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System for Environmental and Agricultural Modelling;
Linking European Science and Society

Documentation of baseline and policy scenarios for Test Case 1

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SEAMLESS integrated project aims at developing an integrated framework that allows ex-ante assessment of agricultural and environmental policies and technological innovations. The framework will have multi-scale capabilities ranging from field and farm to the EU25 and globe; it will be generic, modular and open and using state-of-the art software. The project is carried out by a consortium of 30 partners, led by Wageningen University (NL).

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Executive summary

This deliverable gives a short overview about the conceptual framework behind scenarios in SEAMLESS and describes the structure of the baseline and policy scenarios for Test Case 1. This involves not only the definition of these scenarios but also the identification of the different components involved in their construction.

The description of the baseline is structured upon several global and regional scenario drivers. The global drivers are incorporated into Prototype 1 and try to reflect the projection of policies affecting agriculture in 2012. They are based on previous work carried out by the CAPRI team (partially condensed in PD6.2.3). These should steer Test Case 1, since the effects of policy changes on markets are the main focus of analysis. For the adaptation of the baseline to the sample regions (Nuts 2 administrative regions including Midi Pyrenées, Flevoland, Brandenburg, Andalucía) and test case regions (Pyrzyce in Poland, Neste and Massif Central in France, and Sikasso and Koutiala in Mali) expert information has been collected and will be incorporated in Prototype 2. These regional drivers will be implemented in FSSIM and linked to the market level via EXPAMOD (changes in regional production elasticities). This is an important milestone towards the construction of a comprehensive baseline at different levels, where the local conditions are also taken into account in its design.

The description of the policy scenario for Test Case 1 is only done at the global level (no regional drivers involved besides the ones referring to the Malian case) and introduces a scenario where trade for agricultural commodities is liberalised in the world according to the last European proposal of October 2005 (COMMISSION OF THE EUROPEAN COMMUNITIES, 2005b). The main variables describing the policy scenario are built in the CAPRI model. The link from CAPRI to the regional farm type models of FSSIM is done via changes in regional prices.

The baseline and policy scenarios will be further elaborated in Prototype 2, as more information will become available and the capabilities of SEAMLESS will be extended.

Specific part

1 Introduction: a conceptual framework

1.1 Scenarios in SEAMLESS: from a storyline to a simulation

In SEAMLESS no formal conceptual framework has been developed for the construction of scenarios up to now. Whereas this need is adressed in the new DOW, the conception of different scenarios up to now has been based on a pool of storylines generated through discussion with policy makers, potential users and experts in the scientific community. Moreover, the project description of work incorporates a main goal: *'the assessment of how future alternative and environmental policies affect sustainable development'*, and two levels of analysis for it: *'the market level'* and *'the spatial or meso level, including the farm type level'*. These are used as a guide or constraint for an appropriate selection of storylines to incorporate to our scenarios. From the SEAMLESS perspective, scenarios can be viewed as a linking tool that integrates qualitative narratives or stories about the future and quantitative formulations based on formal modelling.

In several international institutions (e.g. IPCC, FAO) scenario analysis at different levels is a major activity. Scenarios are considered as alternative images of how the future might unfold and are an appropriate tool with which to assess the associated uncertainties, and help in the assessment of future developments in complex systems that are either inherently unpredictable, or that have high scientific uncertainties (IPCC, 2000). Whereas the IPCC has concentrated on the analysis of different scenarios on climate relevant emissions the FAO has focused different policy and market scenarios on product markets at the global level. Both thematic approaches could well be integrated within the SEAMLESS scenario framework.

Moreover, ongoing projects within DG Research are already dealing with the issue of scenario building. This is the case of SENSOR and some need of collaboration has been detected (Meeting SEAMLESS-SENSOR, 11th March, Brussels; see Appendix 1). The idea is to seek actively for synergy effects on the following issues:

(1) Indicators to characterise environmental, ecological and social issues of contributions of agriculture and land use to sustainable development. The aim of the collaboration is to end up with a comprehensive and consistent set of multi-scale indicators and avoiding overlap of work.

(2) Data collection and database development aiming at avoiding overlap in accessing data and ensuring a smooth exchange of data where needed.

(4) Scenario development and definition. The aim of collaboration is to avoid overlapping and to achieve consistency in scenario definition between the two projects.

This last point refers to the Work Package 6 of SEAMLESS and Module 2 of SENSOR, which both address the issues of scenario analysis. In this area, information exhange has taken place between both projects in the last months. This has mainly comprised activities regarding the scenario building process (use of expert data, extrapolation and calibration of data, etc.). The specification/projection of variables exogenous to both systems (scenario drivers) and the use of each other's project results for definition of scenarios will be adressed in prototype 2, where results should be available according to the respective DOWs.

1.2 Test Case 1: the socio-economic dimension

In Test Case 1 of SEAMLESS the effect of agricultural policies on agricultural markets is analysed. This includes basically the effects that price changes exert on production of agricultural commodities at different regional levels (from farm type to global markets) and the changes in welfare suffered by consumers and producers as well as environmental effects. The focus of the analysis is therefore the 'market level', which does not imply that effects at the landscape or farm level will not be observed.

One of the strengths of the SEAMLESS framework which should be ensured from the beginning is the possibility to link models at different levels (parallel top-down and bottom-up approaches). This implies an endogenous coupling between models working with different objectives (farm models, biophysical models, landscape models and socio-economic models). Whereas in the first prototype special attention will be put on economic indicators, with a more superficial asessment of the environment (mainly aggregated environmental indicators), in the second prototype the environmental dimension will be focused in detail.

For the purpose of this analysis, in Test Case 1 a baseline and policy scenarios are constructed. In the following sections these are described. Special emphasis is put on the baseline scenario, since it should remain in following prototypes and considers all scales in itself (global and regional scenario drivers).

