OCL 2014, 21(1) D102
© P. Carré, A. Pouzet, Published by EDP Sciences 2014
DOI: 10.1051/ocl/2013054

OCL Oilseeds & fats Crops and Lipids
Available online at:
www.ocl-journal.org

Research Article – Dossier Open Access

Rapeseed - tremendous potential for added value generation?
Colza : haut potentiel de valeur ajoutée

Rapeseed market, worldwide and in Europe

Patrick Carré[1,*] and André Pouzet[2]

[1] CREOL, 11 rue G. Monge, 33600 Pessac, France
[2] CETIOM, 11 rue Monceau, CS 60003, 75378 PARIS cedex 08, France

Received 4 November 2013 – Accepted 13 November 2013

Abstract – Global rapeseed production has undergone sustained growth over the past 20 years. Having surpassed cottonseed production in the early 2000's, it is now the second most produced oilseed behind soybeans. The major producers are China, India, Canada and European Union (27). During this same period, rapeseed crushing has risen strongly, Europe being the major player in this expansion (development of biodiesel) followed to a lesser extent by Canada and China. World exports of rapeseeds are dominated by Canada, by far the largest exporter. Japan is a traditional importer, while China and the EU (27) are less regular buyers. Although less spectacular than palm oil growth, rapeseed oil growth is also remarkable. Its consumption occurs mainly in the crushing countries, the EU being the principal consumer. Rapeseed meal is the second major oilseed meal produced worldwide (after soybean meal). It has been following broadly the same trends as seeds and oils, this evolution was marked a short period of stagnation in the early 2000's. Consumption of rapeseed meal has grown strongly in the EU (which is deficient in protein feed), in China (due to its extraordinary economic development), and in the USA (due to milk producers' demand for feed). The main exporters of rapeseed meals are Canada and India. Oilseed prices spiked in 2008 and since 2010 are remaining at historically high levels: whilst prices fell sharply following the 2013 harvest, they remain well above the lows of 2009. Rape seed meal, however, will remain a secondary meal with known drawbacks; there is little prospect of its price going higher than 65–70% of that of soybean meal.

Keywords: Rapeseed seed / rapeseed oil / rapeseed meal / production / trade / prices / biofuel

Résumé – Le marché mondial et européen du colza. Durant les 20 dernières années, la production mondiale de graines de colza mondiale a cru très rapidement, devenant la seconde graine oléagineuse mondiale après le soja (et avant l'huile de coton) au début des années 2000. Les producteurs majeurs sont la Chine, l'Inde, le Canada et l'Union européenne (27). Durant la même période, la trituration mondiale de graines de colza s'est fortement développée, l'Europe étant l'acteur le plus influent de cette expansion (développement de biodiesel) suivie dans une moindre mesure par le Canada et la Chine. Le Canada domine les exportations mondiales de graines de colza, s'imposant de loin comme le plus grand exportateur de ces graines. Le Japon est un importateur traditionnel, tandis que la Chine et l'Europe des 27 sont des acheteurs moins réguliers. Bien que moins spectaculaire que la croissance d'huile de palm, la croissance de l'huile de colza est également remarquable. Sa consommation est importante dans les pays triturateurs, l'Union européenne s'imposant comme le premier utilisateur mondial de cette huile. Le tourteau de colza, deuxième tourteau oléagineux produit dans le monde (après le tourteau de soja), suit approximativement les mêmes tendances d'évolution que les graines et les huiles, et à ce titre, il a rencontré une période courte de stagnation au début des années 2000. La consommation de tourteaux de colza a fortement cru en Europe (qui est déficitaire en protéines en l'alimentation animale), en Chine (en raison de son développement extraordinaire) et aux USA (en raison de l'intérêt de producteurs de lait pour l'alimentation). Les exportateurs principaux de tourteaux de colza sont le Canada et l'Inde. Les prix des oléagineux ont atteint un niveau record en 2008, et depuis 2010, ils se maintiennent des hauts niveaux historiques. Depuis la récolte 2013, les prix sont brusquement retombés, mais demeurent au-dessus des plus bas de 2009. Cependant, le tourteau de colza restera un tourteau de second rang, avec des inconvénients connus, et il y a peu de chances que ses prix puissent un jour dépasser 65–70 % du prix des tourteaux de soja.

Mots clés : Graines de colza / huile de colza / tourteau de colza / production / échanges / prix / biocarburants

* Correspondence: carre@cetiom.fr

1 Introduction

With an annual harvest of a little over 450 million tonnes, oilseed production accounts for just 20% of the world grain production. But, growth all over the world in oilseed production has been remarkable in the past 25 years : world production of the major 10 oilseeds (soybeans, cotton seed, rapeseed, sunflower seed, groundnuts – shelled –, sesame seed, palm kernels, copra, linseed and castor seed) rose from approximately 190 MT in 1985/1986 to more than 453 MT in 2010/2011, a 136% rise over the course of a quarter-century, a period during which the grains sector as a whole (wheat, coarse grains and rice) witnessed "only" a one-third growth in production, from 1647 Mn T in 1985 to 2213 Mn T in 2010 (Mittaine, 2012).

Oilseeds are harvested in all continents of the world from a variety of plants of diverse origins: in 2011, 57% of all oilseeds originated in the American continent (most of all because of soybean), 23% in Asia and about 9% in Europe.

With 14% of oilseeds volume, rapseed is the second world oilseed, but its volumes are dwarfed by soybean which represents 55% of the harvest. Nevertheless, for European agriculture this crop is the major oilseed, with a 2012 production of 19.5 Mt for a total production of 27.0 Mt. This volume has increased by about 27% since 2005, a development linked to the expansion of the biodiesel industry (Prolea, 2011).

This article reviews the principal developments in the rapeseed markets. For the seeds, oils and meals, it provides recent figures on the production volumes by geographic zones and international trade. It also gives information on the processing industry and on the volumes of oil incorporated in biofuels. The trends on Europeans markets are reviewed and discussed.

2 Rapeseed seeds

The last 20 years have witnessed a dramatic rise in the production of oleaginous seeds worldwide, especially soybean production which has been multiplied by a factor of 2.2 from 1992 to 2012. Rapeseed production has grown at a slightly higher speed – a factor of 2.4 during the same period. Rapeseed production surpassed that of cottonseed in the early 2000's to become world's second oilseed.

Looking at the most important dry oilseeds (groundnuts, cottonseeds, linseed, palm kernels, rapeseed, soybean and sunflower), soybean accounted for 55% of total crops in 2012 versus 14% for rapeseed. Twenty years ago, the percentages were 50 and 12%, respectively. Palm kernel is the crop whose growth has been the most dramatic, with the 2012 production being 3.8-fold that 20 years previously, reflecting the well-known rapid expansion of the palm oil production. By comparison, groundnuts, cottonseed and sunflower have seen slower development (2012 figures are 1.6 times those of the 1992 values), but this growth remains strong by comparison with cereals which increased by a factor of just 1.29 as a whole and only 1.19 in the case of wheat. During the same period, the global population increased by a factor of 1.29 (FAO, 2013; World Bank, 2013).

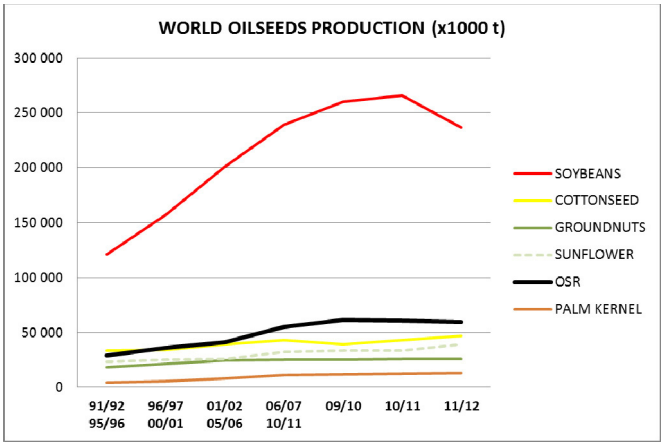


Fig. 1. World oilseeds production (×1000 T) of soybeans, cottonseeds, groundnuts, sunflower, OSR (Oilseed Rape), palm kernel from 1991/1992 to 2011/2012 (Source: Oil World, 2012).

