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International markets for products used in feed consumption: recent developments and perspectives

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RÉSUMÉ
Les marchés internationaux des matières premières pour l’alimentation animale : évolutions récentes et perspectives
Les marchés internationaux des céréales et oléagineux ont connu une flambée des prix au cours des campagnes 2006/2007 et 2007/2008. Ce phénomène s’explique par un ensemble de phénomènes qui sont pour certains conjoncturels et pour d’autres s’inscrivent dans le prolongement de certaines tendances passées. Après avoir analysé la situation présente au niveau mondial entre productions de produits de grandes cultures et utilisations dans les différents secteurs de l’alimentation humaine, de l’alimentation animale et des biocarburants, l’article analyse les évolutions structurelles en terme de surfaces et de rendements des grandes cultures et examine la possibilité d’équilibrage du bilan mondial, notamment en céréales et huiles végétales à un horizon de 10 ans lorsque l’on prend en compte à la fois les perspectives d’augmentation des populations, des productions animales et des demandes de biomasse pour le bioéthanol et le biodiesel de première génération.

Mots clés
marchés internationaux, céréales, oléagineux, huiles végétales, biomasse, bioéthanol, biodiesel.

SUMMARY
World cereal and oilseed markets have seen a huge surge in prices during the 2006/2007 and 2007/2008 crop years. This boost can be explained by some events due to the economic climate and climatic factors and others due to the continuation of past trends. In this presentation, we analyze the current situation of main crop production and use for food, feed and biofuel at the world level, then we look at structural developments in land and yields to examine the possibility to balance supply and demand. This is done in particular for cereals and vegetable oils on a 10 year time horizon when growth in populations, animal products supply, and demand of biomass for first generation bioethanol and biodiesel are taken into account.

Keywords
world cereal and oilseed markets, vegetable oils, biomass, bioethanol, biodiesel.

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1 – INTRODUCTION

Products used in feed consumption are mainly composed of cereals and oilseed products. These can be used in their initial state, but many co products resulting from a first transformation of these plants (crushing, milling, starch production, beet sugar production, ethanol production from cereals) are also often consumed, starting with oil meals (traditionally soymeal et more and more rape meal) and to a lesser extent molasses and beet pulps.

A lot of phenomena lead to a growing need for feed consumption especially of cereals and oilmeal. These include: economic growth in a lot of emerging countries that goes with the development of per capita meat consumption, particularly meat from monogastric animals which consume protein and energy rich products, the intensification of breeding not only in developed countries but also in a growing number of developing countries and important demographic growth in some of these countries in particular in Asia and in South America.

At the same time, in these countries as well as in African and Middle East countries, demographic and sometimes economic growth lead to additional food needs for these populations, in the form of cereals, oils and sugar, and also lead to, with urbanization, some adjustments in consumer habits: traditional food like roots, tubers and pulses seems to diminish.

There exists traditionally, between food and feed consumption competition and complementarities. They exist partially in the competition for agricultural land (considering climatic and agronomic local conditions) even if new land could be found for cereals, oilseed and sugar plants in some regions in the world. This is the case for wheat and rice for example, especially for food consumption and for maize for feed consumption. At the contrary, some complementarities exist for oilseeds between the production of oil mainly for food consumption and at the same time the production of meals for feed. The same thing goes for beet sugar, molasses and pulps.

Besides these traditional forms of use, a new type of demand has surged since the beginning of the 21st century: biofuel production using mainly cereals and sugar plants for ethanol production and mainly vegetal oils for biodiesel production. This activity is quite ancient in countries like Brazil and the United States, but it has grew rapidly since 1999, a coincidence with rising oil prices and new policies in these countries but also in the European Union (EU), India, China, etc., promoting the transformation of a growing part (but still limited) of local vegetal resources into biofuels.

After a long period of depressed agricultural prices, the 2006/2007 crop year and even more the 2007/2008 crop year showed a significant reversal with a rise in prices of some products never seen since more than thirty years. Many scientific (or other) publications have tried to identify “the” cause or more reasonably the causes responsible of this phenomenon attaining people in the developing world trying to cover for their elementary needs of staple food, but also affecting production costs and breeders’ margins in most countries of the world. Among the causes cited are bad crops in some countries in 2006 and 2007, growing needs for food in emerging countries, the boom in oil price (which has led to an increasing demand for maize and vegetal oils for biofuels and a rise in fertilizer and fuel costs), the decline in the US dollar especially against the euro, public policies in many countries (encouraging production of biofuel or restricting exports to protect the domestic market), speculation on future markets,…
In this document, we do not aim to bring up all these factors nor to point out an unique responsible for these events, but we aim to describe first of all the structure of the current world market for these products, with its three demands (food, feed and non-food), to analyze the recent evolutions in these markets in terms of quantities, prices and stocks. Finally, we will examine some perspectives for 2008/2009 and some indications for what could happen in the next ten years.