2 Baseline: projection of policies affecting agricultural markets

2.1 Scenario description

In SEAMLESS, the baseline scenario should capture the complex interrelations between technological, structural and preference changes for agricultural products world-wide in combination with changes in policies, population and non-agricultural markets. Given the complexity of these highly interrelated developments, several possible approaches to the problem of constructing a baseline scenario have been pointed out. VAN NOTTEN ET AL (2003) classify them on the basis of their goals, their methods and their contents. For Test Case 1 a combination of two approaches has been selected for the construction of the baseline based on the scenario-building process followed by the CAPRI model: *expert judgements* (consultation on the most likely developments of a specific variable) and *extrapolation of existing trends* (projection tool). The aim is to provide a baseline used as comparison points or comparison time series for counterfactual analysis:

The baseline may be interpreted as a projection in time covering the most probable future development of the European agricultural policy, with the Luxemburg Agreements on CAP Reform as the core, and including all future changes already foreseen in the current legislation (e.g. sugar market reform). Expert data on future trends have been obtained from internationally reliable sources doing forecasting research at EU level (Commission of the European Communities) and for non-EU regions and exogenous drivers (FAO and World Bank). This information and own linear trend projections using data from the SEAMLESS database are fed in the projection tool as ex-post information. These trend variables are estimated simultaneously subject to several consistency restrictions which ensure mutual compatibility between time series and plausibility of results (e.g. closed area and market balances).

2.2 Global exogenous drivers

The global parameters of the baseline in Test Case 1 are set by the CAPRI model. It currently uses a three-year average around 2002 as 'base year' to calculate all the functional parameters required for scenario analysis. This is due to the fact that 2003 is the last year for which data are delivered at the moment by EUROSTAT (European Accounts of Agriculture as bottleneck). In the future an update of this to a three-year average 2003 is expected.

The decision on 2012 as projection year is taken in order to remain consistent with the latest trends for Common Market Organisations (European Commission, 2005). The idea is to model 'a realistic medium-term scenario' accounting for the different implementation steps of the CAP reform programmed for the next decade[1].

The baseline is mainly constructed by using drivers. Drivers are exogenous variables for which we set values in a scenario, as described in the 'Driving Forces, Pressure, State, Impact, Response' (DPSIR) approach of the European Environmental Agency (EEA, 1999). At the market level in SEAMLESS the following socio-economic drivers are considered:

***1. Inflation in the EU25*:**

1.9 % per annum.

[1] The path in between these two periods is not modelled at the moment in SEAMLESS (static approach). This might change in the future, mainly driven by the dynamics introduced in the biophysical models.

2. *Growth of GDP per capita:*

2.0 % nominal per annum for the EU, 10.5 % for India, 1.5 % for USA, 4 % for Russia, 1.5 % for Least Developed countries and ACPs, and 1 % for the rest. This is an area where interaction with SENSOR will be of importance, being these assumptions changed or extended in the second and third prototypes.

3. *Demographic changes:*

Available EUROSTAT population projections for single European countries and UN projections for the rest of countries in the world. These data are aggregated to the regional aggregates used in the market models.

4. *Technical progress in the EU25:*

0.5% input savings per annum (affecting exogenous yield trends). This assumption will be relaxed whenever APES-FSSIM is fully operational in the second prototype.

5. *Domestic policy in the EU25:*

National decisions on coupling options and premium models, with their expected implementation date for the EU25 Member States (compilation by MASSOT MARTÍ 2005). In the baseline, the variables in CAPRI which account for changes in the CAP are the single activities receiving a per hectare, per head or per historic yield premium, and the specific premium schemes which cover these activities. The current national decisions on coupling options and premium models, with their expected implementation date, are resumed for the EU25 Member States in table 1:

Table 1 Most probable implementation by EU25 Member States of the policy options approved with the Luxemburg compromise

Member state	Arable crops decoupling		Livestock decoupling					Reference for the Single Farm Premium			Implementation partial decoupling	Integration of milk reform in SFP
	partially		partially									
	25% direct premiums	**or** 40% Durum Wheat premium	50% sheep and goat premium	100% calf slaughtering premium	100% suclercow + 40% slaughter premium	**or** 100% shlaughter premium	**or** 75% male beef premium	Individual farm premium	Hybrid model simple	Hybrid model dynamic		
France	x		x	x	x			x			2006	2006
Belgium + Luxemburg [1]				x		x (Belgium)		x (Belgium)	x (Lux.)		2005	2006 (Belgium) 2005 (Lux.)
Netherlands			x	x		x		x			2006	2007
Austria				x	x			x			2005	2007
Germany										x	2005	2005
Finland			x				x			x	2006	2006
Denmark			x				x		x		2005	2005
United Kingdom [2]								x (Wales, Scotland)	x (North Ireland)	x	2005	2005
Ireland								x			2005	2005
Sweden						x			x		2005	2007
Spain	x		x	x	x			x			2006	2006
Portugal				x	x			x			2005	2007
Greece	x		x		x			x			2006	2007
Italy								x			2005	2006
Rest (EU-10)										x	2007-2009	---

Source: Arts. 66 and 68 of COUNCIL OF THE EUROPEAN COMMUNITIES 2003b; Art. 110 COUNCIL OF THE EUROPEAN COMMUNITIES 2004; information based on the compilation made by MASSOT MARTÍ 2005.

[1] Belgium and Luxemburg are modelled together in the CAPRI Model.

[2] Within the United Kingdom England has chosen a dynamic hybrid model, Wales and Scotland a farm historical premium scheme and North Ireland a static hybrid model.

[3] It is allowed to keep 60 % of tobacco payments coupled until 2010. Afterwards 100 % decoupling must be assumed.

[4] For the EU10 countries no partial decoupling is considered. A flat rate premium is assumed to increase gradually over time until 2013 (in 2012 90 % of the negotiated premium ceiling values are paid to agricultural activities).

The FSSIM models will incorporate the information on premium schemes found in the European regulations and modelled in CAPRI, but also further local regulations at the regional level (e.g. irrigation premiums or environmental regulations). Nevertheless, consistency is ensured in the link between models (e.g. average single farm premium per Nuts 2 region should remain equal in both models). Further on, the reform of the sugar and milk sectors are included in the baseline as reflected in the regulation (COUNCIL OF THE EUROPEAN COMMUNITIES 2004).

6. Common Market Organisations:

Supply and demand of agricultural commodities shifted according to the expert forecasts (COMMISSION OF THE EUROPEAN COMMUNITIES, 2005c)

7. Trade policy:

The trade policy[2] considered in the baseline is a continuation of the 1994 Uruguay round (cut of 36 % on tariff bounds). This raw information is found in the Agricultural Market Access Database (AMAD) and, after some 'data massaging', mapped into CAPRI.

