EUROPEAN COMMISSION

Brussels, 20.10.2011
SEC(2011) 1153 final/2

CORRIGENDUM:
Annule et remplace le document SEC(2011) 1153 final du 12 octobre 2011
Langue unique EN (page de couverture)

COMMISSION STAFF WORKING PAPER

IMPACT ASSESSMENT

Common Agricultural Policy towards 2020

ANNEX 2D

{COM(2011) 625 final}
{COM(2011) 626 final}
{COM(2011) 627 final}
{COM(2011) 628 final}
{COM(2011) 629 final}
{SEC(2011) 1154 final}

ANNEX 2D: GREENING - RESULTS OF PARTIAL ANALYSIS ON IMPACT ON FARM INCOME USING FADN

Executive summary

This note provides an overview of the impact of greening measures on farm costs and incomes.

For this purpose several greening options were analysed which differ with respect to the implementation of the greening measures (crop diversification, ecological set-aside, preservation of permanent grassland and green cover), the budget allocated for the greening measures and the redistribution of DP between MS.

Results show that the analysed greening measures would impact farms in different ways: increasing costs and thus negatively impacting on income, or creating a direct or a potential loss of income (an opportunity cost) as a consequence of compliance with the measures. Moreover, the greening measures, notably the crop diversification and the set-aside, could impact the prices of agricultural products and inputs, and therefore income.

Summary methodology and limitations

The assessment of greening is very challenging as natural conditions, level of cost and opportunities vary from one farm to another and these data are often not recorded in any EU-wide database. Efforts have been made to be as accurate as possible using Farm Accountancy Data Network (FADN) information. The assessment is made at the level of each individual farm. Indirect market effects on prices and yields of crop diversification and set-aside are also taken into account in the estimate of farm incomes. When estimating the impact of income, it is assumed that farmers fully comply with greening and receive their full direct payment amounts; hence, the impact on income is solely driven by the (direct or indirect) effect of greening.

The economic approach used in this analysis has some limitations that may lead to an under estimate of the benefits and costs of the greening measures. In addition to the absence of the economic quantification of the environmental benefits of these measures for society as a whole, we can mention:

(1) except for permanent grassland and green cover, the costs of maintaining existing good practices such as crop diversification, especially in a context of an ever increasing economic pressure on farmers, is not taken into account,

(2) the effect of greening is evaluated in the short term; it therefore does not take into account; the improvement of the productivity in the long term due to the adoption of more sustainable farming methods (for example by improving soil quality, by increasing the availability of pollinators, or by increasing resilience to face climate change).

Readers should also keep in mind that, in most cases, results presented in this note are average impacts aimed to compare various greening scenarios. The effect on individual farms may be significantly higher/lower and compounded with other impacts.

Cost of the greening component

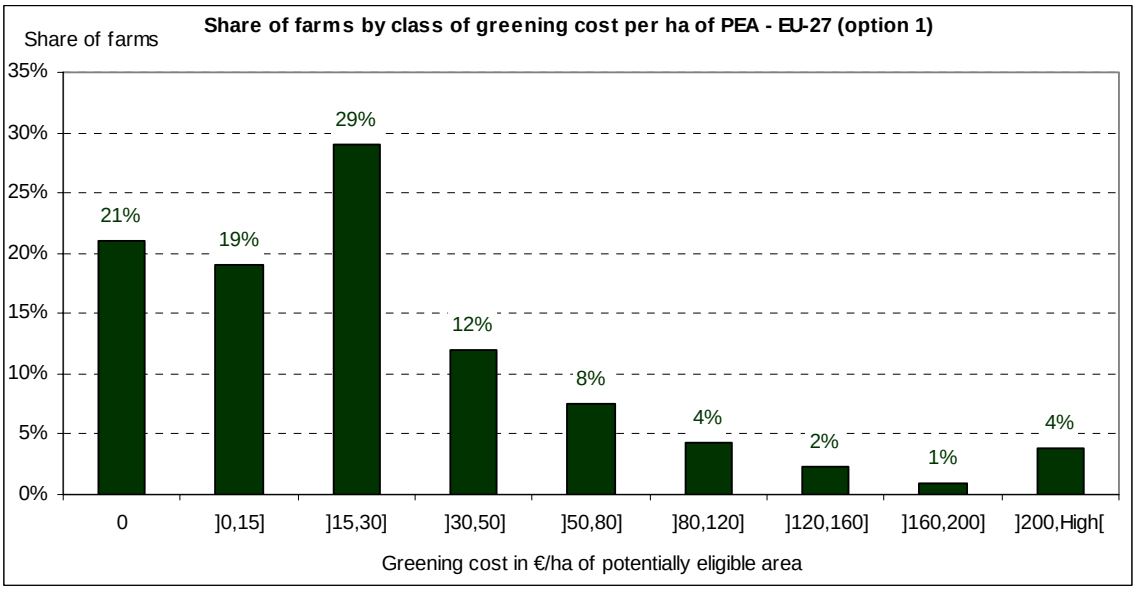
The cost implied by the greening varies a lot according to the specific situation of each farm. It depends on the level of cost of each measure, but also on the share of the potentially eligible area (PEA) which has to be adapted to respect the requirements. In total for the EU-27, it is estimated that 25 to 30% of the PEA would have to be adapted

(crop diversification, ecological set-aside and green cover) or would have an opportunity cost (maintaining permanent grassland).

The costs per ha of land to be adapted vary very much according to the regions and farming systems, reflecting differences in land use and profitability as well as in current environmental practices (and hence the area whose land use would need to be modified). They are in general higher for the maintenance of permanent grassland and the ecological set-aside. For instance, among regions, the cost of maintaining permanent grassland in areas where an alternative use of land exists varies between € 4 and € 620/ha, with an EU average of € 216/ha of grassland. In a case of 5% of set-aside, the average cost of set-aside reaches € 261/ha of land to be kept out of production, while it reaches more than € 1 000 in some regions.

When the cost of greening is measured against the total PEA, the amounts are lower. In an entry scenario of greening, it is estimated that 29% of farms would have a cost between € 15 and € 30/ha of PEA, 4% would have a cost higher than € 200/ha of PEA, and about 21% of farms would not have cost (Figure 1).

Figure 1



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

On average for the EU-27, the cost of greening would range from to € 33 to € 41/ha of PEA, depending on the option of greening, with up to half coming from the cost of maintaining permanent grassland (average € 17/ha). In general, the highest average costs are estimated in countries for which maintaining large areas of permanent grassland is economically challenging due to pressure of substitution by fodder crops (the Netherlands, Slovenia and Belgium).

Impact on farm income

At EU level, the change in farm income due to the greening ranges between - 3.2% and - 1.4%, depending on the option adopted and the detailed requirements of the measures. In addition to increases in cost and/or loss of income, greening could also affect the price level of agricultural products.

Prices are affected differently depending on the area to be set-aside. In the entry scenario where 5% of the land has to be set-aside, farm income decreases on average by 2.8% against the basis while in the option with 10% ecological set-aside, farm income decreases by 1.4%. This is because the reduction of the production area leads to a decrease in supply of agricultural products that in turn increases their prices. In the case of the option with 10% ecological set-aside the corresponding increase in agricultural output prices compensates in some cases (for field crops farms) for the increase in farming costs due directly to greening and indirectly to the induced increase of feed prices.

In contrast the decrease of the maximum share of a single crop in the rotation from 70% of the area to 50% leads to a more pronounced drop in income (- 3.2% on average compared to – 2.8% in the entry scenario). Although the introduction of crop diversification also tends to increase the price level of some products, the effect on costs is much more pronounced.

It has to be emphasised, however, that the effect on farm income differs very much among farms depending on the type of production and their specific situation. For instance the increase of the level of market prices does not affect all farms in the same way. The largest negative impacts are observed for pig and poultry and milk farms due to the increase of fodder prices. Field crops farms may benefit of significant crop prices increased induced by some greening measures. Impact therefore varies also between regions depending mainly on their natural conditions and specialisation. For example in Spain, the impact of the first option of greening goes from -14% in *Asturias* (with a dominant grass-based milk production) to +3.5% in *Aragon* (more diversified agricultural sector with lower greening costs).

More important still is the farm specific situation as the impact of the greening on farm costs differs widely among farms.

Table of contents

1. INTRODUCTION

The aim of this note is to analyse the effect of the introduction of greening measures as specified in the Communication on the CAP towards 2020, without taking into account other changes to the CAP.

In this partial analysis, various options for the greening are analysed, based mainly on data of the Farm Accountancy Data Network (FADN). These options and their underlying assumptions are briefly described in Chapter 2.

The focus of analysis is the estimation of any additional costs (or loss of income) which may stem from the implementation of greening measures on farms and their potential impact on farm income. The approaches to estimate the cost and the results in terms of costs are presented in Chapter 3. Details on the methodology used can be found in Annex 1. In Chapter 4, the change in market revenue due to the greening measures is discussed. The impacts on farm income of the various options is analysed in Chapter 5.

2. THE GREENING MEASURES AND THE OPTIONS OF THE PARTIAL ANALYSIS

2.1. The greening measures

The analysed options for the greening component consist of four measures, which in the analysis were defined as follows:

(1) **Crop diversification:**
Aiming to support the diversity of crop production and to avoid monoculture, this option will oblige farms to cultivate at least 3 different crops, with no crop allowed to cover more than a certain share of the total arable land (with the exception of ecological set-aside).

(2) **Ecological set-aside**:
A part of the land has to be taken out of production. In this analysis and as a simplification, horticulture land is exempted from this measure despite it is a highly intensive form of production with great risks for the environment[1]. Current fallow land is considered as ecological set-aside[2].

(3) **Green cover**:
During winter, farms have to apply green cover on 70% of their arable land and the area covered by permanent crops. The area of ecological set-aside is exempted from this provision.

(4) **Preservation of permanent grassland:**
Farmers have to maintain their permanent grassland at farm level.

Organic farms are exempted from these specific requirements since they are supposed to respect similar principles already or to respect equivalent conditions contributing to the improvement of the environment.

---

[1] When covering also horticulture land, the assessment of the costs of set-aside appears more difficult as the profitability per hectare is very high in comparison with arable crops.

[2] Information on existing farm features is not available in FADN but GAEC obligations such as buffer strip are considered as fallow-land.

A certain share of the budget is allocated to greening. Farm receive a flat rate payment per ha of potential eligible area (PEA)[3]. Additionally, the greening component includes also a flat rate payment to support farms in Natura 2000 areas.

2.2. The options for the partial analysis for the greening measures

For all options, the basis of comparison is the scenario of DP distribution "MFF DP distribution" (flat rate set to decrease by one third the difference with the 90% of EU average based on the budget proposal for DP) without any greening measure. The options applied for the analysis of the greening measures are the following (Table 1):

- **Option 1** is an "entry" scenario: the budget attributed to the greening corresponds to 30% of the total DP budget[4]. Crop diversification foresees that a minimum of three crops is cultivated and that each crop must not cover more than 70% of the area. Ecological set-aside is fixed at 5% of utilised agricultural area (UAA). 70% of arable and permanent crops land should be covered during winter time. Permanent pasture must be preserved. Organic farms are eligible to the greening payment (they are supposed to respect the requirements).

  For each of the following options, one measure is allowed to vary in sequence compared to option 1:

- **Option 2**: the maximum share of one single crop is decreased to 50%,
- **Option 3**: the **ecological set-aside** is increased to 10%,
- **Option 4**: the **budget for greening** is decreased to 25%,
- **Option 5**: the **budget** for DP is based on the DP scenario "90% of EU average and objective criteria".

Table 1: Options for the partial analysis of greening measures

Number of the options for the partial analysis of the greening	Base	1	2	3	4	5
Direct Payments (DP) scenario	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	90% of EU average and obj. criter.
Budget allocated to the greening component	-	30% DP	30% DP	30% DP	25% DP	30% DP
Greening measures	-	70% crop diversification, 5% ecological set-aside, 70% green cover, preservation permanent pasture, organic farming	50% crop diversification, 5% ecological set-aside, 70% green cover, preservation permanent pasture, organic farming	70% crop diversification, 10% ecological set-aside, 70% green cover, preservation permanent pasture, organic farming	70% crop diversification, 5% ecological set-aside, 70% green cover, preservation permanent pasture, organic farming	70% crop diversification, 5% ecological set-aside, 70% green cover, preservation permanent pasture, organic farming

[3] In this analysis, **PEA** is based on IACS information from **2009**.

[4] From this budget first the amount necessary to finance a flat rate payment of € 20 per ha for farms in Natura 2000 areas is deducted. This flat rate payment is limited 5% of DP budget. The rest of this envelope is used for the flat rate payment aimed to finance the other greening measures.

3. THE COST OF THE GREENING MEASURES

3.1. Estimating the cost of greening measures

Greening measures may impact farm incomes in several different ways:

– by increasing costs, for instance due to the requirement to seed cover crops during winter time,

– by decreasing the level of production and revenue, for instance in the case of ecological set-aside,

– by impeding the shift to a more profitable production system, for example due to the "opportunity cost" of maintaining permanent pastures,

– by affecting individual production patterns in a way that leads to changes in the level of production which may have an impact on market prices, for instance in the case of ecological set-aside and crops diversification.

The assessment of the impact of such factors is very challenging as the natural conditions, the level of costs, the opportunities to alter the production system and the farmer's behaviour are of major importance but these data are not available in EU-wide. The assessment is particularly difficult in the case of the measures green cover and maintenance of permanent pastures.

The main features of the approach followed are[5]:

- The assessment is made for each individual farm depending on the situation on the farm,
- Estimates of additional costs or opportunity costs are done using the most precise information at regional level available (regions, LFA, type of farms, etc),
- Market effects (on prices and yields) of the measures crop diversification and set-aside are taken into account.

As a result, the model used to assess the impact of the greening is static. Additional costs and changes in market prices and yields are taken into account in the estimation of the income effects, but the production pattern and structure of individual farms is not adapted.

Cost of greening varies for options 1, 2 and 3. In options 4 and 5, which assess only different distribution of direct payments, the cost of greening is identical to option 1.

The method has some limitations that may lead to an underestimate of the benefits and costs, of the greening measures:

(1) except for permanent grassland and green cover, the costs of maintaining existing good practices such as crop diversification, especially in a context of an ever increasing economic pressure on farmers, is not taken into account;

[5] Various methods have been used. See detailed methodology in annex 1.

(2) the effect of greening is evaluated in the short term; it therefore does not take into account; the improvement of the productivity in the long term due to the adoption of more sustainable farming methods;

(3) there is no economic quantification of the environmental benefits of these measures made.

3.2. Method and results by greening measure

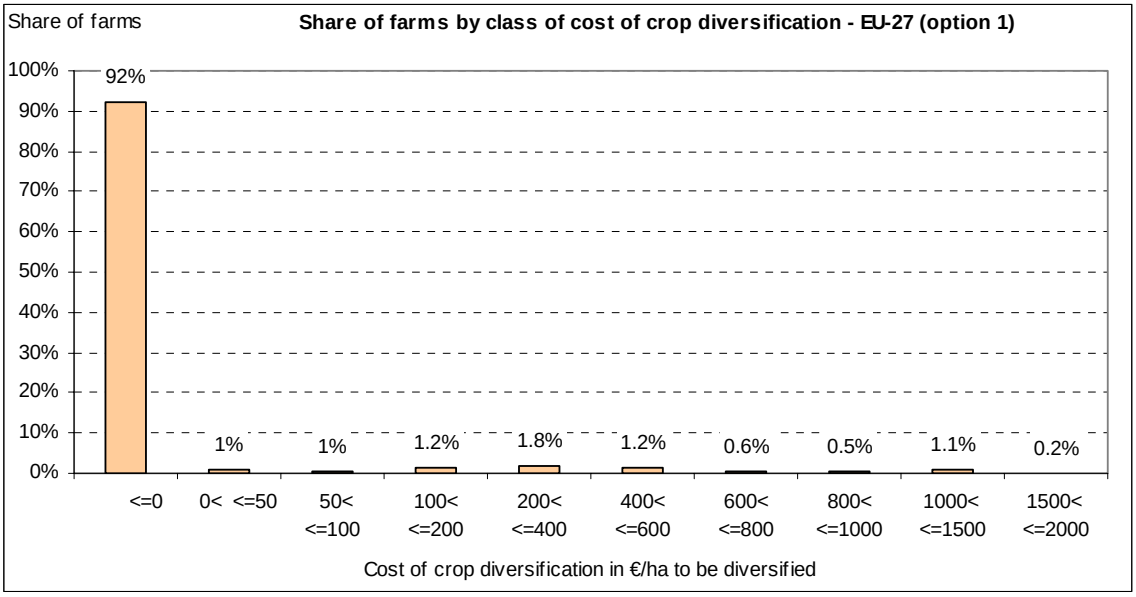
3.2.1. Crop diversification

Summary methodology

It is assumed that additional costs or loss of income arise in those farms where a single crop covers more than 70% (in option 2 the maximum is 50%) of the arable land as farms would have to cultivate other crops on this area. The cost is assumed to be equal to the difference between the farm's individual gross margin of arable land and the average regional gross margin of field crop farms whose set of arable cultures is diversified. In the cases where the farm individual gross margin is lower than this regional average no additional costs are assumed.

It is estimated that only a relatively small share of area would have to be adapted with the measure (1,4% of PEA in options 1, 3, 4, 5 and 3,9% in option 2). 92% of farms would not have additional cost with the measure (Figure 2). However, for the remaining farms, the cost per hectare to be diversified may vary a lot and can be very high. About 7% of farms would have a cost for crop diversification higher than € 100/ha to be diversified and more than 1% would have a cost higher than € 1000/ha.

Figure 2



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

However, when divided by the total PEA, the costs of crop diversification are relatively low, averaging only € 4/ha of PEA in options 1, 3, 4, 5 (Table 2). In Option 2, where the maximum share of a single crop is reduced from 70% to 50%, the average cost per ha of

PEA more than doubles to about € 9/ha mainly because the share of affected land nearly triples.

