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IMPACT ASSESSMENT

Common Agricultural Policy towards 2020

ANNEX 11

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**Annex 11: Methodology; Overview of Evaluations; JRC
Research; Studies and Research Projects Relating to the
CAP**

ANNEX 11A

METHODOLOGY FOR THE MARKET AND INCOME EFFECTS OF THE CAP REFORM

1. ANALYTICAL TOOLS USED

Analysis of the potential impacts from the different policy options about the future CAP has been carried out on the basis of quantitative analysis which was then complemented with quantitative and qualitative information from the literature and public consultations (mostly on the social and environmental impacts).

The core of quantitative analysis on the economic situation of EU agriculture until 2020 and the impacts of policy scenarios have been conducted using DG AGRI tools with the support of JRC IPTS. An economic model was used (a modified version of AGLINK-COSIMO model) to prepare the projections of agricultural markets and the Farm Accountancy Data Network (FADN) information was used to examine their implications for the cost and revenue structure and the income of individual farms¹². These results were then complemented with quantitative and qualitative information from the literature and public consultations to analyse the social and environmental impacts of the policy scenarios.

2. BASELINE PROJECTIONS

The first element of analysis was the preparation of a baseline projection between 2010 and 2020 with regard to the evolution of agricultural markets. It allows taking into account the role of the macroeconomic trends (GDP growth, population, energy prices) in the evolution of agricultural production and prices to see the general conditions under which the farmers will be operating.

The projections were established under a set of status quo assumptions on agricultural and trade policies with macroeconomic projections (world market environment is largely based on the 2010 OECD-FAO agricultural outlook) as well as considerations for climate and animal disease related issues. The projections were based on market statistics and other information available at the end of September 2010 and validated in expert discussions. An external review of the baseline and uncertainty scenarios was conducted in a seminar on 5-6 October 2010 in Brussels, gathering high-level policy makers, modelling and market experts from the EU, the United States and international organisations such as the Organisation for Economic Co-operation and Development, the United Nation's Food and Agriculture Organisation and the World Bank.³

¹ AGLINK-COSIMO is a dynamic partial equilibrium model used to generate medium-term OECD-FAO agricultural outlook

² The FADN is a European system of sample surveys that take place each year and collect structural and accountancy data relating to the farms; their aim is to monitor the income and business activities of agricultural holdings and to evaluate the impacts of the Common Agricultural Policy. The most recent FADN data available for this report are for the 2007 accounting year, because of the time needed to collect the data from all the EU MS. <http://ec.europa.eu/agriculture/rica>

³ Proceedings are available at: <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=4199>.

The results consist of market balances for main agricultural products⁴ (production, area, yields, import, export, consumption, stocks), domestic and world prices as well as agricultural income for every year between 2010 and 2020 for EU as a whole, as well as EU-15 and EU-12. Additional results at MS level for certain specific sectors (i.e. sugar) were calculated using the European Simulation Model (ESIM) model⁵.

Based on this data, the next step was to simulate the profitability and incomes of individual farms with the use of data of the Farm Accountancy Data Network. The projected prices, yields and input costs coefficients for 2020 were imposed on the current economic situation of the farms to reflect the situation under which they would find themselves in 2020 with regard to the costs and revenue structure, production structure and income.

While this static approach assumes unchanged farm structures, trends in labour productivity were introduced in order to reflect the restructuring process in the sector. This simulation allowed calculating the income of farms based on the Farm Net Value Added (FNVA) per Annual Work Unit (AWU), an indicator which represents the amount available to remunerate the factors of production labour, land and capital.⁶ The information was available at farm level. Further aggregation of the FADN data according to economic size, expressed in ESU,⁷ and wider geographical units (Member States, regions, less favoured (LFA) areas) allowed analysis to reflect impacts at different levels.⁸

3. SCENARIO SIMULATION

The baseline results were then used to simulate the effects of changing the level of direct payments as a result of the redistribution of payment and the introduction of different components and mechanisms of the direct payment (for small farmers, natural constraint areas, coupled component as well as capping) on farm income and profitability.⁹ The analysis was made at farm level and aggregates are created on the basis of the individual data using the FADN weighting scheme. The model was static, which means that the structural trends and the allocation of land do not change across the scenarios.

For the purpose of the impact assessment the model has been extended to simulate the policy options covered by the impact assessment with the exception of the no policy scenario and to assess their impact on farm income and farm profitability. For the calculation of farm income both changes in output and intermediate consumption and DP are taken into account. The results allow to compare the income of farms (calculated as Farm Net Value Added/Annual

⁴ Arable crops, meat, milk and dairy products, biofuels

⁵ ESIM is a comparative static partial equilibrium net-trade multi-country model of agricultural sector.

⁶ $FNVA/AWU = (\text{output} - \text{intermediate consumption} + \text{subsidies} - \text{taxes} - \text{depreciation}) / \text{Annual Work Units}$.

⁷ ESU - European size unit represents a standard gross margin of EUR 1 200 that is used to express the economic size of an agricultural holding or farm. For each activity on a farm, the standard gross margin (SGM) and a regional coefficient are estimated. The sum of all such margins derived from activities on a particular farm is its economic size, which is then expressed in European size units (by dividing the total SGM in euro by 1200, thus converting it to ESU).

⁸ The main results of sector-specific and microeconomic analyses are available in Annex 1: The situation and prospects for EU agriculture and rural areas.

⁹ The simulation was conducted with the model AIDS7K developed by DG AGRI L3, based on the structure of farms observed in 2007 to simulate the impact of the change of DP schemes on farm income and DP for the 81 000 sample farms included in FADN.

Working Unit), aggregated by type of farming, economic size (in ESU) and geographical units (Member States, regions) in different scenarios.

Additional analysis with FADN data was conducted to assess the economic costs of introducing the environmental measures as part of the Greening of the CAP – i.e. crop diversification, ecological set-aside, green cover or permanent pasture. The effect of changed crop pattern due to the diversification measure were then introduced in the macroeconomic model, together with set aside rules, to see what effect it would have on the production and prices of agricultural commodities. The new values were taken into account in calculating farm income together with the estimated cost of introducing the various greening measures.

At the same time, the results of agricultural market projections were used as an input for modelling the impact on developing countries and the same model was used to estimate the potential effects of DDA agreement.¹⁰

4. SENSITIVITY ANALYSIS

In order to address the uncertainties regarding the future macroeconomic developments a quantitative assessment of alternative assumptions on supply and demand drivers, the macroeconomic environment and crude oil price developments was made to see how they may affect the outlook for EU agricultural markets. The alternative assumptions examined included higher crop yield growth, faster technological prospects, higher variable costs, higher GDP growth in emerging economies, faster or slower economic growth and higher or lower crude oil price and a biofuel scenario (higher oil price with lower transport fuel demand).

In FADN analysis, three different assumptions on gains in labour productivity was made in order to simulate the restructuring process: fixed labour productivity, gains in labour productivity reflecting recent trends (1.5% for EU15 and 3% for EU12) and gains in labour productivity reflecting long term gains (3% for EU27). Also alternative possibilities were examined with regard to the direct payment scheme: thresholds for the greening component and redistribution as well as conditions of natural constraints scheme, small farmer scheme and capping.

¹⁰ For results and detailed description of the methodology see Annex 11: Analysis of the income effects of CAP reform scenarios and Annex 2d: Partial analysis of greening measures

ANNEX 11B

COMMON AGRICULTURAL POLICY: RESULTS OF MID-TERM AND EX-POST EVALUATIONS OF EXISTING INSTRUMENTS

Evaluations of the different elements of agricultural policy are conducted continuously and their results are incorporated in the ongoing reform process (a full list of evaluations completed during the period 2007 – 2010 is provided in the annex, together with the executive summaries of the evaluation reports). The evaluation projects examine in particular the impacts of CAP measures on markets, farm income, production structures, competitiveness, the environment and rural development.

