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Commodity Market Development in Europe – Outlook

Proceedings of the October 2010 Workshop

Thomas Fellmann, Robert M'barek, Stephan Hubertus Gay

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Commodity Market Development in Europe – Outlook

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Editors:
Thomas Fellmann, Robert M'barek, Stephan Hubertus Gay

Disclaimer:
The views expressed are those given and presented at the workshop and may not in any circumstances be regarded as stating an official position of the European Commission or of the other institutions that participated at the workshop.

Workshop background

This report contains a summary and the presentations of the expert workshop 'Commodity Market Development in Europe – Outlook', jointly organised by the European Commission's Joint Research Centre (Institute for Prospective and Technological Studies, IPTS) and the Directorate General Agriculture and Rural Development. The workshop took place in Brussels on 5-6 October 2010 and is part of the workshop series on commodity market modelling and development, yearly held since 2006.[1]

The 2010 workshop was held in order to present and discuss the preliminary results of the European Commission's outlook on EU agricultural market developments. As part of the validation procedure suggestions and comments made in the course of the workshop were taken into account to improve the final version of the outlook. Thus, for reference to the European Commission's baseline projections refer to the final report:

'Prospects for agricultural markets and income 2010-2020'
(http://ec.europa.eu/agriculture/publi/caprep/prospects2010/index_en.htm)

The workshop gathered high-level policy makers, modelling and market experts from the EU, the United States and international organisations such as the OECD, FAO and World Bank. The workshop provided a forum to present and discuss recent and projected developments on the EU agricultural and commodity markets, outlined the reasons behind observed and prospected developments, and to draw conclusions on the short/medium term perspectives of European agricultural markets in the context of world market developments. Special focus was given on the discussion of the influence of different settings/assumptions (regarding e.g. drivers of demand and supply, macro-economic uncertainties, etc.) on the projected market developments.

[1] The proceedings of the respective workshops are listed below and can be downloaded at the JRC-IPTS webpage (http://ipts.jrc.ec.europa.eu/publications/):

Bartova, L., R. M'barek (Eds.) (2008): Commodity Modelling in an Enlarged Europe. November 2006 Workshop Proceedings. AGMEMOD Report V. JRC Scientific and Technical Reports, European Commission. EUR 22940 EN/5

Bartova, L., S.H. Gay, R. M'barek (Eds.) (2008): Commodity Market Development in Europe – Outlook. November 2007 Workshop Proceedings. JRC Technical Notes, European Commission. EUR 23377EN

Fellmann, T., R. M'barek, S.H. Gay (Eds.) (2009): Commodity Market Development in Europe – Outlook. November 2008 Workshop Proceedings. JRC Technical Notes, European Commission. JRC 51276

Fellmann, T., B. Van Doorslaer, R. M'barek, S.H. Gay (Eds.) (2010): Commodity Market Development in Europe – Outlook. November 2009 Workshop Proceedings. JRC Technical Notes, European Commission. JRC 60425

Acknowledgements

The workshop 'Commodity Market Development in Europe - Outlook' was jointly organised by the European Commission's Joint Research Centre, Institute for Prospective Technological Studies (JRC-IPTS), Agriculture and Life Sciences in the Economy Unit (AGRILIFE) together with the European Commission's DG Agriculture and Rural Development (DG AGRI), Unit L2.

We would like to acknowledge contributions made by all participants (a complete list is included in Annex 2) and their consent to sharing their knowledge and ideas. We thank all contributing and participating colleagues from the European Commission and especially the following invited external experts:

Ash, Ken	OECD, Trade and Agriculture Directorate, France
Baffes, John	The World Bank, USA
Berg, Christoph	F.O. Licht, Germany
Binfield, Julian	Food and Agricultural Policy Research Institute (FAPRI), USA
Blanco Fonseca, María	JRC-IPTS/Universidad Politécnica de Madrid, Spain
Blandford, David	Pennsylvania State University, USA
Blas, Javier	Financial Times, UK
Brown, Richard	GIRA, Research & Consultancy, France
Burrell, Alison	JRC-IPTS/Freelancer, Spain
Cluff, Merritt	FAO, Italy
Glauber, Joseph	United States Department of Agriculture (USDA), USA
Krijger, Adriaan	International Dairy Federation, the Netherlands
Kruse, John	IHS Global Insight, USA
Kunisch, Martin	Association for Technology and Structures in Agriculture, Germany
Schaffner, Achim	German Agricultural Society (DLG), Germany
Schmidhuber, Josef	FAO, Italy
Vavra, Pavel	OECD, Trade and Agriculture Directorate, France
Vellinga, Theun	Wageningen University, the Netherlands

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Workshop Agenda

Date: 5-6 October 2010
Venue: European Commission, Centre Albert Borschette, B-1040 Brussels

AGENDA - DAY I - 5 OCTOBER 2010		
09:30	Welcome. Background of workshop	John Bensted-Smith, JRC-IPTS
09:40	Policy Background	Tassos Haniotis, DG AGRI
10:00	**Session 1: EU agricultural outlook**	**Chair: John Bensted-Smith, JRC-IPTS**
(15 min)	Modelling tools for baseline work at the EC – state of the art / improvements	R. M'barek, JRC-IPTS, P. Londero, DG AGRI & T. Fellmann, JRC-IPTS
(45 min)	EU agricultural outlook	Pierluigi Londero, Bence Tóth DG AGRI & Hubertus Gay, IPTS
11:00 – 11:30	***Coffee break***	
11:30	**Session 1 (continued)**	
(30 min)	Panel discussion	Julian Binfield, FAPRI David Blandford, Pennsylvania State University Josef Schmidhuber, FAO
(45 min)	Open discussion	All participants
12:45 – 14:15	***Networking lunch***	
14:15	**Session 2a: Drivers of demand**	**Chair: Javier Blas, FT**
(20 min)	"Setting the scene"	Merritt Cluff, FAO
(10 min)	EU outlook – sensitivity analysis demand	Hubertus Gay, JRC-IPTS
(20 min)	Panel discussion	Richard Brown, GIRA Consulting Adriaan Krijger, International Dairy Federation
(40 min)	Open discussion	All participants
15:45 – 16:15	***Coffee break***	
16:15	**Session 2b: Drivers of supply**	**Chair: Javier Blas, FT**
(20 min)	Productivity (technical progress, yield, labour)	Martin Kunisch, KTBL
(10 min)	EU outlook – sensitivity analysis supply	María Blanco Fonseca, JRC-IPTS/UPM
(20 min)	Panel discussion	Merritt Cluff, FAO / Achim Schaffner, DLG
(40 min)	Open discussion	All participants
17:45	***End of Day I***	

AGENDA - DAY II - 6 OCTOBER 2010		
09:30	**Session 3: Macro-economic uncertainties**	**Chair: Pavel Vavra, OECD**
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(10 min)	EU outlook – sensitivity analysis	Aikaterini Kavallari, JRC-IPTS
(15 min)	Panel discussion	Moises Orellana, DG ECFIN / J. Binfield, FAPRI
(20 min)	Open discussion	All participants
10:30 – 11:00	***Coffee break***	
11:00	**Session 4: Linkage energy and agro-food markets (biofuels)**	**Chair: Joseph Glauber, USDA**
(15 min)	"Setting the scene"	Christoph Berg, F.O. Licht
(10 min)	EU outlook – sensitivity analysis	Alison Burrell, JRC-IPTS
(15 min)	Panel discussion	John Baffes, World Bank / J. Schmidhuber, FAO
(20 min)	Open discussion	All participants
12:00 – 12:15	***Coffee break***	
12:15	**Session 5: Climate change**	**Chair: Jacques Delincé, JRC-IPTS**
(15 min)	Climate change scenarios	Simon Kay, JRC-IPSC
(15 min)	Climate change and farming systems	Theun Vellinga, Wageningen University
(30 min)	Open discussion	All participants
13:15 – 14:30	***Networking lunch***	
14:30	**Session 6: Policy implications**	**Chair: Tassos Haniotis, DG AGRI**
(10 min each)	Statements	Tassos Haniotis, Director DG AGRI Joseph Glauber, Chief Economist USDA Ken Ash, Director TAD, OECD David Blandford, Pennsylvania State University
(50 min)	Open discussion	All participants
16:00 *(5 min)*	**Concluding remarks**	JRC-IPTS and DG AGRI

Acronyms

CAP	Common Agricultural Policy
DDA	Doha Development Agenda
DDG	Dry Distillers Grain
DG AGRI	Directorate General 'Agriculture and Rural Development'
DG ECFIN	Directorate General 'Economic and Financial Affairs'
DLG	Deutsche Landwirtschafts-Gesellschaft (German Agricultural Society)
EC	European Commission
EDA	European Dairy Association
EDIM	European Dairy Industry Model
EFMA	European Fertilizer Manufacturers Association
EU	European Union
EU-12	12 EU Member States of the 2004 and 2007 enlargements
EU-15	15 EU Member States before May 2004
EU-25	25 EU Member States after 2004 enlargement
EU-27	27 EU Member States after 2007 enlargement
FAO	Food and Agriculture Organization of the United Nations
FAPRI	Food and Agricultural Policy Research Institute, USA
GMO	Genetically Modified Organism
GDP	Gross Domestic Product
IDF	International Dairy Federation
IGC	International Grains Council
IPSC	Institute for the Protection and Security of the Citizen
IPTS	Institute for Prospective Technological Studies
JRC	Joint Research Centre
KTBL	Kuratorium für Technik und Bauwesen in der Landwirtschaft (Association for Technology and Structures in Agriculture)
OECD	Organisation for Economic Co-operation and Development
PSE	Producer Support Estimate
SAPS	Single Area Payment Scheme
SFP	Single Farm Payment
UPM	Universidad Politécnica de Madrid, Spain
USD	U.S. Dollar
USDA	U.S. Department of Agriculture
WTO	World Trade Organization

Summary

The 2010 workshop ‘Commodity Market Development in Europe – Outlook’ forms part of the intensive validation procedure of the results of the European Commission's outlook on EU agricultural market developments. In the following chapters the presentations and discussions of the workshop are briefly summarised. Suggestions and comments made during the workshop were taken into account to improve the final version of the outlook. Thus, for the European Commission's baseline projections please refer to the report ‘Prospects for agricultural markets and income 2010-2020’ which can be downloaded at the DG AGRI homepage[2].

1. Background of the baseline construction process

In an environment of ongoing changes in the world economy and in agricultural policies, the preparation of reliable projections on the development of agricultural commodity markets is getting increasingly complex and demanding. In order to improve the accuracy, usefulness and relevance of the EU market prospects the entire process of the baseline construction has been reviewed and considerably improved by increasing both the number of market and modelling experts involved, and the steps of evaluation and validation of the projection results. Furthermore, to identify and quantify main uncertainties of the market projections, additional scenarios with varying assumptions have been constructed and analysed using different agro-economic models (in addition to AGLINK-COSIMO also ESIM and CAPRI have been applied)[3]. As part of the intensive validation procedure of the baseline results, the 2010 outlook workshop was held in order to present and discuss the preliminary results of the European Commission's outlook on EU agricultural market developments.

For the first time, the construction of the baseline projections involved joint efforts by DG AGRI and the JRC-IPTS, with the latter working on the modelling background and baseline projections, as well as the construction and analysis of specific uncertainty scenarios. The

[2] http://ec.europa.eu/agriculture/publi/caprep/prospects2010/index_en.htm

[3] AGLINK-COSIMO (OECD-FAO): detailed representation of world agriculture and policy, EU-15 and EU-12

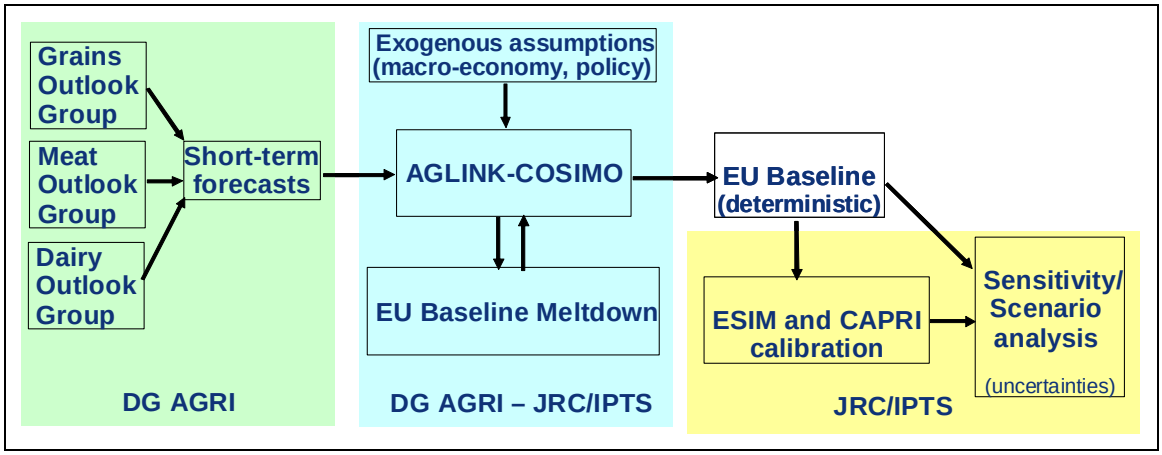
Note: The results of any analysis based on the use of the AGLINK-COSIMO model by parties outside the OECD are outside the responsibility of the OECD Secretariat. Conclusions derived by third-party users of AGLINK-COSIMO should not be attributed to the OECD or its member governments.

ESIM (European Simulation Model): detailed policy of MS

CAPRI (Common Agricultural Policy Regional Impact): highly disaggregated (regions NUTS 2, products)

main steps carried out during the construction of the European Commission's baseline for agricultural commodity markets developments are shown in Figure 1).

Figure 1: Flowchart of the baseline construction



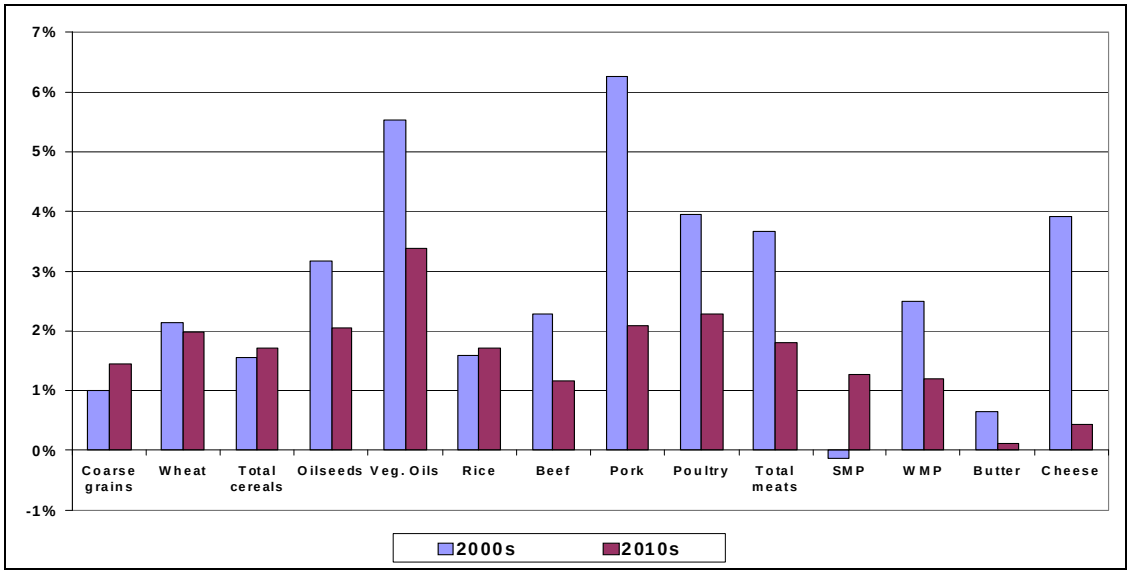
Source: Presentation M'barek, Londero and Fellmann (JRC-IPTS and DG AGRI)

2. Preliminary outlook results

The preliminary results of the European Commission's outlook on EU agricultural market developments were presented by Pierluigi Londero (DG AGRI), Bence Tóth (DG AGRI) and Stephan Hubertus Gay (JRC-IPTS). First the underlying assumptions on policy, economic and world market environment have been briefly delineated. The outlook on EU agricultural markets assumes status quo domestic and trade policy, i.e. the CAP in its current (post Health Check) state and no assumptions are made on the potential outcome of ongoing bilateral, regional or multinational trade negotiations. The *macro-economic environment* is assumed to be influenced by the slow recovery after the recession in the short-term. However, the medium-term prospects are assumed to remain favourable with an EU real GDP growth of around +2% per year, the USD/EUR exchange rate to stabilise around 1.45, EU inflation around 1.9% per year, an increasing crude oil price that stays below 100 USD/barrel, and a world GDP growth of about 3.7% per year.

The baseline projection results on *world market developments* indicate that the demand for agricultural commodities will further grow, as will world production, however the growth rate of the latter will be not as high as in the last decade. An overview on the projected growth of world trade is given in Figure 2.

Figure 2: Growth in world trade (annual rate of change) 2000-2009 vs 2009-2020



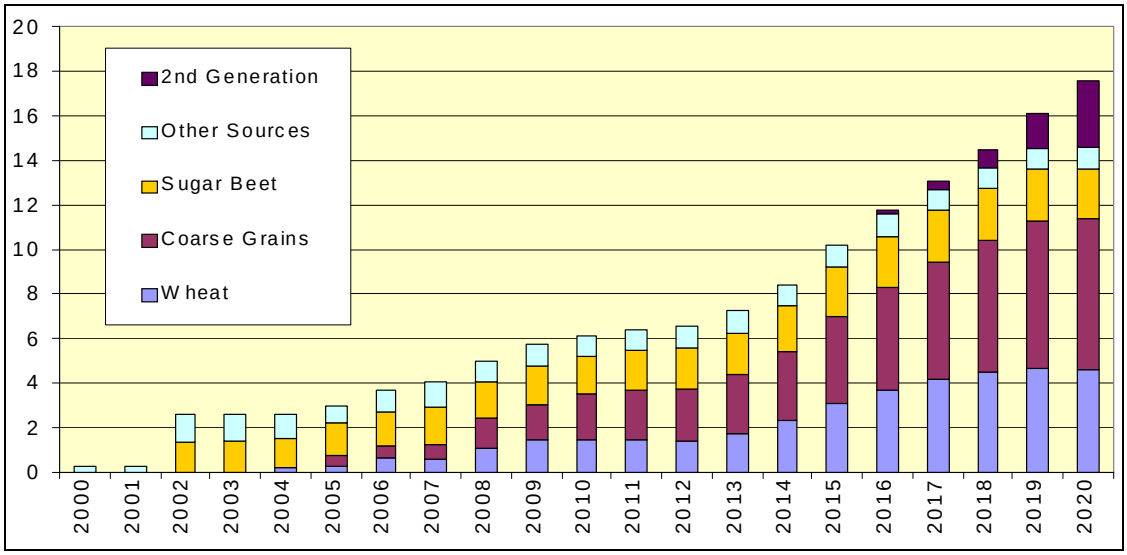
Source: Presentation Londero, Tóth and Gay (DG AGRI and JRC-IPTS)

For the *EU cereal markets* the projection depicts a relatively positive picture, with tight market conditions, low stock levels and prices that remain above long term averages. Projected growth in supply is expected to result mostly from (small) yield growth (only slightly above 0.5% per year on average) with some reallocation between crops in a stable cereals area.

Projections for the *EU oilseed markets* indicate strong demand and high prices for oilseed oil. Supply is increasing, mostly due to moderate yield growth and also a slightly expanding oilseed area, with some reallocation between crops. The increase in EU oilseed production would also be driven by the growth in the biodiesel and biomass industry.

For *biofuels* it is assumed that the mandate of the Renewable Energy Directive (RED) is met, i.e. in 2020 at least 10% of transport fuel use is coming from renewable sources. For meeting the target it is assumed that 7% comes from first generation biofuels and 1.5% from second generation biofuels (starting in 2015) (2nd generation is counted double in terms of meeting the 10% target). Main results on energy shares show that ethanol would represent 9.2% of EU gasoline consumption and biodiesel 8.2% of EU diesel consumption in 2020. Projections show no improvements in the trade balance for biofuels over the medium term because additional imports are required to meet the biofuel targets. In the short-run wheat is projected to be the major ethanol feedstock, and in the medium-term it would be maize (cf. Figure 3).

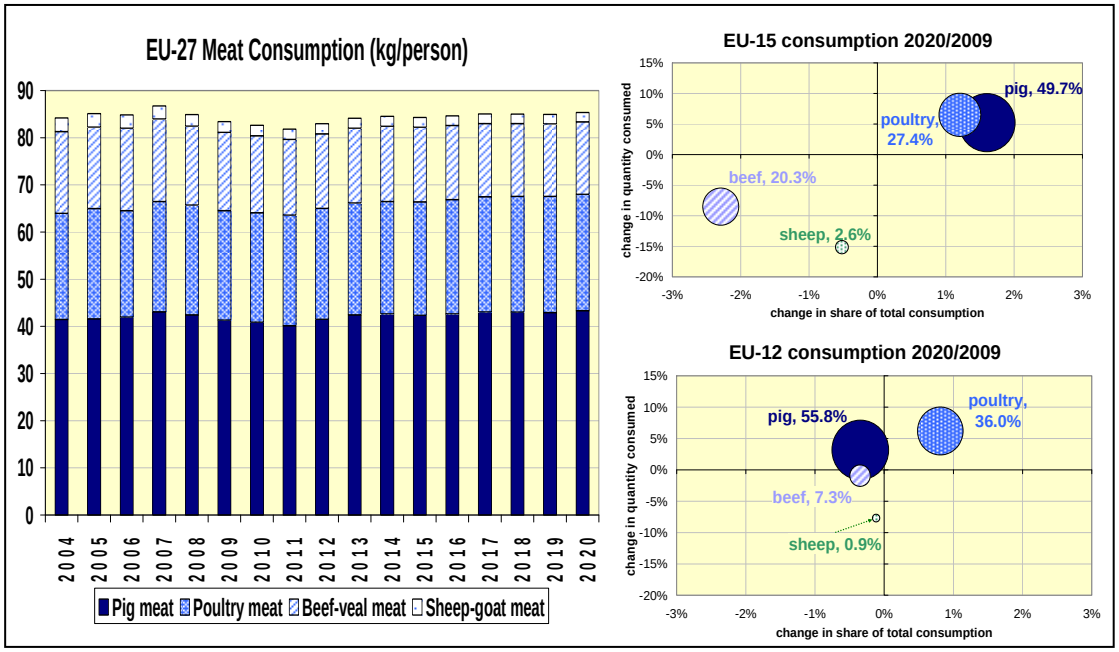
Figure 3: EU27 ethanol production by feedstock (billion litres)



Source: Presentation Londero, Tóth and Gay (DG AGRI and JRC-IPTS)

The projections for *EU meat markets* show a mixed picture. Even though total meat production is projected to recover in the short-term from the decline during the economic crisis, medium-term growth prospects remain modest at an annual rate of about 0.3% on average. In 2020 aggregated meat production is expected to reach about 44.4 mio t, i.e. 4% higher than the level of 2009. While beef and sheep meat production is projected to decrease by about 6% and more than 9% respectively, pig and poultry meat production would expand by 7% and 8% respectively. Increasing poultry and pig meat consumption drive the corresponding production growth. In contrast, consumption of beef and sheep meats are projected to decline. Overall EU meat consumption per capita is expected to increase by 2% in 2020 compared to 2009. With more than 6% poultry meat consumption is projected to increase most while pig meat growth remains below 5% on aggregate between 2009 and 2020 (cf. Figure 4).

Figure 4: EU meat consumption

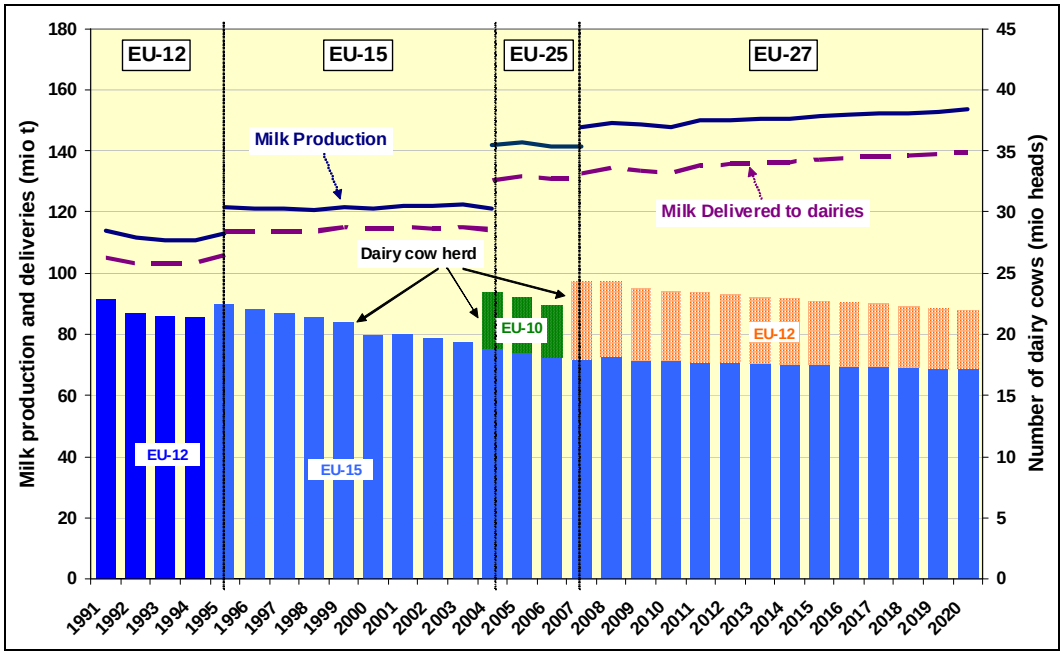


Source: Presentation Londero, Tóth and Gay (DG AGRI and JRC-IPTS)

A steady increase in meat imports (of beef and poultry meats) and a parallel decline in meat exports (of beef, pig and poultry meats) are projected to deteriorate the net trade position of the EU over the outlook period. Moreover, EU producers are increasingly „squeezed" between rising operating costs and gradually lower world market prices, which also imply that EU production growth for poultry and pig meat would be at lower gross margins. Long term prospects for the value of production for pig and poultry sectors remain positive, but increasing costs dampen the overall effect on income.

For *EU dairy markets* the medium-term prospects are expected to be favourable, especially due to increased demand for value added commodities on the one hand and a stable butter market and a gradually recovering SMP market on the other hand. In particular the projected increase in cheese demand supports production growths. EU-27 milk production in 2020 is projected to exceed the 2009 level by about 4%. Milk deliveries would increase by a slightly higher rate (of almost 5%), the difference being due to the gradually declining on-farm consumption in the EU-12. However, growth in milk production would remain below milk quotas and milk quota abolition in the EU is projected to lead to an only very modest reaction of EU-27 milk deliveries at the end of the quota regime in 2015 (cf. Figure 5).

Figure 5: EU milk production and dairy herd developments



Source: Presentation Londero, Tóth and Gay (DG AGRI and JRC-IPTS)

Agricultural income (expressed as real factor income per labour unit) in the EU-27 is projected to recover from the considerable low in 2009. Over most of the projection period the aggregate EU income would grow modestly, however unevenly for the EU-15 and EU-12. While agricultural income in the EU-15 would show a more moderate increase, EU-12 agricultural income is projected to rise considerably and converge towards the EU average. Behind this income prospects the assumed decline in agricultural labour is an important factor for both EU-15 and EU-12. However, for EU-12 another driver for income growth appears to be increasing subsidies granted to agricultural producers over the phasing-in period.

Discussion of the preliminary outlook results

In the panel discussion on the preliminary outlook results Julian Binfield (FAPRI) compared the Commissions figures to the EU GOLD model baseline. Binfield pointed out that FAPRI assumes an US Dollar/Euro exchange rate of 1.57 while the Commissions baseline assumes 1.47. Besides the Commission assumes a slightly higher crude oil price (USD 98) than FAPRI (USD 94). Focusing on the biggest differences between the two baselines, Binfield suggested checking the rapeseed area, as it is projected to be lower in the Commission's outlook than in the FAPRI baseline. The issue of an EU average price was also raised, i.e. it was discussed if it is useful to use only one EU average price as long as significant price differences appear between EU regions. These regional price differences can be potentially very important for trade, within crops, between different types of the same broad product as well as between EU

and world prices. Binfield also highlighted that there seem to be discrepancies in the projections for oilseeds. Despite rapeseed area being projected to grow slowly and growth in oilseed and vegetable oil imports being only small, biodiesel production is still projected to increase by 8 billion litres. So far the EU has imported oilseeds rather than vegetable oil, so the question is if this will continue. Further questions with regard to biofuels concern the drivers of biofuel imports and why not more ethanol would be produced from sugar in the EU. With respect to developments in the dairy markets Binfield would actually expect a greater proportion coming from the EU-12, especially from Poland. In meat markets he sees no real recovery in beef imports and he highlighted that in the EU projections the overall meat consumption of 2009 is not exceeded until 2013.

David Blandford (Penn State University) challenged the general outlook assumption of a return to a stable path broadly along the lines of the previous decade and he delineated the key uncertainties (shift factors) that could make the future different from the recent past. The first key shifter could be a less positive macroeconomic environment. Blandford expects a rather longer and more difficult period of adjustment in developed countries with growth rates of less than 2% per year. This would have negative implications for the adjustment in key developing countries, as for them it would mean an economic rebalancing with less reliance on export-led growth. A second key shifter could be that third countries might show a greater production response to developments in the EU, as for example Brazil, which could be an agricultural powerhouse over the next 10 years. Furthermore, continued rapid expansion in grains and oilseeds production (e.g. Brazil, USA) has consequences for feed supplies and livestock markets. A third key shifter could arise due to problems in achieving biofuel mandates. As assumed in the Commissions outlook 2nd generation biofuels are unlikely to be a key factor. Therefore blend wall constraints in the USA could lead to excess production of maize-based ethanol. Furthermore, high sugar prices could generate intense competition for ethanol feedstock in Brazil. A fourth key shifter could be a possible greater instability in global crop production due to climate change and extreme weather events. Such greater instability in the system could lead to changes in policy, with the ‘market management faction’ confronting the ‘market orientation faction’.

Josef Schmidhuber (FAO) highlighted the consistent overall picture of the Commissions deterministic baseline (within the set of assumptions made). In a saturated internal market at high per capita consumption levels, steady-state population and growing competition from foreign supplies, potential growth could probably only come due to feedstock demand for biofuels (policy driven, at least at ‘low’ energy prices). However, potential policy problems

for biofuels may arise within the WTO negotiations. Schmidhuber pointed out that the co-movement of prices (world and EU, as well as across commodities) in the EU outlook are in line with a priori expectations (except for vegetable oils). With regard to the uncertainties on macro-economic developments he raised the question if the assumed depreciation of the USD (1.45) should be automatically linked to the assumption of higher dollar-denominated world prices. Moreover Schmidhuber highlighted that a 'negative macroeconomic development' would not necessarily be negative for agriculture. Commenting on specific issues of the EU baseline projections, Schmidhuber questioned the compatibility of high EU production growth for pig and poultry meat at declining gross margins. As major uncertainties, risks but also opportunities over the medium-term Schmidhuber stressed i) a sovereign debt default in one or several of the so-called PIIGS countries (Portugal, Ireland, Italy, Greece and Spain), ii) significantly higher oil prices and 'endogenous' bioenergy demand, iii) high volatility even through small shocks (as with no rise in stocks, susceptibility to exogenous shocks remains high), and iv) a general move towards an overall deflationary environment.

