

Decoupling of Aids, Incomes and Production Factors

The common agricultural policy started a continuous process of reforms including the decoupling of aids, proposed by the Luxembourg agreement, which constitutes an important stage. Based on modelling, the GENEDEC programme contributes to the assessments of the reform's impacts as far as gross margins, land allocation, factors' opportunity costs, and some environmental criteria are concerned. This paper recalls some of the results we obtained thanks to the AROPAj model of the research unit "Economie Publique" from Grignon (France).

An agreement for a new reorientation of the CAP

Several motivations have led to the development of the agricultural Policy. External pressure (respect for international agreements) as well as internal pressure (effectiveness, equity, budget control) contribute to this development. The Luxembourg agreement is an additional stage in the search for a certain effectiveness boosted by commissioner Mac Sharry in 1992. One word characterizes the 2003 agreement, decoupling, with the idea that all parties (farmers, consumers, taxpayers) can win, even if the agreement integrates other targets such as a better justification for payments (with the example of cross-compliance) and a greater concern for equity sketched with modulation. The European programme GENEDEC (2004-2007), in reply to a Community call for proposals (FPRD 6th), funded by the European Community, has as its main purpose to assess the consequences of implementation of this agreement on European agriculture. The present document shows a few results on the use and valuation of arable lands obtained from the AROPAj model, one of the models used in the project.

In the following analysis the consumer is taken out of the equation, in the sense that European farming prices are supposed to be constant (and close to world prices). These exogenous prices are not regarded as instruments of public control and we focus on the producer and taxpayer together through modifications of direct aid. Rather than arguing from the point of minimisation of the European agricultural budget guaranteeing a targeted farm income, we analyse the search for effectiveness as it is traditionally seen in Europe: is it possible to increase farm income by managing public money differently? The approach may seem very simplistic, insofar as producers are asked to make efforts in return for the payment of aid. These efforts essentially concern the environment. But we have to note that the cross-compliance of aid only occurs marginally, though the Luxembourg agreement bears the seeds of a true agro-environmental policy.

The model used here is a new version developed for GENEDEC. Some documents give details on its elaboration and use (De Cara et al., Chakir et al.; 2005; Jayet, 2006). Table 1 and 2 give an idea of its representativeness and of the estimation of gross margins and direct aids on the scale of the Member States (EU-15) and FADN regions (France). Let us remember that it is an optimization model of land allocations declined by group-type representative of a set of grouped farm-businesses for each French region (FADN), according to technical orientation, altitude and economic size. The model covers the main annual crop productions and main animal productions.

Questions may be raised about the true decoupling level introduced by the Luxembourg agreement between supports and productions, the ideal decoupled support, from the viewpoint of the economic theory, being that which does not modify production decisions at all in relation to what they would be in the total absence of support. This ideal form will not be reached as long as farming trade and/or activity remain eligibility criteria for supports, since benefiting from aids under these conditions cannot evacuate a wealth-insurance effect, which by itself modifies investment choices, and thus has an influence on production. In addition to the link with the farming activity itself, even though it is as tenuous as possible, the Luxembourg agreement maintains a few obligations, for instance in terms of set-aside lands, and it chiefly gives new Member States room for manoeuvre as to partial re-coupling of aid.

Evaluation of impacts on gross margins and agricultural budget

We should point out immediately that the Luxembourg agreement grants European farmers aid equal or close to previously given aid, with less restrictions on the payment of aid to farm productions. Mathematically, this means that producers' incomes cannot decrease with the implementation of decoupled aids. If decoupled aids are distributed on an individual historic basis, the advantage is individual. When the implementation of the single farm payments (SFP) is

based on a regional basis, the advantage is guaranteed on the regional scale, but not necessarily on the individual level. In the simulations performed, the cross-compliance of aids and the reform of the sugar system are not taken into account.

The Luxembourg agreement stylised in the AROPAj model takes into account member States' choices for implementation of the agreement. The most difficult option in the modelling is that selected by Germany, with a differentiated SFP between crops and pastures. The SFP calculation is a function of 2002, for which we have microeconomic data allowing the parameter assessment of the AROPAj model. Of course the calculated SFP takes into account the partial re-coupling adopted by certain countries for certain productions (for further details, for instance, see chapter 2, Jayet, 2006).