8. World markets:

Supply and demand forecasts as found in the agricultural supply utilization accounts (FAO, 2003).

9. Budgetary overview:

The budgetary outlays are shifted to the projection year according to the agreements achieved by the European Commission.

Table 2 Commission´s proposal for the agricultural budget (MM €)

	2006	2007	2008	2009	2010	2011	2012	2013
At 2004 prices	43.735	43.500	43.673	43.354	43.034	42.714	42.506	42.293
Current prices[4]	45.502	46.163	47.273	47.866	48.463	49.065	49.803	50.544

Source: Own calculations based on COMMISSION OF THE EUROPEAN COMMUNITIES 2005a.

2.3 Regional adaptation

In SEAMLESS a two-layer approach in testing the system at a regional level has evolved.

On the one hand a set of regions at Nuts 2 level ('*sample regions'*) has been selected in order to establish the micro-macro linkage. For the first prototype 4 sample regions have been selected (Midi Pyrenées, Flevoland, Brandenburg, Andalucía), a number which will increase up to ca. 25 sample regions in coming prototypes. The regional variables and approaches considered for the construction of the baseline in these regions are discussed in D3.3.6. On the other hand an additional set of regions at a meso level ('*test case* regions') has been also selected for detailed testing of the capabilities and reliability of the modelling framework. For these regions a selection of scenario parameters affecting the baseline (regional drivers) has been done. These pretend to cover policy issues at the infra-regional level that cannot be covered by the global market models (in this case CAPRI or GTAP) and go beyond the technicalities of the regional drivers considered for the sample regions by testing the validity and reliability of modelling results.

In the following sections, the main scenario characteristics affecting the baseline are described for the test case regions. They will not be considered for Prototype 1, since Prototype 1 will be focused on getting the appropriate functionality of the system (workflow design). They serve, however, to get an idea about the heterogeneity in the modelling questions that SEAMLESS is trying to answer at the meso level and reflect the ideas of regional experts and stakeholders.

[2] The trade distorting instruments are not part of the Common Agricultural Policy.

2.4 The case of Mali

The global scenarios issues to be tested in SEAMLESS were defined in PD6.2.3 (PÉREZ, 2005). However, they will have limited impact on Mali, apart from their effect on international prices of cotton, and on the global trade. Therefore, for Mali, it is essential to define the scenarios at the regional level.

2.4.1 Changes in global policy 2001-2005

The policies related to rural development have evolved between 2001 and 2005. Furthermore, the international environment has changed substantially. This gives us insights on the key issues that are worth testing with SEAMLESS-IF. These evolutions also produced changes that can be used to test the ability of SEAMLESS-IF to reproduce the modification of rural development, as observed during the base years.

The CMDT organizes the cotton sector. It is owned by the Malian State (60 %, climbed to 75 % in 2005) and by a French corporation, DAGRIS (formerly CFDT) with mixed capital. CMDT was in charge of many aspects of rural development until 2001: provide credit to farmers (in fact, CMDT warrants the credit given by a national bank), transport and sell inputs (for cotton and cereal crops), buy and process cotton, technical assistance for all crops, development of a network of blacksmith for mechanisation, rural roads maintenance, building of health centres and schools, etc. After a dramatic financial crisis in 2000, the CMDT focused its activities to the cotton sector and orientations have been taken to privatize the sector (MINISTÈRE DU DÉVELOPPEMENT RURAL, 2001).

This structural modification has affected the rural development as a whole. Among the first measures envisioned, the distribution of fertilizers for non cotton crops had to be transferred to the private sector. As this sector is not present in the rural area, this activity was actually transferred to the farmers unions, with mitigated success. The technical assistance to farmers from CMDT was greatly reduced.

The price of cotton is traditionally fixed by the CMDT, before the beginning of the cropping season. The price is the same for the country, regardless of the distance between the village where the cotton is produced and the nearest processing plant for seedcotton. The fertilisers' prices for cotton are also defined for the whole country, and transported to each village by CMDT.

The cotton sector stakeholders are looking for a better coordination among themselves. A nex system to determine the cotton price is being proposed, with the help of the World Bank, to take into account the evolution of the international prices.

The global environment has also changed during the recent years, due to the difficult political situation in the neighbouring Ivory Coast. Before the upheaval in 2003, nearly all the import/export was through this country. Since the temporary frontier closure, other ways were preferred, through Ghana (by road), Senegal (rail) and Guinea (road building in process), but the transport and transaction costs increased substantially. This situation is expected to last.

2.4.2 Projected changes for the next 6 years

The main expected change in the two test-case regions in Mali (Sikasso and Koutiala) for the coming years is the privatization of CMDT. It has been postponed, but is expected to be completed by 2008 (MISSION CONJOINTE MALI-PTF, 2005).

The envisioned privatization is supposed to follow the "Ivory Coast" model. The cotton area will be split in several sectors (each representing between 50 000 and 300 000 tons of seedcotton, depending on the option finally selected). The new cotton organizations will have the monopoly for buying the cotton in the areas devoted to them, and they will have to respect specified conditions that will be negotiated. These conditions will probably include buying the cotton at the

same price in the allocated area, taking into account the quality, technical assistance to farmers, warrant for the banks to provide credit, and assistance to strengthen the farmers' organizations. Farmers' organizations can take shares in the privatized units, as occurred in Burkina Faso.

Another major change, linked with the former, is the emergence of farmers' organisations, and, possibly, their involvement in technical duties. It was expected to start during the last 2-3 years, but is still to come.

At regional level, Mali has just entered the UEMOA space (West African Union for Economy and Currency). Therefore, regional policies on agriculture and tariffs will probably affect Mali. At the technical level, the introduction of Genetically Modified cotton varieties is probable, if not expected. The GM cotton is supposed to reduce pest pressure and the need of pesticides on the crop. Finally, the local currency is obviously over-estimated. During the next 6 years, a devaluation is probable.

2.5 Pyrzyce region (Poland)

The two main criteria used for selecting the Pyrzyce region as a test case region were intensive wheat and sugar beet production on high quality soils and under water protection requirements, since Pyrzyce is a Nitrate Sensitive Zone. Arable farms dominate the farm structure in the region, although livestock farms (mainly dairy, pig and mixed farms) have also a noticeable share.