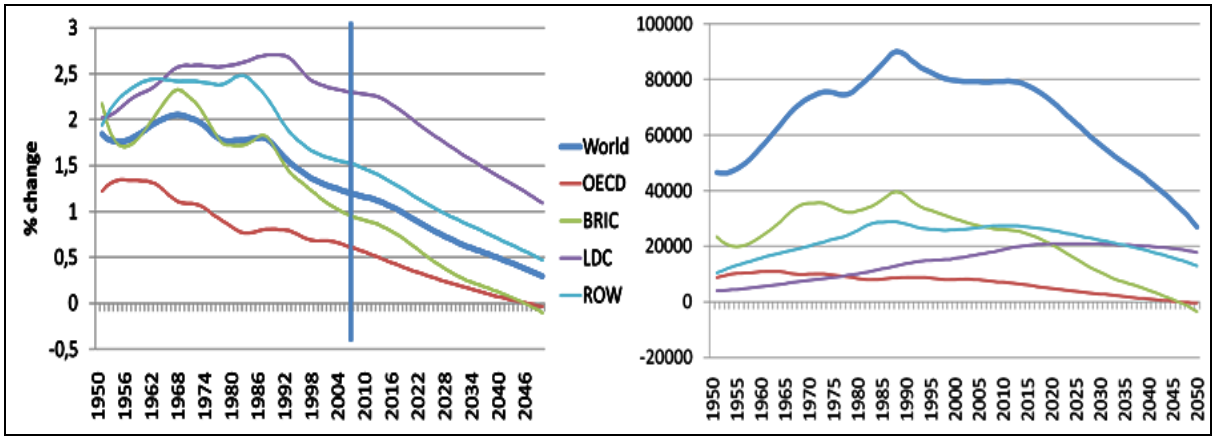
In the general discussion the preliminary results of the European Commission's outlook on EU agricultural market developments have been well received. However it was highlighted that the EU outlook is not a forecast of the future development of agricultural markets, but a description of what may happen under a specific set of assumptions which at the time of the projections were judged plausible. As such the baseline projections serve especially as a reference for policy simulations.

Further analysis/improvements seem to be mainly necessary with regard to assumptions on macroeconomic developments, especially concerning GDP growth, monetary factors and energy costs. Moreover, assumptions on yield developments might have to be reviewed. Declines in yield in the past reflect missing investments due to lower output prices. Thus, increases in output prices will also trigger more investment in research and development which can be expected to result in higher yields. With respect to volatility in agricultural commodity markets it was discussed that on the one hand variability of production is actually decreasing (among others due to GMO crops). On the other hand, an increase in extreme weather events provokes export restrictions in some countries (as for example could be recently observed in Russia and Ukraine) which add to volatility. As a general rule, without sufficient stocks volatility is a logical consequence.

3. Drivers of demand

Meritt Cluff (FAO) focused in his presentation on demographics and income growth as main drivers of food demand. According to UN statistics and forecasts, population growth is declining, and also net addition to population is starting to fall quickly during the projection period (cf. Figure 6).

Figure 6: Population growth (left) and net addition to population (right)



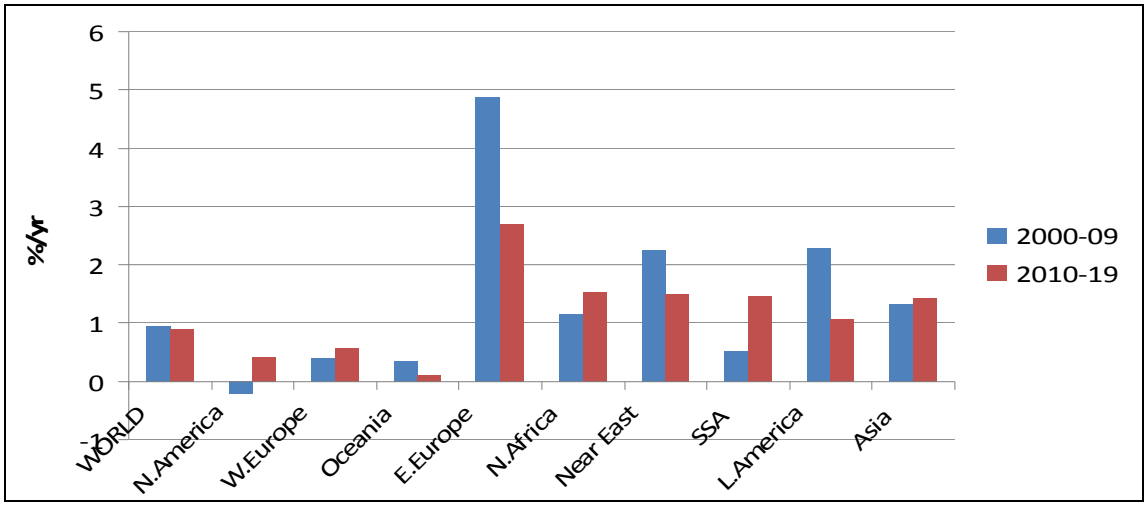
Source: Presentation Cluff (FAO), primary source: UN Statistics/population 2008

While population growth is slowing down gradually, its impact on demand growth is still significant. Population in lowest income countries still grows the most and the rising urban population in developing countries will impact on diets, with a move to more meat and dairy. In addition, the growth in ageing population will also slow down. Regarding income, growth is anticipated to be strong by historical standards. If this holds true, the respective impacts on demand could be important with continued larger growth in demand for meat and dairy. Though, the income impacts on demand are also slowing gradually. When looking at the annual growth rate in per capita consumption for meat and milk they are projected to be around 1 % (cf. Figure 7).

Cluff delineated that relevant characteristics of food demand, as well as potential growth for demand, are (especially but not exclusively in advanced economies) i) lower elasticities with respect to income and price for food, ii) more demand for higher value, safety etc. rather than quantity and iii) generally more and more food being purchased outside the home.

Non-food demand for commodities has also been an important source of new demand. However, depending on the development of energy prices and new technologies, this demand may slow down in the next 10 years.

Figure 7: Annual growth in per capita meat consumption

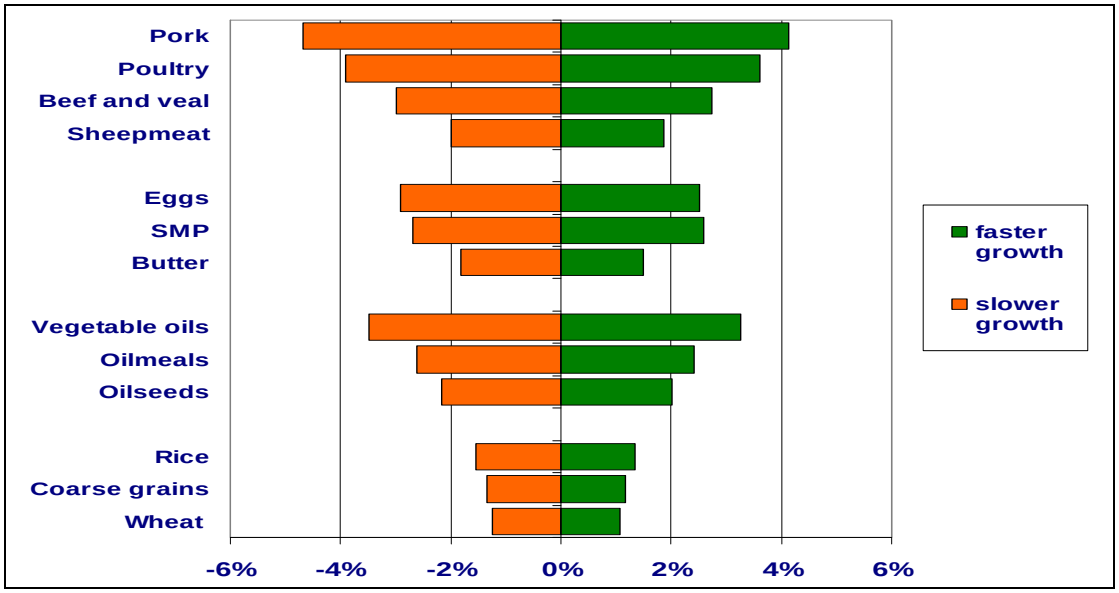


Source: Presentation Cluff (FAO), primary source: OECD-FAO Outlook 2010

In order to reflect uncertainties of the world demand development, some uncertainty analysis has been carried out on the EC outlook. As highlighted in the presentation of Meritt Cluff, economic growth is among the major drivers of food demand. Therefore the effects of a change in the economic growth assumptions for the large emerging markets have been analysed by Stephan Hubertus Gay and Aikaterini Kavallari (JRC-IPTS), using the AGLINK-COSIMO model. The countries considered are Brazil, Russia, India and China (i.e. the so called BRIC countries), Argentina and Mexico for Latin America, as well as Indonesia, Malaysia and Thailand for South-East Asia. A 15% change (up and down) in GDP by the year 2020 has been applied to the considered emerging markets, while no changes in other countries or other model inputs had been made.

Model results show that consumption in the respective countries is substantially influenced by the applied changes in GDP growth rates, and this has also a considerable effect on the world market, including also world market prices. Effects are especially pronounced for pork, poultry and vegetable oils (cf. Figure 8). The effects on the EU markets of changes in GDP growth rates in emerging countries are projected to be limited. As the price effect is only partly transmitted to the domestic EU price there is less incentive to increase production.

Figure 8: Change in world demand with different assumption on economic growth in emerging markets, 2020



Source: Presentation Gay and Kavallari (JRC-IPTS), primary source: AGLINK-COSIMO model results

Regarding the drivers of demand for meat and the preliminary outlook, Richard Brown (GIRA) commented in the panel discussion that most producers seem to be still shocked by the huge price drop after the surge, and that they are still cautious about economic developments in the EU and USA. With 40 million tons GIRA is a bit less optimistic than in previous years with respect to the extra demand in meat in the mid-term. GIRA expects 60% to 80% of the extra meat demand being in poultry, i.e. in cheaper meat, although feed grain is expected to be more expensive.

Richard Brown considered the price developments in the EC projections as being rather pessimistic. GIRA expects prices to increase more, especially because costs also rise (in particular for energy). On a global perspective, China and Russia play an important role with their policy being supportive for local production (in particular when prices are high). According to GIRA expectations a consumption increase in China will be mainly satisfied by increased local production.

With regard to drivers of demand for milk and dairy, Adriaan Krijger (International Dairy Federation) reported in the panel discussion that the dairy sector is generally quite optimistic regarding the medium perspectives. Demand and prices for butter and WMP are expected to remain stable whereas they are expected to increase for cheese (i.e. these expectations are in line with the projections in the EC outlook). Less influence of policy on the market could be seen as a chance for the sector. However, price volatility remains an important issue, even though the magnitude of volatility is expected to decrease. Krijger stated that one way to

protect against fluctuating world prices is the development of high value added products. Another challenge for the milk and dairy sector in the global perspective will be how to meet higher consumption in developing countries in a sustainable way.

In the open discussion focus was laid on the general optimistic projections on demand growth. Especially demand growth projections for China have been discussed. While China is already close to saturation on meat, a steady move from backyard to industry production can be observed. Thus, the striking question might not be 'how to feed the people', but rather 'how to feed the animals'. However, it was also highlighted that even though industrialisation of agriculture is occurring in China, it is expected that China will try to keep people in rural areas (and also keep backyard production). Some of the workshop participants see that demand growth for meat will in general rather slow down, i.e. a slow down in dynamics is expected, as there are alimentary limits to meat consumption.

Another point discussed was the projected increases in trade in dairy products. The question was raised how important the share of traded dairy products is for the determination of the world prices. Around 7% of the milk produced is traded, and it has to be taken into account that food is mostly consumed where it is produced. Therefore it is generally expected that this share in trade will remain the same, even though demand will increase in some countries.

With respect to the modelling of uncertainties in the context of the EU agricultural market projections some discussion centred on the usefulness of the GDP scenarios for the drivers of demand. It was agreed that the usefulness is certainly given, however plausibility might not be given if the shocks are too big. Furthermore it might be useful to put demand shocks into the historical context.

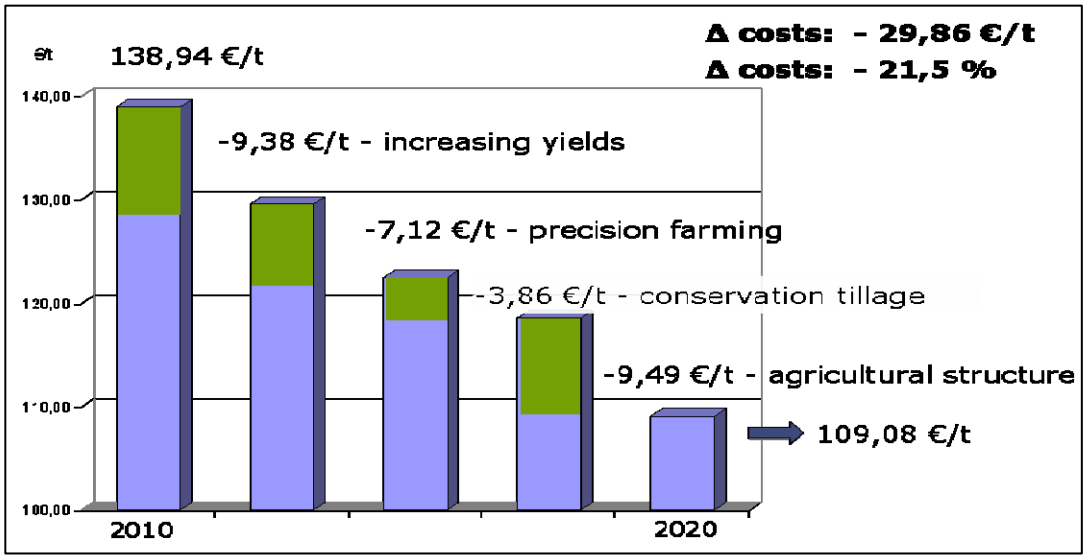
4. Drivers of supply

When setting the scene on drivers of supply Martin Kunisch (Association for Technology and Structures in Agriculture, KTBL) focused in his presentation on productivity growth due to technical progress. As general conditions for technical progress in animal production in 2020 Kunisch pointed out that progress will be made especially in the field of animal welfare and single animal observation. Labour hours saved due to technical progress will be used for observation and management. However, the impact of technical progress on meat and dairy commodity markets can be expected to be rather low. In renewable energy and renewable materials technical progress is also expected to occur, however Kunisch assumes that the resulting impact on commodity markets might be outranged by political measures and market

effects. In arable farming further changes in agricultural structures, with increasing average size of fields and farms, will lead to productivity gains. With regard to soil protection a greater proportion of conservation can be expected and plant breeding might adapt varieties to the effects of climate change (e.g. adapt plants to be more resistant to drought, heat, etc.).

The KTBL expects that in the mid-term precision farming will be widely-used by farmers and will help to increase profitability in the crop sector. Among the techniques that will be quite commonly used in 2020 are monitoring of nutrients and ingredients, as well as weed control. The KTBL calculates that precision farming will induce yield increases up to 2-3% per year, mainly because of higher production security (due to analysis, monitoring and decision support) and better product quality (e.g. higher protein content in wheat due to precision fertilisation and selective harvest). In addition to increases in yields, precision farming is expected to raise profitability also due to reductions in production cost by up to 20 €/ha (due to 5-10% reductions in input, like e.g. pesticides, fertiliser or fuel). Moreover, increased labour and land productivity can be expected due to automation and the use of autonomous systems. Exemplified on wheat production in Germany, the KTBL calculates that productivity gains will lead to cost savings in German wheat production of about 21.5% (i.e. a cost reduction of almost 30 €/ha) between 2010 and 2020 (cf. Figure 9).

Figure 9: Example for cost saving in wheat production 2010-2020 (Germany)



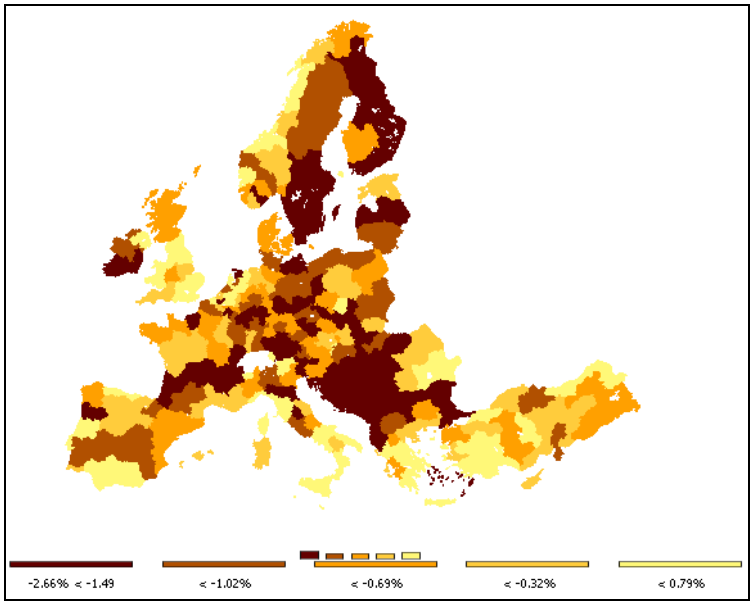
Source: Presentation Kunisch (KTBL), primary source: Betriebsplanung Landwirtschaft 2010/11, KTBL

In summary on the economic effects of productivity growth, Kunisch concluded that technical progress leads to decreasing use of land per production unit, lower input of labour per production unit and generally lower costs of production. The resulting effects are an increasing level of supply and decreasing prices if demand remains stable.

As pointed out in the presentation of Kunisch developments in technological change are a main driver of supply, however the developments are subject to uncertainty. Thus, assumptions made on technological change can be expected to impact on the projected market developments in the EC outlook. In order to reflect some of the uncertainties entailed, the EC outlook projections have been assessed by Maria Blanco Fonseca et al. (IPTS) with regard to different assumptions on developments of crop yields and input costs and their respective influence on the outlook results. For the analysis the CAPRI and ESIM models have been applied. The CAPRI model has been used for an analysis that assumed different yield growth developments, cereals (+/-5%) and oilseeds (+/-10%), only for Europe. As at EU level the necessary data is available, developments in technological change from both the input and the output side of agricultural activities could be captured. With the ESIM model the analysis on yield growth uncertainties was extended to cover global yield developments. However, for this analysis a more general approach was taken by creating a direct link between technological progress rate and yield development. The assumptions on cereals and oilseeds yield variations were introduced on technological progress and not directly on yield growth. Therefore a 5% change in technological progress does not lead to an equivalent 5% change in yields.

In the CAPRI scenario higher yields in the EU lead to an increase in crop supply, which in turn drives down the projected crop commodity prices and therefore leads to decreases in yields in the following year. As lower crop prices lead to lower feed cost, this has a positive effect on meat production. The projected impact on land use depends highly on the initial relationship between yields, prices and costs of the specific crop activity. Thus, a change in the assumption of yield growth only in cereals and oilseeds can induce a different land allocation pattern; however no significant changes in total agricultural land use are projected (cf. Figure 10).

Figure 10: Impact of higher yield assumptions on cereals area (% change)



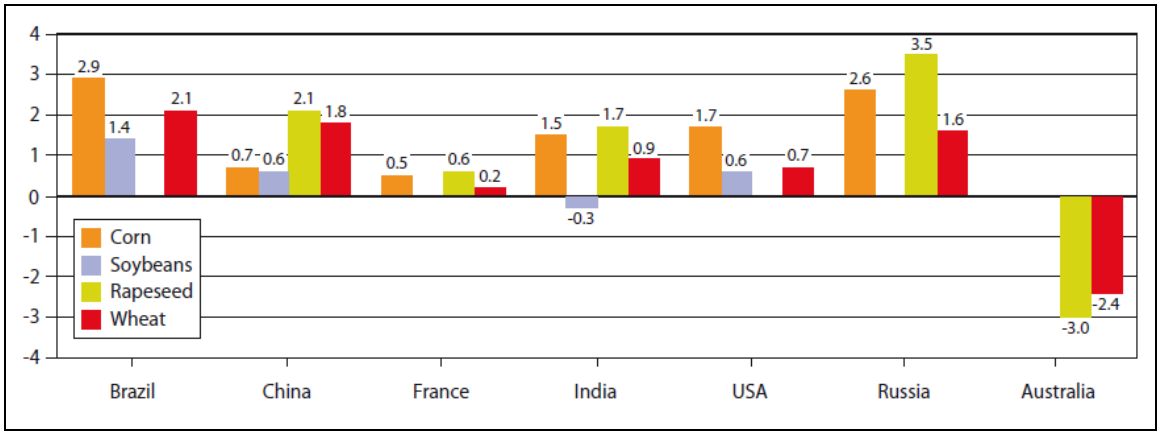
Source: Presentation Blanco Fonseca et al. (JRC-IPTS)

When assuming that yields increase worldwide (using the ESIM model), the effects on world prices as well as on EU prices are projected to be stronger than with the respective increases only in the EU. The ESIM and CAPRI simulations with the assumption of lower yield growth produced rather symmetric results to the simulation with higher yield growth (cf. presentation Blanco Fonseca et al.).

As a further analysis on the drivers of supply, scenarios had been carried out with the CAPRI model with regard to a change in the assumption on input costs. For this exercise 10% higher/lower general input costs than in the baseline have been assumed (with fertilizer and feed costs remaining unchanged). While these changes in the scenario assumptions mainly affect agricultural income they turn out to have only small effects on projected agricultural production and prices in the EU and worldwide (cf. presentation Blanco Fonseca et al.).

In the panel discussion Achim Schaffner (DLG) commented that in Europe the growth rates of yields remain rather low, i.e. actually only low yield progress can be observed (cf. Figure 11). Nevertheless, higher yields will remain an important topic for farmers because increasing the biological output helps farmers to reach a cost efficient production. Thus, farmers will further invest in technological progress to reach higher productivity in farming systems. On the other hand, it needs qualified labour if famers want to realise yield effects during technical progress, and qualified labour actually tends to be short. Schaffner also pointed out that, due to the close connection between domestic and international markets, the results of simulations where solely market conditions in the EU are assumed to change have to be used with caution.

Figure 11: Annual growth rates in yield 1992-2007 (%)



Source: Presentation Schaffner (DLG); primary source: Agribenchmark 2008

Merit Cluff (FAO) commented in the panel discussion that in the analysis of drivers of supply not a lot of focus was given to yield growth in the livestock sector, though substantial gains can be expected in this sector. Especially in developing countries higher yield gains will be very likely to occur. Another important issue is how supply actually responds to price changes, and Cluff pointed out that within 2-3 years such responses might become quite strong, i.e. supply will respond faster to price changes than this has been the case in the past.

In the open discussion the need to also focus on efficiency gains in the meat sector was again highlighted. Furthermore it was discussed that productivity gains are not necessarily directly translated into yield gains and the margins of yield increases depend also on the structure of agricultural production. Moreover, total factor productivity increases also because inputs are used more rational when prices for agricultural commodities are low. Another point discussed was the influence on supply of the observed development in Europe, that wholesalers do not only go up- but also downstream. This implies that higher standards might be requested from farmers; however the consequences for supply and for farmers are not straightforward, and can be beneficial for farmers if they get paid for additional efforts they have to take to comply with the standards. In general the experience with contracting is still mixed (also in the USA), however with respect to securing supply, ensuring traceability and reducing risk contracting can be expected to further develop in both developed and developing countries. In the general discussion it was also stressed that in the future it might be necessary to also specifically consider the use of GM crops for the model projections, e.g. with specific assumptions on the use of GM maize in Europe.

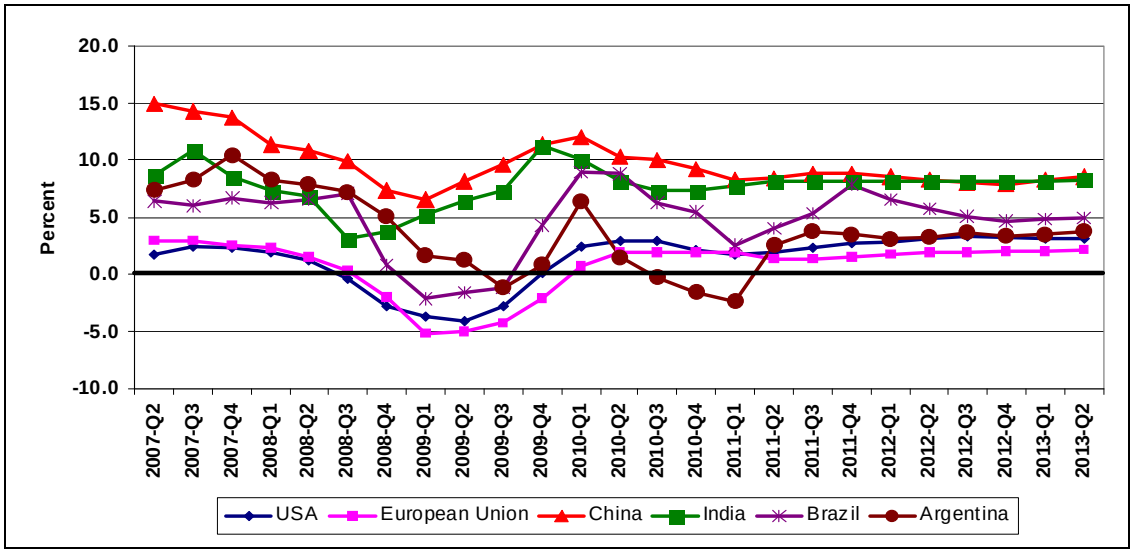
5. Macro-economic uncertainties

John Kruse (IHS Global Insight) set the scene for the session on macro-economic uncertainties and their impact on the development of agricultural commodity markets. Kruse highlighted that the global expansion has slowed but is still on track. Global real GDP growth slowed from an annual rate of 4.5% in late 2009 and early 2010 to 3.8% in the 2nd quarter of 2010 and an estimated 2.2% in the 3rd quarter of 2010. The slowdown in spring was led by America and Asia with weakening support from the inventory cycle and ebbing fiscal stimulus programs. The European business cycle is lagging one quarter behind on the slowdown with export-led growth softening this past summer. While global real GDP growth is expected to remain subdued near 3%, chances of a significant slowdown are still remote. The eurozone's economic growth surged to 4% in the second quarter of 2010, i.e. three times faster than in the first quarter. This spurt in growth was mainly driven by a bounce back in construction from the weather-related setbacks of the first quarter, and surging exports in Germany. However, Kruse saw Europe's economic growth slowing in the 3rd quarter, for the most part because exports to the US and China decelerate, fiscal policies tighten, and the boost from inventory restocking diminishes. Therefore Global Insight expects real GDP growth to average just 1% in the next three quarters and then accelerate to 1.5% from mid 2011 onwards. Regarding the Euro, Global Insight expects a fall to the USD in the short run, mainly because the GDP growth loses momentum and sovereign debt problems might flare up. However, once economic recovery will become well established and markets will gain confidence in fiscal policy options, the Euro is expected to appreciate to USD 1.40 in the medium term. Kruse further delineated that inflation is generally expected to be very low, in the 1.5-2% range, with excess capacity in labour and product markets keeping inflation relatively subdued for several years. Persistent gaps between potential and actual global output will put downward pressure on prices for traded-goods. Furthermore, high unemployment in America and Europe, coupled with technological advances, will restrain unit labour costs.

With regard to the characteristics of the global recession, Kruse marked out that the strong growth economies (many emerging markets) were suffering, but were able to bounce back vigorously. On the other hand the fragile growth economies (developed economies) were hit much harder and will face a longer recovery. Therefore the growth strategies of many companies can be expected to focus almost entirely on the developing world. In general emerging economies are predicted to become more important in determining world GDP growth. Asia-Pacific might achieve the fastest growth; but other emerging markets will also

thrive. The real GDP growth rates (observed and projected) in some selected countries are presented in Figure 12).

Figure 12: GDP growth rates in some selected countries (%)



Source: Presentation Kruse (IHS Global Insight)

Commenting on possible growing risk to economic recovery, Kruse highlighted the issue of competitive devaluations. Examples for this could be observed in i) Japan, where the government is intervening in foreign exchange markets to weaken the yen, ii) China, where the government takes restrictions on allowing the value of its currency to rise, and iii) other emerging markets who are trying to slow the appreciation of their currencies. Furthermore, Kruse pointed out that protectionism sentiments could also rise in the USA and Europe, where unemployment levels might be at politically dangerous levels. A further risk to economic recovery could be the reaction of some countries to agricultural production shortfalls, like for example the Russian ban on wheat exports.

With respect to the specific impacts and implications of the economic crisis on agriculture, Kruse described that while in developed countries some shifts in per capita meat consumption could be observed, data on developing countries shows little or no impact on per capita meat consumption. Weakening oil prices slowed the growth in the US biofuels sector with production falling to mandated levels of support. With the global recession dry cargo shipping rates fell, creating opportunities for increased agricultural trade. On the other hand off-farm income seemed to be weaker throughout Europe and the USA. In general the impact of the economic crisis on the agricultural sector could have been larger, but the strong crop prices following 2007 production shortfalls, biofuels, and continuing growth in developing countries

have buoyed the farm sector with record levels of farm income. In addition, global crop demand continues to be strong especially from China.

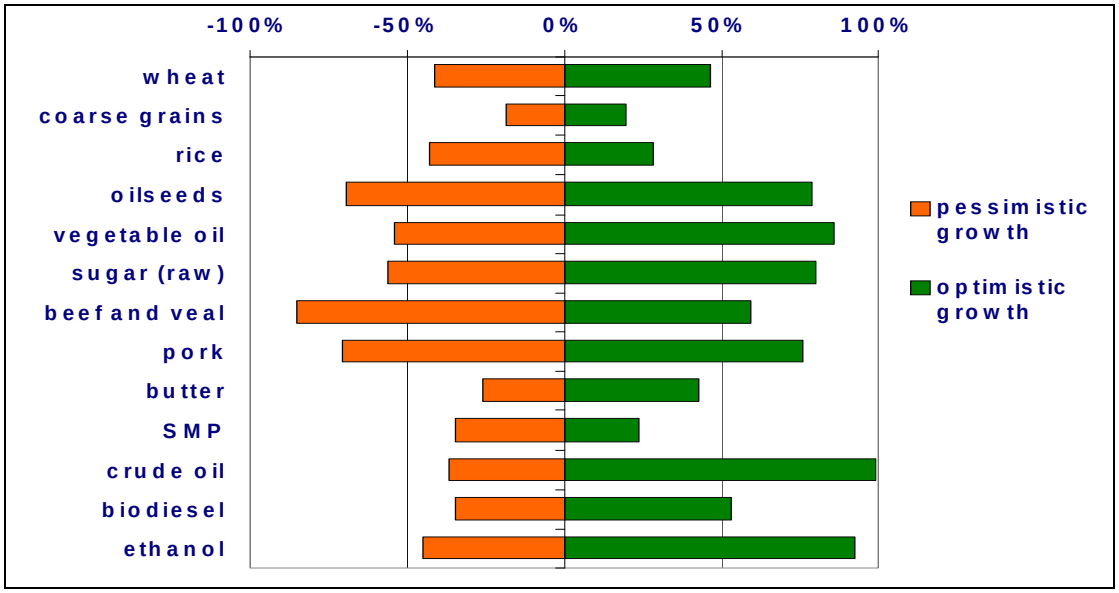
When looking ahead, Kruse concluded that emerging markets will become more significant in determining world GDP growth, and meat demand and resulting feed demands might be mainly driven by emerging market countries. Dietary changes that favor more protein could continue to drive meat and vegetable oil consumption in developing countries, but China may be approaching saturation points in some areas of meat consumption growth. The biofuels mandates in the US are expected to reach their apex in 2015 for starch based ethanol. Rising fuel prices will offer some support to ethanol and biodiesel production, but there are caveats. As the global economy strengthens attention will likely refocus on climate change with significant implications for agriculture.