1. Main results

Evaluations of existing instruments show that they are generally effective, efficient and pertinent to their objectives, but there is a need for better targeting.

A series of evaluations carried out during the period 2007 – 2010 have analysed the effects of the 2003 CAP reform on a wide number of agricultural sectors (starch, rice, protein crops, durum wheat, olive oil, hops, dried fodder, cotton and beef). The results of these sectoral evaluations indicate that while decoupled aid is needed to support farm income, the switch to decoupling and the adjustments in market measures limit distorting effects, provide higher transfer efficiency and ensure coherence with the overall objectives of the CAP. As a result, production decisions of farmers are more determined by market signals and not by the payment of the aid, contributing thus to enhancing competitiveness and the smooth functioning of the internal market. The evaluation reports also recommend to strengthen research and innovation in the agricultural sector to help consolidate market orientation and improve the quality of products, value-added and productivity.

The evaluation of the **markets effects of partial decoupling** has shown that retaining coupled support for suckler cow and sheep and goat premia in certain regions provides environmental and social benefits; however, for many other sectors it has been of limited effectiveness in maintaining production, and secondary to other market and policy developments.

The results of the ongoing evaluation of the dairy CMO are not yet available, but experience from the implementation of the safety-net in the 2008-2009 dairy crisis demonstrated the need to streamline these tools, and subsequent reflections of the High Level Expert Group on Milk pointed to the need to work on improving the functioning of the food chain.

The evaluation of the **income effects of direct support** has examined the efficiency and effectiveness of direct payments in a broad range of agricultural sectors and farm types across the EU. The results of this horizontal evaluation show that direct payments contribute to enhancing the income of farmers and play a particularly important role in generating income for grazing livestock specialist farms, those specialised in field crops, mixed farms and dairy farms. At global level, the efficiency of direct payments in terms of reaching farms that are in need of income support is quite high - the analysis indicates that in 2007, 82% of the expenditure was going to farms which, even with direct payments, did not reach the reference income (regional GDP/employee). However, the system generates very uneven levels of efficiency (direct payments are granted to a certain share of farmers whose income is above the benchmark), especially in certain sectors (i.e. in the field crops sector) and in certain

regions, while other farmers remain below the benchmark¹¹. The evaluation indicates that direct payments make also an important contribution to farm income stabilisation, in particular for small farmers and farmers in LFAs, and in the field crops and mixed farms sectors. In terms of payment modalities, direct payments have a higher positive effect on income equity in regions that apply the hybrid and the regional SPS models than in those applying the historical model.

The synthesis of evaluations of the **environmental effects of CAP measures** provides a comprehensive review of the evaluations in this field carried out between 2007 and 2010 concerning CAP measures for arable crops, cotton, beef and veal, pig, poultry and eggs production, milk quotas and the cross-compliance mechanism. The results of the analysis underline the advantages in terms of environmental performance of decoupled income support which does not directly influence farmer's behaviour, and indicate that decoupled support combined with the cross-compliance mechanism contributes to the integration of environmental concerns in agriculture.

Complementing the evaluations of environmental effects of CAP measures, DG AGRI commissioned the study¹² "The provision of public goods through agriculture in the EU". The purpose of the study was to examine the concept of public goods as it applies to agriculture in Europe and to assess how far there is a case for policy measures to encourage the provision of public goods through agriculture. The results of the study highlight that the environmental public goods associated with agriculture (biodiversity, soil and water quality, landscape preservation, climate change mitigation, etc.) are highly valued by society, and that there is a need to strengthen the provision of public goods through the CAP, giving more emphasis to the integration of environmental objectives to ensure an appropriate balance between the economic, social and environmental dimensions of sustainable agriculture.

The evaluation of the **Farm Advisory System (FAS)** analysed the implementation of the FAS in the Member States during the period 2005-2009. The results indicate that the FAS approach has contributed to awareness-raising, a better understanding of cross-compliance requirements, a reduced risk of penalties, and improved farming practices among beneficiary farmers. As to the future, the evaluation recommends that the Member States explore ways of taking greater advantage of the opportunities offered by the FAS concerning the integration of the advice on cross-compliance with advice on economic-related issues and coverage of broader needs and domains (e.g. climate change, market orientation, productivity). Similarly, the report recommends to further promote synergies between the FAS and other complementary instruments such as extension services, and to facilitate access to the FAS by small farmers.

The current **rural development policy** framework for 2007-2013 has undergone an ex-ante and a mid-term evaluation, which show the positive impact of the strategic approach.¹³ Member States made considerable efforts to develop strategies on the basis of an analysis of

¹¹ The evaluation looks solely at the income objective and does not take into account the contribution of direct payments to other objectives

¹² External study carried out by a consortium led by the Institute for European Environmental Policy (IEEP) in 2009.

¹³ See the evaluation *Synthesis of ex-ante evaluations of rural development programmes 2007–2013 (2008)*; the study *Defining EU Priorities: A Review of Rural Development Instruments (2008)*; and the final report of the Thematic Working Group 1 of the ENRD *Targeting rural territorial specificities and needs in rural development programmes 2007-2013*.

strengths, weaknesses, opportunities and threats (SWOT) so as to best tailor their intervention to policy objectives. However, policy objectives were rarely translated into quantified target levels. The evaluation also indicates that more efforts could have been made by the programme authorities to better fine-tune the general objectives of the rural development policy to the specific contexts of the different programme areas.

While Member States have generally been successful in setting demarcation lines and ensuring coordination between rural development and other policies, synergies have not always been fully exploited to allow the different policies to work together towards common objectives.

Investment measures in rural development programmes generally helped to increase the overall performance of farms in various ways, but reports have suggested some instances of deadweight effects on large productive farms undertaking "traditional" investments.

Agri-environmental measures overall have unquestionably delivered strong environmental benefits and achieved in general their objectives of preserving and enhancing the environment. However, in limited cases the commitments proposed were only marginally above the baseline of legal obligations, or highly demanding commitments were not matched by an appropriate payment rate (discouraging take-up). Similarly, linking more complex agri-environment measures to support for relevant training for farmers was at times found to be difficult. The evaluations identified as conditions for the effectiveness of agri-environmental measures aspects such as the clear definition of priorities at the programme level, information and training for farmers, and the reaching of a "critical mass" of land being subject to a certain measure. Finally, a number of evaluation reports have concluded that moving to a more results-oriented approach, based on setting environmental targets (e.g. a minimum number of indicator species, minimum population size) would be more effective in achieving environmental objectives than the current prescription/activity based approach. It would make the link to objectives more explicit, increase efficiency through paying for results, and would give farmers flexibility to adjust management to seasonal fluctuations and other factors. Some rural development programmes already contain agri-environmental measures operating on this principle.

Among the measures targeting economic diversification and the quality of life in rural areas, support for the creation and development of micro-enterprises – as an example – is seen as highly relevant to the economic fabric of rural areas, and has been actively targeted; its limitation to micro-enterprises has been, however, questioned.

The mid-term evaluation of the EU Forest Action Plan confirms the pertinence of the Action Plan in strengthening the socio-economic and environmental performance of the forest sector in the EU and its role in the development of rural areas. The report also underlines the need to keep a balanced approach to forestry taking into account the economic, social and environmental dimensions of sustainable forest management.

Leader has been successful in promoting the diversification of rural economies and in encouraging sustainable agriculture (although the impact on agricultural productivity has been less pronounced). It has brought local actors together and allowed for the development of local governance capacities. In terms of impacts, Leader has made a positive contribution to employment creation and maintenance, increased income generation (through the creation of new enterprises and activities as well as improved marketing and promotion of existing activities), and the creation of new facilities and services for local people. The capacity of Leader to enhance social capital is one of its key features and should be brought more to the fore in the future in both, the establishment of objectives and the evaluation of the approaches, since these impacts are currently not sufficiently demonstrated or valued.