In comparison with the reference scenario (Agenda 2000, data 2002), two scenarios are defined, 1) the decoupling corresponds to that implemented by the Luxembourg agreement, and 2) the re-coupling is totally suppressed and the payment of SFP is no longer subject to any obligation ("full decoupling"). In both scenarios, livestock is supposed to be adjustable within the limit of +/- 15% of the 2002 livestock and the "sugar" system remains unchanged compared to 2002. Modulation and cross-compliance are not taken into account. The variations measured for FEOGA are due to the sugar system, the partial re-coupling and the German SFP regional system differentiating crops and pastures. As the "adjustment of livestock" effect is significant, we introduce it as an intermediate scenario. Figures 1 and 2 show the variations in gross margin and agricultural income assessed by AROPAj for Member States-15 and 20 French regions, respectively calculated per farm and hectare.

With an increase in aids in the form of SFP following the option selected by this country in the implementation of the Luxembourg agreement, Germany shows an atypical situation. Taken as a whole, the Luxembourg agreement would lead to a significant increase in gross margins, greatly amplified by livestock adjustment. We assess to within 7 billion the European benefit in margin attributable to these two effects, 1.2 billion corresponding to the implementation of the SFP alone. Without any restriction as regards the use of arable lands, the implementation of full decoupling would raise that benefit by 0.8 additional billion euros. Of course, these results come from a statistical model without any adjustment of productive systems. However, in structural terms, these estimations reproduce the contrast between regions - or countries - with important livestock and the others.

While integrating price fluctuations, it should be noted that our first assessments of the reformed CAP impacts on world agriculture would also be in favour of a European gross margin, with a benefit similar to the previous one. These assessments are based on an adjustment of prices determined either by a partial equilibrium model of world agriculture (ESIM) or by coupling AROPAj with another partial equilibrium model (PEATsim). But differences between State Members could be large, and some may not gain anything out of it.

Changes in land allocation

The impacts of the Luxembourg agreement on agricultural supply combine effects of different natures. Regarding the short-term "price" effects, quite aside from the consequences of world market adjustments on European prices, the adjustment of European net farm prices at the production level results from important changes concerning the link between direct aid and productions. This difference in prices has three direct effects. It modifies the yields and variable costs on every plot of each crop. It modifies the gross margin ratios per area unit between different crops, and thus crop rotation. Lastly, via animal productions, it modifies the purpose of agricultural raw materials, between harvesting and consumption on the farm for animal feed. We shall take an interest in crop rotation (the product's purpose is addressed in the abovementioned documents, and the effect on yields is the subject of major work combining the economic model with an agronomical one, (Godard, 2005) and (Debove, 2007)).

Figure 3 shows the trend in the change of arable land use between the reference and both options of decoupling. The Luxembourg agreement would result in a noticeable drop in lands dedicated to cereals (a 10% drop representing more than 4.5% of the utilized agricultural area (UAA) for France, a 9% drop representing a little less than 4% for the EU). This fall will be emphasized by full decoupling. The most significant reverse trend concerns pastures. If the areas dedicated to oleo-proteagenous productions, and fodders in France, decrease with the "Luxembourg" scenario, the fall would be softened via full decoupling.

One of the most significant consequences of the implementation of decoupling could come with the disappearance of the 7 million hectares initially "set aside" within the CAP (and maintained in the Luxembourg agreement) and with an increase in an equivalent level of fallow lands, if decoupling were to evolve towards full decoupling. Care should be taken to ensure that the lands concerned are not the same. Set-aside lands will disappear where they were necessary to obtain aids, fallow land will appear in the areas where net farming prices no longer encourage the allocation of lands for production. More generally, there is a need to assess the effects of agricultural policies on different levels. The re-localization of production basins becomes a decisive element for private agents (processing industrialists, transport) and for public decision-makers in charge of town and country planning. Figure 4 illustrates the problem of scale change when one attempts to assess land use on the "pixel" scale, through the different farming activities. This assessment requires major statistics work which is only made possible by European databases associating physical and economic data. The upstream methodology used was developed by R. Chakir (chapters 14 to 16) and Jayet (2006).

Impact on the price of agricultural lands

One of the decisive elements when assessing the opportunity cost of agricultural lands is the real link between lands and direct aid. The implementation of SFP is associated with complex rules of eligibility and transferability. In the stylisation of the Luxembourg agreement we took when we modelled, we consider that all the agricultural lands included

in the AROPAj model give right to SFP. In other words, SFP is closely linked to lands and not to farmers or farms. In our “full decoupling” scenario, we keep the principle of the link between SFP and the agricultural land unit.