In order to reflect uncertainties of macroeconomic developments, Aikaterini Kavallari and Stephan Hubertus Gay carried out some uncertainty analysis on the EC outlook with regard to a different set of macroeconomic assumptions. Based on historical annual growth rates the AGLINK-COSIMO model was used to assess the impacts of assuming a more optimistic and a more pessimistic growth of GDP index, GDP deflator, consumer price index and exchange rate than in the standard baseline. The assumption on the growth rates of the crude oil price was based on the Annual Energy Outlook (2010) of the US Energy Information Administration (EIA). The countries where these different sets of assumptions had been applied on were Argentina, Australia, Brazil, Canada, China, EU, India, Indonesia, Japan, Malaysia, Mexico, Russia, Thailand, and the USA. The impact of this different setting of macroeconomic scenario assumptions on the projected world market prices is shown in Figure 13).

The scenario of a more optimistic economic growth and high crude oil prices results in generally higher world market prices, with the size of the increase differing between the commodity markets. The effects are mainly driven by the increase in crude oil prices and are highest for ethanol. The price effects on crops are on the one hand due to a higher demand and their increased use as biofuels, on the other hand due to an increase in input costs. Projected price increases in the livestock sector are not only the effect of increased prices in the crop markets but also due to exchange rate developments. The effects on the pig meat sector are more pronounced than in the beef sector, mainly because of the developments in the Chinese markets. Traditionally pork consumption in China is much higher than beef consumption and the projection results in China show an increase of domestic consumption combined with an

increase of imports and a decrease of exports. As expected, the effects of a more pessimistic economic growth and lower crude oil prices are in the opposite direction to the more positive assumptions. However, in this scenario results are not only driven by the assumed developments in crude oil prices but also by the assumed depreciation of local currencies. The decrease of beef and veal world market prices are more pronounced, mainly due to projected developments in South America. Especially the exports of beef and veal in Brazil are projected to increase, primarily driven by the depreciation of the Brazilian Real while at the same time domestic consumption decreases due to the assumption of slower economic growth. The respective impacts of the different macroeconomic settings on producer prices in the EU are similar to world market price developments, and they are also mainly driven by the assumption on crude oil prices and the exchange rate depreciation/appreciation. The impact on the EU net trade for crops and livestock commodities is generally higher for those commodities where the trade volumes are higher in the baseline. Oilseeds and vegetable oil in the EU seem to be most reactive to the assumption of a different macroeconomic development, which is the case because their trade share is highest. However, in general it seems to be rather difficult to exactly interpret the results and to identify separate drivers for the projected changes in the EU markets.

Figure 13: Impact of the different setting of macroeconomic scenario assumptions on the projected world market prices (2020)



Source: Presentation Kavallari and Gay (JRC-IPTS)

In the panel discussion Moisés Orellana (DG ECFIN) commented on the general macroeconomic setting that at global level the views of IHS Global Insight on macroeconomic developments generally match with the expectations of DG ECFIN. The

global as well as the EU economic growth is continuing to recover, but the momentum softens. The EU recovery is seen to be in progress with a favourable rebalancing of growth towards domestic demand and the outlook for inflation remains subdued. The general uncertainties on macroeconomic developments prevail, but risks are more balanced. On the upside Orellana expects a stronger rebalancing of GDP growth and more pronounced spill-over effects from the German growth, whereas on the downside a softening of external demand, further financial market tensions and a stronger short-run impact of fiscal consolidation can be expected.

Julian Binfield (FAPRI) commented specifically on the uncertainty analysis of the EC outlook, stating that he was surprised by the reaction of coarse grains, as at least in the USA there is a long run price relationship between corn versus oil, with corn prices usually following oil prices (except when the US mandate went into force), i.e. with high oil prices coarse grain prices could be expected to also increase significantly.

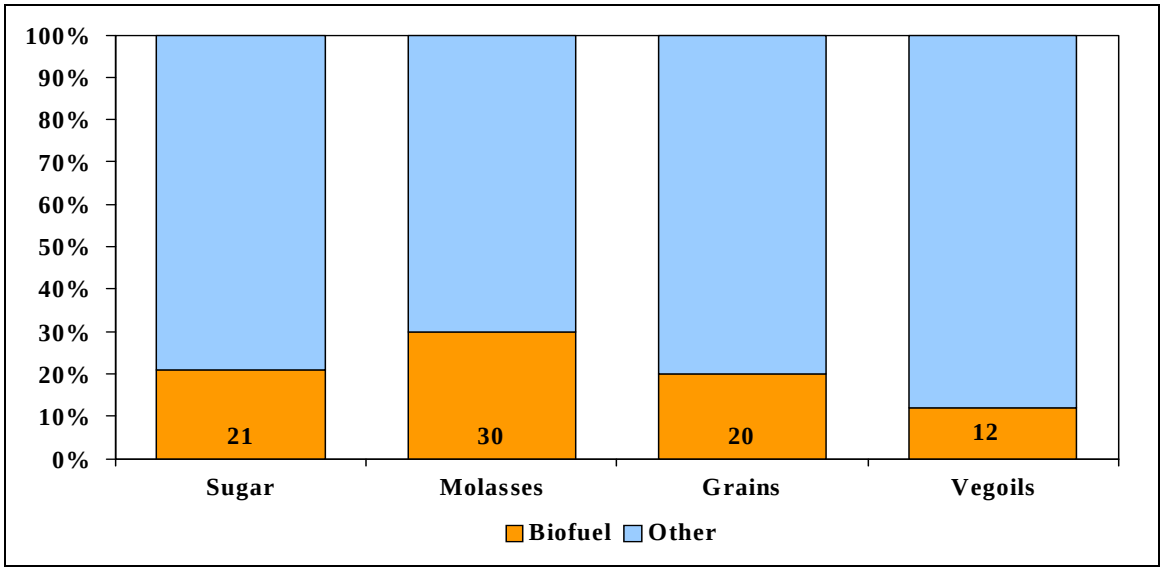
The open discussion was mainly centred on the question how uncertainties in macroeconomic developments could be best captured in the modelling approach of the outlook on agricultural market developments. It was suggested to use different assumptions for the EU, USA and the rest of the world, as all countries/country blocks face different problems. As such, general optimistic or pessimistic macroeconomic assumptions could be misleading. The importance of exchange rates for developments in agricultural markets was also further discussed. In this context some discussion was on the usefulness of using historical developments of exchange rates. It was also emphasised that it could be beneficial to concentrate in the uncertainty analysis only on the exchange rates of those countries that presumably have the biggest impact on developments in agricultural markets (EU, USA, China and Brazil). Furthermore it was also highlighted in the open discussion that it would be beneficial to use stochastics for the analysis of uncertainties on macroeconomic developments.

6. Linkage between energy and agro-food markets (biofuels)

Christoph Berg (F.O. Licht) set the scene for the session on the linkage between the energy and agro-food markets, with a focus on biofuels and its impact on the development of agricultural commodity markets. The policy framework for biofuels in the EU is set by the biofuels directive of 2003 and the Renewable Energy Directive of 2009, which states that the share of renewable energy sources should increase to 10% of total transport fuel use by 2020. According to F.O. Licht the targets set by the biofuels directive were filled between 2005 and 2010 by about 68-98% for biodiesel and 32-51% for bioethanol. The reasons for the

underachievement of the targets might be found in policy (as the targets are only indicative, and industry refined resistance) rather than in the developments of feedstocks used for biofuels production. When looking at feedstocks for biodiesel in the EU, Berg pointed out that about 1/3 of rapeseed oil consumption is due to food use and about 2/3 are used for biodiesel. On the other hand only about 4-5% of grains are used for bioethanol production in the EU. F.O. Licht estimates that the share of biofuels in total world feedstock use accounted is about 21% in sugar, 30% in molasses, 20% in grains and 12% in vegetable oils (cf. Figure 14)

Figure 14: Estimated biofuels and world feedstock use in 2010



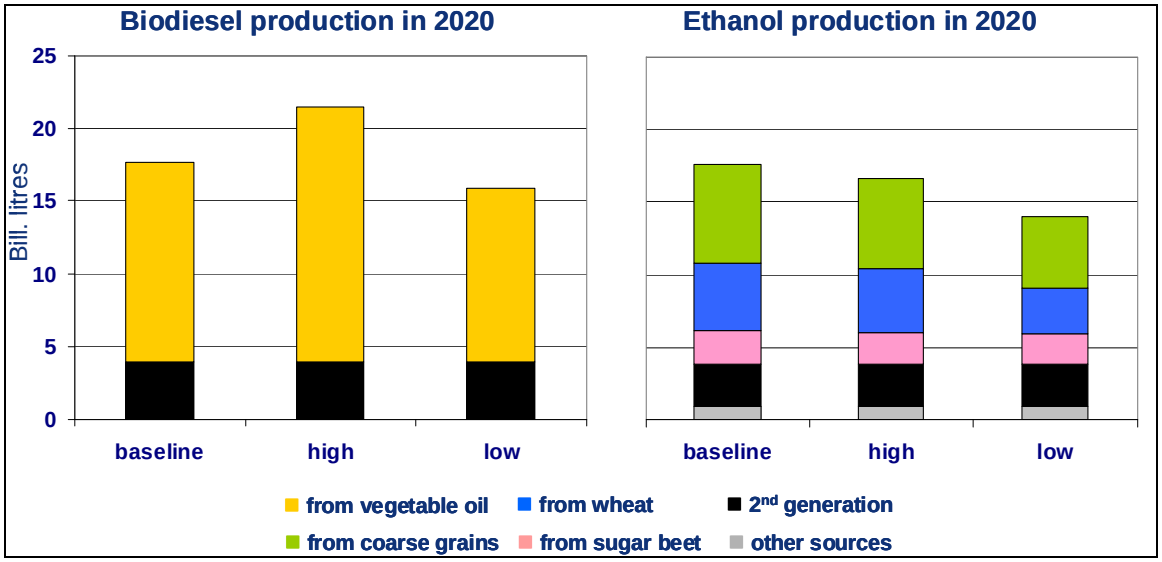
Source: Presentation Berg (F.O. Licht)

Berg further highlighted that biofuels did not have a big impact on the net trade position in the EU. However, the gradual enforcement of sustainability criteria in the EU is expected to cause decreases in demand of biofuels made from palm oil and soybean. Looking further ahead, F.O. Licht expects the EU to remain in deficit in biofuels (oilseeds, vegetable oils), and while fuel ethanol production is likely to grow relatively stronger, Biodiesel targets are regarded as very ambitious.

In the analysis of the uncertainties involved in the EC outlook with regard to biofuels Alison Burrell et al. (JRC-IPTS) analysed how projections would change if the corresponding total EU transport fuel consumption (diesel + gasoline) in 2020 would be increased by 15% with low oil price and decreased by 15% with high oil price respectively. In both scenarios the standard baseline assumptions on the EU biofuels target remain the same, i.e. the percentage share of biofuels in total transport fuel remains the same, but volumes consumed of biofuels by the EU transport sector vary according to total fuel demand. Furthermore, assumptions taken in the baseline with regard to supply and use of 2nd generation biofuel also remain the

same as in the baseline. Results show that the share between biodiesel and ethanol is shifting, with biodiesel being favoured by higher crude oil prices (cf. Figure 15). The balance between domestic production and consumption is closed by biofuel trade. Land use effects are rather limited in both scenarios, but world sugar cane area reacts quite sensitive to crude oil prices, while coarse grains and oilseeds react somewhat less.

Figure 15: Projected EU biofuels production by feedstock in 2020 according to the biofuels scenarios

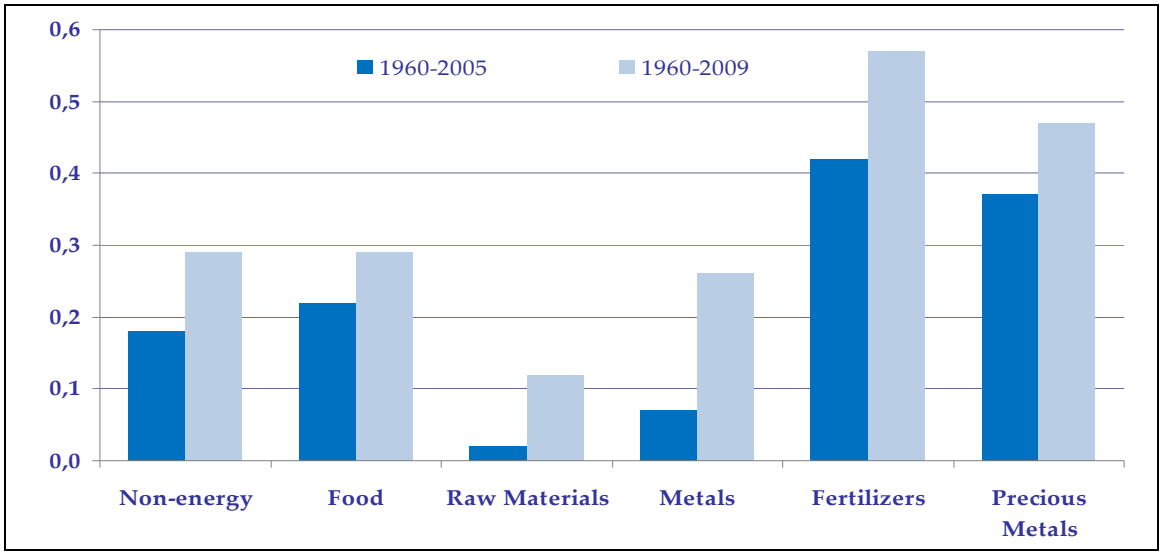


Source: Presentation Burrell et al. (JRC-IPTS)

In the panel discussion John Baffes (World Bank) highlighted that the link between energy and food is complex and goes beyond biofuels. He pointed out that the energy/non-energy commodity price link always existed - however, not much attention was paid to it because of low and relatively stable energy prices (especially between the mid-1980s and early 2000s). In fact, most models treated energy prices as a dummy variable taking the value of 1 during 1973-78 and 0 elsewhere. During the last price boom the energy/non-energy commodity price link has increased considerably across all commodity groups (and commodities). Thus, such increase cannot (and should not) be attributed solely to biofuels but rather also to other direct channels, substitution effects as well as to common factors and indirect channels. Direct channels affecting supply are related to high energy (and thus fuel) prices, which increase the cost of production, transformation and transportation and also fertilizer costs (a key input to agriculture). On the demand side, biofuel demand above and beyond food demand constitutes another direct channel. Substitution occurs on the input side (e.g. land competing for wheat and corn), output side (same use of commodities, e.g. palm and soybean oil) and also due to petroleum-based synthetic products (e.g. natural and synthetic rubber, cotton and man-made fibres). Common factors related to the energy/non-energy commodity price link are

macroeconomic factors (growth, exchange rates, interest rates, fiscal expansion) as well as investment fund activities. With regard to these multidimensional links Baffes conducted an ordinary least squares (OLS) regression analysis which shows that the link between energy and non-energy commodity prices has increased after 2005. However, the respective link strengthened more in other sectors than in food commodities (cf. Figure 16).

Figure 16: Price transmission elasticity estimates from energy to non-energy commodities, OLS regression



Source: Presentation Baffes (World Bank); primary source: own estimates based on World Bank data

Commenting on biofuels Josef Schmidhuber (FAO) considered the impact of policy on biofuel production as quite profound, at least in the EU and the USA. With respect to WTO negotiations he highlighted the need to clarify the magnitude of biofuel subsidies and their effect on farm and food prices as they actually raise feedstock and food demand and thus prices for (food) consumers and producers alike, at home and abroad. With regard to 2nd generation biofuels he raised the question what an improved technology for 2nd generation biofuels would actually mean for LUC and ILUC under a high energy price scenario.

In the open discussion several additional comments were made on the link between energy and food markets and the influence of policies was further emphasised. With respect to the modelling of uncertainties in the EC outlook projections it was highlighted that the impacts of the linkage between energy and agro-food markets should be rather assumed as being non-linear.

7. Climate change

In the session on the impacts of climate change on commodity market development in the EU Simon Kay (JRC-IPSC) gave an overview of observed agro-climatological changes between 1975 – 2007. According to the MARS (Monitoring Agricultural Resources) database a lengthening of the growing season (defined as frost-free period) could be observed in Europe (0.8 - 1 day per year during the last 30 years). However, in a few and localized areas, due to particular microclimatic conditions, reductions were recorded instead. In general an increased plant heat stress was recorded, with worse conditions reported in Spain (mainly southern areas), Italy and the Black Sea area (mainly Turkey). However, it must also be highlighted that locally along the Atlantic coast line and in Greece a reduction of frequency of heat stress was recorded. In Scandinavia, eastern EU, Balkans and Austria a significant increase of cumulated rain both during winter and summer can be observed. In contrast, a significant reduction of cumulated values of rain during winter is documented in Italy, Portugal, Greece, southern France and Ireland. Italy and southern France also show a significant reduction of cumulated summer rainfall. This reduced summer rain increased the water deficit noticeably, even though summer rain generally contributes only little to the cumulated value of the whole year. On the one hand some regions show an increase of water deficit (i.e. irrigation demand), with Italy, central Spain and southern France showing the largest increases. On the other hand, in the Balkans, Austria, Czech Republic, The Netherlands, Denmark, southern Sweden and northern Poland a reduction of water deficit was recorded, mainly due to the increase of rain during the growing season. It is also recorded that many regions experienced an increased risk of late frosts, i.e. the frequency of late frosts has increased, bringing a greater vulnerability to these regions.

Simon Kay delineated that the MARS weather database is used to estimate and assess impacts of climate change on crop production in the mid and long term. The experimental work done at the JRC comprises e.g. effects on yields, water demand, impacts on crop diseases and insect infestation. When assessing impacts of climate change on agricultural production the most difficult issue (apart from the general uncertainties involved) seems to be the incorporation of adaptation strategies, i.e. how farmers adapt their production due to changing climatic conditions. Issues raised by adaptation are related to technology (plant protection, varieties, GMO, etc.), farm systems (resilience, flexibility), competing non-agricultural water demand, as well as local responses and policy choices.

In a presentation on climate change and farming systems Theun Vellinga (Wageningen University) focused on GHG emissions and mitigation potentials in livestock systems. He

stressed that monogastrics (pigs, poultry) have lower GHG emissions than ruminants, but also that milk/beef in dairy systems is produced with lower GHG emissions than in pure beef systems. While methane and nitrous oxide emissions tend to decrease with increasing production intensity, emissions of carbon dioxide increase. Intensive production systems usually have a high carbon dioxide profile due to their higher shares in fertilizer production, buildings and equipment as well as transport and processing. Nevertheless, overall GHG emissions usually decrease with the intensity of the livestock production system. When addressing mitigation of GHG emissions, the focus should be on resource use efficiency and nutrient management, especially with regard to feed, fertilizers and farmers knowledge. Thus, mitigation depends mainly on technique and management. New technique requires investment, especially with regard to storage types and covers, biodigesters and application techniques. Such investments might increase the costs of production. Management needs capacity building and information, especially with regard to the use of fertilizer, grassland management and optimization of animal nutrition (energy and protein). It seems to be important to highlight that the GHG mitigation achieved trough improved management knowledge can be regarded as being cost effective and hence beneficial to farmers' income. Vellinga estimates that there is a GHG mitigation potential of 30–40 % with current technology and management improvements. In his presentation Vellinga also pointed out that GHG emissions are not the only environmental issue of importance. In this context Vellinga highlighted hotspots of nitrate leaching and ammonia emissions, and furthermore pointed out that phosphate will become a limiting factor within a few decades.

In the open discussion the general mitigation potential of agricultural production in Europe and the adaptation capacity of farmers to climate change have been highlighted. However, the issue of climate change has to be seen at global level, and especially water constrains are considered as a key issue. With respect to the impacts of climate change on agricultural commodity markets it was discussed that the multidimensional aspects are hard to tackle, however the dialogue between (scientific) disciplines helps to improve the modelling a lot, and especially the link between biophysical and economic models is considered as being crucial in this context.

8. Policy implications

In the final session the discussion was dedicated to the implications of the agricultural market developments and the involved uncertainties for agricultural policy. The “what if” approach for this years outlook exercise was considered as a very good approach to deal with the involved uncertainties of baseline construction and is assumed as also being very beneficial with regard to policy planning. However, the underlying AGLINK-COSIMO model used for the baseline projections does not yet feature the possibility to produce a stochastic baseline and thus is actually not suitable to take volatility into account. Nonetheless the model is suitable and able to address many factors of volatility. Therefore the sensitivity and uncertainty analysis that is done on the standard baseline projections are highly appreciated and helpful. Especially the issue of price volatility forms a big part of the debate on the CAP after 2013, and also the topic of food security is taken into account in many policy discussions. Concerning price volatility it is evident that with high output prices the scope of using usual market measures is rather irrelevant, and in any case a safety-net will be continued to be implemented. Conversely, with low output prices the question of suitable risk management tools gets more into focus, as does the importance of appropriate private instruments to tackle volatility. The difficulty is to address new problems and issues without undermining what already has been achieved in the development of the CAP. Balancing the markets through strict regulation is not seen as a real option. Instead, guiding and supervising the process of consolidation and concentration in up- and downstream industry could be a key policy task. It was also emphasised that in general the macroeconomic circumstances might not only shape the development of agricultural markets but also the way agricultural policies are implemented.

A general concern for the baseline and scenario analysis is the need to improve databases, an area where institutions could work more closely together. The workshop has been seen as an excellent opportunity to comprehensively discuss developments in agricultural markets on a high level and throughout different (international) institutions. As such the positive and important role of the workshop in the validation process of the outlook for agricultural commodity markets was highlighted.

Workshop Presentations

Commodity Market Development in Europe - Outlook

John Bensted-Smith (JRC-IPTS)

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Introduction

Workshop on "Commodity Market Development in Europe - Outlook"
5/6 October 2010, Brussels

John Bensted-Smith

European Commission
Joint Research Centre
IPTS - Institute for Prospective Technological Studies
Seville - Spain

JRC EUROPEAN COMMISSION

JRC IPTS

7 Institutes in 5 Member States ≅ 2700 staff ≅ 340 M€/y budget + 60 M€ income

- Directorate-General of the European Commission
- Help put EU policy-making onto a scientifically robust foundation by providing customer-driven scientific and technical support
- Its customers are predominantly other services of the Commission, other EU institutions, Member States

IPTS – Sevilla, Spain
Institute for Prospective Technological Studies
Director: John Bensted-Smith

IPTS ≅ 220 staff ≅ 16 M€/y budget + 6 M€ income

JRC EUROPEAN COMMISSION

Organisation of workshop

- **Presentation of European Commission's outlook on EU agricultural market developments**
- **Different sessions on how different settings and assumptions regarding selected factors and uncertainties influence the projected developments**
  - "Setting the scene" presentation for the session/topic with a broader view
  - Sensitivity analysis on the EU outlook with regard to different settings
- **Panel discussion & discussion among all participants**
  - Policy implications with statements by
  - Jean-Luc Demarty, Director-General DG AGRI
  - Joseph Glauber, Chief Economist USDA
  - Ken Ash, Director TAD, OECD
  - David Blandford, Pennsylvania State University

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Background

- IPTS in cooperation with DG AGRI has build up a platform for modelling tools and market analysis to support EU policy-making:
  - Modelling of the Common Agricultural Policy
  - Projections of agricultural commodity markets in Europe
  - Analysis of international agro-food trade patterns
  - Improvement of data quality and availability
- Agro-Economic Modelling Platform (iMAP):
  - Partial equilibrium models: CAPRI, ESIM, AGLINK, AGMEMOD
  - General equilibrium models: GTAP, GLOBE
  - Data management tool
- Expert workshops on agricultural commodity markets in Europe:
  - Yearly workshop since 2006
  - Different orientations: emphasis NMS, expert exchange forum, comparison of different baselines, in-depth analysis of EC market outlook
  - DG AGRI baseline and agri-business information

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Invited experts

Ken ASH	OECD, France
John BAFFES	The World Bank, USA
Christoph BERG	FO-Licht, Germany
Julian BINFIELD	FAPRI, USA
Maria BLANCO	JRC-IPTS/Universidad Politecnica de Madrid, Spain
David BLANDFORD	The Pennsylvania State University, USA
Javier BLAS	Financial Times, UK
Richard BROWN	GIRA, UK
Alison BURRELL	JRC-IPTS/Freelance
Merritt CLUFF	FAO, Italy
Joseph W. GLAUBER	USDA, USA
Adriaan KRLIGER	Dutch Dairy Board, The Netherlands
John KRUSE	IHS Global Insight Inc., USA
Martin KUNISCH	KTBL, Germany
Achim SCHAFFNER	DLG, Germany
Josef SCHMIDHUBER	FAO, Italy
Pavel VAVRA	OECD, France
Theun VELLINGA	Wageningen University, The Netherlands

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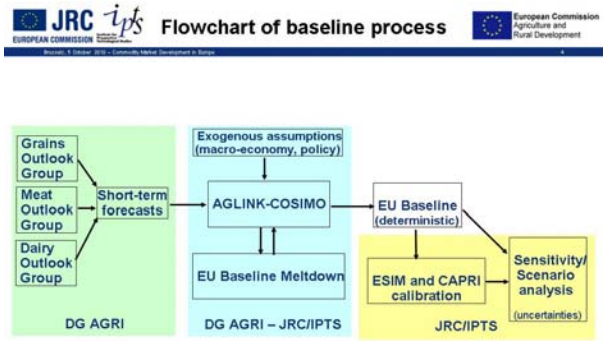
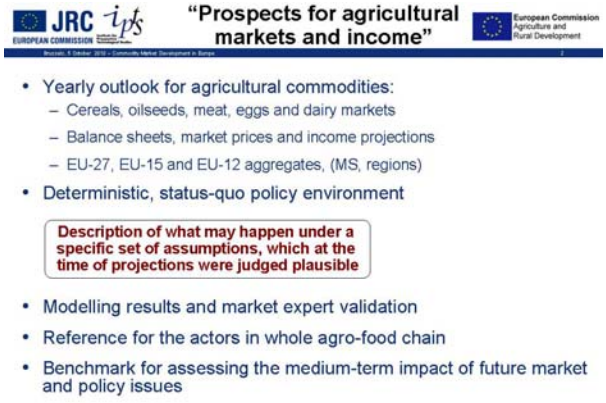
Flashback - Outlook 2009

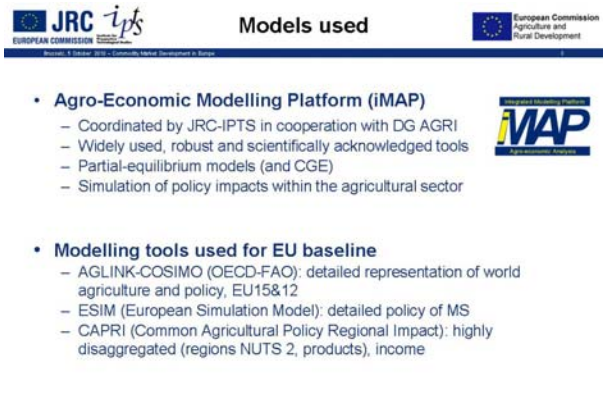
- **Cereals** : sharp price decrease 2008/09 and prices remaining at relatively low levels on the short term
- **Oilseeds** : global supply and demand rising at high growth rates
- Slow down of **biofuel sector** in 2009, but EU policy will drive production upwards
- **Meat** : downward pressure on prices due to lower demand and increase of slaughterings
- **Milk** : price collapse mainly caused by increased global supply and diminishing demand; will recover on the medium term
- Many **input costs** are following the oil price developments, but impact on farm income is rather limited and depending on sector
- **Global economic recovery** after 2010 but a lot of uncertainties on length and breadth of economic crisis and scale of negative feedback loops

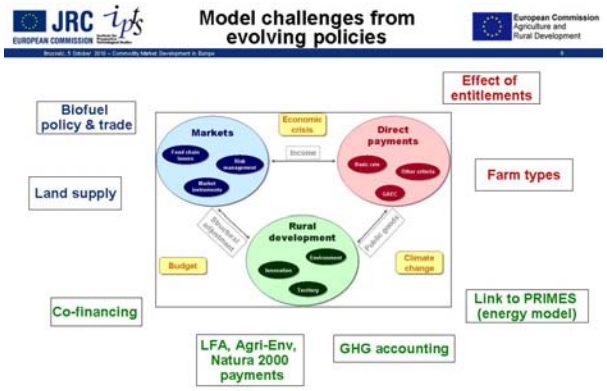
Modelling Tools for Baseline Work at the EC – State of the Art / Improvements

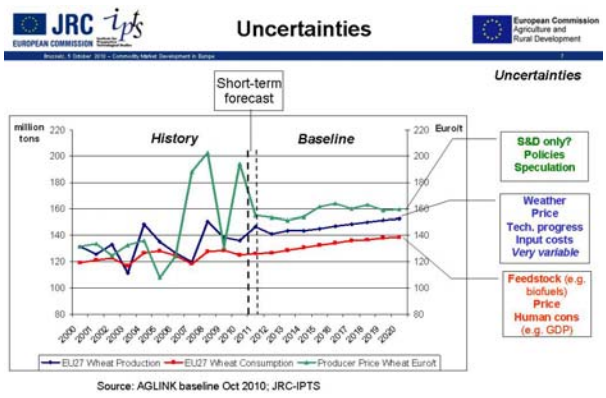
Robert M'barek (JRC-PTS), Pierluigi Londero (DG AGRI)
and Thomas Fellmann (JRC-IPTS)