2.5.1 Policy instruments for the Baseline Scenario

Poland joined the EU in the year 2004. At the same time the CAP was introduced. In general the same policy instruments apply to the Polish agriculture as to other EU member states, including market regimes (e.g. sugar and milk quotas, market intervention). Key differences relate to the direct payments scheme.

The system introduced in Poland is called Single Area Payment Scheme (SAPS). Payments are made to each hectare of agricultural land under the condition that the land is kept in a good agronomic condition and the area of fields is more than 0.1 hectare. The same rules apply to the whole Poland (there are no regional differentiations).

There are 2 components of the payment farmers receive:

- Basic payment – all crops eligible. The rate of payment in the year 2004 was set at the level of 25 % of the EU rates, calculated on the basis of the reference yield of cereals for Poland (3 tonnes/ha);
- Top-up (additional, supplementary payment) to crops eligible for payments in the Agenda 2000 (cereals, oil and protein crops, permanent grassland, maize) and most of the fodder crops grown on arable land (including some root crops for feed, except potatoes). In the year of accession the top-up was set at 35 % of the EU maximum rate.

In the period 2004–2013 direct payments in Poland will be consecutively growing by 5 % or later 10 % yearly, reaching a 100 % convergence with the EU15 in the end.

From the existing SAPS Poland is supposed to switch into Single Farm Payment in the year 2009. Until the introduction of SFP there is no modulation of payments.

Table 3 Direct payments in Poland in the first 2 years after accession were the following:

	Basic payment	Top-up payment
2004	210.53 PLN (25 %)	292.78 PLN (up to total 55 %)
Exchange rate applied ~ 4.71 (average Polish Central Bank for period I-VI 2004)*		
2005	225.00 PLN (30 %)	282.35 PLN (up to total 60 %)
Exchange rate applied – 3.9185 (European Central Bank, 30.09.2005)*		

Source: national statistics.
* Payments from the EU budget made in EUR (Euro) are transferred into PLN (polish zloty) with the use of exchange rate decided for each year. Due to this value of payments in PLN may vary between years apart of the increase of rates.

In the Pyrzyce region the universal scheme for the whole of Poland applies. However, because of the Nitrate Sensitive Zone specific restrictions concerning farming in the region are in place, for example:

- following the code of Good Agricultural Practices;
- respecting periods in which fertilization is forbidden;
- setting the minimal capacity of tanks for storing liquid manure or manure pads;
- limiting nitrogen input from organic manure down to 170 kg/ha;
- monitoring (e.g. fertilization plan and balance of Nitrogen).

Currently not all farms fulfil those requirements.

2.5.2 Expected effects

Policy issues relevant to the Pyrzyce region in the baseline are:

- The sugar reform (2 ways of introducing the reform can be considered).
- The full implementation of cross-compliance and Nitrate Directive regulations (some livestock farms require investments in organic manure storage). In this case however, changes have to be introduced in the nearest future. More restrictive environmental policy can be, however, considered.
- The modulation of direct payments – important for the region because of significant number of large farms, greater than on the average in Poland.

These policies might lead to structural changes in the farming sector – it may be expected, that some processes initiated recently will deepen in the future. This relates mainly to the following:

~ likely concentration of land in a smaller number of relatively large farms;
~ more specialization in arable farming if milk quota will become transferable between regions (at present not allowed). This may result with diminishing number of dairy farms.
~ technological changes due to farm equipment modernization.

2.6 The Neste region (France)

The test case region of the Neste has been selected to illustrate arable crops and more precisely irrigated crops and water management stakes. In the following only information related to “cereal farms” will be proposed. In this section, the regional aspects of the baseline scenario for this infra-Nuts 2 region which are not covered at the macro level (and are relevant for Test Case 1) are adressed.

2.6.1 The main regional policy instrument for the base year period (2000-2003):

In France, the calculation of CAP compensatory payments is based on NUTS III (French department) reference yield by crop. The Neste region selected to test SEAMLESS-IF cover 2/3

of the French department "GERS" (Nuts FR624). The CAP premiums of the SEAMLESS base year period are presented in table 4.

Table 4 CAP compensatory payment by hectare, by crop and year in the GERS (FR624) (taking into account excess area by types of crops for each year; around 3 % for irrigated and rainfed crops and 30 to 50 % for durum wheat).

Type of crops	crops/area	2000	2001	2002	2003
Irrigated crops	maize	452 €	489 €	488 €	473 €
	sorghum	452 €	489 €	488 €	473 €
	soybean	/	/	488 €	473 €
Rainfed cereals	maize	287 €	322 €	312 €	312 €
Irrigated Protein crops		559 €	563 €	561 €	544 €
Rainfed Protein crops		355 €	360 €	359 €	359 €
Oilseeds		438 €	394 €	312 €	312 €
Durum wheat additional payment	traditional. area	233 €	267 €	229 €	226 €
Irrigated fallow or fallow		287 €	321 €	312 €	312 €
Rainfed fallow		287 €	313 €	/	/

Source: information gathered from local experts (agricultural state services and advisory French departmental services).

During the period 2000 to 2002 there was a French modulation (government decree of 24 March 2000) of the compensatory payment. This compensation concerned only the farms that received more than 30 000 € of compensatory payments. For the farms beyond the first 30 000 € there was a constant deduction of 3 % plus a linear deduction depending on their standard gross margin minus reductions due to the family and paid workers.

Therefore between 2000 and 2003 the French Contracts for Sustainable Agriculture (CSA)suggested to farmers to adopt, for a five-year period, Agri-Environmental Measures (AEM) from an adapted regional list of the EU agri-environmental schemes (second pillar). These contracts also allow them to benefit from specific economic subsidies mainly for diversification, environmental protection and to improve the quality of the products. In this framework, 1200 CSA were signed in the GERS during this period (45 million €, plus 5.5 million € to conversion in organic agriculture; an average of 31 700 € by farm). These contracts covered 88 % of the area of these farms and 20 % of the GERS utilized agricultural area. Farmers have mainly chosen the measures to: control pesticides application, adapt management of fertilizers, sow grassed strips or conservation tillage.

On a sample of 124 AEM (all farms' specialisations taken in account) only 30 actions were chosen by more than 10 % of the farms.