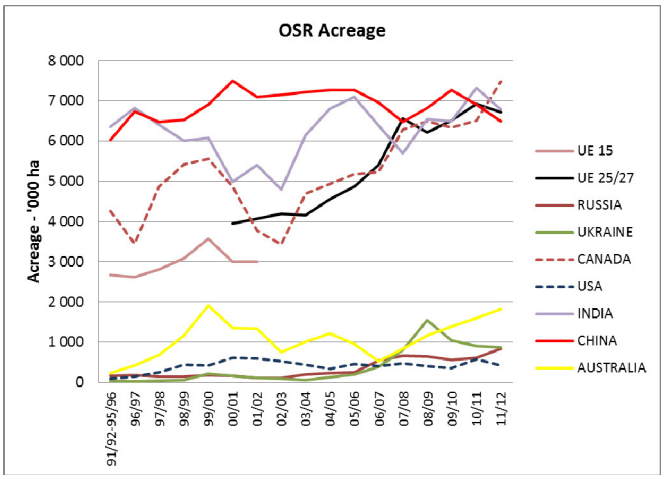


Fig. 2. World oilseed rape (OSR) acreage (×1000 ha) in the major areas of production (EU, Russia, Ukraine, Canada, USA, India, China, Australia) from 1991/1992 to 2011/2012 (Source: Oil World, 2012).

2.1 Major areas of production of rapeseed seeds

Major areas of production of rapeseed seeds in terms of surface

Rapeseed has, at present, four major production areas, each of approximately equal surface: Chine, India, Canada and the European Union (27) (Fig. 2). Over time, these surfaces have markedly increased in Canada and Europe while they have remained quite steady in China and to a lesser extend in India. During the last ten years, acreages have increased by about 3 million hectares in UE27 and Canada. Far behind this group, Australia is becoming a significant player with almost 2 Mha, followed by Ukraine and Russia which each have about 1 Mha under cultivation. In 2013, Canadian acreage diminished by about 9% in comparison 2012, the first reduction since 2006.

In Europe, France and Germany are cultivating approximately the same surface areas, which are following similar trends (Fig. 3). These surfaces are in the range 1.4–1.6 Mha.

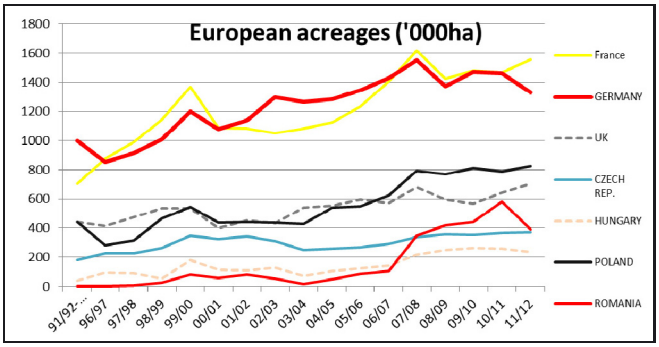


Fig. 3. European oilseed rape (OSR) acreage (×1000 ha) in the major European countries of production (France, Germany, United-Kingdom, Czech Republic, Hungary, Poland, Romania) from 1991/1992 to 2011/2012 (Source: Oil World, 2012).

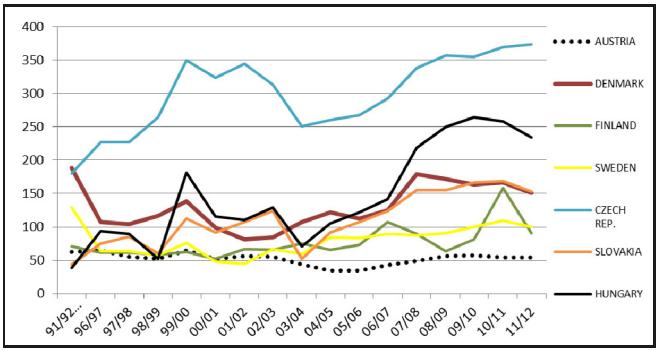


Fig. 4. Oilseed rape (OSR) acreage (×1000 ha) in 7 European countries (Austria, Denmark, Finland, Sweden, Czech Republic, Slovak Republic, Hungary) from 1991/1992 to 2011/2012 (Source: Oil World, 2012).

In 2011 and 2012, France and Germany were diverging with 1.56/1.33 and 1.61/1.31 Mha, respectively but that gap disappeared in the 2013 sowings with 1.44 and 1.46 Mha. The UK and Poland make up a second group of important countries for European rapeseed. They devote between 600 and 800 thousand hectares to this crucifer, Poland leading by one hundred thousand hectares but that spread decreased in the 2012 and 2013 sowings (0.72/0.76 and O.72/0.71 Mha in Pl/UK). Romania has seen its production rise dramatically since its entry in the EU and has taken the fifth place just ahead of the Czech Republic. Sowings were dramatically reduced in 2012 in this country with just 97 000 ha and resumed to 290 000 ha this year. As for Romania, Hungary and Slovakia, they have seen their acreage increasing significantly following their entry into the EU in 2004. Together, they have approximately the same rapeseed surface as Poland (Eurostat, 2013). Denmark, Sweden and Austria are the other important growers of rapeseed in Europe (Fig. 4). Lithuania, Latvia and Estonia are progressively becoming significant producers, Lithuania cultivating approximately twice the acreage of Latvia with 264, 124 and 85 thousand ha, respectively this year.

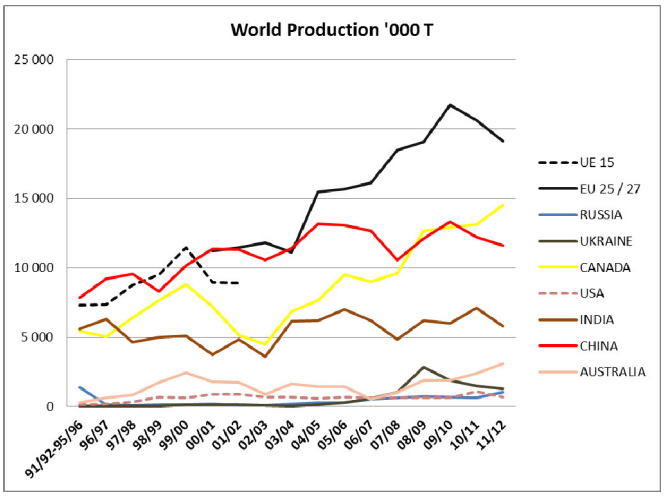


Fig. 5. World oilseed rape (OSR) production (×1000 T) in the major areas of production (EU, Russia, Ukraine, Canada, USA, India, China, Australia) from 1991/1992 to 2011/2012 (Source: Oil World, 2012).

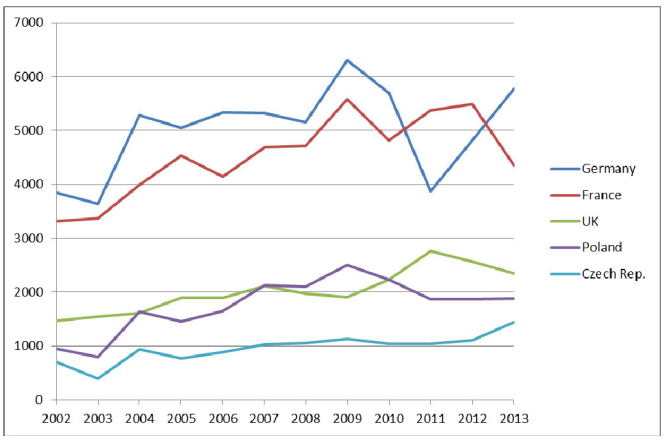


Fig. 6. European oilseed rape (OSR) production (×1000 T) in the major European countries of production (France, Germany, United-Kingdom, Czech Republic, Poland) from 2002 to 2013 (Source: Eurostats, s.d.).

Major areas of production of rapeseed seeds considering volume-production

Rapeseed *production* is much less evenly distributed than areas under cultivation (Fig. 5). The EU (27) is by far the world's largest producer with about 20 Mt per year followed by Canada (15 Mt) and China (12 Mt). India with about 6 Mt yearly is well behind although with a comparable acreage.

In Europe, France with slightly larger acreage trails Germany in production except for the 2011 and 2012 harvests where poor climatic conditions affected German production (Fig. 6). The 2013 harvest saw a severe downturn in France where a combination of adverse climatic hazards eroded yields, compounding the effect of a reduction in the surface area under cultivation. The UK, Poland and the Czech Republic have a fairly regular production that exceeds one million tons per year (Eurostats, s.d.).

