) be evaluated?
- What is the consistency of domestic regulations and standards – for example, mandates requiring the use of biofuels, fuel content requirements, or environmental sustainability import criteria – with WTO rules on international regulations and technical barriers to trade? How do government procurement practices get evaluated?

The paper does not give a final answer but discusses possible options by looking at comparable issues which played a roll with other products.

The Dutch government commissioned an analysis[►] of the Cramer criteria to find out whether the 9 sustainability principles and criteria can be put into law and to which exteny this would cause problems in the light of WTO and EU law. The analysis concludes that while the introduction of greenhouse gas performance criteria into national legislation would be possible, most other sustainability criteria are likely to meet legal objections or are considered to be in breach with existing EU or WTO legislation.

► WTO/EG-rechtelijke toetsing van de door de projectgroep duurzame productie van biomassa opgestelde duurzaamheidscriteria; Prof. Mr. M Bronckers, herziene eindrapportage, 30 augustus 2007

MVO considers compatibility of the introduction of sustainability criteria with existing international law of crucial importance for retaining a level playing field in trade and for the international acceptance of a sustainability framework. MVO will therefore continue to closely monitor this issue.

2.5 Related fields of policy

The renewable energy and biofuel policies are defining the demand factor. Supply should come from the agribusiness. This task is enormous and a real challenge. The development and exploitation of the agribusiness, however, does not take place in an isolated environment. It is interlinked and sometimes conflicting with other economic and social activities and interests. Therefore, several fields of policy are of relevance that can make the difference between success or failure in reaching the renewable energy targets.

2.5.1 Authorisation of genetically modified organisms

Worldwide GMO crops continue to increase their share of total acreage exceeding than 100 Mha in 2006 (ISAAA 2006). The major producing countries are located in the Americas (US, Argentina, Brazil, Canada), followed by India and China. Soy, maize, cotton and rapeseed remain the most prominent bulk commodities produced (in part) with GMO varieties with soy occupying 58.6 Mha (or 57% of the total GMO acreage).

In the EU great reluctance has existed over the years to accept GMO crops and to provide them with an authorization for import and processing and/or cultivation. A deepening asynchrony in authorization between the EU and the countries where GMO crops are commercially cultivated is leading to a surge in incidents of adventitious presence of non-authorized GMOs in EU imports. Also, the current implementation of the EU GMO policy prevents an optimal application of the available agricultural tools to meet the biofuel target.

Rapeseed is the most significant component of the EU biodiesel makeup. However, rapeseed from Canada, the biggest global exporter of rapeseed and third largest producer in the world (or 20% of the global production; 9.66 Mtons in 2005), can not be imported because of an asynchrony in authorization of existing GMO varieties. Recently, the EU authorized the rapeseed variety GT73 for import and processing, which was submitted already in 1998. New soy varieties, some of them with increased yield per hectare, are obtaining authorization in the United States. Files have been submitted for authorization in the EU, but suffer from serious delays in its consideration.

If the current situation persists, this will cause severe economic damage to the European agribusiness. As an example, in 2006 it could occur that, pending authorisation in the EU, Canadian rapeseed was crushed in the Middle East followed by export of the oil to the EU. The situation also prevents the exploitation of feedstock resources with increasing significance. The Canadian rapeseed canola e.g. occupied 4.8 Mha in 2006, more than

80% of the total rapeseed acreage. The biosafety level aimed for with the authorization procedure should be retained and the procedure should be under constant scrutiny to guarantee a robust and reliable evaluation of GMO crops. However, the assessment of biosafety should not be mixed up with a debate on the desirability of GMOs. Most importantly, this undermines the credibility of the safety assessment, hampering public confidence in GMO crops. Furthermore, it prevents GMO crops from proving their added value in a free market situation in the EU. The political discussions on biotechnology in the EU should therefore focus on making a clear distinction between the biosafety component and the economic significance, as well as the existing public concerns. This would contribute to an improved availability of already existing feedstock.

2.5.2 Developments Agricultural Policy

Large-scale cultivation of agricultural commodities is serving a global market. A market that has seen of an ever growing demand for food and feed and in more recent years expanded with a global demand for biofuels. The agribusiness is an outstanding example of an industry with intense government interference. A plethora of financial instruments and enormous capital have shaped this sector. The current Common Agricultural Policy (CAP) of the European Union is aimed at providing income stability for farmers, ensuring sufficient agriculltural production, while preventing overproduction. At the moment the CAP is in a reform period from a production oriented towards a market oriented scheme. This should result in an agricultural production that better meets demand.

In 2003 the EU introduced the Energy Crop Premium Scheme to promote the cultivation of energy crops. At this moment this subsidy system is based on a maximum area of 2 million hectares. If this acreage was fully planted with rapeseed, this would result in a rapeseed production increase by 5.5 million tons assuming a yield of 2.75 tons per hectare. In 2007 2.84 million hectares were registered by energy crop farmers for this financial support. The EC has decided to granted the hectare premium only for about 70% of last mentioned area. In September 2007 the Commission decided to set the obligatory set-aside rate at 0% for autumn 2007 and spring 2008 sowings, in response to the increasingly tight situation on the cereals market. The price hike of these products makes that European farmers rush to plant winter wheat and barley. It is expected that the majority of the land that comes back in production will go to these products (Public Ledger 22 October 2007). The area under set a-side in the EU 27 amount to 7.2 million hectares in 2007, of which 4 million hectares compulsatory and the rest voluntary (EC, DG for Agriculture and Rural development, July 2007). At the Biodiesel Expo in Newark (United Kingdom) the statement was made that 3.8 million hectares of arable land could be added in the EU, which would equate to about 12 million to 16 million tons of oilseeds. Agricultural yields will also rise by an average 2% per year. There is enough potential to produce crops to make biofuels for use in Europe without causing an unworkable impact on the food and the feed sectors (Public Ledger 22 October 2007). In the EU just 3% of arable land is currently used to produce crops for fuel. This is expected to rise to 15% at most by 2020, assuming second generation biofuels are commercialized.

► Prospects for agricultural markets and income in the European Union 2007- 2014

The 2004 LEI report "Beschikbaarheid koolzaad voor biodiesel" analysed the considerations of Dutch farmers for cultivating rapeseed for biodiesel. Of prime importance is the profitability of rape with respect to other crops. Secondary issues are the difficulty of the crop and the risk of a low harvest due to pests or bad weather. Changes in CAP payments for sugarbeet could also influence the farmers. Since the liberalisation of the sugar market profitability of sugar beet in Europe has declined, which could also act in favour of oil crops.

2.5.3 Trade agreements

Trade measures and trade agreements at different levels add to the complexity of the dynamics of the agriculture sector. Differentiation of import or export duties on specific products is one way to influence the economic attractiveness of a feedstock. Argentina for instance applies a higher tariff to the export of Soya bean than to the oil made of this feedstock (this is known as differential export tariffs or DETs). Also differences in classification can lead to different tariffs. The main framework for these regulations is set by the World Trade Organisation (WTO). Under the WTO the so-called Doha Development Agenda that started in 2001 aims for the liberalization of global trade in, among others, agricultural products. It focuses on market access, domestic support and export competition. Furthermore, initiatives to come to regional trade agreements, e.g. between the EU and Mercosur or between the EU and the ASEAN countries, have similar objectives. In defending the sector's interests under these negotiations, MVO has called for the liberalization of trade based on the level playing field principle.

3 Bio-energy policy

The biofuels objectives are part of a broader renewable energy policy. The overall goal of the European Commission is to reach a 20% share in renewable energy in 2020. Besides biomass, wind, solar and water are other sources of renewable energy. Currently, the share of renewable sources to the total primary energy mix of the EU-27 amounts to some 6%, of which biomass and waste account for two-third (Commission staff working document EU energy policy data; SEC(2007)12). The newly proposed target will thus add greatly to the demand for biomass that includes the feedstock for biofuels. To underline the significance, this update report addresses the policy objectives in a separate chapter.

3.1 EU bioenergy policy

EU Directive 2001/77 is legal instrument for the promotion of energy from renewable sources. The directive sets an overall target of 12% in 2010 for electricity from renewables for the EU as a whole. To reach this goal national targets for specific Member States have been set. For the Netherlands this goal is 9% in 2010. EU Member States have different policies and even more programs to stimulate production and use of renewable electricity. The most favoured system is the feed-in system, which pays the producer to produce an amount of renewable electricity. Every year all Member States send a progress report to the Directorate-General for Energy and Transport. The main picture that arises from these reports is the positive correlation between a strong incentive system with a long life span and a high renewables percentage.

On 10 January 2007 the European Commission published proposals for a new Energy Policy for Europe. These included a renewable energy roadmap proposing:
a binding 20% target for the overall share of renewable energy in 2020 – the effort to be shared in an appropriate way between Member States;
a binding 10% target for the share of biofuels in petrol and diesel in each Member State in 2020, to be accompanied by the introduction of a sustainability scheme for biofuels.

The Commission is now drafting proposals to incorporate these targets into legislation, which are expected to be published by the end of 2007.

3.2 Dutch bioenergy policy

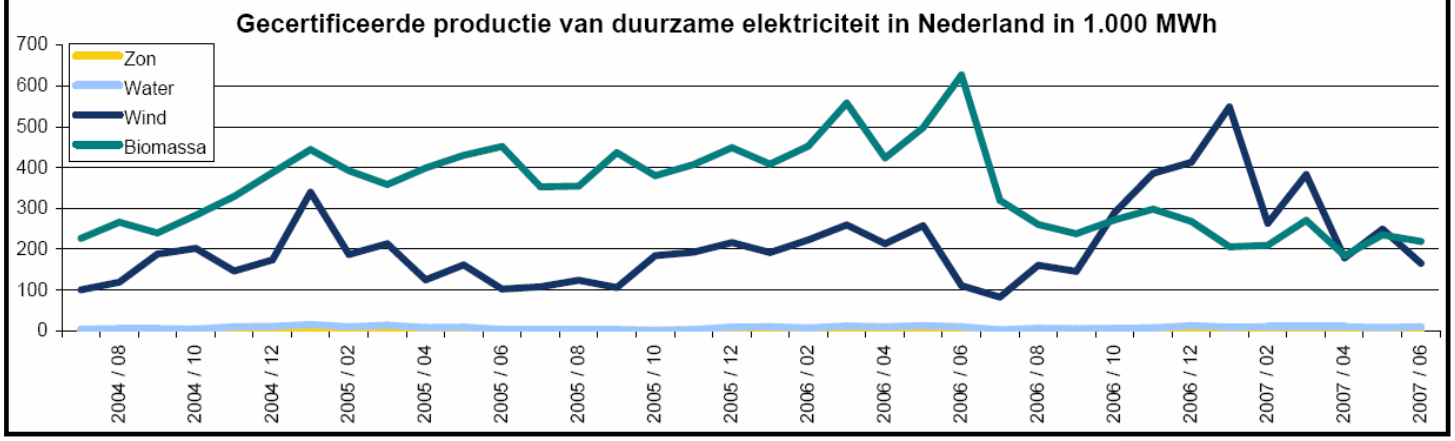
From the afore mentioned EU Directive 2001/77 it follows that the Dutch government had to develop a policy to meet the 9% target for electricity from renewables in 2010. One of the main measures to reach this target was the introduction of a subsidy program (Milieukwaliteit Elektriciteitsproductie - MEP). This program consisted of a feed-in system with payment of a fee per kWh put on the grid. The rate of the fee is related to the extra

cost of the investment needed to use biomass instead of fossil fuel. Due to the big success of this program, which made the program ran out of budget, all payments for new projects have been put on € 0/kWh by 18 August 2006. Especially the use of palm oil, in the beginning of this century the cheapest of vegetable oils, put the budget under stress. Use of liquid biofuels was comparatively easy, needed only small investments and did not meet as much licensing problems as other biomass. Due to change of perception on sustainability and the rise of the feedstock price of vegetable oils, including palm oil, development of new projects has been halted. The last big three projects to be granted under the old MEP program were the combined heat power (CHP) plants of Biox.
As a consequence, the production of renewable energy in the Netherlands has dropped dramatically (see Figure 3.1) and it is quite likely that without clear and substantial support the target of 9% renewable energy in 2010 will not be met. It is expected that the production of electricity from renewables will grow again when three planned 50 MW CHP-units (combined heat power) may come on stream in 2008, although rising palm oil prices may put stress on the economic feasibility.

For 2007 a temporary scheme has been developed which focuses on combined heat-power plants (CHP) with a maximized subsidy amount in total as well as per installation. Another, more permanent scheme should come into force in 2008. Proposals are expected later this year.

Figure 3.1 Certified production of renewable energy in The Netherlands (1,000 MWh);

Gecertificeerde productie van duurzame elektriciteit in Nederland		Vanaf 1-7-2001
(In MWh weergegeven)	Totaal	28.578.455
	Water	592.626
	Biomassa	16.863.037
	Wind	11.104.597
	Zon	18.195



Source: Certiq

Evaluation of the MEP subsidy program showed that subsidy plays a vital role in Dutch energy power from renewables. The writers of the evaluation advise the government to continue a kind of feed-in subsidy system. The Minister of Economic Affairs announced that a new support system will enter into force in summer 2008 at the earliest ('Stimulering duurzame energieproductie'; SDE). A maximum of € 326 million has been made available up to 2011 to support projects in the fields of renewable energy and CHP.

► Kamerbrief Voortgang MEP

Last but not least is the development of new more ambitious targets for GHG-reduction by the Dutch government as part of the coalition agreement. The government's budget proposals presented at Prinsjesdag in September 2007 confirmed a target of 30% CO_2 reduction, 20% renewable energy and 2% reduction in energy consumption in 2020.

In June 2007 the Working Group Transition Path Bio-electricity, part of the Platform Sustainable Electricity Supply, published a report advising the Dutch government to develop, among others, a clear European policy to improve crop cultivation in order to reach long term goals.

► Elektriciteit uit Biomassa Platform duurzame elektriciteitsvoorziening,Werkgroep transitiepad bio-elektriciteit, Juni 2007

4 Bio-energy policy

4.1 EU

Almost every day announcements are made and plans for new biodiesel production units are published by the industry. Definitely not all plans are eventually carried through and withdrawals are usually made in silence. Due to this dynamics it is not possible to give an up to date overview of all biodiesel producers in Europe. Nevertheless some national organisations keep track of existing and new factories in their respective countries.

An overview of biodiesel companies in Germany can be found at the website of Verband der Deutschen Biokraftstoffindustrie e.V. (VDB). An overview of the biodiesel plants in Spain can be found at BioDieselSpain.com.

At this moment the EU counts 185 fully operational biodiesel plants and another 58 factories are currently under construction. The European Biodiesel Board (EBB) estimated the EU-27 biodiesel production capacity at about 6 million tons in 2006 (see table 4.1). This information is confirmed by the Eurobarometer The main part of the EU biodiesel capacity is located in Germany, Italy, France and the United Kingdom (see table 4.1).

Table 4.1 EU biodiesel production capacity [1)] (x 1,000 tons)

Country	2003	2004	2005*	*2006	*2007
Germany	1,025	1,088	1.903	2.681	4,361
Italy	420	419	827	857	1,366
France	500	502	532	775	780
United Kingdom	5	15	129	445	657
Spain	-	70	100	224	508
Greece	-	-	35	75	440
Belgium	-	-	55	85	335
Austria	50	100	125	134	326
Poland	-	-	100	150	250
Portugal	-	-	6	146	246
Sweden	8	8	12	52	212
Czech Republic	-	-	188	203	203
The Netherlands	-	-	-	-	115
Others	49	52	222	242	490
Total EU	**2,048**	**2,246**	**4,228**	**6,069**	**10,289**

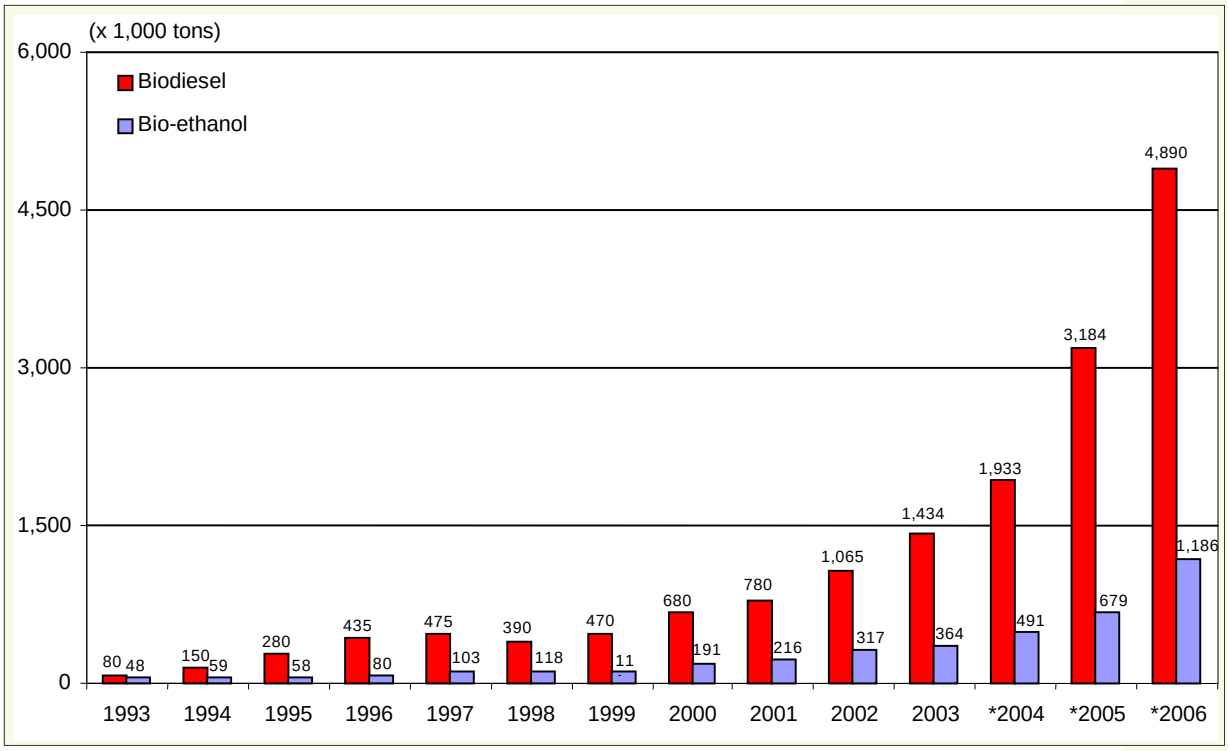
*1) Including the new member states in the period 2005-2007 -) Not or nihil *) Situation on 01/07*

Source: European Board of Biodiesel 2007

Biodiesel production capacities are expected to reach much higher levels, growing by the same rate at least until the end of 2008. Since the industry got off to a modest start in the early nineties, Europe has been the world leader in biodiesel production, representing roughly more than 95% of total world production. Since 2003, the EU share has declined sharply to less than 50% (ISTA Mielke June 2007), primarily as a result of strong capacity expansions in Asia and the Americas. ISTA Mielke expects that the world biodiesel capacities will be boosted to respectively almost 23 million tons and 31 million tons at the end of 2008 and 2009 compared to 12.1 million tons at the end of 2006. The extra capacity will by no means be utilized in the short term due to no profit returns and a lack of sufficient raw materials. Even an average capacity utilization of 50% will not be possible in 2007/2008. In this period the world production of soybeans and rapeseed will respectively decrease by an estimated 6% and rise by almost 4%. These supplies will be completely insufficient to fulfil the big feedstock needs due to the enormous expansion of biodiesel capacity (+156%). This may have serious consequences for the economic viability of biodiesel producers in Europe (and elsewhere).