All information on the implementation and regional coverage are available to adapt the TC1 scenario to the Neste region (specification, premiums/ha and subsidies, number of contracts, number and area covered by the AEM, AEM by type of farms). The implementation of the AEM, however, will depend essentially on the FSSIM functionalities and requirements (probably ready for the second prototype).

2.6.2 The main regional policy instruments for the baseline scenario (2012)

The new CAP compensatory payments and the modulation will have the same implementation in all French territories: since 2006 25 % of the premiums for the arable crops are coupled (see table 5 for the application in the GERS). In France, the final implementation framework of these payments will be known in August 2006 (debit rate of the single farm payments).

Table 5 Coupled compensatory payments by hectare and by types of crops in the GERS for 2006-2012 (potential premiums):

Type of crops	2006-2012
Irrigated cereals	122 €
Rainfed cereals	80 €
Irrigated Protein crops	122 € + 55.55 €
Rainfed Protein crops	80 € + 55.55 €
Oilseeds	80 €
Durum wheat addi. Pay.	285 €* + 40 €**
Fallow	320 €
Carbon credit crops	+ 45 €

Source: national statistics
* During the past years in the GERS, durum wheat area excess has been very important what led to a 30 % to 50 % decrease of the potential additional payment between 2000 and 2005).
** Additional payment for durum wheat quality depending on the variety.

The associated cross-compliance measures for the French "cereal farms" are:

1. grassed strips or environmental area on 3 % of the farms' arable area,
2. no burning of straw,
3. diversity of crops (3 different crops or 2 families of crops). But the monocultures can be kept if there is management of crops' residues or a nitrate catch crop during the rainy season.
4. water meter for irrigation,
5. minimal "maintenance" of all agricultural lands,
6. accordance with the rules of the Nitrate and the Habitat Directive.

All these measures have been determined at the state scale. But the rivers which must be protected by a grassed strip and the Vulnerable Zones are defined at the NUTS III scale.

Furthermore, in 2004, new CSA appeared proposing less Agri-Environmental Measures and above all less "money" to

farmers (the NUTS III average cost of the new contracts must be under 27 000 € for five years while there was no limit in the former years). They are thus much less attractive for the farmers (only 10 CSA have been contracted in 2005 in the GERS).

For the first prototype it seems actually possible to take into account the compensatory payments presented in the table 5, the 4 cross compliance rules (number 1, 3, 5 and 6) and do not consider the AEM. For the TC1.2 (second prototype) based on the future French government decisions

related to the new CAP implementation and the improvements of SEAMLESS-IF tools the definition of the baseline scenario will be improved in terms of policy relevance and accuracy.

2.7 The Massif Central region (France)

The test case region of the Mountains and Uplands of Cantal has been selected to illustrate the livestock production, essentially milk production for cheeses and grass calves production (PD6.1.1, 6.1.2). The main stakes of this region are the preservation of the high level of biodiversity, the natural landscape and the water quality with a stabilization of the rural population. In the following only the information related to "livestock farms" will be presented. In this section, the regional aspects of the baseline scenario for this infra-Nuts 2 region which are not covered at the macro level (and are relevant for Test Case 1) are adressed.

2.7.1 The main regional policy instruments for the base year period (2000-2003)

In France, the calculation of CAP compensatory payments by crop is based on NUTS III (French department) but the compensatory premiums for the meat production are implemented at national level with no differences between regions. The departmental and regional councils (NUTS II and III) have no specific premium to these measures. The Mountains and Uplands of Cantal region selected to test SEAMLESS-IF cover 61 % of the agricultural area of the French department "CANTAL" and 97 % of its agricultural surface is forage area. The CAP premiums of the SEAMLESS base year period are presented in **Error! Reference source not found.**table 6. To simplify the table, the descriptions of compensatory payments concern only the specific national applications of the Council regulations or the French additional measures. The agro-environmental measures (2nd pillar) vary with the regional conditions (NUTS II) and their amounts depend on regional (NUTS II) or departmental budgets (NUTS III).

Table 6 CAP compensatory payment by ha, by crop and year in the GERS (FR624) (taking into account excess area by types of crops for each year; around 3 % for irrigated and rainfed crops and 30 to 50 % for durum wheat).

Premium Type	Description of premiums implemented in 2000-2003 for meat production and agri-environmental measures
BOVINE PRODUCTION	
- Suckler cow premium:	Reserved to cows and heifers from meat breeds or cross bred animals in respect of a stocking density of 2 LU/ha of forage area in years 2000-2001 and only 1.9 LU/ha in 2002. The French additional premiums per eligible cow are, year 2000 : +37 € / cow for the first 40 cows and +12.85 € / cow for the following cows years 2001 –2002 -2003 +50 €/ cow for the first 40 cows and +25.85 € /cow for the following cows In years 2002-2003, the number of heifers must be between 15 % and 40 % for herds superior to 13 animals and this number must be inferior to 40 %, for herds at most equal to 13 animals. A quota of this premium is managed each year by a departmental

Premium Type	Description of premiums implemented in 2000-2003 for meat production and agri-environmental measures
	committee according to the evolution of farms with suckler cows.
- Special premium:	French producers have to justify the holding of male bovine animals on their farm during two months at least, in respect of a stocking density of 2 LU/ha of forage area in years 2000-2001 and only 1.9 LU/ha in 2002 then 1,8 LU/ha in 2003. The amounts of the premiums are : Years 2000 - 2001: 185 € per bull (and an additional premium of 98 € if the bull is castrated and aged more than 22 months) 136 € per steer and per period : 1° 7 to 19 months of age, 2° more than 20 months of age Years 2002- 2003 : 210 € per bull 150 € per steer and per period : 1° 7 to 19 months of age, 2° more than 20 months of age The number of premium is limited to 90 prize animals per farm per year.
- Extensification payments:	Additional premium for producers receiving the suckler cow premium and / or the special premium. The French state had chosen : amounts in years 2000 –2001: 33€ if stocking density >=1.6 LU/ha and < 2 LU/ha 66€ if stocking density < 1.6 LU/ha amounts in year 2002- 2003 : 40€ if stocking density >=1.4 LU/ha and < 1.8 LU/ha 80€ if stocking density < 1.4 LU/ha.
- Slaughter premium:	National additional premium : Year 2000 : 6.10 € for females aged 8 months or more and 53.36 € for heifers of meat breeds, aged 8 months or more Year 2001: 12.20 € for all females aged 8 months or more and 53,36 € for females of meat breeds, aged 8 months or more Year 2002: 18.29 € for all females aged 8 months or more