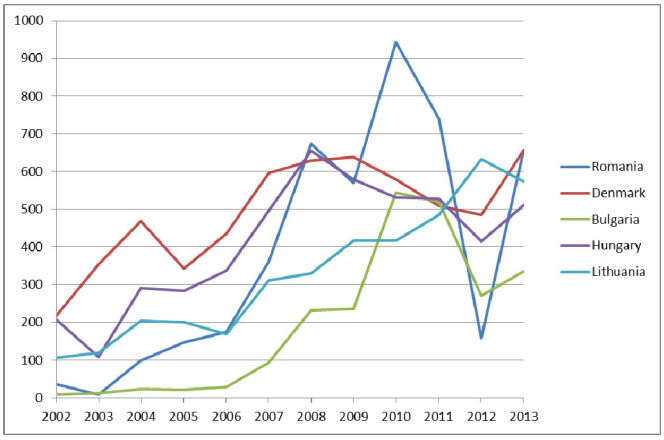


Fig. 7. Oilseed rape (OSR) production (×1000 T) in 5 European countries (Romania, Denmark, Bulgaria, Hungary, Lithuania) from 2002 to 2013 (Source: Eurostats, s.d.).

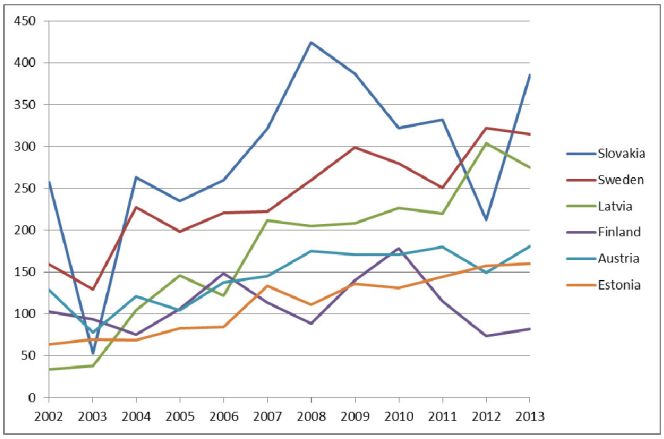


Fig. 8. Oilseed rape (OSR) production (×1000 T) in 6 European countries (Slovakia, Sweden, Latvia, Finland, Austria, Estonia) from 2002 to 2013 (Source: Eurostats, s.d.).

After a strong progression, Romania production regressed dramatically in 2012 due to a pronounced autumn drought followed by freeze damages in winter (360 000 ha sowed/92 000 ha harvested). The 2013 situation has not totally recovered because of soil dryness resulting in reduced acreage under cultivation (Fig. 7). Lithuania, by contrast, experienced a steady increase in its production and is at levels close to Denmark and above Hungary. Bulgarian production surged from 2006–2010 and then experienced a similar evolution to that of Romania, though the vagaries of 2012 were less damaging in this country.

Slovakia, Sweden and Latvia form a group of countries that produce between 200 and 500 kt/year. Austria, Estonia and Finland are the three other with a significant production, their harvests above 100 kt/year.

2.2 Rapeseed seeds crushing

Global rapeseed crushing has been rising strongly. Europe has been the major player in this expansion, followed to a lesser extent by Canada and China (Fig. 9).

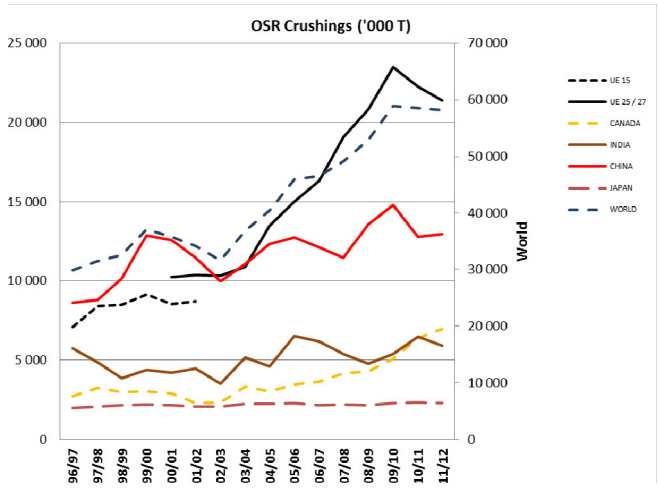


Fig. 9. World oilseed rape (OSR) crushings (×1000 T) and OSR crushings (×1000 T) in major players (UE, Canada, India, China, Japan) from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

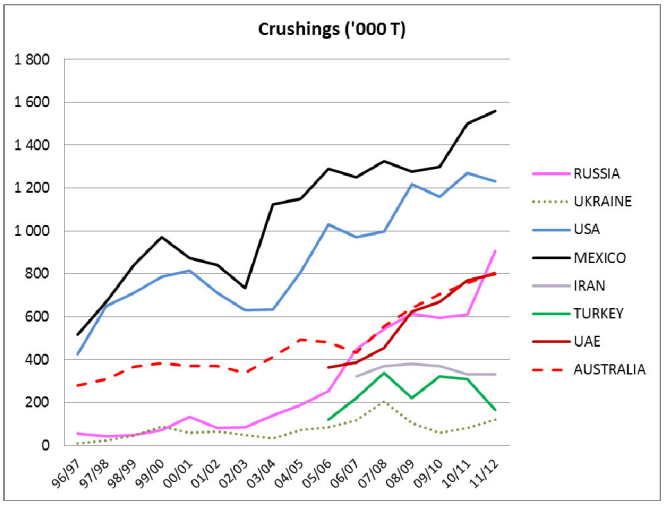


Fig. 10. Oilseed rape (OSR) crushings (×1000 T) in Russia, Ukraine, USA, Mexico, Iran, Turkey, United Arab Emirate (UAE), Australia from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

European growth has been driven by the emerging use of biodiesel, as it will be discussed below.

Elsewhere in the world, Mexico, a non-producing country, has developed a processing industry whose production is steadily increasing (Fig. 10). Similarly, there has been a steady increase in rapeseed crushing the United States. Australia and Russia are two other countries which have also developed a business in crushing, joined in 2006 by the United Arab Emirates. All three crush more than 800 kt of rapeseed per year.

In Europe, crushing is dominated by Germany, which handles almost twice as many seeds as France, which itself has an activity twice that of Poland and the UK (Fig. 11).

Belgium and the Netherlands have strongly increased their operations, a development related to the growth of the biodiesel business (Fig. 12).

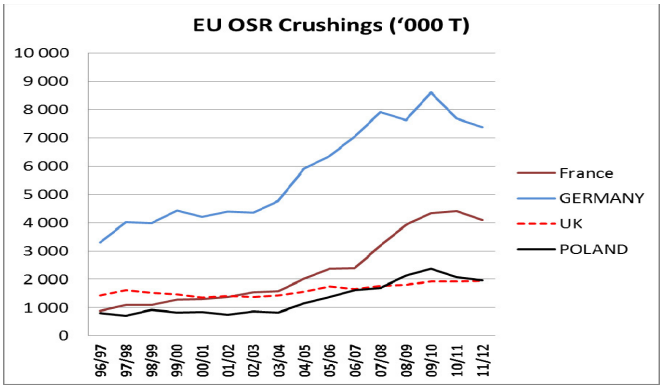


Fig. 11. Oilseed rape (OSR) crushings (×1000 T) in major players of Europe (France, Germany, United Kingdom, Poland) from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

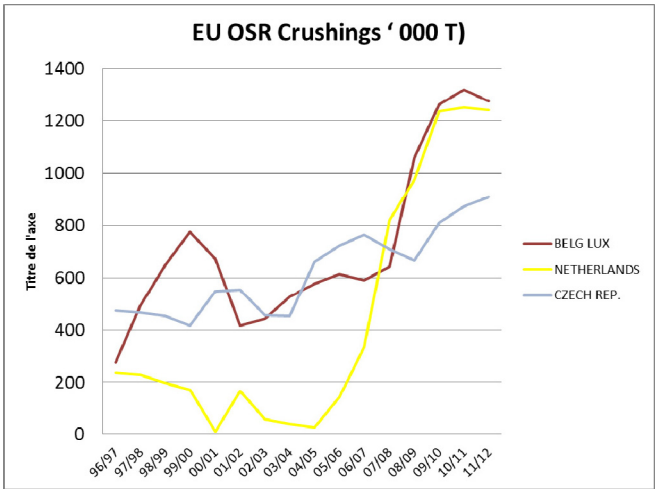


Fig. 12. Oilseed rape (OSR) crushings (×1000 T) in Belgium-Luxemburg, Netherlands and Czech Republic from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