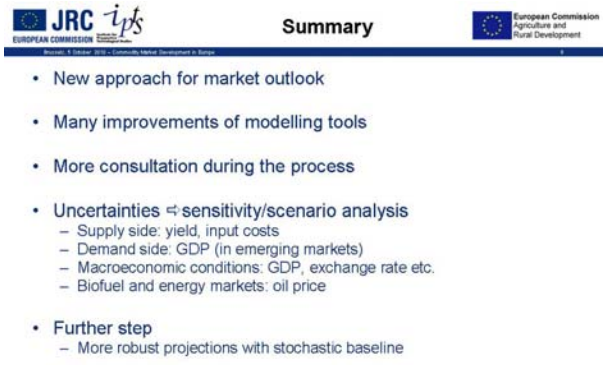






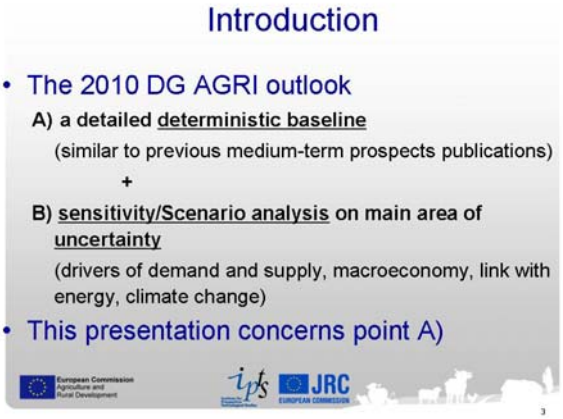


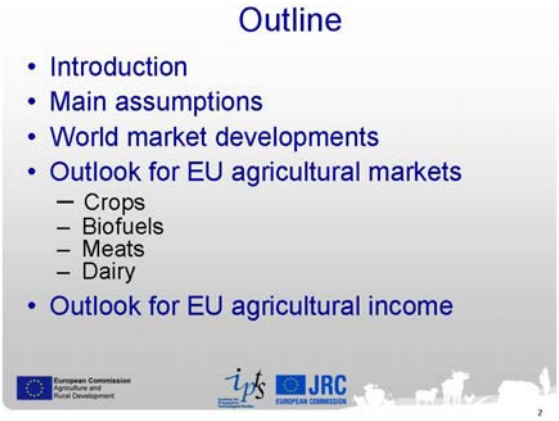




Medium-term Prospects for EU Agricultural Markets and Income

Pierluigi Londero, Bence Tóth (DG AGRI) and S. Hubertus Gay (JRC-IPTS)

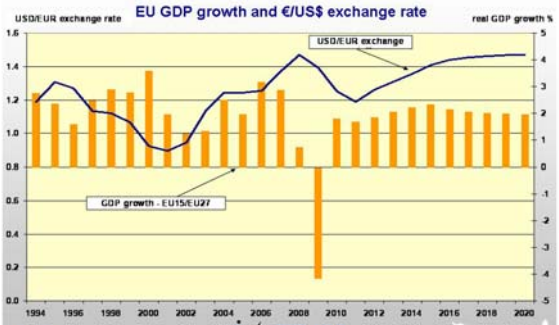




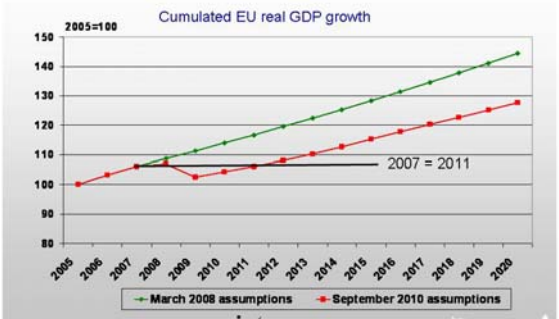
Assumptions: Macro-economic environment

- Short-term influenced by the slow recovery after the recession
- Medium-term prospects remain favourable
  - EU real GDP growth around +2% per year
  - USD/EUR exchange rate to stabilise around 1.45
  - EU inflation around 1.9% per year
  - EU population growth would slow to 0.3% per year
  - Crude oil price to grow but stay below 100 USD/barrel
  - World GDP growth above 3.7% per year
- High degree of uncertainty as the economic outlook remains subject to a number of (mainly downside) risks

Macroeconomics: slow EU recovery and stronger €



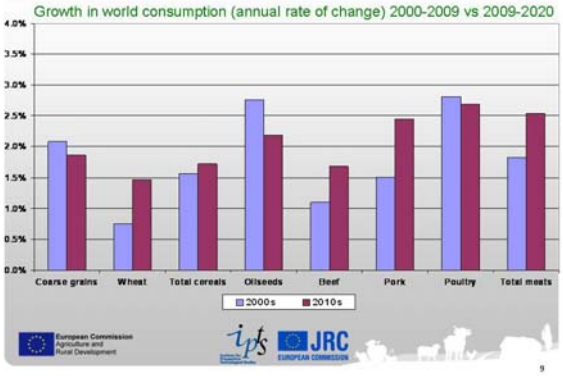
Macroeconomics: growth, but 4 years lost



Main results

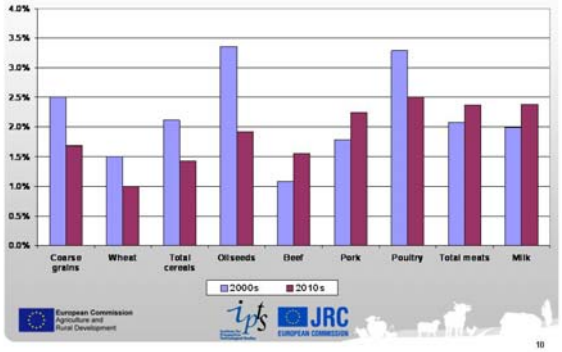
World market developments: still strong demand

Growth in world consumption (annual rate of change) 2000-2009 vs 2009-2020



World market developments: production also growing, but not as fast

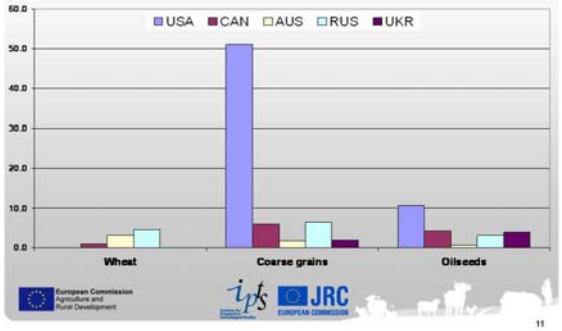
Growth in world production (annual rate of change) 2000-2009 vs 2009-2020



World market developments

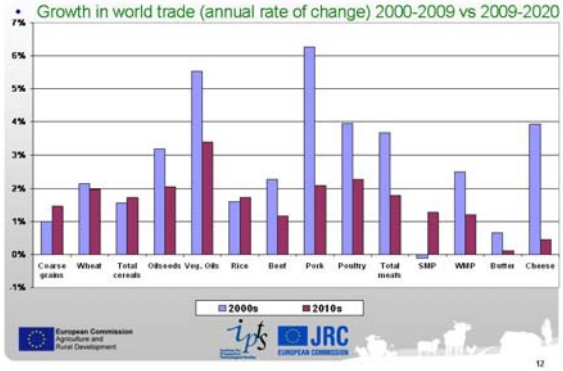
Projected production developments in main producing and exporting countries

difference in production - 2020 compared to 2009 (mio t)



World market developments: trade

Growth in world trade (annual rate of change) 2000-2009 vs 2009-2020



EU Crops

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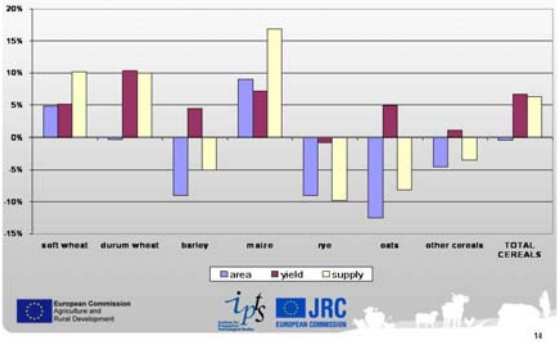
Cereals: (low) yield growth keeps the sector growing

EU-27 area, yield and production projections – 2020/21 vs 2009/10 - %



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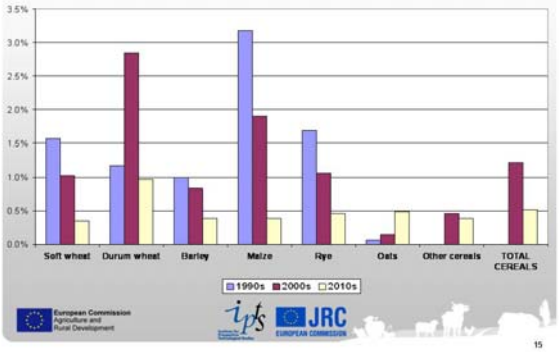
Cereals: focus on yield growth

EU-27 past and projected yield growth – average annual rate of change



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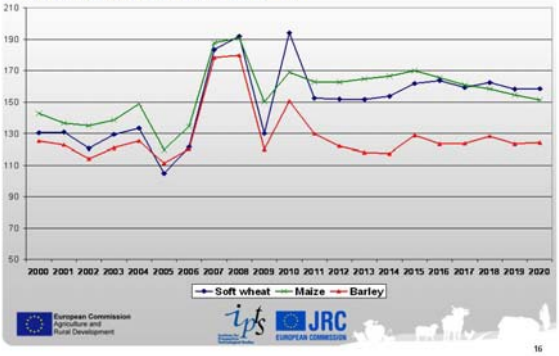
Cereals prices: another blip or a new pattern?

EU-27 domestic price projections – €/t



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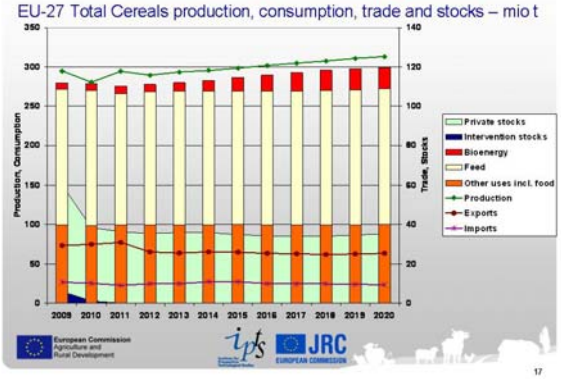
Cereals balance: tight market projections

EU-27 Total Cereals production, consumption, trade and stocks – mio t



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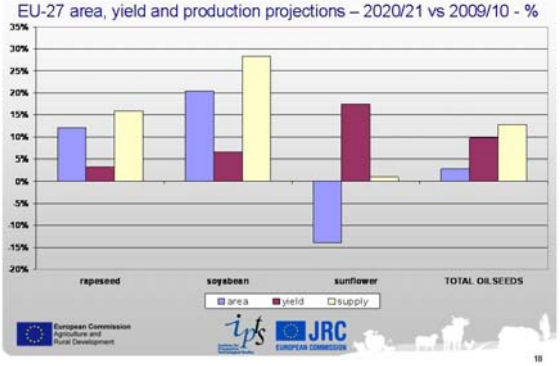
Oilseeds: gaining area

EU-27 area, yield and production projections – 2020/21 vs 2009/10 - %



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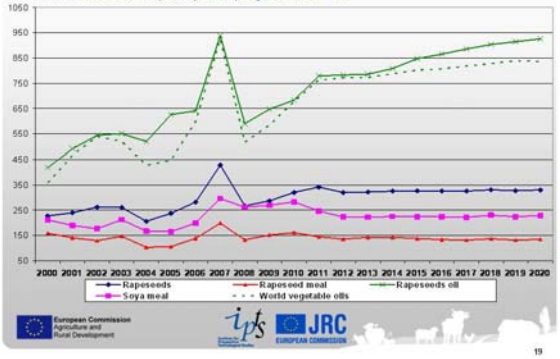
Oilseeds prices: oils up and (therefore) meals down

EU-27 oilseed complex price projections – €/t



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Land use: more maize, soft wheat and rapeseed less barley and sunflower

EU-27 Area under arable crops – mio ha

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cereals		**58.5**	**56.3**	**57.7**	**57.1**	**57.4**	**57.4**	**57.8**	**57.8**	**57.9**	**58.0**	**58.2**	**58.3**
of which	EU-15	35.5	34.3	35.1	34.8	34.9	34.9	35.0	35.1	35.2	35.3	35.4	35.4
	EU-12	23.1	22.0	22.5	22.3	22.5	22.5	22.8	22.7	22.7	22.8	22.9	22.9
Soft wheat		22.9	23.0	23.8	23.3	23.5	23.4	23.5	23.7	23.8	23.8	23.9	24.0
Durum wheat		2.8	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Barley		13.9	12.4	12.8	12.8	12.8	12.8	12.8	12.8	12.7	12.7	12.7	12.7
Maize		8.4	8.1	8.1	8.3	8.4	8.5	8.6	8.7	8.8	9.0	9.1	9.2
Rye		2.8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5
Other cereals		7.7	7.3	7.4	7.3	7.3	7.3	7.3	7.2	7.2	7.2	7.2	7.1
Oilseeds		**10.8**	**10.9**	**10.8**	**10.9**	**10.9**	**11.0**	**11.0**	**11.0**	**11.0**	**11.0**	**11.1**	**11.1**
of which	EU-15	6.0	5.9	5.9	6.0	5.9	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	EU-12	4.8	5.0	4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Rapeseed		6.5	6.9	6.9	7.0	7.0	7.1	7.1	7.1	7.2	7.2	7.3	7.3
Sunseed		3.9	3.7	3.6	3.6	3.6	3.5	3.5	3.5	3.5	3.4	3.4	3.4
Soyabeans		0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4
Sugar beet		**1.5**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.3**	**1.3**
Protein crops		**0.9**	**1.1**	**1.1**	**1.1**	**1.1**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**
Total selected arable crops		**71.8**	**69.8**	**71.0**	**70.5**	**70.7**	**70.8**	**71.0**	**71.2**	**71.3**	**71.4**	**71.6**	**71.7**
Total utilized agricultural area		**188.8**	**188.3**	**187.7**	**187.2**	**186.6**	**186.1**	**185.5**	**185.0**	**184.4**	**183.9**	**183.3**	**182.8**

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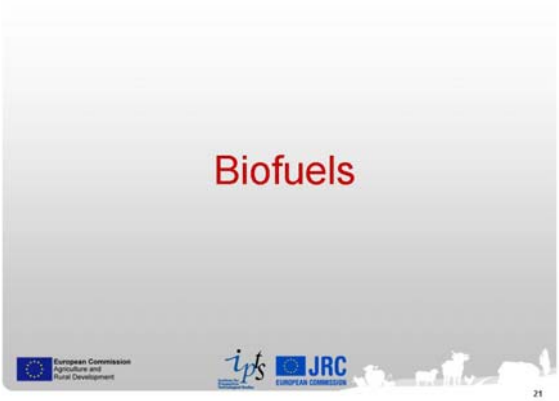
Biofuels
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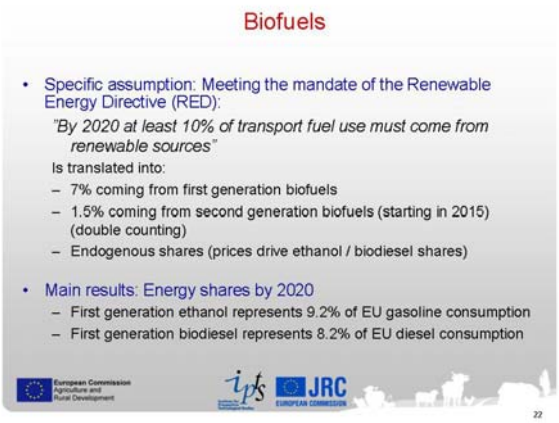
Biofuels
• Specific assumption: Meeting the mandate of the Renewable Energy Directive (RED):
"By 2020 at least 10% of transport fuel use must come from renewable sources"
Is translated into:
– 7% coming from first generation biofuels
– 1.5% coming from second generation biofuels (starting in 2015) (double counting)
– Endogenous shares (prices drive ethanol / biodiesel shares)
• Main results: Energy shares by 2020
– First generation ethanol represents 9.2% of EU gasoline consumption
– First generation biodiesel represents 8.2% of EU diesel consumption
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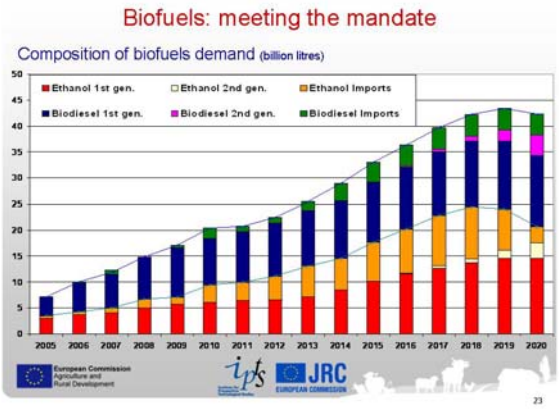
Biofuels: meeting the mandate
Composition of biofuels demand (billion litres)
Ethanol 1st gen.
Ethanol 2nd gen.
Ethanol Imports
Biodiesel 1st gen.
Biodiesel 2nd gen.
Biodiesel Imports
50
45
40
35
30
25
20
15
10
5
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
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2020
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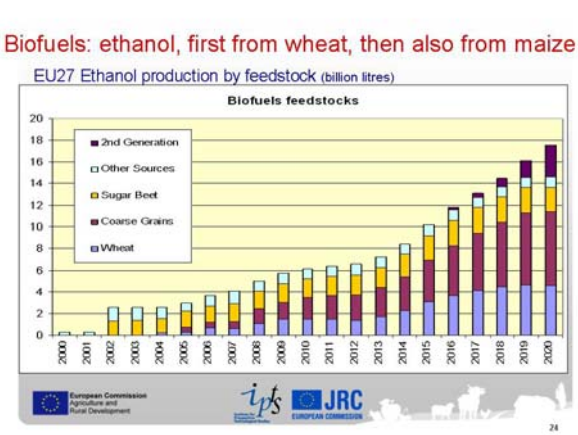
Biofuels: ethanol, first from wheat, then also from maize
EU27 Ethanol production by feedstock (billion litres)
Biofuels feedstocks
2nd Generation
Other Sources
Sugar Beet
Coarse Grains
Wheat
20
18
16
14
12
10
8
6
4
2
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
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2014
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2017
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2019
2020
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Meats
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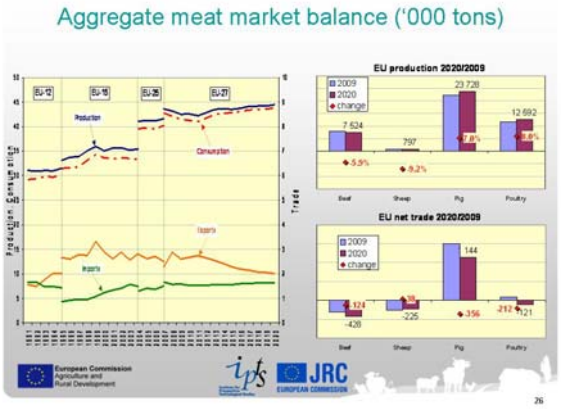
Aggregate meat market balance ('000 tons)
EU-12
EU-15
EU-25
EU-27
Production
Consumption
Imports
Exports
EU production 2020/2009
2009
2020
change
7 624
797
23 728
12 692
-5.5%
-9.2%
7.8%
EU net trade 2020/2009
2009
2020
change
-124
-428
-225
144
-356
-212
-121
Beef
Sheep
Pig
Poultry
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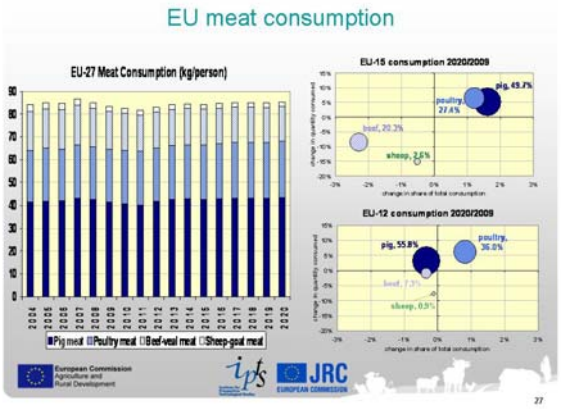
EU meat consumption
EU-27 Meat Consumption (kg/person)
Pig meat
Poultry meat
Beef-veal meat
Sheep-goat meat
EU-15 consumption 2020/2009
pig, 49.7%
poultry, 27.4%
beef, 20.2%
sheep, 2.6%
EU-12 consumption 2020/2009
pig, 55.8%
poultry, 36.0%
beef, 7.3%
sheep, 0.9%
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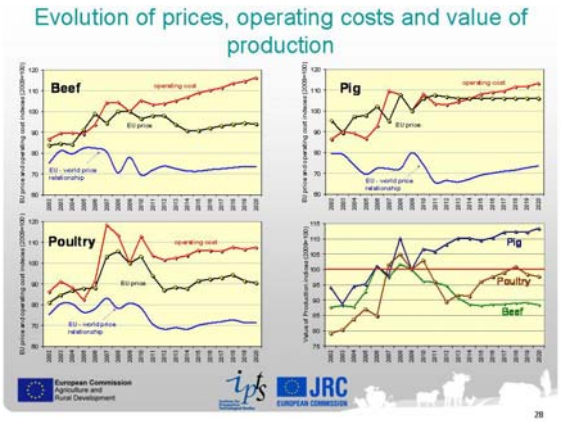

Evolution of prices, operating costs and value of production
Beef
Pig
Poultry
operating cost
EU price
EU - world price relationship
Value of Production
European Commission
Agriculture and Rural Development
ipts
JRC
EUROPEAN COMMISSION
28

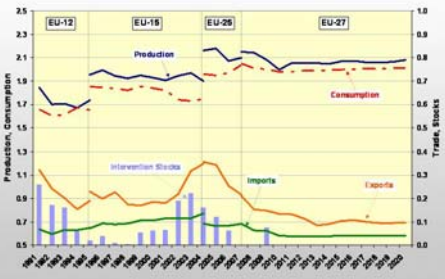
Conclusions

- Favourable demand prospects for poultry and pig meat (versus declining consumption of beef and sheep meats) drive markets
- But EU producers are increasingly „squeezed" between rising operating costs and gradually lower world market prices
  - EU production growth for poultry and pig meat at lower gross margins
  - EU net trade position deteriorates
- Long term prospects for the *value of production* for pig and poultry sectors remain positive, but increasing costs dampen the overall effect on *income*.

Dairy

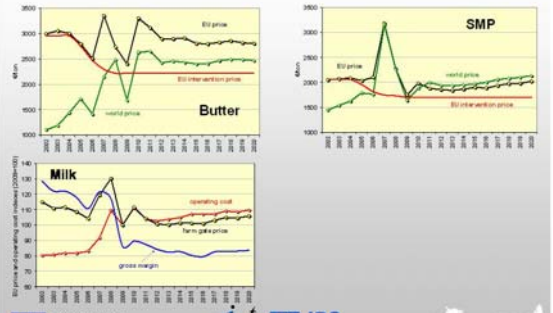
Cheese demand supports production growth

Butter market remains stable



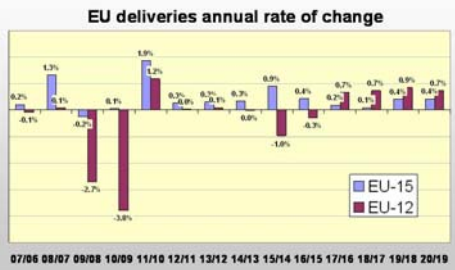
SMP market recovers gradually

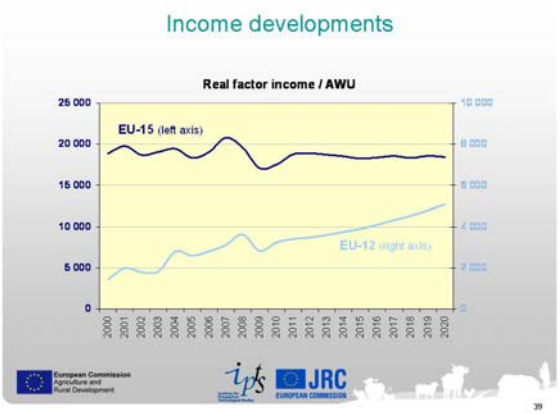
Evolution of prices and operating costs

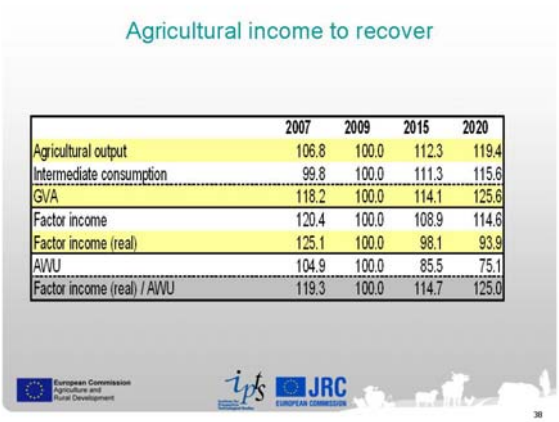


Milk production growth remains below quota increase

Milk deliveries in the EU-15 and EU-12







	2007	2009	2015	2020
Agricultural output	106.8	100.0	112.3	119.4
Intermediate consumption	99.8	100.0	111.3	115.6
GVA	118.2	100.0	114.1	125.6
Factor income	120.4	100.0	108.9	114.6
Factor income (real)	125.1	100.0	98.1	93.9
AWU	104.9	100.0	85.5	75.1
Factor income (real) / AWU	119.3	100.0	114.7	125.0

Comments on EU Outlook I

Julian Binfield (FAPRI)

Comments on EU Outlook

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FAPRI

Background

- I'll compare the Commissions figures to the EU GOLD model baseline from earlier in the year
- We will update this soon, but long run probably won't change too much
- Dollar/euro, we have 1.57, they have 1.47
- We have oil at $94, Commission at $98
- I will try to focus on big issues and big differences

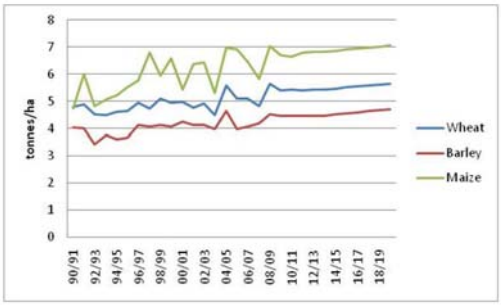
Cereals, 2019

		Commission	Me
Area	Wheat	26.7	26.1
	Barley	12.7	12.5
	Maize	9.1	9.0
	Rapeseed	7.3	8.0
Yield	Wheat	5.67	5.66
	Barley	4.63	4.75
	Maize	7.30	7.09
Production	Wheat	151.5	147.6
	Barley	58.8	59.4
	Maize	66.4	63.8

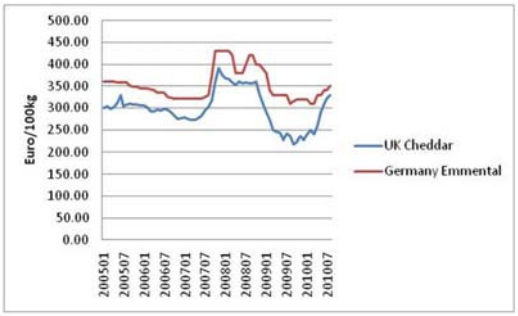
French vs Hungarian Maize

Source: Commission prices

Gold model EU-27 yields

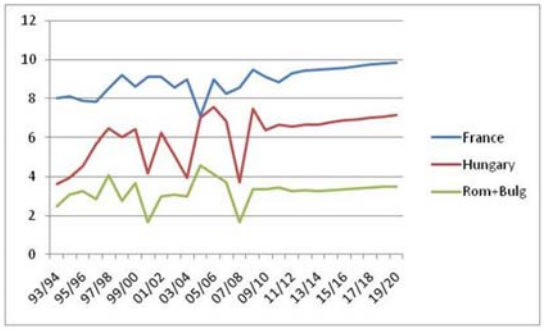


UK Cheddar vs German Emmental

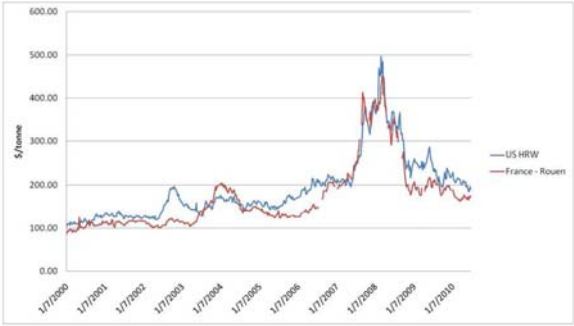


Source: Commission prices, MDC Datum

GOLD Model Maize Yields



EU Wheat vs World Price

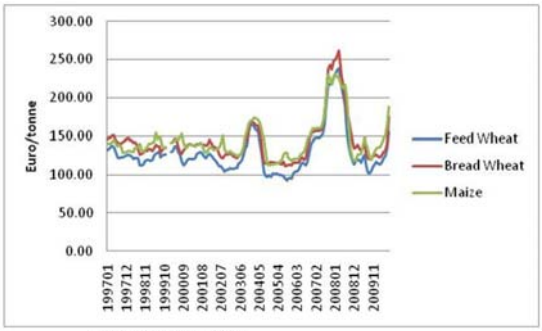


Source: HGCA

EU Prices?

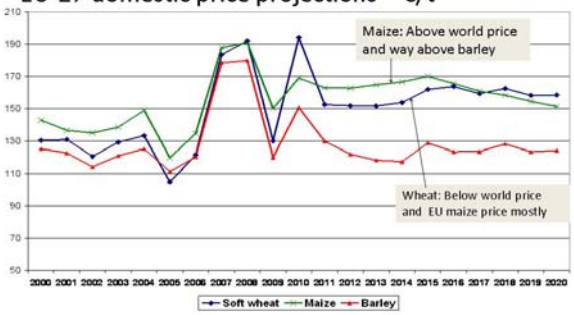
- As EU expands, how useful is a EU average price? Wide divergences across regions
- Potentially very important for trade
- Within crops
- Between different types of the same broad product
- Between EU and world prices

EU Average Wheat vs Maize Price



Source: Commission prices

EU-27 domestic price projections – €/t



Biofuels

- How hard are 2010 net trade figures?

	Commission	Strat. Gns.
Biodiesel	-2.0 bil ltrs	-2.5 bil ltrs
Ethanol	-3.3 bil ltrs	-.6 bil ltrs

- What is driving imports?
- Why is there not more ethanol from sugar?

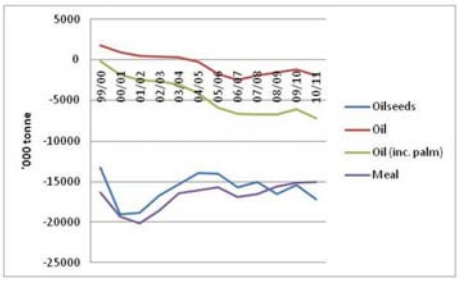
Oilseeds

- Seems to be discrepancy in oilseeds:
  - Rapeseed area growing slowly
  - Small growth in oilseed and veg.oil imports
  - Increase on biodiesel production of 8 billion litres
- Up until now, EU has imported oilseeds rather than vegetable oil, will that continue?