In 2006/2007, cereals, oilseed and sugar plants were cultivated on 914 millions hectares (Mha) in the world. These plants produced about 2.6 billions of metric tons of primary products (tons of sugar plants are expressed in terms of sugar equivalent). The main part of the 438 millions of metric tons (Mt) of oilseeds planted produced about 217 Mt of oil meal and 117 Mt of oil (including palm oil), the balance (about 66 Mt) being used directly in feed and food consumption.

Figure 1
Structure of the cereal, oilseed products and sugar world market in 2006/2007.
Food consumption is by far the largest demand with more than 1.2 billion tons of cereals, sugar and oils (in grain equivalent). Considering 6.6 billions of habitants in the world, this represents about 227 kg of products per capita. At the second place comes feed consumption with more than a billion tons of mostly cereals, but also oil meal, co products from cereals and oilseeds in their initial state. Considering a production of 321 millions tons of beef, pork and poultry meat and eggs; this corresponds to an average consumption of 3.13 kg per kg of animal product. The third demand is for biofuels with approximately 80 Mt of mostly cereals but also vegetal oils. Globally, biofuels represent 3% of world production, equivalent to 27 Mha of agricultural land.

Other demands are starch production, oils for soap production, paint and varnish, lipid chemistry etc. Ethanol production for cereals and starch production have produced 25 Mt of co products like corn gluten feed (cgf) and dried distillers grains and solubles (ddgs). The co products from the production of biodiesel (about 7 Mt) are included in “total oil meal”.

3 – RECENT EVOLUTIONS IN INTERNATIONAL CEREAL AND OILSEED MARKETS

The 2004/2005 crop year was characterized by a large crop of cereals and oilseeds due to high yields, growing stocks and low prices. The 2005/2006 crop year showed the first reversal with a drop in cereal production mainly due to low yields. Despite a decrease in cereal stocks of more than 15 Mt, world prices stayed low. The oilseed production and stocks increased and their price fell again.

The boom in prices came during the 2006/2007 crop year. This crop year was characterized by a new drop in world cereal production due particularly to a decrease in land, lower yields than in 2004/2005 and 2005/2006, a very bad crop in Australia and low production in the United States and the EU. At the same time, world consumption increased more than production (mostly for food but also for ethanol production in the United States) and world stocks dropped with more than 48 Mt. World oilseed production and stocks continued to increase. Responding to changes in stocks, cereal prices increased rapidly and oilseed prices too as demand for oil for food and biofuel uses kept growing, but to a lesser extent than cereal prices.

As cereal prices had increased, plantings in 2007/2008 turned to cereals instead of oilseed, especially in the United States. The very strong average yield in the world (despite a new drought in Australia and new decreases in production in the EU and in Canada) resulted in an increase in world cereal production and in stabilization in stocks even though at a low level. At the same time, oilseed production and stocks decreased. For maize and vegetal oils, the increase in demand for biofuel continued to push up prices, and world prices also continued to progress for wheat and oilseeds. The events described above were mainly due to physical disequilibrium in agricultural markets. In the same period of time, there was also a boom in oil price, the US dollar declined, speculation on futures markets for these products increased, policies were established by some countries to isolate their domestic market from the international one (to limit the increase in domestic prices) by restricting exports (Argentina, Ukraine, Russia) or by creating incentives to
Import (EU, India, Indonesia). All these events could also have had more or less directly an impact on international grain prices.

4 - SHORT AND MIDDLE TERM OUTLOOK

The latest USDA 2008/2009 outlook shows a clear progress in world production, due to an increase in land and yield for cereals (especially wheat) and for oilseed (in particular soybean). Wheat stocks should begin to increase, oilseed stocks to stabilize and corn stocks would fall again. With a continuing growth in demand, USDA forecasts only a moderate increase in soybean and wheat prices (wheat prices has already started to decrease in the end of the 2007/2008 crop year), but a continuation in the increase in corn price, partly due to the demand for ethanol production in the United States. This forecast is made with caution and final prices will largely depend on future changes in oil price.

To be able to elaborate a middle-term outlook, it is necessary to deviate from the economic conditions that prevailed during the last crop years in order to bring out some important trends that will continue to affect world markets in the next ten years.

Between 2006 and 2016, world population would grow with about 780 millions of habitants (+ 12%), mainly in South Asia (+ 260 millions), in Sub-Saharan Africa (+ 190 millions) and “only” 90 millions in China. If the current level of per capita consumption were to be maintained until 2016, an additional quantity of more than 140 Mt of cereals, 15 Mt of sugar and 10 Mt of vegetal oils would be necessary. According to the last FAO/OCDE forecasts, during the next ten years, world beef/veal, poultry, pork meat and egg production would increase with about 20% to reach a production level of more than 380 Mt. With current consumption level of concentrated products for feed (3.13 Kg per kg of animal product, of which 2.3 kg cereals, and 0.68 kg oil meals) an additional quantity of 148 Mt of cereals and 43 Mt of oilcake would be necessary to meet demand. Globally, the additional quantities required to meet food and feed demand in the next ten years would be about 300 Mt of cereals and 55 Mt of soybean equivalent.