2. Evaluations carried out during the period 2007 – 2010

Interventions in agricultural markets + direct aids

Year	Title
2010	Evaluation of the income effects of direct support (to be completed in May 2011)
	Evaluation of the markets effects of partial decoupling http://ec.europa.eu/agriculture/eval/reports/decoupling/exec_sum_en.pdf
	Evaluation of direct support applied to the beef and veal sector http://ec.europa.eu/agriculture/eval/reports/directaidbeef/exec_sum_en.pdf
	Evaluation of measures applied under the CAP to the starch sector (to be published in May 2011)
	Synthesis of evaluations on environmental effects of CAP measures http://ec.europa.eu/agriculture/eval/reports/environment-summary/fulltext_fr.pdf
	Evaluation of the environmental impacts of pig/poultry production http://ec.europa.eu/agriculture/eval/reports/pig-poultry-eggs/exec_sum_en.pdf
2009	Evaluation of measures applied under the Common Agricultural Policy to the raw tobacco sector http://ec.europa.eu/agriculture/eval/reports/captabac/ex_sum_en.pdf
	Evaluation of measures applied under the Common Agricultural Policy to the rice sector http://ec.europa.eu/agriculture/eval/reports/rice/exec_sum_en.pdf
	Evaluation of measures applied under the Common Agricultural Policy to the olive sector http://ec.europa.eu/agriculture/eval/reports/oilseeds/exec_sum_en.pdf
	Evaluation of measures applied under the Common Agricultural Policy to the hops sector http://ec.europa.eu/agriculture/eval/reports/hops/exec_sum_en.pdf
	Evaluation of measures applied under the Common Agricultural Policy to the protein crops sector http://ec.europa.eu/agriculture/eval/reports/protein_crops/exec_sum_en.pdf
	Evaluation of measures applied under the Common Agricultural Policy to durum wheat sector http://ec.europa.eu/agriculture/eval/reports/wheat/exec_sum_en.pdf
	Evaluation of the implementation of the Farm Advisory System http://ec.europa.eu/agriculture/eval/reports/fas/exec_sum_eval_en.pdf
	Evaluation of actions for Outermost Regions (POSEI) and Aegean Islands applied under the Common Agricultural Policy http://ec.europa.eu/agriculture/eval/reports/posei/exec_sum_en.pdf
2008	Evaluation of measures regarding producer organisations in the fruit and vegetable sector http://ec.europa.eu/agriculture/eval/reports/producer/ex_sum_en.pdf
	Evaluation of the Set Aside measure 2000 to 2006 http://ec.europa.eu/agriculture/eval/reports/setaside/exsum_en.pdf
	Evaluation of the environmental impacts of milk quotas http://ec.europa.eu/agriculture/eval/reports/milk_quot_ei/exsum_en.pdf

Year	Title
	Evaluation of the system of entry prices and export refunds in the fruit and vegetables sector http://ec.europa.eu/agriculture/eval/reports/fruitveg/exsum_en.pdf
	Evaluation de l'activation des paiements directs sur les cultures de fruits et légumes dans le modèle régional http://ec.europa.eu/agriculture/eval/reports/directpay/exsum_fr.pdf
2007	Evaluation of market measures in the beef and veal sector http://ec.europa.eu/agriculture/eval/reports/beef/summary_en.pdf
	Evaluation of Environmental impacts of the CAP measures related to the Beef and Milk Sector http://ec.europa.eu/agriculture/eval/reports/beefmilk/ex_sum_en.pdf
	Evaluation study of the Common Market measures for dried fodder http://ec.europa.eu/agriculture/eval/reports/fourrage/rapport.pdf
	Evaluation of the extensification payment http://ec.europa.eu/agriculture/eval/reports/paiement/fulltext.pdf
	Évaluation de l'impact sur l'environnement des OCM et des mesures de soutien direct de la PAC relatives au cultures arables http://ec.europa.eu/agriculture/eval/reports/ocm/sum_en.pdf
	Evaluation of the application of cross compliance as foreseen under regulation 1782/2003 http://ec.europa.eu/agriculture/analysis/external/cross_compliance/full_text_en.pdf
	Evaluation of the environmental impacts of CAP measures related to cotton http://ec.europa.eu/agriculture/eval/reports/coton/ex_sum_en.pdf
	Evaluation of withdrawals and crisis management in fruit and vegetable sector http://ec.europa.eu/agriculture/eval/reports/withdrawals/sum_en.pdf

Rural development + pre-accession measures

Year	Title
2010	Ex-post evaluation of Leader+ (to be published in May 2011)
	Synthesis of Sapard ex-post evaluations (to be published in May 2011)
2009	Mid-term evaluation of the EU Forest Action Plan http://ec.europa.eu/agriculture/eval/reports/euforest/exec_sum_en.pdf
2008	Synthesis of ex-ante evaluations of rural development programmes 2007–2013 http://ec.europa.eu/agriculture/eval/reports/rurdev/ex_sum_en.pdf
2007	Evaluation on the impact of Nordic aid schemes in northern Finland and Sweden http://ec.europa.eu/agriculture/eval/reports/nordic/sum_en.pdf

ANNEX 11c

COMMON AGRICULTURAL POLICY: SELECTED RELEVANT STUDIES AND RESEARCH PROJECTS CARRIED OUT BY THE JRC (JOINT RESEARCH CENTRE)

The present annex includes a short description of different research projects and studies recently carried out by the JRC (Joint Research Centre), applying various partial equilibrium and general equilibrium modelling tools as well as other quantitative techniques. Full references of each study are detailed in the last section.

1. CAPRI –FARM BASED STUDIES

a. EU-wide Distributional Effects of EU Direct Payments Harmonization

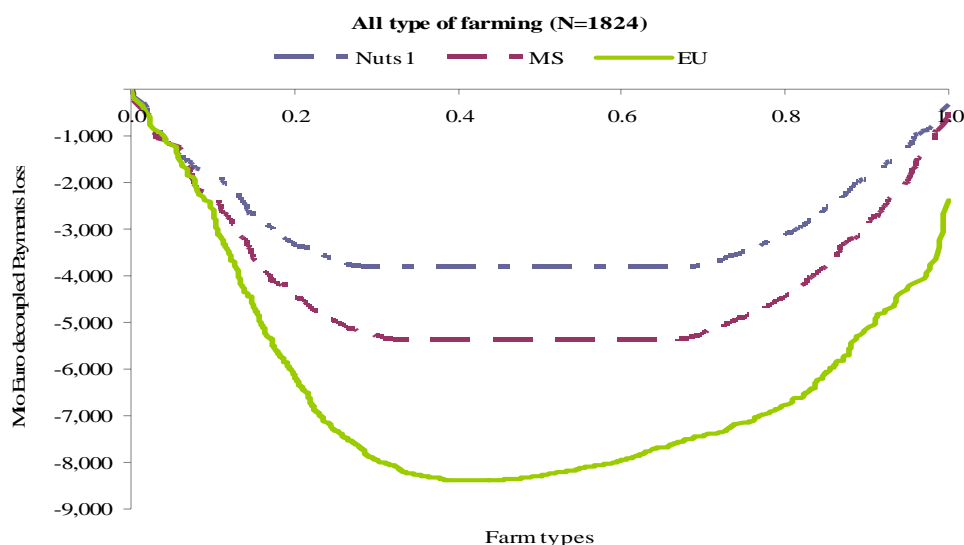
This IPTS study examines distributional effects of scenarios depicting different levels of harmonisation of CAP decoupled payments between farms and regions in the EU. The study considers three flat-rate scenarios. The first assumes a flat-rate payment at Nuts1 level, the second a flat-rate at MS and the third a flat-rate at EU level. The study applies the CAPRI-FARM model, which is an extension of the CAPRI modelling tool. The advantage of the CAPRI-FARM is that it provides policy impacts at farm type level compared to the standard regional focus of the CAPRI. The CAPRI-FARM disaggregates the standard Nuts2 regional resolution (270 Nuts2) of the supply models in CAPRI further to farm type models (1823 farm types), capturing farm heterogeneity in terms of farm specialization and farm size across EU.