Dairy

- For a given expansion in milk production I would have a greater proportion coming from NMS especially Poland?
- Overall, the dairy market projection is pretty stable. Are we missing something?
- EU butter price is greater than the world price and above the intervention price. Does this imply export subsidies?

Oilseed Product EU Net Exports



Source: PS and D

Meat

- No real recovery in beef imports
- I must have stronger beef consumption as I have prices rising to around 350 euro/100kg
- Meat consumption as a whole does not exceed 2009's until 2013
- Why are sheep imports falling?

Comments on EU Outlook II

David Blandford (Pennsylvania State University)

PENNSTATE

Workshop on Commodity Market Development in Europe - Outlook

Session 1

Brussels
October 5-6, 2010

David Blandford
Penn State University

1

PENNSTATE

Commodity Market Outlook

- Will we see a return to a stable path broadly along the lines of the previous decade?
- What are the key uncertainties (shift factors) that could make the future different from the recent past?

2

PENNSTATE

Key shifters

- A less positive macroeconomic environment?
  - A longer and more difficult period of adjustment in developed countries with growth rates of less than 2% per year
  - Implications of adjustment in key developing countries - economic rebalancing with less reliance on export-led growth

3

PENNSTATE

Key shifters

- Greater production response?
  - Brazil as an agricultural powerhouse over the next 10 years
  - Continued rapid expansion in grains and oilseeds production (e.g., Brazil, US) with consequent implications on feed supplies and livestock markets

4

PENNSTATE

Key shifters

- Problems in achieving biofuel mandates?
  - 2nd generation biofuels unlikely to be a key factor - as assumed in the Outlook
  - Blend wall constraints in the United States leading to excess production of maize-based ethanol
  - High sugar prices generating intense competition for ethanol feedstock in Brazil

5

PENNSTATE

Key shifters

- Greater instability in global crop production?
  - Climate change and extreme events
  - An increasing likelihood of price blips leading to adjustment problems (and frequent "crisis" meetings in international fora)

6

Key shifters

- Policy change as a result of greater instability in the system?
  - The "market management faction" confronts the "market orientation faction" in the face of greater market instability

7

Can we predict the future?

"Please tell me about the Outlook."

8

Comments on EU Outlook III

Josef Schmidhuber (FAO)

"Medium term prospects for EU agricultural markets and income 2010-2020"

Comments

Josef Schmidhuber
FAO

Brussels, 5 October 2010

Specific comments

1. Comparison to the OECD-FAO medium term outlook:
   - Lower GDP growth, but more consumption of pig meat, poultry (24.6 vs. 20.5 kg/p/y), coarse grains? Less wheat.
   - Higher population growth (0.3% vs. < 0.2%)
2. How compatible is the high EU production growth for pig and poultry meat at declining gross margins?
3. Shouldn't pig/poultry prices follow cereal prices in the long-run? Efficiency gains implicitly assumed for poultry production?
4. The wedge between EU and world prices for vegetable oils is rising over time. Ditto, oil prices/oilseed prices rise faster than the rest. Why?
5. Why will 6 million ha of "utilized area" go out of production?

Brussels, 5 October 2010

General comments

1. Consistent overall picture of a deterministic baseline (within the set of assumptions made)
2. Satiated internal market at high per capita consumption levels, steady-state population, growing competition from foreign supplies, potential growth only in feedstock demand for biofuels (policy driven, at least at "low" energy prices).
3. But potential policy problems for biofuels: UR: no problems; DDA potentially huge problems wrt. WTO subsidy notification, AMS, OTDS limits, EGS classification.
4. Higher price levels compared to previous decades, but declining from (cereals, meat, milk) or stagnating at current levels (oil, oilseeds).
5. Co-movement of prices (world and EU, as well as across commodities) in line with a priori expectations (except for oils)
6. "High degree of uncertainty due to downside risks from the macro-economic front"
   - Should the assumed depreciation of the USD (1.45) automatically be linked to the assumption of higher dollar-denominated world prices?
   - 1.9% inflation appears to be high, not least with rising Euro
   - Would a "negative macroeconomic development" necessarily be negative for agriculture?

Brussels, 5 October 2010

General questions – beyond the baseline

1. What are the major uncertainties/risks/opportunities over the medium term?
   - Sovereign debt default in one or several PIIGS?
   - Significantly higher oil prices and "endogenous" bioenergy demand
   - High volatility even through small shocks: no rise in stocks, susceptibility to exogenous shocks remains high (ERs, weather, USD, etc.)
   - A policy change for biofuels in the context of a successful conclusion of the DDA ?
   - Overall move towards an overall deflationary environment? What impacts would that have on agriculture?
2. Will real prices really remain on this higher plateau? Why is supply responsiveness so low? (higher input prices? Time lag of technological progress? High volatility?)
3. Higher price volatility globally: will it provide a relative advantage for EU producers?
4. Is there a plan to calculate the carbon footprint of the baseline and changes in alternative scenarios (CAP reform, macro, etc.). Ditto for the healthiness of the diet (shift from beef to poultry ...), impact of lower SSR on carbon footprints, etc.

Brussels, 5 October 2010

Drivers of Demand: Setting the Scene

Merritt Cluff (FAO)

Setting the scene: Drivers of Demand

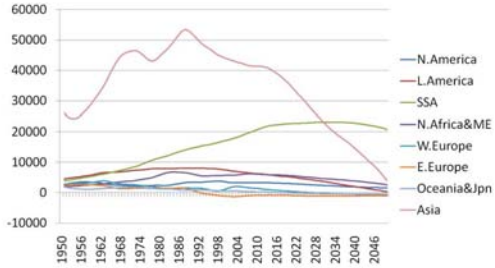
Workshop on "Commodity Market Development in Europe – Outlook
October 5-6, 2010

Trade and Markets Division

Outline

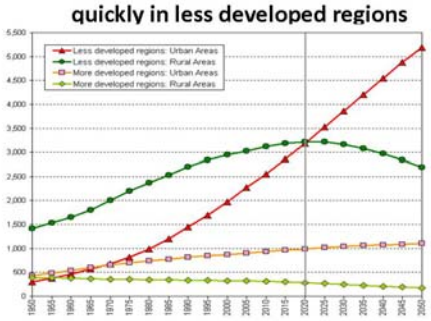
- Key drivers of global commodity demand
  - Demographics
  - Income growth
  - Demand
    - Food
    - Non-food
- Conclusions

By region fall in net addition is highest in Asia region



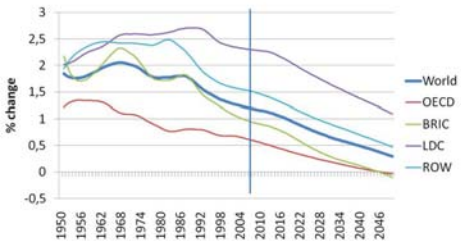
Source: UN-Statistics/population 2008

Urban/Rural transition is happening most quickly in less developed regions



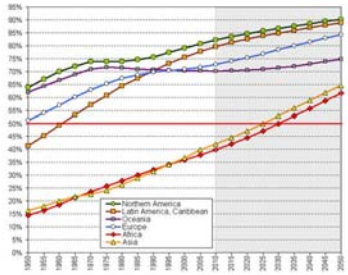
Source: UN-Statistics/population 2009

Population growth is declining(%)



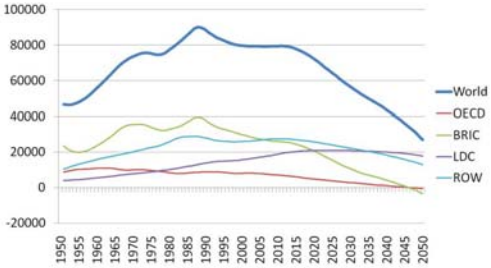
Source: UN-Statistics/population 2008

Urban transition lags in Asia and Africa



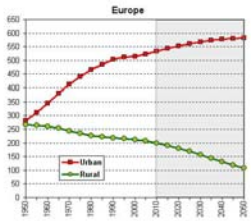
Source: UN-Statistics/population 2009

Net Addition to population starting to fall quickly during the projection period



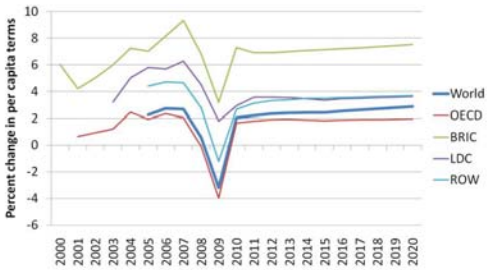
Source: UN-Statistics/population 2008

In Europe rural numbers falling quickly



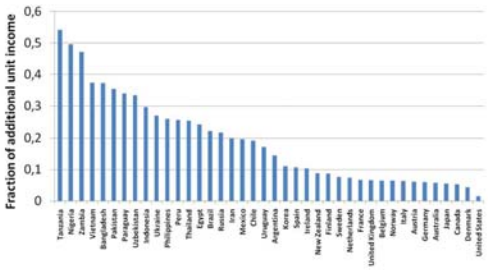
Source: UN-Statistics/population 2009

Growth in recover may be slower than period prior to the "Great Recession", but strong



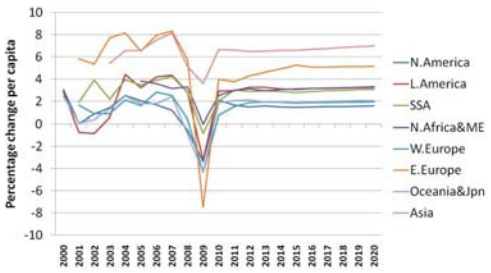
Source: IMF April, 2010 to 2015, extended to 2020

Additional food expenditure per unit



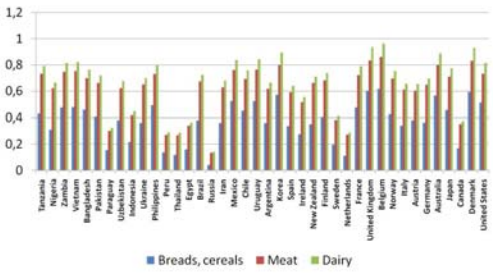
Regmi and Searle (2003)

Will cumulative growth be this strong?



Source: IMF April, 2010 to 2015, extended to 2020

Elasticities wrt to income

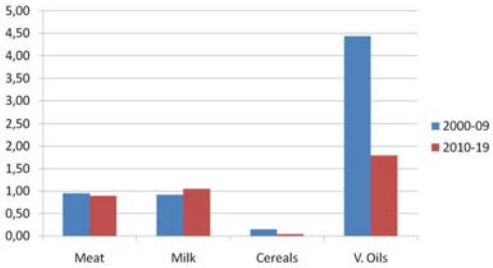


Regmi and Searle (2003)

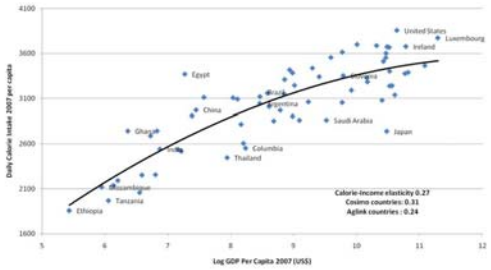
Summary

	Annual growth -2010-2020	
	Population	P-C Output
N.America	0.9	1.5
L.America	0.9	3.1
SSA	2.3	3.0
N.Africa&ME	1.5	3.1
W.Europe	0.2	1.9
E.Europe	-0.4	4.8
Oceania&Jpn	0.1	2.0
Asia	1.0	6.7
World	1.1	2.5

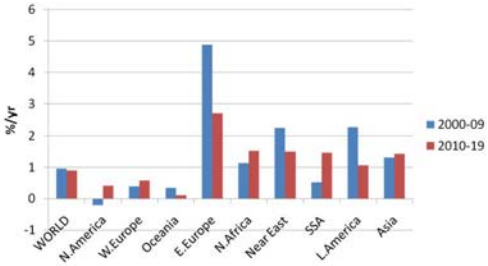
OECD-FAO Outlook: Annual growth in per capita consumption



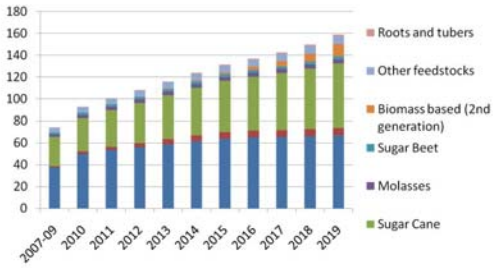
Calorie consumption vs GDP: Engel again



OECD-FAO Outlook: Annual growth in per capita meat consumption



Non-food use:
Feedstock use in Ethanol Production

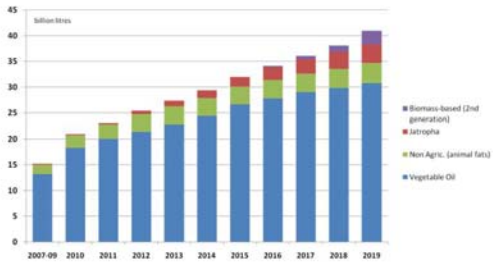


Source: OECD-FAO Agriculture Outlook

Conclusions (1)

- While the slowdown in population growth is gradual, its impacts are significant
  - Ageing population will also slow growth
  - Rising urban population in developing countries will impact on diets – move to more meat/dairy
  - Population in lowest income countries still grows the most.
- Income growth is anticipated to be strong by historical standards
  - If true, impacts on demand could be important with continued larger growth in meat/dairy
  - But income impacts on are also slowing gradually
- Non-food demand for commodities has been an important source of new demand – this may slow in the next 10 years
  - depending on energy prices/technologies

Non-food demand:
Feedstock use in bio-diesel production



Source: OECD-FAO Agriculture Outlook

Conclusions (2)

- It may be the characteristics of demand, as much as potential growth for demand which is relevant, especially but exclusively for advanced economies
  - Lower elasticities wrt to income and price for the food group
  - higher value/safety etc, rather than quantity
  - More and more food purchased outside the home, everywhere
- Are price elasticities getting lower or not? What does this mean for volatility/shocks, and the nature of the market.

Drivers of Demand: EU Outlook - Sensitivity Analysis

S. Hubertus Gay and Aikaterini Kavallari (JRC-IPTS)

JRC ipts
EUROPEAN COMMISSION
European Commission Agriculture and Rural Development

Session 2a: Drivers of demand
EU outlook – sensitivity analysis demand

Workshop on "Commodity Market Development in Europe - Outlook"
5/6 October 2010, Brussels

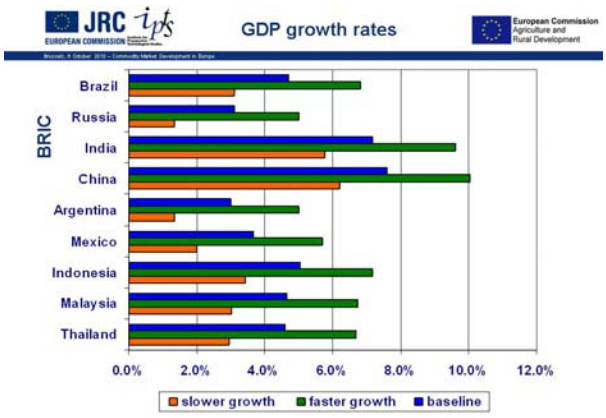
S. Hubertus Gay and Katerina Kavallari

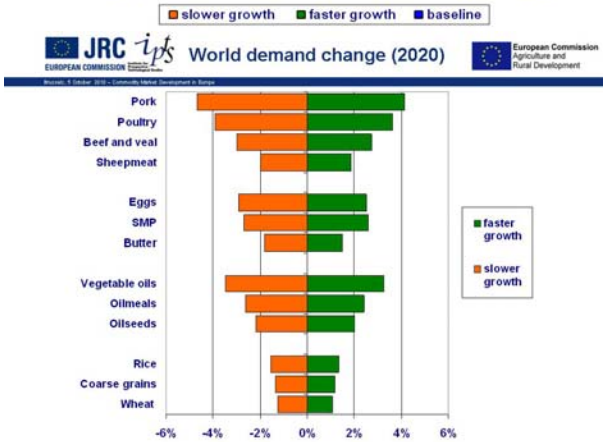
European Commission
Joint Research Centre
IPTS - Institute for Prospective Technological Studies
Seville - Spain

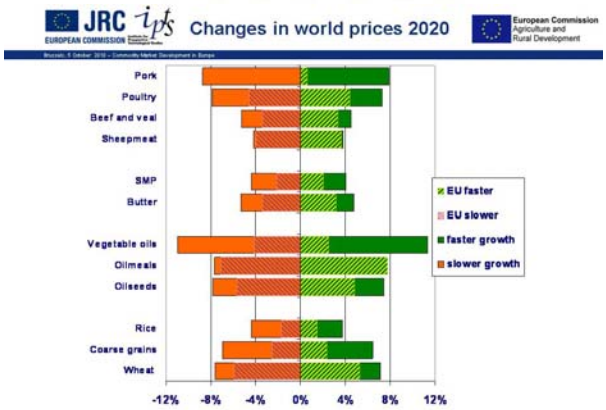
JRC ipts
EUROPEAN COMMISSION
European Commission Agriculture and Rural Development

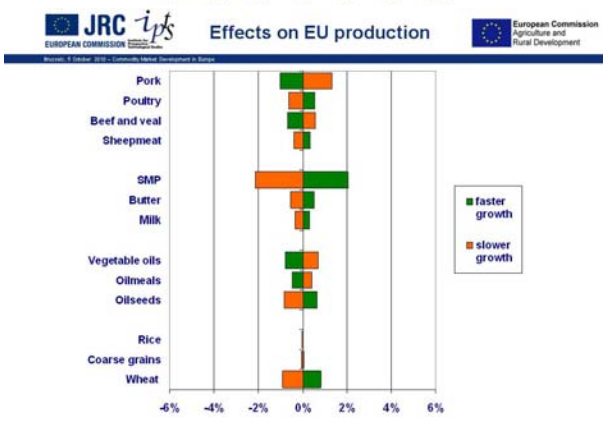
Setting for sensitivity analysis

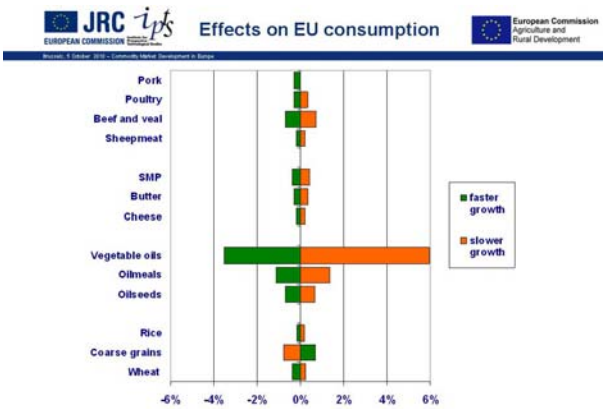
- Uncertainty about world demand development
- Most important major emerging markets:
  - BRIC (Brazil, Russia, India and China)
  - Argentina and Mexico
  - Indonesia, Malaysia and Thailand
- Demand changes are simulated through changing GDP growth rates
- 15% change in GDP by 2020 (up or down)
- no changes in other countries or other model inputs









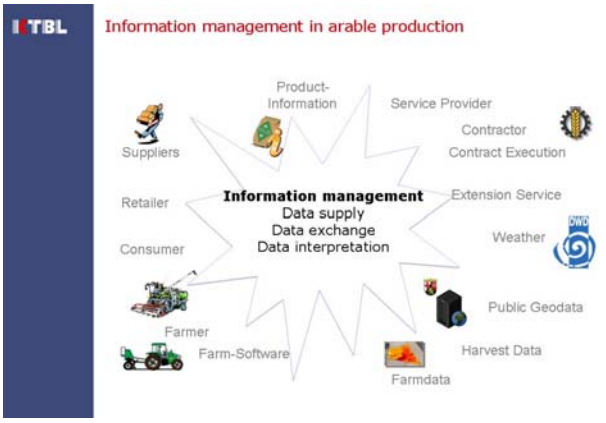


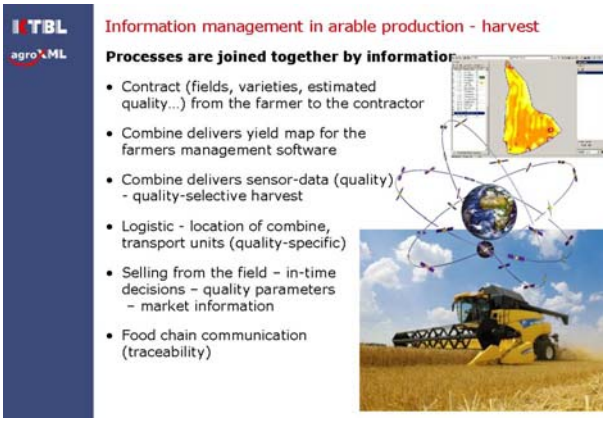
Closing remarks

- **The demand of the large emerging countries has strong impact on the world market**
  - This includes also world market prices
  - Especially vegetable oil, pork and poultry ...oilmeals, -seeds and grains
- **The effects on the EU markets are expected to be limited**
  - The price effect is only partly transmitted on the domestic prices
  - Thus, less incentives to increase production

Drivers of Supply: Setting the Scene

Martin Kunisch (KTBL)





Technical progress in agriculture 2020 – general conditions

Not technically related effects in arable farming

Changes in agricultural structure

- Increasing size of fields and farms (also in animal production)

Soil Protection

- Proportion of conservation tillage will increase

Plant breeding

- Adaptation of varieties on effects of climate change (drought, heat...)

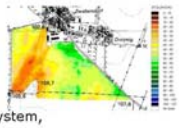
Precision farming - new techniques will be usual in 2020

Monitoring of ingredients - near infrared sensor

Photo: John Deere

Precision Farming - Elements

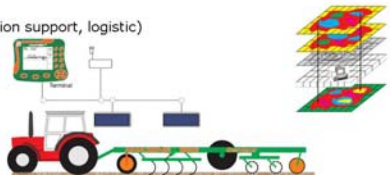
Site specific farming
(fertilization, pest control, tire pressure adaptation systems)



Guidance
(automatic headland managment-system, parallel tracking system)

Documentation
(fertilization, pest control, yield monitoring, quality)

Management
(Decision support, logistic)



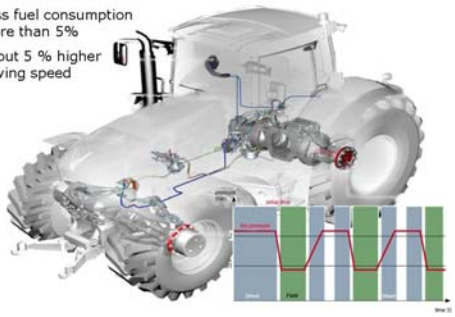
Precision farming - new techniques will be usual in 2020

Monitoring of weed control - three-chamber-sprayer

Precision farming - new techniques will be usual in 2020

Tire pressure adaptation system

- Lower soil compaction
- Less fuel consumption more than 5%
- About 5 % higher driving speed



Precision farming - profitability

Increasing yield up to 2-3 % per year

- Higher production-security due to analysis, monitoring and decision support
- Incresing product quality, e.g. higher protein content in wheat due to precision fertilization and selective harvest

Reduction of production-costs up to 20 €/ha

- Reduction of means of production, e.g. pesticides, fertilizer, fuel by 5-10 %

Precision farming - new techniques will be usual in 2020

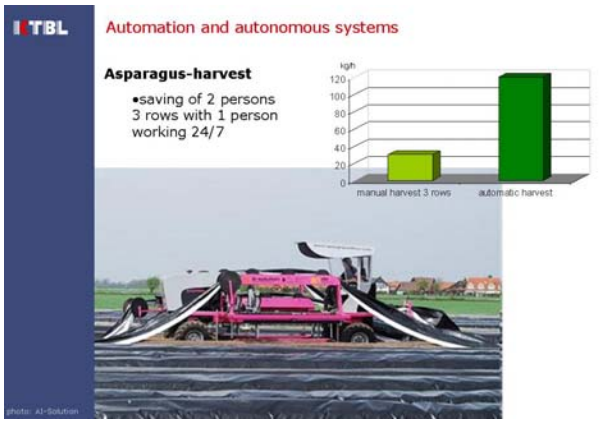
Monitoring of nutrients - Spectroscopic detection of plant parameters

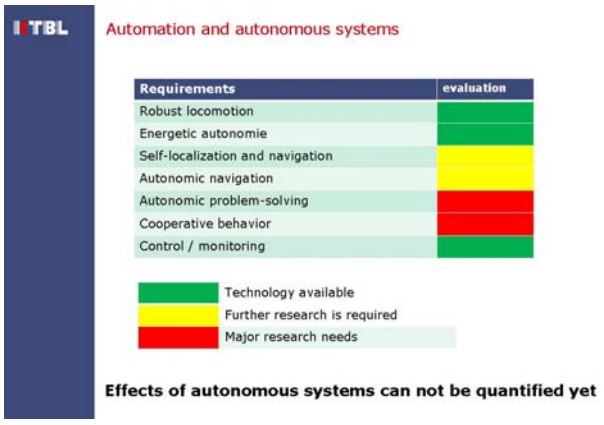
Photo: Fritzmeier

Automation and autonomous systems

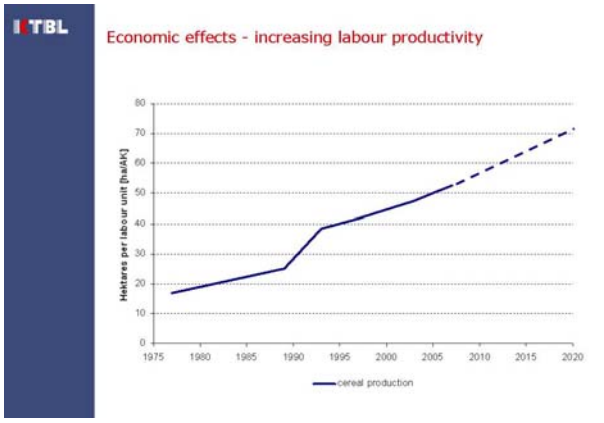
Monitoring of loading processes - automatic filling system

Photo: New Holland

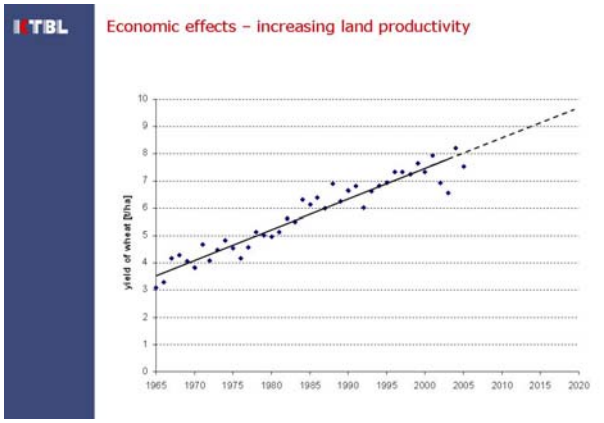

KTBL
Automation and autonomous systems
Asparagus-harvest
•saving of 2 persons
3 rows with 1 person
working 24/7
kgh
120
100
80
60
40
20
0
manual harvest 3 rows
automatic harvest

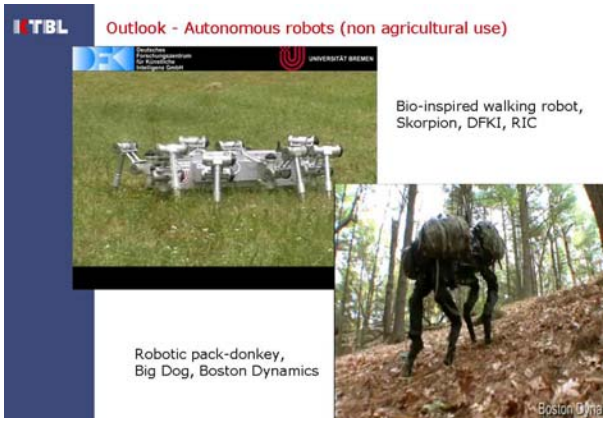

KTBL
Automation and autonomous systems
Requirements
evaluation
Robust locomotion
Energetic autonomie
Self-localization and navigation
Autonomic navigation
Autonomic problem-solving
Cooperative behavior
Control / monitoring
Technology available
Further research is required
Major research needs
Effects of autonomous systems can not be quantified yet

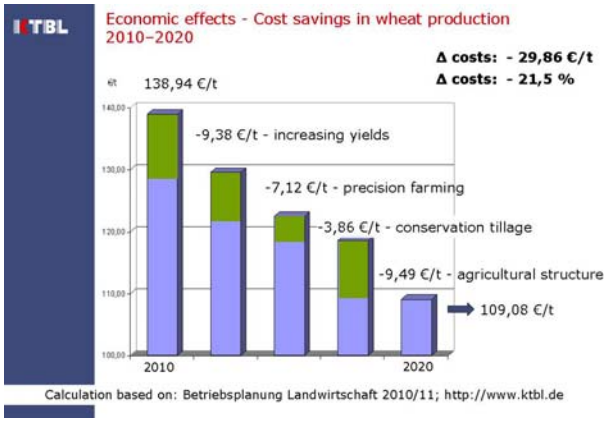

KTBL
Automation and autonomous systems
Common machines adapted to automatic operation
Electronic towing bar
one driver routes 3
combines
Master-slave system

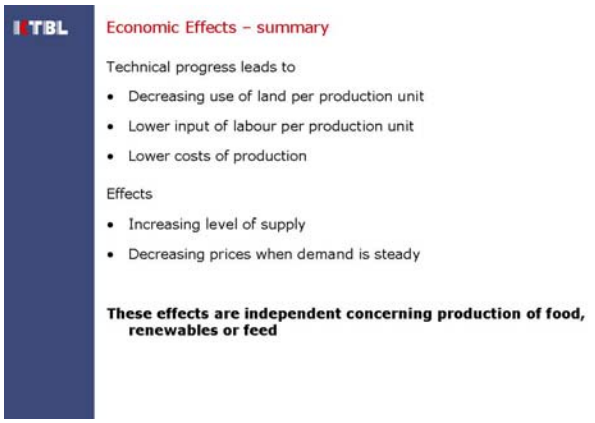

KTBL
Economic effects - increasing labour productivity
Hectares per labour unit [ha/AK]
80
70
60
50
40
30
20
10
0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
cereal production

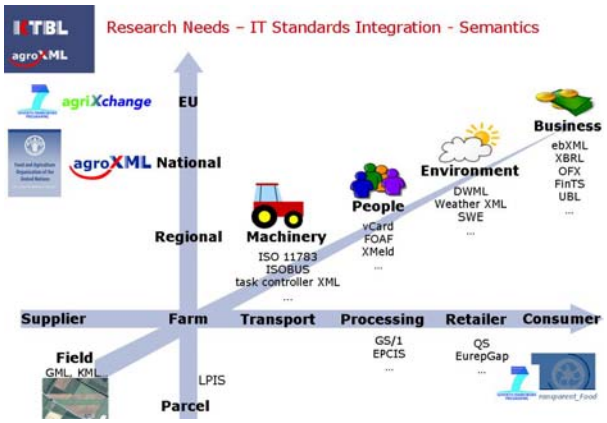

KTBL
Automation and autonomous systems
Small sized autonomous robots
Effects
- completely autonomous
- working under bad conditions
- active 24/7
- able to act interactive in groups
Operations
- analysis and monotoring
- sampling
- pest control


