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Invitation to tender No AGRI/2000/evaluation/1

Evaluation of the Community aid scheme for forestry measures in agriculture of Regulation No 2080/92

FINAL REPORT

Coordinator : Institute for Forestry Development

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Following the presentation of this report during the Standing Forestry Committee on 1 October 2001, the authors deemed necessary to bear in mind the remarks provided by the national experts and add some supplementary information in order to clarify some observations or to update recent evolutions in some national programs.
The recommendations and conclusions only apply to the authors of this report and do not necessarily reflect the opinion of the European Commission.

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SUMMARY

In 1992, measures accompanying the common agricultural policy (the CAP) were adopted to benefit the environment, early retirement and silviculture. These measures aimed to support the expected processes of change, and to mitigate some of the effects deemed to be disadvantageous for farmers.

Council Regulation No 2080/92 of 30 June 1992 therefore introduced a system of Community aid for forestry measures in agriculture, with 4 main objectives :

- ✔ To accompany the changes to be introduced under market organisations rules,
- ✔ To contribute towards an eventual improvement in forest resources,
- ✔ To contribute towards forms of countryside management more compatible with environmental balance,
- ✔ To combat the greenhouse effect and absorb carbon dioxide.

To meet these 4 objectives, the instruments already in place were reinforced, in order to be more effective, and the following were therefore introduced :

- ✔ aid for **afforestation**, intended to promote an alternative use of the agricultural land :
  - aid for investment, in order to create plantations
  - premium for maintaining afforestation
  - compensatory premium for loss of income
- ✔ aid for **improving existing afforestation** (enabling farmers to develop their forestry activities).

  At the same time, the Member States were obliged to draw up national or regional multiannual programmes defining how this aid was to be apportioned.

The Directorate-General for Agriculture wished to evaluate the impact of this system of aid set up for the 15 countries of the European Union for each of the objectives listed and to assess how the national and regional programmes contributed to their implementation.
Therefore judgement criteria and indicators were defined for each of them, and the latter were quantified from the data regarding the European situation collected from the Commission and in 8 target countries representing 96% of the area afforested due to Regulation 2080.
In addition to the national and European statistics, information was also obtained therefore from maintenance work carried out for 171 beneficiaries carried out by decision-makers and national or regional experts in these 8 countries.
The data was collected and processed in each of these countries by a national evaluator.

Nevertheless, the complexity and breadth of the matters dealt with, the many sources of data, the absence of monitoring tools common to the Member States, the sometimes patchy nature of the official data and finally the difficulty of assessing results obtained only 6 years ago (which is very little in view of the length of forestry cycles), limit the scope of the analyses and conclusions of this evaluation.

Regulation 2080 offered the Member States a compulsory framework within which each had the freedom to show preference for certain objectives and certain beneficiaries, and to adjust the aid according to its strategy and financial means.
This adjustment according to national contexts and priorities was all the more important because Regulation 2080 has sometimes been seen as an « all-purpose » regulation, listing many objectives and different and sometimes even contradictory levels.
Indeed, a large range of projects can be seen, of relatively little significance at European level, apart from a few exceptions, but which are often innovative, varied and which create a very positive dynamic, whether this is from the point of view of rural development, forestry resources or the environment.

Although it has not been possible to show evidence of good practice exactly, and in spite of the fact that the Regulation, initially planned for a Europe with twelve Member States, was not necessarily suitable for

a Europe with fifteen Member States, the overall impact of these projects, in terms of their relatively low cost to the budget at Community level, can be considered to be positive.

Projects and key figures

One million hectares of agricultural land were afforested between 1994 and 1999 owing to Regulation 2080.

As far as the beneficiaries are concerned, a rapid review of the characteristics of the operations carried out reveals a typical picture : the « 2080 forester » is a Mediterranean farmer, more Spanish than anything else, over 50 years of age, who has been growing 56.8% broadleaf species, preferably *Quercus suber or* Quercus *ilex*, on an area of 8 hectares very probably devoted to low productivity grazing.
He did not do the work himself (even less so if the area he planted was quite large in size), but the costs of the operation were virtually covered by the aid if the afforestation was in an Objective 1 region. The compensatory premium for lost income brought him almost 20% of his gross farm income.
As far as the countries are concerned, one of the ends of the range of operations can be seen in Spain and Ireland which have had ambitious afforestation programmes, with a strong impact, partly connected with the higher Community part-financing in an Objective 1 region ; these two countries have to some extent played the role of « pillars» of the application of the Regulation, hence taking on the risk of environmental counterparts which may perhaps be less positive.
At the other end of the range, Germany, where the impact of the Regulation in terms of afforestation has been considerably more limited, has developed many operations for improving the environment or enhancing the rural heritage.

Contribution of Regulation 2080 to rural development

Overall this contribution appears to us to be significant and positive, and Regulation 2080 has fully played its expected role accompanying the reform of the common agricultural policy.

Although it is clear that the impact of the Regulation on the maintenance or creation of income and employment has been particularly prominent in the countries of southern Europe, all the Member States have in fact benefited, owing to Regulation 2080, from very favourable effects along the lines of diversification of agricultural activities and the development of socio-economic activities connected with afforestation.
As the compensatory premium for loss of income reached between 10% and 20% of the gross farm income when the national agricultural income is low (countries of southern Europe and Ireland) and 2% in countries where agricultural income is high, and the aid covered 40% to 80% on average of the costs borne by the beneficiaries, the lever effect has been undeniable.

According to our estimates, 150 000 full-time equivalent jobs have been created owing to the afforestation operations, even if forestry activities do not replace agricultural activities because they require less labour and do not require the same know-how. Furthermore, the beneficiaries often use outside enterprises, and a large degree of sub-contracting – which in some cases reflects little involvement of the beneficiaries – therefore developed in Spain, Ireland and Portugal. In some areas these activities led to considerable spurts of development , but these cannot be relied upon because the jobs created are seasonable and precarious and depend on the investments made continuing.

Afforestation has also made it possible to occupy marginal agricultural land with lesser potential, thereby preventing this land from being abandoned, whatever the countries and regions concerned, the « foresters » having concentrated their production efforts on the best and most profitable land.
The potential additional benefits of Regulation 2080 to other structural measures (such as Regulation 2078 concerning agri-environmental measures), on the other hand, are fairly poorly exploited.

This real success nevertheless has to be tempered by a certain number of reservations as to how long it can last. It would appear that no long-term strategy has been thought out, nor posted by the Member States, and we do not know the extent to which their future afforestation policies, and those of Europe, will, in political and financial terms, continue to support the impetus given.

The average age of the beneficiaries, 55, furthermore poses a definite problem as regards the continuity and quality of the maintenance operations when these people carry them out themselves (which is usually the case) and raises questions on the conditions of their succession.

Contribution of Regulation 2080 to the increase in forestry resources in terms of quantity and quality

Overall this contribution does not seem to us to be very significant, with a few national and regional exceptions, but is positive in terms of quality.

At a European level, Regulation 2080 is responsible for 10% of the annual net increase in area afforested. At the level of the 8 target countries under discussion, the area afforested due to Regulation 2080 is equivalent to 2% of the area of production forests.
This impact does not appear to be very significant, but it is clearly more noticeable in Mediterranean areas and positively important in Ireland, in view of the number of plantations created.
The contribution in terms of volume of wood is 2.7% of the wood produced in Europe, and here too the national disparities are large (in Ireland the plantations attributable to Regulation 2080 will, in the long-term, produce 48% of current national production).

In qualitative terms, the broadleaved species represent 56.8% of the planted areas and cork oak and the evergreen oak stands occupy a dominating position, which is the reverse of the planting trends compared with previous decades ; conifers represent 32.1% of the trees and 4% of the areas have been planted with fast-growing species ; the frequent planting of mixtures in certain countries and regions also considerably enhances the resource created.

The provisions of the Regulation concerning improvements have been little used by farmers and only affect 4% of the budget of the regulation. Their quantitative impact is even less than that of the plantings, but it will be noticeable in the shorter-term (10-30 years).
But they contributed, for example in Germany, Finland and Austria in particular, to a greater diversity of populations; and in Spain and Portugal they enabled the specific interventions connected with fire-protection to be developed as well as the improvement of cork oak stands (we are hoping for new cork production of the order of 10% to 15% of the quantity exported by Spain and Portugal).