The EU was also the fourth-largest producer of ethanol in 2006, far behind the United States and Brazil. China produced more or less the same levels of ethanol as the EU (F.O. Licht October 2007). Spain, Germany and France are the main EU producers of ethanol. Ethanol is still the dominant biofuel on a world scale, but biodiesel is steadily increasing is share. Figure 4.1 shows the ethanol and biodiesel production of the EU in the period 1993-2006. The European ethanol is mainly produced from wheat and to a lesser extent sugar beet. Most ethanol is processed into ethyl tertiary butyl ether (ETBE) as an additive to gasoline.

Figure 4.1 Development of biodiesel and bio-ethanol production in the EU, 1993-2006



** Includes the new member states*
Sources: EurObserver, European Board of Biodiesel 2007

The European Biodiesel Board (July 2007) indicated that in 2006 biodiesel production in the EU has risen by 54% to nearly 4.9 million tons compared to 2005. This corresponds to 80% of total production capacity. The extra biodiesel came mainly from Germany

(+993,000 tons), France (+251,000 tons) and the United Kingdom (+142,000 tons) (see also table 5.2). The ethanol production in the EU 27 rose even more sharply:+71% to more than 1.2 million tons in 2006. Germany and Spain accounted for more than half of this production (see also table 4.2). The Netherlands was with respectively 18,000 tons and 12,000 tons of biodiesel and ethanol a modest producer in 2006. In 2007 biodiesel production is declining in several EU countries because producers are making losses following the recent price rally of vegetable oils. They get also more competition of biodiesel imports from the United States and Argentina.

Table 4.2 EU biodiesel and ethanol production and consumption in 2005-2006

	Biodiesel					Ethanol			
	Production		Consumption			Production		Consumption	
	(x 1,000 tons)		(x 1,000 TOE*)			(x 1,000 tons)		(x 1,000 TOE*)	
Country	**2006**	**2005**	**2006**	**2005**	**Country**	**2006**	**2005**	**2006**	**2005**
Germany	2,662	1,669	2,408	1,548	*Germany*	343	131	307	145
France	743	492	532	344	*Spain*	320	241	115	113
Italy	447	396	177	172	*France*	199	115	150	75
United Kingdom	192	51	128	25	*Sweden*	111	122	163	145
Austria	123	85	275	79	*Italy*	102	6	0	5
Poland	116	100	42	13	*Poland*	96	51	53	28
Czech Republic	107	133	18	3	*United Kingdom*	-	-	48	43
Spain	99	73	63	*23*	*Others*	75	61	42	4
Portugal	91	1	58	0.1	***Total EU-27***	**1,246**	**727**	**878**	**557**
Slovakia	82	78	n.a	9					
Denmark	80	71	4	0					
Greece	42	3	70	3					
Others	106	32	74	25					
Total EU-27	**4,890**	**3,184**	**3,849**	**2,245**					

** Ton Oil Equivalent (estimate)*
Sources: EurObserver, European Board of Biodiesel 2007

Germany and France are the biggest consumers of biofuels in 2006. Germany consumed 2.4 million TOE of biodiesel, 0.63 million TOE of PPO and 0.3 million TOE of bio-ethanol (see also table 4.2). This corresponds with an incorporation rate (in energy content) higher than 6% of Germany's domestic fuel consumption, the largest for an EU country. In France this percentage was 1.6%, which means a consumption of 682,0000 TOE of biofuels (see also table 4.2).

4.2 The Netherlands

The Netherlands have three operating biofuels plants (Biodiesel Kampen, SunOil and Biovalue, the last of which started production last August), but much more are planned or already under construction. The total biofuels capacity will reach almost 2.5 million tons in 2009 (see table 4.3). By that time the capacity will probably exceed national demand based on current legislation, by approximately 5 times. If the capacity is going to be completely used The Netherlands will become a biofuel exporting country. However, it is not clear how the current low biodiesel price due to cheap, subsidised import of B99 from

the US will influence the outcome of these plans. Most of the plants will be designed to use multiple feedstock. Since most of the plants depend on import of feedstocks most are located in or near a seaport.

Table 4.3 Biodiesel capacity in the Netherlands (x 1,000 tons)

Location, company name	Start production (estimated)	Yearly capacity (estimated tons**)	Resources, more information
Bewa	2006/2007	15.000	used frying oil
Biodiesel Kampen*	2007	60.000	used frying oil
BioDsl	2007	6000	used frying oil
Biofueling*	2008	200.000	multi resources
Biovalue*	2007	240.000	rape and soya
Clean Energy*	2007	250.000	multi resources
DutchBioDiesel	2008	200.000	rape oil
Ecoson (Rendac)	2007	4.000	animal fat
Greenmills	2009	200.000	used frying oil
Mercuria Energy Group*	2008	200.000	multi resources
Rosendaal Energy and Heros*	2008	250.000	multi resources
SunOil*	2006	60.000	multi resources
Biopetrol*	2007	400.000	rape and soya
WHEB	2009	400.000	multi resources

** Member of the Association of the Dutch Biodiesel Industry*
*** based on public available information like websites and press releases*

Updates on biodiesel initiatives in The Netherlands can be found on the MVO website.

Besides biodiesel plants The Netherlands counts several, relatively small plants for the production of pure plant oil (PPO). Rapeseed is processed by cold pressing at De Noord Nederlandse Oliemolen, De Twentsche Oliemolen. OPEK and Carnola, all varying in capacity from 1.000 tot 3.000 tonnes.

4.3 Germany

Germany's once booming biodiesel industry is only producing at about 40-50%% of its almost 4.4 million tons annual capacity as a result of the continued sharp fall in biodiesel sales together with low profit margins. The German government said it could not afford to lose the large tax revenues from fossil diesel. The changing of the tax regime of biofuels has greatly reduced the price advantage over fossil diesel. As of 1 August 2006 the excise duties reductions in B100 and blended biodiesel were lowered and tax relief for biodiesel and PPO should be virtually nil after 2011 (see table 4.4 on the next page). Use of biodiesel and PPO by farmers is fully tax exempted. For E85 ethanol (85% bio-ethanol, 15% gasoline) the excise duty reduction of 65 eurocents continues to exist till 2015 but for other blends it has been abolished.

Table 4.4 Excise duty reductions and quota's for biofuels

	Biodiesel		PPO	Quotas		
	B 100	*Blend*		*Diesel*	*Petrol*	*Total*
2006	0.47	0.47	0.47			
As of 1 August 2006	0.38	0.32				
2007	0.40	0.00	0.47	4.4%	1.2%	
2008	0.34		0.39		2.0%	
2009	0.27		0.30		2.8%	6.25%
2010	0.21		0.22		3.6%	6.75%
2011	0.15		0.15			7.00%
2012	0.02		0.02			7.25%
2013	0.02		0.02			7.50%
2014	0.02		0.02			7.75%
2015	0.02		0.02			8.00%

Further tax rise on biodiesel has been planned for in January 2008 (see table 4.4), which makes the outlook for this industry very uncertain. Some biodiesel producers are saying they may close plants if the second round of tax increases goes ahead. To cushion the impact of these reductions, Germany imposed mandatory biofuels content in road transport fuels. The 4.4% target for biodiesel (see table 4.4) would create a requirement for about 1.3-1.4 million tons of biodiesel annually. However, the volumes for blending are overwhelmingly coming from imports from the United States and other countries since the required quality for blending was low and cheap supplies could be bought.
The German Federal Biofuels association (BBK) was lobbying hard for an amendment to the 2006 tax law. The BBK is hopeful that Germany's ruling government coalition would agree to amend the law, replacing automatic tax rises with a more flexible system based on keeping a suitable price difference between fossil diesel and biodiesel as crude oil prices fluctuate. The recent increases in fossil diesel prices makes keep direct consumption of refined rapeseed oil competitive. In Germany an estimated 60.000-70.000 tons of last mentioned product is used as fuel, and mainly consumed by trucks.

4.4 France

In 2006 more than 0.23 million tons of bio-ethanol and 0.62 million tons of biodiesel was consumed, which represented 1.6% of the domestic fuels use (EurObserv'ER 2007). France has set up an ambitious biofuel plan which foresees a prospective sharp increase in French biodiesel consumption and production from January 2008 onward due to the higher admixture quota of 5.75% (from 3.5%).The French government's aim is to replace respectively 7% of the domestic gasoline and diesel consumption by biofuels in 2010 and 10% by 2015. To favor sector development, the French government grants a partial petroleum tax exemption to producer industrialists. This tax exemption is allocated by calls for tenders in the form of official approvals of industrial sites. In 2006, the excise tax on consumption was €25.92 per hectoliter (hl) for ethanol incorporated in the form of Ethyl Tertiary Butyl Ether (vs. €58.92/hl for SP95/98 super) or directly incorporated and €16.69 per hl for biodiesel (vs. 41.69 €/hl for diesel oil). It's also foreseen that E85, also called "super ethanol", be taxed at 33.43 €/hl to have a pump price in the neighborhood of 80 eurocents per liter. Another tax incentive is constituted by an additional General Tax on Polluting Activities imposed on fuel distributors who incorporate less than the minimum rate

(3% in 2007, 7% in 2010). It's likely that the French biodiesel industry cannot keep pace with the rapid demand expansion. This will lead to higher biodiesel imports. Beneficiaries will be neighboring countries like Germany or Spain, but to some extent also Argentina or the United States. The USDA estimates that in the period 2006-2010 French oilseeds acreage dedicated to biodiesel production have to be doubled to 1.5 million hectares, of which 83% rapeseed and 17% sunflower seed. In 2006 nearly 0.7 million hectares of rapeseed plantings was dedicated to food (USDA 2007) An enlargement of the rapeseed area is not easy because this crop need to be rotated. France has an estimated 1.3 million hectares of fallow land in 2005. These low quality wastelands are often not suitable for rapeseed. INRA projects a shortage of 700,000 hectares in 2010. Most of the additional plantings have to come from its 17 million hectares of arable land.

In 2006 rapeseed methyl ester (RME) accounted for 80% of the biodiesel production, followed by 10% sunflower MTE, 5% soybean oil and 2% palm oil. According to the production quotas of the French government the production of biodiesel have to rise from 678,000 tons in 2006 to 3.2 million tons in 2010 (USDA 2007). The investments that shall be necessary to fulfill French commitments are substantial. Besides the development of existing factories, the construction of 21 new factories is planned, with 6 of them producing bio-ethanol and 15 producing biodiesel. Most of the biodiesel will be produced by the various plants of the French company Diester Industrie (DI). At the end of 2008, this company will possess a production capacity of approximately 2 million tons versus 0.71 million tons in 2006. DI produced 550,000 tons of biodiesel in last mentioned year. The mandatory biodiesel quota target for blending in France has been set as high as 7% for 2010, leading to annual demand of roughly 3.2 million tons.

France's ethanol sector is confident it can overtake Spain to become Europe's top producer by 2008 as it races to meet ambitious government targets for biofuels. It is expected that France produce 880,000 tons of ethanol in that year and two million tons by 2015. The domination of one company in the French biodiesel market is not found in the ethanol industry. The production in 2008 will be produced by several players like Tate & Lyle, Téréos, Cristanol, AB Bioenergy, Roquette, Soufflet and Abengoa. Last mentioned company, the European leader in ethanol production, will open an ethanol plant in 2008 with a production capacity of 197,500 tons per year.

4.5 Rest of the World

United States

A rapid increase in oil prices over the past several years combined with the Energy Policy Act of 2005 and Federal and State biofuel programs provided impetus for the large expansion of U.S. biofuels production. This development affects virtually every aspect of the field crops sector, ranging from domestic demand and exports to prices and the allocation of acreage among crops like (especially) soybeans, grains and cotton. Cellulosic sources as feedstocks for ethanol production hold some promise for the future, but the primary feedstock in the United States is currently corn. Livestock feeding is the largest use of U.S. corn, typically accounting for 50-60% of the total. The increased use of corn for bio-ethanol will lead to much higher corn prices resulting in a reduced use of 40-50% of this product in animal feeding over the next decade.

The greater availability of distiller's grain from dry-mill ethanol partly offsets this price effect. Ethanol production in the United States totaled almost 5 billion gallons in 2006, about 1 billion gallons more than in 2005. While this was a significant increase, further expansion in the industry is continuing, making production grow to 12 billion gallons by

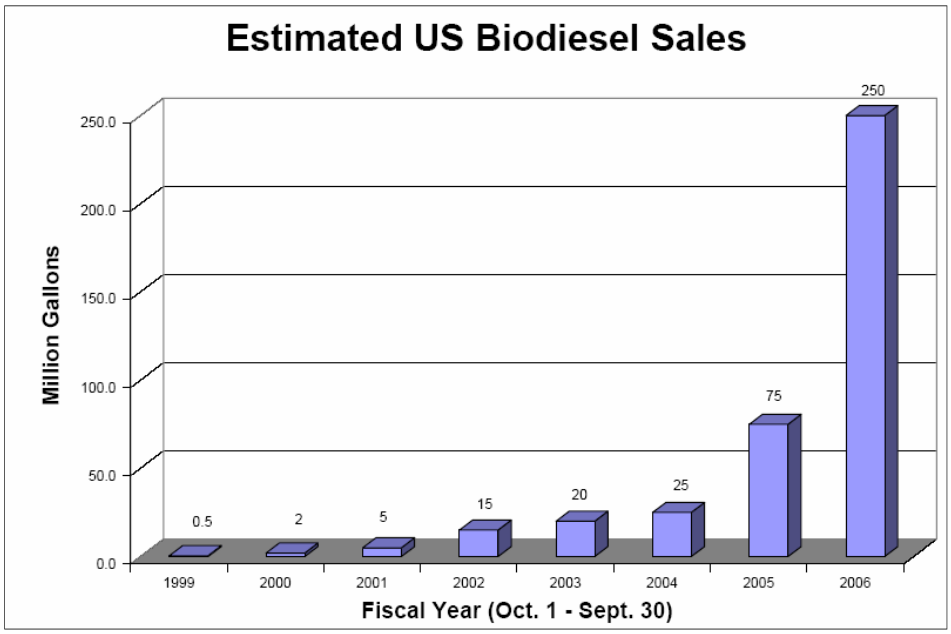
2015. The Energy Policy Act of 2005 mandated that renewable fuel use in gasoline reach 7.5 billion gallons by 2015. The IEA reported a domestic ethanol consumption of 5 billion gallons in 2005/2006 (October till September). The ethanol industry took advantage of the fact that earlier mentioned Act did not offer protection to methyl tertiary butyl ether (MTBE) producers against lawsuits that would make them pay compensation for MTBE's contamination of water and associated clean-up costs. This has led to sharp reductions in its use and a switch to ethanol as a fuel additive. Federal tax laws provide tax credits to blenders equal to 51 cents for each gallon of ethanol blended with gasoline. Additionally, the US market of ethanol is highly protected by an import duty of 54 cents per gallon ethanol and only a duty-free status on up to 7% of the US imports from designated Central American and Caribbean countries. Ethanol's share in the overall gasoline market is relatively small, but its importance to the corn market is comparatively large. In 2006, ethanol (by volume) represented about 3.5 percent of motor vehicle gasoline supplies in the United States. However, about 14 percent of corn use went to ethanol production in the 2005/06 crop year. In 2016/2017 this share will increase to more than 30%. Still, even by 2017, ethanol production (by volume) will represent less than 8 percent of annual gasoline use in the United States.

The Renewable Fuels Association counts 113 U.S. ethanol distilleries in operation and another 78 under construction, with the capacity to produce 11.8 billion gallons within the next few years. The Energy Information Administration (EIA) predicts in its Annual Energy Outlook 2007 that ethanol consumption will reach 11.2 billion gallons by 2012, outstripping the 7.5 billion gallons of biofuels (including biodiesel) required in the Renewable Fuel Standard that was enacted as part of the Energy Policy Act of 2005. Most cars on the road today in the U.S. can run on blends of up to 10% ethanol, and motor vehicle manufacturers already produce vehicles designed to run on much higher ethanol blends. Portland, Oregon, recently became the first city in the United States to require all gasoline sold within city limits to contain at least 10% ethanol. Ford, Daimler Chrysler and GM are among the automobile companies that sell "flexible-fuel" cars, trucks and minivans that can use gasoline and ethanol blends ranging from pure gasoline up to 85% ethanol (E85). By mid-2006, there were approximately six million E85-compatible vehicles on U.S. roads.

Biodiesel

The biodiesel capacity has expanded rapidly, although less impressive than in the ethanol industry. As of September 2007 165 biodiesel plants are operational with total capacity of an estimated 6.1 million tons, up from 2.5 million tons in 2006. Eighty companies have reported that their plants are currently under construction and are scheduled to be completed within the next 18 months. An additional four plants are expanding their existing operations. Their combined capacity, if realized, would result in another 4.1 million tons of biodiesel production per year (National Biodiesel Board United States September 2007). Domestic production of just 825,000 tons in 2005/2006 implies a low degree of utilization. More than half of the operational facilities use soybeans as raw materials. Three of them use rapeseed (2) and cottonseed oil (1) and the remainder uses inedible animal fats as feedstock. In 2006 soybean-based biodiesel accounted for 86% of total production. In the United States soybean oil stocks are declining rapidly owing to the strong domestic demand for biofuels and large exports. A large part of the biodiesel production is exported. The National Biodiesel Board estimated that 250 million gallons of biodiesel were consumed in the period October 2005 till September 2006 (see figure 4.2), which is small compared with ethanol (see previous page).

Figure 4.2 Estimated biodiesel sales in the Unted States, 1999-2006



Source: National Biodiesel Board 2007

Table 4.6 gives an overview of the largest biodiesel facilities in the United States which are already running and coming online.