Premium Type	Description of premiums implemented in 2000-2003 for meat production and agri-environmental measures
	and 114.34 € for heifers of meat breeds, aged 8 months or more
SHEEP AND GOAT PRODUCTION - Sheep compensatory premium (SCP)	The French state adds in mountainous zones, a premium (called premium for rural zones) which is allocated in the same conditions than SCP. In years 2000 - 2001: +6.641 €/ewe for heavy lambs producers + 5.977 €/ ewe for light lambs (from dairy flocks) and goat producers
- Sheep and goat premium:	In years 2002- 2003, Cantal farmers have the supplementary premium i.e. 7 € / ewe or goat. The quotas are not limited at the moment.
OTHER - Agro-Environmental premium for grassland:	This premium is a national measure with regional (NUTS II) specifications according to the agricultural conditions since 2003. Farmers have to contract for 5 years with no significant modifications during each period. In particular, they have to maintain 75 % of their agricultural area for grasslands with 1.4 LU/ha and a meadow can turn over one time during the 5 years. The aid is equal to 76.22 € / ha in year 2003 with a ceiling of 100 ha and concerns 62 % of professional farmers.
- Other specific Agro-Environmental measures:	The French Contracts for Sustainable Agriculture (CSA) suggest to farmers subsidies for investments mainly in diversification, environmental protection and quality products. Within such contracts, farmers have to include agro-environmental measures similar to the agro-environmental premium for grassland or more specific for hedges, ponds or peat bogs maintaining with different options. In the Cantal region, farmers can choose among dozens of measures. In this Cantal zone, only 28 % of professional farmers have contracted, because areas put in contract with the agro-environmental premium for grassland cannot be contracted in CSA with new involvements as limited fertilization or peat bog preservation for example, but only with linear measures as hedge planting or river bank maintenance.
- Compensatory premium for natural handicaps:	This national premium is allocated to herbivore breeders for the forage area intended for livestock food with a maximum of 50 ha per farm.The amount varies according to the zone: mountain or upland, dry or wet. In Cantal, 78 % of farmers receive this premium. The average amount for mountainous zones of Cantal is:

Premium Type	Description of premiums implemented in 2000-2003 for meat production and agri-environmental measures
	Year 2000: 126.51 € /ha Year 2001: 125.59 € /ha Year 2002: 127.92 € / ha Year 2003: 130.33 € / ha

Source: information provided by national regulations and local experts (agricultural state services and advisory French departmental services).

2.7.2 The main regional policy instrument for the baseline scenario (2012)

The French governement decided the new CAP compensatory payments and the modulation will have the same implementation in allFrench territories and they will bebased on the period 2000 to 2002. In France, the final implementation framework of these payments will be known in August 2006 (debit rate of the single farm payments) but the national government has still decided to keep a part of premiums coupled to the production for meat production: 40 % for slaughter premium, 50 % for sheep and goat premium, 100 % for suckler cow premium and 0 % for special premium which disappears in 2006 as the extensivation payment. The milk quota is maintained and could increase since 2007 but in this zone, the quota does not limit the milk production at the moment. The new compensatory payments for milk production: 35.5 €/t in 2004-2005 will be decoupled since 2006.

The cross-compliance for the French livestock farms concerns identity of animals, animal health and welfare, traceability of animals to secure human health. Identity of animals was already controlled in the last CAP in France and systems have been developed to help breeders to book all their sanitary practices. The good agricultural practices are obligatory to access to Agro-Environmental Measures.

The observer noticethe Agro-Environmental Measures represented 31 % and the Compensatory Payment for Natural Handicaps 31 % of the national second pillar of the CAP (called 'Rural Development Plan') between 2000 and 2004 in France. These measures are, at the moment, the only way to maintain the natural heritage of hilly zones as Cantal: with specific aids for preservation of landscape such as hedgerows, ditches and woods, conservation of high-value habitats and their associated biodiversity. The payment differences per ha between favoured and disadvantaged zones do not allow to compensate differences of production cost. The French government plans new measures to develop Geographic Indication Labels, farm made products and animals welfare in the future Rural Development Plan, and he should come soon to a decision about a national or regional option for its implementation. Even if the Agro-Environmental Measures for grasslands and the Compensatory Premium for Natural Handicaps take already place in the second axe of the Rural Development Plan for 2007-2013: in "Environment and land management section", their implementation conditions are not yet defined.

The French implementation of the new CAP in meat and milk productions concerns all the national territory. In this zone, the premiums (compensatory payments and agro-environmental measures) could represent in 2003 about 30 % of the income in milk production farms and even more than 150% of the income in suckler systems. As there is no alternative through crops productions in this hilly zone, the impact of measures of the 2nd pillar (particularly in favour of grassland keeping and quality products) have to be taken in account in SEAMLESS-IF. These measures will be implemented in FSSIM in further prototypes.

3 Policy scenario: EU trade liberalisation proposal of October 2005

3.1 General overview

In Test Case 1, a policy scenario on 'trade liberalisation' is adopted ('impact scenario' more generally). This scenario fulfils three requirements: (1) it addresses a currently debated issue (ongoing negotiations in the WTO), (2) it relates to the market level of the agricultural sector and affects all commodities through the price mechanism, and (3) it builds upon the past experience of the CAPRI and GTAP teams. The policy scenario is also performed in year 2012, for evident comparison purposes with the baseline.

The latest proposal on the elimination of trade-distorting instruments by the EU was released in 2004 (WTO 2004a) and will be the main objective of the Test Case 1 policy scenario.

3.2 Main scenario variables

3.2.1 Reductions in import tariffs

Given the lack of a final concrete proposal on tariff reduction, the basic impact scenario builds on the WTO Draft Proposal as set out in 2003 by the former chairman Stuart Harbinson. He suggested an average cut in bound tariffs by 60 % with different percentage reductions depending on the tariff level, as shown in table 7:

Table 7 Simulated tariff cuts depending on ad-valorem equivalents

AVE (Ad-valorem equivalent)	Reduction in tariff
>= 90 %	- 60 %
<= 15 % < 90%	- 50 %
< 15 %	- 40 %

Source: BRITZ ET AL. 2005.