Table 2: Estimated cost of crop diversification by Member State

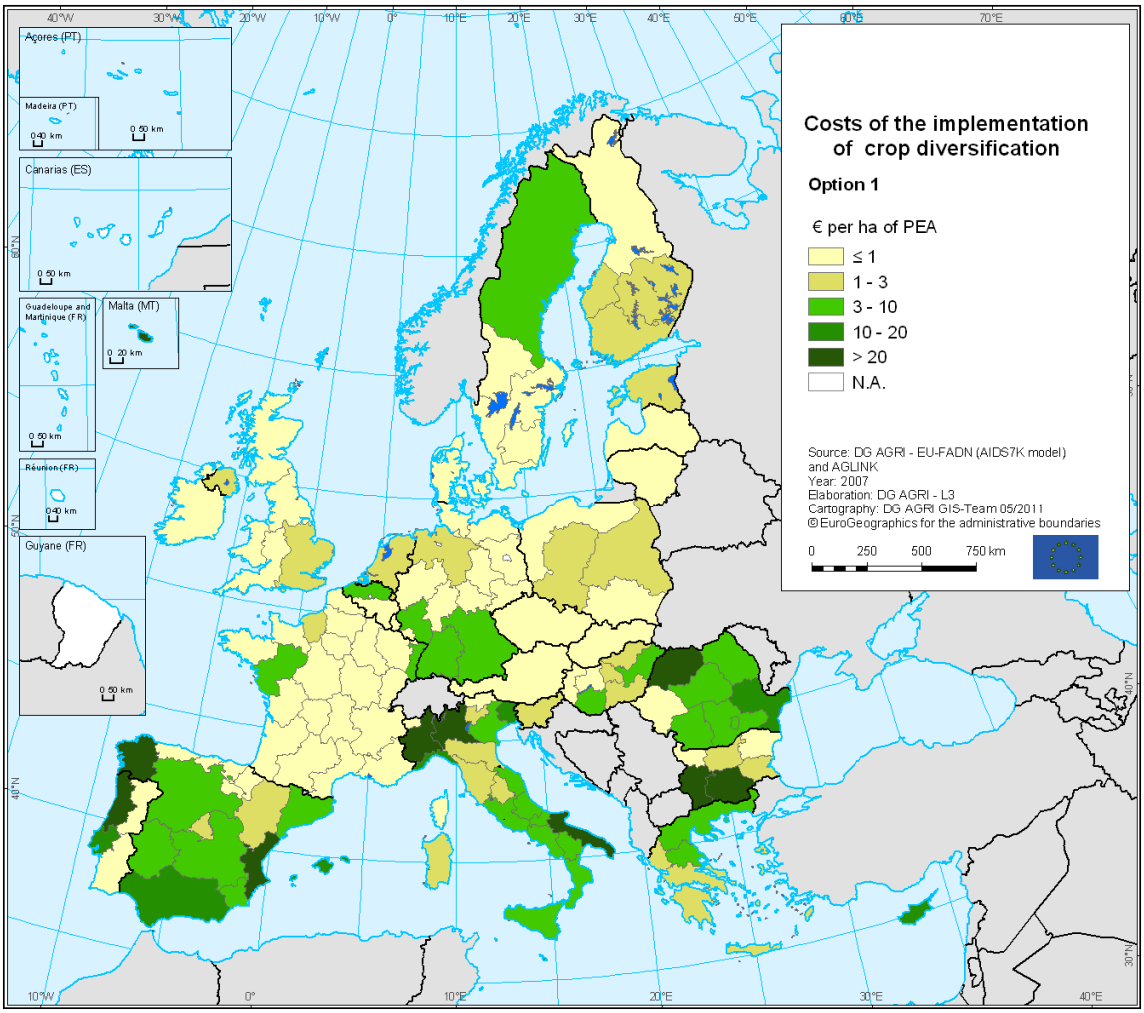
			Option 1				Option 2			
	Potential Eligible Area (PEA)	Area covered*	Area forced to be "diversified"		Costs per ha to be "diversified"	Costs per ha of PEA	Area forced to be "diversified"		Costs per ha to be "diversified"	Costs per ha of PEA
	Average ha	Average ha	Share in total arable land	Share in PEA	€ per ha	€ per ha	Share in total arable land	Share in PEA	€ per ha	€ per ha
Belgium	43.5	22.4	1.7%	0.9%	268	2.3	5.0%	2.6%	191	4.9
Bulgaria	25.3	20.1	1.3%	1.1%	518	5.5	4.6%	3.7%	297	10.9
Cyprus	7.2	5.1	5.0%	3.5%	467	16.4	11.6%	8.1%	375	30.4
Czech Republic	236.9	171.0	0.2%	0.1%	133	0.2	1.3%	1.0%	187	1.8
Denmark	80.7	64.5	1.6%	1.2%	72	0.9	6.3%	5.1%	131	6.6
Germany	84.3	59.3	0.4%	0.3%	624	1.8	1.9%	1.4%	416	5.7
Greece	10.2	4.4	5.8%	2.5%	239	6.0	14.8%	6.4%	256	16.4
Spain	29.5	15.6	3.8%	2.0%	399	8.0	11.3%	6.0%	302	18.1
Estonia	123.5	58.0	0.7%	0.3%	336	1.1	3.3%	1.6%	162	2.5
France	77.3	41.6	0.7%	0.4%	225	0.9	3.0%	1.6%	154	2.5
Hungary	54.1	42.9	1.2%	0.9%	278	2.6	4.0%	3.1%	283	8.9
Ireland	47.9	3.2	8.1%	0.5%	27	0.1	18.8%	1.2%	115	1.4
Italy	16.8	7.2	8.6%	3.7%	364	13.4	18.5%	7.9%	439	34.8
Lithuania	51.4	30.6	0.9%	0.5%	178	0.9	4.1%	2.5%	150	3.7
Luxembourg	80.2	38.5	0.1%	0.0%	0	0.0	0.8%	0.4%	6	0.0
Latvia	61.3	31.1	0.8%	0.4%	164	0.6	4.5%	2.3%	135	3.1
Malta	3.4	1.6	2.7%	1.3%	***6989	***90.5	5.5%	2.6%	***6894	***181.4
Netherlands	31.7	13.1	6.4%	2.6%	59	1.6	13.1%	5.4%	161	8.7
Austria	33.5	17.2	0.3%	0.2%	429	0.7	1.5%	0.8%	352	2.7
Poland	17.3	12.7	0.5%	0.4%	311	1.2	2.3%	1.7%	227	3.8
Portugal	28.4	14.4	1.4%	0.7%	921	6.6	2.9%	1.5%	924	13.8
Romania	10.2	7.6	3.1%	2.3%	380	8.9	8.7%	6.5%	332	21.6
Finland	51.6	33.9	2.3%	1.5%	84	1.3	7.7%	5.1%	120	6.1
Sweden	96.6	52.6	0.7%	0.4%	109	0.4	2.6%	1.4%	123	1.8
Slovakia	581.7	370.4	0.2%	0.1%	66	0.1	0.5%	0.3%	81	0.2
Slovenia	11.6	3.0	2.5%	0.6%	417	2.7	7.8%	2.0%	640	13.0
United Kingdom	164.2	53.4	1.6%	0.5%	117	0.6	6.1%	2.0%	140	2.8
EU-27	31.2	17.5	2.0%	1.1%	330	3.6	5.8%	3.3%	289	9.5

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.
*** For Malta, the opportunity cost is overestimated.

But in farms which are heavily affected by the measure, such as highly specialised farms that realise a high gross margin per ha, the corresponding cost per ha of PEA is often higher than the greening payment or total direct payments. A large share of these farms is located in southern Spain, Portugal, northern and southern Italy, northern Greece, Cyprus, southern Bulgaria and northern Romania (Map 1). In the case of Malta, the method used resulted in an overestimation of opportunity cost. Therefore it should not be considered as a reliable measurement of the opportunity costs of crops diversification[6].

[6] In Malta, crops production is almost exclusively based on vegetables with very high margins per hectare. It was not possible to find an appropriate benchmark of margins of "diversified" field crops farms in Malta or in neighbouring countries and regions. In the results presented, the EU-average was used as a benchmark.

Map 1: Estimated cost for crop diversification – option 1



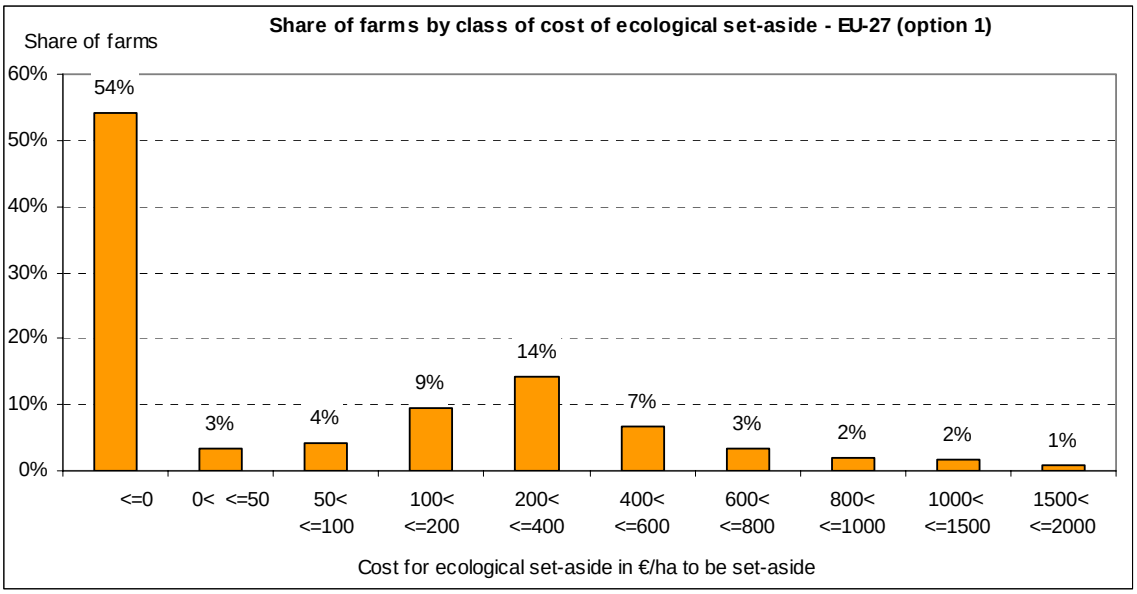
3.2.2. Ecological set-aside

Summary methodology

Additional costs for the implementation of the measure arise only if the amount of fallow land on the farm is lower than the area to be set-aside (5% of the PEA in option 1, 2, 4 and 5 and 10% in option 3). For each additional ha it is assumed that the costs equal 2/3 of the farm individual gross margin of arable land. The assumption is that the farmers will set-aside the less productive areas (with the assumption that they reach 2/3 of the average farm gross margin).

Similarly as for crop diversification, only a relatively small share of area would have to be additionally set-aside (2,3% of PEA in options 1, 2, 4, 5 and 4,6% in option 3). However a higher share of farms would have a cost (46% against 8% for crop diversification) (Figure 3). The cost per ha to be set-aside varies widely: 14% of farms have a cost between € 200 and € 400/ha, but it can be higher than € 1500/ha in 1% of farms.

Figure 3



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

After divided by the total PEA, the cost for ecological set-aside amounts on average to € 6/ha of PEA, similar to the costs of the implementation of crop diversification (Table 3). In option 3 where the requirement of ecological set-aside is doubled (10% of the PEA) the average cost more than doubles to about € 14 /ha. The increase in costs is more pronounced than the increase of the share of set-aside because the increase in set-aside leads to a drop in production triggering a rise in market prices. Due to this effect, the gross margins and thus the opportunity costs of the land to be set-aside increase.

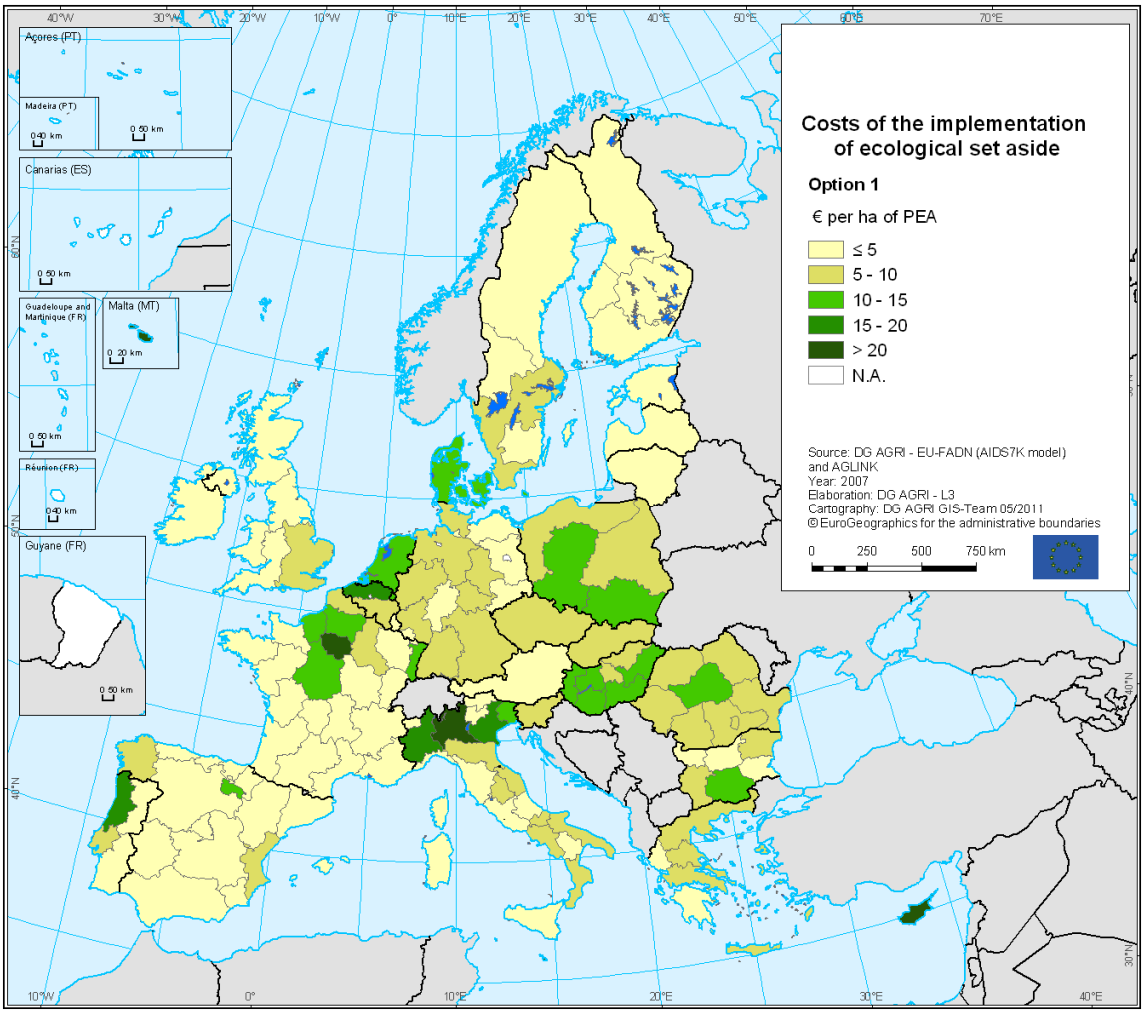
Table 3: Estimated cost of ecological set-aside by Member State

		Option 1				Option 3			
	Potential Eligible Area (PEA)	Area to be set aside after deduction of existing fallow land		Costs per ha set aside	Costs per ha of PEA	Area to be set aside after deduction of existing fallow land		Costs per ha set aside	Costs per ha of PEA
	Average ha	Average ha	Share in PEA	€ per ha	€ per ha	Average ha	Share in PEA	€ per ha	€ per ha
Belgium	43.5	1.1	2.5%	515	13	2.2	5.1%	561	28
Bulgaria	25.3	1.0	3.9%	157	6	2.0	8.0%	172	14
Cyprus	7.2	0.3	3.5%	658	23	0.5	7.1%	656	46
Czech Republic	236.9	8.4	3.5%	221	8	16.9	7.2%	261	19
Denmark	80.7	3.3	4.1%	351	14	6.5	8.1%	401	33
Germany	84.3	2.8	3.3%	194	6	5.7	6.8%	231	16
Greece	10.2	0.2	1.5%	459	7	0.3	3.1%	484	15
Spain	29.5	0.2	0.6%	497	3	0.4	1.3%	496	7
Estonia	123.5	2.9	2.3%	166	4	5.7	4.6%	194	9
France	77.3	2.1	2.7%	195	5	4.2	5.4%	229	12
Hungary	54.1	2.2	4.1%	280	11	4.4	8.1%	319	26
Ireland	47.9	0.2	0.3%	363	1	0.3	0.7%	424	3
Italy	16.8	0.3	1.7%	486	8	0.6	3.4%	544	18
Lithuania	51.4	0.8	1.6%	228	4	1.9	3.6%	263	10
Luxembourg	80.2	2.0	2.4%	124	3	3.9	4.9%	142	7
Latvia	61.3	0.6	1.0%	165	2	1.3	2.2%	187	4
Malta	3.4	0.1	1.9%	2 204	42	0.1	3.9%	2 391	93
Netherlands	31.7	0.5	1.4%	754	11	1.0	3.1%	800	25
Austria	33.5	0.7	2.1%	220	5	1.5	4.3%	250	11
Poland	17.3	0.6	3.6%	273	10	1.3	7.3%	308	22
Portugal	28.4	0.1	0.5%	435	2	0.3	1.1%	437	5
Romania	10.2	0.4	3.5%	193	7	0.7	7.0%	213	15
Finland	51.6	1.2	2.3%	110	3	2.6	5.0%	143	7
Sweden	96.6	1.9	2.0%	215	4	4.0	4.1%	257	11
Slovakia	581.7	16.4	2.8%	204	6	33.6	5.8%	238	14
Slovenia	11.6	0.2	1.3%	603	8	0.3	2.6%	645	17
United Kingdom	164.2	1.7	1.0%	359	4	3.8	2.3%	419	10
EU-27	31.2	0.7	2.3%	261	6	1.4	4.6%	297	14

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

Compared to crop diversification the costs of ecological set-aside are more evenly spread throughout EU. This is because in all regions the same share of land has to be set-aside (Map 2).

Map 2: Estimated cost for ecological set-aside – option 1



The differences in cost are due to three factors: the amount of land which is already fallow, the level of the gross margin and the share of grassland in the total PEA. For instance in Spain and Portugal costs are low because the amount of land to be additionally set-aside is low. There is indeed already a lot of fallow land in those countries. In Ireland, average costs are low because the share of area concerned by the measure is low (high share of grassland, which is not in arable land, in the total PEA).

3.2.3. Green cover

Summary methodology

The cost of green cover is estimated based on assumptions on the affected area and the costs per ha. Green cover has to be applied on 70% of the arable land and area of permanent crops. The area of ecological set-aside is excluded. As there is no information on green cover available in EU-wide database, several assumptions had to be made: first, it was assumed that a large part of the area covered by cereals is covered during the winter, as in most cases a large share of the cereals are winter crops. As the information is not differentiated between winter and summer crops in FADN, it was assumed that on each farm the share is equal to the national shares of winter and summer varieties published by EUROSTAT. Furthermore, it was assumed that 30% of the area of permanent crops is already covered. The costs per ha of land to be additionally covered in order to meet the requirement are assumed to be equal to 50€.

It is estimated that around 13% of PEA would have to be adapted to respect the green cover measure. 29% of farms would respect already the requirements and 71% would have a cost (€ 50/ha to be covered according to the assumptions). Divided by the total PEA, to cost of the green cover would be on average € 6/ha of PEA (Table 4). Basically, this cost stays rather identical among the options.