The simulation results show relatively minor allocative market responses and thus small price effects for all three scenarios. More important are income effects driven by redistribution of payments. According to model results, the value of re-distributed payments varies strongly between the three flat-rate systems. The value of payments reallocated between farms in the EU increases from 9% (3.7 billion €) of the total CAP budget in the Nuts1 flat-rate scenario to 19% (8.2 billion €) in the EU flat-rate scenario. Particularly negatively affected are large- and medium-sized farms and dairies, mixed crops and livestock, general field and mixed cropping, olives, cereals and oilseeds and permanent crops. Small farms tend to be less affected. However, sheep, goats and grazing, the residual farm category and mixed livestock farms realise higher premiums and incomes.

Figure 1 shows that in the Nuts1 scenario, almost 30% of all farm types lose payments, approximately 30% are not affected (mainly those from new MS and Germany) and the remaining 30% gain payments. For the other two scenarios (MS and EU flat rate), more farms are affected by the redistribution of decoupled payments (the horizontal part of the curve is smaller). In particular, the EU flat-rate scenario reveals that almost 40% of the farm types lose payments, whereas 60% gain payments.

The Nuts1 and MS flat rates have minor payment redistributional effects between MS. On the contrary, the EU flat-rate scenario has a considerable impact on the redistribution of payments, particularly between the old and new MS. In relative terms, the Netherlands (-48%), Belgium (-45%) and Greece (-44%) experience the highest relative losses, whereas the highest gains are observed in new MS with large land endowments: Latvia (149%), Romania (92%), Estonia (82%), Bulgaria (55%) and Lithuania (54%). However, Portugal (43%) and Spain (35%) also gain considerable additional payments through a EU-wide flat-rate scheme because of low initial support levels.

Figure 1: Cumulative income change relative to the baseline over all farm types (normalised to 100%) for Nuts1, MS and EU flat rates



b. Farm level impacts of trade liberalization

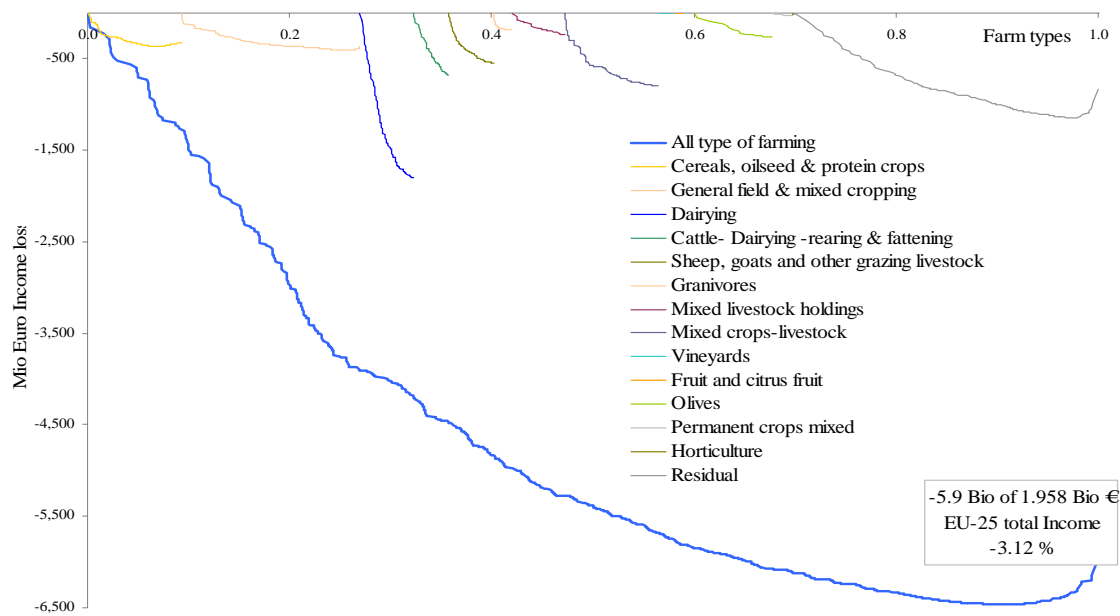
The same study also examines the impact of the trade liberalization scenario on farming sector in EU. The study simulates the impact of the proposal made by the chair of the WTO's agriculture negotiations, Ambassador Crawford Falconer. The scenario assumes a general *tariff reduction* based on a tiered formula (i.e. tariffs that are high are cut more aggressively than tariffs that are low), a reduction of TRQs in quota tariffs and the possibility to exclude certain products, called *sensitive products*, at the cost of the *extension of TRQs* for imports.

The simulation results show that tariff reduction increases consumer welfare in the EU by 8.5 billion € whereas agricultural income decreases by 6.8 billion € (-3%), mainly driven by losses realised in the animal sector that account for 5.5 billion €

Reduced trade protection increases imports and results in lower producer prices in the EU. The price reductions translate into relatively small changes in agricultural production but have a significant impact on farm income available to pay for the primary factors such as land and labour.

Generally, farm types specialised in livestock production lose more than other farm types. The absolute and relative income change for different farm types compared to the baseline vary between -2.6 billion € and 0.033 billion € and between -8% and 0.1%, respectively. Absolute income losses are the largest for the *dairy* farm type, at -1.8 billion €, followed by *mixed crops livestock* at -0.8 billion € and *cattle, dairying -rearing and fattening* at -0.7 billion €. Medium-sized farms are most affected, at -2.6 billion € when considering farm size. In percentage terms, the farm type *cattle dairying, rearing and fattening* loses the most income, at -8%, followed by *dairy farming* at -6%. Farm types that are positively or little affected include those specialised in *fruit and citrus fruit* (2%), *vineyards* (0.1% income change relative to the baseline), and *horticulture* (-0.9%). Overall, of all farm types modelled in the CAPRI-FARM (1823), 95% lose income, whereas 5% realise income growth (Figure 2).

Figure 2: Cumulative income change relative to the baseline over all farm types (bottom line) normalised to 100% and by single farm type (upper small curves)



2. THE VALUE OF EU AGRICULTURAL LANDSCAPE

The IPTS study estimates the value of EU agricultural landscape. Landscape is one of the key public good produced by agriculture. Farmers by being involved in the production of market commodities confer benefits on society by maintaining and creating rural landscapes.

In the last few decades there has been a great deal of research in scientific literature attempting to value (to place a price on) agricultural landscape. Because landscape is a non-traded good its value cannot be observed and thus it is not available from traditional statistical sources. The literature therefore most often applies *stated preference* (SP) approach by using survey based method to uncover societies' *willingness to pay* (WTP) for landscape. The vast majority of studies evaluating agricultural landscape in EU and non-EU regions find that society positively values agricultural landscape.

The IPTS study applies a meta-approach which combines results of the available evidence on the WTP for agricultural landscape from scientific literature with the aim to estimate the benefit transfer (BT) function. The BT methodology is based on the idea of using existing valuation studies, that value landscape at specific region, and it transfers valuation information from these regions to build the benefit estimate for landscape in other regions. The estimated transfer function is then used to calculate the value of landscape for different land types and for the whole EU. The final database contains 33 studies providing 96 WTP estimates and covering studies from 11 European and 3 non-European countries for the period 1982 to 2008.

The estimated per hectare value of EU agricultural landscape varies between 89 €/ha and 169 €/ha with an average value of 142 €/ha in 2009. Grassland and permanent crops report higher mean values (189 €/ha) than the arable land (113 €/ha). Further, the calculations indicate that the total value of EU landscape in 2009 is estimated to be in the range of €16.1 – 30.8 billion per year, with an average of €25.8 billion, representing around 7.5 percent of the total value of EU agricultural production and roughly half of the CAP expenditures (Table 1).