3.2.2 Elimination of export subsidies

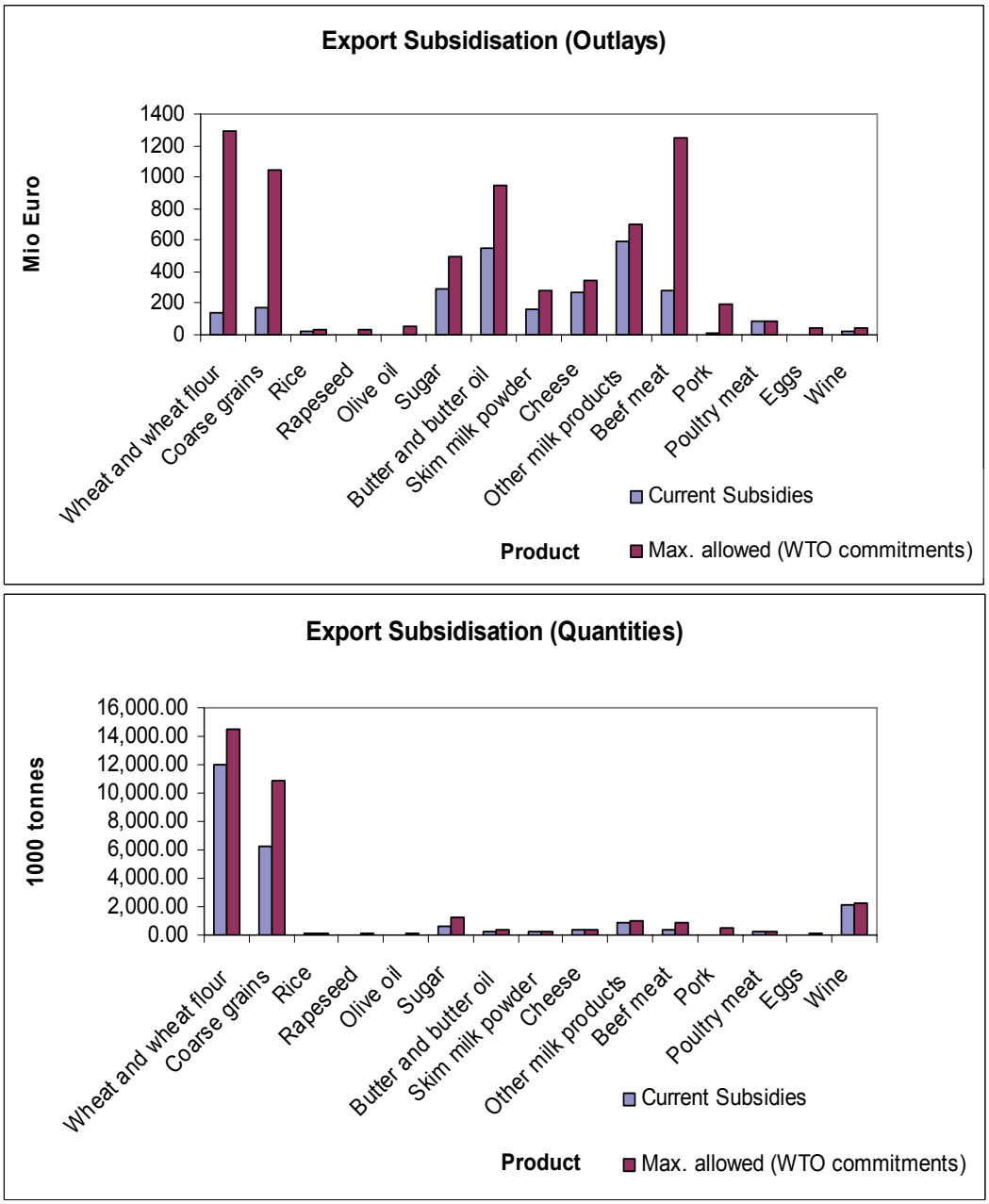
Under the Agreement on Agriculture (AoA), export subsidies are defined as referring to "subsidies contingent on export performance". As specified in more detail in Article 9.1 of the Agreement, this list covers most of the export subsidy practices which are prevalent in the agricultural sector, notably:

- Direct export subsidies contingent on export performance;
- Sales of non-commercial stocks of agricultural products for export at prices lower than comparable prices for such goods on the domestic market;
- Producer financed subsidies such as government programmes which require a levy on all production which is then used to subsidise the export of a certain portion of that production;
- Cost reduction measures such as subsidies to reduce the cost of marketing goods for export: this can include upgrading and handling costs and the costs of international freight.

All such export subsidies are subject to reduction commitments, expressed in terms of both the volume of subsidized exports and the budgetary outlays for these subsidies (see figure 1 for an outlook on European export subsidisation: subsidies in blue and WTO commitments in red). In this table it is shown, that for most products in the European Union export subsidisation remains

well below the limits allowed by the WTO. In the framework agreement of August 2004 (WTO 2004a), the European Union went further than the reduction commitments and accepted to eliminate all forms of subsidies by a 'credible date' (WTO 2004b, p. 27).

Figure 1 Subsidisation of exports in the EU25



Source: European Commission; data included in the CAPRI modelling system.

3.2.3 Expansion of tariff rate quotas

A tariff quota is a two-tiered tariff. In a given period, a lower in-quota tariff (preferential tariff) is applied to the certain amount of imports (maximum allowed import quota) and a higher over-quota tariff (most-favourite-nation tariff) is applied to all subsequent imports. In order to improve market access, tariff rate quotas should be expanded up to 10 % of domestic consumption.

The two-tiered tariffs are most likely subject to the same reduction commitments proposed by Harbinson for import tariffs: cut in average by 60 % tariffs providing an ad-valorem protection higher than 90 %, by 50 % the ones between 15 % and 90 %, and by 40 % tariffs below 15 % ad-valorem rate (as in sub-section 3.2.1).

3.2.4 Bilateral trade agreements

The EU has signed different bilateral trade agreements (Everything but arms, Cotonou, South Africa, Mercosur, Chile and Global Mediterranean policy). In the policy scenario we include those agreements not implemented before 2012, and therefore not part of the baseline. This is the case of the EBA agreement with the 48 least developed countries (LDCs), for which duty-free access to all agricultural products is granted.