These favourable conclusions in terms of quality nevertheless have to be accompanied by a number of restrictions relating to the youth of the plantations in question and due to the fact that it is risky to assess their future success, particularly in countries suffering from « difficult » natural conditions. Furthermore, not all the guarantees are in place, either from the point of view of plantation maintenance or from that of training and consultancy work or with regard to the quality of the plants used.

Finally we should remember that over the period 1994-1999, if Regulation 2080 really created new forestry resources, even if only to a small extent, this period is not long enough to ensure their continuity and their growth in the long term. Uncertainties weigh us down in this respect, connected with the absence of a real strategy for the Member States, and with the ability of some countries financially to continue afforestation at a comparable rate over the period 2000-2006.

Contribution of Regulation 2080 to the reduction of agricultural surpluses

In spite of the absence of data on the growing history of the land under timber, we can affirm that as regards the reduction of agricultural surpluses, the impact of Regulation 2080 is negligible.
Agricultural production withdrawn due to afforestation under Regulation 2080, according to our estimates and assuming that all the arable land planted due to Regulation 2080 had been able to produce common wheat, amounts to 0.85% of the annual production of common wheat.

It is very clear that the regulation has proved to be ineffective in encouraging the afforestation of the most productive agricultural land.
What has in fact been afforested, with a few rare exceptions, is land with a poor yield and producing little income, in all countries ; the beneficiaries having all followed the clear logic of not abandoning the most profitable land for an irreversible crop with a hypothetical yield.

Hence the national programmes on the whole put this expectation at the bottom of their list of priorities, and sometimes even posted priorities against it.

Contribution of Regulation 2080 to the environment

Here the lack of truly specific objectives posted by national programmes, specific monitoring tools and references is a glaring omission.

We are however able to say that the impact of the afforestation under 2080 on the storing of carbon is positive but would be negligible in 2012, and that it will hardly be significant before 2030, mainly because of the slow growth of the Mediterranean species planted (it would then represent 2 to 3% of the total carbon fixed by the European forests, but will remain small when compared with Europe's undertakings at the Kyoto Conference).

As far as the contribution of Regulation 2080 to biodiversity is concerned, both medium and large scale, it is rather positive and relatively significant.
The national programmes have in fact all encouraged the use of broad-leaved trees (with the exception of Ireland), the planting of indigenous species in the interests of the country's heritage (particularly Spain) and also of the types of forests and original improvements, based on mixes of species.

Plantations and improvements carried out owing to Regulation 2080 are ultimately part, with few exceptions, of a step which generally helps to protect the soil from erosion and desiccation (in particular in an arid Mediterranean area), and protects the water by cleansing it of nitrates. However, it is impossible to quantify this impact, in the absence of tools and references available in the countries.

We would however point out that the plantations planted in Spain and Ireland would in some cases and to a certain extent have had an effect deemed to be detrimental to biodiversity, habitats and the protection of natural resources.

Contribution of the implementation of the national and regional programmes to the aims of Reg. 2080 and impact on the beneficiaries

Out of the 142 628 beneficiaries of 2080, it has been impossible, due to the lack of data on their status, to know how many exactly for each country, according to this status, had received aid for afforestation and maintenance ; we only know that it is the farmers who received the majority (up to 72%) of the compensatory premium for loss of income – given that the title of farmer covers situations differing significantly from country to country.
The majority of these farmers have farms with low-intensity production, a gross farm income below the national average with marginal agricultural land and more than the national average are under forest.
All the beneficiaries interviewed were satisfied with how the projects were proceeding and how they were being implemented, insofar as they met their objectives, which cover those of Reg. 2080 in fairly different ways depending on the country.
Clearly none of them or almost none would have planted trees without the aid from Reg. 2080 ; and the afforestation projects had effects which were demonstrably real but impossible to quantify.

Overall in a clear and very comprehensible manner, the national and regional programmes interpreted the objectives of Reg. 2080 in the light of their contexts and their priorities (very roughly the countries of southern Europe tended to put forward the objectives of rural development, whereas those of northern Europe presented forestry and environmental objectives). Via their aid-granting and aid modulation systems, they broadly relayed and indeed amplified the three underlying trends driven by the general framework of the regulation, i.e. support of agricultural income, improvement of not particularly productive land and the creation of a forestry resource mainly based on broad-leaved species.

These programmes, which vary in terms of precision, had not generally made a diagnosis prior to the application of the regulation, nor had they arranged for any zoning measures, properly speaking, which

would have made it possible to target the objectives of the regulation (only a few measures relating to the choice of species planted went some way towards this).
The cumbersome nature of the administrative and financial procedures for implementing these programmes, as well as the fact that they are difficult to operate, are frequently criticised by the beneficiaries interviewed, mainly in the countries of southern Europe.

As for the technical monitoring of the afforestation, it generally relies on existing development and consultancy mechanisms – which are more or less suitable and adequate depending on the size of the request. And, although the monitoring and checking of the environmental impact of Regulation 2080 was actually the reason for the drawing up a number of measures, as yet no information is available to check whether they are being applied correctly and effectively.

Finally, the awareness and training programmes, particularly in the countries of the south where the afforestation programmes were significant, were often deemed to be not particularly suitable and inadequate. Furthermore, the existing training (and consultancy) mechanisms, both agricultural and forestry-related, would appear to be meeting requirements in a relatively satisfactory manner.
We should remember that these measures provided for by the regulation were entirely the responsibility of the Member States and were not the subject of Community part-financing.

Recommendations

In view of the earlier conclusions, the development of Regulation 2080 and of the national and regional programmes connected with it requires seven recommendations, which have to be placed in large part in the context of the new rural development regulation and the evolution of the common agricultural policy, in the spirit and in the context in which they directly fall :

- Emphasise rural development
- Take better account of the environmental objectives
- Use other regulatory tools to limit agricultural surpluses ?
- Ensure the longevity of the newly-planted forests and their maintenance and development
- Place more emphasis on the improvement operations
- Compartmentalise the beneficiaries, differentiate between the forms of aid and introduce suitable zoning
- Consolidate and develop the accompanying mechanisms
- Equip oneself with monitoring and evaluation tools.

INTRODUCTION

The Community aid system for forestry measures in agriculture

1. The context

In 1992, measures accompanying the common agricultural policy (CAP) were adopted to benefit the environment, early retirement and forestry. These measures aimed to support the expected processes of change, and to mitigate some of the effects deemed to be to the disadvantage of farmers.

Falling under one of the basic options for the reform of the CAP (temporarily leaving land to lie fallow or use land for afforestation of non-food production), Council Regulation No 2080/92 of 30 June 1992 therefore introduced a system of Community aid for forestry measures in agriculture.

The latter were already the subject of measures within the context of earlier regulations, particularly in Regulation EEC No 797/85 then Regulation EEC No 1609/89.

But Regulation 2080/92, which provided for aid part-financed by the European Agricultural Guidance and Guarantee Fund, « guarantee » section, introduced important innovations, both from the points of view of objectives and from that of the implementing provisions.

2. The 4 objectives of the regulation

- ✔ To accompany the changes planned in the context of the common market organisations,
- ✔ To contribute to a long-term improvement in forestry resources,
- ✔ To help to manage the countryside in a way which is more compatible with the balance of the environment,
- ✔ To fight against the greenhouse effect and absorb carbon dioxide.

3. The instruments

To meet these 4 objectives, the instruments already in place were reinforced, in order to be more effective, and the following were introduced :

- ✔ Aid for afforestation, intended to promote an alternative use of the agricultural land :
  - Aid for investment, in order to create plantations,
  - Premium for maintaining the new planting
  - Premium for compensation for loss of income

- ✔ Aid for **improving existing afforestation** (enabling farmers to develop their forestry activities).

At the same time, the Member States were obliged to draw up national or regional multiannual programmes defining :

- the amounts and duration of the aid,
- the conditions for granting the aid,
- the provisions for the evaluation and monitoring of the effects of the regulation on the environment and on regional development planning,
- the nature of any accompanying measures,
- how agricultural and rural operators were to be informed.

4. The innovations made

Since 1985, measures in favour of farmers' forests have been introduced, in addition to the regional or national measures which sometimes already existed at European level. Then, in 1989, Community aid specifically intended for planting and improving existing forests succeeded them with the financial support of the EAGGF, « Guidance » section.
But these were not sufficiently effective to produce satisfactory results, as Regulation 2080 shows in its introductory remarks.