Table 4: Estimated cost of green cover by Member State

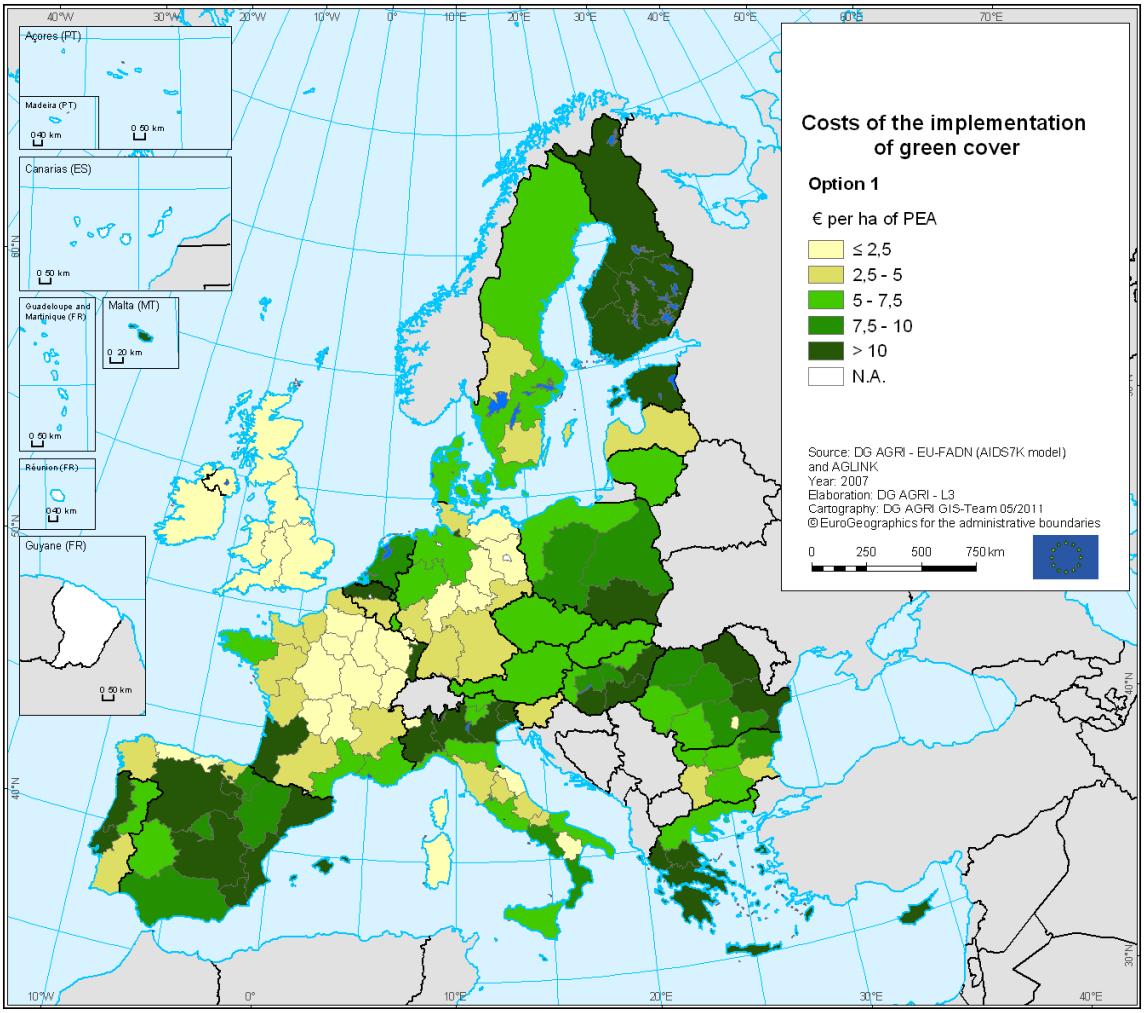
			Option 1			Option 2			Option 3		
	Potential Eligible Area (PEA)	Costs per ha to be covered	Area to be covered		Costs per ha of PEA	Area to be covered		Costs per ha of PEA	Area to be covered		Costs per ha of PEA
	Average ha	€ per ha	Average ha	Share in PEA	€ per ha	Average ha	Share in PEA	€ per ha	Average ha	Share in PEA	€ per ha
Belgium	43.5	50	7.4	16.9%	8	7.4	16.9%	8	7.4	17%	8
Bulgaria	25.3	50	3.2	12.7%	6	3.2	12.7%	6	3.2	13%	6
Cyprus	7.2	50	1.8	24.8%	12	1.8	24.8%	12	1.8	25%	12
Czech Republic	236.9	50	31.5	13.3%	7	31.5	13.3%	7	31.5	13%	7
Denmark	80.7	50	8.6	10.7%	5	8.6	10.7%	5	8.6	11%	5
Germany	84.3	50	6.3	7.5%	4	6.3	7.5%	4	6.3	8%	4
Greece	10.2	50	1.9	18.5%	9	1.9	18.5%	9	1.9	18%	9
Spain	29.5	50	6.4	21.6%	11	6.4	21.6%	11	6.4	22%	11
Estonia	123.5	50	27.3	22.1%	11	27.3	22.1%	11	27.3	22%	11
France	77.3	50	5.8	7.5%	4	5.8	7.5%	4	5.8	8%	4
Hungary	54.1	50	11.3	21.0%	10	11.3	21.0%	10	11.3	21%	10
Ireland	47.9	50	1.3	2.6%	1	1.3	2.6%	1	1.3	3%	1
Italy	16.8	50	2.4	14.5%	7	2.4	14.5%	7	2.4	14%	7
Lithuania	51.4	50	7.3	14.2%	7	7.3	14.2%	7	7.3	14%	7
Luxembourg	80.2	50	10.3	12.9%	6	10.3	12.9%	6	10.3	13%	6
Latvia	61.3	50	5.6	9.1%	5	5.6	9.1%	5	5.6	9%	5
Malta	3.4	50	1.3	37.4%	19	1.3	37.4%	19	1.3	37%	19
Netherlands	31.7	50	6.3	19.9%	10	6.3	19.9%	10	6.3	20%	10
Austria	33.5	50	4.2	12.6%	6	4.2	12.6%	6	4.2	13%	6
Poland	17.3	50	2.9	16.9%	8	2.9	16.9%	8	2.9	17%	8
Portugal	28.4	50	3.9	13.8%	7	3.9	13.8%	7	3.9	14%	7
Romania	10.2	50	1.9	18.2%	9	1.9	18.2%	9	1.9	18%	9
Finland	51.6	50	16.9	32.7%	16	16.9	32.7%	16	16.9	33%	16
Sweden	96.6	50	11.1	11.5%	6	11.1	11.5%	6	11.1	12%	6
Slovakia	581.7	50	85.8	14.7%	7	85.8	14.7%	7	85.8	15%	7
Slovenia	11.6	50	1.1	9.8%	5	1.1	9.8%	5	1.1	10%	5
United Kingdom	164.2	50	3.9	2.4%	1	3.9	2.4%	1	3.9	2%	1
EU-27	31.2	50	4.0	12.9%	6	4.0	12.9%	6	4.0	13%	6

Source: DG AGRI L3 calculations based on EU FADN and the AIDS7K model.

However, the average costs differ significantly between regions (Map 3). The estimate of cost of green cover heavily depends on the assumptions made in the framework of the analysis. Due to the use of an universal cost estimate of € 50/ha to be covered and the lack of details on the actual application of green cover by the farms, the differences in the level of costs are determined by the share of winter cereals in the Member States and the share of arable land and permanent crops in the total PEA. In Member States with a high share of winter cereals the average level of costs is low because the area of winter cereals is counted as covered area. Similarly, in Member States with a low share of arable land and a low share of permanent crops, the costs are low because the amount of land on

which the measure has to be applied is lower. It should be underlined that in the Nordic countries maintaining a crop during winter time is, in most cases, not feasible and that the land is covered by snow. The calculated high cost is therefore rather theoretical.

Map 3: Estimated cost for green cover



3.2.4. Maintaining permanent grassland

Summary methodology

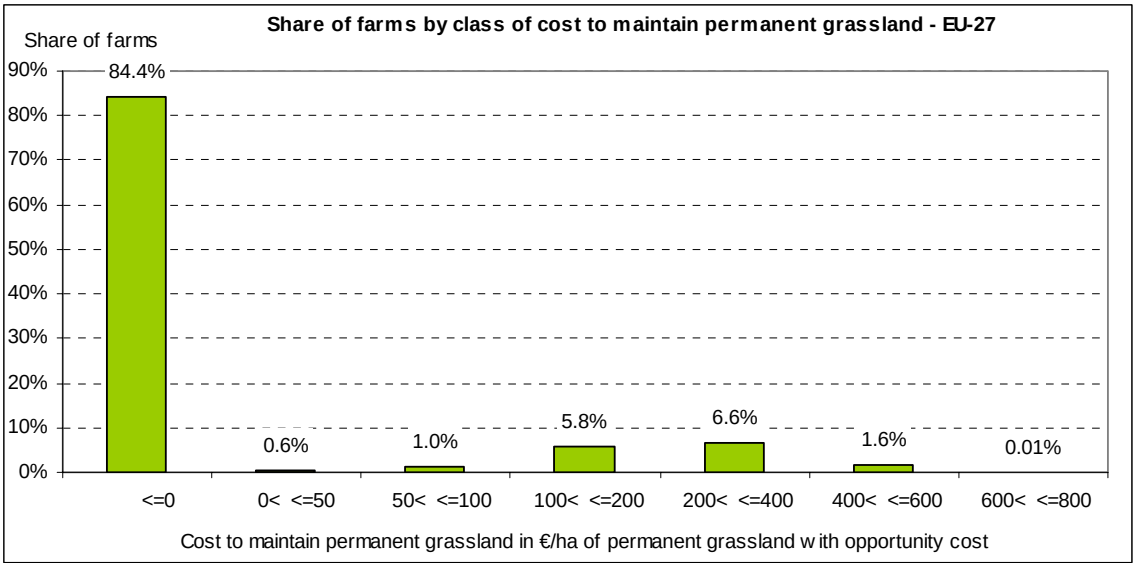
There will be little or no opportunity to convert grassland in farms with poor soil quality. For the simulation it is assumed that this is the case on farms with a low share of arable land (less than 5%) and on farms where sheep and goats represent more than 70% of grazing livestock units. Furthermore, it is assumed that rough grazing and 10% of the permanent pastures have no alternative use. For the permanent pasture thus having an opportunity to convert, it is assumed that the opportunity costs are 2/3 of the difference in gross margins between permanent grassland based dairy and beef production systems and alternative systems at regional level.

For the calculation of the difference in gross margins at regional level, it is considered that there is no opportunity costs in regions where permanent grassland is not relevant or where there is no alternative identified (no cattle production). Otherwise, in regions where grass-based and forage crops based feeding systems co-exist in specialised farms, it is assumed that the first alternative to cattle production based on grass is to continue production with adapting the feeding systems by ploughing the grassland to produce forage crops. Finally, in the remaining regions, where cattle production takes place in mixed cropping-livestock farms, the farm gross margins per hectare of utilised agricultural area in mixed and specialised cropping farms are compared.

The existing CAP limit of 10% on ploughing up permanent grassland, applied at MS or regional level, was not taken into account in the calculations and there is no assumption concerning possible flexibility provided to individual farmers on ploughing up permanent grassland.

It is estimated that the area with opportunity cost to maintain grassland corresponds to 8% of total PEA. 84% of farms would not have any opportunity cost to maintain permanent grassland (when there is no permanent grassland or when no alternative is detected) (Figure 4). However, for the remaining 16% farms, the opportunity cost per ha of permanent grassland may vary a lot and can be high: it is between € 200 and € 400/ha for 6,6% of farms and between € 100 and € 200/ha for 5,9% of farms.

Figure 4



Source: DG AGRI L3 calculations based on EU FADN and the AIDS7K model.

When divided by total PEA, the average cost would amount to € 17/ha of PEA (Table 5), which is the highest among the analysed measures. The cost per ha of PEA depends on the estimated cost per ha of permanent grassland and on the share of permanent grassland with opportunity cost in total PEA. The Member States with the highest cost per ha of

PEA are Belgium (€ 78/ha), the Netherlands (€ 98/ha) and Slovenia (€ 99/ha). In these Member States, it is explained mainly by high cost per ha of permanent grassland: Slovenia (€ 402/ha), the Netherlands (€ 358/ha) and the United Kingdom (€ 341/ha). Indeed, both cattle systems based on permanent pasture and based on other fodders coexist at regional level in these Member States, and the difference in gross margins could encourage farmers to plough permanent pasture in favour of other fodders.

Table 5: Estimated cost to maintain permanent grassland by Member State

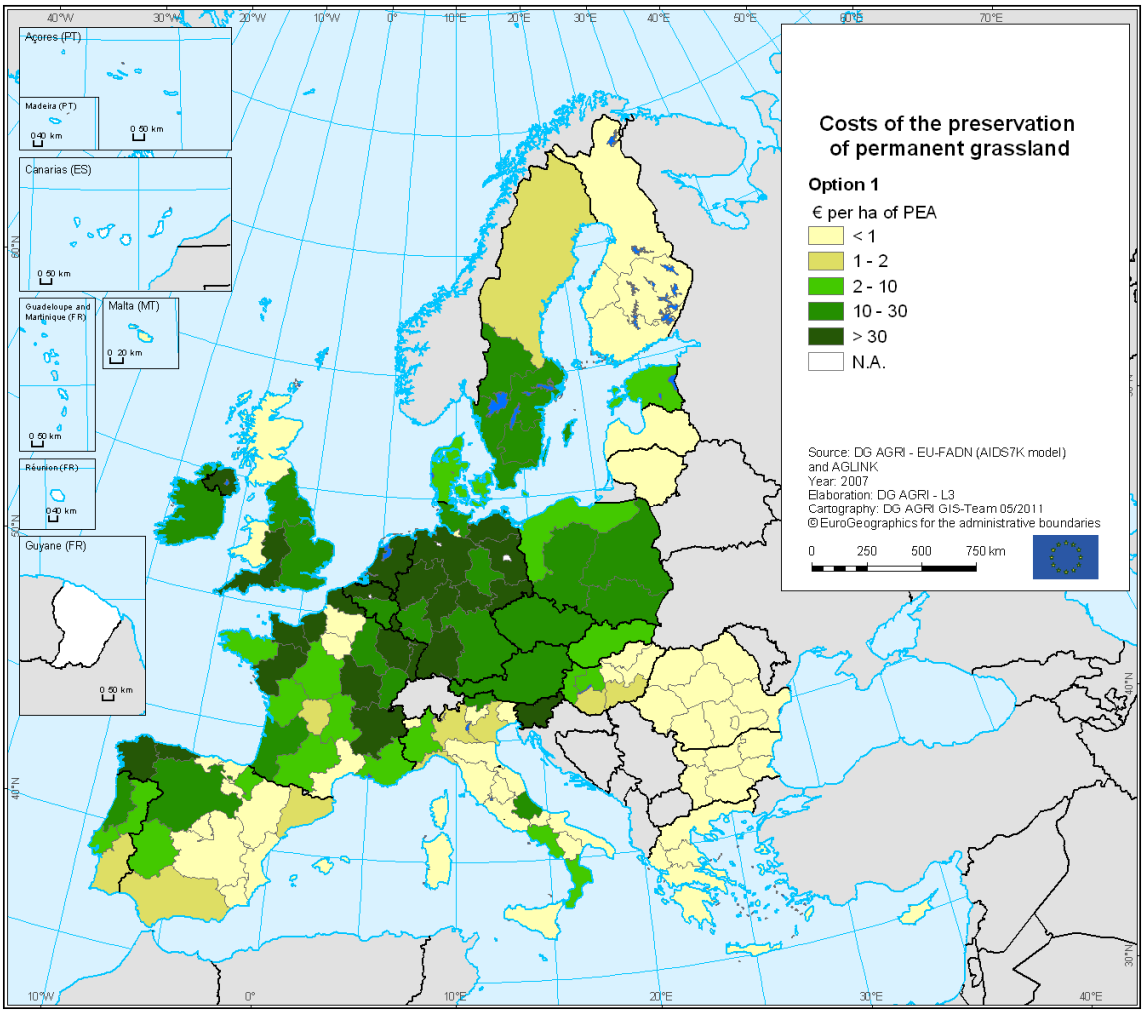
	Potential Eligible Area (PEA)	Permanent pasture (PP)	Area with opportunity costs	Costs per ha PP	Costs per ha of PEA
	Average ha	Share in PEA	Share in PEA	€ per ha	€ per ha
Belgium	43.5	39%	27%	295	78
Bulgaria	25.3	11%	1%	8	0
Cyprus	7.2	0%	0%		0
Czech Republic	236.9	23%	12%	202	24
Denmark	80.7	5%	3%	124	3
Germany	84.3	24%	15%	251	37
Greece	10.2	2%	0%	0	0
Spain	29.5	24%	3%	326	9
Estonia	123.5	20%	6%	56	3
France	77.3	26%	13%	170	22
Hungary	54.1	13%	2%	74	2
Ireland	47.9	82%	9%	224	20
Italy	16.8	8%	0%	327	2
Lithuania	51.4	12%	5%	15	1
Luxembourg	80.2	49%	42%	113	47
Latvia	61.3	27%	5%	4	0
Malta	3.4	0%	0%		0
Netherlands	31.7	53%	27%	358	98
Austria	33.5	43%	10%	230	22
Poland	17.3	17%	11%	176	20
Portugal	28.4	16%	4%	107	4
Romania	10.2	18%	3%	0	0
Finland	51.6	2%	0%	173	1
Sweden	96.6	15%	6%	274	17
Slovakia	581.7	30%	18%	34	6
Slovenia	11.6	65%	25%	402	99
United Kingdom	164.2	53%	8%	341	27
EU-27	31.2	25%	8%	216	17

Source: DG AGRI L3 calculations based on EU FADN and the AIDS7K model.

In several Member States, the share of permanent pastures is very low (Finland, Denmark, Italy, Bulgaria) or a large share of the permanent pastures are estimated with no alternative (Ireland, Spain, United Kingdom), and therefore the cost is low. The extreme situation is observed in Romania, Greece, Malta and Cyprus where it leads to an estimate of no opportunity costs for the country.

The average cost differs also significantly between regions (Map 4).

Map 4: Estimated cost for maintaining permanent grassland



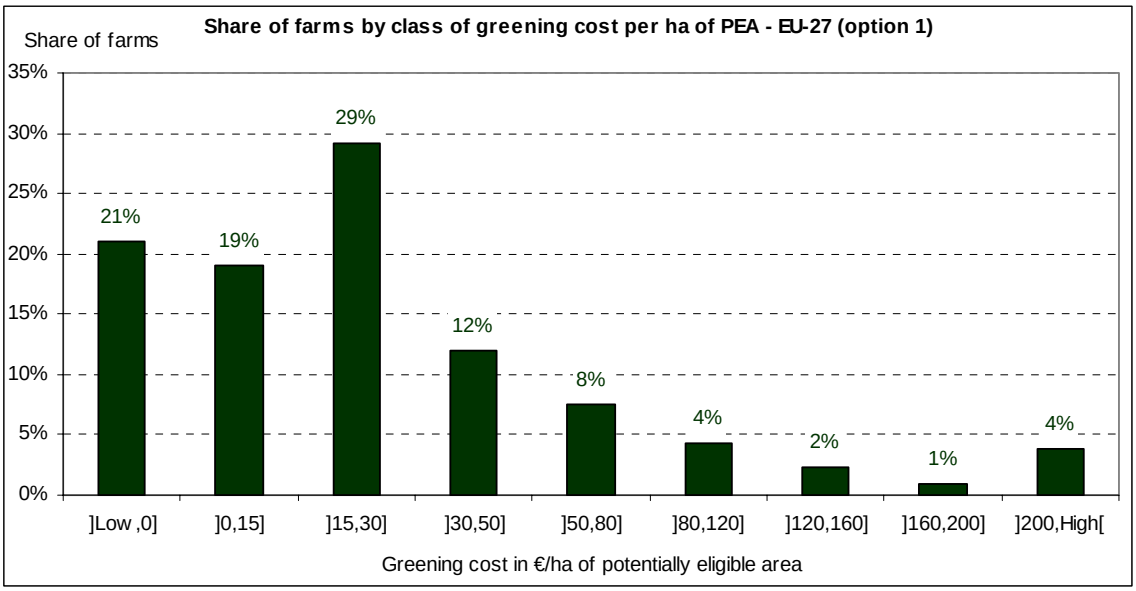
3.3. Total greening cost

The total greening cost depends on the level of cost of each measure, but also on the share of the potentially eligible area (PEA) which has to be adapted to respect the requirements. In total for the EU-27, it is estimated that 25% to 30% of the PEA would have to be adapted (crop diversification, ecological set-aside and green cover) or would have an opportunity cost for maintaining permanent grassland[7].

Based on the assumptions described above, the total greening cost would amount on average for the EU-27 between € 1041/farm and € 1280/farm depending on the option of greening. When the cost of greening is divided to the total PEA, the amounts are lower. In option 1, it is estimated that 29% of farms would have a cost between € 15 and € 30/ha of PEA, 4% would have a cost higher than € 200/ha of PEA, and about 21% of farms would not have cost (Figure 5). The share of farms with greening costs varies significantly between MS ranging from 17% in Ireland to 96% in Luxemburg (Figure 6).