The marginal land value mathematically depends on constraints, which explicitly activate land availability. In the “Luxembourg” scenario, as well as the usual constraint of land allocation that must not exceed the utilized agricultural area (UAA) estimated to be steady in the short term, a constraint appears associating set-aside lands and UAA. The overall marginal cost is the sum of dual variables associated with these constraints. In the “full decoupling” scenario, when SFP is directly associated with the hectare of land available on the farm, then the overall marginal cost is the sum of the dual variable associated with the constraint of land availability (UAA) and the SFP which, by construction, is equal to the aid paid in 2002. Table 3 and 4 give the marginal cost of land calculated in this way, and the marginal cost of the milk quota, on different scales (national and regional) and for the different scenarios. Redirecting all direct aid towards land obviously adds value to this production factor. Two effects must be taken into consideration. The first one is linked to the fact that less constraints in return for aids leads to a rise in gross margin, and thus, is a benefit to the whole factors of production. The second one is linked to SFP modes of payment, which benefit lands against other factors. We note that the livestock adjustment benefits livestock and particularly meat production.

While associating SFP to land, the public regulator would contribute to the increase in value of arable lands. SFP transfers are not questioned here. We note that the marginal cost calculated by the model is to be compared with the rent price of factors. The differential between the real price of land rent and the estimated marginal cost can

be explained by the necessary remuneration of unconsidered factors, work being in the first place.

Beyond the effects on production

In comparison with the commitments made by the EU towards its main economic partners, the CAP reformed by the Luxembourg agreement should meet some of the declared targets (less distortion on agricultural markets, budget control). The reform also shows a godsend effect as regards the reduction in greenhouse gas emissions (GHG), resulting from a drop in productions and inputs responsible for these emissions. The assessments brought by the AROPAj model should be noticeably improved with the introduction of technical functions associating production and input, and associating GHG emissions and inputs. Better reactivity of the model when introducing a (GHG) carbon price should even help justify the importance of the agricultural sector better in the perspective of implementing the KYOTO protocol by the EU (chapter 10, Jayet 2006).

Whether it is a matter of reducing net GHG emissions or of regulating other positive or negative externalities attributable to agricultural activity, the opportunities provided by the coupling of economic and biophysical models and techniques of changing scale, provide public deciders with better and better performing instruments of policy evaluation. A CAP declaring environmental targets facilitates the social justification for supports, themselves likely to become more effective and more transparent with the implementation of SFP.

Though responsible for market distortion on factors and products, the link between SFP and land gives public decision-makers more options to choose for the future, for instance in the establishing of environmental and energy policies.

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For further information

De Cara S., Houzé M., Jayet P.A., (2005), Greenhouse gas emissions from agriculture in the EU: a spatial assessment of sources and abatement costs, *Environmental And Resource Economics*, vol. 32, n° 4 . pp 551–583.

Chakir R., Debove E., Jayet P.A., (2005), *Decoupling of direct payments : an application of the AROPAj model projecting regionally differentiated impacts on the EU-15 farming sector (preliminary results)*, Expert workshop jointly organized by DG JRC, DG AGRI, SG RTD, JRC Séville, 6-7 octobre 2005, 21p. http://safh.jrc.es/documents/3Jayet_doc.pdf

Debove E., (2007), http://www.avignon.inra.fr/stics/download/Annales_STICS_seminaire2007_Reims.zip (pp. 21-24)

Godard C., (2005), http://www.grignon.inra.fr/economie-publique/publi/these_CG_2005_12_17.pdf

Jayet P.A., coord., (2006), *Report on results concerning models linking farm, markets and the environment*, GENEDEC Deliverable 4, décembre 2006, 305p. http://www.grignon.inra.fr/economie-publique/genedec/publi/deliv/WP3_D4.pdf

TABLE 1 – Some characteristics of the AROPAj model: “reference solution” without livestock adjustment for the EU-15 (from FADN 2002)