Table 4.6 Largest biodiesel facilities in the United States, operational and coming online

Operational		*Capacity* (x 1,000 tons)
Company	*State*	
Fuel: Bio Holdings LLC	New Jersey	165
Independence Renewable Energy Corp	Indiana	133
Incobrasa Industries LTDi	Illinois	99
Minnesota Soy Processor	Minnesota	99
SoyMor Biodiesel LLC	Minnesota	99
MidAmerica Biofuels (ADM)	Missouri	99
Coming online		*Capacity* (x 1,000 tons)
Company	*State*	
Agri-Source Fuels LLC	Florida	396
Louis Dreyfus	Indiana	265
ADM	North Dakota	280
Imperium Renewables	Washington	330

Source : F.O. Licht 2007

Biodiesel made of vegetable oils received a federal tax credit of 1 US $ per gallon when blended with conventional diesel. The tax credit is 0.50 US $ lower if the biodiesel is produced from recycled cooking oils or animal fats. Smaller manufacturers with an annual production of 60 million gallons or less receive a credit of 0.10 US $ per gallon on up to 15 millions gallons. Without the tax incentives the production of soy-based biodiesel is not economically viable. Conventional diesel will be cheaper when the price falls below the 2.41 US $ per gallon, but it fluctuates above this price with a top of 3.06 U.S. $ in August 2006. Earlier mentioned credits were introduced in 2005 and will expire in 2008. The

American Congress adopted the Renewable Energy and Energy Conservation Act (REEC) that extends these credits to 2010. South American and Southeast Asian countries can export biodiesel duty-free to the United States, where they are blended with a very small amount of conventional biodiesel to qualify for the tax break. These so-called B-99 blends are shipped to Europe receiving further subsidies. These re-exports create a fiscal problem because US tax payers subsidize this trade. Part of the REEC is the abolition of these subsidized re-exports. Another provision of the REEC is to prevent large integrated oil companies from claiming the $1.00 per gallon renewable diesel tax credit. Absent this provision, taxpayers would subsidize existing oil refineries at the expense of stand-alone biodiesel and renewable diesel producers.

Assuming that the federal tax credit is extended, FAPRI projects a domestic biodiesel production of 1.86 million tons in 2009/2010 which will then fall to about 1.5 million tons in 2016/17. Last mentioned production level means a nearly doubling compared to 2005/2006. Assuming this production, there will be an enormous overcapacity in United States' biodiesel industry, which may lead to the start of a consolidation process in this industry.
The market share of soy-based biodiesel may decline as prices for soybean oil will rise and for glycerin remain constant. Domestic use of soybean oil in the United States amounted to 7.8 million tons in the period October 2006 till August 2007, of which nearly 15% for biodiesel. The share of soybean methyl ester in the total soybean oil production will remain constant and not exceed the 18 percent in the period till 2016/2017 (FAPRI 2007). In this period the used feedstock in the U.S. biodiesel industry will partially shift from soybean oil to rapeseed oil and animal fats/ recycled vegetable oils and animal fats. The input of the last two categories in the production of this industry will rise to respectively 17% (from 8%) and 10% (from 6%). The potential to make biodiesel from animal fats is limited due to quality problems. The process called thermal de-polymerization (TDP) which turns hazardous plastic as well as food waste into fuel may become attractive. The potential feedstock supply seems large and it also qualifies for the same tax credits as agricultural biodiesel. However, TDP has to prove its economic credentials first.

Over the next few years a substantial rise of soybean porduction is expected although the outlook on the demand side is not so positive. Production costs can be influenced by the competition for arable land between soybeans and corn (see above).

4.6 Canada

The Canadian biodiesel production is mainly located in the western provinces. Canada's ability to supply the majority of the feedstock necessary for the projected required volume of biodiesel may be hindered by high prices for oilseeds and limited crushing capacity in Canada. Another problem is that the federal government does not want to inadvertently subsidize crushing plants, which are also used to produce oil for human consumption. Most of the current and forecasted increase in biodiesel production comes from rendered fats (yellow grease and tallow), recycled vegetable oils and palm oil. Industry sources put a ceiling on the potential biodiesel output from rendered animal fats at 250 million liters. In 2007 the forecasted use of canola oil for biodiesel will be only 1%.

Most of the Canadian ethanol production takes place in Ontario (50%), Saskatchewan (24%) and Quebec (20%). Multinationals have not expressed interest in Canadian produced ethanol, seeing Canada primarily as a market for US produced ethanol. Only ADM has invested in Husky's large wheat-based ethanol production facility in Saskatchewan. Canadian ethanol production is expected to reach 1.579 billion liters by

2009 (see table 4.7). Suncor is looking into expanding its current facility in Ontario. This additional production could bring Canada's production capacity up to 1.777 billion liters by 2010.

Corn is estimated to account for 77% of the feedstock used in Canada's ethanol production in 2006. In 2007 and 2008 it is expected to account for respectively 69% and 66% of ethanol feedstock, as more wheat-based ethanol plants come online. Canada's current biodiesel production capacity is about 100 million liters per year (see table 4.7 on the next page). The government has put incentives (see table 2.1 in Chapter 2) in place to help that production grow to 500 million liters.

Table 4.7 Canada's existing and projected biofuels capacity (x 1 million liters) in 2009

	Corn-based ethanol	
	Operational	
Company	**Province**	**Capacity**
Suncor Energy	Ontario	*200*
Greenfield Ethanol	Quebec	*130*
	Ontario	*150*
Iogen (1)	Ontario	*2*
	Under construction	
Greenfield Ethanol	Ontario	*200*
	Ontario	*200*
IGPC	Ontario	*150*
Collingwood Ethanol	Ontario	*50*
Total		**1,082**

	Wheat-based ethanol	
	Operational	
Company	**Province**	**Capacity**
Husky Energy	Saskatchewan	*130*
	Manitoba	*10*
Permolex	Alberta	*40*
NorAmera Bioenergy	Saskatchewan	*25*
Poundmaker	Saskatchewan	*12*
	Under construction	
Terra Grain Fuels	Saskatchewan	*150*
Husky Energy	Manitoba	*130*
Total		**497**

	Biodiesel	
	Operational	
Company	**Province**	**Capacity**
BIOX Corporation	Ontario	66
Rothsay	Quebec	30

Company	**Province**	**Capacity**
Milligan Bio-tech	Saskatchewan	1
	Total	**97**

1) Primary feedstock is straw

The Minister of Environment expects to propose a draft "Renewable Fuels Regulation" in the autumn of 2008.

4.7 Russia

The high excise taxes on alcohol of 23.5 rubles per liter (€3.57) limits the domestic production of bio-ethanol. Only when bio-ethanol is exported, these duties return to the producer. The high and increasing grain prices further constrain bio-ethanol production in Russia. If this continues grain-based ethanol will not be economically feasible. Sugar beet molasses may be an option as an alternative. According to the Russian Biofuels Association producers of ethyl alcohol (like vodka) can easily switch their production to bio-ethanol. Other experts indicate that this only applies to plants with a capacity of 1.4 billion liters or more. They also expect that the transition will require investment in technology, which can be quite expensive.

At regional level the situation is somewhat different. Several projects have been developed to build biofuels plants (see table 4.8 below) as well as domestic companies have started or increased the production of wooden pellets, rapeseed and rapeseed oil for exports to this industry. Only the Titan company is operational at this moment (USDA 2007). In the last months several companies announced plans to build biofuel plants in Russia, like Pava (ethanol), Mayr-Melnhof Holz Efimovskij (biodiesel), Alternative Fuel Biotechnologies (biofuel pellets), Derzhava (biodiesel) etc. This means that the listed capacities in table 4.8 will be an underestimate of the future potential output.

Table 4.8 Biofuel projects in Russia as of June 2007

Ethanol				
Company	*Location*		*Capacity* (x 1,000 tons)	*Feedstock*
	City	**Oblast**		
Vipoil	Mikhaylovka	Volgograd	300	Grains
Yugtranzitservis	Azov or Taganrog	Rostov	250	Feed wheat
Bashnedt-Yug	Rostov	Rostov	250	-
Aston	-	Rostov	250	
Titan	Omsk	Omsk	150	-
Vinagradov	-	Lipetsk	65	-
Extrasib	-	Tomsk	15	
Tatneftekhiminvest	Tatarstan	*Republic*	-	-
Agrotop (1)	Penza	Penza	-	-
	Total		**1,280**	

Biodiesel				
Company	*Location*		*Capacity* (x 1,000 tons)	*Feedstock*
	City	**Oblast**		
Azov Shipyards	Rostov	Rostov	150	-
Razgulyai	Stavropol	*Kraj*	100	Rapeseed
T & T Trade	Oryol	Oryol	100	Rapeseed
Consortium (2)	-	Lipetsk	90	Rapeseed oil
Masloproduct	Voronezh	Voronezh	-	-
		Total	**440**	

-) Unknown 1) Israeli company 2) Of 5 agribusiness companies

Sources: F.O. Licht, USDA 2007, Russian Association of Biofuels

The emerging Russian biofuels industry is driven primarily by growing EU demand for biofuels. The market potential for Russian bio-ethanol is estimated at 800 million liters. Russia, with 9% of the world's arable lands, may well be suited to benefit from the international trade in biofuels rather than direct gains from domestic use. This country also hold 25% of the world stocks of wood. Specialists estimate that the use of waste of agriculture and timber industry will make it possible to get about 100 billion liters of bio-ethanol a year (Russian Biofuels Association 2007). Russia consumes some 30 billion liters of petrol per year. Russia's biofuel production volumes are still small and in an experimental stage.

4.8 The Ukraine

Investors are in no hurry to invest in Ukraine's biodiesel industry due to the shortage of raw materials of requisite quality, the UKROLIAPROM association announced. Main West European consumers and producers of biodiesel do not buy rape, rapeseed oil and cake from Ukraine. The reason is the low quality of Ukrainian rape seeds, specifically the content of glucosinulates in them is 2-3 times higher than the requirement established by European Union countries. The existing methodology to determine the content of these substances in rape and rapeseed cakes in the Ukraine is imperfect. Under these circumstances, UKROLIAPROM asked the government to speed up regulatory changes to bring standards for rape, rapeseed cake, oil and other products in line with EU requirements. The objective of the Ukrainian government is to construct three biofuel plants before 2008 and at least 20 with a total biodiesel capacity of 623,000 tons before 2010. In January 2007 Bessarabia Biodiesel launched the first plant line on production of biofuel diesel with a production capacity of 7,000 tons a year in the city of Sarata (district center of Odessa region). This company also planned to launch its vegetable oil processing complex by 2008, which would allow increase of biofuel production to 14,000 tons a year. BioDiesel Vienna (Austria) intends to invest EUR 100 million in the construction of a plant for the production of biodiesel fuel from rapeseeds in Ivano-Frankivsk region by 2008. Half of this sum will be used for the building of the plant, while the other half will be used for equipment and stimulation of rape cultivation. The planned capacity of the factory is 100,000 tons of biofuels a year. With this purpose in view it must process 250,000 tons of rape seeds. Abaramyk said to load the plant, rapeseeds will also be supplied by neighboring regions (Khmelnytskyi, Lviv and Ternopil). One of the largest operators of Ukrainian grain and oilseeds market, Group "Grain trading company Allseeds Ukraine" is also going to build a biodiesel producing plant with a capacity of 200,000 tons per year. Sunflower, rapeseed, linseed and soybean oils will be used as raw materials for this fuel production.

4.9 Conclusions

Biofuel production capacity shows a rapid growth worldwide. In the EU biodiesel production capacity is expected to amount to approximately 30 million tons by 2020. This capacity will be enough to meet the 2020 targets (that requires 24.2 Mtons; see Chapter 8). Unless an international market develops where the EU could manifest itself as an exporter of biodiesel, the overcapacity would put pressure on the economic viability of biodiesel production.

At this moment, biodiesel production volumes amount sometimes to only 50% of the production capacity (like in the US and Germany). This may be due to shortage of feedstock. Also, the current high feedstock prices may render biodiesel production uninviting.

5 Supply and demand of oils and fats

This Chapter describes the developments in the oils and fats market with a special focus on rape oil. This oil will remain the most important feedstock for biodiesel production used in the EU, at least in the short and medium term.

5.1 Rape oil use in the EU

The use of rape oil in the EU-27 is more and more dominated by biodiesel. In 2004/2005 for the first time the non-food use of rapeseed oil became more important than the food use (see table 5.1).

Table 5.1 EU-27 (estimated) usage of rapeseed oil (in million tons) 2001-2008

	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	*2006/2007	*2007/2008
Total	**4.00**	**4.15**	**4.39**	**5.38**	**6.65**	**7.09**	**7.82**
Food sector	2.88	2.70	2.62	2.67	2.62	2.59	2.82
Non-food :	1.12	1.45	1.77	2.71	4.03	4.50	5.00
Rape methylester	*1.12*	*1.45*	*1.72*	*2.51*	*3.53*	*3.90*	*4.40*
Pure Plant oil	-	-	*0.05*	*0.20*	*0.50*	*0.60*	*0.60*
Percentage biodiesel	*28%*	*35%*	*40%*	*50%*	*61%*	*63%*	*64%*

** Estimate*
Source: IST A Mielke Augustus 2007

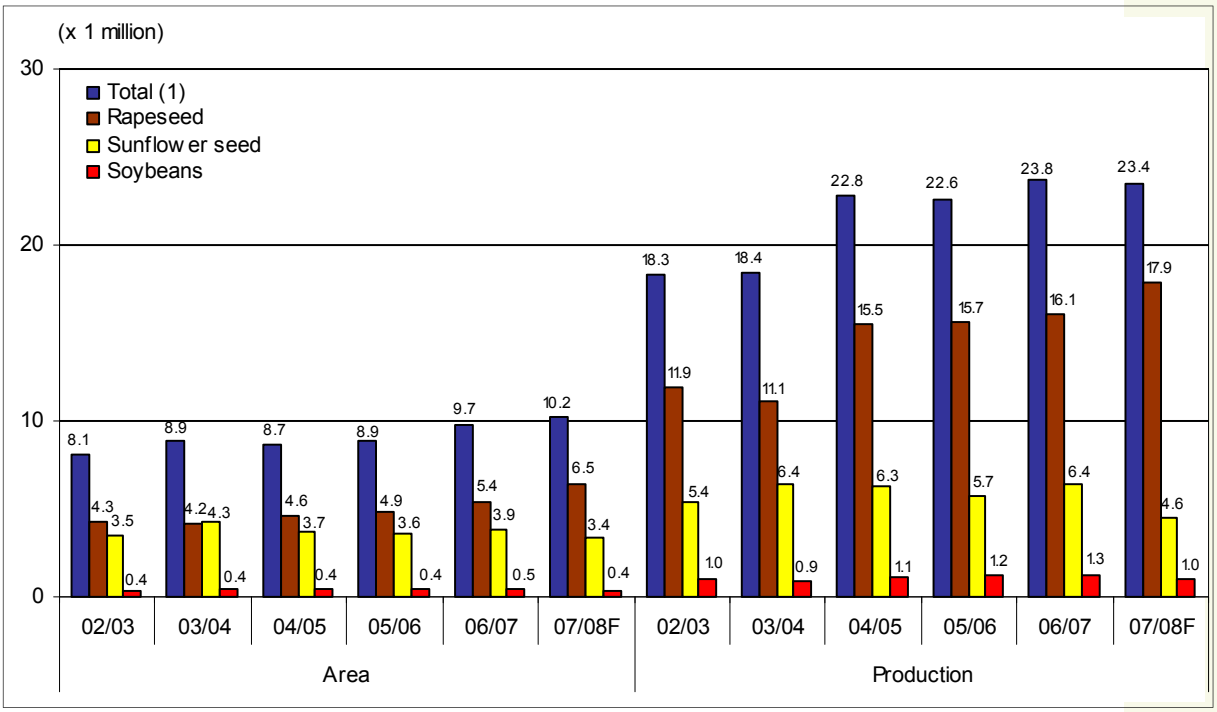
Rapeseed oil usage in the EU will continue to increase in 2007/2008, driven by a strong recovery of consumption in the food industry as well as further growth in biofuels (see table 5.1). Due to this strong demand and unusually high prices of rapeseed oil and meal, crush margins are still attractive in the EU, despite the current high raw materials costs. Tight feed supplies in the EU, to a large extent caused by the sharply reduced exports of US cornglutenfeed, and very high prices of feedgrains force feed producers to raise the share of oil meals. This has sparked a rally in rape meal prices to a near-record of 272 US $ on 11 October 2007 (ISTA Mielke October 2007). Because of GMO restrictions, EU buyers cannot import maize, dried distillers grain or corn gluten feed from the United States and other biotech countries. Crude rapeseed oil prices in the EU reached new record levels of 835 euros in the beginning of October. The price of this product was pulled up by the tightness and very high prices of sunflower oil. The acute shortage of sun oil drove the sun oil premium to 273 US $ over rapeseed oil on 4 October (ISTA Mielke October 2007). Many edible oil consumers have switched part of their sun oil usage to rapeseed oil. Rapeseed oil produced from non GM European rapeseed is the first choice as a substitute for sunflower oil and generally preferred to soybean oil. In addition, growing demand from

the biodiesel industry and a sizeable decline in rapeseed/canola oil imports into the EU-27 have resulted in a sharp decline in rapeseed oil stocks. It is important to note that in most EU countries the biodiesel standard EN14214 speaks for rapeseed oil as the key feedstock and limits the scope for using alternatives like soybean oil and palm oil. Prices of rapeseed and oil have still upward potential due to lower than expected crops in the northern hemisphere. There is also an increasing risk of a sharp decline in autumns plantings of rapeseed in Germany, France, Poland, United Kingdom, and other European countries like the Ukraine because of the shift to wheat. This effect can be enhanced by crop rotation requirements and the fact that East European countries are hit by drought, which can influence rapeseed sowings. The rapeseed price ratio in comparison to wheat has fallen to historic lows in the EU. Farmers have responded by sizeably increasing winter wheat plantings at the expense of rapeseed this autumn. EU ministers have also approved EC proposals to set the obligatory set-aside rate at 0% (from 10%) for autumn 2007 and spring 2008 sowings to alleviate the tightness in the cereals market. The longer-term future of the set aside system will be part of the CAP debate, which will take place on 20th November 2007. Today's big demand for rapeseed can only be achieved if world stocks of rapeseed and canola are reduced sharply.

5.2 EU oilseeds production

In 2007 the total forecasted harvested oilseeds area in the EU 27 (excluding linseed and cottonseed) amounted to 10.2 million hectares with an output of 23.1 million tons (see Figure 5.1). The American Food and Agricultural Policy Research Institute (FAPRI) forecasts that this oilseeds area and production will increase to respectively 11.1 million hectares and 31 million tons in 2016/2017 (see figure 5.2 A and B). FAPRI's Agricultural Outlook till 2017 was, however, published in january 2007 and could therefore not take into account the actual figures of the oilseeds production and areas for the 2007/2008 season, which turned out higher than FAPRI assumed.