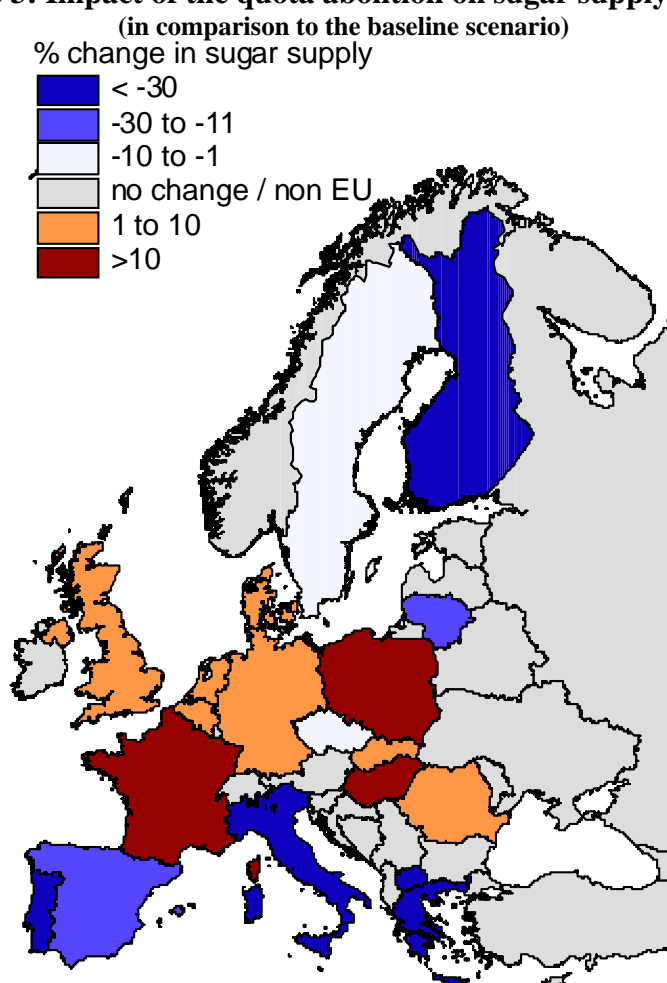
Table 1: The value of EU agricultural landscape in 2009

	Unit	Mean value	Min value	Max value
All land	€/ha/year	142	89	169
Grassland and permanent crops	€/ha/year	189	131	224
Arable land	€/ha/year	113	62	135
Total landscape value	million €/year	25,823	16,128	30,795

3. IMPACT ASSESSMENT OF THE SUGAR REFORM

The IPTS note "Impact assessment of the sugar reform" aims to assess the impact of the sugar quota abolition by Member State in the framework of the reform of the CAP after 2013. For this analysis the model ESIM¹⁴ has been used.

Figure 3: Impact of the quota abolition on sugar supply in 2020



If the sugar quota is abolished in 2015/2016 the **production in the EU27** in 2020 is expected to be higher by 7% than if the quota is maintained. However the developments in production are very different in the Member States (MS). The production increases in the MS with the lowest costs of production, which were particularly limited by the quota, namely in France,

¹⁴ ESIM (European Simulation Model) is a comparative static partial equilibrium model. It is a net-trade multi-country model of the agricultural sector. It covers supply and demand for agricultural products, with a detailed specification of cross commodity relationships, and some first-stage processing activities. The 27 EU MS are individually modelled in ESIM.

Germany, Poland and the UK. In certain competitive MS the margin of progress with quota abolition is limited because these MS are expected to produce a lot of sugar out-of-quota if quotas are not abolished; this is the case for the Netherlands, Denmark, Sweden and Belgium.

In Greece the production stops, and the production decrease is very large in Italy and Finland where the production costs are high. In Spain, the production drop is also significant.

4. RURAL EC MOD – AN EX-ANTE SPATIAL POLICY IMPACT ANALYSIS OF THE RURAL DEVELOPMENT REGULATIONS IN EUROPEAN RURAL AREAS

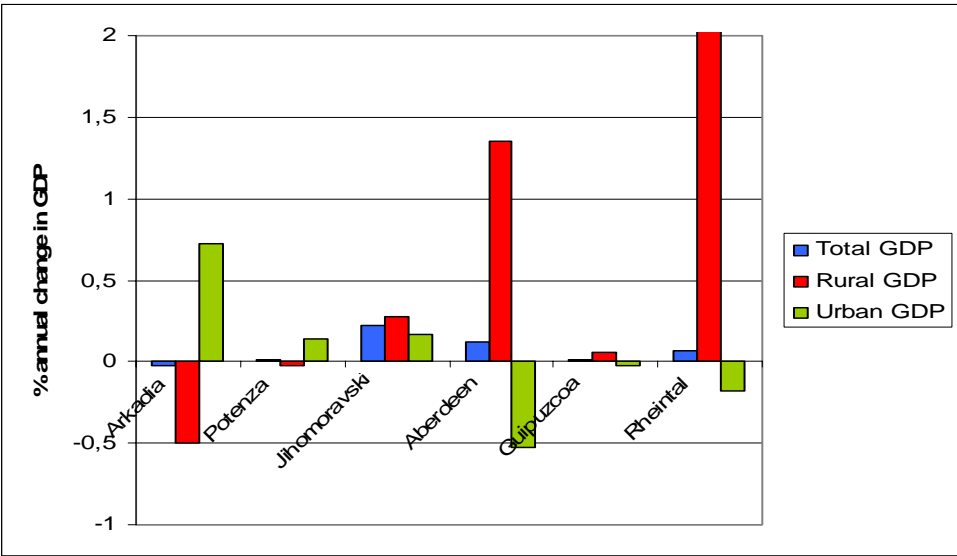
This research project aims to improve understanding of the regional economy impacts of CAP policy instruments, and, in particular, the impacts associated with switch away from an agriculture-centred focus, to an approach aimed at the balanced and sustainable development of EU rural areas. RURAL-ECMOD is particularly concerned with the estimation of rural / urban and sectoral effects of agricultural policy options and cause-effects patterns between different types of regional economies (diversification, rural / urban balance, etc.) and different types of CAP tools including Rural Development policy measures, in particular their sector-specific direct impacts.

It adopts a dynamic Computable General Equilibrium (CGE) modelling approach to the ex-ante assessment of various policy scenarios in six, specially selected on the base of previous work (project TERA SIAP) concerning typology of rural areas, EU NUTS3 regions. The model is recursive and implemented on a total duration equal to 2 financial periods (until 2020).

Scenarios tested refer to three groups: scenarios contemplating changes in the distribution of pillar 2 funds within axes; aggregate scenarios (change of distribution between pillar 1 and pillar 2); scenarios concerning intra axis 3 distribution of funds.

The project shows that, at local level, regional economic structures influences the direction and magnitude of policy effects. The diversity of results across study areas reinforces the menu-driven nature of the RDP where member states are able to tailor the policy to specific regional needs. It seems in addition that direction of effects are in general opposite in rural areas and urban areas (Figure 4).

Figure 4: Impact of Diversification Rural development policy on total / rural / urban GDP



Rural Development policy with emphasis on diversification measures seems to benefit more to already diversified rural economies. Reciprocally, Rural Development policy with emphasis on agriculture and food industries benefits more to agri-oriented rural economies. However, in the longer term, diversification policy seems to be beneficial in all areas, even those agri-oriented, due to increased rural interdependence and structural changes.