M. S.	Number of group-types	Farm number. (1000)	Represented UAA (M ha)	Gross margin (k€/expl.)	Direct Aid (k€/expl.)	Gross Margin (€/ha)	Direct aid (€/ha)
Belgium	27	33,8	1432,2	22,6	12,7	534	300
Denmark	22	43,6	2436,5	40,2	17,9	719	320
Germany	144	204,9	14728,1	78,7	23,1	1095	322
Greece	54	198,1	1219,7	13,0	3,9	2112	636
Spain	155	330,0	11329,5	23,8	10,4	692	303
France	157	313,9	24041,8	63,7	26,1	831	340
United Kingdom	59	118,2	11647,3	72,1	26,0	731	264
Ireland	22	76,9	3198,1	25,8	11,8	620	283
Italy	278	373,9	7552,1	44,2	6,8	2189	336
Luxembourg	13	1,6	129,7	72,3	21,5	914	272
Netherlands	19	51,3	1511,3	103,9	9,3	3526	317
Austria	38	74,1	1788,1	23,5	7,8	975	324
Portugal	37	79,0	1989,6	22,3	6,3	885	249
Finland	20	42,9	1889,1	36,8	8,7	835	198
Sweden	29	39,0	2638,9	49,8	15,0	736	221
EU	1074	1981,2	87532,0	44,7	13,8	1012	313

TABLE 2 – Some characteristics of the AROPAj model: “reference solution” without livestock adjustment for the 22 French regions (from FADN 2002)

Region	Number group-types	Farm number. (1000)	Represented UAA (M ha)	Gross margin (k€/expl.)	Direct Aid (k€/expl.)	Gross Margin (€/ha)	Direct Aid (€/ha)
Ile de France	3	3,8	488,9	116,1	48,1	900	373
Champagne Ar. Picardie	9	10,9	1405,8	107,0	43,0	829	333
Hte Normandie	8	10,6	1162,3	128,4	35,4	1165	321
Centre	5	7,5	724,0	91,1	32,6	944	338
Basse Norman.	7	19,8	2324,7	101,0	36,7	859	312
Bourgogne	7	16,5	1145,6	66,8	21,6	961	311
Nord Pas de C.	10	13,1	1669,7	67,6	41,4	529	324
Lorraine	9	12,3	815,5	93,7	20,2	1417	305
Alsace	5	8,1	1079,1	101,0	45,9	758	345
Franche Comte	4	5,2	269,5	66,6	21,9	1288	424
Pays de la Loire	7	7,1	688,5	80,6	27,2	828	279
Bretagne	12	30,1	1983,5	52,6	23,4	799	356
Poitou Charent.	13	34,5	1742,5	47,0	18,8	929	373
Aquitaine	7	18,7	1605,0	67,2	32,0	781	372
Midi Pyrenees	8	24,6	1102,7	34,7	19,2	774	429
Limousin	14	30,5	1981,9	54,6	23,7	838	364
Rhone Alpes	5	10,3	779,7	17,6	20,8	233	275
Auvergne	9	21,2	1183,8	53,1	18,8	952	338
Languedoc Rou.	9	18,4	1415,6	41,2	21,6	535	281
PACA	3	5,2	252,4	40,4	21,3	838	442
Corse	1	4,3	175,3	49,1	18,5	1200	452
	2	1,4	45,6	10,3	10,2	311	308

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TABLEAU 3 – Marginal costs of lands and milk quotas in different scenarios (National average, UE15)

M. S.	Reference without livestock adjustment.		Reference & livestock adjustment		Luxembourg & livestock adjustment		Full decoupling & livestock adjustment	
	Land (€/ha)	M. Q. (€/t)	Land (€/ha)	M. Q. (€/t)	Land (€/ha)	M. Q. (€/t)	Land (€/ha)	M. Q. (€/t)
Belgium	973	313	938	201	1023	182	1121	169
Denmark	795	360	786	241	869	215	854	215
Germany	751	325	762	246	919	212	846	214
Greece	1175	350	1207	264	1553	205	1573	205
Spain	654	320	645	212	687	196	732	175
France	677	336	664	273	710	262	772	249
United-Kingdom	583	286	568	178	752	152	737	153
Ireland	464	294	554	180	658	132	657	132
Italy	808	403	814	310	905	284	894	281
Luxembourg	519	347	492	241	623	249	610	251
Netherlands	3485	345	3515	250	3587	205	3592	201
Austria	728	334	741	233	767	231	838	196
Portugal	735	311	735	192	814	178	881	177
Finland	394	367	393	283	480	248	475	247
Sweden	485	341	479	265	551	240	532	252
EU	733	328	727	243	825	217	837	212

TABLE 4 – Marginal costs of lands and milk quotas in different scenarios (Regional average, France)