KTBL
Economic effects – increasing land productivity
yield of wheat [t/ha]
10
9
8
7
6
5
4
3
2
1
0
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020


KTBL
Outlook - Autonomous robots (non agricultural use)
UNIVERSITÄT BREMEN
Bio-inspired walking robot,
Skorpion, DFKI, RIC
Robotic pack-donkey,
Big Dog, Boston Dynamics

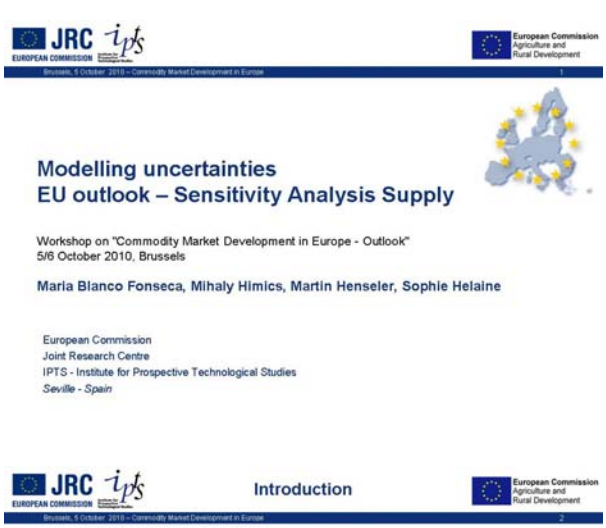

KTBL
Economic effects - Cost savings in wheat production
2010–2020
Δ costs: - 29,86 €/t
Δ costs: - 21,5 %
€/t
138,94 €/t
140,00
130,00
120,00
110,00
100,00
-9,38 €/t - increasing yields
-7,12 €/t - precision farming
-3,86 €/t - conservation tillage
-9,49 €/t - agricultural structure
109,08 €/t
2010
2020
Calculation based on: Betriebsplanung Landwirtschaft 2010/11; http://www.ktbl.de

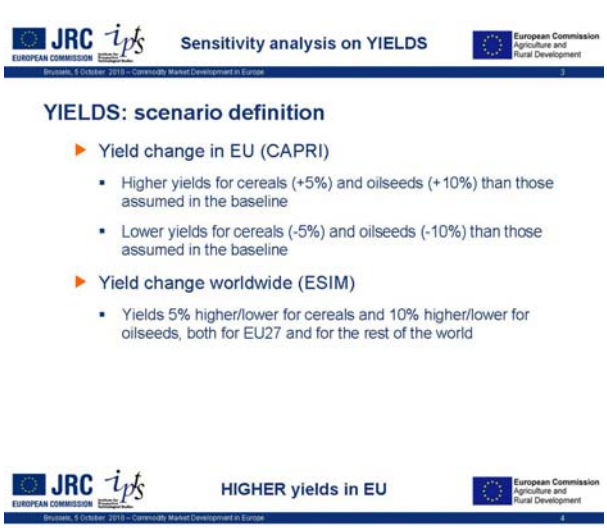


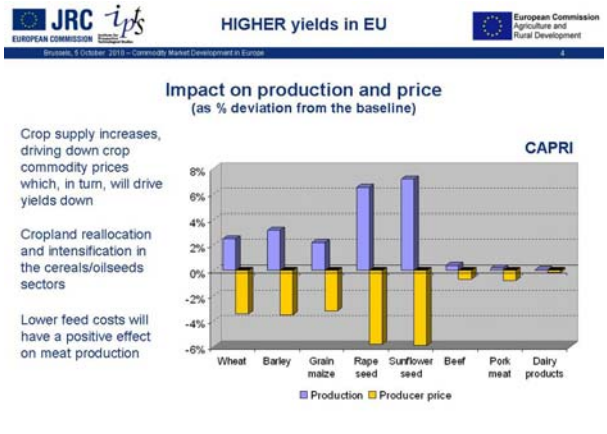


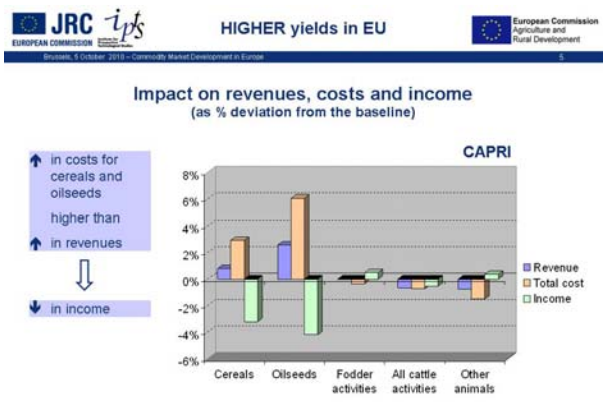
Drivers of Supply: EU Outlook - Sensitivity Analysis

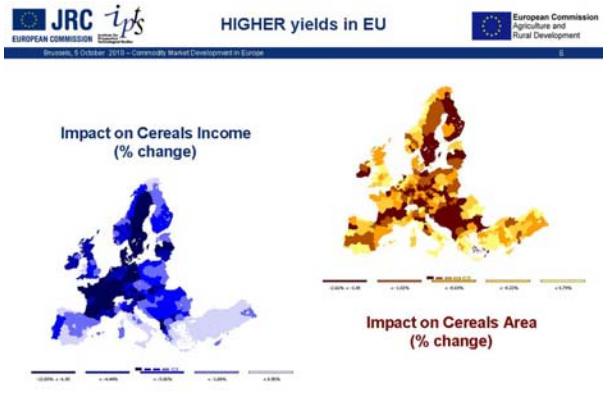
Maria Blanco Fonseca (JRC-IPTS/UPM), Mihaly Himics, Martin Henseler, and Sophie Helaine (JRC-IPTS)

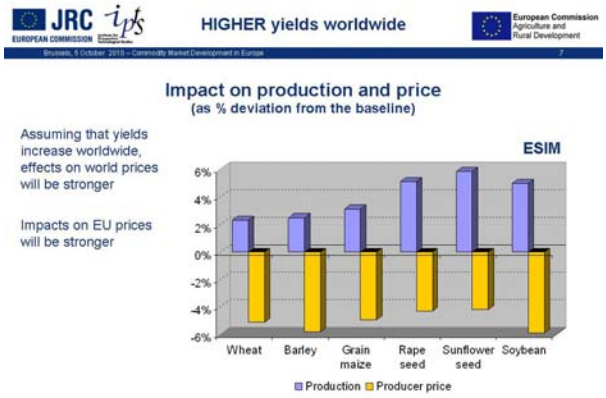


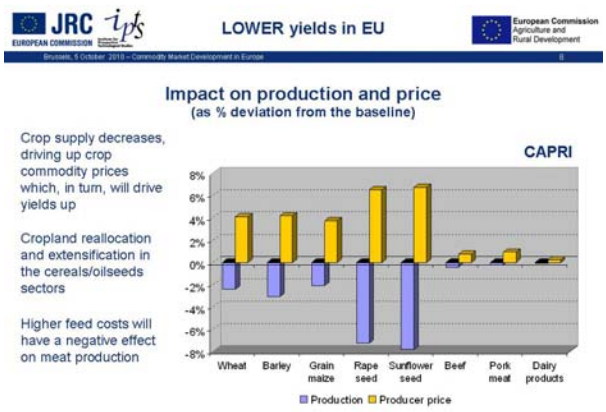


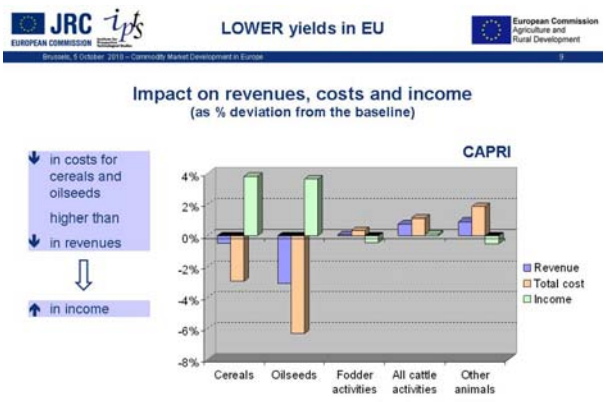


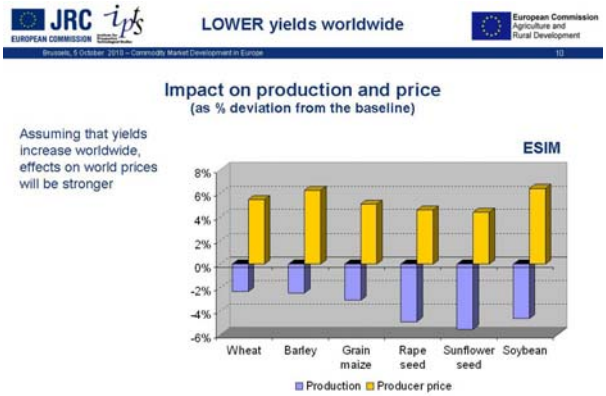

JRC ipts
HIGHER yields in EU
European Commission Agriculture and Rural Development
Impact on revenues, costs and income
(as % deviation from the baseline)
in costs for cereals and oilseeds
higher than
in revenues
in income
CAPRI
8%
6%
4%
2%
0%
-2%
-4%
-6%
Cereals
Oilseeds
Fodder activities
All cattle activities
Other animals
Revenue
Total cost
Income

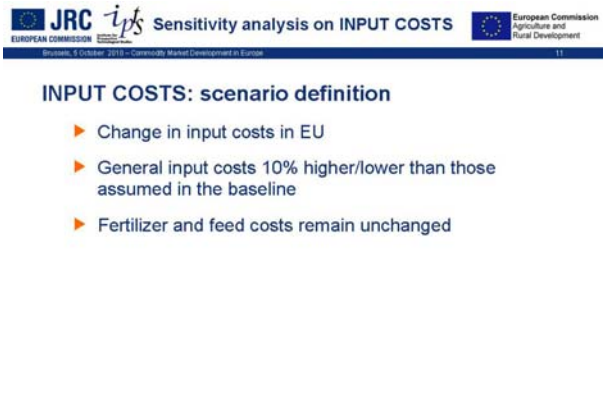

JRC ipts
HIGHER yields in EU
European Commission Agriculture and Rural Development
Impact on Cereals Income
(% change)
Impact on Cereals Area
(% change)

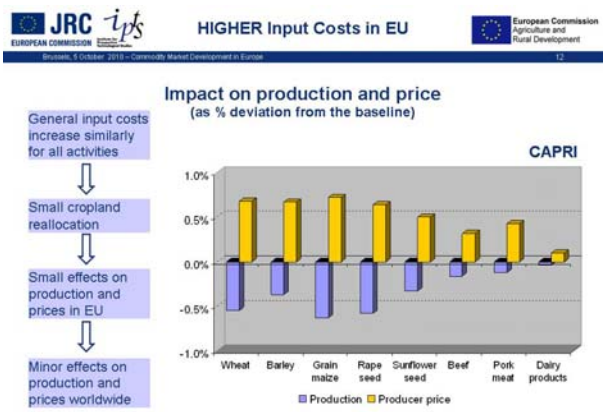

JRC ipts
HIGHER yields worldwide
European Commission Agriculture and Rural Development
Impact on production and price
(as % deviation from the baseline)
Assuming that yields increase worldwide, effects on world prices will be stronger
Impacts on EU prices will be stronger
ESIM
6%
4%
2%
0%
-2%
-4%
-6%
Wheat
Barley
Grain maize
Rape seed
Sunflower seed
Soybean
Production
Producer price

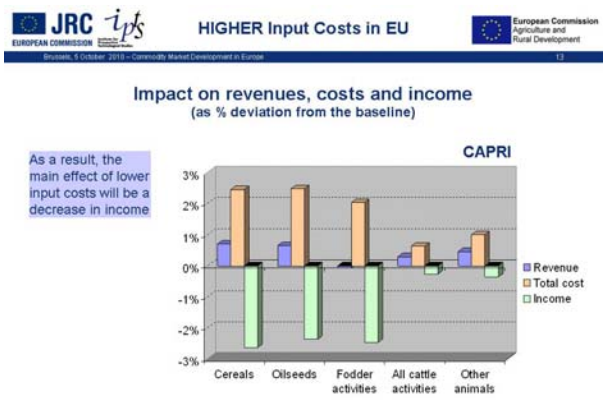

JRC ipts
LOWER yields in EU
European Commission Agriculture and Rural Development
Impact on production and price
(as % deviation from the baseline)
Crop supply decreases, driving up crop commodity prices which, in turn, will drive yields up
Cropland reallocation and extensification in the cereals/oilseeds sectors
Higher feed costs will have a negative effect on meat production
CAPRI
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
Wheat
Barley
Grain maize
Rape seed
Sunflower seed
Beef
Pork meat
Dairy products
Production
Producer price

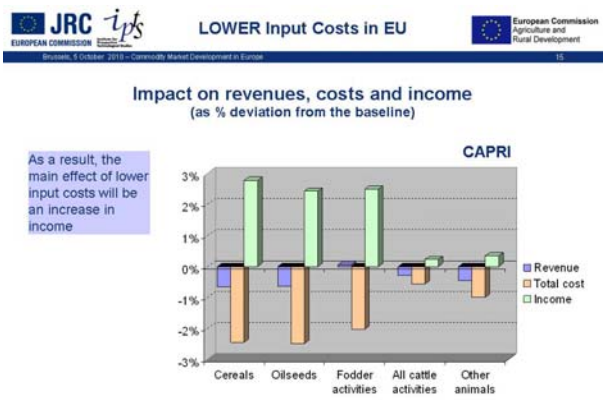

JRC ipts
LOWER yields in EU
European Commission Agriculture and Rural Development
Impact on revenues, costs and income
(as % deviation from the baseline)
in costs for cereals and oilseeds
higher than
in revenues
in income
CAPRI
4%
2%
0%
-2%
-4%
-6%
-8%
Cereals
Oilseeds
Fodder activities
All cattle activities
Other animals
Revenue
Total cost
Income

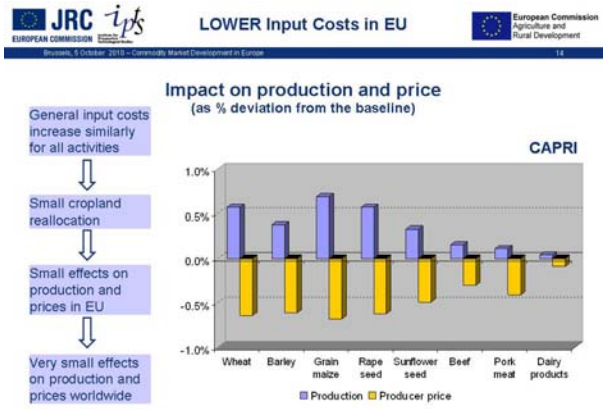

JRC ipts
LOWER yields worldwide
European Commission Agriculture and Rural Development
Impact on production and price
(as % deviation from the baseline)
Assuming that yields increase worldwide, effects on world prices will be stronger
ESIM
8%
6%
4%
2%
0%
-2%
-4%
-6%
Wheat
Barley
Grain maize
Rape seed
Sunflower seed
Soybean
Production
Producer price

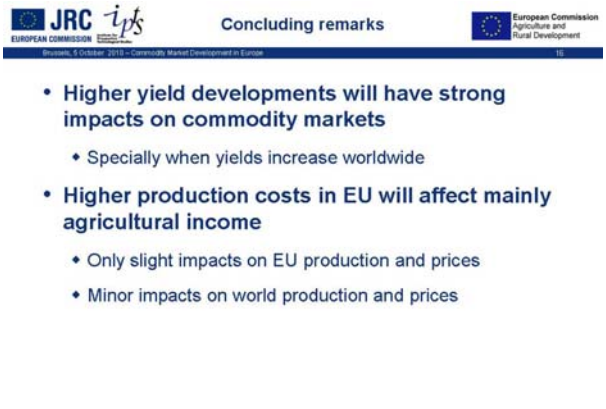

JRC ipts
Sensitivity analysis on INPUT COSTS
European Commission Agriculture and Rural Development
INPUT COSTS: scenario definition
Change in input costs in EU
General input costs 10% higher/lower than those assumed in the baseline
Fertilizer and feed costs remain unchanged


JRC ipts
HIGHER Input Costs in EU
European Commission Agriculture and Rural Development
Impact on production and price
(as % deviation from the baseline)
General input costs increase similarly for all activities
Small cropland reallocation
Small effects on production and prices in EU
Minor effects on production and prices worldwide
CAPRI
1.0%
0.5%
0.0%
-0.5%
-1.0%
Wheat
Barley
Grain maize
Rape seed
Sunflower seed
Beef
Pork meat
Dairy products
Production
Producer price



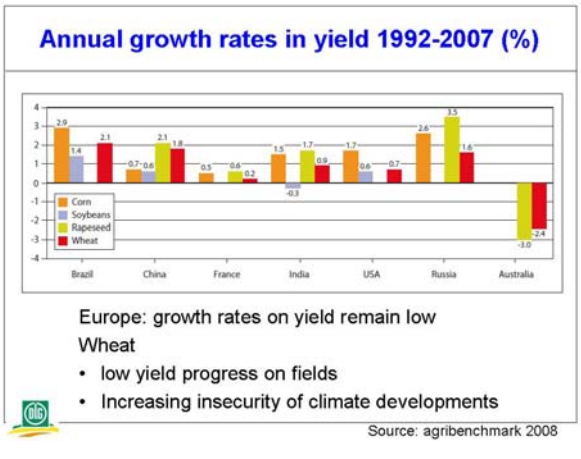




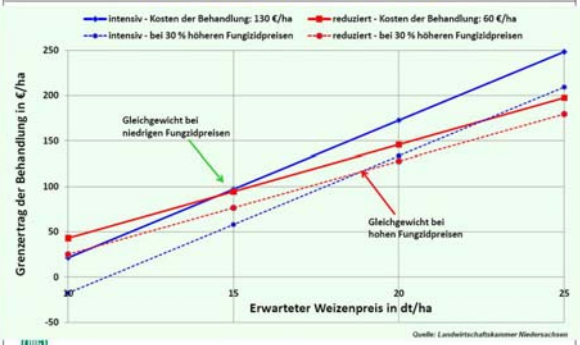


Drivers of Supply: Comments

Achim Schaffner (DLG)



Border returns of different wheat and fungicide costs



Source: Jennissen 2010

Drivers of supply – comments I

Yields

- Farmers have to increase biological outputs to reach a cost efficient production – higher yields will be still a important topic for farmers
- Yield progress on wheat stagnate since the last ten years; farmers are not able to realize the breeding progress

Farm income simulation

- Simulation of yields / effects of different input costs: Changes in intensity of production should be part of the simulation – to capture farmers reaction on different product prices
- Simulation of influences of market conditions only on EU should be used carefully because of the close connection of the domestic market to international markets

"Yield factor labour"

2006: 320.000 farms
→ dav. 48.000 farms > 75 ha
(15% of farms, 40% of area)

2030: 140.000 farms,
→ dav. 21.000 farms (60% of area)
Ø 470 ha, 5 employees / farm

Need on labor:
320.000, but only 90.000 qualified workers are available
→ Increasing in work-productivity, reduction of working hours on 0,3 AK je 100 ha

Drivers of supply – comments II

Technological progress

- Farmers will further invest in technological progress to reach higher productivity in farming systems

Labour and farm management

- Qualified labour is needed for realizing yield effects during technical progress – qualified work labour tends to be short
- Impacts of marketing of grain have a growing relevance to farm incomes

Macro-economic Uncertainties: Setting the Scene

John Kruse (IHS Global Insight)

Macro-economic Uncertainties Setting the Scene

Presented By:
John Kruse, PhD
Director, Agriculture Services
Email: John.Kruse@ihsglobalinsight.com

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The Source for Critical Information and Insight

The Global Expansion Has Slowed, But Is Still On Track

- Global real GDP growth slowed from an annualize rate of 4.5% in late 2009 and early 2010 to 3.8% in the 2nd quarter of 2010 and an estimated 2.2% in the 3rd quarter of 2010.
- America and Asia led the slowdown in the spring with weakening support from the inventory cycle and ebbing fiscal stimulus programs.
- The European business cycle is lagging one quarter behind on the slowdown with export-led growth softening this past summer.
- While global real GDP growth is expected to remain subdued near 3%, chances of a significant slowdown are still remote.

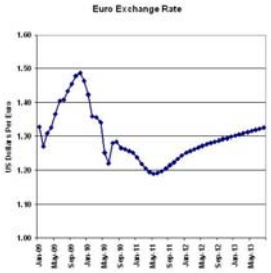
Europe's economic growth is slowing

- The eurozone's economic growth surged to 4% in the second quarter of 2010, 3 times faster than the first quarter. This spurt in growth was driven by
  - A bounce back in construction from the weather-related setbacks of the first quarter, and
  - Surging exports in Germany.
- However, growth in the 3rd quarter is slowing as exports to the US and China decelerate, fiscal policies tighten, and the boost from inventory restocking diminishes.
- Real GDP growth is expected to average just 1% in the next three quarters and then accelerate to 1.5% from mid 2011 onward.

Inflation will be minimal in the 1.5-2% range

- Excess capacity in labor and product markets will keep inflation relatively subdued for several years.
- Persistent gaps between potential and actual global output will put downward pressure on traded-goods prices.
- High unemployment in American and Europe, coupled with technological advances, will restrain unit labor costs

Euro expect to fall in the short term



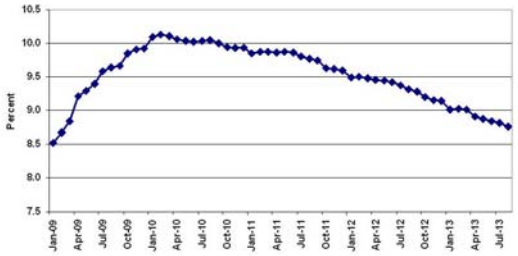
- Euro is expect to fall to the US $1.20-1.25 range next year.
  - GDP growth loses momentum
  - Sovereign debt problems flare up
- Medium term the euro is expected to appreciate to US $1.40 by 2015.
  - Economic recovery becomes well established
  - Markets gain confidence in fiscal policy options

Characteristics of the Global Recession

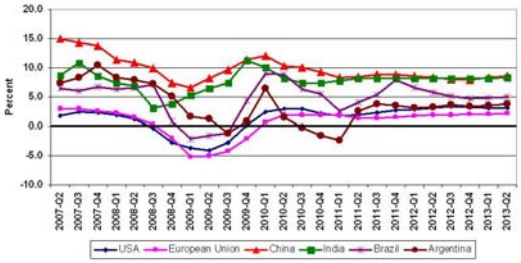
- The strong growth economies (many emerging markets) were stricken, but were able to bounce back vigorously.
- The fragile growth economies (developed economies) were hit much harder and face a long recovery.

Bottom Line: Many companies' growth strategies will focus almost entirely on the developing world

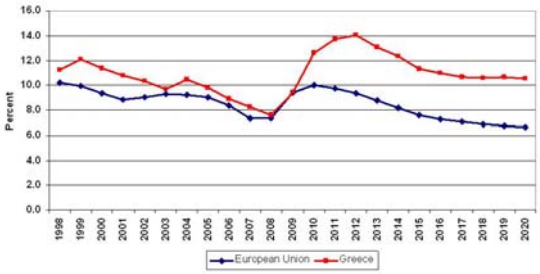
European Union Unemployment Rate



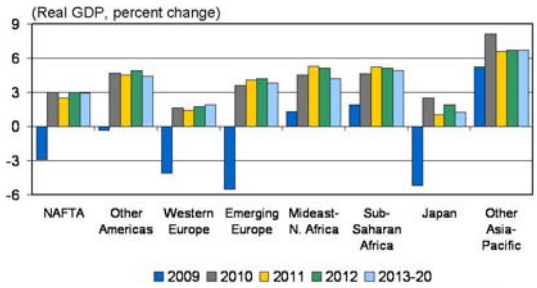
Real GDP Growth Rates in Selected Countries



Unemployment Rate in Greece
(Long Term Forecast)



Asia-Pacific Will Achieve the Fastest Growth; Other Emerging Markets Will Thrive



Emerging Economies are becoming more important in determining world GDP growth

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Real GDP Growth																
United States	5.2	1.8	2.9	1.9	3.1	3.0	2.8	2.2	0.5	-2.5	2.9	2.3	2.9	2.8	2.6	2.5
European Union	4.0	2.0	1.3	1.3	2.3	2.1	3.3	3.0	0.5	-4.2	1.6	1.5	1.8	2.1	2.2	2.3
Japan	2.8	0.2	0.3	1.5	2.7	1.9	2.0	2.3	-1.2	-5.2	2.7	0.9	1.8	2.1	2.1	1.7
Asia Excluding Japan	8.6	4.4	6.2	6.5	7.4	7.5	8.2	9.3	5.9	5.2	8.2	6.6	6.7	6.9	7.1	7.0
Russia	10.0	5.1	4.7	7.3	7.2	6.4	7.8	8.1	5.6	-7.9	3.6	4.3	3.7	3.7	3.4	3.4
Brazil	4.3	1.3	2.7	1.1	5.7	3.2	4.0	6.1	5.1	-0.2	7.3	5.0	5.5	5.2	5.5	4.7
World (chain weighted average)	**4.3**	**1.6**	**2.0**	**2.7**	**3.9**	**3.6**	**4.2**	**4.1**	**1.8**	**-1.8**	**3.7**	**3.3**	**3.8**	**3.8**	**4.1**	**4.0**
Share of World GDP																
United States	28%	28%	29%	28%	28%	28%	27%	27%	26%	26%	26%	26%	26%	25%	25%	25%
European Union	32%	32%	31%	31%	31%	30%	30%	30%	29%	29%	29%	28%	28%	27%	27%	26%
Japan	11%	11%	10%	10%	10%	10%	10%	10%	9%	9%	9%	9%	9%	9%	8%	8%
Asia Excluding Japan	12%	12%	13%	13%	14%	14%	15%	16%	16%	16%	17%	18%	19%	19%	20%	21%
Russia	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Brazil	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Share Subtotal	**86%**	**86%**	**86%**	**86%**	**86%**	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**	**84%**	**84%**	**84%**
Simple Weighted Average Growth	**4.1**	**1.8**	**2.2**	**2.1**	**3.1**	**2.9**	**3.4**	**3.4**	**1.3**	**-1.6**	**3.1**	**2.5**	**2.9**	**3.0**	**3.0**	**3.0**

Implications for Agriculture to Date

- Economic Crisis Impact
  - In developed countries – some shifts in per capita meat consumption.
  - In developing countries – little or no impact on per capita meat consumption showing in the data
  - Weakening oil prices slowed the growth in US biofuels sector with production falling to mandated levels of support
  - No resolution in the US debate on climate change policy which could carry significant implications for US agriculture and global agriculture
  - Dry cargo shipping rates fell with the global recession creating opportunities for increased agricultural trade
  - Off farm income perceived to be weaker throughout Europe and the US
- Impact could have been larger
  - Strong crop prices following 2007 production shortfalls, biofuels, and continuing growth in developing countries have buoyed the farm sector with record levels of farm income.
  - Global crop demand continues to be strong especially from China
  - The South American production response to high agricultural prices has been muted

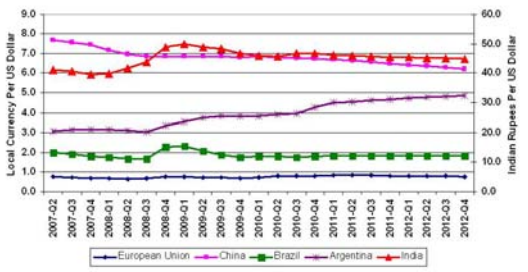
Growing Risks to Recovery

- Competitive devaluations
  - Japanese government intervening in foreign exchange markets to weaken the yen
  - China's restrictions on allowing the value of its currency to rise
  - Other emerging market are trying to slow the appreciation of their currencies
- Protectionism sentiments are rising in the US and Europe
  - Unemployment levels at politically dangerous levels
- Country reactions to agricultural production shortfalls
  - Russian ban on wheat exports

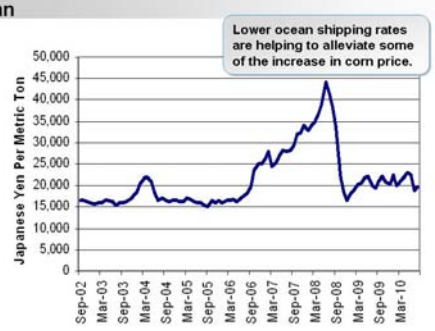
Looking Ahead

- Emerging market are becoming more significant in determining world GDP growth
- Meat demand and resulting feed demands will driven by emerging market countries
- Dietary changes favoring more protein will continued to drive meat and vegetable oil consumption in developing countries, but China may be approaching saturation points in some areas of meat consumption growth.
- Biofuels mandates in the US reach their apex in 2015 for starch based ethanol
- Rising fuel prices will offer some support to ethanol and biodiesel production, but there are caveats
- As the global economy strengthens attention will likely refocus on climate change with significant implications for agriculture.