5. INVESTMENT BEHAVIOUR IN CONVENTIONAL AND EMERGING FARMING SYSTEMS UNDER DIFFERENT POLICY SCENARIOS

The study about farm investment behaviour under the CAP reform process aims to investigate farmers' investment behaviour, and evaluate the impact of different CAP scenarios on selected farming systems (Viaggi et al., Forthcoming). It followed up a previous study on investment behaviour carried out in 2006 (Gallerani et al., 2008). The methodology was divided into two components: a) the administration and analysis of a survey of 256 farm-households; and b) the simulation of selected scenarios through dynamic farm-household models. Eight scenarios were developed: 1.1 (-30+RSP) Reference/baseline, based on the reference scenario in the Scenar 2020 II study; 1.2 (GR+LSP) based on the liberalisation scenario in the Scenar 2020 II study; 2.1 (-30+LP) and 2.2 (GR+LP) analogous to the previous two respectively, but with a flat price decrease by 20% compared to 2009; 3.1 (-100+CP) characterised by a total abolishment of CAP payments after 2013 and 2009 prices; 3.2 (-15+LP) characterised by a reduction of CAP payments by 15% after 2013 and 2009 prices; 4.1 (HC+LP) characterised by Health Check CAP and a flat price decrease by 20% compared to 2009; 4.2 (HC+CP) that reproduces 2009 payment and prices conditions.

The results of the study can be summarised in four main outcomes. With respect to the effects of the CAP decoupling process, the 2009 results mostly confirm those of the 2006 Investment study. In both cases, for about half of the farms decoupling did not result in any change. Among those farms showing some reaction, one of the more prominent effects is the increase in on-farm investment.

Additionally, depending on the system and farm typology, decreases in on-farm, and increases in off-farm investment have also been observed when comparing 2009 results with those from 2006.

The price trends in 2007/2008 and the ongoing economic and financial crisis have partially reshaped access to credit, perceptions of objectives, constraints and expectations. In particular, farms have witnessed a major reduction in access to credit, particularly the share of farms using short term credit, which dropped from more than 40% in 2006 to about 7% in 2009. As far as objectives are concerned, farm-households seem to have increased their overall focus on agricultural activities by increasing the importance of objectives such as debt-asset ratios, and decreasing the importance of objectives such as leisure. In 2009, the share of farmers expecting an increase in production costs, and a decrease in CAP payments, increased. The willingness to invest is still high, although the number of farmers stating an intention to invest in land, buildings or machinery has decreased by about 20% compared to 2006.

The change in economic conditions between 2006 and 2009 has increased the role of the CAP in guaranteeing a minimum level of income through farming, while the importance of CAP payments in covering current expenditures has become more evident.

The results of the modelling exercise confirm that farm and farm-household income and investment choices depend more on the price level than on the level of payment received. However, some farming systems, particularly those in eastern EU and livestock systems,

show a very high dependency on payments. However, the variability of impact across farm types is very high.

A summary of the effects of the different scenarios on sustainability measured through different indicators is provided in Table 1, using a qualitative scale (+,0, -).

Table 2 - Scenario effect on sustainability

Scenarios	1.2 (GR+LSP)	2.1 (-30+LP)	2.2 (GR+LP)	3.1 (-100+CP)	3.2 (-15+LP)	4.1 (HC+LP)	4.2 (HC+CP)
Farm income	0	-	-	0	-	-	+
Household income	0	-	-	0	-	-	0
On-farm labour	0	0	-	0	0	0	0
Nitrogen use	0	+	+	0	0	0	0
Water use	+	+	+	+	+	+	0

In addition the variability of results highlights the relevance of farm/household -specific components and path-dependent issues (e.g. asset age) in affecting reactions to markets and policy, particularly concerning investment choices.

6. IMPLEMENTATION OF THE CAP POLICY OPTIONS WITH THE LAND USE MODELLING PLATFORM

The Land Use Modelling Platform (LUMP) has been developed by IES to support the exploration of future policies and the impact assessments of specific proposals. The land use model EUClueScanner (EUCS100), developed in collaboration with DG Environment, is the core component of the platform which links specialized models and data within a coherent workflow. The definition of global and economic scenarios entails the interface with external models related to different categories of drivers (demography, agriculture, regional economy, climate change, etc.). A set of other factors are also defined (e.g. accessibility maps, soil characteristics, topography, biophysical properties, etc.).

In the context of the simulation for the CAP Reform Impact Assessment, the agro-economic model CAPRI is used to drive the land cover classes associated with agriculture. We use observed CLC data for 1990, 2000 and 2006 as well as the prediction for 2020 from CAPRI-FARM (with the assumption of national-flat rates) in order to establish a trend in land claims for the agricultural sector. Biophysical crop suitability maps are provided by the JRC/AGRI4CAST Action. For residential areas we use population projections from Eurostat (EUROPOP 2008).

The Status Quo (representing the current socio-economic and environmental trends with current policy provision maintained) is considered as the reference scenario and the impacts of the Integration Policy Option are compared to it. Specific greening options (or measures) are defined for the Integration Policy Option. Following discussion with DG AGRI, the land use modelling focuses on the environmental part of the CAP reform and particularly on greening component of direct payment. The three following options are assessed:

Option 1: crop diversification with 3 crops and main crop is maximum 70% of the area, ecological focus area 5% of the area, soil cover in winter time 70% of area, maintenance of permanent pasture (PP), separate payment for Natura 2000 areas;

Option 2: crop diversification with 3 crops and main crop is maximum 50%, ecological focus area 10% of the area, soil cover in winter time 70% of area, maintenance of permanent pastures, separate payment for Natura 2000 areas;

Option 3: crop diversification with 3 crops and main crop is maximum 70% of the area, ecological focus area 5% of the area, no soil cover, PP, no specific payment for Natura 2000 areas.

For the purposes of delivering product within the deadline set for the Impact Assessment, **Option 2 is implemented**. The other options will follow at a later stage.

Indicators for environmental assessment of CAP reform

The main output of EUCS100 model is a series of projected land use/cover maps for the coming years up to 2020 for the two policy alternatives. The EUCS outputs are then used to compute a set of various indicators in the frame of LUMP by linkage with thematic models.

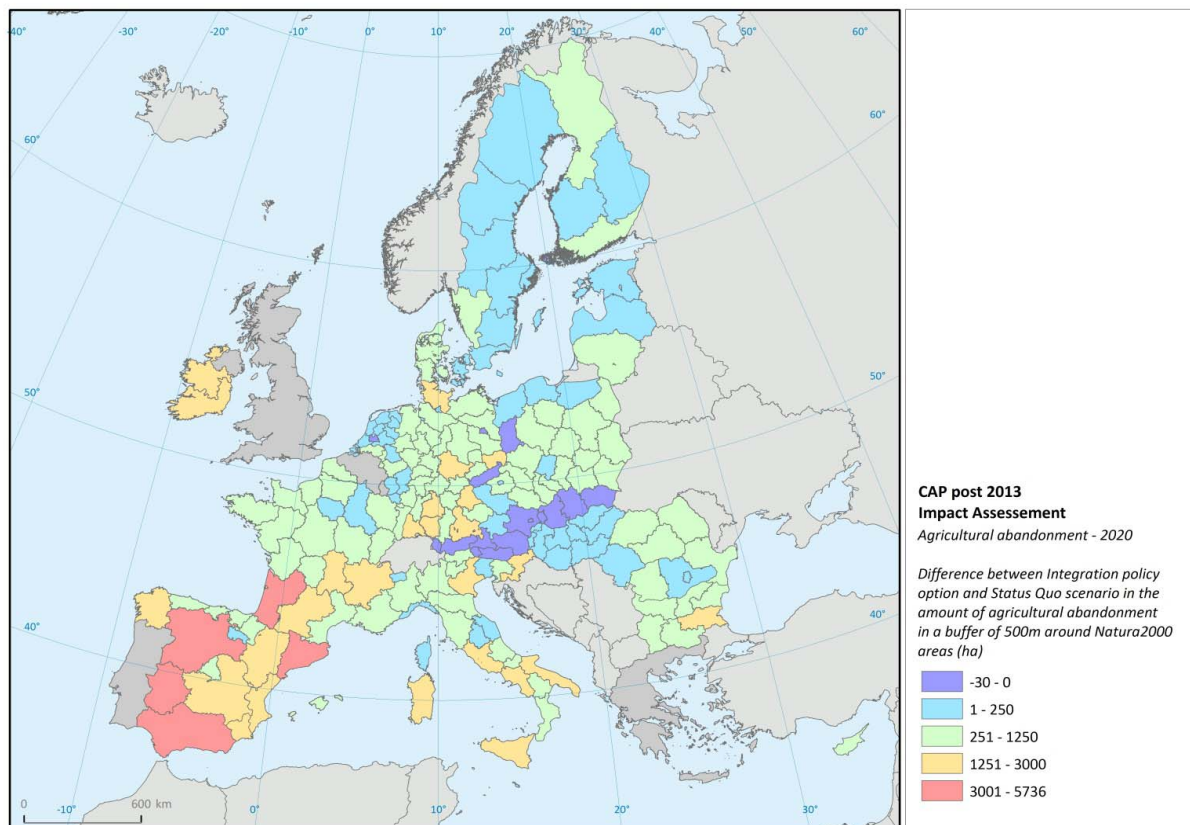
The following of indicators are computed (provisional list):