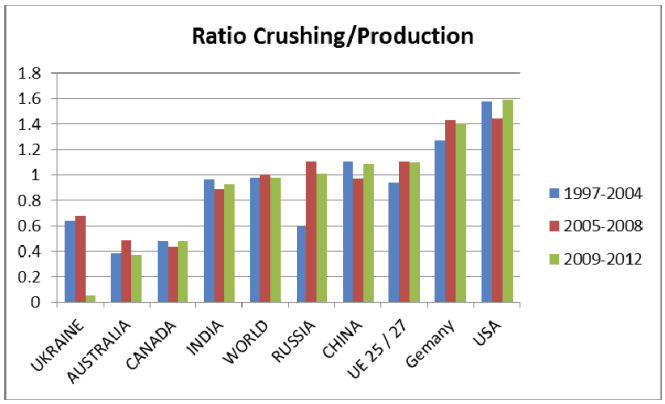


Fig. 13. Crushing/production of oilseed rape (OSR) ratio in several countries (Ukraine, Australia, Canada, India, Russia, China, UE, Germany, USA) and worldwilde, during three periods (1997–2004, 2005–2008 and 2009–2012) (Source: Oil World, 2012).

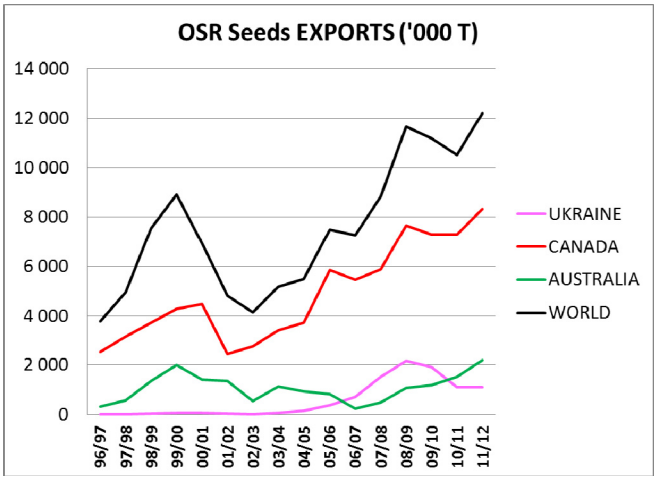


Fig. 14. Global world oilseed rape (OSR) exports (×1000 T of seeds) and world OSR exports (×1000 T of seeds) of major players (Ukraine, Canada, Australia) from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

2.2.1 Rapeseed world trade of seeds

There are three categories of countries in the world: those that produce more than they process, such as Ukraine, Australia and Canada; those whose processing is broadly the same as their production, which is the case of India, Russia, China and Europe as a whole; and countries such as the USA, Germany, Mexico and the UAE that produce less than they process (Fig. 13).

2.2.2 Rapeseed exports of seeds

World exports of rape seeds are dominated by Canada, by far the largest exporter, followed essentially by just two other countries, Australia and Ukraine (Fig. 14).

Since 2003 there has been an upward trend in internationalisation of oilseed trade, but this trend is not without history since a few years earlier the international trade share had peaked at 25%. The share of rapeseed in the volume of exported oilseeds followed the same trend. It is striking that the two curves follow a parallel evolution, in particular with regard to the low of 2002/2003, while at that time the production of rapeseed and soya bean were not growing at the same rates (Fig. 15). The 99/00 peak is not correlated to a change in seeds prices but rather to strong import demand from China, which fell back in the succeeding years.

2.2.3 Rapeseed imports of seeds

On the imports side, Japan is a traditional player with a steady consumption while China and the EU27 are less predictable buyers (Fig. 16). The EU has become the largest importer in recent years due to increasing needs related to the expansion of biofuels; China's demand varies according to changes in food needs. Pakistan and Mexico, two countries with large populations and which lack oilseeds, are seeing imports grow year on year.

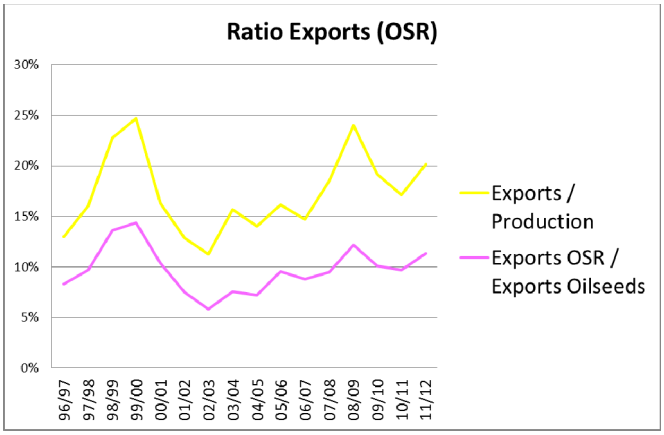


Fig. 15. Ratio of world exports of oilseeds and total oilseed production and ratio of oilseed rape (OSR) world export and all oilseeds world export. The first is an indicator of the proportion of the production that is traded at international level; the second one represents the participation of OSR in these exchanges.

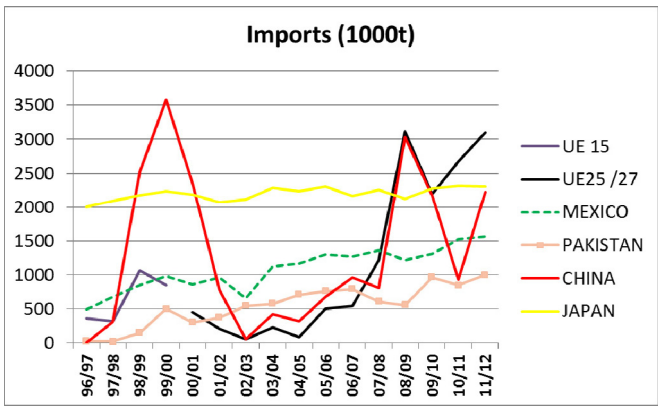


Fig. 16. World oilseed rape (OSR) imports (×1000 T of seeds) of major players (EU, Mexico, Pakistan, China, Japan) from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

3 Rapeseed oil

3.1 Production of seed oils

The global seed oil market has been led by palm oil since 2004, and its production has almost tripled since 1997, exceeding 50 MT in 2011/2011. 15 years earlier, palm oil production had been less than 20 MT per annum (Fig. 17).

That growth in palm and palm kernel oil is higher than that of all the other oils. Although less spectacular, the growth in rapeseed and soybean oil has also been remarkable (Fig. 18). The growth in sunflower oil production has also grown faster than the world population; corn, cotton and olive oil have been following the growth trend of the global population.

Groundnut oil is in decline. This is being driven by a multiplicity of factors, among which an increasing share taken by unprocessed groundnuts being used in food, its replacement in some geographical areas by soybeans and problems with afla toxin contamination.