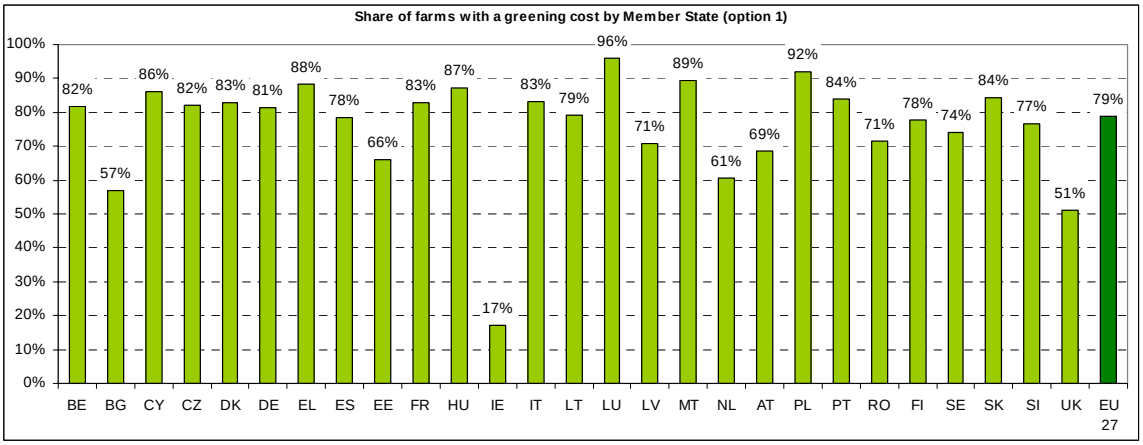
[7] It should be kept in mind that the cost of greening is underestimated as, except for permanent grassland, the costs of maintaining good practices in a context of an increasing economic pressure on farmers, is not taken into account.

Figure 5



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

Figure 6

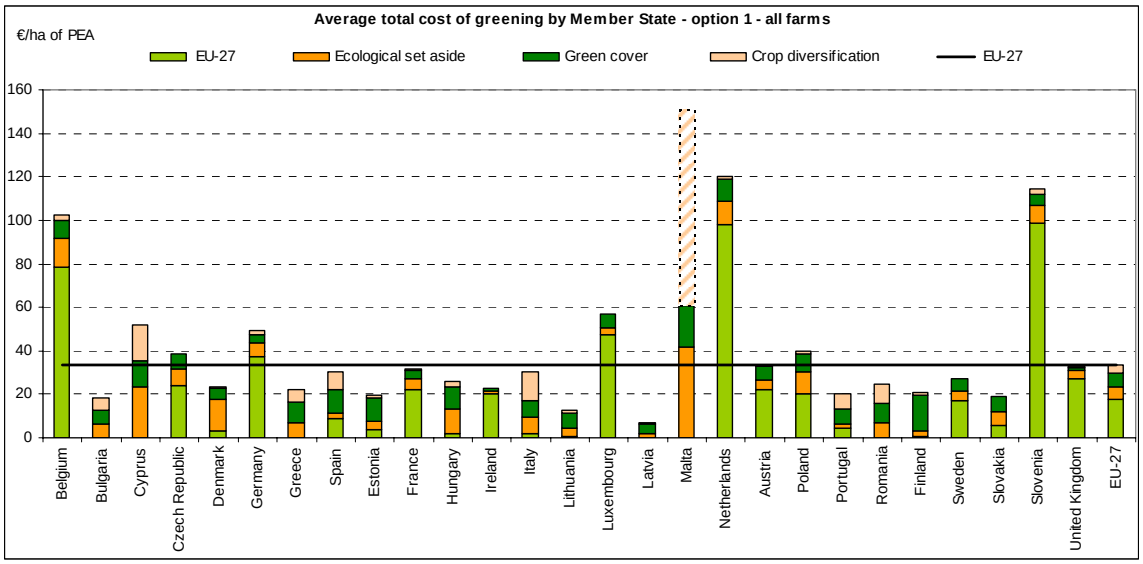


Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

On average for the EU-27 and option 1, the cost of greening would be € 33/ha of PEA. Up to half of the total cost comes from the cost of maintaining permanent grassland (average € 17/ha of PEA) (Figure 7

, Table 6). The rest is approximately evenly distributed among the three remain greening measures. However, the cost varies a lot between Member States and regions (from € 7/ha in Latvia to € 151/ha in Malta). The highest total costs are estimated for Malta, the Netherlands, Slovenia and Belgium.

Figure 7



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

*** For Malta, the opportunity cost is overestimated. Total cost of greening should therefore be used with outmost caution.

The average total greening cost by Member State or region depends on (Figure 7

, Table 6, Map 5):

– the main types of farming: cattle farms have on average higher cost to maintain permanent pasture, and horticulture and granivores farms have on average higher costs for crop diversification and ecological set-aside,

– the importance of less favoured areas: the opportunity cost to maintain permanent grassland are indeed often much lower than in other areas because there is less alternative in LFA areas,

– the usual agricultural practices or natural conditions allowing or not to respect already the requirements of the green cover, the ecological set-aside and the crop diversification.

Results show that costs of greening would be relatively higher due to:

– crop diversification in southern Member States (MT, IT, CY, ES, EL, RO, PT),

– set-aside in Member States with high area productivity, for instance due to importance of horticulture production (MT, CY),

– green cover in some southern countries or Baltic countries (MT, FI, CY, ES, EE, EL),

– permanent pastures in Member States where milk and beef production are important and based on both intensive and extensive systems (SI, NL, BE, LU, DE, UK, CZ).

Table 6: Greening cost in option 1

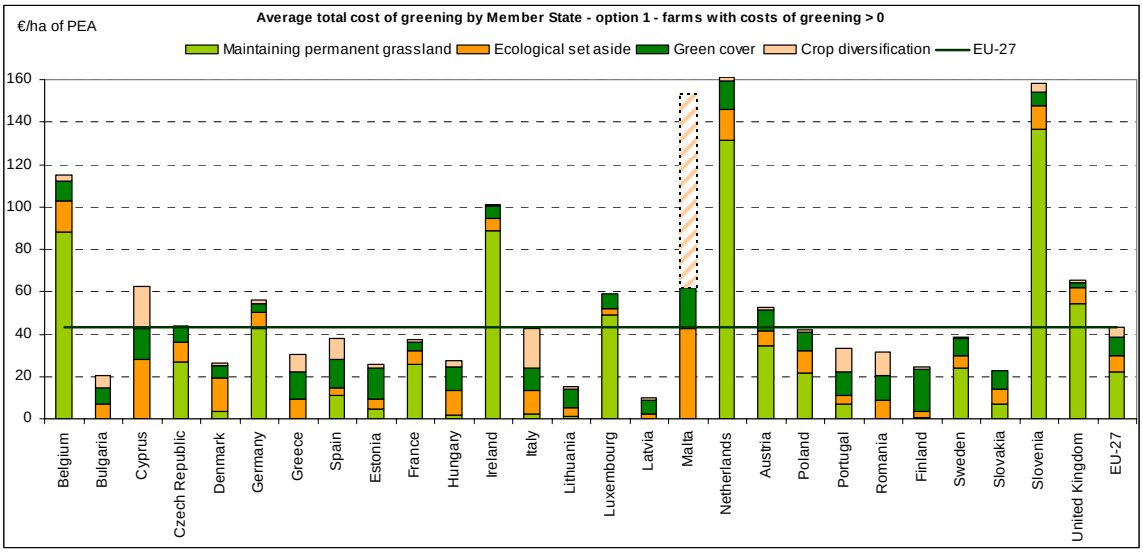
	Average costs for greening measures per ha of Potential Eligible Area (€ / ha)									
	All farms					Farms with greening costs > 0				
	Crop diversification	Ecological set aside	Green cover	Maintaining permanent grassland	Total measures	Crop diversification	Ecological set aside	Green cover	Maintaining permanent grassland	Total measures
Belgium	2	13	8	78	102	3	15	10	88	115
Bulgaria	5	6	6	0	18	6	7	7	0	21
Cyprus	16	23	12	0	52	20	28	15	0	62
Czech Republic	0	8	7	24	38	0	9	8	27	44
Denmark	1	14	5	3	24	1	16	6	4	26
Germany	2	6	4	37	49	2	7	4	43	56
Greece	6	7	9	0	22	8	10	13	0	31
Spain	8	3	11	9	30	10	3	14	11	38
Estonia	1	4	11	3	20	1	5	14	5	25
France	1	5	4	22	32	1	6	4	26	38
Hungary	3	11	10	2	26	3	12	11	2	27
Ireland	0	1	1	20	23	1	5	6	89	101
Italy	13	8	7	2	30	19	11	10	2	43
Lithuania	1	4	7	1	12	1	5	9	1	15
Luxembourg	0	3	6	47	57	0	3	7	49	59
Latvia	1	2	5	0	7	1	2	6	0	10
Malta	***90	42	19	0	***151	***92	43	19	0	***154
Netherlands	2	11	10	98	120	2	14	13	131	161
Austria	1	5	6	22	34	1	7	10	34	53
Poland	1	10	8	20	40	1	11	9	21	42
Portugal	7	2	7	4	20	11	4	11	7	33
Romania	9	7	9	0	25	11	9	12	0	32
Finland	1	3	16	1	21	1	3	19	1	25
Sweden	0	4	6	17	28	1	6	8	24	39
Slovakia	0	6	7	6	19	0	7	9	7	23
Slovenia	3	8	5	99	114	4	11	7	137	158
United Kingdom	1	4	1	27	33	1	7	2	55	65
EU-27	4	6	6	17	33	5	8	8	22	43

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

*** For Malta, the opportunity cost is overestimated. Total cost of greening should therefore be used with outmost caution.

Of course, when considering only farms with costs, the average cost of greening is higher (Table 6 and Figure 8). It is mainly coming from the measure proposed to maintain permanent pastures. It changes significantly the relative situation in Ireland (average cost multiplied by more than 4), in the United-Kingdom and in The Netherlands.

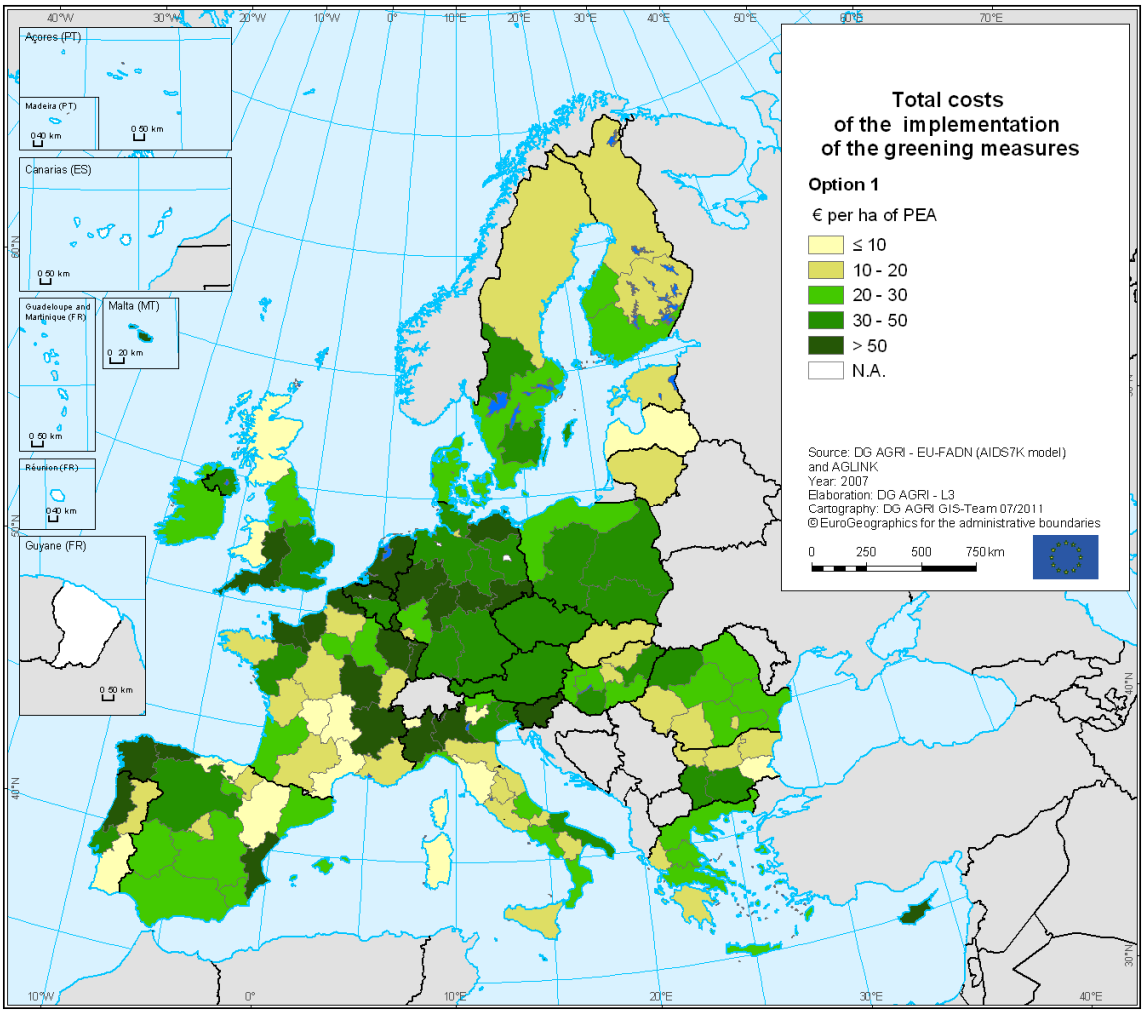
Figure 8



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

*** For Malta, the opportunity cost is overestimated. Total cost of greening should therefore be used with outmost caution.

Map 5: Total cost for greening – option 1



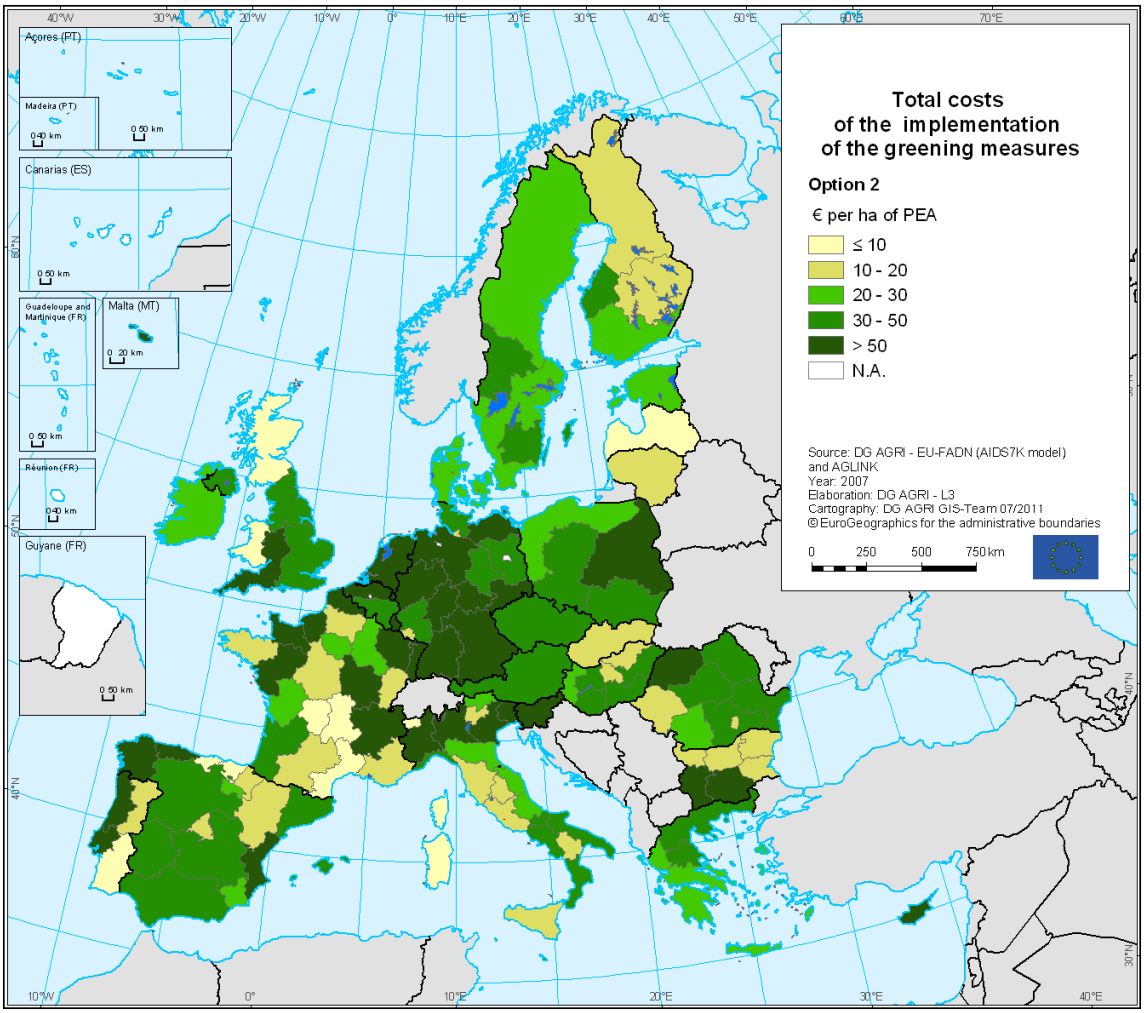
In option 2, which is more demanding in terms of crop diversification, the total cost rises to € 39/ha of PEA due to the increase of the crop diversification cost from 4 to € 9/ha (Table 7 and Map 6). This option increases significantly the total cost especially in Italy (+73%), Malta (+60%) and Romania (+51%) and Greece (+48%).