Region	Reference without livestock adjustment		Reference & livestock adjustment		Luxembourg & livestock adjustment		Full decoupling & livestock adjustment	
	Land (€/ha)	M.Q. (€/t)	Land (€/ha)	M.Q. (€/t)	Land (€/ha)	M.Q. (€/t)	Land (€/ha)	M.Q. (€/t)
Ile de France	848	338	848	296	845	275	832	255
Champagne A.	680	335	680	265	681	263	688	261
Picardie	910	331	908	260	901	250	877	248
Hte Norman.	705	337	685	242	724	225	707	236
Centre	678	300	676	278	785	278	839	266
Basse Norm.	582	338	532	299	613	280	720	253
Bourgogne	669	334	631	238	694	219	764	204
Nord Pas de C	1139	325	1137	242	1128	231	1116	233
Lorraine	575	335	574	262	587	265	634	270
Alsace	1101	347	1140	296	1127	281	1123	280
Franche Com.	447	350	446	273	482	262	543	245
Pays de la Lo.	654	335	603	268	654	254	749	237
Bretagne	731	330	732	273	752	272	831	258
Poitou Charent.	655	327	672	286	694	276	751	260
Aquitaine	618	335	657	307	654	313	726	306
Midi Pyrenees	723	321	689	263	731	251	836	215
Limousin	377	329	375	177	418	157	532	124
Rhone Alpes	605	372	583	302	645	285	741	254
Auvergne	503	327	477	272	573	232	688	233
Languedoc R.	851		851	139	867	151	927	165
PACA	1050	326	1053	250	1197	225	1194	209
Corse	492		484		534		725	

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FIGURE 1 – Impact 1/ of a livestock adjustment, 2/ of the implementation of the Luxembourg agreement, 3/ of a full decoupling –national averages in the EU.

FIGURE 1a – Evaluation in € per farm

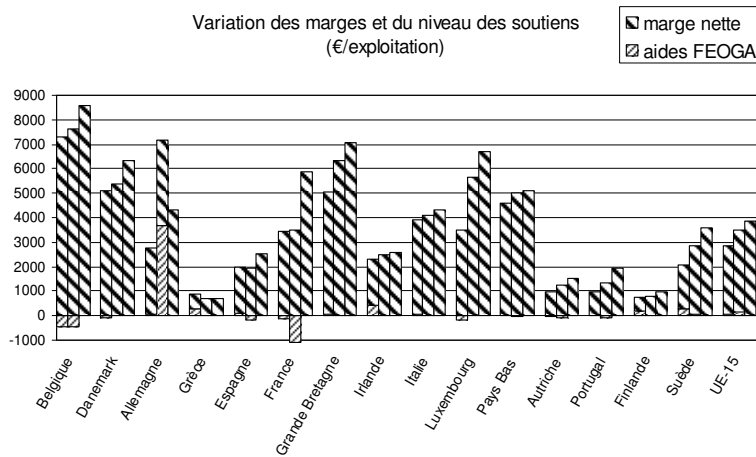


FIGURE 1b – Evaluation in € per hectare

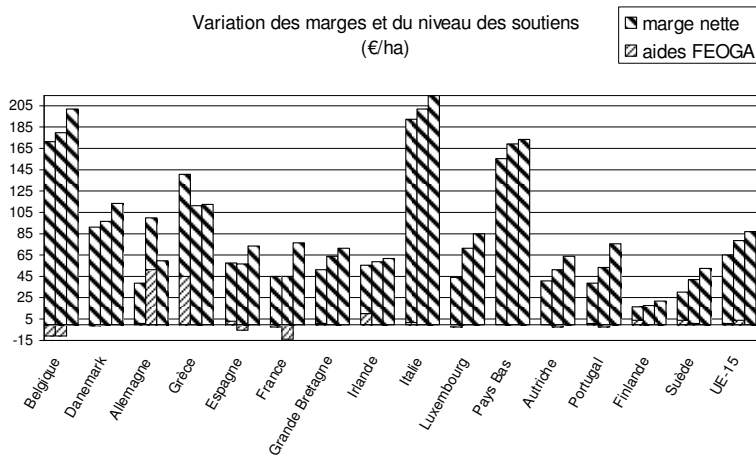


FIGURE 1b – Evaluation in € per hectare

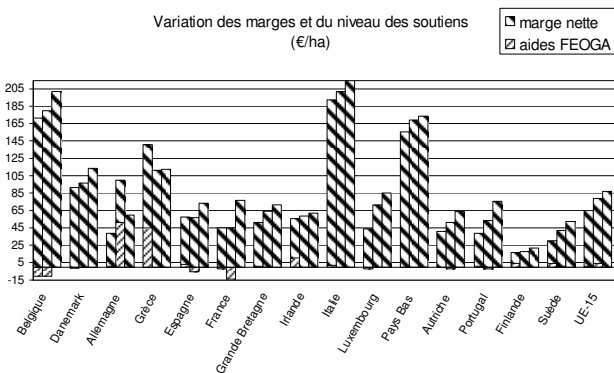


FIGURE 2 – Impact 1/ of a livestock adjustment, 2/ of the implementation of the Luxembourg agreement, 3/ of a full decoupling –national averages in France