- Land use change, Cropping patterns, Land cover change, Connectivity level of green infra-structure, Landscape Patterns, Soil quality (Soil organic carbon stocks), Riparian protection, Level of agricultural abandonment, Pressure on NATURA 2000.

Indicators related water quantity and water quality will be ready at a later stage since requires the running of other models.

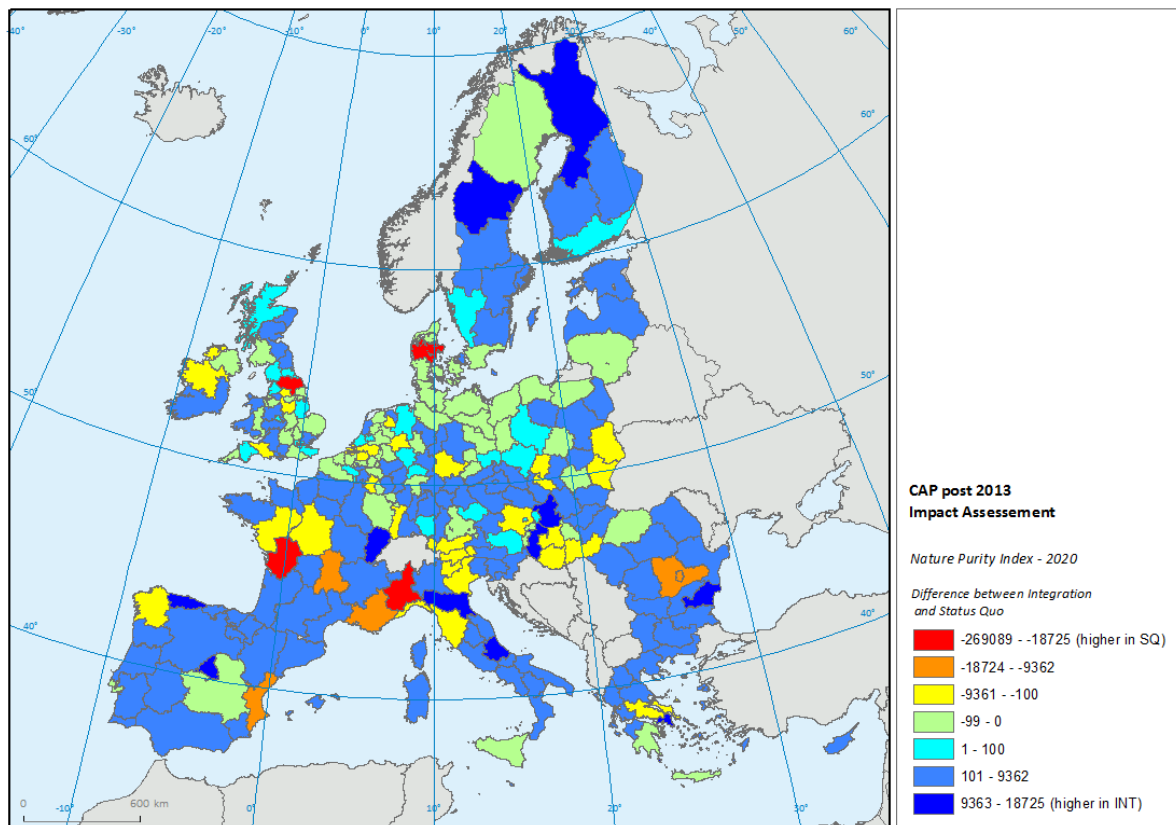
Two examples of indicators are presented in figures 5 and 6.

Figure 5: Level of agricultural abandonment around Natura 2000 Sites



The map presents the amount of arable land and permanent crops that are abandoned in year 2020 in a 500-meter wide strip around Natura 2000 sites resulting from the difference between the Integration and the Status Quo policy options. A positive value indicates a decreased pressure on Natura 2000 sites in the Integration scenario. Values for UK, PT, BE, GR and LU are being finalised at date of writing and not included in the map.

Figure 6: Nature Purity Index



Mapping pure natural areas is of interest in order to understand the differences in overall pure natural areas per NUTS 2 region, as shown in this figure, between the two scenario forecasts for 2020, and can lead to an understanding of if and where regions benefit from the greening measures proposed in the Integration scenario. As shown in this figure, more NUTS 2 regions benefit from the Integration scenario in terms of gaining in pure natural areas, than do lose due to the proposed measures.

7. IMPACTS OF THE EU BIOFUEL TARGET ON AGRICULTURAL MARKETS AND LAND USE

The EU's Renewable Energy Directive sets an overall binding target of 20% for the share of EU energy needs to be sourced from renewables by 2020, with at least 10% of each Member State's transport fuel coming from renewable sources (including biofuels).

The consequent growth in biofuel production is also likely to trigger indirect land use changes worldwide. The IPTS report presents an agro-economic impact analysis of the impacts of EU biofuel policies on agricultural production, trade and land use within and outside the EU, up to the year 2020, based on the market outlook from 2009 (full report available <http://ftp.jrc.es/EURdoc/JRC58484.pdf>).

The three agro-economic models used in this exercise, AGLINK-COSIMO, ESIM and CAPRI are robust, scientifically acknowledged tools for simulating agricultural policy changes. They are able to identify policy impacts on supply and demand, trade flows, domestic and world markets. In addition, they can give a consistent global picture of indirect land use change impacts triggered by price signals transmitted via market interactions.

The impacts identified include higher EU production of ethanol and biodiesel, and of the crops used to produce them, as well as more imports of both biofuels. AGLINK-COSIMO estimates an extra 5.2 million hectares used for cereals, oilseeds and sugar crops globally. One

quarter of this extra land use is in the EU. However, the global figure does not include any land use implications of the higher vegetable oil production in Indonesia and Malaysia.

Inevitably, the results depend on various underlying assumptions such as future trends in fossil fuel prices, population and world GDP. For instance, global land use change estimates due to biofuel policies turned out to be quite sensitive to yield growth assumptions.

Currently, an update of the assessment based on the latest available market outlook for the EU is being prepared.

8. PARTICIPATION TO (ON-GOING) FP7 RESEARCH WORK

a. CAPRI RD

JRC-IPTS and JRC-IES are both involved in the FP7 project "Common Agricultural Policy Regionalised Impact – The Rural Development Dimension (CAPRI RD)"¹⁵. Deliverable 6.2 of the project is a modelling exercise for the impact assessment of a possible 'greening' scenario of the Common Agricultural Policy. The policy scenario defines a combination of a regional flat-rate system for direct payments with a 15% corridor around the EU27 average payment rate. The study is led by University of Bonn with DG Agri playing a key role in scenario design. The Institutions vTI, LEI and IPTS are also directly involved.