Table 7: Total cost of greening for the 3 alternatives

	Total cost of greening		
	Option 1	**Option 2**	**Option 3**
	70% crop diversification 5% ecological set-aside	50% crop diversification 5% ecological set-aside	70% crop diversification 10% ecological set-aside
Belgium	102	105	117
Bulgaria	18	23	25
Cyprus	52	66	73
Czech Republic	38	40	49
Denmark	24	30	42
Germany	49	53	58
Greece	22	33	30
Spain	30	41	34
Estonia	20	21	24
France	32	33	39
Hungary	26	32	40
Ireland	23	24	25
Italy	30	52	41
Lithuania	12	15	18
Luxembourg	57	57	60
Latvia	7	9	9
Malta	151	242	194
Netherlands	120	127	134
Austria	34	36	39
Poland	40	42	52
Portugal	20	27	19
Romania	25	38	32
Finland	21	26	25
Sweden	28	29	34
Slovakia	19	19	27
Slovenia	114	125	123
United Kingdom	33	35	39
EU-27	33	39	41

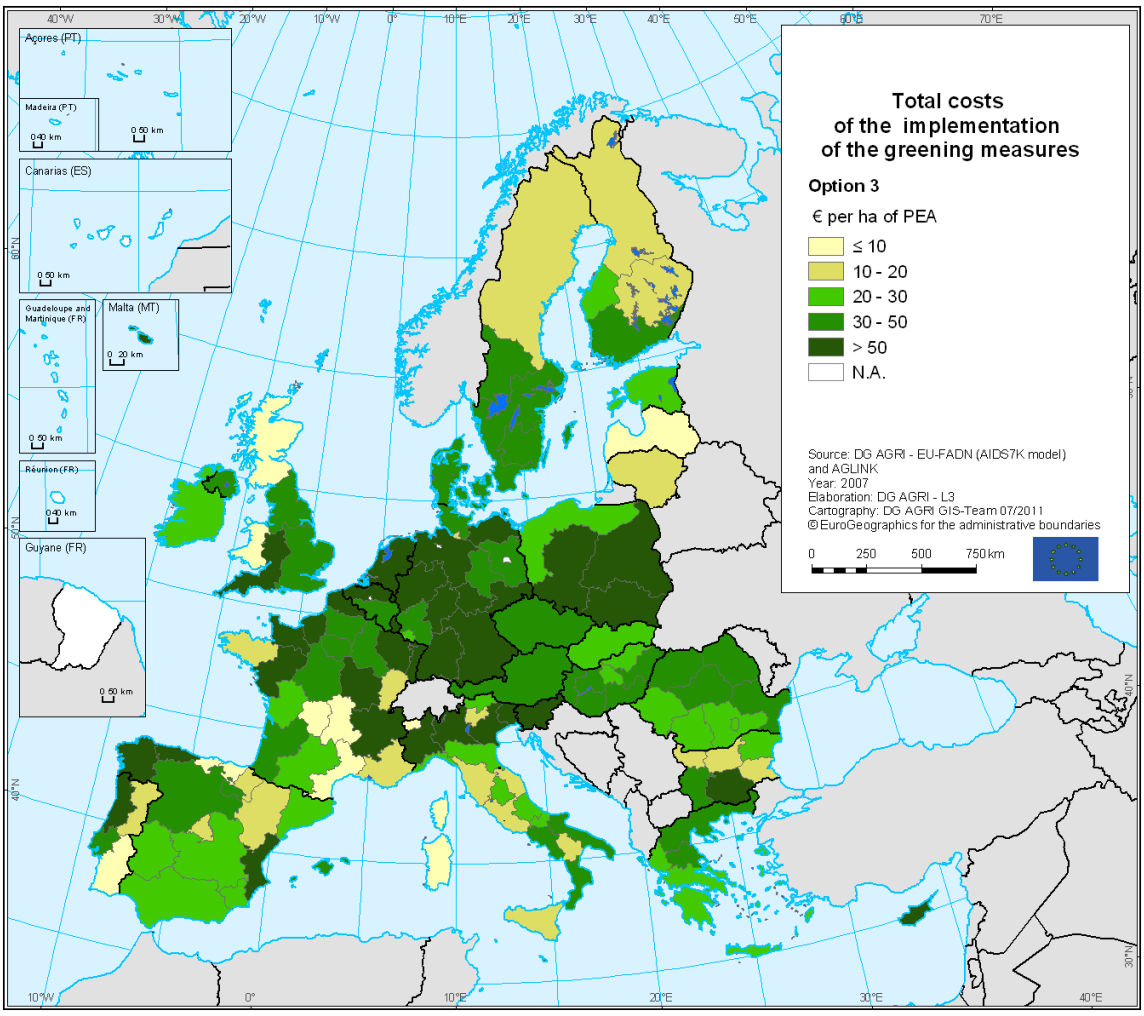
Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

Map 6: Total cost for greening – option 2



Option 3, which is more demanding in terms of ecological set-aside, the total cost reaches approximately the same level as in option 2 (€ 41/ha of PEA) (Table 7 and Map 7). It has an impact on the total greening mainly in Denmark (+76%) and Hungary (+54%).

Map 7: Total cost for greening – option 3



4. THE IMPACT OF CROP DIVERSIFICATION AND ECOLOGICAL SET-ASIDE ON AGRICULTURAL MARKETS

Summary methodology

To estimate the impact of the crop diversification rules on individual farms of EU-FADN, it is assumed that a farm will adapt land allocation among different crops by rebalancing the existing crops by order of importance (favouring the most important ones) or, when necessary, by introducing the most common profitable crops of the region. This allowed estimating the change of area for the arable crops due to crop diversification at EU level. This information, together with the rate of set-aside has been used as inputs in the AGLINK market model to estimate the impact in terms of changes in prices and yields for the productions and the costs. These results have then been implemented as inputs in the AIDS7K model of EU-FADN to incorporate these market effects of the crop diversification and ecological set-aside in the estimate of the impact of greening measure on farm incomes.

Results reveal that introducing crops diversification rules has a bigger impact on land allocation in EU-15 than in EU-12 (Table 8) due to the higher production specialisation in EU-15.

With a rule of maximum of 70% of the area for the main crop, in EU-15, the area would decrease for rice, durum wheat and barley and would increase for sunflower, soya and sugar beet. In EU-12, the area would decrease for grain maize and rice and be replaced by sunflower, durum wheat and sugar beet.

A more ambitious rule in terms of diversification (maximum 50% of the area for the main crop), does not change the above pattern, but results in higher impacts per crop.

Table 8: Changes in area of various crops due to 2 options of crops diversification

	70% max for the main crop and minimum 3 crops and minimum 5% of the area for the third crop			50% max for the main crop and minimum 3 crops and minimum 5% of the area for the third crop		
	EU-15	EU-12	EU-27	EU-15	EU-12	EU-27
Wheat	1.7%	0.7%	1.3%	1.2%	-1.5%	0.1%
Durum Wheat	-3.8%	1.9%	-3.6%	-9.2%	5.9%	-8.8%
Rye	1.2%	-0.8%	0.1%	3.5%	-1.3%	0.9%
Barley	-3.6%	0.1%	-2.7%	-8.3%	1.1%	-6.0%
Oats	1.1%	-1.0%	0.4%	4.2%	-0.8%	2.4%
Summer mix and other cereals	-2.2%	-0.3%	-0.7%	-0.4%	-0.6%	-0.6%
Grain Maize	-0.1%	-2.0%	-1.1%	-3.5%	-3.9%	-3.7%
Rice	-7.5%	-1.3%	-7.2%	-17.4%	-2.7%	-16.7%
Rapeseed	1.7%	-0.1%	1.0%	7.8%	2.6%	5.8%
Sunflower	13.4%	2.9%	7.1%	30.9%	7.9%	17.1%
Soya	5.1%	-0.1%	2.3%	16.5%	1.1%	8.1%
Sugar beet	2.3%	0.7%	1.9%	11.1%	5.0%	9.6%
Other	0.1%	-0.6%	-0.1%	1.9%	0.1%	1.4%

Source: DG AGRI L3 calculations based on EU FADN and AGLINK COSIMO.

In terms of market effects, for most of the products, the impact of introducing crops diversification and set-aside induce an increase in prices (Table 9). In the crop sector, it concerns mainly rice and barley while sunflower price decrease as production increase

due to crop diversification. In the animal sector, the market receipts would increase significantly for beef, rise in a limited way for sheep, pig and poultry meats but decrease for eggs. However, except for the beef sector, the feed cost increases more than production prices.

As expected following the land allocation changes, crop diversifications rules push prices up for rice, barley and durum wheat and down for sunflowers, rapeseed and sugar beet. In general, prices are increasing more when ecological set aside area is expanded than when crops are more diversified, as in the later case a more limited area is concerned.

Table 9: Output and costs changes in EU market due to various options of greening

	Differences with the baseline level					
	70% max one crop - 5% set-aside		50% max one crop - 5% set-aside		70% max one crop - 10% set-aside	
	EU-15	EU-12	EU-15	EU-12	EU-15	EU-12
OUTPUT						
Wheat	1%	1%	2%	2%	7%	8%
Durum Wheat	3%	4%	6%	7%	8%	10%
Rye	1%	1%	-1%	-1%	9%	7%
Barley	7%	8%	13%	14%	19%	22%
Oats	4%	5%	4%	5%	18%	21%
Summer mix and other cereals	4%	4%	5%	4%	14%	13%
Grain Maize	3%	5%	5%	9%	8%	16%
Rice	32%	41%	72%	95%	55%	72%
Rapeseed	1%	1%	-4%	-4%	6%	6%
Sunflower	-4%	-6%	-10%	-16%	0%	1%
soya	0%	0%	0%	0%	1%	2%
Sugar beet	1%	1%	-6%	-6%	9%	8%
Milk	0%	0%	0%	1%	0%	2%
Beef &Veal	4%	4%	6%	6%	12%	14%
Sheep	0%	0%	1%	1%	2%	2%
Pig	0%	0%	0%	0%	3%	3%
Poultry	1%	1%	2%	2%	4%	4%
Eggs	-1%	-1%	-2%	-2%	-4%	-4%
Vegetables and flowers	0%	0%	0%	0%	0%	0%
Quality Wine	0%	0%	0%	0%	0%	0%
Table Wine	0%	0%	0%	0%	0%	0%
Olives and olive oil	0%	0%	0%	0%	0%	0%
Home-grown fodder	4%	4%	6%	6%	15%	13%
Home-grown seeds and plants	4%	3%	7%	5%	12%	11%
For other outputs:	0%	0%	0%	0%	0%	0%
COSTS						
Seeds & plants (coarse grain price)	4%	3%	7%	5%	12%	11%
Feed	4%	4%	6%	6%	15%	13%
Energy and fertiliser	0%	0%	0%	0%	0%	0%
Rest of intermediate consumption	0%	-2%	0%	-2%	-1%	-4%

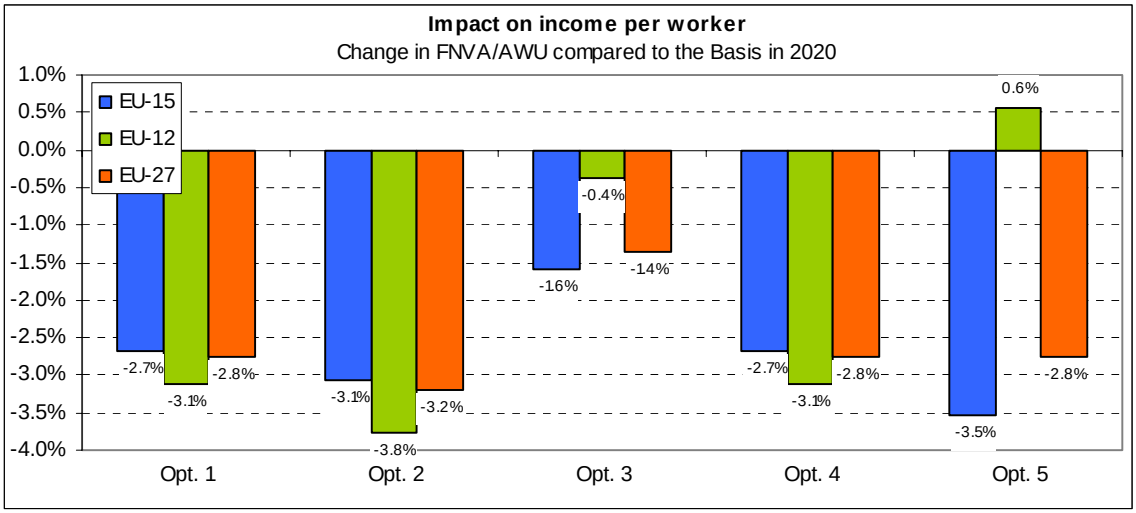
Source: DG AGRI L2 calculations based on AGLINK COSIMO model and EU FADN.

5. THE IMPACT OF GREENING ON FARM INCOME

5.1. EU aggregates

On average for the EU-27, greening would decrease income per worker between -3.2% and -1.4% (Figure 9). In the EU-15, depending on the option, the greening would change the average income between -3.1% and -1.6 %. In the EU-12, it would be between -3.7% and -0.4%. In option 5, the assumptions of greening are identical as in option 1 but the distribution of DP between MS is different:

Figure 9



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK.

The increase in market margin (market output minus intermediate consumption) would only partially compensate the estimated cost of the greening measures (around € 1042/farm on average for the EU-27 for options 1, 4 and 5, see Table 12 in annex). The implementation of crop diversification and set-aside would indeed have an impact on the market by increasing agricultural prices. The intermediate consumptions would also increase (higher prices for agricultural inputs as well), but not to the same extent (see previous chapter)[8]. It results that on average for the EU groups, the market margin would increase slightly. Moreover with or without greening, the total amount of Pillar 1 payments would not change (only the share dedicated to greening changes), except in option 5 when the payment are also redistributed (Min 90% and objective criteria) in comparison with the basis (MFF DP distribution).

In option 1, the increase in the market margin is not sufficient to fully compensate the estimated cost for greening, which is why we observe a decrease in income around -3% (see Table 12 in annex). Option 2 (the maximum share of one single crop is decreased to 50% in crop diversification) has a slightly more negative impact because the increase in market margin compensates a lower share of greening costs. These costs are a bit higher (€ 1228/farm on average for the EU-27) than in option 1 due to the greater constraint concerning the crop diversification.

[8] As a reminder, there would also be an (unquantifiable and sometimes longer term) economic benefit for farmers resulting from improved soil quality, improved pollination services, improved resilience to climate change, etc.

Option 3 (ecological set-aside increased to 10%) would have a less negative impact on income since the higher rate of set-aside allows higher increase in market margins which offset a higher share of the greening cost (€ 1280/farm on average for the EU-27, see Table 12 in annex). The impacts on income of options 1 and 4 are the same for all EU groups since the definition of the greening measures is the same (only the proportion of budget dedicated to the greening changes), and therefore the cost for the greening and the market impacts are the same. The only difference is the allocation of the direct payments to each component.

Option 5 has also the same definition of the greening measures as in option 1, so the result on income is the same for the EU-27. But since the redistribution of direct payments between Member States is not identical in the two options (MFF DP distribution in option 1 and Minimum 90% of EU-average and objective criteria in option 5), the impact on income in EU-15 and EU-12 differs significantly in the two options. With option 5 income would increase by 0.6% in EU-12 while it would decrease by 3.1% with option1. On the contrary, for EU-15, the drop of income would further decrease from -2.7% in option 1 to -3.5% in option 5.

The impacts do not differ much between EU-12 and EU-15, except for option 3 (ecological set-aside increased to 10%), where the decrease is relatively smaller for EU-12. In this option, EU-12 benefits from the significant increase in cereals prices (stemming from the increased set-aside), which results in a more significant increase in the average market margin (cereals represent indeed around one fourth of the EU-12 agricultural production). This increase compensates a higher share of the greening cost.

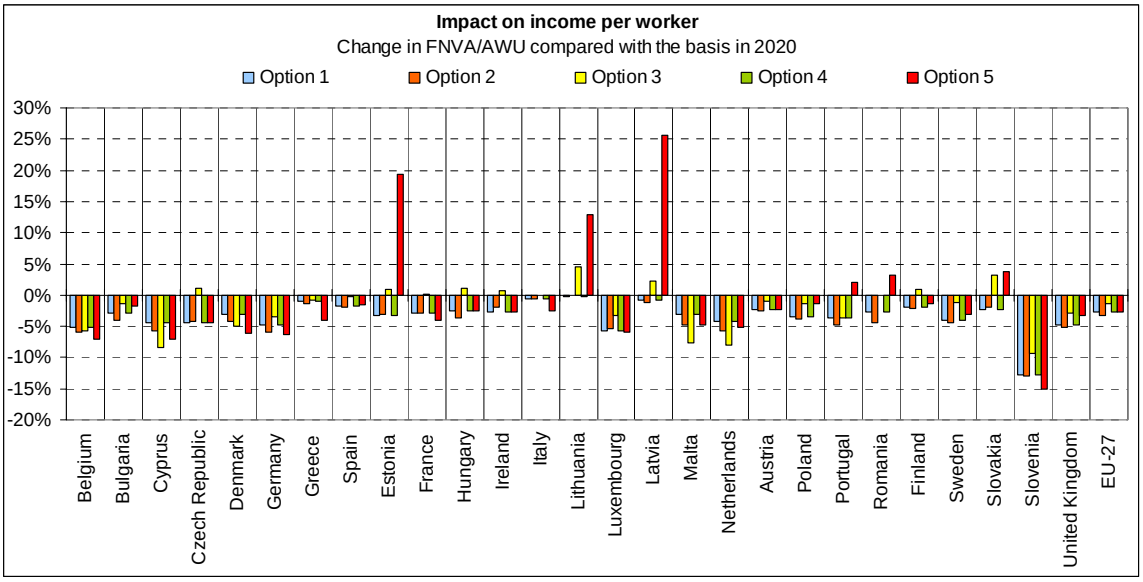
5.2. Member States

As previously mentioned, the market effect induced by crop diversification and the ecological set-aside plays a major role in the impact of the greening on farm income. The market effect is positive for all Member States except the Netherlands, Denmark, Malta, Belgium, Cyprus and Portugal (see Table 15 in annex). It is explained by the large shares of animal production, in particular pigs and poultry production, and fruits and vegetables production in these Member States. For these sectors, market prices developments are not positive while increased feed costs represent a major part of the intermediate consumption. For Portugal, the impact is more limited as pigs & poultry production is less developed.

In most of the cases, greening leads to a decrease of farm income (Figure 10 and Table 10), as the cost of greening is balanced by a positive market effect only in few cases. Slovenia is particularly impacted by the greening. Its agricultural sector is dominated by the milk and beef production and therefore benefits from the increase of beef prices but the costs of greening is particularly high as it is estimated that there are good alternative for permanent pastures[9]. Indeed, in Slovenia, the difference in margins per hectare between grass-based farms and more intensive systems is higher than in other countries such as Austria.

[9] It should be mentioned that the estimate of the opportunity costs for permanent pastures is differentiated by Less Favoured Areas in Slovenia and therefore does not mix production conditions in mountains and in plains.

Figure 10



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

Table 10: Impact on income per worker by Member State

	FNVA/AWU (€/AWU)	FNVA/AWU - comparison with the Basis in 2020				
	MFF € per AWU	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.
	Basis	1	2	3	4	5
	-	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF
Belgium	61 583	-5.1%	-5.9%	-5.7%	-5.1%	-7.2%
Bulgaria	9 470	-2.8%	-4.0%	-1.4%	-2.8%	-1.8%
Cyprus	15 064	-4.3%	-5.7%	-8.4%	-4.3%	-7.1%
Czech Republic	23 372	-4.5%	-4.2%	1.0%	-4.5%	-4.5%
Denmark	71 177	-3.1%	-4.3%	-4.9%	-3.1%	-6.2%
Germany	44 364	-4.8%	-5.9%	-3.5%	-4.8%	-6.2%
Greece	15 413	-1.0%	-1.3%	-0.7%	-1.0%	-4.0%
Spain	29 192	-1.8%	-2.0%	-0.3%	-1.8%	-1.6%
Estonia	24 949	-3.2%	-3.1%	1.0%	-3.2%	19.3%
France	38 466	-2.9%	-2.9%	0.1%	-2.9%	-4.0%
Hungary	27 795	-2.6%	-3.6%	1.1%	-2.6%	-2.6%
Ireland	27 237	-2.7%	-1.9%	0.8%	-2.7%	-2.7%
Italy	35 189	-0.5%	-0.6%	0.1%	-0.5%	-2.4%
Lithuania	19 345	-0.3%	-0.1%	4.4%	-0.3%	12.9%
Luxembourg	50 691	-5.6%	-5.3%	-3.2%	-5.6%	-6.0%
Latvia	14 786	-0.7%	-1.1%	2.2%	-0.7%	25.7%
Malta	31 121	-3.1%	-4.8%	-7.7%	-3.1%	-4.9%
Netherlands	67 857	-4.3%	-5.6%	-8.0%	-4.3%	-5.1%
Austria	32 384	-2.3%	-2.5%	-0.9%	-2.3%	-2.3%
Poland	12 991	-3.5%	-3.8%	-1.3%	-3.5%	-1.4%
Portugal	11 357	-3.6%	-4.8%	-3.6%	-3.6%	2.1%
Romania	4 882	-2.7%	-4.4%	0.0%	-2.7%	3.3%
Finland	28 456	-1.9%	-2.2%	0.9%	-1.9%	-1.3%
Sweden	43 959	-4.0%	-4.4%	-1.1%	-4.0%	-3.1%
Slovakia	20 563	-2.3%	-1.9%	3.2%	-2.3%	3.8%
Slovenia	7 727	-12.7%	-13.0%	-9.4%	-12.7%	-15.2%
United Kingdom	50 363	-4.8%	-5.1%	-2.9%	-4.8%	-3.3%
EU-27	**23 717**	**-2.8%**	**-3.2%**	**-1.4%**	**-2.8%**	**-2.8%**

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

Option 2 is the less favourable scenario for the majority of Member States. The strengthening of crop diversification rules leads to a generally higher decrease of income than in option 1 for nearly all Member States. Only 6 Member States (Slovakia, Czech Republic, Estonia, Lithuania, Luxemburg and Ireland) have a lower drop of income due to production systems benefiting more from crops and beef price increases.