As the reform of the common agricultural policy (CAP) modified the provisions for financial support to farmers, it appeared necessary to improve the earlier aid schemes and make them more dynamic.

Regulation 2080/92 introduced a few innovations along these lines :

✔ The part-financing of the cost of the operations by the « guarantee » section of the EAGGF, making it possible to cover as much as 75% of these costs in Objective 1 regions and 50% in other areas.

✔ Opening the aid for afforestation up to a much wider range of beneficiaries, (including local authorities), and opening up the compensatory premium for loss of income to non-farmers.

✔ The introduction of a maintenance premium over the first 5 years, set up according to the types of planting and the period (the first two years and the following three years)

✔ A significant increase in the maximum amount eligible for aid, and in particular in the compensatory premium for loss of income.

✔ The modulation of the maximum amount of aid per type of afforestation, distinguishing between broadleaved trees, conifers and short-rotation species.

The two tables below show how the amount of aid for afforestation and improvements has risen from 1989 to 1996.

Table 1 : Development of the amount of aid for afforestation according to the various regulations.

Regulation	No 1609/89	No 2080/92	No 231/96
Type of aid	1989 amount	1992 amount	1996 amount
	Euros/ha	Euros/ha	Euros/ha
Afforestation aid	1 800	Broadleaved 4000 Conifers 3000 Eucalyptus 2000	Broadleaved 4830 Conifers 3623 Eucalyptus 2415
Maintenance premium		Broadleaved 500/300 Conifers 250/150	Broadleaved 603.8/362.3 Conifers 301.9/181.1
Compensatory premium for loss of income	Farming 150	Farming 600 Non-farming 150	Farming 724.5 Non-farming 181.1

Source : DG Agriculture.

Table 2 : Development of the amount of aid for forestry improvements according to various regulations.

Regulation	No 1609/89	No 2080/92	No 231/96
Type of improvement	1989	1992	1996
	Euros/ha	Euros/ha	Euros/ha
Improvement of wooded areas and windbreak development Euros/ha	700	700	845.3
Firebreaks Euros / ha	150	150	181.1
Water points Euros/ ha	150	150	181.1
Forest paths Euros / km	18 000	18 000	21 735
Underground improvements Euros / ha	1400	1 400	1 691

Source : DG Agriculture.

Note :

- Regulation 1609/89 introduced aid for afforestation and a compensatory premium for loss of income for the first time ;
- Regulation 2080/92 is the regulation under examination in this evaluation ;
- Regulation 231/96 updates the amounts to take account of the horizontal adaptation of the levels of greenery.

CHAPTER 1
HOW THE EVALUATION WAS CARRIED OUT

1. Objectives and scope of the evaluation

1.1. Reasons for the evaluation

In accordance with Article 8 of paragraph 3 of Regulation 2080/92, a report[1] on the implementation of Regulation 2080 was submitted to the European Parliament and to the Council in 1997.

In line with its obligations, the Commission wished to supplement the first elements with an evaluation of Regulation 2080 ; the advantages of such an evaluation, as stressed by the European Parliament, being that it assesses accurately the impact of the regulation and its contribution to the objectives followed in the following areas :

- the role of forestry activities in rural development,
- the improvement in and increase in forestry resources,
- the contribution to reducing agricultural surpluses,
- the contribution towards mitigating climate change, biodiversity and the protection of natural resources.

Moreover, this evaluation was also to show any contribution made by the implementing means and programme management to achieving these objectives.

Seven evaluation questions were defined in the tender specification :

- ✔ question 1 : to what extent, in promoting rural development, did the forestry activities enable the effect of the 1992 reform to be cushioned ?
- ✔ question 2 : to what extent have the forestry resources been increased ?
  - How significant is the long-term increase planned for forestry production ?
  - Can a better quality of product and/or added value be expected of the forestry improvement measures ?
  - Can we expect better stability and longevity of the forestry plots from the forestry improvement measures ?
- ✔ question 3 : To what extent has afforestation helped to reduce agricultural production surpluses ?
- ✔ question 4 : To what extent have the forestry activities helped to slow down climate change ?
- ✔ question 5 : To what extent have forestry measures helped with biodiversity ?
- ✔ question 6 : To what extent have the forestry activities improved the protective function of the forests, particularly as regards natural resources ?
- ✔ question 7 : To what extent did the implementation of national/regional programmes help to achieve the objectives of the regulation and enable it to help a significant proportion of its potential beneficiaries ?

Insofar as most of the results of forestry activities can be measured in the long term, it is understood that their impact on controlling the greenhouse effect or on forestry resources have to be studied prospectively.

1.2. Scope of the evaluation

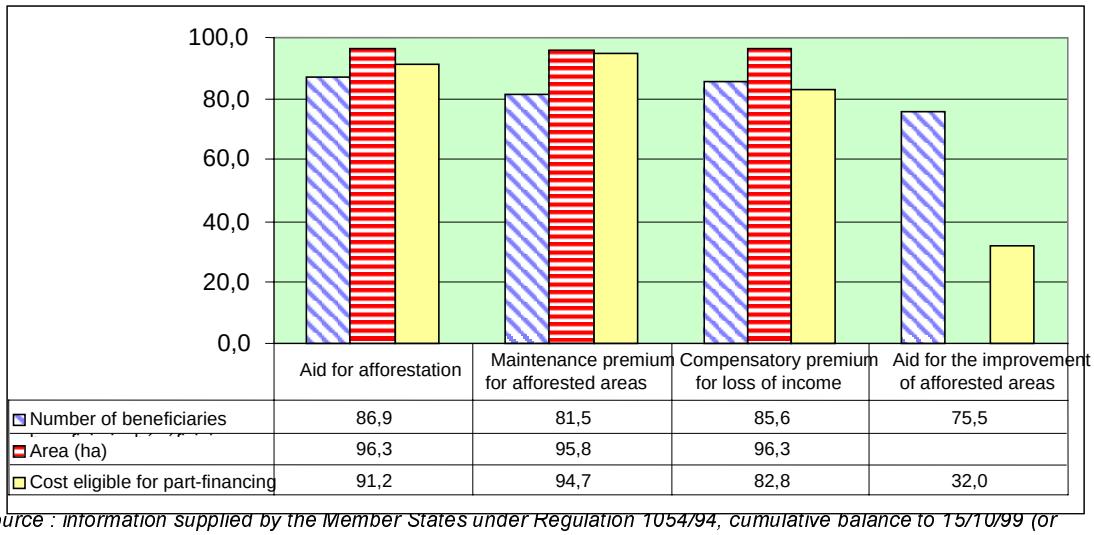
Article 5 of Regulation 2080 provided for Member States to communicate the national or regional programmes to the Commission before 30 July 1993, as well as an estimate of annual expenditure.
As the programme was not actually implemented before 1994, the period analysed runs from 1994 to 1999 ; earlier periods have sometimes been taken into consideration for specifying the context when measures were put in place and to draw comparisons.

[1] COM (97) 630, 28.11.1997

The evaluation mainly concentrated on countries which had invested most in afforestation, namely Spain, Portugal, the United Kingdom and Italy, or in improvements, such as Germany.
In view of the existence of the « Boisterra » network of European partners, set up earlier by the Institute for Forestry Development (IDF), which carried out the evaluation, it was thought to be appropriate to add Denmark and France to this group, which had smaller projects linked with the size of the country and the importance of their agricultural sector.
These 8 countries, which we will call « target countries » in the present report, represent more than 96% of the area afforested by the Regulation and 74% of the improvement projects executed, but only 32% of the financial amounts awarded under this last heading.

The other 7 European countries were not included in the main scope of the evaluation : either because they had only acceded to the European Union recently (Austria, Finland and Sweden), which made evaluation difficult due to a lack of historical information, or because of the small scale of the operations undertaken.
However, wherever possible, for the global results reference is made to the 15 countries of the Union.

Figure 1 : Projects executed in all of the eight countries included in the evaluation as a percentage of the total number of projects executed in the 15 countries of the European Union



	Aid for afforestation	Maintenance premium for afforested areas	Compensatory premium for loss of income	Aid for the improvement of afforested areas
Number of beneficiaries	86,9	81,5	85,6	75,5
Area (ha)	96,3	95,8	96,3	
Cost eligible for part-financing	91,2	94,7	82,8	32,0

Source : information supplied by the Member States under Regulation 1054/94, cumulative balance to 15/10/99 (or 30/04/99 for some countries).
Scale of the eight target countries.