FIGURE 2a – Evaluation in € per farm

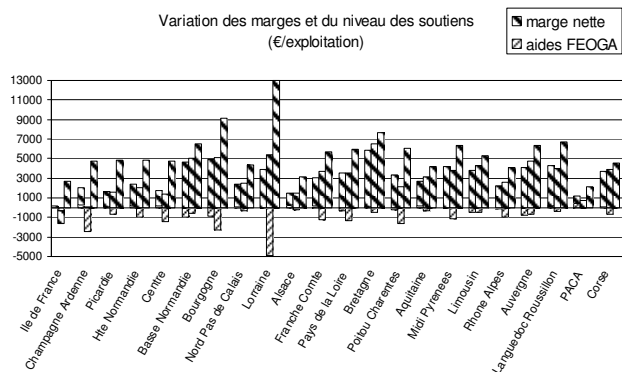


FIGURE 2b – Evaluation in € per hectare

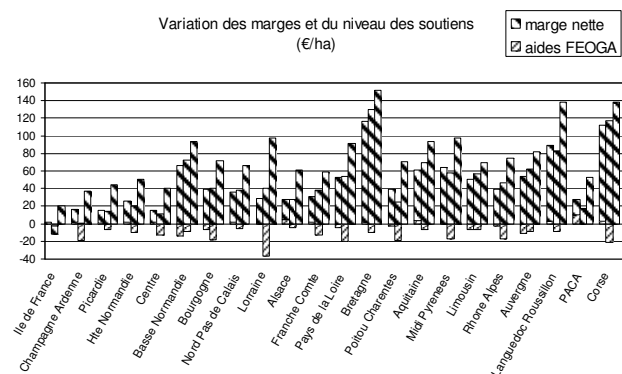
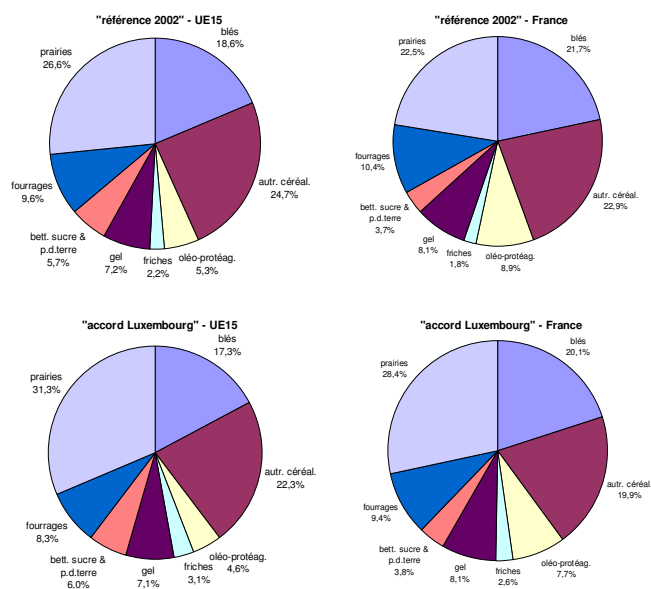


FIGURE 3 – Allocation of arable lands (France, EU-15)



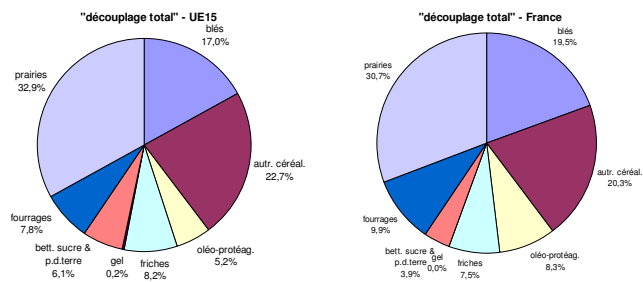


FIGURE 4 – Allocation of lands and change of scale.

Variation of location probability between the situation of “reference 2002” and the “Luxembourg” scenario