The potential need for cereals and oils for biofuel production has to be added to feed and food demand. The latest Agricultural Outlook (2008) from FAPRI forecasts an ethanol production of about 62 Mt from cereals in 2016 in USA, EU, India, China, and from sugarcane in Brazil compared to 22 Mt in 2006. This would mean an additional need of about 135 Mt of cereals (mainly corn in the USA). The biodiesel production would reach 16 Mt in 2016 up from 6 Mt in 2006; meaning an additional need of 10 Mt of vegetal oils.

If all potential needs were cumulated (sugar excluded), total additional quantities would be around 435 Mt of cereals, 43 Mt of oil meal and 20 Mt of oils. Ethanol production from cereals could mean 50 Mt of co products put on the market which would partly substitute cereals (around 33 Mt) and oil meal (around 17 Mt).

The question is at which price this potential demand could eventually be satisfied.

We have to point out that during the last 30 years, cultivated areas in cereal and oilseed progressed with an average of 2 millions hectares per year (about 0.24% of average land). But the increase for oilseed land has been about 3 Mha per year as...
the land for cereals has been slightly decreasing. Annual progression in production has been about 24 Mt for cereals and 8.9 Mt for oilseeds; in the case of cereals this increase is totally due to the rise in yields.

If we assume that these trends in land and yield would continue, we could reach an additional production of 240 Mt of cereals and 89 Mt of oilseeds over the next ten years, with the sole requirement of 20 Mha additional lands. For oilseeds, it seems that the potential need could easily be satisfied, but cereals would not be able to meet the demand and would encounter a 160 Mt deficit. To cover all needs, we would need to speed up cereal land progression and yield. As possibilities to increase cropped surfaces are limited because of the competition with non agricultural uses and forests, this land would have to be taken on grassland and pastures which represent more than 3.4 billions of hectares in the world. These evolutions would suppose some intensification in cattle breeding to free spaces, continuation in yield progress, sufficient water resource to irrigate and possibility to use different entrants in important quantities.

Table 1

Additional needs in the world between 2006 and 2016 (Estimated in millions of tons).

<table>
<thead>
<tr>
<th></th>
<th>Cereals</th>
<th>Oilmeal</th>
<th>Oils</th>
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<tbody>
<tr>
<td>Food consumption</td>
<td>+ 140</td>
<td>+ 10</td>
<td></td>
</tr>
<tr>
<td>(to nourish 780 millions additional inhabitants)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Feed consumption</td>
<td>+ 148</td>
<td>+ 43</td>
<td></td>
</tr>
<tr>
<td>(to produce 60 millions CWE additional meat)</td>
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<tr>
<td>Ethanol</td>
<td>+ 135</td>
<td></td>
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<tr>
<td>(to produce + 40 millions of T)</td>
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<tr>
<td>Biodiesel</td>
<td></td>
<td>+ 10</td>
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<tr>
<td>(to produce + 10 millions of T)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>+ 423</td>
<td>+ 43</td>
<td>+ 20</td>
</tr>
<tr>
<td>Supply</td>
<td>+ 240</td>
<td>+ 89</td>
<td></td>
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<tr>
<td>According to recent trends</td>
<td></td>
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<tr>
<td>Deficit in 2016</td>
<td>- 160</td>
<td></td>
<td>Equilibrium</td>
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<td>(after adjustment)</td>
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5 – CONCLUSION

Since 30 years now, agricultural land for cereals has regressed and only the improvement of yields has made it possible to satisfy the growing demand for food and feed. Since ten years, but especially since the 2004/2005 crop year, world harvests have been too poor to meet demand and world stocks have been falling. This is due to some climatic incidences, partial substitution between cereals and oilseeds and the surge of an additional demand for ethanol production especially in the United States. This situation was naturally translated into a not surprising boom in international prices. What was surprising was the extent to which this happened especially in 2006/2007 and in 2007/2008, as it was associated to a lot of other macro economic, monetary and financial phenomena. The latest forecasts for the
2008/2009 crop year reveal less pressure on wheat markets and a slight increase in stocks.

Rapidly growing and quite inelastic demand associated to a supply which tends to keep up to demand could be problematic for future equilibrium in cereal and oilseed markets. Even if we consider a quite optimistic evolution of world yields, an important increase in land for cereals, oilseeds and sugar plants will be necessary. This is possible, but if these new lands are marginal they also have higher production costs than others which could be reinforced by high oil prices. This leads us to think, that international prices will maintain higher than they were in the end of the 20th and in the beginning of the 21st century.