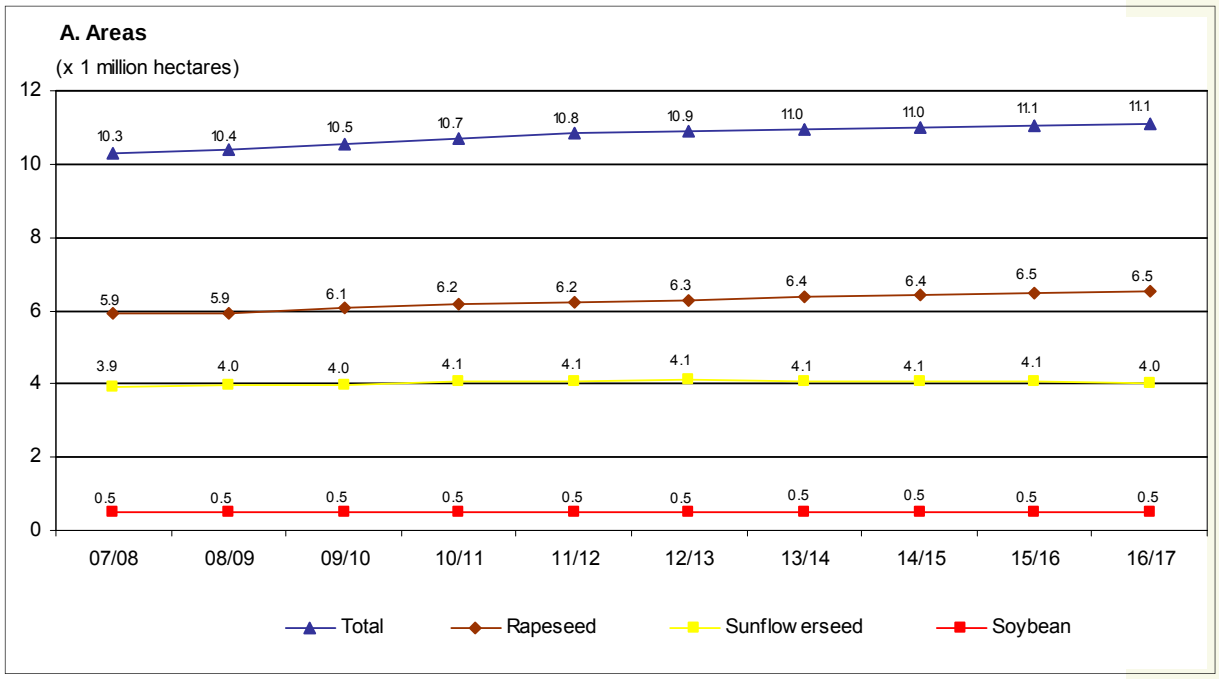
Figure 5.1 Development EU 27 oilseeds areas (in hectares) and production (in tons), 2002-2008

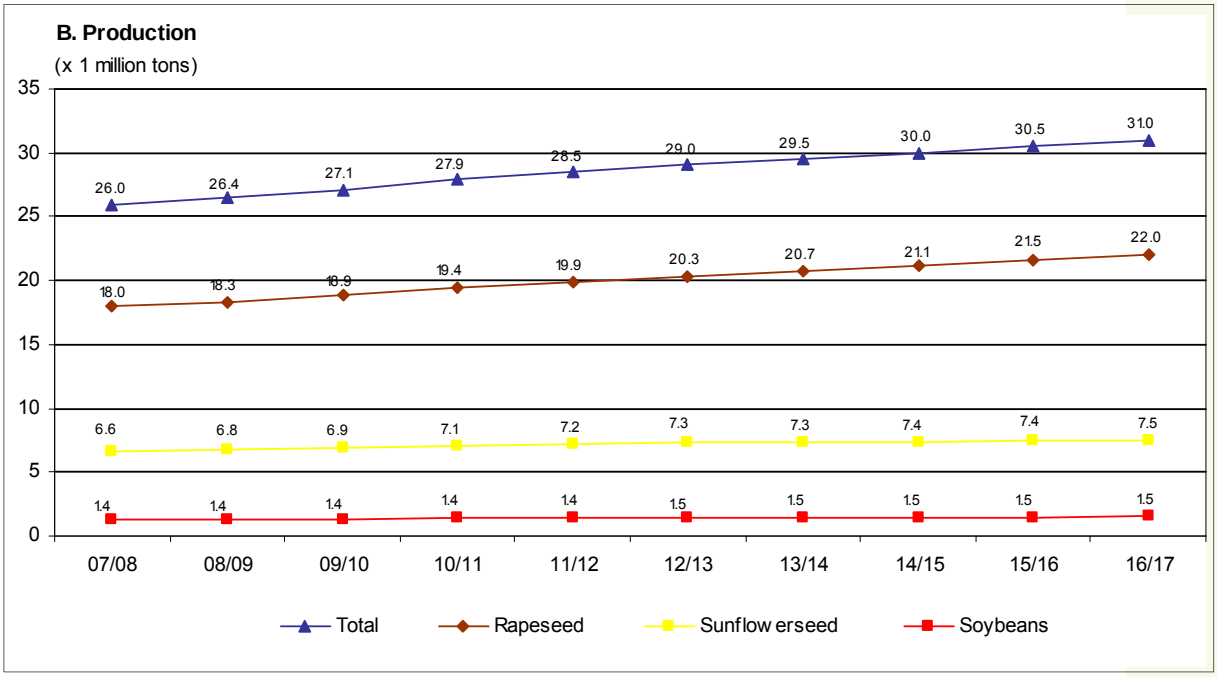


F) Forecasts

Source: ISTA Mielke August 2007

Figure 5.2 Forecasts EU 27 areas and production of rapeseed, sunflowerseed and soybeans, 2006-2017

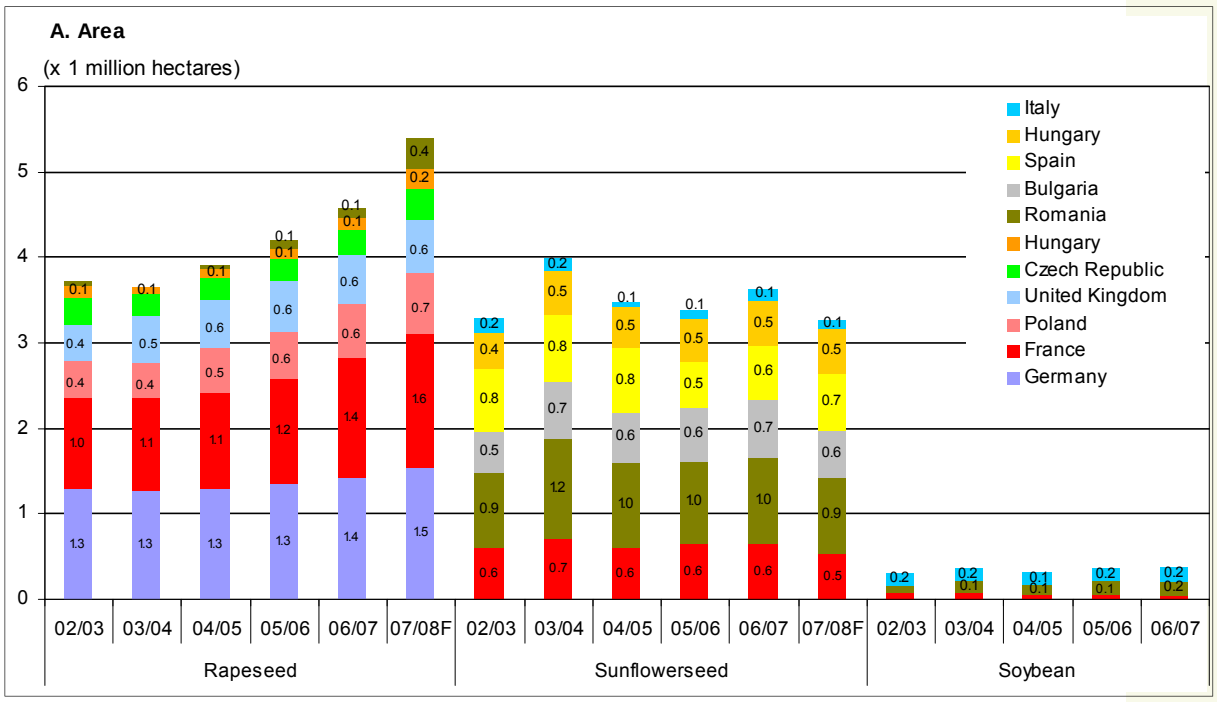


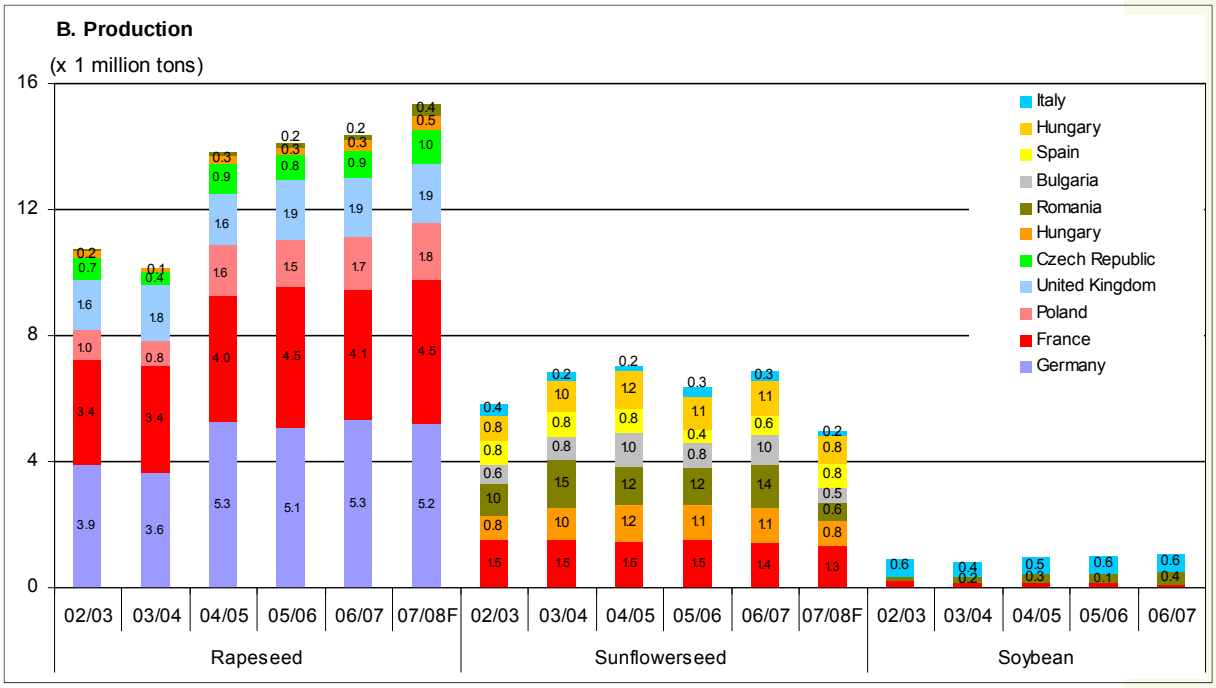


Source: FAPRI, January 2007

Figure 5.3 presents an overview of the oilseeds production in the EU-27. The countries that have been selected produced more than 88% of the total EU-27 rapeseed, soybeans and sunflowerseed yield in 2006/2007. Figure 5.3.A depicts the oilseeds acreage, while Figure 5.3.B shows the oilseeds production.

*Figure 5.3 Development oilseeds area and production of selected EU countries, 2002-2008**





** Breakdown by country for the (forecasted) soybean area and production in 2007/2008 is not available.*

Source: ISTA Mielke 2007

Conclusions

The EU production of rapeseed is estimated to reach 17.9 million tons in 2007/2008. This means an increase of 11.2% in comparison to 2006 and 27.5% compared to the 2002-2006 average. This year the average EU yields per hectare decreased sharply to 2.75 ton by the poor weather compared to 3-3.2 tons in 2005-2006. The production increase was therefore completely due to area enlargement of 19.6% to 6.5 million hectares. The rapeseed areas and production in the EU were put constantly under revision this year. The FAPRI has published the Agricultural Outlook in the beginning of 2007, which makes the starting values of these indicators lower than what was actually realised. The FAPRI forecasts that the EU rapeseed area and production will increase by respectively 0.6 million hectares (+10%) and 4 million tons (+22%) in the period 2007-2017. This means that the yield per hectare shall improve significantly. The area expansion will probably take place in the Eastern European countries because of their enormous agriculture potential. The rapeseed areas in Romania (+217%), Hungary (+56%) and Slovakia (19%) showed already big expansions in 2007 (see figure 5.3). Paragraph 5.3 about the EU-27 imports of rapeseed indicates that also the Ukraine, Russia and other CIS countries like Kazakhstan are becoming more and more important suppliers of rapeseed to the EU. By 2012 this region can produce 4.5 to 5.5 million tons of rapeseed from the current 1.5 million tons (Public Ledger, 8 October 2007).

5.3 EU rapeseed imports

In 2006 the EU 27 transformed from a little net exporter of rapeseed into a big net importer (see table 5.2). The USDA (2006) expects that the growing demand for biofuel and expansion of biodiesel capacity will further curb the EU exports of oilseeds.

Table 5.2 Net trade (intra and extra) of rapeseed (x 1,000 tons) by selected EU countries

Net import				Net export			
Country	2005	2006	2007 (1)	Country	2005	2006	2007(1)
Germany	1,261.9	1,317.8	592.7	France	1,350.2	1,644.3	923.1
Belgium	681.8	678.7	314.8	Hungary	302.3	342.3	37.3
Denmark	82.9	198.9	124.9	Romania	111.0	126.3	4.3
Austria	145.1	192.0	41.4	Latvia	100.9	63.1	11.3
Finland	147.7	131.8	30.2	United Kingdom	125.2	61.4	92.9
Spain	19.3	64.1	10.4	Lithuania	210.8	51.8	25.8
The Netherlands*	37.1	62.5	142.6	Poland	151.6	27.5	23.5
Czech Republic		63.6				218.8	125.9
Rest EU-27		32.9	65.8		12.0		
Total EU-27 extra		*534.6*	*10.7*		*162.9*		

1) First half of the year
*Sources: Eurostat, *Product Board MVO September 2007*

In 2006 the EU-27 imports of rapeseed septupled to about 632,000 tons. The extra imports came for the most part from the Ukraine and Australia (see table 5.3 on the next page). The 2007 figures concern the first six months of that year.

Table 5.3 Non-EU suppliers of rapeseed to the EU-27 (x 1,000 tons)

Country	2005	2006	2007 (1)
The Ukraine	22.1	291.0	12.8
Australia	0.1	252.6	0.0
Russia	52.8	51.7	14.5
Kazakhstan	0.0	24.7	16.0
Belorussia	2.8	6.0	0.0
Canada	3.2	3.0	2.1
Croatia	9.6	1.2	0.0
Others	0.4	1.8	0.4
Total EU-27 imports	**91.0**	**631.9**	**45.7**

1) First half of the year 2) From non EU 27 countries

Sources: Eurostat, Product Board MVO September 2007

For the season 2007/2008 (July-June) ISTA Mielke forecasts that the EU-27 imports of rapeseed will rise by 48% to 710,000 tons compared to last season. Main suppliers will be the Ukraine (440,000 tons) and Russia (120,000 tons). Due to the tightness in and high prices of sunflowerseed, some crushers in Spain and Italy have shifted to rapeseed, part of which is imported from the Ukraine. Canada and Australia are indicated by ISTA Mielke as the major global exporters of rapeseed to non-EU countries like China. The projected export volume of these countries is estimated at respectively 6 million and 0.6 million tons of rapeseed for the current season. The drought in Australia has deteriorated the canola crop at an alarming pace. The projected production has been reduced by 0.45 million tons to 1.1 million tons. It's possible that the harvest turns out below 1 million tons. It's therefore unlikely that Australian canola will be exported to the EU in early 2008.

Higher prices of rapeseed and rapeseed oil in the EU-27 in comparison to world market prices have triggered larger production in third countries for export to the EU. This trend is likely to continue (ISTA Mielke August 2007). In coming years ISTA Mielke expects an upswing in rapeseed production in the Ukraine, Russia, Romania and South America.

5.3.1 Rapeseed production in the Ukraine

Considering Ukrainian's enormous territory of 60.4 millions hectares, of which 69% agricultural lands, the country presents a tremendous potential to grow energy crops. Pursuant to the Ukrainian Program on development of biodiesel production for 2006-2010, the potential rapeseed area may reach 10% of total farmlands in Ukraine in 2010, which may generate a (potential) harvest of 5.4 million tons (see table 5.4). The ministry believes the program will help create intensive rapeseed production zones of 50,000 to 70,000 hectares with the use of latest technologies. Main aim is to increase the level of ecological fuels and energy security in the country. Other tasks are the promotion of biofuel plants construction and assuring guaranteed sales of rapeseed necessary for biofuel output. Ukranian's objective is a biofuel share of 33% of the total diesel fuel volume used by agricultural producers in 2010. To reach this aim three biofuel plants need to be constructed before 2008 and at least 20 with a total biodiesel capacity of 623,000 tons before 2010 (see table 5.4). To produce this quantity almost 1.9 million tons of rapeseed as feedstock is needed.

Table 5.4 Current and potential production (x 1 million tons) of rapeseed in the Ukraine, 2003-2010

	2003	2004	2005	2006	2007	2008 (P)	2009 (P)	2010 (P)
Production:	0.05	0.15	0.29	0.65	1.20	3.00	3.60	5.40
Of which for biodiesel						0.3	0.9	1.89
Potential biodiesel production						0.1	0.3	0.623

P) Potential according the Program

Sources: Ukrainian Institute for Economic Research and Policy Consulting, UkrAgroConsult 2007

In the "Program on development of bio-diesel production till 2030" the indicated potential for 2006 and 2007 was respectively 1.2 and 2 million tons of rapeseed. Table 5.4 tells us that only 50%-60% of this potential has been realized (0.65 and 1.2 million tons respectively). Under the program, the government subsidy per hectare must be increased from 65 Ukrainian hryvnia (UAH) in 2006 to 100 UAH (€15,21) in 2007-2010. The total financing of the program should amount to 12.1 billion UAH (1.84 billion euros), including 1,04 billion UAH taken from the state budget. In the Ukraine sowings of winter rapeseed for the season 2008/2009 are almost completed, exceeding market expectations at 1.37 million hectares, up from 0.82 million hectares planted last year. Largely due to attractive world market prices plantings exceed initial intentions by 64%. The rapeseed crop can reach almost 2.4 million tons in 2008 (UkrAgroConsult October 2007).