2. Evaluation method

The evaluation is based on the collection of two major types of data :

- those from various national and European sources, mainly of a statistical and administrative nature ;
- those from field surveys carried out among a representative sample of beneficiaries (approximately twenty per country), and national experts.

In order to be relevant given the objectives of the evaluation, the data was collected using 3 major tools, detailed in an annex :

• An evaluation grid, made up of a list of judgement criteria and indicators corresponding to each question of the evaluation, and which really did consist of a screening mechanism by which the projects under Regulation 2080 were plotted and analysed.

• Typologies, which made it possible to structure the national information more clearly and to compare one country with another and to make it easier to summarise for the 8 target countries the information on the types of afforestation and improvement as well as the types of crops grown beforehand (see Annex 3).

• Biogeographical zoning which made it possible to examine in greater detail the effects of Regulation 2080 on the environment and the forest resources (see how this zoning was drawn up in Annex 8).

2.1. National and European source data

The cross-referencing of several sources of data at several levels was necessary to understand the impact investigated in areas as different as rural development, agriculture, forestry and the environment.

European data

At European level, therefore, the following were used :

✔ The data supplied by the Directorate-General for Agriculture of the European Commission concerning :
  - Regulation 2080/92 (operations carried out, the number of beneficiaries, the areas concerned),
  - Regulation 1054/94 (annual financial balance sheets of the Member States concerning the use of the budget broken down by operation up to 31/10/1999),
  - The statistical data concerning the economic results of the farms, owing to the network of Agricultural Accounting Information (see presentation in Annex 4)
  - The working documents of the Standing Forestry Committee and the decisions of the European Commission (details of the content and implementation of the national programmes).

✔ The statistical data supplied by EUROSTAT, concerning :
- The use of agricultural land owing to the EUROFARM survey which takes place every two years: 1991, 1993, 1995, and 1997,
- The forestry statistics published in 1992, 1995 and 1998.

We would point out that we were unable to obtain official data up-dated to 15/10/99, for the eight target countries of the evaluation :

• The reports of Regulation 2080 were up-dated to 15/10/99 solely for the United Kingdom and Greece, and (they are staggered between 1996 and 1998 for the other countries) ;

• As regards the reports of Regulation 1054, only Spain, Italy and Portugal supplied data up-dated to 15/10/99, and for other countries, the data date back to 30/04/99. Moreover, the information sent is of a general nature.
The reports of supplementary Regulation 1054, which are more detailed, bear the same dates as the reports of Regulation 2080 and are staggered between 1996 and 1999.

To make up to some extent for this lack of recent information, we therefore asked the partners to supply us with more detailed national data.

National and regional data

This data was sent to us by our partner evaluators from the IDF, who obtained it themselves from competent bodies or experts in their country.

This national official data for the eight target countries of the evaluation is detailed to as great an extent as possible by type of afforestation or improvements, by species and crops grown beforehand and broken down by region.

Depending on the country, there may be a certain time-lag between the European data and the information supplied by the partners regarding the total area of woodland. This is mainly connected with the period taken into consideration. However, this national data is often the only information capable of providing sufficient detail to answer the questions of the evaluators.

In other respects we would point out that in Germany and in Italy, the evaluators have noted differences between the national data and the information directly collected from the Länder or the regions. In these cases, regional data have been taken into account as they are generally more precise and analytical than the national data.

Finally we would point out that few detailed data have been sent to us, generally, on the woodland improvement operations.

2.2 The surveys on the ground

Surveys among national experts

In order to supplement the information from the Directorate-General for Agriculture, which concerned mainly the financial amounts and the areas planted and improved, it appeared to be necessary to meet heads of the administration concerned (agriculture, forestry and environment) in each country, experts and representatives of professional agricultural and forestry organisations and associations in order to have a better understanding of the context within which Regulation 2080 was implemented.

For heavily « regionalised » countries (Italy, Germany and Spain), these meetings were reduced, particularly in the regions most affected by the afforestation, in order to be able to better tackle the scale of the decision-making.

These meetings allowed greater light to be thrown on the subject, particularly as regards implementing the national programmes.

Surveys among the beneficiaries

In order to provide some answers in areas where there was little information, such as rural development, socio-economic aspects, prospective questions (quality expected of the plantations, for example), surveys were carried out directly among samples of beneficiaries (according to their status, the type of woodland and objectives of the afforestation, etc…)
The main characteristics of these samples are presented in Annex 21.

About twenty surveys were conducted in November-December 2000, distributed over at least two of the regions most affected by Regulation 2080, for each of the eight countries.
In all, 171 people were questioned, which corresponds to 2575 hectares of woodland.

3. Limits of the study

This study has been compared at different limits, which modify the evaluation methods adopted and the area of validity of the replies evaluated.

The most important ones can be attributed to the context as it existed prior to the study and to the evaluation methods on the one hand and the data collection on the other.

3.1. Limits connected with the context of the study and the evaluation methods

The relatively short duration of the study
This constraint has above all increased the other constraints detailed below. But it had a particular effect on how the surveys were conducted in the 8 target countries : approximately only twenty people, on average, were approached per country, in view of the very tight time-scale. Consequently, even though the samples of beneficiaries and experts approached by the evaluators are indeed representative (because they were drawn up in accordance with the general characteristics of the population targeted), it was not possible to make them up according to the sampling rules in the strict sense and they are not large enough to be statistically valid.

The large number of countries concerned
The information sources and evaluation times were reduced accordingly.

The scope of the « technical » part of the evaluation
As the afforestation of agricultural land lies at the interface between four very clear distinct areas (agriculture, forestry, environment and rural development), this involved the multiplication of the evaluation criteria and indicators and of the data collected, and made data analysis a complex matter which, in certain cases, had to rely to a great extent on qualitative elements.

The prospective nature of certain questions
Clearly there was a lack of historical data there compared with the effects of the regulation (carbon fixing and impact of the forest resources, evidently to be perceived on a different time-scale).

3.2. Limits connected with seeking and using information :

Using the evaluation grid and the judgement criteria and indicators was sometimes made very difficult by the absence of common obligatory tools applying to different countries for collecting information connected with each of the questions set in the tender specifications.

As the official data on Regulation 2080/92 on the European scale (reports of Regulation 2080/92 and Regulation 1054/94) had not been up-dated by all the Member States, there was a lack of recent and homogeneous information.

As the afforestation of agricultural land derives from four different areas (agriculture, forestry, rural development and the environment), it was difficult to use the European statistics.

The small size or even total absence of samples of farms which had benefited from aid for the afforestation of agricultural land belonging to the FADN network rendered this source of information virtually useless in most cases.

The multiplication of data from different sources, at different levels (European, national and regional level ; field surveys and interviews with experts) and the use of different collection methods in some cases made it very difficult or even impossible to consolidate, compare and even interpret the data at European level.

No or virtually no information was available on where operations financed by Regulation 2080/92 were sited (and in particular in the area of rural development, as well as in the area of the environment, linked with the protection of natural resources).

Collecting data in countries with regional programmes was particularly complicated : there was a lack of consistency between the national figures and the data collected directly from regional authorities, an absence of common data-collection and data-processing methods between the regions and a multitude of steps for obtaining information.

Detailed information concerning species planted and types of afforestation, earlier crops and improvement operations was almost non-existent or inaccessible.

In brief :

Table 3 : Difficulties encountered by the evaluators during the collection of national and regional data concerning the operations of Regulation 2080/92.

Type of information	Difficulties encountered
Woodland by type of earlier crop	Very incomplete and heterogeneous data, hence impossible to draw up a quantitative summary for the 8 countries. In Denmark this data does not exist at national level. In Portugal and in certain parts of Germany, they were not advised at the beginning of the programme. In Spain the information comes from estimates made by each region ; due to the absence of a common collection system, the earlier crops could have been interpreted differently. In Italy the national data date from 1996.
Woodland by type of afforestation	In Germany, Spain and Italy, the regional data differ from the summary at national level.
Woodland by species	In Denmark, Ireland and in the United Kingdom, it is not possible to collect any figures. In Italy and Germany information was only obtained for some regions. In Spain the regional data differed from the national data. In general it is difficult to know whether mixtures of species were used, as only the main species had been taken into consideration (Spain, France and Portugal).
Improvement operations	Quantitative data was collected but very little qualitative information was obtained, particularly on the types of forestry work, on the nature of the operations to improve cork oak plantations, on the objectives and siting of infrastructure improvement work (forest road,…).