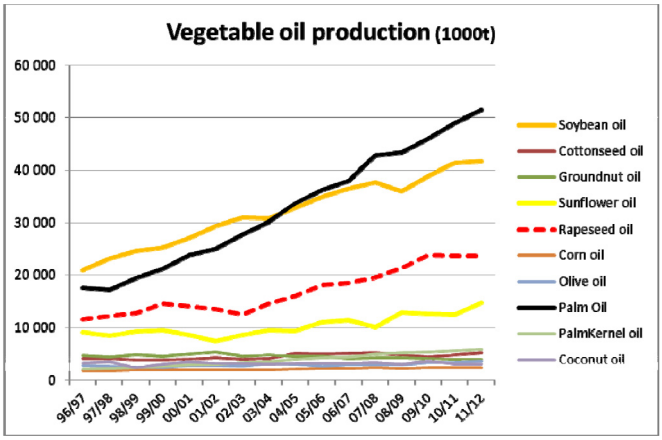


Fig. 17. World vegetable oil production (×1000 T) of soybean oil, cottonseed oil, groundnut oil, sunflower oil, rapeseed oil, corn oil, olive oil, palm oil, palmkernel oil, coconut oil, from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

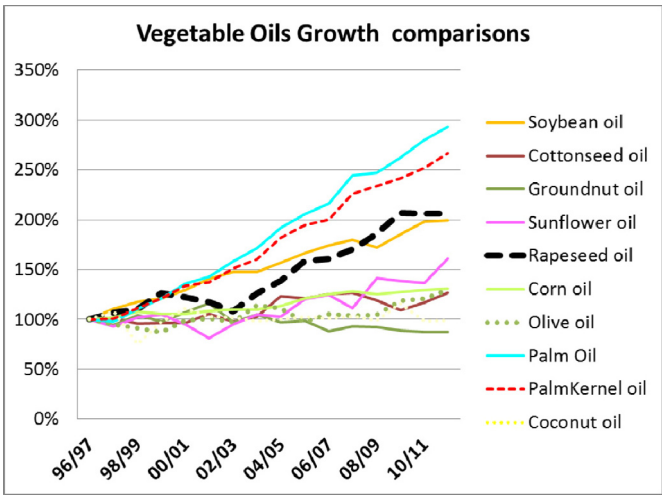


Fig. 18. Comparisons of vegetable oils growth (soybean oil, cottonseed oil, groundnut oil, sunflower oil, rapeseed oil, corn oil, olive oil, palm oil, palmkernel oil, coconut oil, from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

3.2 Global trade of rapeseed oil

Consumption of rapeseed oil takes place mainly in the crushing countries. It is therefore not surprising that the EU is the principal consumer (Fig. 19). The notable feature of that zone is the strong rise in its consumption since the early 2000's. China and the USA are experiencing growing consumption, unlike India and Japan where volumes remain flat. China's appetite for OSR oil can be explained by developments in the country's wealth and demography while in the USA, the nutritional quality of the product would explain the evolution since the price of rapeseed oil price makes it uncompetitive for biodiesel production (FranceAgriMer, 2013). International trade in rapeseed oil reached 4 Mt in the 2011–2012 crop year, which amounts to 17% of global production (Fig. 20). Since the early 2000's, an expansion in international trade has accompanied the growth in global demand.

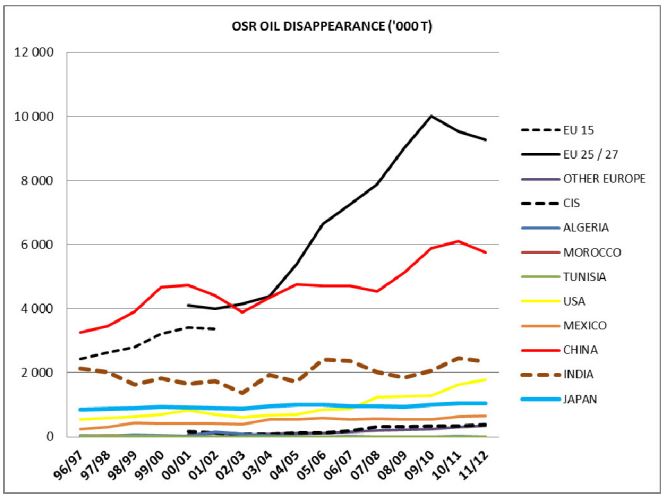


Fig. 19. World oilseed rape oil (OSR oil) disappearance (×1000 T) in Europe, CIS (Commonwealth of independent States, most of all the Soviet Union), Algeria, Morocco, Tunisia, USA, Mexico, China, India, Japan from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

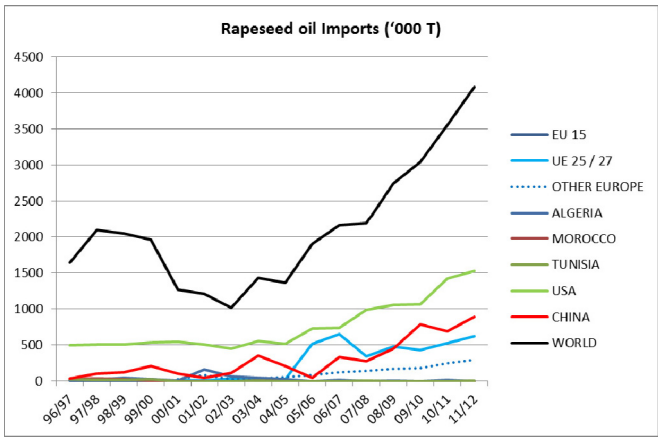


Fig. 20. World rapeseed oil imports (×1000 T) and rapeseed oil imports (×1000 T) in Europe, Algeria, Morocco, Tunisia, USA, China from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

3.3 Biofuels and vegetable oil

According to the FAO, the use of vegetable oil for biodiesel is at about 10% of the global vegetable oil production observed during 2008–2010. The conversion of vegetable oils to biodiesel is limited to a low number of countries (Fig. 21). Argentina, EU (27) and Thailand have respective shares (biodiesel/total oil consumption) of biodiesel consumption of 58%, 37% and 39%, far above the world average. They are trailed by Brazil and Indonesia with 23% and 20% conversion rates. In these countries, the biodiesel production is still growing thanks to developments in mandatory incorporation. In Indonesia the rate of incorporation has moved from 5 to 7% in 2012 (US Energy Information Administration, 2013). In the United States of America, demand for biodiesel have shifted from 1.9 Mm^3 in 2009 to 3.8 Mm^3 in 2012 encouraging production to reach 4.1 Mm^3 in 2012 (National Biodiesel Board, 2013). This rate should remain at that level while the

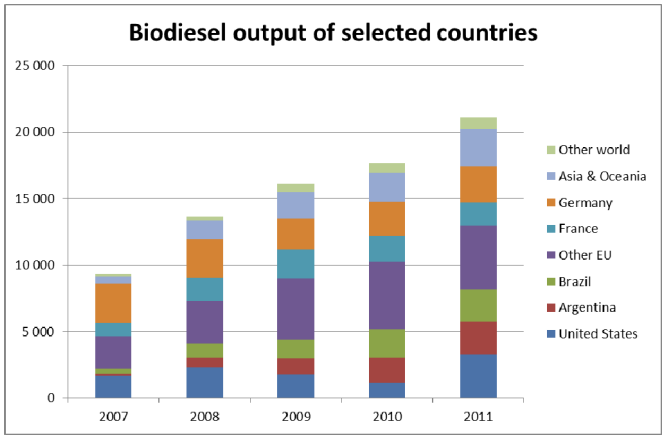


Fig. 21. Production of biodiesel (1000 m^3) by a selection of countries (Source: US Energy Information Administration, 2013).

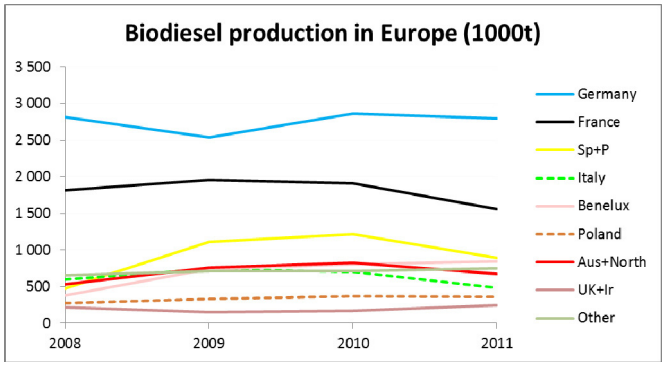


Fig. 22. Biodiesel production (×1000 T) in European countries, from 2008 to 2011 (Source: Oil World, 2012).

so-called 'advanced biofuels' are expected to take the lead in the future. Brazil is similarly increasing its incorporation target, shifting from 5% in 2011 to 7% in 2012 and has invested in esterification capacities far beyond his internal consumption with 5.6 Mt available in 2011.