5.3.2 Rapeseed production Russia

Recently Russia's Agriculture Minister Alexei Gordeyev indicated that Russia could expand growth of crops for energy production, such as rapeseed and supply it to the European Union. The Russian rapeseed production more than doubled in the period 2005-2007 to 660,000 tons. This increase was completely due to enlarged rapeseed area: +0.42 million hectares to 0.76 million hectares. By 2012, Russia plans to increase sowing area under winter and spring rapeseed to 2 million hectares. This means a rapeseed production of 3 million tons in 2012. The State Program "Development of agriculture and agricultural markets regulation for 2008-2012" includes giving of subsidies for the acquiring of elite rapeseeds by farmers as partly compensation of expenses. The Russian government plans to invest 4.6 billion Russian rubles (181 million US $/131 million euros) in the raising of rapeseed production between 2008 and 2012. The plan is directed at increasing the country's biodiesel production capacity. Russia has 20 million hectares of productive arable land which is not being used. This area has the potential to produce a biofuels volume comparable with that of the United States. Russia can support the EU in the first place as a supplier of biomass and maybe in the future as a supplier of biofuels.

5.3.3 Rapeseed production in Canada

Canadian canola is an extremely efficient North American feedstock for biodiesel production. The Canadian oil content averaged over 44 per cent in both 2005 and 2006 and is likely to make even further gains. The new quality standards set for variety registration in Western Canada will see oil content in new varieties increase 1.2 per cent over the next five years. While low saturated fat levels improve cold weather performance, pure canola biodiesel also contains 10 per cent oxygen by weight. It is this oxygen that leads to a reduction in emissions of hydrocarbons, toxic compounds, carbon monoxide and particulate matter. These benefits also apply to biodiesel blends burned in diesel engines. While the growing international interest in renewable fuels does account for some of the general strength in rapeseed, rapeseed's use as healthy edible oil was driving the demand

side more than anything else. Still, a recent USDA report on the Canadian biofuel market stated that “biodiesel demand could and will likely be met using feedstocks that come from yellow grease and palm oil.” Canola oil use would remain mainly for food, with some going into soap and chemical production and feed and an even smaller amount going to export. In addition, canola oil may be used as an additive to biodiesel to help improve the flow and storability issues that often complicate biodiesel production. Soybeans would be used exclusively for food use and tallow would be reallocated from feed use into biodiesel.

At present two GM rapeseed types are being used by commercial rapeseed growers in Canada, namely Bayer Crop Science's Ms8xRf3 and Monsanto's GT73. Canada is the major global exporter of GM rapeseed, but mainly due to the lack of an EU authorization commercial bulk imports of this Canadian rapeseed into the EU have not been possible for a long time. The impact of the EU authorization process is discussed in Chapter 2.5. In the first half of 2007, Canada exported almost 3.1 million tons of rapeseed, mainly destined for Japan (35%), China (19%), Mexico (17%), the United States and Pakistan (each 11%).

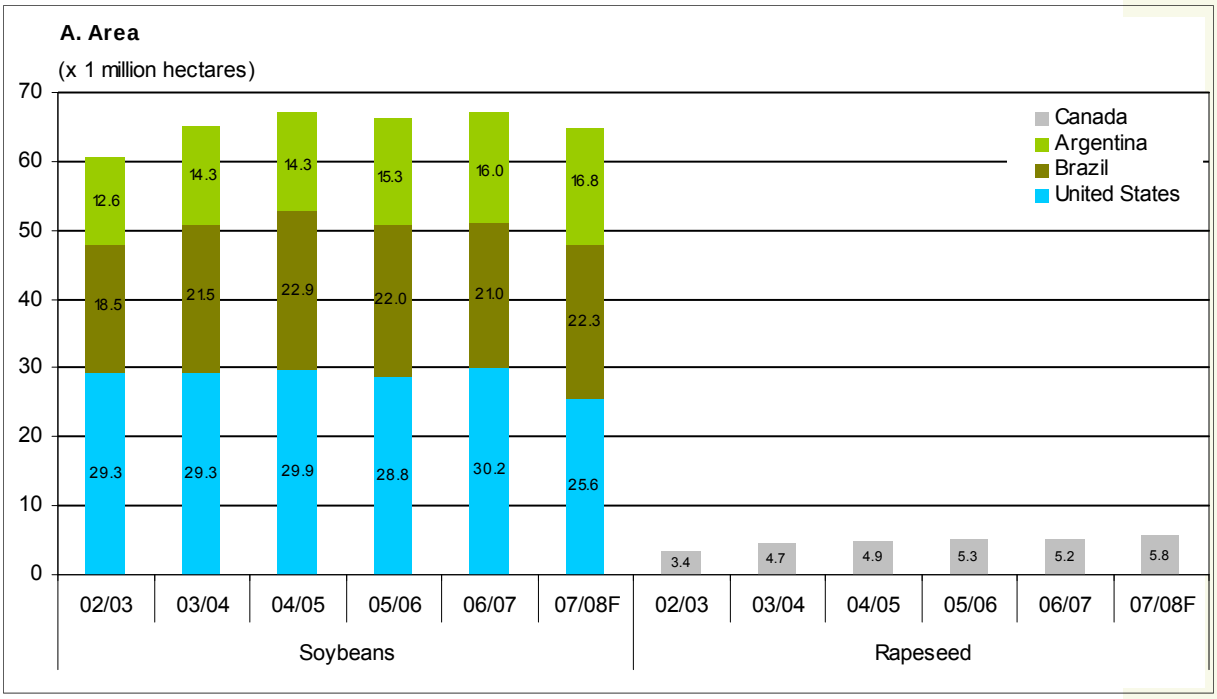
The current Canadian harvest of canola has been revised downwards by 0.4 million tons to 8.86 million tons. This means a production decrease of 0.14 million tons compared to 2006 while area expanded by 12%. The projection is a sharp decline of Canada’s canola stocks to a 4-year low of 0.65-0.7 million tons as of end July 2008. A bullish (price) scenario is possible when the canola plantings are reduced next spring in favor of wheat. Canadian rapeseed oil does enter the EU, either directly or indirectly (after the processing of Canadian rapeseed in countries such as United Arab Emirates) for technical purposes (e.g. biodiesel). In 1999 the use of fully refined rapeseed oil produced from GM rapeseed lines Ms8, Rf3 and the hybrid lines Ms8xRf3 in food products was already approved by the EU under Regulation (EC) nr. 258/97 (the so-called 'Novel Food Regulation') after it had been notified as "substantially equivalent" to conventional rapeseed oil. Canada’s processing of canola was recently driven by strong export demand for canola oil, especially from China. The poor Chinese rapeseed crop this year triggered an increase in imports of Canadian rapeseed and rapeseed oil during the last months. The USA is a (more) permanent buyer of Canadian canola oil. In the first half of 2007 this country accounts for more than the half of the Canada’s exports of this product. The demand of both countries tightened to a large extent supplies available for the EU-27. Canada’s rapeseed crushing capacity is expected to increase significantly over the next several years to meet the demand for healthy edible oils as well as to provide a feedstock for biodiesel (Public Ledger October 2007). In Canada oil accounts for 80% of the value of rapeseed. There are fears that the glut of rapeseed meal will weaken the prices of this product and therefore the profit margin of the total product. Solutions are sales to non-traditional markets such as aquaculture or a higher inclusion of rapeseed meal in feed rations. Another answer is producing a higher energy content by using cold press technology, which makes it a more desirable product for livestock feeders.

5.3.4 Rapeseed and soybean production in the Americas

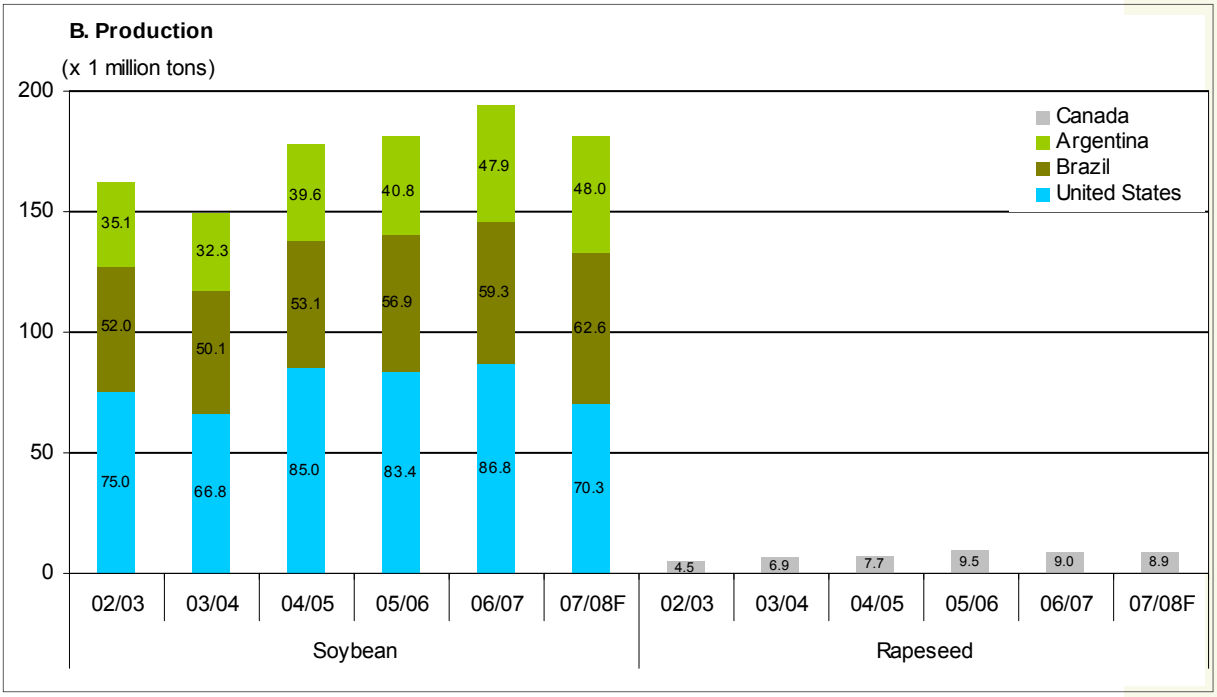
North and South America contain several of the most significant oilseeds producing countries that will therefore play an important role in fulfilling the increasing EU demand for oilseeds and vegetable oils. A major uncertainty on the supply side surrounds the South American soybean production because of the severe drought in several major soybean growing areas in Brazil and Argentina. In Brazil plantings are delayed and a large share of early sown soybeans must be replanted. The earlier estimated Brazilian soybean crop of 62.6 million tons in 2008 (Public Ledger October 2007, see figure 5.4) will probably not be realized and it has been revised downwards to 62 million tons by ISTA Mielke (October 2007). There were already massive production declines, particularly in the United States

(see figure 5.4) and to a lesser extent China. The sharp production decline in the United States is caused by a strong switch in area from soybeans to maize. China has reduced the import duty on soybeans to cover the shortage on the domestic soybeans market. This will raise the global dependence on South American supplies in 2008. Figure 5.4 presents the soybeans and rapeseed acreage (A) and production (B) in Argentina, Brazil, Canada and the United States.

Figure 5.4 Development of soybean and rapeseed areas and production in Argentina, Brazil, the United States and Canada, 2002-2008



Continuation of figure 5.4 Development of soybean and rapeseed areas and production in Argentina, Brazil, the United States and Canada, 2002-2008

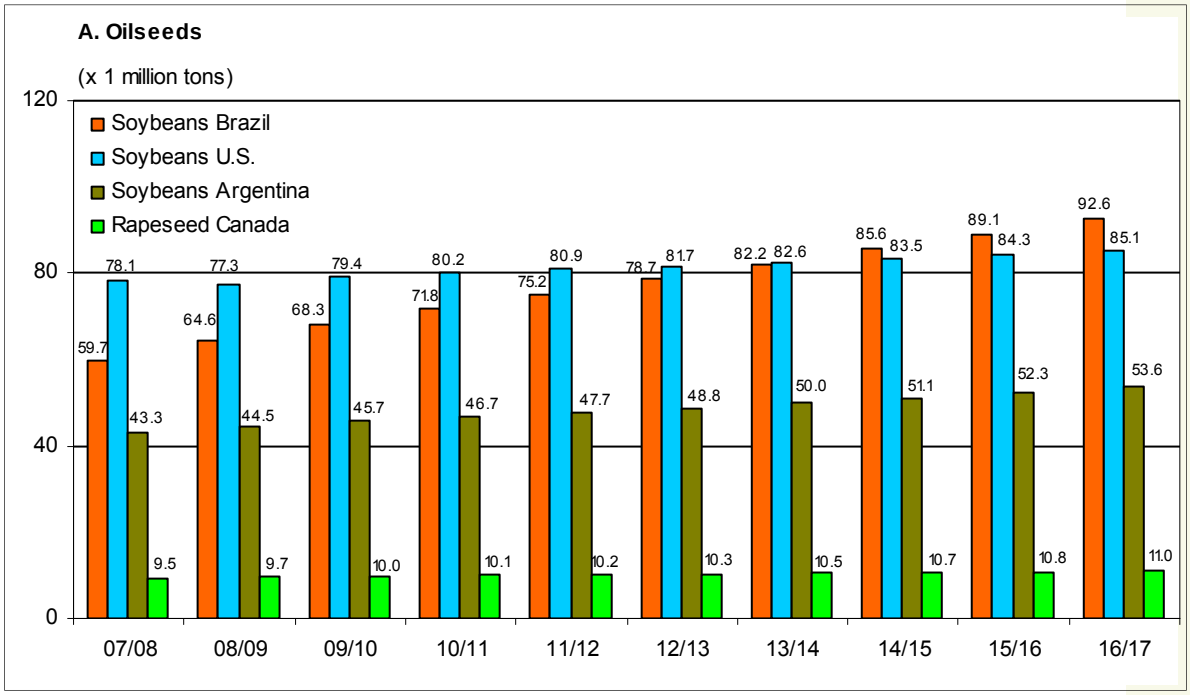


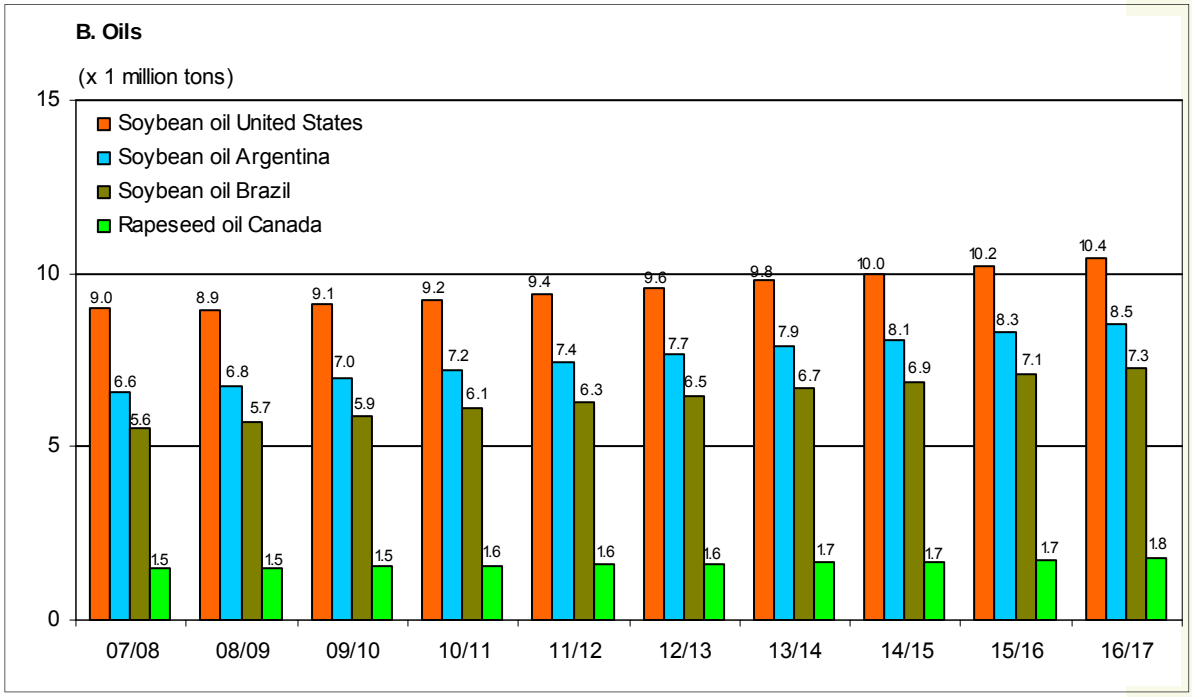
Sources: ISTA Mielke, Public Ledger October 2007

The FAPRI (January 2007) forecasts that soybean and rapeseed production at the American continent will increase most in respectively Brazil, Argentina and Canada (see

figure 5.5.A). The soybean and rapeseed oil production will also show the strongest growth in these countries (see figure 5.5.B). As mentioned earlier, FAPRI's Agricultural Outlook till 2017 was published in january 2007, therefore not taken into account the actual production figures of oils and oilseeds and oilseeds areas in 2007/2008 which turned out much higher than expected, resulting in too low values for these indicators in this season.

Figure 5.5 Production forecasts for soybeans, rapeseed, soybean oil and rapeseed oil in Argentina, Brazil, the United States and Canada 2006-2015





Source: FAPRI January 2007

FAPRI's production estimate of 10.6 million tons of Canadian rapeseed in 2015 (see figure 5.5.A) seems very conservative. The vice-president of the Canadian Canola Council stated that Canada's aim is to reach an output level of 15 million tons in that year, because there will be an international demand for canola. This could be realized through an increase in seeded area, as well as higher oil and plant yields. The Canola Council expects that last mentioned yields can increase by 2% each by adopting higher yielding hybrid varieties and

different agronomic practices. Canola has the genetic potential to yield over 4 tons per hectare (Agri-Food Canada 2007) versus almost an average yield of almost 1.77 tons in 2005-2007. The area seeded to canola could be increased by a shortening of the crop rotation time. The area could also expand in the dry growing regions of southern Saskatchewan and Alberta with the release and adoption of more drought tolerant canola varieties. Canada's Canola Council's aim is that the canola area will be enlarged by 30% in 2015. This council received a 1.47 million $ of government funding to support the development of new global market opportunities for Canada's canola exporters.