In contrast, for 10 Member States, a higher ecological set-aside of 10% has a positive effect due to the increase of market prices and, for a large majority of Member States, **option 3** least decreases farm income. The exceptions are 5 countries (Belgium, Denmark, The Netherlands, Cyprus and Malta) where animal production is important and where animal feed costs play a large role in the intermediate consumption. For these countries except Belgium it is the worst option.

In **option 5**, the effect is more differentiated as Member States are differently affected by the distribution of DP with the "Minimum 90% and objective criteria" scenario than with the "MFF DP distribution" scenario. It provides very significant increases of farm income in Latvia, Estonia and Lithuania, slight improvements in Slovakia, Romania and Portugal but is the worst option for the income of farmers in 6 MS, especially in Slovenia, Belgium, Greece and Italy.

5.3. Analysis by type of farming

The impacts on income are very different according to the type of farming (Table 11). Granivores farms would suffer a significant loss of income, from -10% to -26%, depending on the option of greening. This loss stems mainly from the market impacts of greening (Table 16 in annex). The crop diversification and ecological set-aside would indeed result in increased feed price, which is a main cost item for granivores (input). At the same time the greening would generate only low increase in pig and poultry prices and even a decrease in eggs price (output). The effect is bigger in option 3 when the ecological set-aside is set at 10%.

Table 11: Impact on income per worker by type of farming

	FNVA/AWU (€/AWU)	FNVA/AWU - comparison with the Basis in 2020				
	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.
	Basis	1	2	3	4	5
	-	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF
Fieldcrops	24 404	-1.4%	-1.9%	4.0%	-1.4%	-1.2%
Horticulture	36 293	-0.8%	-1.3%	-2.0%	-0.8%	-0.8%
Wine	35 023	-0.2%	-0.1%	0.4%	-0.2%	-0.4%
Other permanent crops	20 896	-0.6%	-0.6%	-0.5%	-0.6%	-1.0%
Milk	29 141	-5.3%	-5.6%	-5.7%	-5.3%	-5.3%
Other grazing livestock	22 771	-3.9%	-3.4%	-1.4%	-3.7%	-4.2%
Granivores	23 210	-10.1%	-15.2%	-25.4%	-10.1%	-10.2%
Mixed	14 789	-5.6%	-6.1%	-3.7%	-5.6%	-5.0%
Total	**23 717**	**-2.8%**	**-3.2%**	**-1.4%**	**-2.8%**	**-2.8%**

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

The income of milk farms would decrease between -5.3% and -5.7%, depending on the option. This is mainly caused by a higher cost of greening for this farm type: € 2 117/milk farm compared to € 1 042/farm on average for the EU-27 (options 1, 4 and 5). Even though the greening payment would compensate for the cost, in comparison

with the basis without greening requirements and with the same total mount of direct payments, the income would decrease. Moreover, the indirect market effects would not be favourable on average for milk farms: the low milk price increase would not compensate the increases in inputs prices.

Mixed farms would have their income decreasing by -3.7% to -6.1%, depending on the option. It is driven by the cost of greening (€ 1 169/mixed farm), a modest positive market impact and a relatively lower level of income (€ 14 789/AWU in comparison with € 23 717/AWU for all types), which makes any change relatively higher than for other farm types.

For other grazing livestock and especially field crops farms, the positive market effects compensate a higher share of the greening cost, allowing lowest decreases in income. In option 3, the higher rate of ecological set-aside would even create cereals and crops price increases allowing to obtain an increase in income for field crops farms. But as highlighted before, this would mean higher prices for feed, driving significant drop in income for livestock sectors, especially granivores.

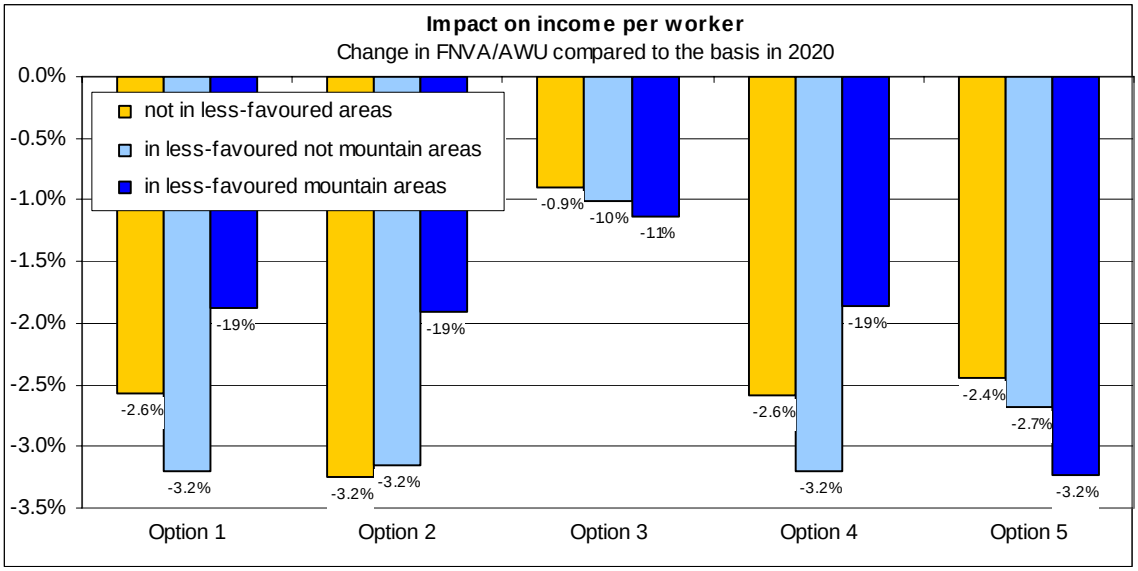
The impact on income is more moderate for wine farms, other permanent crops and horticulture farms, because the cost of greening is lower for them (€ 254/wine farm, € 154/other permanent crops farm and € 153/horticulture farm).

5.4. Analysis by LFA

On average for the EU-27, the impact of greening on income would vary between -3.2% and -0.9% depending on the LFA class and the option (Figure 11 and Table 17).

It can be noticed that, except for options 3 and 5, the impact on income for LFA Mountain is more attenuated than for the other classes. This is mainly thanks to a lower cost for greening: it is € 576/farm in LFA Mountain and € 1045/farm in not LFA (for options 1, 4 and 5). In LFA Mountain, the opportunity cost to maintain permanent pasture is indeed much lower than in other areas (there is often no alternative) and farms in LFA may respect already the other greening requirements. In option 3, the impact is slightly bigger for LFA Mountains because they do not benefit from as much positive market impacts as in other areas (they produce less cereals and more milk, sheep and goat with less advantageous developments).

Figure 11



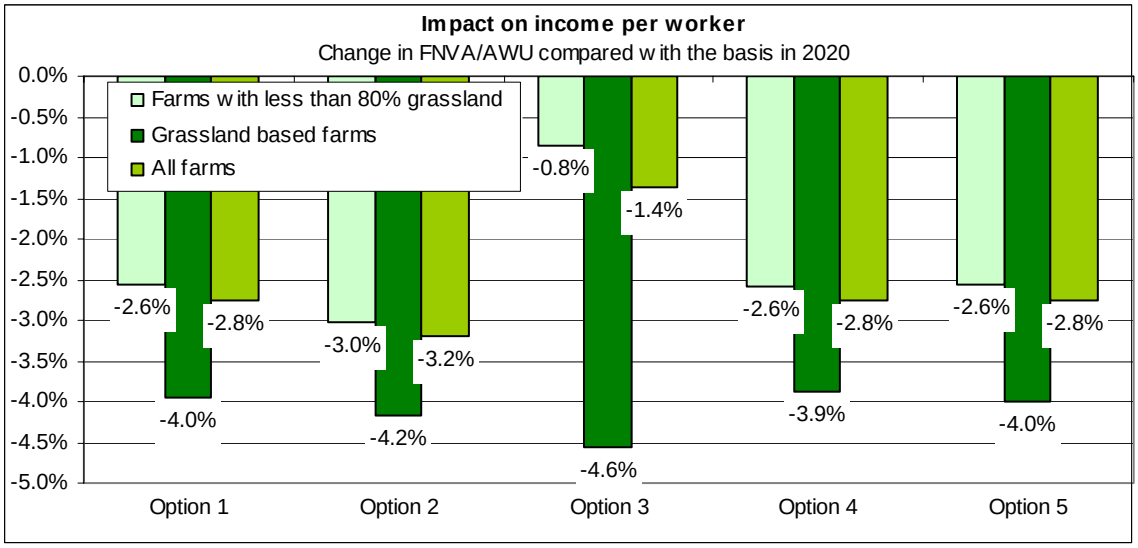
Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

In option 5, farm income is negatively impacted in LFA Mountain mainly because of the decrease in the total amount of direct payments in the "Minimum 90% and objective criteria" scenario than in the "MFF DP distribution".

5.5. Grassland-based farms

Grassland-based farms, where temporary, permanent grassland and rough grazing represent more than 80% of the utilised agricultural area, would suffer relatively more than other farms (Figure 12). Their income would decrease between -3.9% and -4.6%, depending on the option. This is not due to the cost of greening, which is similar in the two classes of farms (around € 1 034/grass-based farms and € 1 042/other farm, respectively in options 1, 4 and 5). This is mainly driven by the different market impacts (see Table 18 in annex). Grassland-based farms are mainly milk and other grazing livestock farms, which are relatively more affected than field crops and permanent crops, which constitute the bulk of farms with less than 80% of grassland. It should be underlined that to select grassland-based farms, temporary grass, i.e. grassland grown for less than five years on arable land, is also taken into account.

Figure 12



Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

The cost of greening increases for all farms in options 2 and 3, only slightly for grassland based farms but much more for the other farms.

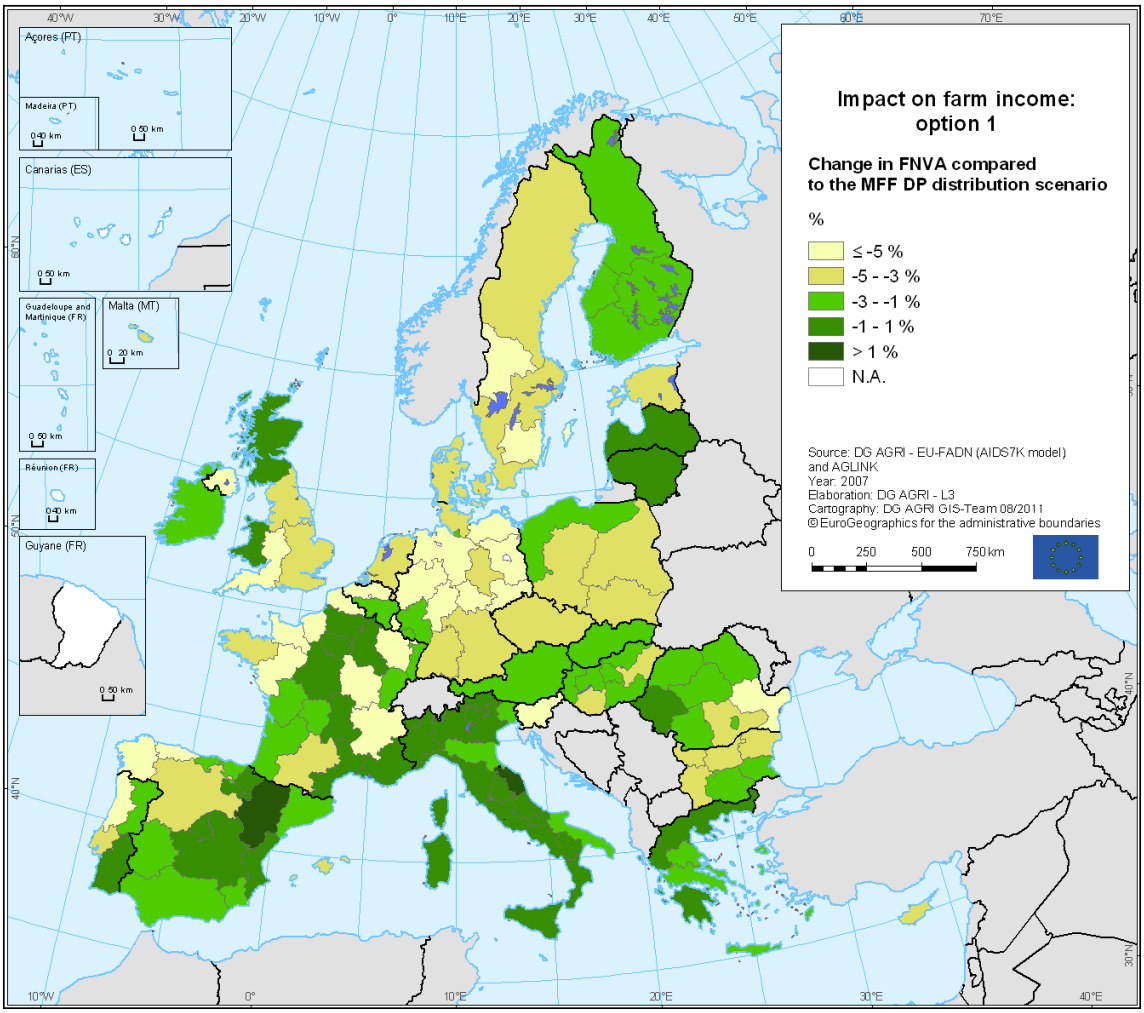
Therefore, for grassland based farms, the higher drops of income in options 2 and 3, in comparisons with option 1, are coming from the increasing negative market effect. For the other farms, the market effect is positive but does not totally offset the significant increase of the costs of greening, in particular for option 2. Option 2 is then the worst option as regards farm income for this type of farms.

5.6. Analysis by regions

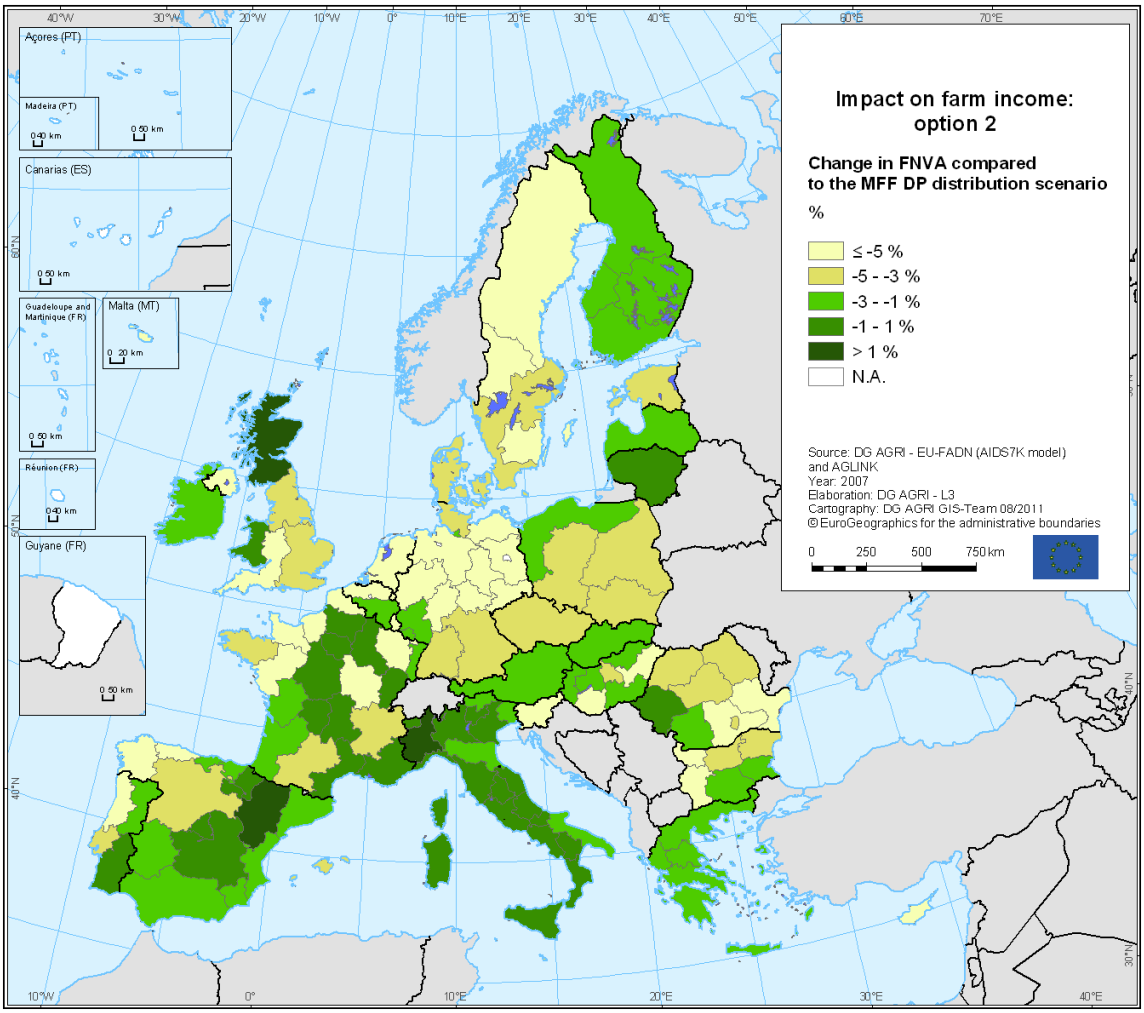
The following maps illustrate the diversity of impact in EU regions. Within one Member State, the impact can be significantly negative in some regions and positive in others.

For example in Spain, the impact of the first option of greening goes from -14% in *Asturias* to +3% in *Aragon* (Map 8). In *Asturias*, the negative impact is driven by the high total greening cost (Map 5) coming mainly from the permanent grassland requirement (Map 4) and the indirect market effects which are not favourable for milk and other grazing livestock farms (main activities in the region). In *Aragon*, greening cost is relatively low and the region is more diversified in terms of agricultural activities, especially fieldcrops, horticulture, wine, other permanent crops, which benefit from better market effects (see chapter 5.3). In option 1, the most negative impacts are observed in *Basse-Normandie*, *Lorraine*, *England-West*, *Northern Ireland*, *Entre Douro e Minho/Beira litoral*, *Slovenia* and *Asturias*. In general, the opportunity cost to maintain permanent grassland plays a major role, combined with disadvantageous market effects.