CHAPTER 2
MAIN OPERATIONS

1. Salient points country by country

It is difficult to compare the results of Regulation 2080 from one country to another due to the great variety of their climatic, geographical, economic, sociological, political and environmental factors which affect the policy on afforestation of agricultural land or the improvement of existing forests.
We therefore thought that it would be useful to give a very brief account of the diversity of the national contexts and to summarise in a few sentences the notable facts and operations of the implementation of Regulation 2080 in the eight countries involved in the evaluation.
This is to give readers the key to an indispensable references for understanding the global results presented in the following part.

Germany

Afforestation of the agricultural land covered 26 249 ha and involved 22 064 beneficiaries, mainly part-time farmers (53% of the beneficiaries) and non-farmers.
Overall, Regulation 2080 was implemented in sparsely-wooded areas.

The afforestation projects were on a small scale : 1.2 ha on average consisting of broadleaved trees,
- 41% oaks and 21% beeches. On farms, it tended to be poor soil which was afforested.
Areas which had been improved, which were larger than those afforested, covered 101 000 ha and affected 20 000 beneficiaries. The improvement programme was specific and aimed mainly to ensure the stability and longevity of the forest population, mainly conifers, and in a state of abandonment ; the forestry objective being to encourage a mixture of species and forestry in an irregular population.

The national programme aimed mainly to make the beneficiaries aware of the environmental management of the plantations. It was therefore a long-term effect which was expected on the behaviour of the players in the countryside, in that they were presumed to have a greater respect for natural resources such as water and soil.

Denmark

Denmark's main objective was to double the area of woodland in 80 to 100 years, at an afforestation rate of 4000 to 5000 ha/year. Owing to Regulation 2080, between 1994 and 1999 5467 hectares were planted by 1430 beneficiaries, which corresponds to 45% of the total plantings.

Part-time farmers are the most numerous beneficiaries in the use of the aid introduced by Regulation 2080. The main objective of these beneficiaries was to improve the quality of life and the landscape of the farm, in order to develop other rural activities (tourism, pick-your-own and hunting, etc.). Most of the trees planted, therefore, were broadleaved.
However, those farmers which, more rarely, intended to derive income from the afforestation used conifers which can be felled in the shorter-term (40-50 years).
As for the forestry improvements, there were 8000 beneficiaries for these, mainly for the maintenance of 3973 ha of shelter belts, created by planting broadleaved trees.

The major environmental objectives of the national programme targeted the protection of underground water by the creation of water catchment areas, soil fertility and the recreational role of the forest in a periurban area.
The compensatory premium for loss of income was only introduced in 1996.

Spain

In Spain, 45% of the areas planted due to Regulation 2080 were planted by 8410 beneficiaries, i.e. 459 395 ha created on areas which on average were very variable (from 2 ha in Cantabrica to 52.4 ha in Extremadura).
131 000 ha of forests were planted in Andalusia alone, mainly with *Quercus ilex*.
The afforestation affected mainly beneficiaries with farming as their main occupation, generally aged 55 and over.

The land planted was often marginal land of the « grazing » type (erial a pastos). The trees planted were mainly broadleaved species (50.8%) in mixed populations and mixed populations of broadleaves and conifers (13.3%).
Forestry improvements aimed in particular at implementing a programme to relaunch the production of cork oak, with 82 405 ha planted in 6 years, and fire prevention and control infrastructures.

France

45 147 hectares were planted in all by 10 608 beneficiaries (i.e. 7500 ha per annum for a 55 000 ha increase in woodland annually).
From 1994 to 1999, these plantings, the average area of which varied from 5 to 11 hectares, made up a large proportion of the plantation created and subsidised. The areas planted were concentrated in the west of the country (Pays de Loire, Poitou-Charentes, Aquitaine).

Poplars cover 21% of these planted areas, followed by the Laricio pine (20%), then by the oaks (*Quercus robur* and *Quercus petraea*) up to 16%.
Afforestation of the agricultural land was concentrated in the regions where agriculture was in a difficult situation. Most of those benefiting from the aid are non-farmers over 55 years of age, who plant instead of renting out their land. As far as the farmers are concerned, afforested land is marginal land for non-specialised production. Only 1/3rd of the beneficiaries receive the compensatory premium for loss of income (3408 beneficiaries for 25 399 ha).

The part on forestry improvement is missing, because the existing programme of the national forestry Fund already covered this type of operation.

Italy

According to the information provided within the context of Regulation 1054, 64 162 hectares were planted by 12 819 beneficiaries. This figure is to be treated with caution and it would appear to be closer to 100 000 hectares, if the regional data are incorporated.
Afforestation of the agricultural land affected mainly farmers, both in the south of the country and in the provinces of the north (Piedmont, Lombardy and the Veneto).

The most productive plantations are those situated in the northern regions of Italy. More than 19 000 ha of valuable broadleaved species, *juglans sp* and *prunus avium* were planted there and are likely to be a potential resource of high value. Rapidly-growing species, such as the poplar planted in the Valley of the Po, cover 23 000 ha (26% of the area wooded on account of Regulation 2080).
The beneficiaries used Regulation 2080 to produce high-quality wood in 35 to 40 years, which is a profitable alternative for marginal agricultural land.

The objectives of the programme varied in the 20 Italian regions, which makes it difficult to see truly national trends.
The regulation appears to have provided the opportunity for taking stock of the importance of afforestation in farming but also in the creation of jobs in the rural area around the planting, (forestry advisors, nurseries or forestry work enterprises)
In other respects it enabled innovatory plantation models to develop along water courses to trap nitrates.
Apparently there were some problems connected with a lack of checking of the provenance of the plants and seeds used, in particular of species of shrubs frequently used.

Ireland

Regulation 2080 contributed to the creation of a forest resource of 100 000 ha in 5 years, consisting of 84% conifers *(Picea sitchensis)*, on poor, humid grassland. The productivity declared was 16m^3/ha/year on average.
The beneficiaries are farmers with farming as their main occupation on small areas of less than 4 ha, (with the projects being eligible as from 0.1 ha for broadleaved trees and 0.2 ha for conifers). The public forestry bodies planted large areas after purchasing farmland.
For farmers, afforestation is a very profitable operation on marginal land, in view of the level of aid – generally covering 100% of the cost – and of the income expected after the first 15 and 20 years following the sales of the first thinnings out.

Ireland is the country which has automatically given the three aid packages in Regulation 2080 to the beneficiaries.
Aid for improvement was not used, because it was not the priority over this period; furthermore, there is little forest still existing.

Portugal

It is in Portugal that the size of the plantations is largest, with 29 hectares on average, (16 to 46 ha depending on the regions), mainly because of the planting in the region of Alentejo where farms occupy areas ranging from 500 to more than 1000 hectares..

Most of the beneficiaries (7 018 in all, who planted 205 000 ha), are to be found in the less well developed areas of the east of the country (*Tras es Montès*), where the planting was carried out mainly by enterprises which thus created jobs, but often temporary ones.

The main species planted is *Quercus suber*, which represents 43% of the area planted under Regulation 2080.

In the south of Portugal, the afforestation and improvement programme made it possible to relaunch the production of high-quality cork, and also encourage a population to return to the centre of the Algarve.

United Kingdom

The 15 600 beneficiaries of the aid for afforestation are primarily main occupational farmers and they planted 141 078 ha.

Afforestation took place in two regions : Scotland (96 000 ha) and England (33 000 ha).
It was mainly less fertile areas and grassland that was planted.

The aid was indexed on the potential productivity of the soil.
There is no maintenance premium because the maintenance of the first 5 years is included in the initial investment; therefore the aid for afforestation and the compensation premium for loss of income is not open to non-farmers.

There were few forestry improvements, because national and regional programmes exist to rehabilitate abandoned wooded plots belonging to farmers.

2. Main operations and key figures

This part shows the key figures and main operations which will serve as a basis for the evaluation.
They are drawn up at different levels (15 countries of the European Union, the eight target countries of this evaluation and biogeographical areas and according to the different sources explained earlier).
Generally the table below gives an initial overall view :

Table 4 : Cumulative balance as at 15/10/99 (and 30/04/99 depending on the countries) of the operations of Regulation 2080.