FAPRI (January 2007) also indicates Argentina, Brazil and the United States of America as countries of this continent with an (increasing) net export of soybeans and soybean oil in the period until 2017 (see table 5.6). For rapeseed and rapeseed oil Canada is the only country of this continent with a rising net export in this period.

Table 5.6 Development of net exports (x 1 million tons) of soybeans, soybean oil, rapeseed and rapeseed oil by country

	Soybeans				Soybean oil			
	2007/2008	2011/2012	2016/2017	Change	2007/2008	2011/2012	2016/2017	Change
Brazil	28.2	38.8	50.5	+22.3	2.1	2.5	3.3	+ 1.2
Argentina	7.2	6.9	7.9	+0.7	5.9	6.6	7.7	+ 1.8
United States	29.7	26.7	25.0	-4.7	0.2	0.3	1.3	+1.1
			Rapeseed					Rapeseed oil
Canada	5.5	5.9	6.2	+0.7	1.0	1.1	1.2	+0.2

Source : FAPRI January 2007

Conclusion

The booming biodiesel industry will also have a substantial impact on the demand for soybeans and soybean oil. This is also reflected in a decreasing net-export of soybeans by the United States in the period 2007-2017 due to strong domestic demand (see table 5.6), but it still remains a big net-exporter of soybeans. The FAPRI indicates Brazil as the main (net) exporter of this feedstock in the earlier mentioned period because in this country the sharpest production growth (+55%) will take place compared to the United States (+9%) and Argentina (+24%) (see figure 5.5). Last mentioned country will use most of the national production increase to fulfill domestic needs. Canada will be the main net-exporter of rapeseed in the world. FAPRI projections of Canada's rapeseed and rapeseed oil exports in 2016/2017 seem conservative. As earlier mentioned the Canola Council is working on a plan that would see annual Canadian rapeseed production increase to 15 million tons by 2015, with planted area forecast to see a 30% increase from current levels of 13 million acres. If successful, annual exports would hit 7.5 million tons by 2015, while domestic processing would reach the same amount. In 2007/2008 the crushing and export of Canadian rapeseed is projected at respectively 3.8 and 5.8 million tons. At this moment Canadian exporters have a strong focus on the United States and Asian countries, like China, Japan and Pakistan. The production increases of soybean oil in Brazil (+30%), Argentina (+29%) and the United States (+16%) will be mostly for national use. This is also reflected in the little increases of the (net-) soybean oil exports of the concerning countries (see table 5.6).

5.4 EU Rapeseed oil imports

Demand for biodiesel is also seen as a driving force behind the increasing rapeseed oil imports from third countries by EU countries. These imports increased almost tenfold to more than 658,000 tons in 2006. Canada was by far the main supplier of rapeseed oil to the EU-27 last year, followed by the United States, China and the United Arab Emirates (see table 5.7).

Table 5.7 EU-27 imports of rapeseed oil from third countries (x 1,000 tons) in 2005-2007

	Suppliers	2005	2006	2007 (1)
*Rank**				
1.	Canada	15.4	258.4	106.2
2.	United States	1.1	126.3	58.9
3.	China	0.0	98.0	63.5
4.	Unit. Arab Emirates	0.0	82.0	79.2
5.	Belorussia	9.1	15.3	7.8
6.	Russia	4.7	10.3	13.5
7.	The Ukraine	17.0	4.7	6.3
8.	Morocco	0.0	15.6	0.0
9.	Paraguay	3.1	7.7	4.6
10.	Algeria	0.0	11.6	0.3
11.	Argentina	5.2	4.4	1.5
12.	Croatia	4.3	2.3	0.3
13.	Others	0.2	10.9	1.3
	TOTAL	**60.1**	**647.5**	**343.5**

** Ranking based on 2006 figures 1) First half of 2007*

Sources: EUROSTAT , Product Board MVO 2007

The extra imports are mirrored by the transforming of the EU-27 from a (little) net exporter of rapeseed oil to third countries in 2005 into a big net importer in 2006 (see table 5.8, last row).

Table 5.8 Net trade (intra and extra) of rapeseed oil (x 1,000 tons) by selected EU countries

Net import				Net export			
Country	**2005**	**2006**	**2007 (1**	**Country**	**2005**	**2006**	**2007 (1)**
Germany		832.7	514.2		22.4		
				France	279.0	263.8	68.8
Italy	221.5	305.8	106.8	Poland	95.6	177.1	97.9
The Netherlands	209.9	83.0	99.8	United Kingdom	52.2	128.7	95.4
				Belgium	24.8	89.8	2.4
				Czech Republic	43.5	58.9	32.5
				Denmark	21.2	34.2	20.9
Austria		19.6	28.6		23.4		
EU-27 extra trade		**602.1**	**360.6**		**31.3**		

1) The first half of the year

*Sources: Eurostat, *Product Board MVO August 2007*

Conclusions
The EU developed in the period 2005 - first half 2007 from a small net-exporter of rapeseed oil to a big net-importer. Especially Canada plays an important role to cover the EU needs for this product. The United States, China and the United Arab Emirates seem to have discovered the gap in the EU rapeseed oil market in 2006/2007. Another important development is the emergence of the CIS countries as increasingly important suppliers of rapeseed oil to this market.

5.5 Domestic by-products

By-products from the food and feed industry, like animal fat and used frying oil, have a good CO_2 performance. This feedstock should therefore as such be considered as low CO_2 fuel. According to a survey[►] yearly 425,000 ton is collected in the EU-25. This could be increased to 1.12 million ton.

► VITO and BIO, with Institute for European Environmental Policy and IVM , September 2007, Data gathering and impact assessment for a review and possible widening of the scope of the IPPC Directive in relation to waste treatment activities, *Fact sheet E12 – Recycling of used edible fats and oils.*

6 Feedstock price developments

Feedstock prices for the bulk commodities in the oils and fats business have surged dramatically since the beginning of 2007. The increase is an extension of a trend that has been seen over the past several years having an increasing effect on the local and global oils and fats markets, including the biofuels industry.

6.1 Price graphs

Figure 6.1 shows the price developments for crude palm oil (MalSum, CIF Rotterdam), soybean - (NL, fob), rapeseed - (NL, fob) and sunflower oil (ex tank R'dam) in the 2002-2007 period. While palm, soy and rapeseed showed a ±25% increase from March 2007 to September, sunflower seed oil showed a stunning 75% increase. These peaks were witnessed before, as shown in figure 6.2. This graph presents the price curves of these commodities over the past 20 years. However, the current prices score all time high levels and are accompanied significant price surges for other agricultural commodities, like maize, sugar, wheat and grains. Several outlooks provide price projections for the period up to 2020. These need to be considered with necessary caution, as they are mostly based on the assumption that market developments follow the business-as-usual scenario. However, the introduction of biofuel policies and increasing demand for food and feed may in fact put significant uncertainty margins on these projections. According to the FAPRI Agricultural Outlook 2006 prices for all agricultural commodities will continue to rise, although the increases will slow down beyond 2010. According to FAPRI, this is explained by adjustments in supply and demand. Also the OECD-FAO Agricultural Outlook 2007-16 predicts sustained higher price levels for the next 10 years.

► FAPRI Agricultural Outlook 2006

► OECD FAO Outlook 2007 16

The OECD-FAO report distinguishes both structural factors and factors of temporary nature to explain the price curves. Weather conditions affecting production figures will remain an incidental factor introducing an uncertainty that can work both ways. For 2007 rapeseed production forecasts for Germany and France have been adjusted downwards, while the acreage increased. Also, the Black Sea region expects lower yields due to weather conditions. An additional temporary factor is the lowered stock levels. This transition is observed in general due to improved supply chain management and market intelligence and this has been identified as an important factor in stabilizing economic growth. With the sudden changes in demand seen in the oils and fats market, this factor, however, contributes to short term price volatility. Another factor will be speculation in the feedstock market that may in fact be strengthened by the current price peaks and the introduction of obligatory biofuel targets. Economic recession is another example of a temporary factor, but plays no role in the current price developments.

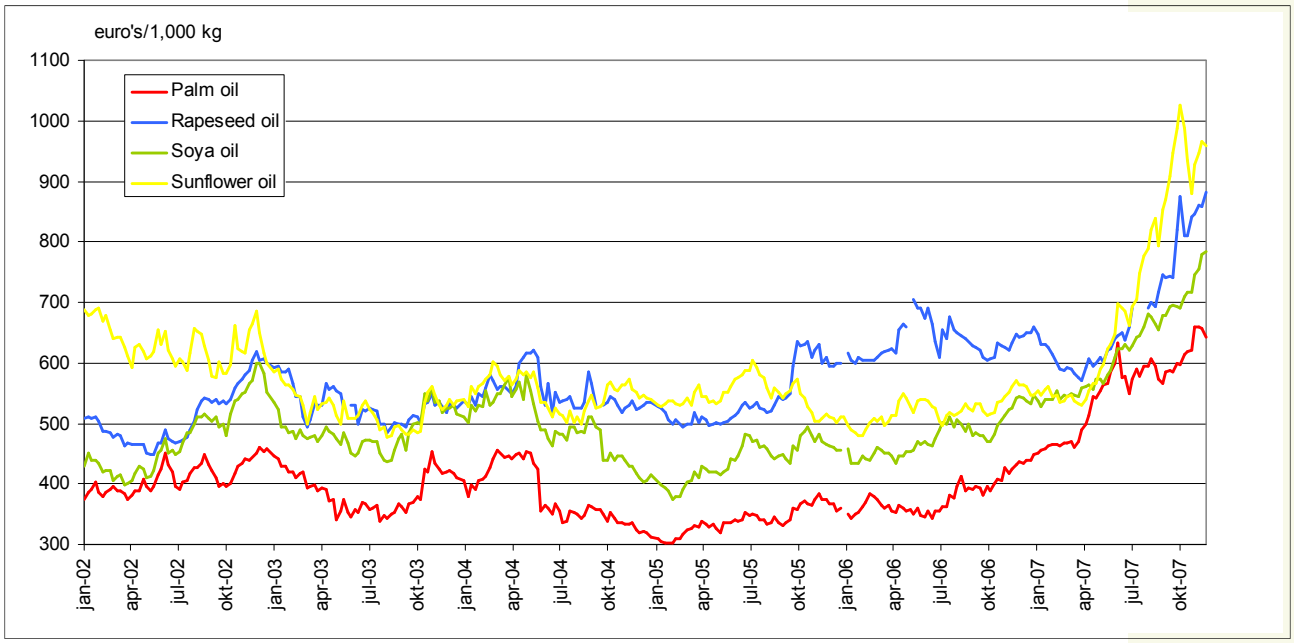
► UAC: Market Weekly Report, 23.07.2007

Structural factors of relevance include the demand for biofuels, due to the current policies of long term obligatory targets. Another structural factor is the increasing demand for oils and fats in food in upcoming economies with huge population numbers, like China and India. This greatly adds to the pressure on availability and thus price. As an example: in 2016 China is predicted to account for ±50% of the global oils and oilseeds imports.

The extent to which the different factors have contributed to the recent price surges is difficult to estimate, but the primary cause appears to reside in the fact that supply is unable to meet global demand.

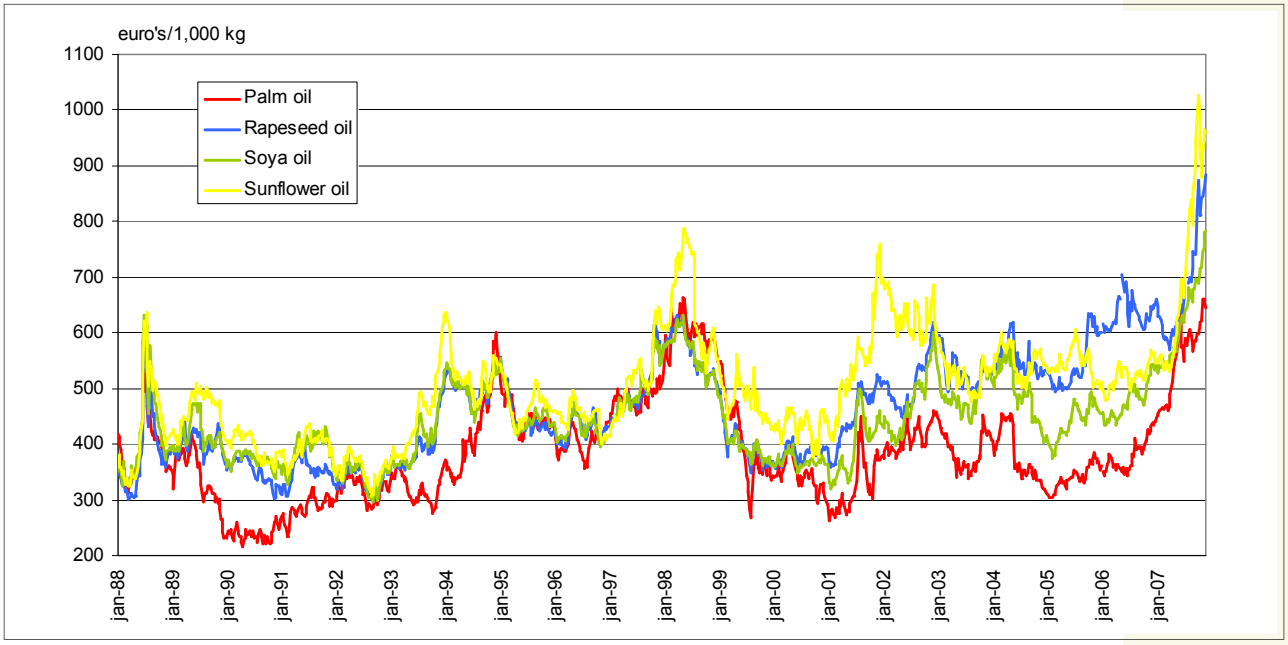
While the price increases appeared to be restricted initially to feedstock that can also be used for biofuel production, Figure 6.1 shows that also the price for sunflowerseeds went up more recently. The rate of increase is even faster than for any other vegetable oil, while the application is limited to food production. This can be interpreted as a replacement effect of vegetable oils in food production. Sunflowerseeds in this case may substitute for rapeseed. Both the limited availability of rapeseed and its high feedstock price may contribute to this effect.

Figure 6.1 Price developments of selected crude vegetable oils, 2002-November 2007



Source: Product Board MVO 2007

Figure 6.2 Price developments of selected crude vegetable oils, 1988-November 2007



Source: Product Board MVO 2007

6.2 Price impacts

The current price developments are perceived differently in the oils and fats sector. It affects the operational management of food producing companies and threatens the profitability of biodiesel production. The situation is highly profitable for the vegetable and animal oils and fats producers and processors. Also, the farmers shall make a better profit. Below, a short inventory is presented of the impacts on both the food and biofuel sectors.

Despite rising prices farmers seem to be among the last to profit from this development in commodity price. Russell Mildon, Director Economics of Agricultural Markets for DG Agris of the European Commission during the Conference on the Impact of biofuels on commodity markets presented a graph showing that agricultural prices are lagging behind in the development of consumer prices for food. Thus far, the profit of that gap went to traders, processors and distributors, and only very limited to farmers. One would assume that supply can be stabilized as soon as farmers get a financial incentive to produce more. With prices for grains hitting records this moment could come soon. Forecasts show that crop area for 2007/2008 will grow. The question remains whether the balance between grains and oilseeds will create enough production to satisfy the demand in both. In the US corn might be favoured over Soya.

6.2.1 Food

The oils and fats market is a global market and price increases are thus seen worldwide. Therefore, when assessing the feedstock price impacts on the food sector, it is important to differentiate between the developed and developing countries. In The Netherlands warnings have been issued that food prices will go up due to the current feedstock prices. The Netherlands Federation for the Food Industry (FNLI) stated in a press release that basic food products including vegetable oils will become more expensive. The bakery sector has already increased its prices and other sectors might follow. Also in Italy, price increases of the pasta was blamed on the wheat cost price. It is clear that price increases for the consumer is a politically sensitive issue, as it will interfere with the purchasing power of the consumer. This will become more significant when the feedstock prices would indeed remain at a structurally higher level.
In developing countries the impact is more far-reaching. As food takes a more significant part of an individual's budget, primary goods like palm oil for cooking is becoming too expensive for many. As a consequence, governments take measures to control the local market food prices. In Indonesia e.g. the government recently abolished a 10% VAT on non-branded cooking oil. It also raised its export taxes on palm oil products to improve the availability for domestic use.

► MVO Newsletter Trade Policy no. 34 2007

6.2.2 Biofuels

While the introduction of biofuels is due to policy considerations long term maintenance of the industry will depend on the economic viability of the product. This is determined by the equation of cost price for the production of biofuels versus the market price of the end-product. The latter is determined by the price of fossil fuels. The obligatory nature of the biofuels targets does not change this mechanism, although governments can decide to use financial instruments to temporarily influence profitability. The current high feedstock prices have a serious negative effect on the viability of the biofuels industry as it accounts for a significant amount of the total cost. As outlined in Chapter 5 many initiatives to build production capacity are still in their start up phase. These extra costs are difficult to bear with the small margins if any, on the biofuel production. This holds for the biofuels industry worldwide. The Malaysian minister for Trade and Industry, Chin, recently announced to hold up a national bill to set obligatory biofuel targets. The current crude palm oil prices

would leave the biofuel production non-profitable. Also in Europe sustained high prices for biofuel feedstock may result in lowered production figures. These developments would be very undesirable for meeting the objectives set out with the biofuels introduction.

Since the price of the feedstock is currently higher than the sales price of biodiesel production is not economically feasible at the moment.

6.3 Conclusions

From the graphs in Figure 6.2 it is clear that oils and fats products have always shown a dynamic price pattern. Strong price peaks were followed by corrective mechanisms restoring original price levels. This time, the surge in prices is primarily caused by a sharply increased global demand causing a shortage of supply. This original market mechanism is highly sensitive to price that should boost the production of oils and fats. This would ease the prices for raw materials, thereby contributing to the economic viability of biodiesel production.

7 Changing markets

7.1 New stakeholders

With a growing demand for biofuels producers, traders, law firms and other consultants develop services aimed to facilitate this trade. Service providers and their associations like Fosfa and Coceral develop standard contracts. The International Parcel Tankers Organisation (IPTA) issued a statement on the interpretation of the Marpol Regulation under which conditions to ship biodiesel.

7.1.1 Dutch Association for the Biofuel Industry

Recently the Vereniging Nederlandse Biodiesel Industrie (VNBI) has been established by 8 Dutch Biodiesel producers. The association represents a capacity of approximately 1,5 million tons of biodiesel. Goal of the association it to promote biodiesel use and inform government, politics and consumers.