Ethanol production dwarfs biodiesel at global level with 82 Mm^3 *vs.* 20 Mm^3 in 2010 but in Europe, this biofuel leads the market. European output was about 9.5 Mt in 2010, while the US and Brazil were producing 1.1 Mt each, Argentina 0.9 Mt, and other countries approximately 4 Mt. Argentina's output has increased strongly and is now at about 3 Mt per year with substantial exports (2 Mt), mainly directed to the EU (27). In that country a differential between taxes on biodiesel (20%) and oil and seeds (32%) has been crucial for the development of exports. Argentina also has a biodiesel incorporation requirement of 10% and an allocated volume of 1.3 Mt for 2012 (OECD-FAO, 2011)

France and Germany are the leading European countries for the production and consumption of biodiesel (Fig. 22). Together, they account for approximately half of the EU (27) volumes. In 2011, French production was impacted by imports of animal fats and waste oils due to the double counting of these materials in the mandatory incorporation requirement. Other European countries are affected by competition from imports of methyl esters of soybean oil from Argentina and palm oil from South Asia. Germany has suffered less from this

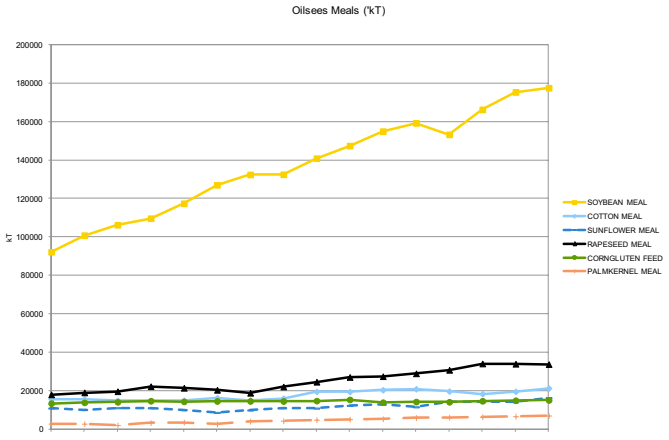


Fig. 23. World production (×1000 T) of various oilseeds meals (soybean meal, cotton meal, sunflower meal, rapeseed meal corn-gluten feed, palm-kernel meal) from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

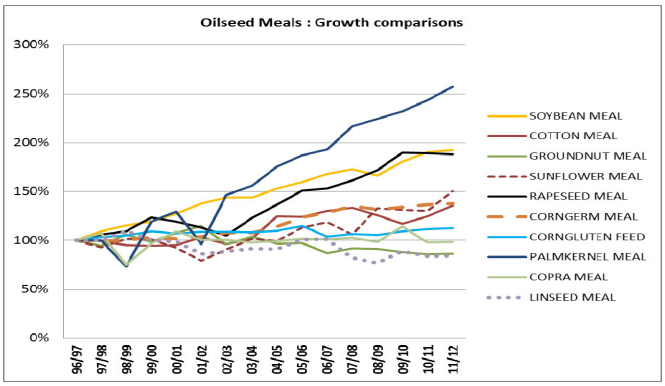


Fig. 24. Comparisons of oilseed meals growth (soybean meal, cottonseed meal, groundnut meal, sunflower meal, rapeseed meal, corngerm meal, corn-gluten feed, palm kernel meal, copra meal, linseed meal), from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

competition thanks to a more favorable regulation regarding the double counting of spent oils and animal fats and a strong local industry.

According to the available sources, rapeseed oil transesterification was consuming between 6 and 7 Mt in 2010/2011. With rapeseed oil production being at about 10 Mt, this market has a strong importance for the business; the cap set by the EU will have major consequences for the future of rapeseed in Europe (Oil World, 2012).

The European industry is also being strongly affected by a possible revision of EU legislation that would introduce the accounting of the so-called ILUC (indirect land use change) in the greenhouse emissions of biofuels. The new accounting would penalize biofuels produced from vegetable oil. During a recent vote (Oct. 23, 2013), the European Parliament Environment Committee withheld a negotiating mandate from Corinne Lepage, the French MEP leading the proposal. In consequence, there is little chance that a new proposal will be readied before the next European elections and therefore that a new law could be voted before the end of 2014. The biodiesel industry was relieved by the news which it hopes will lead to the provision of new scientific data that might indicate a more nuanced effect of the ILUC. The proposal of Lepage was to cap the mandatory incorporation of biofuels for transports at 6% instead of 10%, *i.e.*, at approximately the level already attained. That change, if enforced, would cause losses on the heavy investments already made in light of the previous target. It would also weaken the existing units because a sharp reduction of the incorporations was planned after 2020 (Keating, 2013)

4 Rapeseed meals

4.1 World oilseed meals production, including rapeseed meals

Soybean meal is by far the major oilseed meal produced worldwide (Fig. 23). With 177 Mt for the 2011–2012 crop year, it accounted for 63% of available meals (including corn-gluten feed) in mass and almost 72% of the proteins supply from these materials. Rapeseed meal is the second by rank but with only 33.6 Mt it is just the first of the secondary sources.

In terms of growth (Fig. 24), we see again the trends already observed for the cases of seeds and oils. Rapeseed meal and soybean meal have witnessed approximately the same trends although rapeseed meal encountered a short period of stagnation in the early 2000's. Not surprisingly, palm-kernel meal is the resource that has experienced the fastest growth and sunflower is ahead of the other meals. Linseed declined slightly, but that crop's acreage is lagging far behind and it is far from clear that its decline is linked to the development of canola in Canada.

4.2 Global trade of rapeseed meals

4.2.1 Rapeseed meals imports

Consumption of rapeseed meal has grown strongly in the EU (27) which is deficient in protein feed and where these new supply was replacing imported soybean meal. China, with its extraordinary economic development, has seen its plant protein needs explode, from which rape has benefited (Fig. 25). The USA is increasing its consumption of rapeseed meal due to the interest of milk producers in this feedstuff. Mexico took 1 Mt in 2011/2012, as compared with half that amount 10 years previously. Russia is also experiencing rising consumption but its volumes are remaining below 0.6 Mt. Some other countries, like Iran, Vietnam and Indonesia, are progressively adding rapeseed meal to their list of feedstuffs.

The USA and China are the major importers of rapeseed meal (Fig. 26) but their consumptions are complemented by an ensemble of new consumers each with relatively low volumes allowing the global exchanges to rise sharply during the least years.

4.2.2 Rapeseed meals exports

The main exporters of rapeseed meals are Canada with more than 3 MT (Fig. 27) and, surprisingly, India which exported in 2011/2012 around 1 MT. The EU (27), Russia and the UAE each supplying between 250 and 350 kt in 2011/2012.

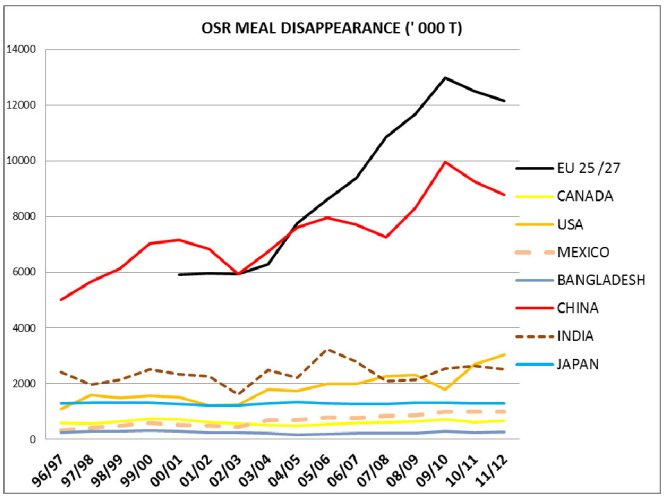


Fig. 25. World oilseed rape meal (OSR meal) disappearance (×1000 T) in Europe, Canada, USA, Mexico, Bangladesh, China, India and Japan from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

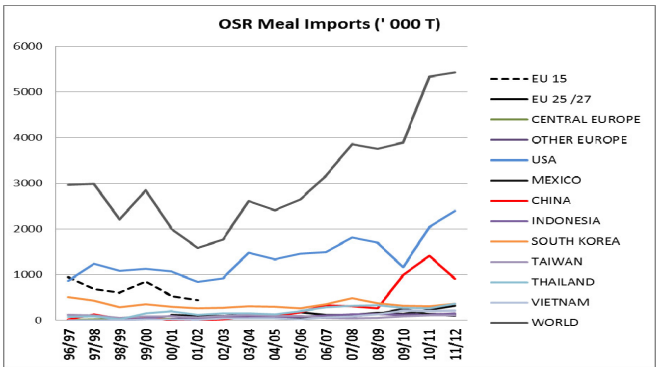


Fig. 26. Rapeseed meal world imports (×1000 T) and rapeseed meal imports (×1000 T) in Europe, USA, Mexico, China, Indonesia, South Korea, Taiwan, Thailand, Vietnam from 1996/1997 to 2011/2012 (Source: Oil World, 2012).