Within SEAMLESS this agreement is especially important for Mali (e.g. effects on cotton trade), as selected test case region. This should be addressed in further prototypes by GTAP.

3.3 Regional policy variables for Mali

Regional scenario elements that SEAMLESS-IF will probably be able to test:

A scenario dealing with the evolution of cotton prices and privatization of the sector will be tested. Other modifications of prices will concern meat and milk. They will depend on the future of the Economic Partnership Agreements (ECA) with Africa.

At the local level, some policy scenarios could be worth testing in Test Case 1:

- Introduction of subsidies on fertilizers: fertilizer use is very low in Mali, putting at stake the sustainability of agricultural production in a context of increasing land pressure.
- Introduction of new modalities to finance agricultural activities (rates, kind of loan, etc.) in the current reform of the cotton sector.
- Introduction of mechanisms to stabilize the price of cereal crops. The announcement of the cotton price before the onset of the cropping season partly explains the success of this crop. This scenario testing is only possible if FSSIM takes into account the farmers' strategies dealing with risks. Additional to prices, options could be tested that would encourage the development of stock management systems.

Regional scenario elements that SEAMLESS-IF should look at in the future:

It is doubtful that SEAMLESS-IF (in the current state of APES/FSSIM) will be able to adequately simulate the following scenarios. However, this might be interesting in the future:

- Land tenure: there is currently no land market since farmers consider that there is still land available for free. It would be interesting to test this issue, but the ability of SEAMLESS-IF to consider them is limited.
- The diversification of productive activities is a major issue in Sikasso. Nevertheless, we are not sure if FSSIM will be pertinent when working on marginal crops because linear programming tends to find corner solutions meaning that it tends to overestimate or underestimate the crop area.

4 Concluding comments

This paper describes the basic scenario elements used in Test Case 1 for prototypes 1 and 2 from the perspective of the test case regions. The implementation of them in SeamFrame will be done by a specific SEAMLESS scenario editor (SSE). Moreover, several links between different model components (APES/FSSIM, EXPAMOD and CAPRI) will be handled through the SEAMLESS GUI. In further prototypes the capabilities of the system will certainly increase, probably giving more room for scenario variables. Therefore progress in this area is not restricted to what is written in this deliverable and will be subject to the 'success' of the single components of the system (models, indicators, data and software tools).

In the second prototype a higher user involvement is also foreseen in the definition of the policy scenario. This could mean that the 'storyline' for Test Case 1 might change, which is perfectly in line with the requirements to SEAMLESS. At this stage the system should be able to answer different policy questions in time and incorporate in the baseline the regional differences in rural systems found in the test case regions.

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Glossary

Base year	Year used for expost analysis and parameter calibration of the models.
Projection year	Year used for counterfactual analysis
Baseline scenario	Projection in time covering the most probable future development of the European agricultural sector under the status-quo policy. In Test Case 1 this covers the most probable future development of the European agricultural sector under the status-quo policy in 2012.
Driver	Exogenous variables for which we set values in a scenario
Policy scenario	Scenario covering a identified set of policy variables which are shocked in the system. In Test Case 1 this covers the European trade liberalisation proposal presented to the WTO projected for year 2012.
Ad-valorem tariff	A tariff which is imposed in percentage terms over the value of the good. For example, a 5 % tariff, which means that the import tariff is 5% of the appraised value of the good in question.
Ad-valorem equivalent	When a tariff is fixed in specific or mixed terms, usually an "ad valorem equivalent (AVE)" of the non ad valorem portion of the duty is calculated for reference purposes. There are several formulas for estimating the AVEs. One common approach is based on MFN trade dividing duties collected by Customs value.
Export Subsidies	Subsidies contingent on export performance"
Specific tariff	A tariff which is imposed in terms of specific monetary charges per unit or quantity of the imported good. For instance, 100 € per metric tonne of a given good.
Scenario template	Software tool that formally allows to define scenarios comprehensively by editing scenario variables relevant for all indicators and models
Tariff rate quotas	A tariff quota is a two-tiered tariff. Its components: a most-favourite nation tariff (high tariff), a preferencial tariff (lower tariff) and an import quota (allowance to import at the preferencial rate).

Appendix 1: SEAMLESS-SENSOR collaboration

On scenarios (meeting SEAMLESS-SENSOR, 11th March 2005, Brussels):

Work Package 6 of SEAMLESS and Module 2 of SENSOR address issues of scenario analysis. The collaboration between the projects is intended to explore possibilities for synergy, consistent scenario formulation, and comparison of results. Depending on the specific scenarios considered in both projects, this exchange could comprise activities regarding the general framework of scenario formulation, an exchange of information on baseline and subjects of policy scenarios, the specification/projection of variables exogenous to both systems, and use of the others project results for definition of scenarios.

Principles:

- The two projects (through Thomas Heckelei in SEAMLESS and Erling Andersen in SENSOR) will keep each other informed about issues related to scenario formulation and results of scenario analyses.
- Representatives from SEAMLESS WP6 and SENSOR M2 will meet annually to discuss progress and changes on scenario issues. These meetings could be arranged e.g. in connection with Annual Conferences or in combination with SEAMLESS meetings as Erling Andersen is a member of both consortia (The first systematic exchange on scenario issues will take place during a visit of Erling Andersen in Bonn, June 23rd, 2005).

On baseline construction (extract from deliverable 2.1.1 of SENSOR).

Policies are influenced both by cultural change and by institutions, and may themselves contribute to both. They are obviously needed as a driver in our scheme, since it is the impact of policies which we want to examine. They are kept constant in the baseline scenarios, but considered in the policy cases. Policies are also influenced by the other drivers, in that they may be a response to economic events, to demography or to technological change. In SENSOR, we consider primarily EU policies. In Modules 3 and 6 there is room for considering policies at other spatial levels, however.

1. This brings us to the following set of drivers for the baseline scenarios:
2. demographic change within Europe
3. the rate of participation in the labour force (in Europe)
4. growth of world demand (outside Europe itself)
5. the price of petroleum on the world market
6. expenditure on research and development
7. institutions
8. cultural change.