7.1.2 Fosfa trade contracts for biofuels from oils and fats

The Federation of Oils, Seeds and Fats Associations (Fosfa) represents the interests of the oils and fats traders. In order to cut on cost and the logistic processes of relevant bulk product like oilseeds and liquid oils standard trade contract rules have been developed. The demand for biofuels is growing making it a bulk product rather than a specialty. Therefore the Fosfa viewed the time ripe as to develop standard contract for Fatty Acid Methyl Ester (FAME). The contract will generally be in line with FOSFA 53 and 54 contracts (vegetable and marine oils FOB and CIF) for the trade of oils and will include reference to biodiesel standards like ASTM, EN14214.

7.1.3 Trade platforms and services

Ecofys started in 2005 with some foreign partners and financial support of the European Commission DGTREN - Altener Project**,** Bioxchange, an internet-based Biomass Trading Floor.

The Swiss UBS and Diapason Commodities Management introduced the worlds first biofuel index: UBS Diapason Global Biofuel Index [UBS-D GBFI] and can be checked online. The UBS-D GBFI is designed to be a benchmark tool for investors who want to invest in the global biofuel market. It is composed of futures contracts on physical commodities related to the global production of ethanol and biodiesel. The index is weighted to reflect the importance of the different feedstocks used in the production of ethanol and biodiesel, as well as open interest and trading volumes of the underlying futures contracts.

7.1.4 United Nations Environmental Program (UNEP)

UNEP, the United Nations Environment Program, is the designated authority of the United Nations in environmental issues at global and regional level. Its mandate is to coordinate the development of environmental policy consensus by keeping the global environment under review and bringing emerging issues to the attention of governments and the

international community for action.
Since the impact of the introduction of biofuels is a global issue, especially the UNEP is eligible for putting this subject on the international agenda. According to Achim Steiner, UN Under-Secretary General and UNEP Executive Director, at the opening Plenary of Global Business Summit for the Environment (B4E), UNEP backs the EU plan to require biofuels into road fuels despite the fear by environmalists that this could lead to deforestation in parts of Asia and South America. According to Steiner “norms and standards are needed and perhaps market instruments and certification that ensure biofuels meet sustainability criteria that satisfy the demands of consumers - the group that in a very real sense gives companies their *license to operate*". UNEP has been approached by concerned energy companies seeking a sustainability solution to the dilemma of biofuels. They fear that a backlash could undermine multi billion dollar investments in this field. UNEP works through the G8 and other fora to try and devise a fair, equitable and sustainable biofuels industry.
In addition, in March 2007 the UN launched the International Biofuels Forum. The forum, a joint project of Brazil, China, India, South Africa, the United States and the EU, will initially be established for one year and meet regularly to discuss ways to promote the sustained use and production of biofuels around the globe.

► Achim Steiner at the Opening of the Global Business for Environment Summit (B4E)

► press release launching the International Biofuels Forum

7.1.5 Oil Producing and Exporting Countries (OPEC)

Mineral oil producing countries are united in the Organisation of the Petroleum Exporting Countries (OPEC). From statements made by representatives of OPEC it seems that these countries regard the development of biofuels as a threat. Abdalla El-Badri, secretary-general of the OPEC, said the powerful cartel was considering cutting its investment in new oil production in response to moves by the developed world to use more biofuels.
Claude Mandil, Executive Director of the International Energy Agency (IEA), in return said to the Financial Times that "biofuels would pose no threat to Opec", and that even in the worst case-scenario for the oil cartel, there would be a dramatic need for them to increase production, so "Opec has nothing to fear". Mr. Mandil said he sees the need for oil, continuing to grow, and the IEA forecasts that global oil demand in 2015 would rise by close to 10m barrels a day to 94.8m b/d.
Interestingly, it was especially the high prices of oil and the disruption of gas supply that sparked the growing interest in biofuels. If the OPEC would carry out its threat this would give the world even more reason to search for alternative sources for energy to secure supply at the lowest cost.

7.1.6 The Round Table on Sustainable Biofuels

The Round Table on Sustainable Biofuels has been founded in 2006 by WWF. The Roundtable is a new multi-stakeholder initiative to develop international standards for sustainable biofuels production and processing, hosted by the Energy Center at (EPFL). The Roundtable's multi-stakeholder Steering Board, in which among others the Dutch government, Bunge, Shell and BP participate, is responsible for overseeing the standards drafting process, according to the ISEAL Alliance Code of Good Practice for Standard Setting. In late May 2007, the Steering Board will draft the principles of sustainable biofuels production, which will then be open for public comment on their website. The criteria for measuring performance against these principles will be drafted by four Working Groups, open to any interested party.

7.1.7 The European Technology Platform Biofuels

The European Biofuels Technology Platform has been founded by the European Commission in 2006. The main objective of this platform is to implement the major proposals outlined in the Vision Report. This report presents a long-term view on how to

overcome both the technical and non-technical barriers to biofuel use, both in the European Union and Worldwide. The European Biofuels Technology Platform is supervised by a Steering Committee. The activities are carried out by the members of Five Working Groups and supervised by a Member State Mirror Group.

7.1.8 Car manufacturing sector

ACEA, the European Automobile Manufacturer Association, represents the 13 major European car, truck and bus manufacturers. This stakeholder has an important position when it comes to guarantee the engine performance and possible damage. The ACEA Position on the use of bio-diesel (FAME) and synthetic bio-fuel in compression ignition engines allows maximum 5% of EN14214 biodiesel to be used in cars and trucks unadapted engines. Higher blends or pure biodiesel can only be used in adapted engines. The ACEA also refers to the fuel injection equipment manufacturers, which are united in the FIE. This association supports the ACEA position stating that blends with with more than 5% biodiesel can cause problems with injection systems. The position of the Engine Manufacturers Association (EMA) is in line with both above mentioned statements.

7.2 New feedstock

In this paragraph new feedstock are presented that are entering the biofuel market. The focus is on those that could be used for the production of biodiesel and appear to be the most promising. So called 2nd generation biofuels are not discussed. Their feedstock is generally not based on vegetable oils and animals fats, their production facilities require substantial investments and their technology is not yet commercially available on a large scale. Therefore it is not clear if and when these fuels will live up to their expectations.

7.2.1 Jatropha

Among others Jatropha is the main new oil crop. Especially India has an ambitious goal of 10 million hectares of Jatropha plantations. Jatropha causes less opposition regarding competition with food and feed because the oil as well as the cake is toxic. Moreover Jatropha can grow on dry, marginal lands, although low levels of water and minerals will affect the yield, therefore ranging from 2 to 10 tons per hectare, although it all depends on the input. Due to lack of water and fertilizer marginal lands will never reach a high yield. Because Jatropha is a perennial crop it takes at least four years after sowing Jatropha beans before seeds can be harvested. At this moment a substantial part of the seeds is needed to grow new plants rather than being available for crushing to produce oil.

Although Jatropha does not seem to constitute the ultimate solution to the growing demand for biodiesel feedstock in the EU, it can help to diminish the dependency of developing countries on import fossil fuel. This can have a positive impact on their trade balance reducing the need for foreign currency.

7.2.1.1 Product characteristics

Jatropha oil is vegetable oil produced from the seeds of the Jatropha curcas, a shrub that can grow almost anywhere, even on marginal soils. Normally, it grows between three and five meters in height. Leaves and nuts are toxic. This shrub produces (toxic) nuts in winter when the shrub is leafless, or it may produce several crops during the year if soil moisture is good and temperatures are sufficiently high. However, a non-toxic variety is reported to exist in Mexico and Central America that is used for human consumption after roasting. The nuts have an oil content of 37%, up to 40% under optimal conditions. When the seeds are crushed, the resulting jatropha oil can be used in a standard diesel car, while the residue can also be processed into biomass to power electricity plants. The claim that

farmers can grow Jatropha without irrigation on poor soils is technically the case, but yields are so low in these conditions that the crop's viability becomes questionable. Indian studies show that, without irrigation, the average yield after five years is 1.1–2.75 tons per hectare, compared with 5.25–12.5 tons per hectare with irrigation (see table 7.1 below). Instead of being grown in marginal areas, Jatropha production for agrofuels can compete directly with the production of food crops on the most fertile, irrigated lands (GRAIN 2007).

Table 7.1 Jatropha yields per hectare (x 1,000 kilograms) in practice

	Without irrigation			With irrigation		
	Yield			Yield		
	Low	Normal	High	Low	Normal	High
Year 1	0.10	0.25	0.40	0.75	1.25	2.50
Year 2	0.50	1.00	1.50	1.00	1.50	3.00
Year 3	0.75	1.25	1.75	4.25	5.00	5.00
Year 4	0.90	1.75	2.25	5.25	6.25	8.00
Year 5	1.10	2.00	2.75	5.25	8.00	12.50

Source: Centre for Jatropha promotion 2007

7.2.1.2 Exploitation

Developed in India as a fuel oil, it has received wide attention, particularly in Africa and Asia (e.g. Indonesia and the Philippines) as a source of biodiesel. In April 2003, the Indian government launched a national mission on biodiesel that identified *Jatropha* as the most suitable oilseed for the production of biodiesel. Food security is a national priority and therefore India cannot afford to use (or promote) edible oils for biodiesel production as is done in other biofuel promoting countries like EU and the United States. India had an estimated 55.3 million hectares of wastelands, which could be brought into productive use by raising biodiesel crops. The ambition of the Indian government is to plant 11.2 million hectares of these lands with Jatropha by 2012, in order to produce sufficient biodiesel to replace 20% of India's diesel consumption. This scenario seems not feasible at this stage because of the following problems:

- Lack of good quality planting material and management practices leading to poor yields.
- Lack of bank financing for Jatropha plantations because the crop has a long gestation period compared to annual crops.
- Ownership issues with community or government-owned wastelands.
- Monoculture practices which raise environmental concerns about the impact on soil fertility and the water table.

Despite this - several state governments have announced policies to encourage Jatropha cultivation and setting up biodiesel plants and supply chains - producing biodiesel in India is not profitable. At this moment the production costs of 35-45 rupees (€0.86-€1.11) per liter are much higher than the government's advised purchase price of 26.5 rupees.

The total Jatropha plantation in India is currently estimated at only around 400,000 hectares, of which about 70-80 percent are new plantations (1-3 year old) that have not been put into production yet. These plantations can generate a total biodiesel production of 480,000 tons per annum in the long run. India's annual biodiesel capacity is currently estimated at 100,000 tons but is not commercially significant. Most units are closed during

the year as a result of the insufficient supply of Jatropha seeds. The new policy, still in the draft stage, envisages 10 percent blending of diesel with biofuels by 2012. With the diesel demand for 2011/12 estimated at 48.5 million tons, approximately 4.9 million tons of biodiesel is needed. This requires 5-6 million hectares of mature plantations of Jatropha in full production. This draft recommends minimum support prices for biofuels crops like Jatropha and other non-edible oilseeds.

7.2.1.3 Stakeholders

UK-based D1 Oils is the world's leading developer of Jatropha biodiesel. Although its biodiesel refinery in England currently relies on Soya oil from Brazil, D1 Oils will soon switch to Jatropha oil, sourced from its own plantations. In July 2007 D1 Oils announced that up to 30 June 2007, it has planted or obtained rights to produce from a total of about 175,000 hectares of Jatropha worldwide (Public Ledger July 2007). Most of the supply will come from plantings in the northeast of India but this company has also Jatropha plantations in Saudi Arabia, Cambodia, Indonesia, the Philippines, China, Zambia, South Africa and Swaziland. D1 is now working on the development of high-yielding Jatropha varieties, with much of its breeding work focusing on India, an important centre of Jatropha diversity and research. The challenge lies in identifying and developing the most promising wild varieties of Jatropha and producing hybrids with enhanced yield and higher oil content. The first commercial outcome of the plant science programme is the elite seed material called E1 selected for higher yield and good biodiesel profile. D1 expects this seed will deliver an oil yield of 2.7 tons per hectare under properly managed conditions when the trees attain maturity.
Executives from the US-based company Xenerga Inc. say that they have already patented a Malaysian variety of high-octane Jatropha that they will introduce for commercial production in the US in 2007. Xenerga and its associate company, German-based EuroFuelTech, also manage Jatropha plantations in Kenya, where they say they have hundreds of thousands of hectares available for production.

7.2.2 Algea

Production of biodiesel from algae could theoretically produce a very high amount of product per hectare and is therefore presented as the solution to a lot of the disadvantages of other feedstock. Nevertheless all projects are still in an experimental phase. At this moment projects are running in Mozambique, US (Greenfuels, Solazyme and Petrosun) and South Africa. The project of the Delft University of Technology has been awarded the Leo Petrus Innovation Tropy of € 100,000 for further research.

Research by the US Department of Energy on an Aquatic Species Program had produced biodiesel from specialized algea varieties, of which some contained in excess of 50% oil. The studies determined that theoretically the United States could meet its entire 141 billion gallons fuel requirements (in diesel-equivalent) from algea grown on a (pond) area of about 4 million hectares in a high sunshine area such as the Sonora desert. By contrast producing biodiesel from soybeans or canola would require respectively 200% and 66% of the US cropped area.

Algea could theoretically produce 95,000 litres of biodiesel per hectare in saline environment and with sufficient sunshine, which is much more compared to other feedstock (see table 7.2 on the next page).

Table 7.2. Biodiesel production by source crop

Feedstock	Liters per hectare
Soybeans	375
Canola/rapeseed	1,000
Mustard	1,300
Jatropha	1,590
Palm oil	5,800
Algea	95,000

Source: United States Department of Energy 2007

Algae as feedstock would open opportunities for coastal regions in warm areas. Advantage over conventional oilcrops is a smaller competition for land and water. The proteins which are produced at the same time could be used for food or feed. CO_2 emission from electricity production could be used as input to increase the yield. Main hurdles to reach the predicted yield seems to be lack of the right sort of algae and the maintaining of a stable environment in which the algae can flourish.

Since a lot of developing countries have abundant sunshine production of algae could be an opportunity to diminish the dependency of developing countries on import fossil fuel. This can have a positive impact on their trade balance reducing the need for foreign currency.

Although the theoretical potential of biodiesel from algae is high it will certainly take time and money to develop this potential. Current algae production is small and only feasible for products with a high added value and certainly not yet for bulk products like fuel. It will take several years of R&D to be able to say more about the biofuel potential of this feedstock.

7.3 New biofuels

Biomass to liquid

Conversion of woody biomass to liquid could help to increase the availability of feedstock. By-products and non-food energy crops with high yield could serve as feedstock which is expected to have the advantage of high GHG emission reduction.

Shell has a large stake in Choren a German company producing Biomass to liquid (BTL) based on the Fischer-Tropsch process. Recently Nuon and Shell announced renewed research in the possibility to produce Fisher Tropsch Diesel from the syngas produced in the Buggenum powerplant.

The production cost of this biofuel will be high due to the hugh investment in conversion technology. Therefore the price of the first commercial BTL biofuels will be high. Besides that it will take time to develop enough capacity to create a substantial supply. Therefore MVO expects that the demand for so called 1st generation biofuels will remain for at least a few decades. MVO favours to use the word low CO_2 fuel, since CO_2 reduction potential seems to be the main distinguishing factor between the so called 1st and 2nd generation biofuels. MVO is of the opinion that it is quite likely that due to innovations, economy of scale and technological developments CO_2 performance of the current biofuels will improve in the future. Already now, by-products from the food industry like used frying oil and animal fat show a good CO_2 performance.

Hydro treated vegetable and animal oils and fats

The Finnish oil firm Neste Oil, will soon start producing a diesel alternative, NExBTL, a pure alkane made from hydrotreated vegetable oil. Being a mixtures of alkenes, this product has properties very much like mineral diesel without the disadvantages of FAME-biodiesel like oxidation stability. The production process seems to be more expensive than production of FAME. In February 2007 Neste Oil and Total announced to discontinue their project to build a plant to produce diesel fuel from renewable raw materials at a Total refinery in France. A joint venture with OMV is building a production facility in Austria.

The new fuel from Neste, produced at a new facility in southern Finland, will now be subjected to environmental and operational trials in close cooperation with Scania, starting in autumn 2007 and lasting until the end of 2010. The tests involve monitoring of exhaust emissions and engine condition with different mixes of the fuel into standard diesel in distribution vehicles and shuttle vessels in the Stockholm region, as well as city buses in Helsinki.

Six Scania city buses take part in the trial. Four of them will run on 100% NExBTL and two on normal diesel. The project also involves tests with various mixes on some 100 vehicles operated by Posten Logistik, the logistics division of Swedish Post, and 2-3 ships in the Stockholm archipelago operated by Waxholmsbolaget.

When this process can be operated at a competing price the main fuel distributors may prefer this biofuel derived from vegetable oils and animal fats over methylester since it is fully compatible with fossil fuel.

7.4 Conclusions

Due to its characteristics Jatropha presents itself as a promising crop to fulfill the biofuel demand without interfering with the demand for oils for food. Development of the crop into large scale commercialization however, still appears to be some years off.

8 Impact assessment of biofuels policy on feedstock availability

Chapter 2 outlined the current EU biofuels policy, as well as the proposals for future targets. The 2007 spring Summit of the EU Council supported the proposal to aim for a 10% biofuels share in 2020. This chapter focuses on the implications of this figure on feedstock availability and elaborates several scenarios to reach this target. Also, the impacts of related policies and global developments are addressed.

The outline of the scenarios presented in this chapter are based on several parameters. These include default values as well as projections on future developments and are taken from cited publications. As different publications show varying values of these parameters, it has to be realized that the parameters introduce a level of dispersion to the presented calculations. However, it does not change the emerging general picture that is of relevance for drawing conclusions on the ways forward to ensure sufficient availability of feedstock.

8.1 EU 27 biofuels policy proposal: 10% in 2020

The expected total energy demand in 2020 in the EU-25 transport sector is 405.5 Mtoe (million tons oil equivalent; EU-25 Energy and Transport Outlook to 2030, part IV; 2005 update). According to the European Commission, a share of 55% of this total is expected to be taken by diesel use (EC Impact assessment Renewable Energy Roadmap 2007). This amounts to 223 Mtoe. This implies that with a 10% biofuel target 23 Mtoe diesel should be replaced in 2020 with biofuel based on vegetable and animal oils and fats and so-called second generation biofuels. Adjusting for the energy content of biodiesel with respect to mineral oil (0.92) this will total to a demand of 24.2 Mtons (million tons) biodiesel. Biodiesel used in the EU is largely based on rapeseed oil. This is due to local availability of this feedstock, but also due to current fuel quality requirements that limit the application of alternative sources. At this moment, rapeseed oil makes up ±75% of the total biodiesel use in the EU (EC Biofuels Progress Report COM(2006) 845). Therefore, for an assessment of the impacts of the 10% biofuel target a 75% rapeseed oil share is taken as a default scenario. This is elaborated in 8.1.1. Under 8.1.2 the impact of a broadened applicability of feedstock is sketched.