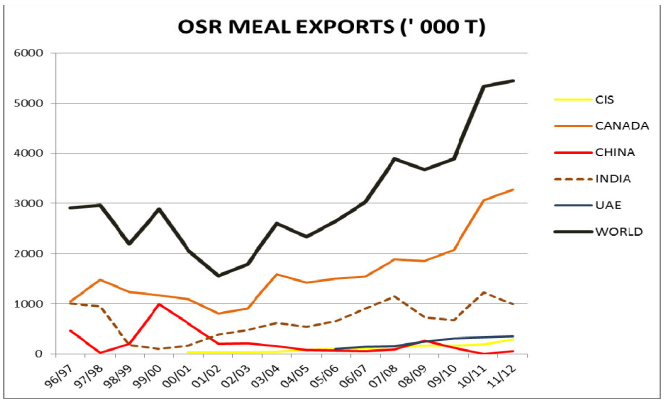
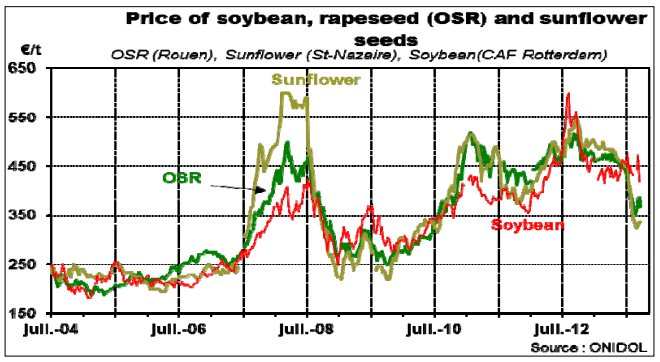
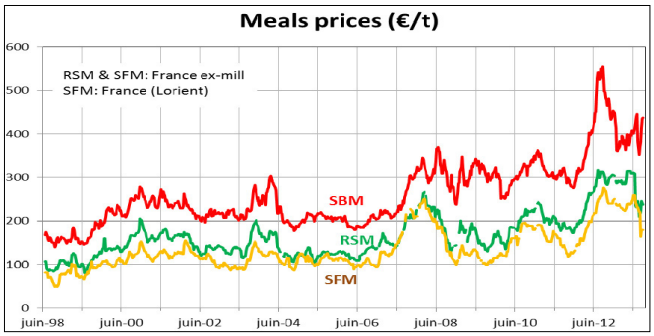


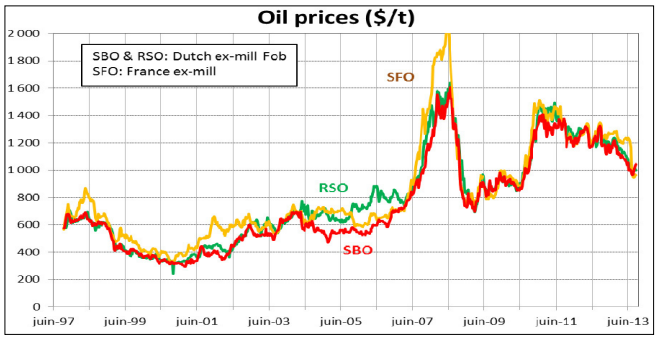
Fig. 27. Rapeseed meal world exports (×1000 T) and rapeseed meal exports (×1000 T) of CIS (Commonwealth of independent States, most at least the Soviet Union), Canada, China, India and United Arab Emirates (UAE) from 1996/1997 to 2011/2012 (Source: Oil World, 2012).



(a)



(b)



(c)

Fig. 28. Evolution of prices of soybean, rapeseed and sunflower seeds (a), meals (b) and oils (c) from July 2004 to beginning of 2013 (Source: Oil World, 2012).

5 Rapeseed prices

5.1 Evolution of rapseed seeds, oils and meals prices

The price of the oilseeds (Fig. 28a) peaked in 2008 and since 2010 have reencountered historically high levels. Whilst prices have fallen sharply since the 2013 harvest, they remain above the lows of 2009.

Data about seeds prices were collected by ONIDOL from the weekly publication "La Dépêche":

– Sunflower seeds: quotations for depart Chateauroux " until 2007 and after 2017 CAF St Nazaire.
– Soyba beans: CAF Rotterdam.
– Rapeseed seeds: CAF Rouen.

– Rapeseed oil: Fob Rotterdam and after 2007 Fob Dutch ex-mill.
– Sunflower oil: Fob France up to May 2007 then Fob NW Europe.
– Soybean oil: Fob Rotterdam then after 2007, Fob Dutch ex-mill.
– Rapeseed meal: France, Ex-mill Brest and Rouen after 2007.
– Sunflower meal: France, Fob St Nazaire.
– Soybean meal: France, Lorient.

In the charts presented here (Figs. 28a–28c), fluctuations in the price of soybean are 89% explained by the price of the meal and 7% by the price of oil; residual variability is of the order of 4%. This variability is the variability of crushing gross margin and has a standard deviation of 17 €/t seed (average price: 283 €/t, initial standard deviation: 89.4 €/t). There is a correlation between the price of oil and that of meal, the R^2 coefficient being 0.74.

In the case of rapeseed, it is the value of the oil that is the main driver: it explains 82.6% of the variability in the data presented in the charts, as compared with 11.6% for meal prices. The residual variability has a standard deviation of 23.5 €/t and represents 6% of the total variance in the price of seed (SD 96.7 €/t, average 286 €/t). The correlation between prices of oil and meal has an R^2 coefficient of 0.68. This correlation is somewhat weaker than that between the prices of soy products. Overall, the markets for oil and meal are relatively uncorrelated. The prices of meals are mainly under the influence of the demand for feed, which is growing steadily, and the supply of soybean meal. Demand in the oil market depends on both the food market and industrial uses including biodiesel; the supply side must cope with competition from palm oil.

With regard to market developments, it is interesting to note that the price spike in 2007/2008 was not followed in 2009 by a return to prices of 2006/2007 and that the whole period has been marked by a strong progression in seed prices which was only interrupted in July 2013. The ensuing decrease has been more marked for rapeseed and sunflower than for soybeans. This differentiation is easily explained by the fact that meal prices remain at historically high levels, while oil prices are heading downwards, pursuing a trend that seems not about to stop.

5.2 Co-evolution of rapeseed meal and soybean meal prices

The relationship between the prices of these meals has undergone some variation during the period under review (Fig. 29). Before 2008, there was a relatively tight link between the prices of soybean meal and rapeseed meal which explained about 80% of the variations of rapeseed meal and where the general trend was that rapeseed meal was around 0.7 of the cost of soybean meal. In the years 2008/2010, this relation has loosened to the point that it explained only 30% of the variability. But, from January 11 to July 2012, the cloud realigns and the R^2 coefficient jumps to 0.91. In the recent period, we observe a new de-correlation characterized by a relatively low variability of the rapeseed meal in times of high volatility in soybean meal prices.

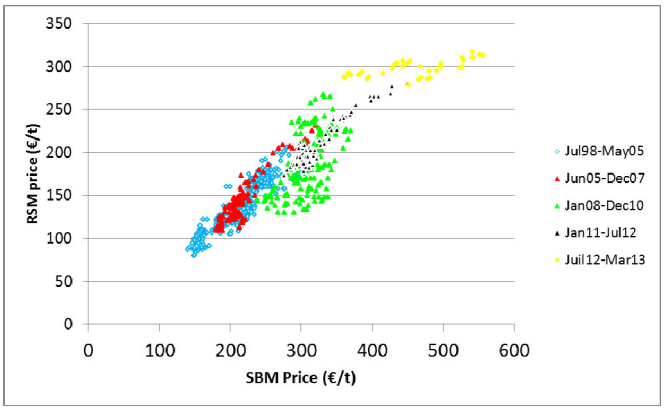


Fig. 29. Rapeseed meal (RSM) prices (in €/T) as a function of Soybean Meal (SBM) prices (in €/T), for 5 periods of time, between July 1998 and March 2013 (Source: Oil World, 2012).