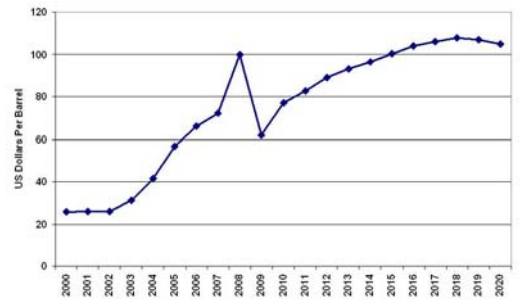
Exchange Rates in Selected Countries



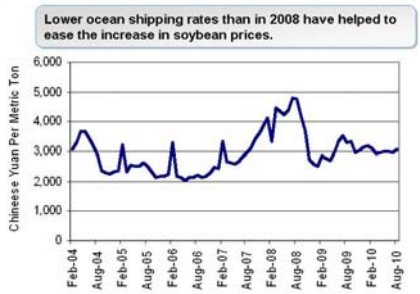
Landed Corn Cost
Japan



Crude Oil Price
West Texas Intermediate Price

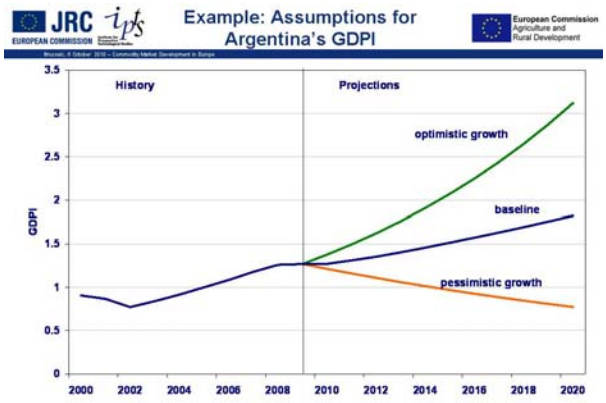


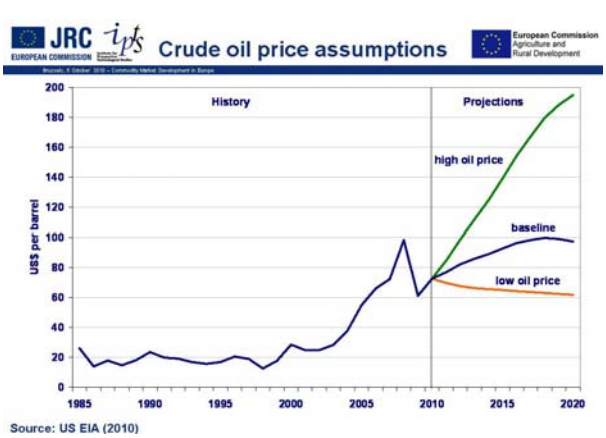
Landed Soybean Cost
China

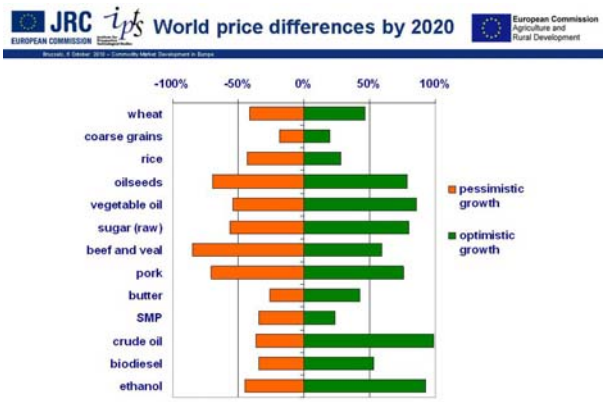


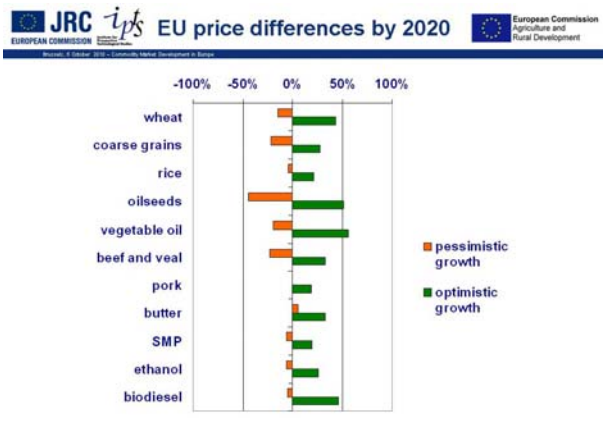
Macro-economic Uncertainties: EU Outlook - Sensitivity Analysis

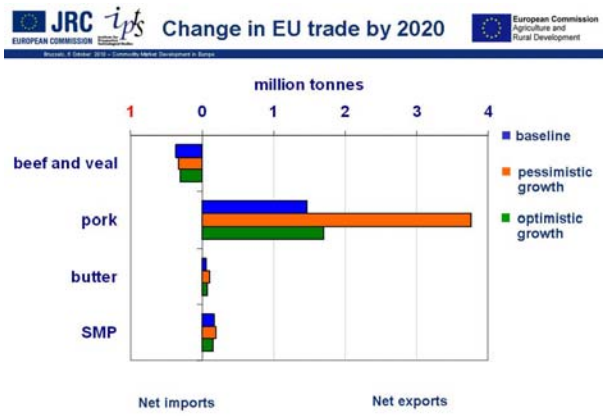
Aikaterini Kavallari and S. Hubertus Gay (JRC-IPTS)





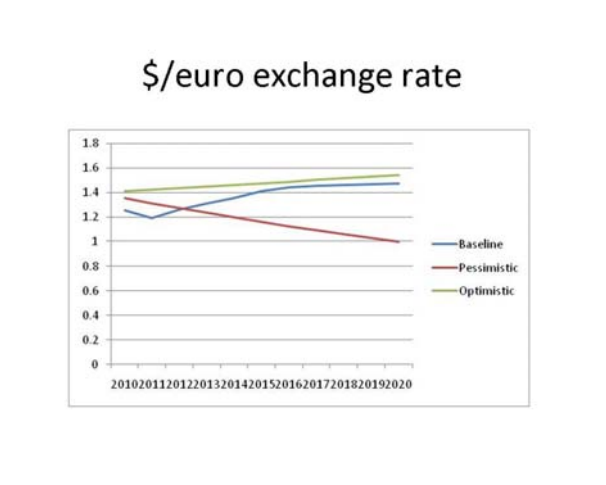






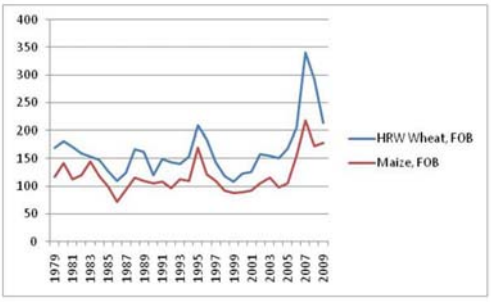
Macro-economic Uncertainties: Comments I

Julian Binfield (FAPRI)

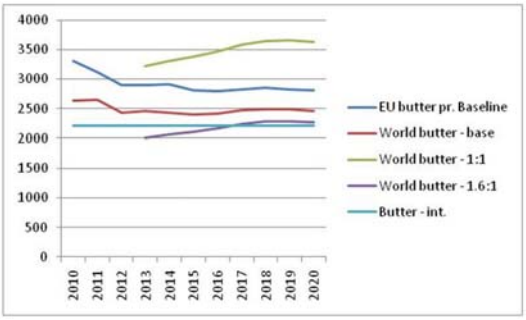


Long run price relationships: Corn vs oil

Long run price relationships: Corn vs wheat



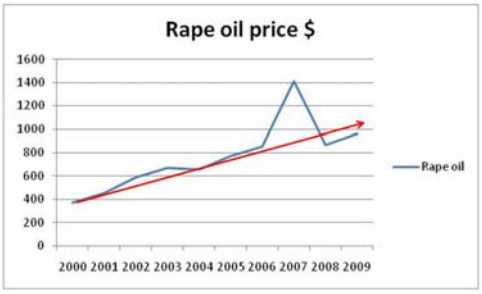
Exchange rates and dairy



Exchange rates and beef

- Pre-2008 Brazilian beef entering market paying full tariff
- Prior to closing of EU market to Brazilian beef, imports from there had already started to fall
- Because the Brazilian price had risen as supplies tightened
- So:
  - When there is no embargo beef trade can vary
  - Relevant price (exchange rate) Brazilian

Exchange rates and biofuels



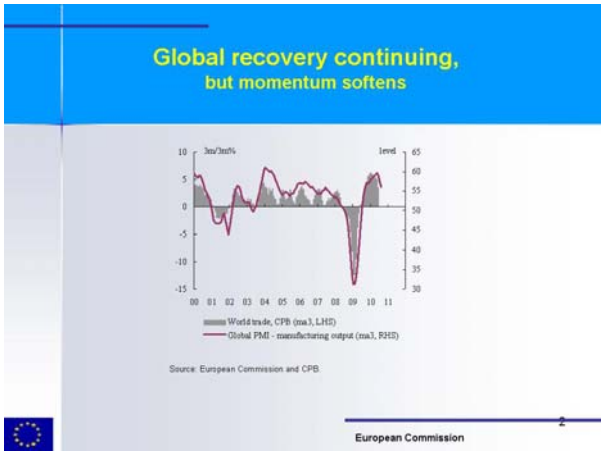
Exchange rates and biofuels

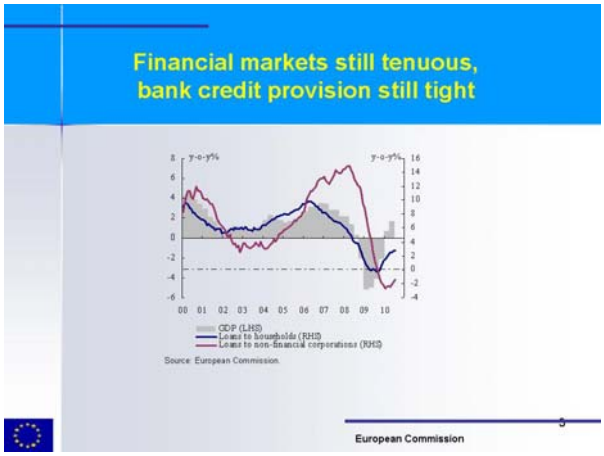
Biofuels – Can the EU switch between biodiesel and ethanol?

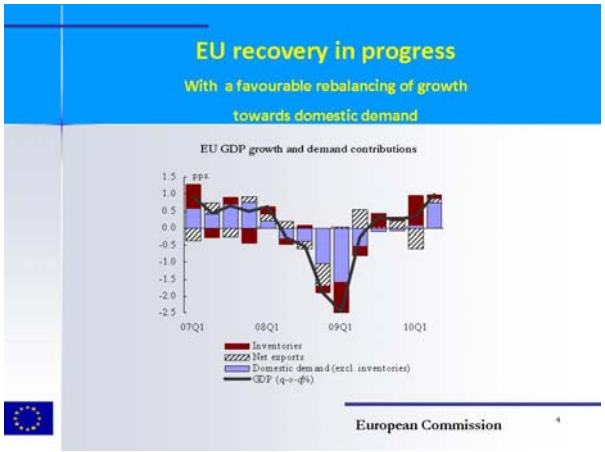
- EU has bigger blend wall problem than US?
  - Many countries set blending rates for both fuels
  - Even where there is the possibility of switching this is restricted by regulations/standards
  - In US, resolved by E-85. Easier than in Europe

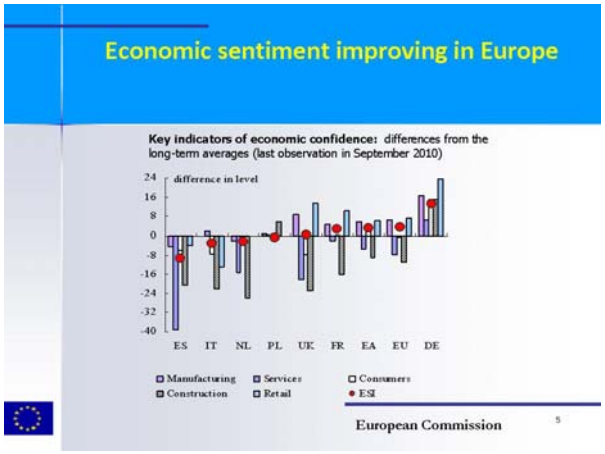
Macro-economic Uncertainties: Comments II

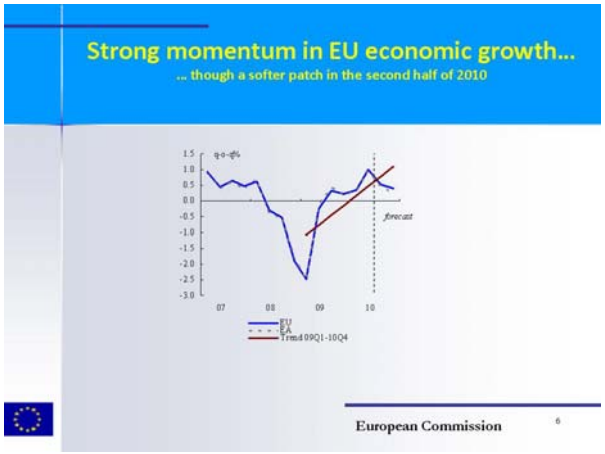
Moisés Orellana (DG ECFIN)

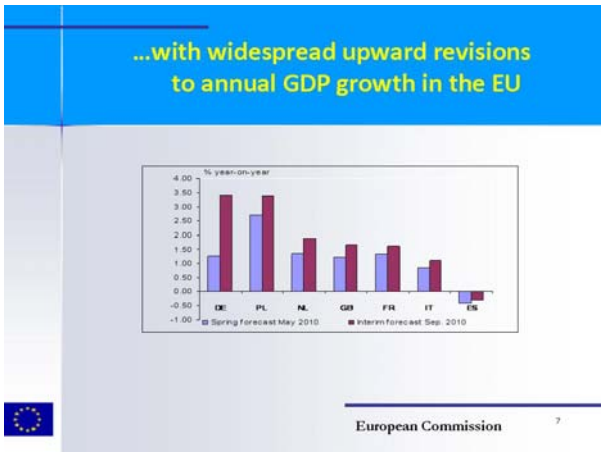


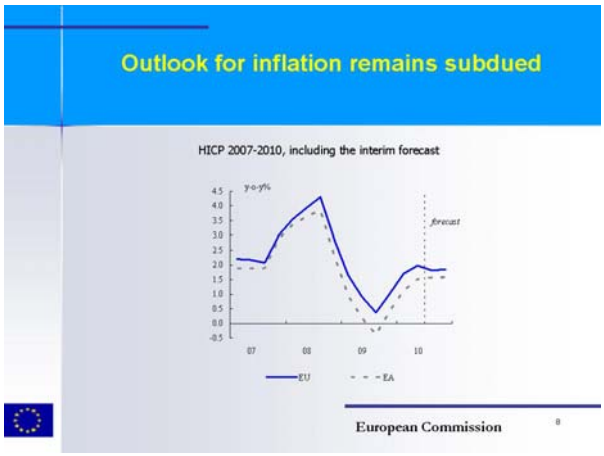


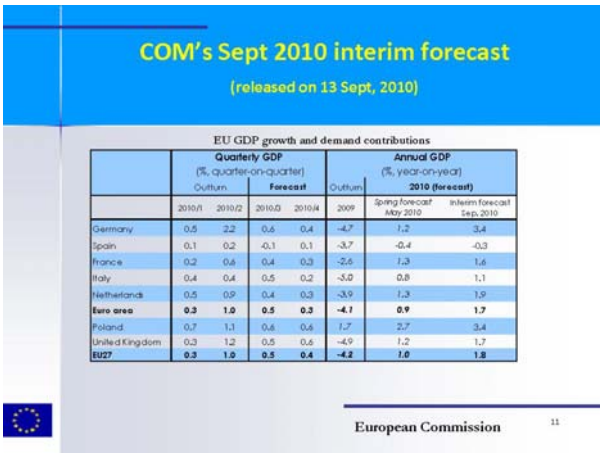






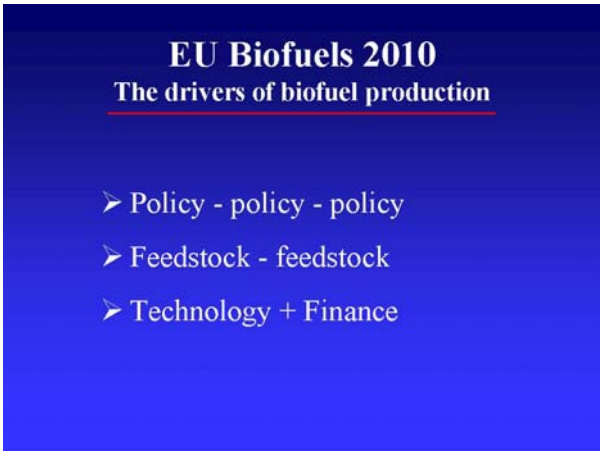






Linkage Energy and Agro-food Markets (Biofuels): Setting the scene

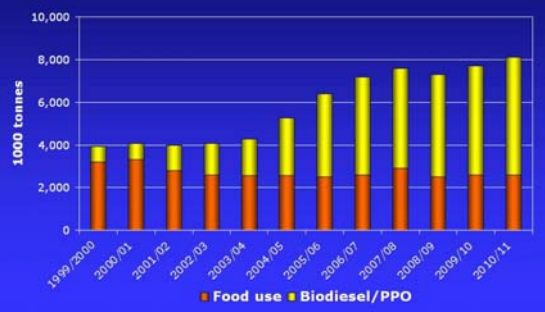
Christoph Berg (F.O. Licht)



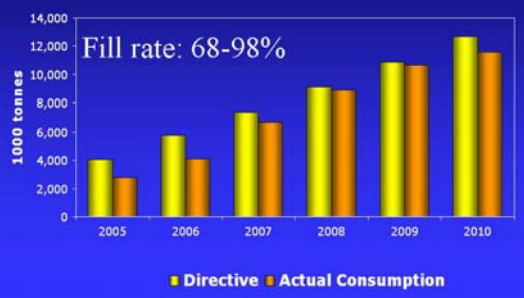
EU Biofuels 2010
The policy frame-work in the EU

- The biofuels directive of 2003
- The renewable energy directive of 2009

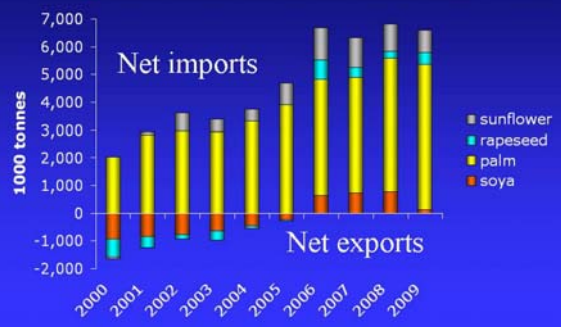
EU Biofuels 2010
Feedstocks for Biodiesel: Rapeseed oil



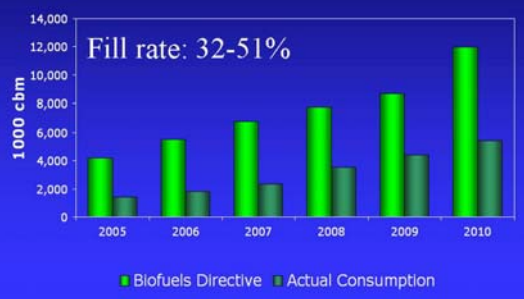
EU Biofuels 2010
Biodiesel and the Biofuels Directive



EU Biofuels 2010
EU – Vegoil net trade



EU Biofuels 2010
Fuel Ethanol and the Biofuels Directive



EU Biofuels 2010

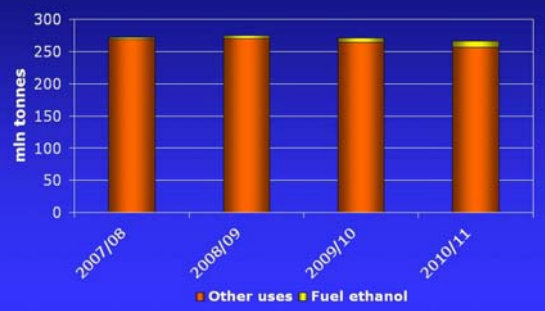
EU: Biodiesel Balance (imports include blends) (1000 Tonnes)

	2010	2009	2008	2007	2006
Opening stocks	1,876	1,852	566	746	197
Output	9,600	8,869	7,890	5,778	4,592
Imports	2,100	1,871	2,265	820	91
Consumption	11,640	10,650	8,810	6,750	4,119
Exports	100	66	59	28	15
Ending stocks	1,836	1,876	1,852	566	746

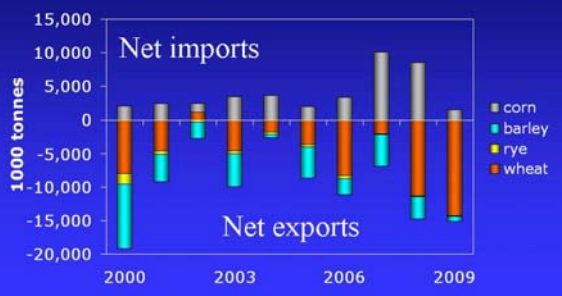
EU Biofuels 2010
Reason for poor performance

- Policy, policy, policy
  - Indicative targets
  - Refining industry resistance
- Feedstocks?

EU Biofuels 2010
Feedstocks for Ethanol: Grains



EU Biofuels 2010
EU – Net grain trade



EU Biofuels 2010

EU Biodiesel Consumption in 1,000 Tonnes (nREAP)	2005	2010	2015	2020
France	364	2,406	2,639	3,167
Germany	1,776	3,100	2,304	4,937
Italy	199	964	1,527	2,089
Spain	183	1,634	2,410	3,444
United Kingdom	63	957	2,020	2,736
Total	**2,585**	**9,484**	**10,900**	**16,372**
EU-27 (actual and extrapolated)	**2,764**	**11,600**	**17,080**	**27,200**

EU Biofuels 2010

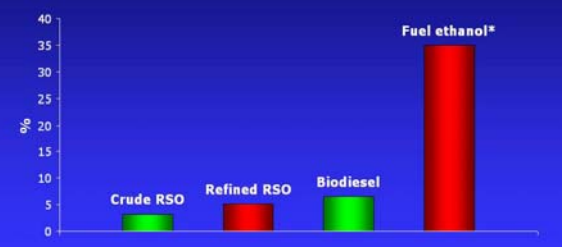
EU: Ethanol Balance (1000 cubic metres)

	2010	2009	2008	2007
Opening stocks	1,494	1,427	1,416	1,485
Fuel ethanol	4,475	3,594	2,753	1,796
Non-fuel ethanol	2,000	1,978	1,683	1,920
TOTAL OUTPUT	6,475	5,572	4,436	3,716
Imports	1,400	1,430	1,653	1,351
Fuel ethanol	5,405	4,410	3,521	2,298
Non-fuel ethanol	2,390	2,380	2,182	2,668
TOTAL CONSUMPTION	7,795	6,790	5,703	4,966
Exports	135	145	374	171
Ending stocks	1,439	1,494	1,427	1,416

EU – Required GHG Savings from Biofuels

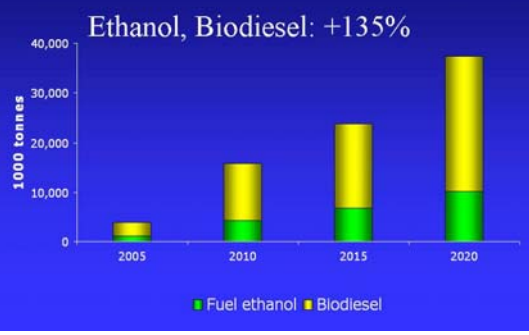
Biofuel production pathway/ threshold value	Without ILUC	With ILUC
Beet ethanol / 35%	61%	???
Wheat ethanol / 35%	16-47%	???
Sugarcane ethanol / 35%	71%	???
SME / 35%	31%	???
RME / 35%	38%	???
PME / 35%	19-56%	???

EU Biofuels 2010
Tariffs



* Based on a fuel ethanol price of EUR550 per m³

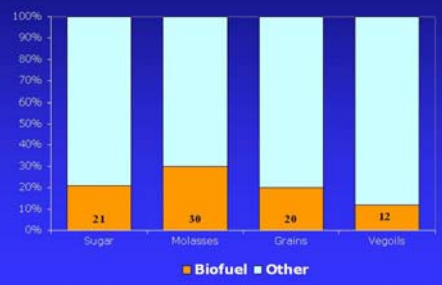
EU Biofuels 2010
The long term: 2010-2020

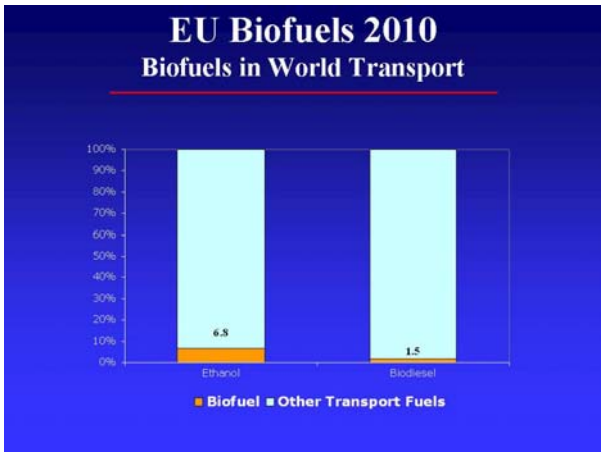


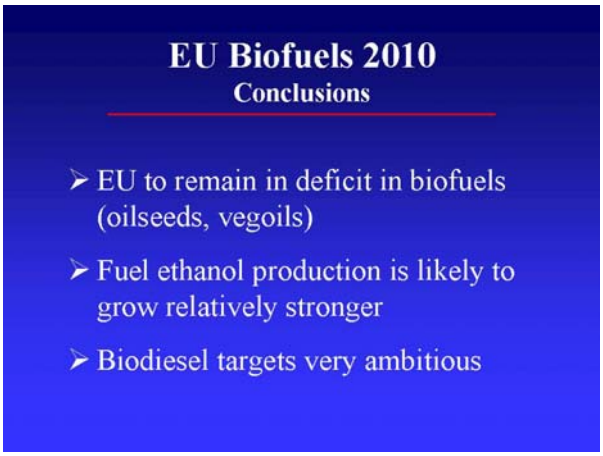
EU Biofuels 2010

EU Fuel Alcohol Consumption in mln litres (nREAP)	2005	2010	2015	2020
France	146	1,071	1,071	1,266
Germany	280	1,244	1,940	1,669
Italy	0	288	728	1,168
Spain	220	452	586	779
United Kingdom	35	263	1,348	3,394
Total	**682**	**3,318**	**5,673**	**8,277**
EU-27 (actual and extrapolated)	**1,390**	**5,400**	**8,728**	**12,813**

EU Biofuels 2010
Biofuels and 2010 World Feedstock Use

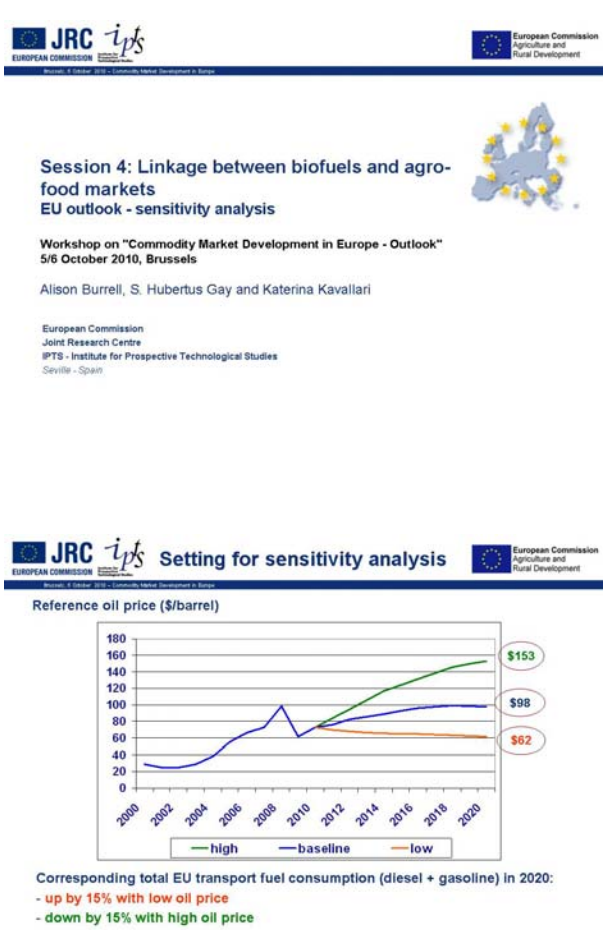


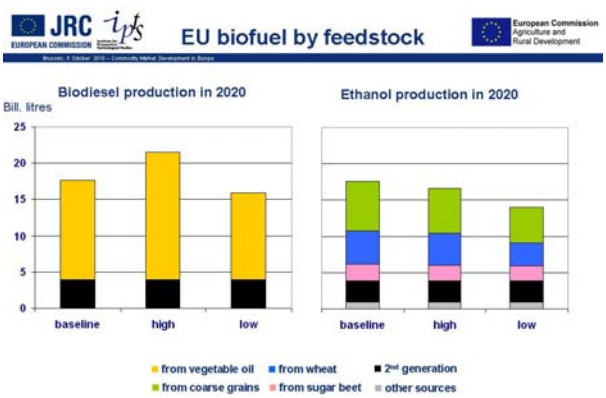




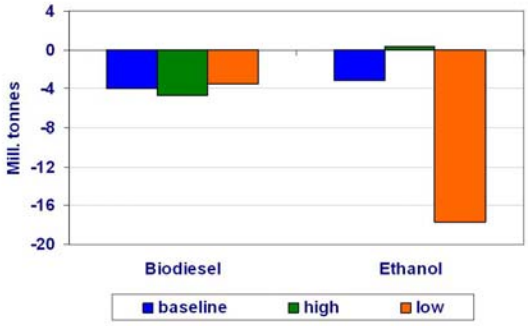
Linkage Biofuels and Agro-food Markets: EU outlook - sensitivity analysis

Alison Burrell, S. Hubertus Gay and Aikaterini Kavallari (JRC-IPTS)

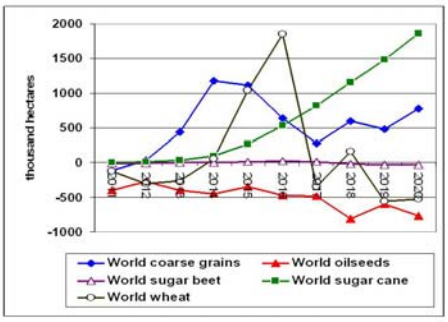




EU net trade effects



High oil price growth, land use differences



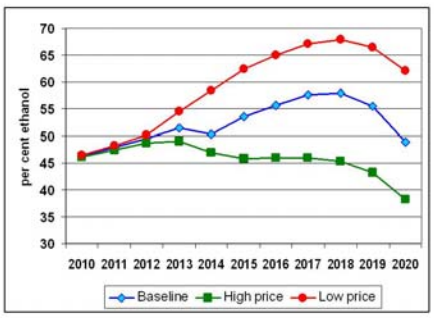
EU biofuel use and sources

	High	Low
Total transport fuel	↓	↑
Biofuel use	↓	↑
Biodiesel		
Production	↑	↓
Use	↑	↓
Imported share	18 %	18 %
Ethanol		
Production	↑	↓
Use	↓↓	↑↑
Imported share	(small net exports)	56 per cent
Share of biofuel energy from ethanol	29 %	52%

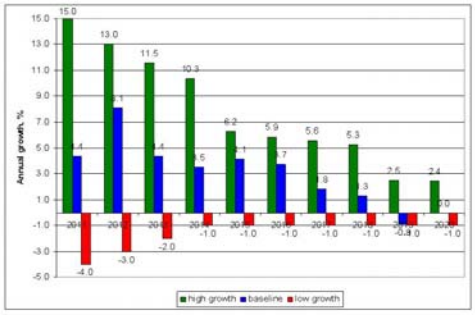
Summary

- **Land use effects limited**
  - but world sugar cane area is quite sensitive, coarse grains and oilseeds somewhat less
- **Total EU biofuel consumption determined by 2020 target**
  - Share between biodiesel and ethanol shifting
  - Biodiesel favoured by higher crude oil price
  - Biofuel trade closes the balance between domestic production and consumption

Share of ethanol in total EU transport biofuel (litres)



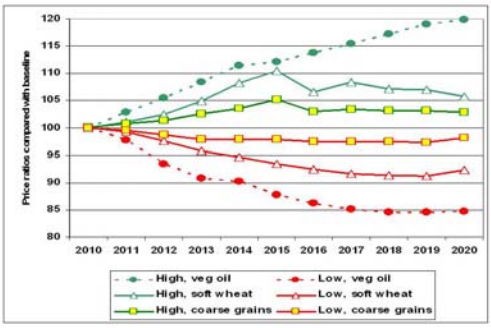
World oil price, annual growth rates by scenario



Further remarks

- **Land use effects limited**
  - but world sugar cane area is quite sensitive to crude oil price, coarse grains and oilseeds somewhat less

EU price differences



Linkage Energy and Agro-food Markets: Comments I

John Baffes (The World Bank)

Commodity Market Developments in Europe—Outlook

JOHN BAFFES
THE WORLD BANK

Session 4: Panel discussion
Linkage between energy and agro-food markets (biofuels)

European Commission
Brussels, October 5-6, 2010

1

Three remarks

I. The link between energy and food is complex and goes far beyond biofuels.
II. The energy/non-energy commodity price link has always been there. However, because of low and relatively stable energy prices—especially between mid-1980s and early 2000s—not much attention was paid. In fact, most models treated energy prices as a dummy variable taking the value of 1 during 1973-78 and 0 elsewhere.
III. The link has increased considerably during the boom across all commodity groups (and commodities). Thus, such increase cannot (and should not) be attributed solely to biofuels.