8.1.1 Feedstock demand with a 75% share of rapeseed oil

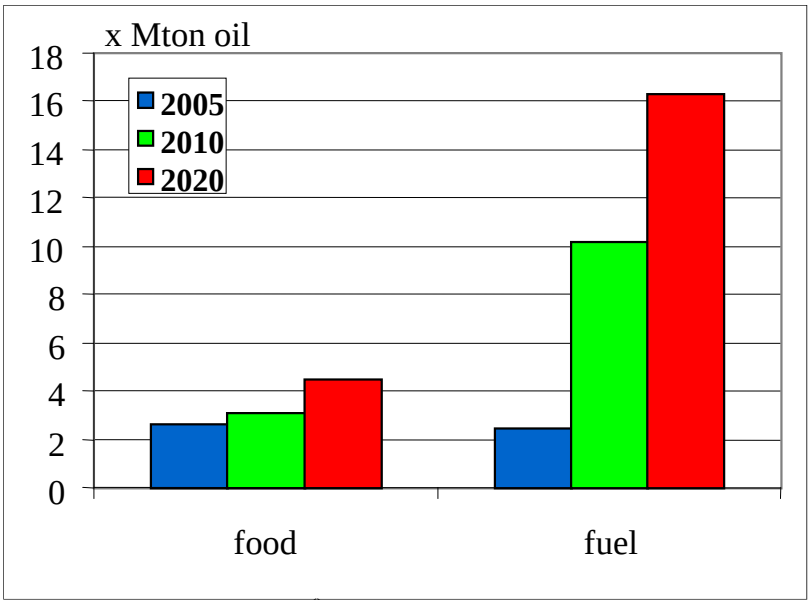
In analysing this scenario several assumptions are made:

- the 10% biofuel share is mandatory and will be met in a linear fashion up to 2020;
- there are no restrictions for the direct blending of biofuels up to a 10% share;
- biodiesel and bio-ethanol will equally contribute to the blending of diesel and petrol;
- all rapeseed oil and biodiesel will meet sustainability standards and be freely available.

Some of these parameters will be addressed in the following paragraphs.

In 2005 the use of rapeseed oil in fuel was 2.4 Mtons. With a 75% share, rapeseed oil use in biofuel will increase to 18.2 Mtons (0.75 x 24.2 Mtons) in 2020. For application in food 2.6 Mtons rapeseed oil was used in 2005. Assuming an annual 4% growth for use in food the 2020 demand for rapeseed oil in food will be 4.5 Mtons. The total 2020 rapeseed oil demand will thus equal 22.7 Mtons (4.5 + 18.2). This is a 4-fold increase with respect to the 2005 demand (2.4 + 2.6) and should be met in a 15 years period (see figure 8.1).

Figure 8.1 EU demand for rapeseed 2005-2020



Source: Europese Commissie (fuel) and ISTA Mielke (food)

To meet the 22.7 Mtons rapeseed oil demand 56.8 Mtons of rapeseed needs to be produced in 2020 (assuming an average extraction ratio of 40%). The 2005 EU production equalled 15.5 Mtons, whereas the global production amounted to 47.8 Mtons. FAPRI projections predict a growth in global rapeseed production to 61.9 Mtons in 2017. The EU demand for rapeseed will thus increase from 32% to almost 92% of global production. It should be noted that the FAPRI projections are to be considered with some caution as it might reflect a rather conservative estimate on the increase in production of 1.5 Mtons per year. Still, this calculation clearly illustrates the possible impact of the EU biofuel targets.

► FAPRI Agricultural Outlook 2007

This scenario shows that the proposed biofuel target is a very ambitious one to meet under the given conditions. Additionally, some of the parameters in this model are not self-evident. While biodiesel and bio-ethanol are considered to equally contribute to the blending of diesel and petrol, the EC progress report showed that the biofuels use in the EU in 2005 shows an 80% share of biodiesel versus only 20% bio-ethanol. The EC, in a recently published impact assessment study, however, expects that a 50:50 ratio will be realized. This view is supported by the OECD-FAO Agricultural Outlook. Concerning the availability of produced rapeseed, serious limitations are experienced in the import of Canadian rapeseed. As discussed in Chapter 7.1.1. rapeseed from Canada is prevented from being imported due to existing asynchrony in the authorization of genetically modified varieties. Finally, on the biofuel blends of 10% this may be technically possible, but is at this moment prevented by existing fuel quality standards (see Chapter 2.1.2).

8.1.2 Feedstock demand with a 50% share of rapeseed oil

In an alternative scenario multisourcing of feedstock is achieved, allowing the rapeseed percentage to be lowered to 50% with respect to the default scenario. In this ‘burden sharing’ scenario it is considered that the fuel quality standards are adjusted to allow

application of alternative sources in higher percentages. The effects of this scenario on the availability of the other feedstock is discussed.

A lowered share of rapeseed puts up the demand for other feedstock. At this moment, a limited number of alternatives are currently available, most notably soy. Other feedstock are frying fats and animal fats, but these are available only in limited quantities (the global animal fat production equalled 16 Mtons in 2005; MVO Statistisch Jaarboek 2006). Palm oil, due to its characteristics, is best suited for biodiesel use in tropical regions and could only be applied in limited percentages in biodiesel in The Netherlands or the EU. As discussed in Chapters 7.2 and 7.3 new feedstock and new technologies for producing biofuels from alternative sources are at various stages in its product development. Large scale commercial introduction of these products is, however, not expected in the short term. This model therefore focuses on the impact on soy as most significant alternative.

For soy a maximum of 60.5 Mton beans are needed for the production of 12.1 Mton biodiesel. This matches the predicted growth in soybean production up to 2017. The EU biodiesel demand would thus consume the entire global growth in soybean production if it were employed to constitute 50% of the biodiesel makeup.

►FAPRI Agricultural Outlook 2007

Palm oil production surged over the past years and the FAPRI outlook predicts another increase in production of more than 16 Mton in 2017. The increase in production is primarily fuelled by increased demand for food use. Only more recently, biofuel policies caused a further interest for increasing production. An EU demand of 12.1 Mton would represent 72% of the expected global increase in palmoil production. However, as stated the applicability of palm oil based biodiesel under the current production technology is limited in the EU.

In this scenario, a 50% rapeseed share in biodiesel still requires a significant increase in production. At 50% the EU demand for rapeseed oil for biodiesel will be 12.1 Mton. This translates into 30.2 Mton rapeseed, or a required increase in production of 22.2 Mton. This increase slightly exceeds the expected growth in global rapeseed production and would raise EU demand for rapeseed from 32% to 56% of global production.

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From this scenario it is concluded that the multisourcing strategy takes off the pressure from rapeseed demand by transferring the demand to other feedstock. With the limited number of alternative feedstock available at present, the availability of this feedstock quickly comes under pressure when significant amounts are used to replace rapeseed based biofuel.

9 Conclusions

9.1 Headlines from this report

This report presents an overview of the latest developments in policy, technology and market developments. In addition, it outlines some of the scenarios that might develop concerning the availability of oils and fats feedstock. Below, the three main conclusions are listed that follow the contents of this report. In Chapter 9.2 the way forward is described as a short term and long term approach to meet the biofuel and food and feed demand.

9.1.1 Biofuels and Renewable energy targets translate into enormous pressure on feedstock availability

An increasing number of countries are setting biofuel targets, often as part of a broader renewable energy policy. Chapters 2.3 and 3.3 provide an overview of these policies. Already the EU biofuel target would eat up more than 90% of the future global rapeseed production if the current conditions of production are continued (Chapter 8.1.1). The EU Energy for Europe renewable energy program aims for a 20% share of renewable energy use in 2020. The expected EU-energy demand is 1,895 Mtoe, setting the bio-energy target at an impressive 380 Mtoe (this figure includes the 22.3 Mtoe biofuel target). Biomass including vegetable and animal oils and fats will be one of a number of sources and accounted for 4.2% of the total EU energy mix in 2004 (Commission staff working document EU energy policy data; SEC(2007)12). This was two-thirds of the total share of renewable energy sources. With the large-scale exploration of wind, solar and geothermal energy still a long way from realization, the renewable energy target will add to the pressure on biomass resources.

9.1.2 Adjacent policies are ready for improvements

The scenarios outlined in Chapter 8 underscore the need for multisourcing. They also illustrate the limitations current policies impose on meeting the biofuel policy objectives. A more integrated approach would clearly move things forward more quickly. This would require uniting the different interests that are at stake. The use of by-products and animal fat as feedstock meets serious opposition from existing legislation. The use of by-products appears incompatible with a definition of waste as laid down in the EU Framework Directive on Waste. Similarly, the use of animal fats is restricted due to strict rules on incineration of this material. The discussions on amendment of fuel quality standards meet resistance from the car manufacturing industry leading to significant delays in decision-making. Finally, as discussed in detail in Chapter 2.5.1 the authorization procedure of GMOs is severely hampered by a political reluctance to introduce the commercial application of GMO derived products.

9.1.3 There is agricultural potential for meeting demand

The calculations in Chapters 8.1.1 and 8.1.2 show that the biofuels policies create an enormous surge in demand for agricultural commodities, in particular for rapeseed. Current production figures are highly inadequate to meet this demand and are further hampered by interfering policy frameworks. Thus, the biofuel policy targets and current feedstock production levels create a real challenge to meet demand for both food and fuel. Additional measures will therefore have to be exploited to prevent an unprecendted competition for commodities for the production of food, feed and biofuels. These should focus on improving agricultural output (yield per hectare, total acreage), as well as crop improvements and oil extraction ratios.

The European Commission issued an impact assessment in June 2007. One of the conclusions of the report was that the 10% biofuels target will not put an unacceptable strain on the agricultural markets. The calculations are based on the current agricultural policy. The 10% scenario does not overly stretch land availability nor does it lead to a significant increase of intensities of production because of the limited pressure on markets, according to the report. About 15% of arable land would be needed to produce the required biofuel quotum. In their analysis it is assumed that so-called 2nd generation biofuels would account for 30% of the total biofuel share. This is considered a highly optimistic assumption and the report acknowledges that production costs and costs of transport may seriously challenge this percentage. In a recent study by Nielsen *et al.* it was concluded that 50% of the EU 2030 transport fuel needs could be met by improved yields and applying 20% of the areable acreage in the EU for energy crop production (Energy crop potentials for bioenergy in EU-27; 2007). These percentages correspond with the land use required for meeting the rapeseed demand in the default scenario (Chapter 8.1.1). To produce a total demand of 56.8 Mtons some 23Mha (million hectares) of agricultural area will be required (assuming an average production of 2.4 tons of seed per hectare). This equals 14% of the total available agricultural area in the EU. The 2007/8 rapeseed acreage is forecasted to amount to 6.3 Mha, from a 4.3 Mha in 2002/3 (Figure 5.1). In further increasing the acreage for rapeseed it has to be taken into account that rapeseed is a rotation crop that allows for cultivation on the same area only once every 3 or 4 years.

The studies referred to above indicate that there is agricultural potential to meet the feedstock demand by expanding energy crop acreage. An additional approach is to improve the yield per hectare. This also adds to the sustainability of feedstock production and has already taken a big step in palm oil production. While the average yield is about 3.5 tons per hectare, different companies have reported yields of more than 6 tons/hectare from plots as large as 150,000 hectares (Global Oils & Fats 4(3), 2007). These best practises show the potential of yield improvements and serve as good examples for the sector.

One incentive to materialize the agricultural potential is the current high feedstock prices. This should push farmers to cultivate more and improve their crop and yield/hectare. The CAP reform in the EU should further contribute to this objective. The clearance for the use of set-aside land and the Energy Crop Premium Scheme are examples of the promotion of energy crop production.

9.2 The way forward

With the long term renewable energy policies in an increasing number of countries and with the structural increase in demand for food and feed in countries like China and India the way forward consists of a short term and a long term approach.
In the short term, the current use of existing oilseeds and vegetable oils is inevitable to allow the establishment of a biofuels industry and to meet the existing demand for food and feed. The current feedstock price levels provide the necessary stimulus to boost production and meet demand in the short term. The agricultural potential is present and should be exploited better by promoting best practises. The future demand, however, is of such dimensions that the application of current oils and fats should be complemented with the output of the long term approach.
The long term approach should further push the ongoing efforts to develop new feedstock and technologies to produce more advanced biofuels, as well as other renewable sources of energy like solar, wind and water. These efforts should be equally directed at the applications in food, feed and the oleochemical industry. In The Netherlands the development of a biobased economy offers unique opportunities to exploit the biomass potential, especially in synergy with the strong Dutch chemical industry.

The build-up of a biofuels industry requires significant investments. Additionally, for both the food, feed, oleochemical and biofuels industries the development and application of new feedstock or production and processing technologies may require unconventional and innovative approaches that demand a high spirit of enterprise. Clear and long-term policies should therefore be directed at capitalization of this potential that should also create a corresponding investment climate.

Consulted literature

Agence Internationale de l'Energie (2007), Consommation de carburants-auto et de gazole.

Agra Informa (2006-2007, January-December), a) AgraFood East Europe b) Public Ledger.

Agriculture and Agri-Food Canada (2007), A) Biofuels and the European Union. B) Biodiesel developments Canada.

BBK (Bundesverband Biogene und Regenerative Kraft- und Treibstoffe, 2007), Various newsletters.

Biofuel Review (2007), EBB calls for greater support for biodiesel in the EU.

Biopact (2007), Various press releases about biofuels developments in divers countries.

BusinessUkraine (2007), Can Ukraine capitalize on the growing biofuels market?

Various Dutch Newspapers (2006-2007), Various articles on biofuel related topics in different countries

ECN (Energy research Centre of the Netherlands, 2006), Biofuel implementation scenarios up to 2030. Exploration by the VIEWLS Biotrans model.

Ecoworld (2007), Jatropha in Africa.

EIA (Energy Information Administration, US government, 2007), a) Renewable energy consumption and electricity: 2006 statistics b) Biodiesel performance, costs and use.

Ethanolmarket.com (2007), The ethanol market in the United States.

EurObserver (2006-2007), Biofuels barometer.

European Biodiesel Board (EBB, 2007), a)The EU biodiesel industry: production and capacity b) Biodiesel and oilseeds c) Various press releases about biofuels.

European Biomass Conference (2007), Energy crop potentials for bio-energy in EU-27.

European Commission (2006-2007), a) Biofuels Progress Report 2006 and 2007 b) The impact of a minimum 10% obligation for biofuels use in the EU-27 in 2020 on agricultural markets c) EU-25 energy and transport outlook to 2030 d) Prospects for agricultural markets and income 2007-2014 e) Biofuels in the European Union. A vision for 2030 and beyond f) Promoting biofuels in Europe. Securing a cleaner future for transport g) Impact of the rise in agricultural prices on European food consumption and prices h) Renewable Energy Road Map. Renewable energies in the 21st century: building a more sustainable future i) Biofuel issues in the new legislation on the promotion of renewable energy j) European Biomass Action Plan: State of play 2007 k) European Energy and Transport: "Scenarios on high oil and gas prices" and "Trends to 2030" l))International conference on biofuels m) Various press releases about biofuels and energy crops.

EUROSTAT (2007), a) EU Import and export statistics of rapeseed and rapeseed oil b) Main crop areas in the EU in 2007 c) Crop yield forecasts for 2007.

FAO (2006), Oilseeds area and production in some selected European and American countries.

FAPRI (Food and Agricultural Policy Research Institute, January 2007), Agricultural Outlook 2007.

FEDIOL (2007), Market comments made about soybean, rapeseed, sunflowerseed and palm oil complex.

Financial Times (2007), Various articles about biofuels

F.O. Licht (2007), World ethanol and biofuels report.

GRAIN (2007), Jatropha - the agrofuel of the poor?

IEA (International Energy Agency, 2006-2007), World Energy Outlook

IEA Bioenergy Task 39 (2007), Commercializing 1st and 2nd generation liquid biofuels from biomass.

InvestEgate (2007), D1 oils accelerates expansion in India.

International Business Strategies (2007), Biofuels in Ukraine.

JatrophaWorld, a) Crop cultivation and economics of Jatropha b) Biodiesel in India.

Kyiv Weekly (2007), Using rapeseed as a strategic alternative energy resource.

ISTA Mielke (2006-2007), a) Oil World Annual 2006 and 2007 b) Oil World weekly and monthly c) Major global trends. Supply and demand outlook. Impacts from biofuels.

Louis Bolk Instituut (2007), Biomassa als energiebron. Een missie voor de biologische en duurzame landbouw.

National Biodiesel Board US (2007), House ways and means Committee gives nod to biodiesel measures.

OECD-FAO (2007), Agricultural Outlook 2007-2016

Oxford Business Group (2007), Country Business Intelligence Reports: the Ukraine and Russia.

OECD (2006), Agricultural market impacts of future growth in the production of biofuels.

Planet Ark (2006-2007, Various articles on biofuel related topics in different countries.

Product Board MVO (2006-2007), Various Newsletters a) Biobrandstoffen b) Trade policy.

Public Ledger (2005-2006), Various articles about biofuels and oilseeds production in divers countries.

SenterNovem, Various articles on biodiesel en bioethanol.

Russian Biofuels Association (2006-2007), Various articles about biofuels developments in CIS countries.

UNCTAD (United Nations Conference on Trade and Development, 2007), An assessment of the biofuels industry in India..

UkrAgroConsult (2006-2007), Market weekly reports AgriNews.

UFOP (Union zur Förderung von Oel- and Proteinpflanzen), a) Current situation and prospects for biodiesel and vegetable oils and fuels: from niche products to market players
b) Status report biodiesel: Biodiesel in Germany: market trends and competition
c) Biodiesel: rapeseed market with good perspectives.

Ukrainian Institute for Economic Research and Policy Consulting (2007), Overview on Renewable Energy in Agriculture and Forestry in Ukraine.

University of Lethbridge, Alberta (2007), The development and sustainability of the biofuel industry in Canada.

USAID (US Agency for International Development, August 2006), Assessment of the potential of Jatropha curcas for energy production and other uses in developing countries.

USDA (20062007, a) Ethanol expansion in the US. How will the agricultural sector adjust?
b) Several Biofuels Annuals 2007: Canada, India, France, Russian Federation, EU-27
c) Oilseeds: World markets and trade.

Wageningen Universiteit (WUR, February2006), Quick scan kansen op het gebied van bio-brandstoffen; met de nadruk op de agrosector.

WWF (Wolrd Wide Fund for Nature, 2007) WWF position on biofuels in the EU.

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