Map 8: Impact of greening on farm income – option 1

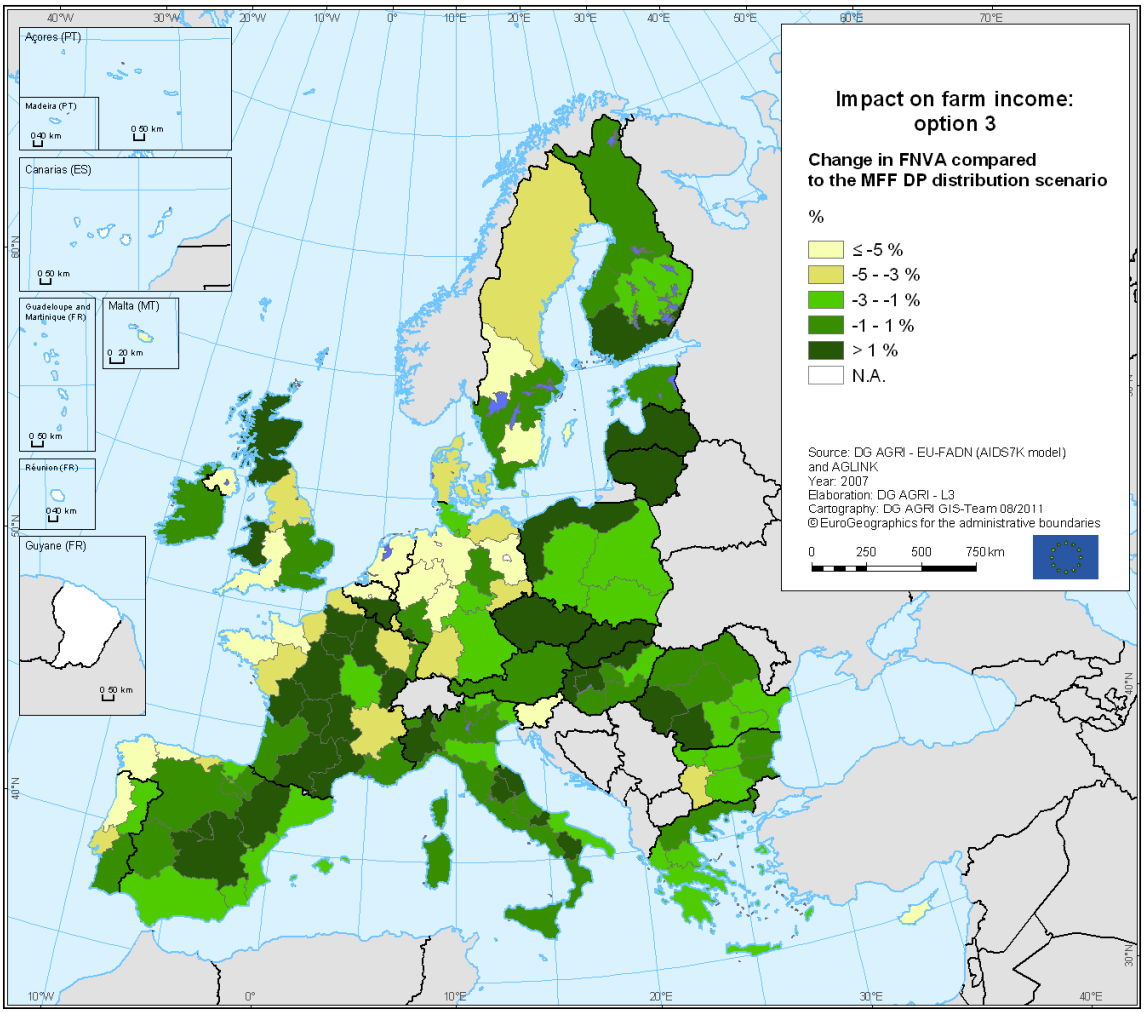


Map 9: Impact of greening on farm income – option 2



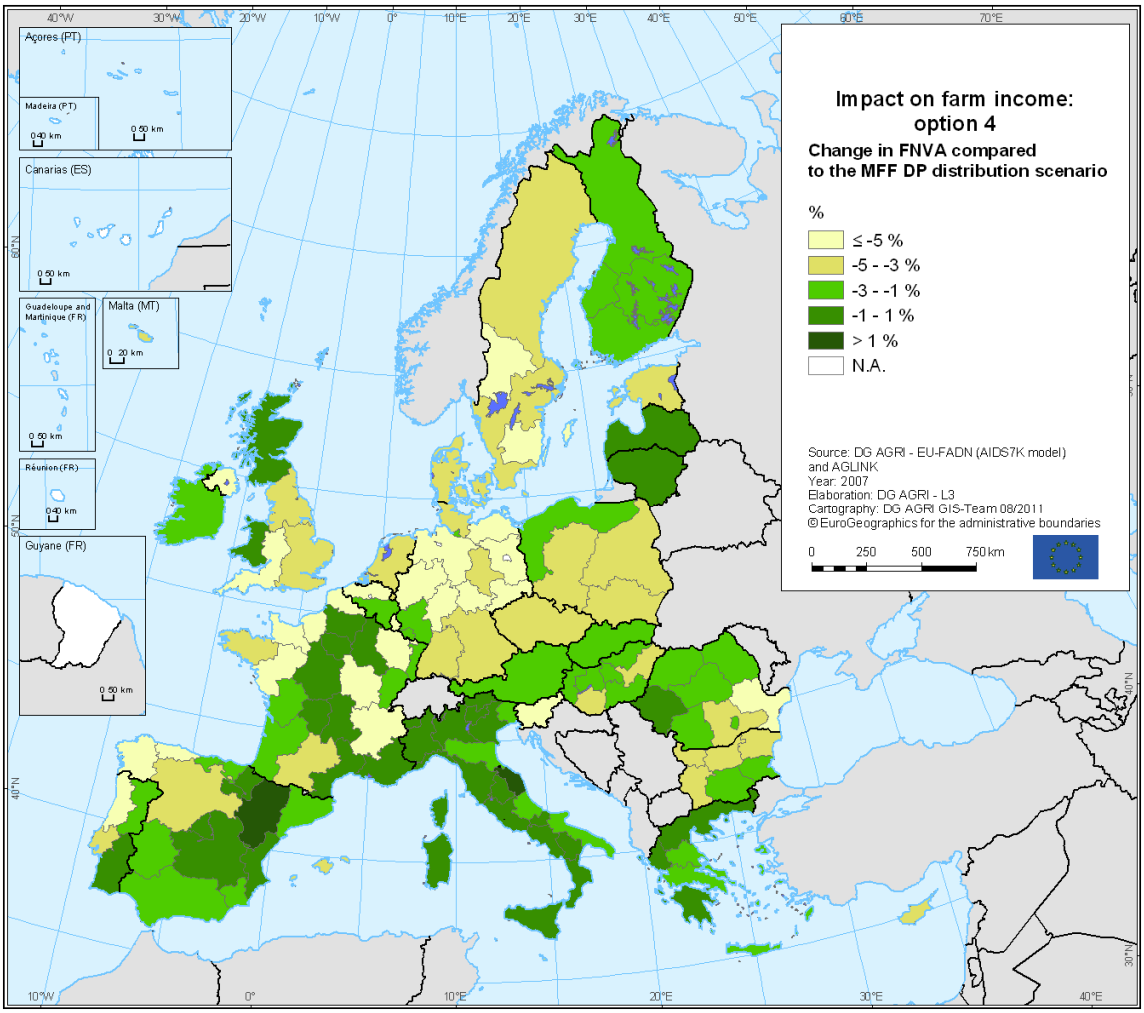
The picture in option 2, more demanding in terms of crop diversification, does not change much in comparison with option 1. Some regions are better off (like *Scotland* and *Limousin*), because they are less concerned by crop diversification (arable crops are not major production), and thanks to advantageous market developments driven by the indirect effects of the implementation of crop diversification such as beef price increases (Map 9). But in general regions switch to a more negative impact (*Entre Douro e Minho/Beira litoral*, the Netherlands, *Niedersachsen*, *Sachsen-Anhalt*, northern Romanian regions and northern Greek regions).

Map 10: Impact of greening on farm income – option 3



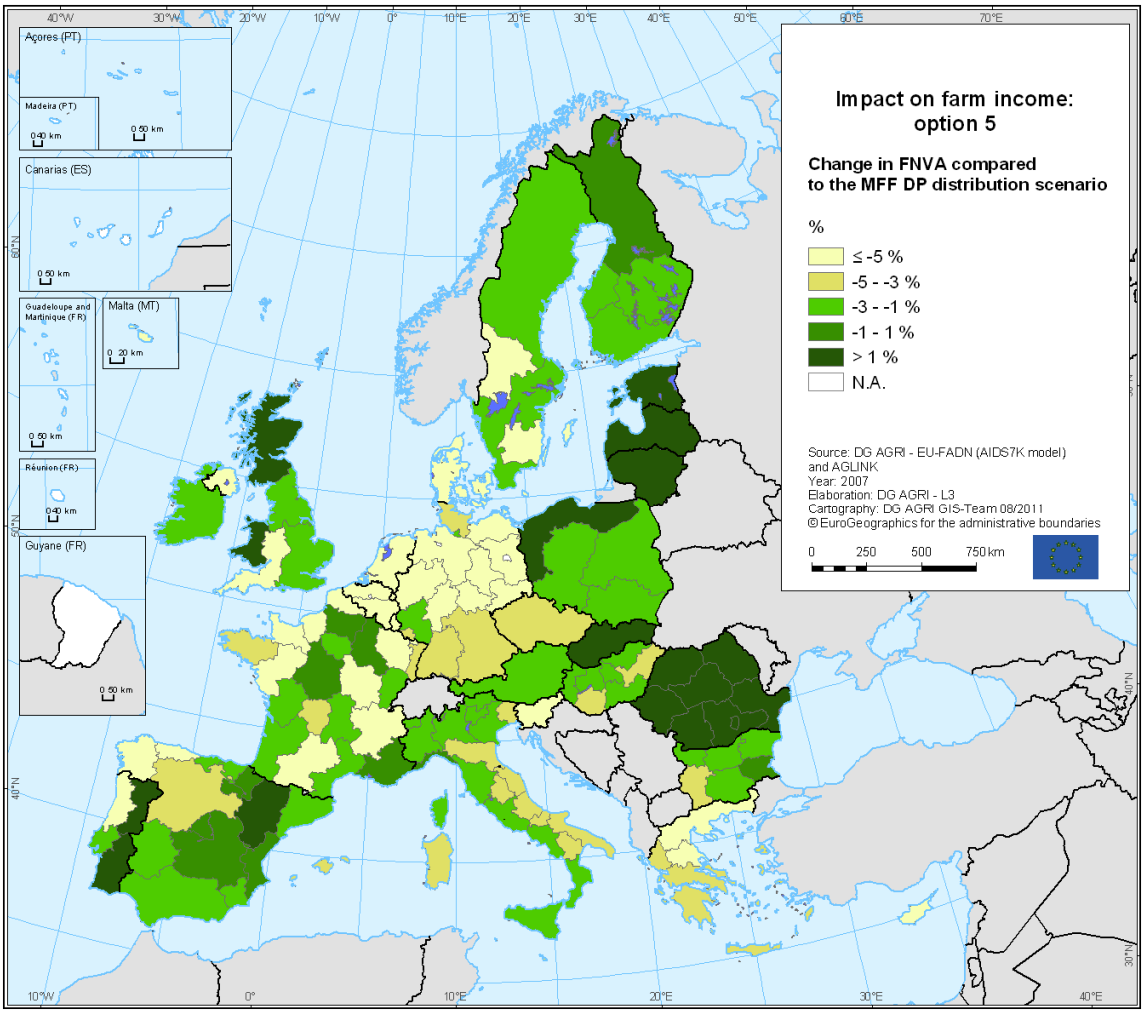
In option 3, although more demanding in terms of ecological set-aside, the impact is in general less negative than in option 1, with some regions even benefiting from the measure (for example the Center and North of France, *Mecklenburg-Vorpommern*, *Castilla-León*, *Sud-Vest* in Romania, Eastern regions of Hungary, the Czech republic, Slovakia, *Etela-Suomi* in southern Finland etc.) (Map 10). This is thanks to increased output prices generated by a higher rate of set-aside. But it is not systematic: the impact is for example more negative for *Bretagne* (France) and the Netherlands.

Map 11: Impact of greening on farm income – option 4



As explained before (see chapter 5.1), the impacts on income of options 1 and 4 are the same since the definition of the greening measures is the same (only the proportion of budget dedicated to the greening changes), and therefore the cost for the greening and the market impacts are the same. The only difference is the allocation of the direct payments to each component. Therefore Map 11 is identical to the one corresponding to option 1.

Map 12: Impact of greening on farm income – option 5



For option 5, the differences of impacts in comparison with option 1 come from the different distribution of direct payments between the two options: MFF DP distribution in option 1 and Minimum 90% and objective criteria in option 5. It leads to significant increases of income in Baltic countries, *Alentejo e Algarve* and *Tras-os-Montes/Beira interior* in Portugal, southern regions in Romania and Slovakia (Map 12). On the contrary, income decreases further in particular in eastern side of Italy, Greece, *Wallonie* (Belgium) and Denmark.

Annexes

Annex 1 – Methodology on the estimate of costs of greening measures

Crop diversification

Summary methodology

It is assumed that additional costs arise in those farms where a single crop covers more than 70% (in option 2 the maximum is 50%) of the arable land as farms would have to cultivate other crops on this area. Additional costs or loss of income are assumed to be equal to the difference of the farm individual gross margin of arable land and the average regional gross margin of field crop farms whose set of arable cultures is diversified. In the cases where the farm individual gross margin is lower than this regional average no additional costs are assumed.

Ecological set-aside

Summary methodology

Additional costs for the implementation of the measure arise only if the amount of fallow land on the farm is lower than the area to be set-aside (5% of the PEA in option 1, 2, 4 and 5 and 10% in option 3). For each additional ha it is assumed that the costs equal 2/3 of the farm individual gross margin of arable land. The idea is that the farmers will set-aside the less productive areas (with the assumption that they reach 2/3 of the average farm gross margin).

Green cover

Summary methodology

The costs for the implementation of green cover are estimated based on assumptions on the affected area and the costs per ha. It was assumed that green cover would have to be applied on 70% of the arable land less the area of ecological set-aside + the area of permanent crops. As there is a no information on green cover available in the FADN farm accounts, several assumptions had to be made: first, it was assumed that a large part of the area covered by cereals is covered during the winter, as in most cases a large share of the cereals are winter crops. As in the FADN it is not differentiated between winter and summer crops it was assumed that on each farm the share is equal to the national figures published by EUROSTAT. Furthermore, it was assumed that 30% of the area of permanent crops is already covered. The costs per ha of land to be additionally covered are assumed to be equal to 50€.

Preservation of permanent grassland

Summary methodology

At farm level, it is assumed that:

– there is no opportunity cost, and therefore no economic cost, of the measure in farms where there are less than 5% of arable land. Indeed, if there is no arable land on the farm, it means that at local level, the natural conditions probably do not allow to convert permanent grassland into arable land. Moreover, if there is no arable land on the farm, to convert permanent grassland in arable land would have a high "entry cost", because),

– there is no opportunity where sheep and goats represent more than 70% of grazing livestock units,

– there is no opportunity for rough grazing and for 10% of permanent pastures.

Otherwise, the opportunity cost is estimated to be 2/3 of the difference in gross margins (if positive) between permanent grassland based systems and alternative systems at regional level. Only a fraction of the difference is kept in order to take into account the investment that the farmer needs to do to convert grassland into arable land. The opportunity cost is therefore less than the difference in gross margins that assume identical level of fixed costs. Moreover the newly converted grassland would probably not have a level of productivity as high as land already in fodder crops (the most productive areas have been converted into arable crops before). Therefore the gross margin of the newly converted grassland is probably lower. If the difference is negative, the opportunity cost is null.

The existing CAP limit of 10% on ploughing up permanent grassland, applied at MS or regional level, was not taken into account in the calculations and there is no assumption concerning possible flexibility provided to individual farmers on ploughing up permanent grassland.

The regional opportunity cost is based on the difference in gross margins (if positive) between permanent grassland based systems and alternative systems in the region considered. If the difference is negative, the opportunity cost is null. European regions have been divided into three groups:

- Regions for which there are enough specialised cattle farms in both systems "permanent grass-based" and "forage crops-based". In those regions, it is considered that the first alternative to cattle production based on grass is to continue production with adapting the feeding systems by ploughing the grassland to produce forage crops. The gross margins of cattle production (milk and beef) per hectare of forage area are compared between the two systems (permanent pasture and other fodders), where possible with differentiating by Less Favoured Area (LFA) status. Those regions represent on average 84% of total permanent pasture in the EU-27 and 54% of rough grazing.

- Regions where permanent pasture is not relevant or where there is no alternative identified. Those regions cover around 3% of total permanent pasture and 9% of rough grazing.

- In the remaining regions, where cattle production takes place in mixed cropping-livestock farms, it is assumed that the alternative is to give up cattle production and to specialise towards field cropping. The farm gross margins per hectare of utilised agricultural area in mixed and specialised cropping farms are compared. Those regions represent on average 13% of total permanent pasture in the EU-27 and 36% of rough grazing.

The methodology applied is detailed below for each group of regions. For all groups average FADN data 2005-2006-2007 have been used.

For the **first group of regions**, specialised cattle farms[10] have been classified into 4 categories:

(1) Farms with very low fodder area (less than 5 ha): to exclude very intensive farms and very extensive farms based mainly on common land.

(2) Farms based on permanent pasture: farms not in (1), where grassland (temporary grassland + permanent grassland + rough grazing) represents more than 75% of fodder area, where permanent pasture and rough grazing represent more than 50% of fodder area and where permanent pasture is greater than 0.

(3) Farms based on rough grazing: farms not in (1), where grassland (temporary grassland + permanent grassland + rough grazing) represents more than 75% of fodder area, where permanent pasture and rough grazing represent more than 50% of fodder area and where permanent pasture = 0.

(4) Farms based on other fodder: farms not in the previous categories.

Using the model to allocate cost for milk and beef, the gross margins[11] for milk and beef have been calculated for categories (2) and (4) by region and when possible by distinguishing by LFA area. The difference between the gross margin per hectare in category (4) and the one in category (2) is supposed to be the basis to estimate the regional opportunity cost for permanent pasture.

The **second group of regions** was identified applying a series of criteria:

– regions where there is no permanent pasture

– or where the share of grassland in total agricultural area is greater than 90%

– or where the share of rough grazing in grassland is greater than 90%.

In the **remaining regions**, farms have been classified into 4 categories:

(1) Field crops: farms in the types of farming (TF) 'specialist COP' or 'general field cropping' (TF 13 and 14),

(2) Grazing mixed: when the type of farming is in grazing livestock and mixed livestock farms (TF 41, 42, 43, 44, 71, 81), when fodder area is strictly positive, when permanent pasture is strictly positive, and when permanent pasture plus rough grazing represent more than 50% of fodder area,

(3) Other grazing: when the type of farming is in grazing livestock and mixed livestock farms (TF 41, 42, 43, 44, 71, 81), and not in the previous class

(4) Other: other types of farming

In those regions, we compared the farm gross margin (total output minus intermediate consumption) minus wages paid per hectare of utilised agriculture area in the categories (1) and (2). The basis to estimate the regional opportunity cost is supposed to be the difference in farm gross margin per ha between (1) and (2).

[10] Specialised cattle farms: farms where milk and beef represent more than 50% of the total output (value of the production).

[11] Milk and beef market margin (possible coupled payments are not included) per hectare of fodder area.