Type of measure	Number of beneficiaries	Wooded area (ha)	Cost eligible for Community part-financing (in M of Euros)	Average cost per hectare (Euro/ha)	Average cost per beneficiary (Euro)
Aid for investment in afforestation	142 628	1 041 589	1 626.0	1 561.0	11 403
Premium for maintaining afforestation	82 526	794 116	359.0	452.0	4 354
Compensatory premium for loss of income	101 011	864 578	1 776.0	2 055.0	17 591
Aid for investment in improving existing woodlands	40 450		162.8		4 006.0

Total cost eligible for Community part-financing (in M of Euros)	**3 924.8**
Total cost for the EAGGF (in M of Euros)	**1 519.0**

Source : information supplied by the Member States under Regulation 1054/94.
European Union scale.

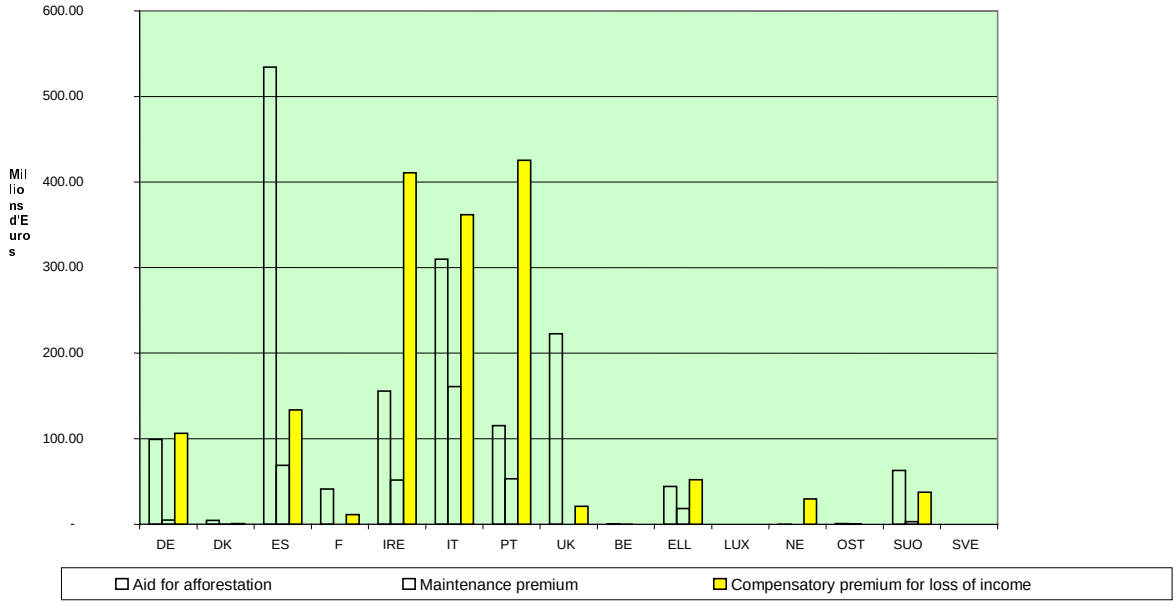
Comments :

When interpreting these data, several points have to be taken into account :
- There are two different up-dating dates depending on the country, 30/04/99 and 15/10/99 ;
- The figures shown only relate to operations which have ended, whereas a not insignificant proportion of projects are still on-going, as shown in Figure 5 ;
- The average cost eligible for investment per hectare is less than the maximum shown in the Regulation, because the countries have not automatically accepted this maximum ;
- The total for maintenance corresponds to the total of the 5 out-payments planned, from year 1 to 5 ;
- The amount of 2055 Euros/ha, for the premium for loss of income, corresponds to the total annual out-payments committed to.

2.1. Afforestation of agricultural land

2.1.1. Results country by country in terms of amounts committed

Figure 2 : Distribution of the amounts eligible for Community part-financing (EAGGF Guarantee section), by type of measures, for the 15 countries of the European Union.



*Source : Information supplied by the Member States under Regulation 1054/94, cumulative balance as at 15/10/99 (*or 30/04/99 depending on the countries).*
Scale of the 15 countries of the Union.

Comments:

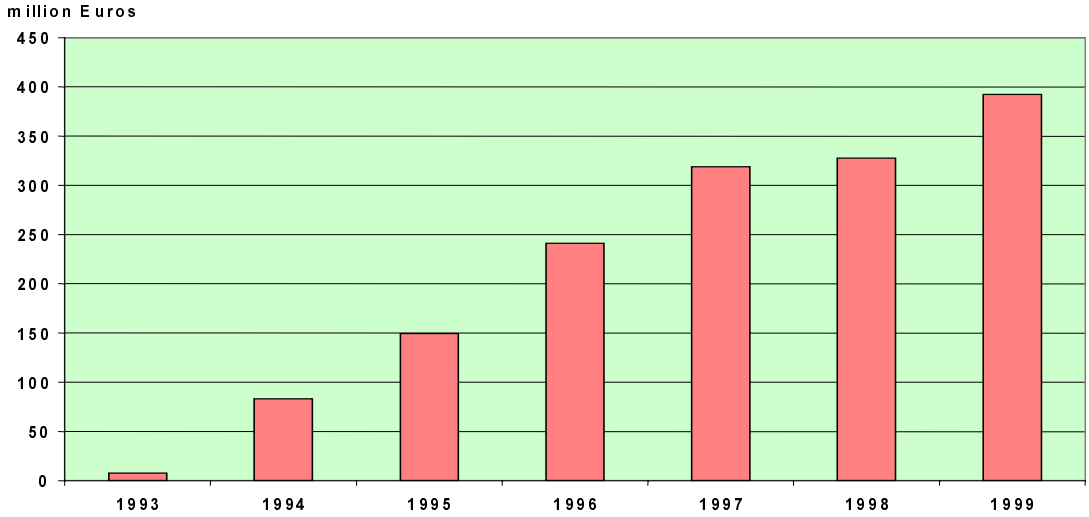
- The countries used the aid in different ways, according to their national or regional programmes approved by the European Union :
  All used the aid for investment in afforestation, with variable eligible amounts, within the range set by the regulation.
  All used the compensatory premium for loss of income, (Denmark only introduced it, however, in 1996).
  France did not use its maintenance premium, and the United Kingdom incorporated its maintenance costs in the initial afforestation costs.

- As far as the aid for afforestation is concerned, the eligible costs for Community part-financing are highest in Spain, Italy and the United Kingdom ; Portugal and Ireland only come later in spite of the size of the wooded areas.

- As far as the maintenance premium is concerned, the costs eligible for Community part-financing are highest in Italy (most of the afforestation projects have benefited from this).

- As far as the compensatory premium for loss of income is concerned, the costs eligible for Community part-financing are highest in Portugal, Ireland and in Italy ; the differences between countries depend on the number of beneficiaries and the amount of the premium, and are also explained by the more or less selective nature of this premium.

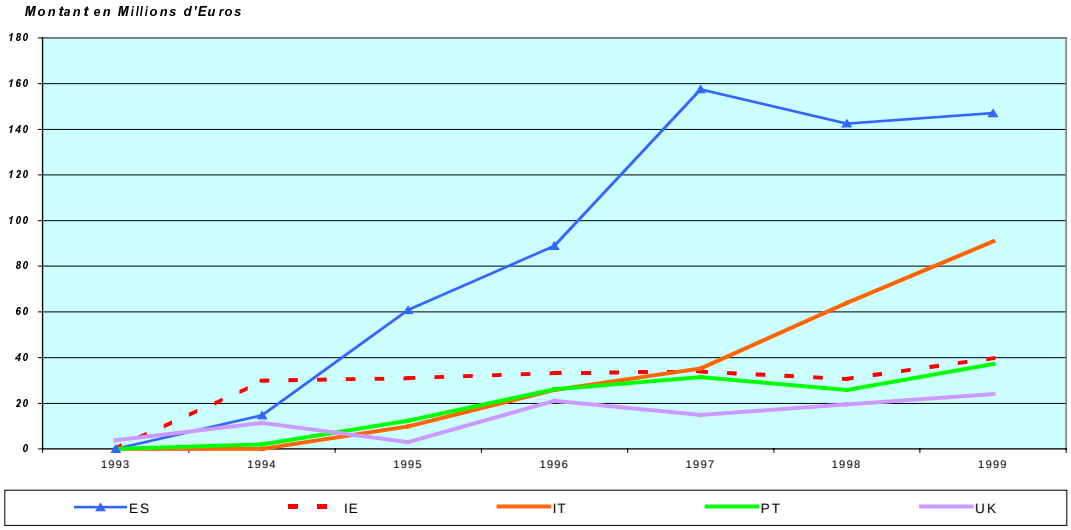
Figure 3 : Amount of expenditure by the EAGGF in millions of euros



Source : DG for Agriculture.
Scale :15 countries

Between 1994 and 1999, the EAGGF spent 1519.2 million euro in the 15 countries of the European Union.