2

I. The energy/non-energy commodity price link is not just biofuels

I. DIRECT CHANNELS
- SUPPLY: high energy (and hence fuel) prices increase (i) the cost of production, transformation, and transportation and (ii) the prices of fertilizers (key input to agriculture)
- DEMAND: Biofuel demand which is above and beyond food demand

II. SUBSTITUTION
- Substitution on the input side (e.g., land competing for wheat and corn) and output side (same use of commodities, e.g., palm and soybean oil)
- Petroleum-based synthetic products (e.g., natural and synthetic rubber, cotton and man-made fibers)

III. COMMON FACTORS/INDIRECT CHANNELS THROUGH ENERGY
- Macro factors (growth, exchange rates, interest rates, fiscal expansion)
- Investment fund activity, often referred to as "speculation" (relatively new phenomenon)

3

II. Price transmission elasticities estimates from energy to non-energy commodities (excluding the recent boom period)

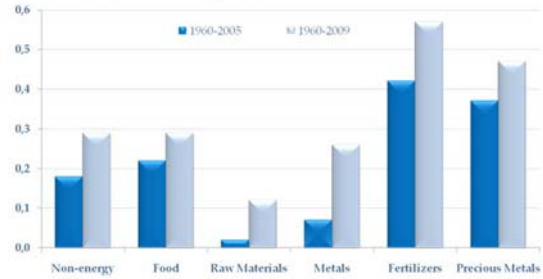
	Holtham (1988) 1967:S1-1984:S2	Gilbert (1989) 1965:Q1-1986:Q2	Borensztein and Reinhart (1994) 1970:Q1-1992:Q3	Baffes (2007) 1960-2005
Non-Energy	NA	0.12	0.11	0.16
Food	NA	0.25	NA	0.18
Raw Materials	0.08	NA	NA	0.04
Metals	0.17	0.11	NA	0.11

Source: Holtham (1988), Gilbert (1989), Borensztein and Reinhart (1994), Baffes (2007)

4

III. The link between energy and non-energy commodity prices increased after 2005

Transmission elasticity estimates, OLS regression



Source: Author's estimates based on World Bank data

5

Linkage Energy and Agro-food Markets: Comments II

Josef Schmidhuber (FAO)

"EU biofuels 2010"

Comments by
Josef Schmidhuber
FAO

Brussels, 6 October 2010

Estimates of the total support for ethanol and biodiesel in selected OECD countries in 2006 (billion dollars)

Country	Ethanol	Biodiesel	Total liquid biofuels
United States1	5.4-6.6	0.5-0.6	5.9-7.2
EU25	1.6	3.1	4.2
Canada	0.15	0.01	0.11
Australia	0.04	0.02	0.05
Switzerland	0	0.01	0.01
Total	7.2-8.4	3.6-3.7	10.8-12.1

Source: GSI

Brussels, 6 October 2010

Biofuel subsidies –policies

- It's all about policies, at least in the US and the EU
- "Upside 1": current policies remain in place and mandates, tax credits will be further expanded. Tariff protection to remain untouched.
- "Upside 2": Persistently high energy prices. What would that mean for prices levels (floor, ceiling) and equally important for price volatility?
- "Downside 1": Technical constraints, blending limits
- "Downside 2": Possible change in the WTO notification process.
  - Raise feedstock/foodstuff demand and thus prices for (food) consumers and producers alike, at home and abroad (unlike "traditional" subsidies).
  - Need to clarify the magnitude of biofuel subsidies, their effect on farm and food prices. Notifications w/o price effects.
  - UR limits: no problem
  - DDA: Total AMS, product-specific AMS limits, perhaps even OTDS limits would circumscribe policy space for subsidies
  - Biofuels as a EGS?

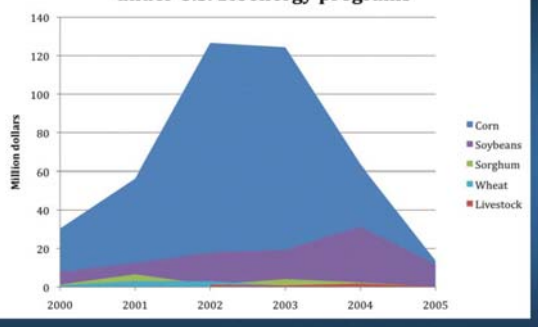
Brussels, 6 October 2010

Biofuel subsidies – beyond policies

- Thought experiment: What would improved technology for 2nd generation biofuels mean for LUC and ILUC under a high energy price scenario?
- Injustice done to biofuels? ILUC and carbon footprint discussion: to be put into the context of the footprint of overall energy supply?!

Brussels, 6 October 2010

Figure 1. Payments notified to the WTO under U.S. bioenergy programs



Source: Josling, Blandford, Earley

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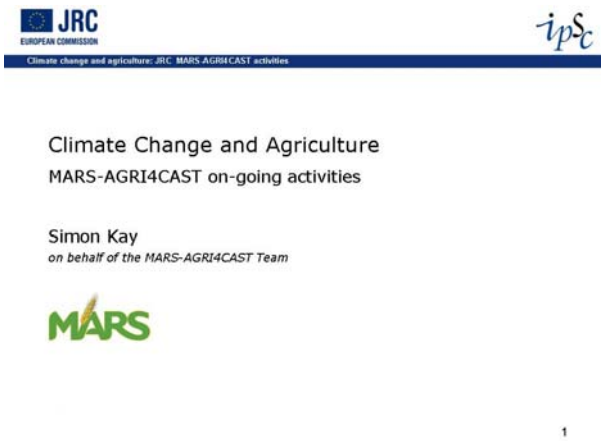
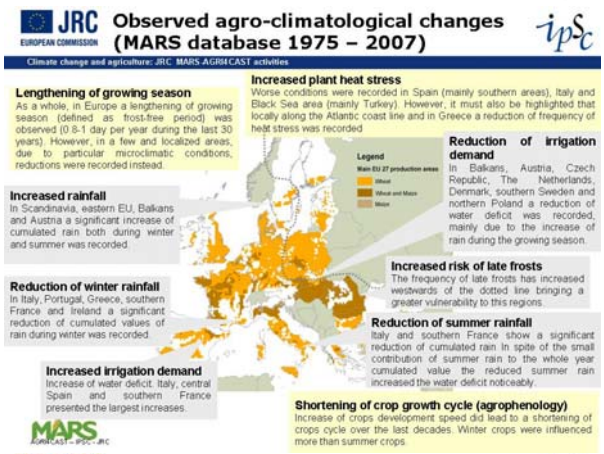
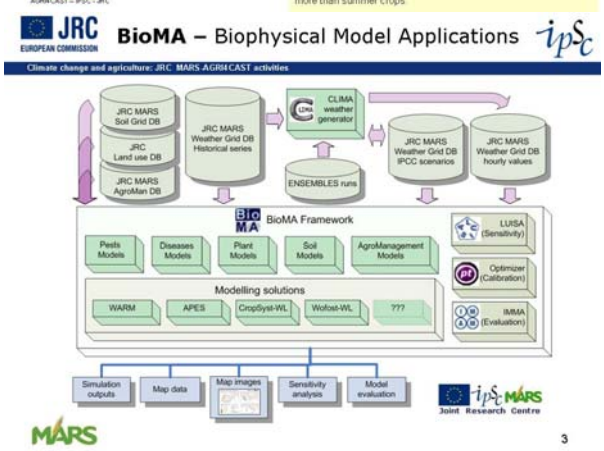
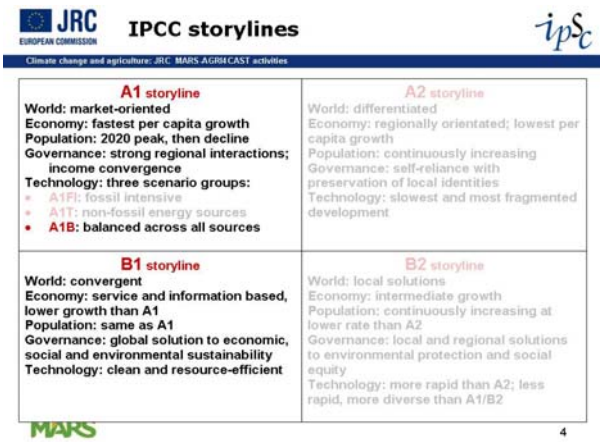
Climate Change Scenarios

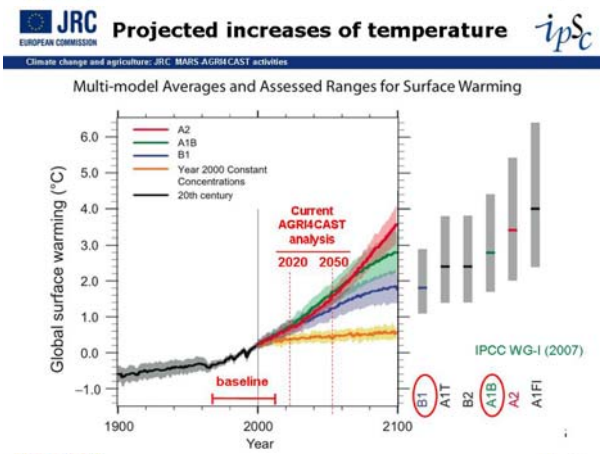
Simon Kay (JRC-IPSC)

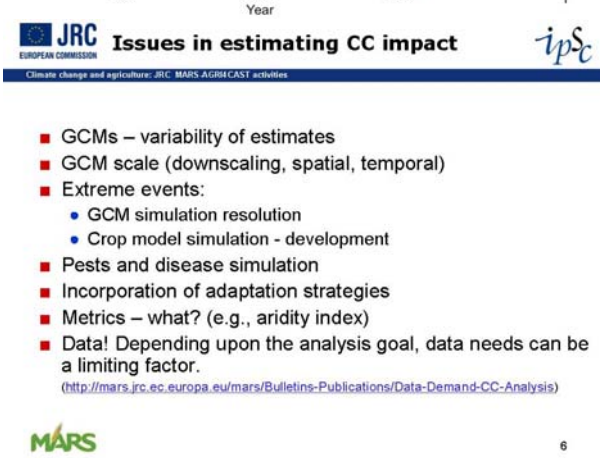












Current weather DB for CC analysis

Climate change and agriculture: JRC MARS AGRI4CAST activities

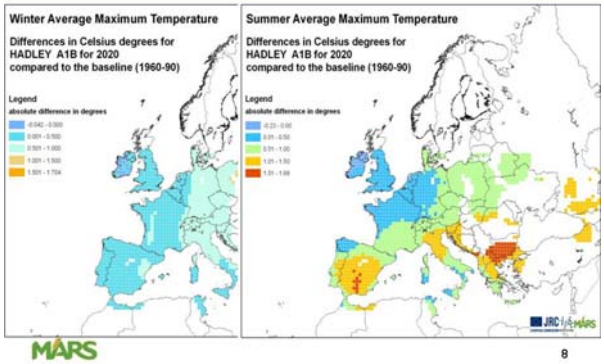
Currently the database (25 km grid) consists of:

- Reference data - 25 years of daily data (capability to add at run-time hourly values when needed)
- Trends from runs of several GCMs used as inputs for a Local Area Model to perturbate data in the time series representing "current weather" for each grid cell.
- Three time frames:
  - "baseline" (based on reference series1982-2008)
  - 2020
  - 2050
- Two emission scenarios: A1B and B1

7

Hadley A1B "2020" vs. baseline: Tmax

Climate change and agriculture: JRC MARS AGRI4CAST activities



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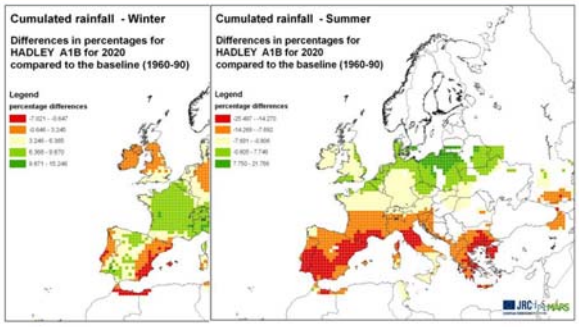
Hadley A1B "2020" vs. baseline: Rain

Climate change and agriculture: JRC MARS AGRI4CAST activities



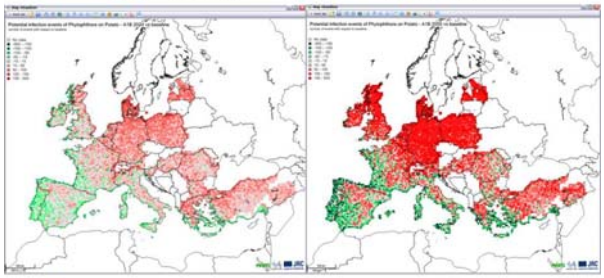
9

Phytophtora infestans (e.g. potato)

Climate change and agriculture: JRC MARS AGRI4CAST activities

Emission scenario = A1B

2020 - baseline | 2050 - baseline



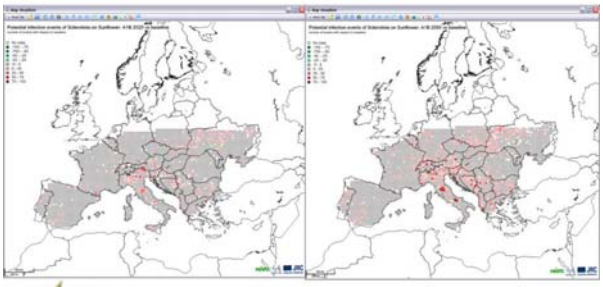
10

Sclerotinia sclerotiorum (e.g. sunflower)

Climate change and agriculture: JRC MARS AGRI4CAST activities

Emission scenario = A1B

2020 - baseline | 2050 - baseline

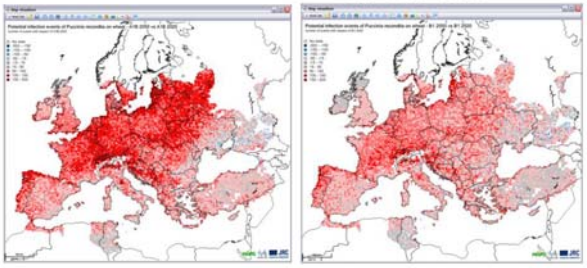


11

Puccinia recondita (e.g. wheat)

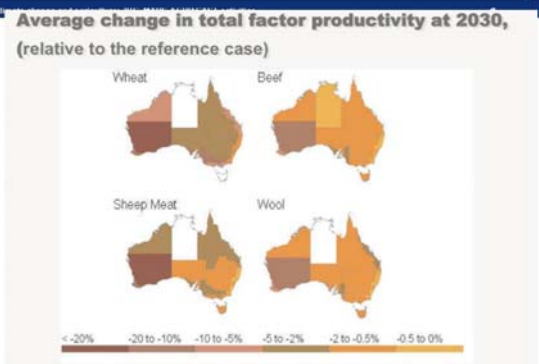
Climate change and agriculture: JRC MARS AGRI4CAST activities

A1B 2050 - 2020 | B1 2050 - 2020



12

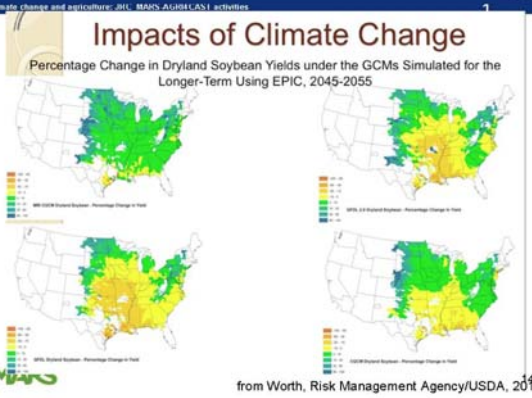
Other work on CC impact



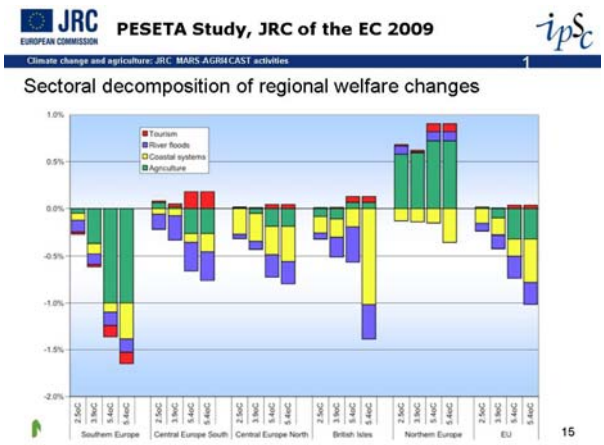
From Ahammad, 2010

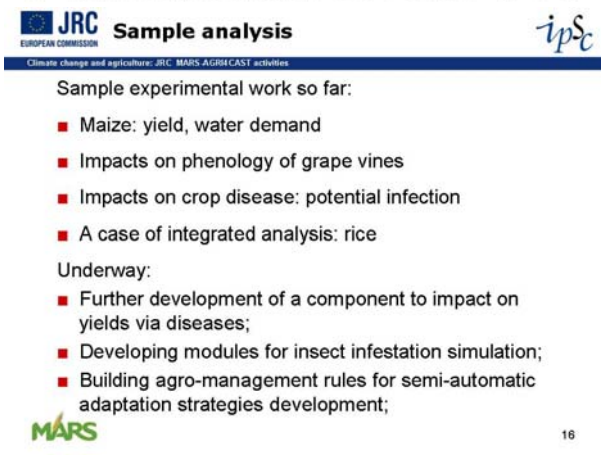
abare.gov.au

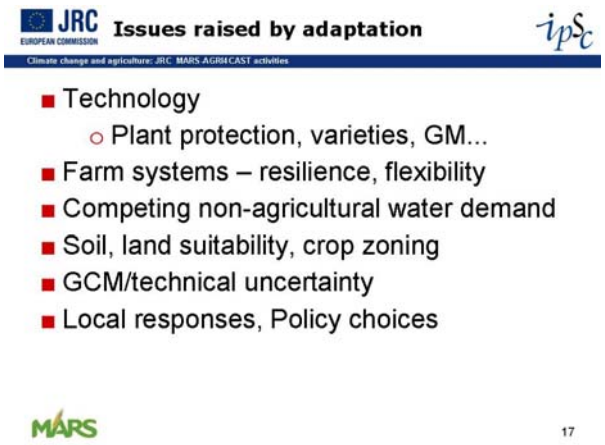
Other work on CC impact



from Worth, Risk Management Agency/USDA, 2010

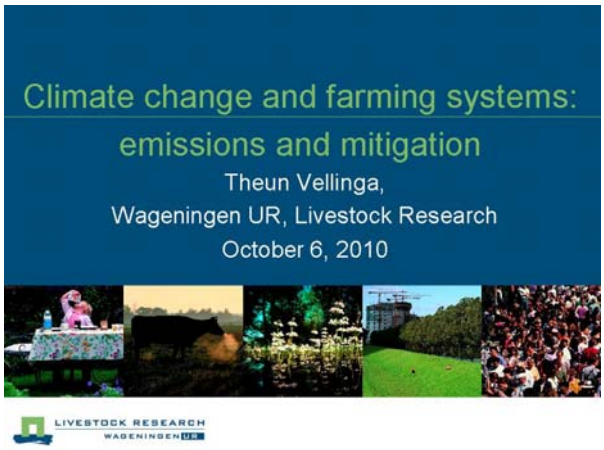






Climate Change and Farming Systems: Emissions and Mitigation

Theun Vellinga (Wageningen University)



GHG emissions of livestock systems

LIVESTOCK RESEARCH WAGENINGEN UR

Effects of intensity on emissions of milk and meat

Country	Milk yield (kg/yr)	Digestibility of feed (%)	Dairy herd: Emissions related to milk (kg CO2eq./kg)	Dairy herd: Emissions to meat (kg CO2eq./kg)
The Netherlands	7,400	75	1.48 *(protein 46)*	9.68 *(protein 46)*
Brazil	1,200	60	4.48 *(protein 128)*	24.28 *(protein 128)*
India	1,000	49	5.34 *(protein 160)*	30.44 *(protein 160)*

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To analyse livestock systems, we have to look INSIDE

Statistical data are not enough

LIVESTOCK RESEARCH WAGENINGEN UR

Effects of intensity on emissions of milk and meat

Country	Milk yield (kg/yr)	Digestibility of feed (%)	Dairy herd: Emissions related to milk (kg CO2eq./kg)	Dairy herd: Emissions to meat (kg CO2eq./kg)	Beef herd: Emissions to meat (kg CO2eq./kg)
The Netherlands	7,400	75	1.48 *(protein 46)*	9.68 *(protein 46)*	36.9 *(protein 176)*
Brazil	1,200	60	4.48 *(protein 128)*	24.28 *(protein 128)*	86.54 *(protein 455)*
India	1,000	49	5.34 *(protein 160)*	30.44 *(protein 160)*	103.22 *(protein 543)*

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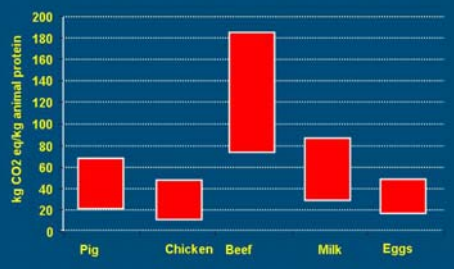
Emissions of different animal types



Source: DeVries & DeBoer (2009)

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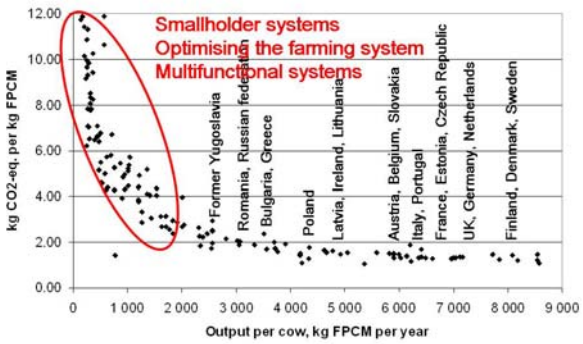

Source: FAO, 2010

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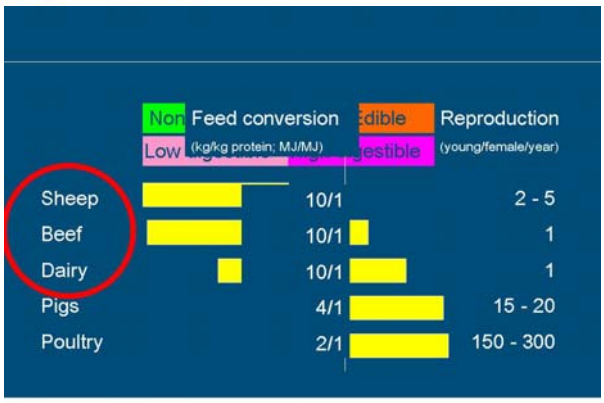

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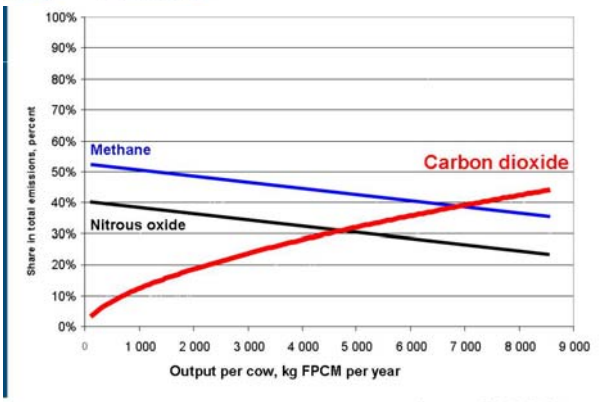

Source: FAO, 2010

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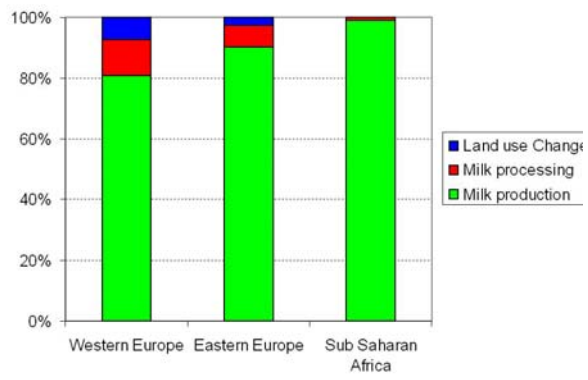

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Mitigation

- Resource Use Efficiency/Nutrient management: 3F
  - Feed
  - Fertilizers
  - Farmers
- Renewable energy
  - Mitigation methane, biogas production
  - Solar and wind energy

LIVESTOCK RESEARCH WAGENINGEN UR

Intermediate conclusions

- Monogastrics (pigs, poultry) lower GHG than ruminants
- Milk/meat in dairy systems is produced with lower GHG than pure beef systems
- Intensive systems have a high CO2 profile
  - Fertilizer production,
  - Buildings & equipment,
  - Transport and processing

LIVESTOCK RESEARCH WAGENINGEN UR

Mitigation is technique and management

- Technique (= investments):
  - Storage types and covers
  - Biodigesters
  - Application technique

Might increase costs of production

- Management (= capacity building and information):
  - Manure is a fertilizer
  - Fertilizers and concentrates not as insurance premium
  - Optimizing animal nutrition (energy and protein)
  - Grassland management

Cost effective mitigation, costs of knowledge infrastructure ?

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Mitigation of GHG emissions

LIVESTOCK RESEARCH WAGENINGEN UR

Beware of trade offs

		RR= 33% (3 lactations)	RR= 12.5% (8 lactations)	RR= 12.5% (8 lactations) + Beef production
Meat, carcass weights	t/year	280,428	206,081	280,428
Milk	t/year	10,585,000	10,585,000	10,585,000
Emission per kg animal protein	kg CO2eq/ kg protein	45.70	42.25	47.52
Emission per kg milk	kg CO2eq/ kg milk	1.55	1.44	1.44
Emission per kg meat	kg CO2eq/ kg meat	8.68	8.02	15.66

LIVESTOCK RESEARCH WAGENINGEN UR

Main contributions to GHG emissions

- All three greenhouses are important
- Intensive systems: high CO2 fraction
- Ruminants: methane is a big contributor
- High input level of nitrogen

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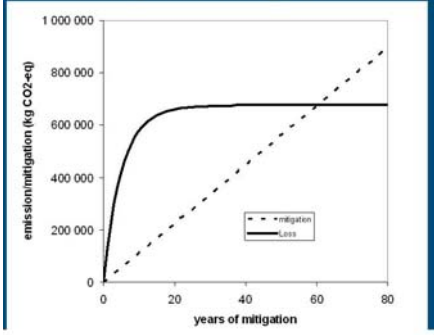
Feed crops and mitigation in dairy systems



Replacement of grass by feed crops:

Carbon Payback time takes decades

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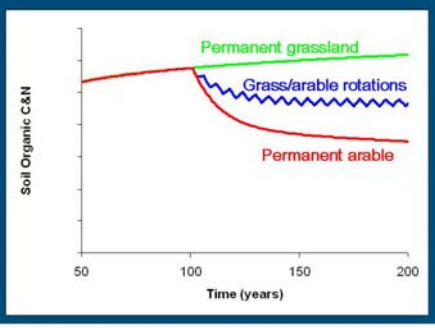
C sequestration and land use



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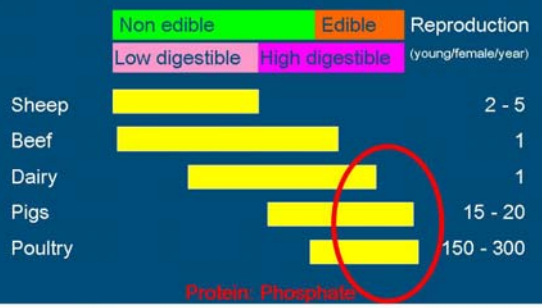

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Carbon sequestration ?

- One time event until equilibrium is realised
  - Buying time
  - Not reducing annual emissions
  - Sequestration potential depends on soil, climate and management
- Useful to develop resilient systems
- C sequestration needs nitrogen and phosphorus
- Don't touch it !

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Multiple environmental goals for dairy farms
A Dutch example

	1990	2007	Goal (year)
GHG	143	114	100 (2012)
NO_3	300	140	100 (1990)
NH_3	500	250	100 (2010)
P_2O_5	178	119	100 (2015)

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Intermediatie conclusions

- Mitigation potential of 30 – 40 % with current technology and management improvements
- Combination of technology and management
- Beware of land use change from high to low C systems, i.c. grasslands to arable lands or grass/arable rotations

LIVESTOCK RESEARCH WAGENINGEN UR

Intermediate conclusions

- Phosphate will become limiting within a few decades
- Hotspots with high stocking rates:
  - Water quality
  - Air quality
- Water use in general will become a limiting factor

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GHG is not the only issue…

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Conclusions

- GHG:
  - Monogastrics < Ruminants
  - Intensive < Extensive
  - Milk << Beef
- Mitigation
  - Potential of 30 – 40 %
  - Technology and capacity building & information
  - Carbon sequestration ≠ annual mitigation
- Other environmental issues
  - Hotspots: nitrate and ammonia
  - Imbalance phosphate
  - Water use

LIVESTOCK RESEARCH WAGENINGEN UR

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European Commission

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Abstract
This report contains a summary and the presentations of the expert workshop 'Commodity Market Development in Europe – Outlook', held in October 2010 in Brussels. The workshop was held in order to present and discuss the preliminary results of the European Commission's outlook on EU agricultural market developments.
The workshop gathered high-level policy makers, modelling and market experts and provided a forum to present and discuss recent and projected developments on the EU agricultural and commodity markets, outline the reasons behind observed and prospected developments, and to draw conclusions on the short/medium term perspectives of European agricultural markets in the context of world market developments. Special focus was given on the discussion of the influence of different settings/assumptions (regarding e.g. drivers of demand and supply, macro-economic uncertainties, etc.) on the projected market developments.

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