In the modelling exercise the newly developed farm-type layer of the CAPRI modelling system will be applied taking into account the farm heterogeneity across EU. The results will include a detailed description of possible CAP redistribution effects across EU regions and farm types. Also the effects on land use, product balances, prices and some relevant environmental indicators will be examined.

b. CAP-IRE

The objective of CAP-IRE is to develop concepts and tools to support future CAP design, based on understanding of the long-term socio-economic mechanisms of change in rural areas.

The reaction of farm households to CAP reforms is analysed under the lens of six thematic, and one cross-thematic, viewpoints: 1) farm structural adjustment, investment and innovation; 2) chain interactions between agriculture and related economic sectors; 3) environmental sustainability; 4) social sustainability; 5) interactions between rural communities and the rest of the world; 6) farm and rural governance issues; 7) the interplay between the previous aspects. The project used a mixed method approach, including a major survey of 2363 farm households across 11 case study areas (CSA) in 9 EU countries.

http://www.cap-ire.eu/Documents%20Respository/Policy_brief_final_24%20jan%202011.pdf

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¹⁵ http://www.ilr1.uni-bonn.de/agpo/rsrch/capri-rd/capriird_e.htm. The project aims to investigate the regional effects of CAP Pillar I and II policy options. The standard CAPRI modelling framework has been further developed to meet this goal, featuring for example a modelling layer of regional computable general equilibrium models.

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ANNEX 11D

LIST OF RELEVANT DG AGRI COMMISSIONED STUDIES AND DG RTD RESEARCH PROJECTS

5. EXTERNAL STUDIES

5.1. Studies completed in 2007

- Effects of Globalisation on the Economic Viability of EU Forestry
- Adapting Agriculture to Climate Change
- Measurement of CAP-related Administrative Burden for Farmers
- Indicators of High Nature Value for Evaluation
- Agriculture within the Overall Economy
- IT Availability in Rural Areas

5.2. Studies completed in 2008

- Economic, Social and Environmental Impact of Modulation
- Defining EU Priorities: A Review of Rural Development Instruments
- Development and Marketing of Non-market Forest Products and Services
- Economic Analysis of the Effects of the Expiry of the EU Milk Quota System
- Economic Impact of the of the Abolition of Milk Quota Regime – Regional Analysis of Milk Production in the EU
- Study on the Functioning of Land Markets

5.3. Studies completed in 2009

- Agricultural Insurance Schemes II
- Scenario 2020 Follow-up Study: scenario study on agriculture and the rural world
- Study on the Provision of Public Goods through EU Agriculture
- Value of Agricultural Production under Protected Designations of Origin and Protected Geographical Indications
- Assessment of Criteria for the Identification of Less Favoured Areas

5.4. Studies completed in 2010

- Livestock Sector's Contribution to EU Greenhouse Gas Emissions

- Marketing Standards in the Fruit and Vegetable Sector
- Study on Employment, Growth and Innovation in Rural Areas
- Designation of Less Favoured Areas

5.5. Studies launched in 2010 to be completed in 2011

- Impacts of Renewable Energy on European Farmers
- Addressing Biodiversity and Habitat Preservation through Measures Applied under the Common Agricultural Policy
- Use and Efficiency of Support Measures for Organic Farming
- Study on Administrative Burden Reduction
- Study on Efficient Measures for Adaptation to Climate Change

6. RTD PROJECTS

6.1. List of projects recently concluded / ending (FP6 programme)

Acronym	CAP Policy Domain	Title
SENSOR*	CAP – impact assessment	Sustainability Impact Assessment: Tools for Environmental, Social and Economic Effects of Land Use in EU Regions
SEAMLESS*	CAP – impact assessment	Science for Integrated Assessment of Agricultural Systems in Europe
TRADEAG	CAP - trade	Agricultural Trade Agreements
CEEC AGRI POLICY	CAP – new MS	Agro-economic policy analysis of the accession and the candidate states and the countries of Western Balkan
AGEMOD 2020	CAP – new MS	Agricultural Member State Modelling for the EU and E. European Countries
EUROCROP	CAP - production	Agricultural Research for Improving Arable Crop Competitiveness
IDEMA	SPS - income	The impact of decoupling and modulation in the enlarged Union: a sectoral and farm level assessment
GENEDEC	SPS – decoupling	A quantitative & qualitative assessment of impacts of decoupling on agricultural production, markets and land use in EU
CROSS-COMPLIANCE	SPS – cross compliance	Facilitating the CAP reform: compliance and competitiveness of EU agriculture
Income Stabilisation	SPS - income	Design & economic impact of risk management tools for EU agriculture

FOODCOMM	CAP – food chain	Key factors influencing economic relationships and communication in European food chains
CARERA	RD - employment	The Impact of CAP Reform on the Employment Levels in Rural Areas
LUMOCAP	RD – land use	Dynamic land use modelling for CAP impact assessment on the rural landscape
MEACAP	RD - environment	Impact of Environmental Agreements of the CAP
TOP-MARD	RD - multifunctionality	Towards a Policy Model of Multifunctional Agriculture and RD
CCAT	SPS- cross compliance	Cross Compliance Assessment Tool
ENDURE	RD - environment	EU Network for the Durable Exploitation of Crop Protection Strategies

* RTD-ENV Programme projects

6.2. List of ongoing projects (FP7 programme)

Acronym	CAP Policy Domain	Title
AgriPolicy	CAP – new MS	Enlargement Network for Agripolicy Analysis
AgFoodTRAdE	CAP - trade	New Issues in Agricultural, Food and Bioenergy Trade
CATSEI	CAP - trade	Chinese Agricultural Transition: Trade, Social and Environmental Impacts
TAPSIM	CAP - trade	Trade, Agricultural Policies and Structural Changes in India's Agrifood System; Implications for National and Global Markets
NTM-IMPACT	CAP - trade	Assessment of the Impacts of Non-Tariff Measures-NTB on the Competitiveness of the EU And Selected Trade Partners
CAP-IRE*	CAP – impact assessment	Assessing the multiple Impacts of the Common Agricultural Policies (CAP) on Rural Economies
FACEPA	CAP – costs of production, FADN	Farm Accountancy Cost Estimation and Policy Analysis of European Agriculture
FutureFarm	SPS – cross compliance	Integration of Farm Management Information Systems to support real-time management decisions and compliance of management standards
RUFUS*	RD - impacts	Rural Future Networks
RuDI	RD - impacts	Assessing the Impact of Rural Development Policies
RuralJobs	RD - employment	New Sources of Employment to Promote the Wealth-Generating Capacity of Rural Communities

CAPRI-RD	RD – regional impact	Common Agricultural Policy Regionalised Impact - The Rural Development Dimension
DERREG*	RD - regions	Developing Europe's Rural Regions in the Era of Globalization: an Interpretative Model for Better Anticipating and Responding to Challenges for Regional Development in an Evolving International Context

* RTD-SSH Programme Projects

6.3. List of projects just started / about to start (FP7 programme)

Acronym	CAP Policy Domain	Title
Factor Markets	SPS – land, inputs	Comparative analysis of factor markets for agriculture across the Member States
SPARD	RD - territoriality	Spatial Analysis of Rural Development (SPARD): Providing a tool for better policy targeting
TRANSFOP	CAP – food chain	Transparency in food pricing (price transmission...)
SOLINSA	CAP – extension, innovation	Agricultural knowledge systems in transition: towards more effective and efficient support of learning and innovation networks for sustainable agriculture (LINSA)
PURE	RD - environment	Pesticide use and risk reduction in European farming systems with Integrated pest management
FarmPath	RD – public goods	Assessment of transition pathways to sustainable agriculture and social and technological innovation needs
AnimalChange	RD – climate change	Integration of mitigation and adaptation options for sustainable Livestock production under climate change