Figure 4 : Development from 1993 to 1999 of EAGGF expenditure for the 5 countries which carried out the most afforestation.



[Montant en Millions d'Euros : Amount in millions of Euros]

Source : DG for Agriculture.

Comments :

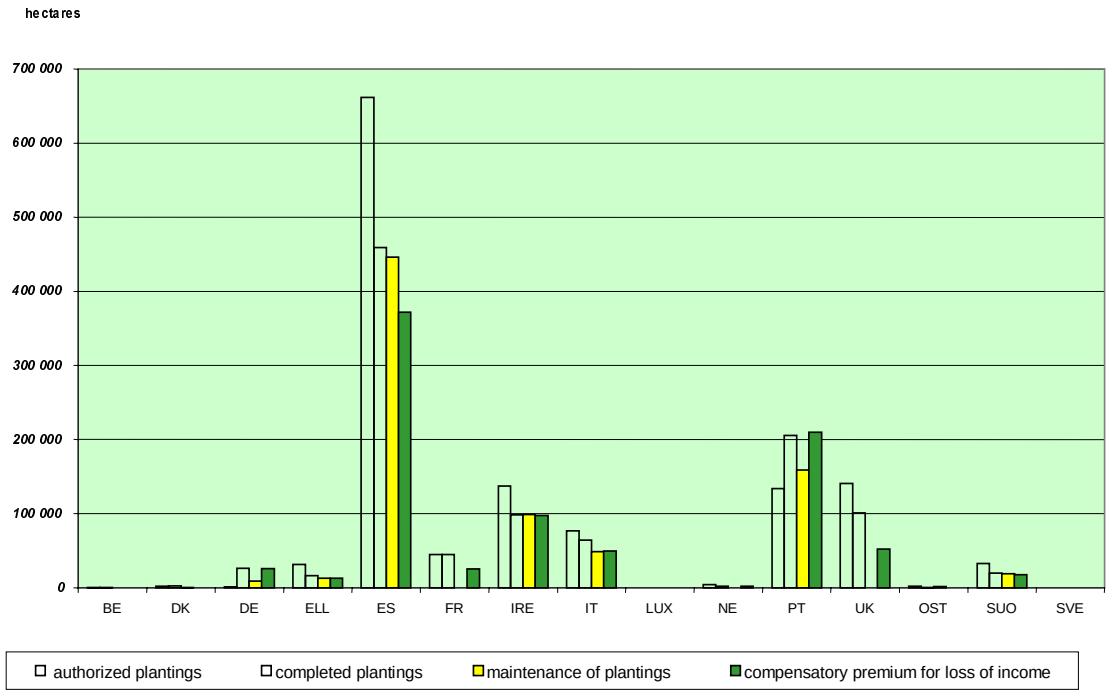
This figure shows the differences between the strategies of the 5 countries which used the EAGGF fund most heavily.
Hence Ireland set itself an annual expenditure of 30 million euro, which it adhered to, this regularity enabling it to spread expenditure but also establish a forest resource of a sustainable nature if the movement continues.

On the other hand, Spain immediately planted considerable areas, proportional to the expenditure committed, which poses problems for resources in the long term and also makes it uncertain whether the corresponding premiums can be paid in the coming 20 years.
Portugal and the United Kingdom had a rising policy which was reasonable up to 1997, but more irregular for the United Kingdom.

2.1.2. Results by country in terms of area

The operations under Regulation 2080 in terms of area are shown in the figure below.

Figure 5 : Distribution of the areas financed by Regulation 2080 by types of aid and by country, over the period 1994-1999.



*Source : information supplied by the Member States under Regulation 1054/94, cumulative balance as at 15/10/99 (*or 30/04/99 depending on the country).*
Scale : 15 countries of the European Union

Comments :

- The « authorised » plantings correspond to the projects which were the subject of administrative authorisation for aid for afforestation, but which are on-going (some of them have not yet been carried out), the « completed » plantings correspond to the afforestation projects which have been completed and checked by the competent authorities.

- We would point out that in some cases (Germany and Portugal), the operations appear to exceed the authorisation, due, it would appear, to problems with consolidating data at regional and national level.

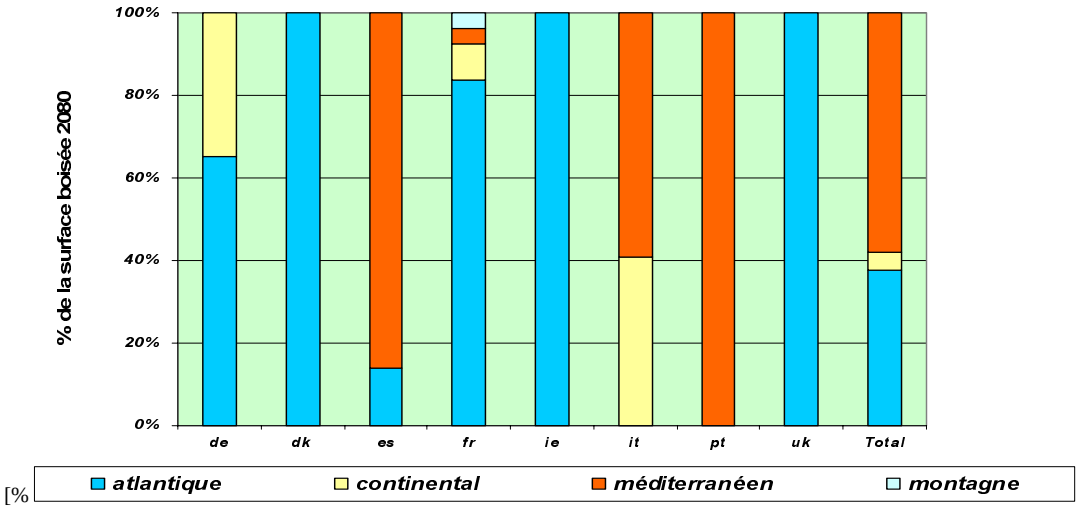
- 80 % of the areas planted is to be found in three countries : Spain, Portugal and Ireland ; Spain alone represents almost 45% of the area for which aid for afforestation has been granted and has 24% of the beneficiaries of this aid.

2.1.3. Results by biogeographical area

The results presented cover the whole of the regions of the 8 target countries.

A biogeographical area has been attributed to each region, according to the following four types : Mediterranean, Atlantic, mountain and continental (see detail of this classification by type in Annex 8).
In the case of mixed regions (e.g. mountain/Atlantic), we used the area most affected by the operations financed under Regulation 2080.

Figure 6 : Distribution of areas planted under Regulation 2080 by biogeographical area and by country.



[%

Source : evaluators
Scale : eight target countries

Comments :

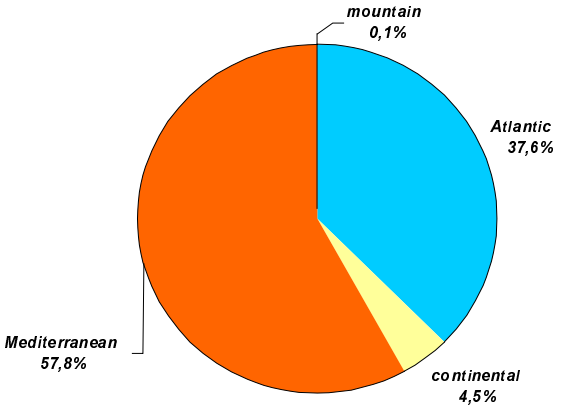
- the Mediterranean area, covering the regions of Spain, Portugal and Italy, represents 60% of the total area planted under Regulation 2080 of the 8 countries studied ;

- the Atlantic area covering Ireland, the United Kingdom, Denmark and regions of France and Germany represents 33% of the area planted ;

- the Continental area consists mainly of Germany and France; it represents only 4% of the area planted ;

- the mountain area was planted to only a very marginal extent under Regulation 2080.