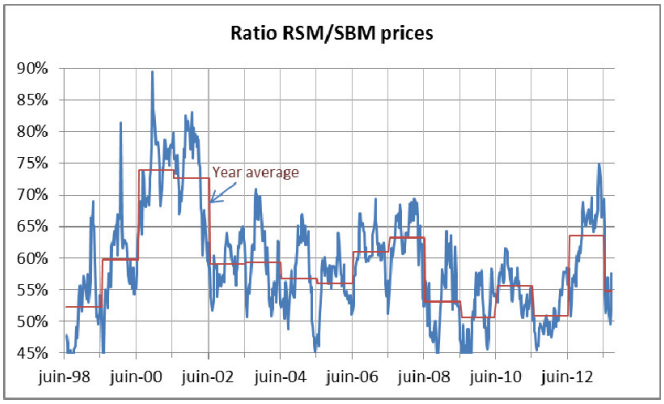


Fig. 30. Ratio between rapeseed meal (RSM) prices and Soybean Meal (SBM) between July 1998 and March 2013 (Source: Oil World, 2012).

An interesting fact is the yearly drop of the rapeseed meal/soybean meal prices ratio (Fig. 30) at the change of crops year. Even when the consecutive years averages are close, there is a strong likelihood that the rapeseed meal prices are going to fall relative the ones of soybean meals. Another interesting fact is the relative decline in the price of rapeseed meal in the period from July 2008 to June 2012 while soybean meal prices were around 300 €/t followed by a rise in 2012/2013 campaign marked by very high soybean meal prices. Since the 2008/2009 crop year, the average price of rapeseed meal has been about 55% of soybean meal (SD 6.6%). This price is well under the potential value of a rapeseed meal that contains 75% of the proteins of soybean meal and 80–90% of its energy value. According to the Canola Council, the potential relative value of rapeseed meal is between 70–85% for dairy cattle, 65–75% for hog growers and 55–70% for chickens. These latter require more concentrated feed and hence rapeseed meal is less beneficial than soybean meal (Canola Council, 2007).

5.3 Impact of biodiesel development

The development of biodiesel since the second half of the mid of 2000's has led to a relative decline in rapeseed meal prices due to an abundance in supply. These relatively low prices have encouraged the development of meal usages by feed manufacturers in a larger range of feed specialties. The gap between the potential value of the feedstuff and its real prices is likely to diminish in a context of long term high proteins prices. Time and experience are increasing the knowledge of feed manufacturers who are progressively learning how much rapeseed meal they can safely use to take advantage of its cheaper price. However, rapeseed will remain a secondary meal with known drawbacks and there is little hope that its prices could go beyond 65–70% of the price of soybean meal.

With soybean meal prices at 437 €/t, this implies that rapeseed meal could gain about 45 €/t, *i.e.*, a potential improvement of about 30 € per ton of seeds.

5.4 Future of the protein demand

China is the key driver of trends on the global proteins market. Its imports of soybean meals accounted for almost two thirds of the global trade in 2012/2013 with 58 Mt, this compares with 25 Mt in 2004/2005. That spectacular rise is being led by the dramatic expansion of the livestock sector, itself driven by the growth in per capita meat consumption. Since 1980, Chinese people have increased fourfold their purchases of animal products (14.6 to 58.2 kg/year). Regardless of whether or not this consumption reaches the level of countries like France (88 kg/capita), demand will continue to grow for the foreseeable future. FranceAgriMer note that other factors are going to be taking place in China that will boost demand for soybean. The country is affected both by substantial losses of agricultural land (1% per year) and by the adverse effects of pollution, as yet largely uncontrolled. Farmland diminishes under the effect of desertification and urban expansion. The Gobi Desert in the center China has grown by 25 000 km^2 in 10 years. This phenomenon could be the consequence of an overexploitation of aquifers and/or of global warming. Wastewater is discharged into rivers without any purification and its use for irrigation leads to serious contamination of soils and crops. The USDA expects continued growth in soybean meals import by China, at least until 2020 with a forecast of 90 Mt at that date.

6 Conclusion

The development of biodiesel has induced a significant increase in both the production and consumption of rapeseed oil. But biodiesel has not been the only driver of these changes. Along with the energy use of this oil, there is growing interest in its food uses observed in China (China's demand for oil has added 2–3 Mt to global consumption), in the USA (1 more Mt per year), and in Korea; that can be attributed to the effect of its nutritional features in a context where trans fats are in the spotlight. Rapeseed meal, which accounts for only 20–25% of the seed's value, has benefited from the strong demand for proteins; despite a slight decline in its value relative to soybean meal, the surge in supply has not led to a price collapse. The gigantic needs of China for proteins is likely to maintain high prices on the meals market, a situation that could help to reduce the gap between the prices of meals.

But these strengths are balanced by the threats of changes in EU regulations to mandatory incorporation of first generation biofuels and by the fragile situation of the soybean market characterized by the predominance of China on demand side, which alone accounts for around two thirds of the trade, and a very small number of suppliers. This imbalance is a factor driving volatility in prices and reduces visibility for the actors. This effect would be reinforced by the possible consequences of global warming, which would increase the intensity and the frequency of droughts, heatwaves and excessive rains.

After 2020, the fate of the first-generation biofuels is likely to become less favorable. Nevertheless, depending on changes in the relative valuation of the meals and the trends observed in the USA where the nutritional properties of rapeseed oil have led to increase its usage in food, one can expect that the demand will remain sufficiently strong to sustain a continuous progression in rapeseed, even if this growth slackens in comparison with that of the last ten years.

References

European Biodiesel Board. 2013. Statistics – The EU biodiesel industry. Available at: http://www.ebb-eu.org/stats.php.

Aradhey A. 2012. Global agricultural information network, USDA, Foreign agricultural service. Available at: http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Oilseeds%20and%20Products%20Annual_New%20Delhi_India_4-5-2012.pdf.

Canola Council. 2007. Canola Meal Competitive Situation and CCC Goals. Available at: http://www.canolacouncil.org/media/505140/welcome_and_overview.pdf.

Eurostat. 2013. Colza, Superficie. Available at: http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=fr&pcode=tag00099&plugin=1.

Eurostats. s.d. Colza, Production. Available at: http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=fr&pcode=tag00104&plugin=1.

FAO. 2013. FAOSTATS. Available at: http://faostat3.fao.org/faostat-gateway/go/to/download/Q/QC/E.

FranceAgriMer. 2013. La trajectoire Agricole de la Chine, dynamique des grandes cultures de 1950 à nos jours. *Les synthèses de France AgriMer*, Fevrier, 8: 1–7.

India Law Office. s.d. Indian Edible Oil Industry. Available at: http://www.indialawoffices.com/ilo_pdf/industry-reports/edibleoilsindustry.pdf.

International Markets Bureau of Agriculture and Agri-food Canadian Ministry. 2012. Consumers trends, cooking oils in China. Available at: http://www.ats-sea.agr.gc.ca/asi/pdf/6260-eng.pdf.

Keating D. 2013. Biofuel reform delayed indefinitely. Available at: http://www.europeanvoice.com/article/2013/october/biofuel- reform-delayed-indefinitely/78485.aspx.

Ministry of food and processing industries of India. s.d. Edible oil. Available at: http://mofpi.nic.in/content_printpage.aspx?categoryid=687.

Mittaine JF, Mielke T. 2012. The globalization of international oilseeds trade. *OCL* 19: 249–206.

National Biodiesel Board. 2013. Production Statistics. Available at: http://www.biodiesel.org/production/production-statistics.

OECD-FAO. 2011. Available at: http://www.oecd.org/site/oecd-faoagriculturaloutlook/highlights-2013-EN.pdf.

Oil World. 2012. *Annual Report,* Hamburg: ISTA Mielke Gmbh.

PROLEA. 2011. *De la productionà la consommation, France - Europe - Monde, Statistique des Oléagineux and Protéagineux 2011-2012.* Paris: PROLEA-Documentation.

US Energy Information Administration. 2013. International Energy Statistics. Available at: http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=79&pid=81&aid=1&cid=regions&syid=2007&eyid=2011&unit=TBPD.

World Bank. 2013. DATA: Population, Total. Available at: http://data.worldbank.org/indicator/SP.POP.TOTL.

Cite this article as: Patrick Carré, André Pouzet. Rapeseed market, worldwide and in Europe. OCL 2014, 21(1) D102.