Annex 2 – Detailed results

Table 12

EU-27	MFF DP distribution	MFF DP distribution		MFF DP distribution			MFF DP distribution			MFF DP distribution			Min 90% and obj. crit.		
	Basis	1		2			3			4			5		
	-	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF		30% DP, 50% diver, 5% set-as, 70% GC, PP, OF			30% DP, 70% diver, 10% set-as, 70% GC, PP, OF			25% DP, 70% diver, 5% set-as, 70% GC, PP, OF			30% DP, 70% diver, 5% set-as, 70% GC, PP, OF		
	2020	2020	/Basis	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1
MARKET															
Output - €/farm	66 678	67 311	*1%*	67 604	*1%*	*0%*	69 069	*4%*	*3%*	67 311	*1%*	*0%*	67 311	*1%*	*0%*
DIRECT PAYMENTS (DP) AND SUBSIDIES															
Total Pillar 1 payments - €/farm	8 382	8 381	*0%*	8 381	*0%*	*0%*	8 381	*0%*	*0%*	8 381	*0%*	*0%*	8 381	*0%*	*0%*
Basic rate / decoupled - €/farm	8 073	5 650	*-30%*	5 650	*-30%*	*0%*	5 650	*-30%*	*0%*	6 054	*-25%*	*7%*	5 650	*-30%*	*0%*
Coupled payments - €/farm	309	231	*-25%*	231	*-25%*	*0%*	231	*-25%*	*0%*	244	*-21%*	*6%*	231	*-25%*	*0%*
Greening - €/farm	0	2 499	-	2 499	-	*0%*	2 499	-	*0%*	2 083	-	*-17%*	2 499	-	*0%*
Natural handicap - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
Small beneficiaries - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
Total Pillar 1 and 2 payments - €/farm	10 035	10 035	*0%*	10 035	*0%*	*0%*	10 035	*0%*	*0%*	10 035	*0%*	*0%*	10 034	*0%*	*0%*
Amounts transfered to Pillar II or capped - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
COSTS															
Total operating costs, depreciation and taxes	45 729	47 215	*3%*	47 643	*4%*	*1%*	48 539	*6%*	*3%*	47 215	*3%*	*0%*	47 215	*3%*	*0%*
Intermediate consumptions - €/farm	38 864	39 309	*1%*	39 550	*2%*	*1%*	40 394	*4%*	*3%*	39 309	*1%*	*0%*	39 309	*1%*	*0%*
Depreciation and taxes - €/farm	8 030	8 030	*0%*	8 030	*0%*	*0%*	8 030	*0%*	*0%*	8 030	*0%*	*0%*	8 030	*0%*	*0%*
Estimated costs for greening - €/farm	0	1 041	-	1 228	-	*18%*	1 280	-	*23%*	1 042	-	*0%*	1 042	-	*0%*
Total external factors, own capital and investment aids	15 255	15 255	*0%*	15 255	*0%*	*0%*	15 255	*0%*	*0%*	15 255	*0%*	*0%*	15 256	*0%*	*0%*
External factor costs - €/farm	10 220	10 221	*0%*	10 221	*0%*	*0%*	10 221	*0%*	*0%*	10 221	*0%*	*0%*	10 217	*0%*	*0%*
Own capital - €/farm	5 030	5 030	*0%*	5 030	*0%*	*0%*	5 030	*0%*	*0%*	5 030	*0%*	*0%*	5 034	*0%*	*0%*
INCOME ESTIMATORS															
Farm Net Value Added - €/farm	30 984	30 130	*-3%*	29 995	*-3%*	*0%*	30 564	*-1%*	*1%*	30 130	*-3%*	*0%*	30 130	*-3%*	*0%*
Farm Net Value Added per AWU - €/AWU	23 717	23 064	*-3%*	22 960	*-3%*	*0%*	23 396	*-1%*	*1%*	23 063	*-3%*	*0%*	23 063	*-3%*	*0%*
Remuneration for family labour - €/farm	15 729	14 875	*-5%*	14 739	*-6%*	*-1%*	15 309	*-3%*	*3%*	14 874	*-5%*	*0%*	14 873	*-5%*	*0%*
Remuneration for family labour - €/FWU	15 535	14 753	*-5%*	14 626	*-6%*	*-1%*	15 109	*-3%*	*2%*	14 753	*-5%*	*0%*	14 712	*-5%*	*0%*
Share of Pillar 1 payments in FNVA	27%	28%	*3%*	28%	*3%*	*0%*	27%	*1%*	*-1%*	28%	*3%*	*0%*	28%	*3%*	*0%*

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

Table 13

EU15	MFF DP distribution	MFF DP distribution		MFF DP distribution			MFF DP distribution			MFF DP distribution			Min 90% and obj. crit.		
	Basis	1		2			3			4			5		
	-	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF		30% DP, 50% diver, 5% set-as, 70% GC, PP, OF			30% DP, 70% diver, 10% set-as, 70% GC, PP, OF			25% DP, 70% diver, 5% set-as, 70% GC, PP, OF			30% DP, 70% diver, 5% set-as, 70% GC, PP, OF		
	2020	2020	/Basis	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1
MARKET															
Output - €/farm	93 890	94 745	1%	95 181	1%	0%	97 053	3%	2%	94 745	1%	0%	94 745	1%	0%
DIRECT PAYMENTS (DP) AND SUBSIDIES															
Total Pillar 1 payments - €/farm	11 284	11 284	0%	11 284	0%	0%	11 284	0%	0%	11 284	0%	0%	10 917	-3%	-3%
Basic rate / decoupled - €/farm	10 754	7 527	-30%	7 527	-30%	0%	7 527	-30%	0%	8 065	-25%	7%	7 271	-32%	-3%
Coupled payments - €/farm	531	397	-25%	397	-25%	0%	397	-25%	0%	419	-21%	6%	397	-25%	0%
Greening - €/farm	0	3 359	-	3 359	-	0%	3 359	-	0%	2 800	-	-17%	3 250	-	-3%
Natural handicap - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
Small beneficiaries - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
Total Pillar 1 and 2 payments - €/farm	13 513	13 512	0%	13 512	0%	0%	13 512	0%	0%	13 512	0%	0%	13 146	-3%	-3%
Amounts transfered to Pillar II or capped - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
COSTS															
Total operating costs, depreciation and taxes	63 878	65 897	3%	66 499	4%	1%	67 731	6%	3%	65 898	3%	0%	65 898	3%	0%
Intermediate consumptions - €/farm	54 056	54 710	1%	55 070	2%	1%	56 273	4%	3%	54 710	1%	0%	54 710	1%	0%
Depreciation and taxes - €/farm	11 464	11 464	0%	11 464	0%	0%	11 464	0%	0%	11 464	0%	0%	11 464	0%	0%
Estimated costs for greening - €/farm	0	1 366	-	1 608	-	18%	1 637	-	20%	1 366	-	0%	1 366	-	0%
Total external factors, own capital and investment aids	22 287	22 287	0%	22 287	0%	0%	22 287	0%	0%	22 287	0%	0%	22 218	0%	0%
External factor costs - €/farm	15 054	15 056	0%	15 056	0%	0%	15 056	0%	0%	15 056	0%	0%	15 015	0%	0%
Own capital - €/farm	7 189	7 188	0%	7 188	0%	0%	7 188	0%	0%	7 188	0%	0%	7 159	0%	0%
INCOME ESTIMATORS															
Farm Net Value Added - €/farm	43 525	42 360	-3%	42 193	-3%	0%	42 834	-2%	1%	42 359	-3%	0%	41 993	-4%	-1%
Farm Net Value Added per AWU - €/AWU	34 058	33 146	-3%	33 016	-3%	0%	33 517	-2%	1%	33 146	-3%	0%	32 859	-4%	-1%
Remuneration for family labour - €/farm	21 237	20 072	-5%	19 906	-6%	-1%	20 547	-3%	2%	20 072	-5%	0%	19 775	-7%	-1%
Remuneration for family labour - €/FWU	21 810	20 688	-5%	20 522	-6%	-1%	21 138	-3%	2%	20 688	-5%	0%	20 400	-6%	-1%
Share of Pillar 1 payments in FNVA	26%	27%	3%	27%	3%	0%	26%	2%	-1%	27%	3%	0%	26%	0%	-2%

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

Table 14

EU12	MFF DP distribution	MFF DP distribution		MFF DP distribution			MFF DP distribution			MFF DP distribution			Min 90% and obj. crit.		
	Basis	1		2			3			4			5		
	-	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF		30% DP, 50% diver, 5% set-as, 70% GC, PP, OF			30% DP, 70% diver, 10% set-as, 70% GC, PP, OF			25% DP, 70% diver, 5% set-as, 70% GC, PP, OF			30% DP, 70% diver, 5% set-as, 70% GC, PP, OF		
	2020	2020	/Basis	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1	2020	/Basis	/Scenario 1
MARKET															
Output - €/farm	29 202	29 528	1%	29 626	1%	0%	30 529	5%	3%	29 528	1%	0%	29 528	1%	0%
DIRECT PAYMENTS (DP) AND SUBSIDIES															
Total Pillar 1 payments - €/farm	4 384	4 383	0%	4 383	0%	0%	4 383	0%	0%	4 383	0%	0%	4 887	11%	12%
Basic rate / decoupled - €/farm	4 380	3 065	-30%	3 065	-30%	0%	3 065	-30%	0%	3 284	-25%	7%	3 418	-22%	12%
Coupled payments - €/farm	4	3	-30%	3	-30%	0%	3	-30%	0%	3	-25%	7%	3	-30%	0%
Greening - €/farm	0	1 315	-	1 315	-	0%	1 315	-	0%	1 096	-	-17%	1 466	-	12%
Natural handicap - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
Small beneficiaries - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
Total Pillar 1 and 2 payments - €/farm	5 246	5 245	0%	5 245	0%	0%	5 245	0%	0%	5 245	0%	0%	5 749	10%	10%
Amounts transfered to Pillar II or capped - €/farm	0	0	-	0	-	-	0	-	-	0	-	-	0	-	-
COSTS															
Total operating costs, depreciation and taxes	20 736	21 487	4%	21 676	5%	1%	22 110	7%	3%	21 487	4%	0%	21 487	4%	0%
Intermediate consumptions - €/farm	17 941	18 097	1%	18 177	1%	0%	18 526	3%	2%	18 097	1%	0%	18 097	1%	0%
Depreciation and taxes - €/farm	3 303	3 303	0%	3 303	0%	0%	3 303	0%	0%	3 303	0%	0%	3 303	0%	0%
Estimated costs for greening - €/farm	0	595	-	705	-	19%	789	-	33%	595	-	0%	595	-	0%
Total external factors, own capital and investment aids	5 571	5 571	0%	5 571	0%	0%	5 571	0%	0%	5 571	0%	0%	5 668	2%	2%
External factor costs - €/farm	3 563	3 562	0%	3 562	0%	0%	3 562	0%	0%	3 562	0%	0%	3 609	1%	1%
Own capital - €/farm	2 057	2 057	0%	2 057	0%	0%	2 057	0%	0%	2 057	0%	0%	2 108	2%	2%
INCOME ESTIMATORS															
Farm Net Value Added - €/farm	13 713	13 287	-3%	13 195	-4%	-1%	13 665	0%	3%	13 287	-3%	0%	13 791	1%	4%
Farm Net Value Added per AWU - €/AWU	10 191	9 875	-3%	9 807	-4%	-1%	10 156	0%	3%	9 875	-3%	0%	10 250	1%	4%
Remuneration for family labour - €/farm	8 142	7 716	-5%	7 624	-6%	-1%	8 094	-1%	5%	7 716	-5%	0%	8 123	0%	5%
Remuneration for family labour - €/FWU	7 206	6 875	-5%	6 799	-6%	-1%	7 105	-1%	3%	6 875	-5%	0%	7 162	-1%	4%
Share of Pillar 1 payments in FNVA	32%	33%	3%	33%	4%	1%	32%	0%	-3%	33%	3%	0%	35%	11%	7%

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

Table 15: Decomposition of the impact of greening on farm income in the market effect and the "direct payment"(*) effect – by Member States

	Market Effect of greening - per farm					DP Effect of greening (including costs of greening) - per farm					Full Effect of greening - per farm				
	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF
Belgium	-593	-1 273	-570	-593	-593	-4 448	-4 551	-5 090	-4 448	-6 509	-5 041	-5 825	-5 661	-5 683	-7 102
Bulgaria	28	-21	414	28	28	-459	-595	-633	-459	-298	-431	-616	-219	-605	-270
Cyprus	-145	-205	-478	-145	-145	-373	-475	-524	-373	-705	-518	-679	-1 002	-669	-850
Czech Republic	3 374	4 126	12 938	3 374	3 374	-9 127	-9 533	-11 620	-9 127	-9 127	-5 753	-5 408	1 318	-8 246	-5 753
Denmark	-949	-1 582	-1 167	-949	-949	-1 916	-2 411	-3 373	-1 916	-4 787	-2 865	-3 994	-4 540	-4 322	-5 736
Germany	56	-539	1 968	56	56	-4 151	-4 478	-4 906	-4 157	-5 347	-4 095	-5 017	-2 938	-4 850	-5 291
Greece	74	143	198	74	74	-226	-335	-308	-226	-670	-153	-192	-110	-234	-597
Spain	303	557	920	303	303	-893	-1 195	-1 009	-893	-822	-590	-638	-89	-706	-519
Estonia	935	1 176	3 400	935	935	-2 414	-2 597	-2 962	-2 414	7 894	-1 479	-1 420	438	-2 027	8 829
France	668	786	3 093	668	668	-2 462	-2 592	-3 002	-2 462	-3 105	-1 794	-1 806	91	-2 333	-2 437
Hungary	516	525	2 555	516	516	-1 418	-1 761	-2 178	-1 418	-1 418	-902	-1 236	378	-1 662	-902
Ireland	416	688	1 384	416	416	-1 106	-1 172	-1 181	-1 106	-1 119	-690	-484	203	-765	-703
Italy	287	617	712	287	287	-509	-879	-691	-509	-1 292	-222	-262	22	-404	-1 004
Lithuania	565	763	2 071	565	565	-636	-781	-929	-636	2 743	-71	-18	1 142	-364	3 308
Luxembourg	613	878	2 599	613	613	-4 568	-4 572	-4 857	-4 568	-4 793	-3 955	-3 694	-2 258	-4 244	-4 180
Latvia	267	324	1 096	267	267	-431	-582	-584	-431	5 585	-165	-259	512	-317	5 852
Malta	-713	-1 063	-2 357	-713	-713	-508	-813	-651	-508	-1 194	-1 221	-1 876	-3 008	-1 364	-1 907
Netherlands	-2 939	-4 817	-8 273	-2 939	-2 939	-3 809	-4 028	-4 233	-3 809	-5 103	-6 748	-8 845	-12 506	-7 172	-8 042
Austria	137	105	920	137	137	-1 125	-1 193	-1 324	-1 125	-1 125	-988	-1 087	-404	-1 187	-988
Poland	164	166	695	164	164	-687	-734	-897	-687	-370	-523	-568	-202	-733	-206
Portugal	-8	20	-42	-8	-8	-570	-774	-530	-570	348	-578	-754	-572	-538	340
Romania	72	88	328	72	72	-253	-383	-331	-253	148	-181	-295	-3	-258	220
Finland	406	587	1 604	406	406	-1 074	-1 333	-1 284	-1 074	-866	-668	-746	320	-878	-460
Sweden	434	359	2 622	434	434	-2 656	-2 792	-3 245	-2 656	-2 157	-2 222	-2 433	-623	-2 811	-1 723
Slovakia	5 669	6 842	23 029	5 669	5 669	-11 117	-11 266	-15 552	-11 117	3 234	-5 448	-4 424	7 477	-9 883	8 903
Slovenia	173	267	570	173	173	-1 321	-1 441	-1 419	-1 321	-1 538	-1 148	-1 174	-849	-1 246	-1 365
United Kingdom	673	705	3 555	673	673	-5 402	-5 768	-6 399	-5 402	-3 900	-4 729	-5 063	-2 843	-5 726	-3 227
EU-27	188	240	861	188	188	-1 042	-1 229	-1 281	-1 043	-1 043	-854	-989	-420	-1 093	-854

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

(*) it corresponds only to the cost of greening except for option 5 where there is another distribution of direct payments than in the base scenario

Table 16: Decomposition of the impact of greening on farm income in the market effect and the "direct payment"(*) effect – by Type of Farming

	Market Effect of greening - per farm					DP Effect of greening (including costs of greening) - per farm					Full Effect of greening - per farm				
	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF
Fieldcrops	782	1 083	2 897	782	782	-1 184	-1 657	-1 720	-1 195	-1 126	-402	-574	1 178	-413	-344
Horticulture	-540	-896	-1 544	-540	-540	-149	-240	-215	-151	-181	-689	-1 136	-1 759	-691	-722
Wine	120	189	433	120	120	-206	-226	-242	-216	-356	-86	-36	191	-96	-236
Other permanent crops	7	12	38	7	7	-138	-161	-153	-142	-246	-131	-149	-116	-135	-239
Milk	-107	-173	-203	-107	-107	-2 072	-2 134	-2 154	-2 080	-2 086	-2 180	-2 306	-2 357	-2 187	-2 194
Other grazing livestock	332	526	1 114	332	332	-1 468	-1 517	-1 523	-1 428	-1 560	-1 136	-992	-409	-1 096	-1 228
Granivores	-2 938	-4 489	-8 004	-2 938	-2 938	-573	-795	-856	-577	-611	-3 511	-5 285	-8 859	-3 514	-3 549
Mixed	118	113	714	118	118	-1 182	-1 268	-1 422	-1 180	-1 071	-1 064	-1 156	-708	-1 063	-954
Total	188	240	861	188	188	-1 042	-1 229	-1 281	-1 043	-1 043	-854	-989	-420	-854	-854

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

(*) it corresponds only to the cost of greening except for option 5 where there is another distribution of direct payments than in the base scenario

Table 17: Decomposition of the impact of greening on farm income in the market effect and the "direct payment"(*) effect – by LFA

	Market Effect of greening - per farm					DP Effect of greening (including costs of greening) - per farm					Full Effect of greening - per farm				
	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF
not in less-favoured areas	230	281	1 067	230	230	-1 025	-1 286	-1 342	-1 029	-986	-795	-1 005	-276	-799	-756
in less-favoured not mountain areas	270	388	1 057	270	270	-1 166	-1 272	-1 339	-1 163	-1 020	-896	-884	-282	-893	-750
in less-favoured mountain areas	100	167	371	100	100	-622	-697	-684	-615	-991	-522	-530	-313	-514	-891
Total	188	240	861	188	188	-1 042	-1 229	-1 281	-1 043	-1 043	-854	-989	-420	-854	-854

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

(*) it corresponds only to the cost of greening except for option 5 where there is another distribution of direct payments than in the base scenario

Table 18: Decomposition of the impact of greening on farm income in the market effect and the "direct payment"(*) effect – for grassland based farms

	Market Effect of greening - per farm					DP Effect of greening (including costs of greening) - per farm					Full Effect of greening - per farm				
	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.	MFF DP distribution	MFF DP distribution	MFF DP distribution	MFF DP distribution	Min 90% and obj. crit.
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 50% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 10% set-as, 70% GC, PP, OF	25% DP, 70% diver, 5% set-as, 70% GC, PP, OF	30% DP, 70% diver, 5% set-as, 70% GC, PP, OF
Farms with less than 80% grassland	234	300	1 036	234	234	-1 021	-1 233	-1 295	-1 025	-1 020	-787	-932	-259	-791	-785
Grassland based farms	-115	-157	-295	-115	-115	-1 182	-1 206	-1 191	-1 156	-1 196	-1 297	-1 364	-1 486	-1 270	-1 311
All farms	188	240	861	188	188	-1 042	-1 229	-1 281	-1 043	-1 043	-854	-989	-420	-854	-854

Source: DG AGRI L3 calculations based on EU FADN, the AIDS7K model and AGLINK COSIMO.

(*) it corresponds only to the cost of greening except for option 5 where there is another distribution of direct payments than in the base scenario