Figure 7 :Distribution of the areas planted under Regulation 2080 by biogeographical area



source : Data collected by the evaluators, November 2000
scale : the eight countries of the study

2.1.4. Earlier types of agricultural land use

The afforested land was classified according to its previous agricultural use : arable land, grassland and grazing, other (see Classification by type in Annex 3)

For each of the eight countries of the study, earlier agricultural land use is given as a percentage of the area afforested under Regulation 2080.

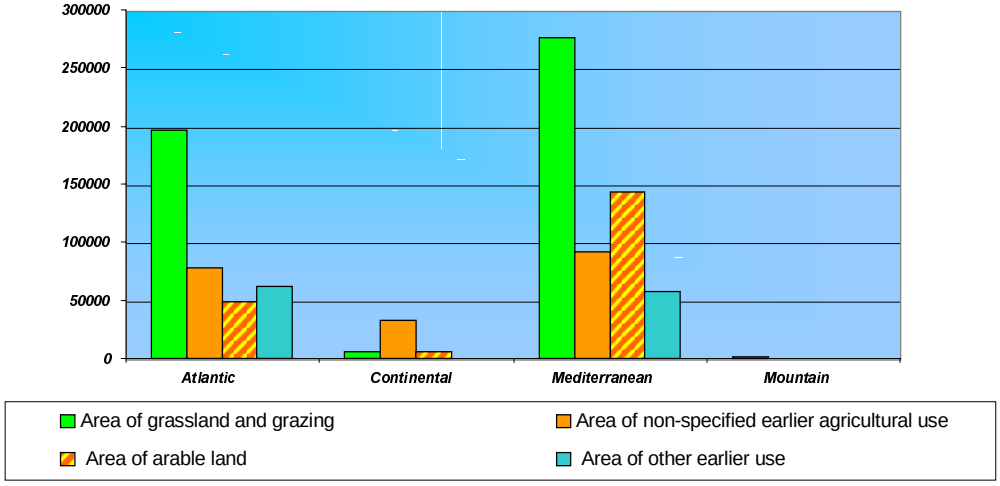
Table 5 : Earlier agricultural land use as a % of the area afforested under Regulation 2080 in each country

Country		Germany	Denmark	Spain	France	Italy	Ireland	Portugal	UK
Arable land	% of total	67% (60% regional data)	100% (85% beneficiary surveys)	22.4%	34.2%	82	5%	32%	26.3%
	Type			Temporary crops and grasslands 22.26% family gardens 0.16%	Cereals (26.7%), maize (5.9%), oleaginous crops (1.4%) set-aside (0.7%)				Lowlands, DA, SDA
Grassland and grazing	% of total	31% (34% regional data)	0% (15% beneficiary surveys)	49.6%	55.8%	17	95%	37%	73.7%
	Type			Grazing 14.74% Natural grassland 0.73% Erial a pastos (grazed fallow land) 34.25%	Grassland (54.6%) fodder crops (1.2%)		Rough grazing and bogland (76 %)		Improved grassland, unimproved grassland
Other	% of total	2% (6% regional data)		28%	0.9%	1%	0%	4.2%	0%
	Type			open afforested area and dehesas 13.74%, set-aside and other non-occupied land (Barbecho) 9.46%, perennial crops 4.25%, cork oak 0.43%	Vines			Olive groves, orchards, vines	
Not specified	0			0%	9.1%			26.7%	

Source : cumulative data collected by the evaluators in November 2000.
Scale : the eight countries of the study

In view of the limitations encountered when collecting the data, the quantitative interpretation for the eight countries overall is difficult. The figures available, although incomplete, are given by biogeographical area in the figure below.

Figure 8 : Distribution of earlier agricultural land use by biogeographical area



Source : cumulative data collected by the evaluators in November 2000
Scale : the eight countries of the study

Comments :

- The 8 target countries of the evaluation represent 88.8% of the total Usable Agricultural Area (UAA) of the 15 countries of the European Union.

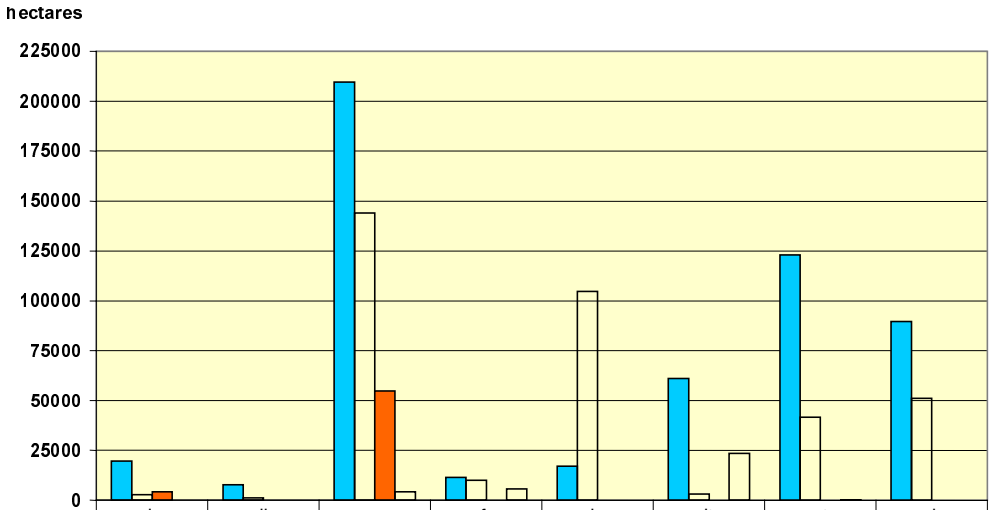
- Over the whole of the 15 countries, there is a fair distribution between various earlier types of agricultural use. Less than 1% of the total UAA has been afforested. Only the perennial crops (vines, olive groves and orchards) have been afforested by more than 2% (this is heavily influenced by Spain).

- The Atlantic countries such as Ireland and the United Kingdom mainly afforested grassland, which constitute the major UAA in these countries. However, on the European scale, afforestation on grassland only constituted around 0.5% of their area.

2.1.5. Types of afforestation

Four broad categories have been defined (see Classification by type in Annex 3) to characterise the quantitative data on the plantings carried out within the framework of Regulation 2080/92 ; plantations of broadleaves, conifers, mixed plantations of broadleaves and conifers, plantation of fast-growing species. The table below gives their distribution in the 8 target countries.

Figure 9 : Distribution by type of afforestation of the planted areas



	de	dk	es	fr	ie	it	pt	uk
Broadleaved	19677	7905	209661	11673,5362	17058	61217	123077	89868
Conifers	2982	1288	143992	10150,6073	104783	3132	41717	51210
Mixed broadleaved/coniferous	4386	0	54769	0	0	0	0	0
Fast-growing species	0	0	4382	5850,0584	0	23513	316	0

Source : data collected by the evaluators, November 2000
Scale : the eight target countries

Definitions :

- broadleaved plantations are those which contain more than 75% broadleaved species (idem for coniferous plantations) ; it being understood that this definition is the one given by the terms of the regulation, but does not necessarily correspond to the usual biological and forestry concept.

- mixed broadleaved/coniferous plantations correspond to populations where there are at least 20% of broadleaves (to 80% of conifers) or 20% of conifers (to 80% of broadleaves) ; there are not many of these plantations and would cover 7.1% of the area, planted mainly by Spain (55 000 ha) and Germany (5 300 ha), according to the figures available ;

- so-called « mixed » plantations are plantations based on several species. According to the data available, they would represent 32% of the areas planted under Regulation 2080, which is a much more significant figure.

We would point out that the definition of mixed plantation is difficult to appreciate as the composition of the mixes is not specified for all the countries ; the Danish regulation, for example, provides that all the plantations have to include at least 10% of trees of three different species in addition to the main species, but it is not known whether these plantations are solely broadleaved, coniferous or both.
Finally, in spite of the existence of partial data, not all the countries were able to supply a detailed breakdown by species planted.

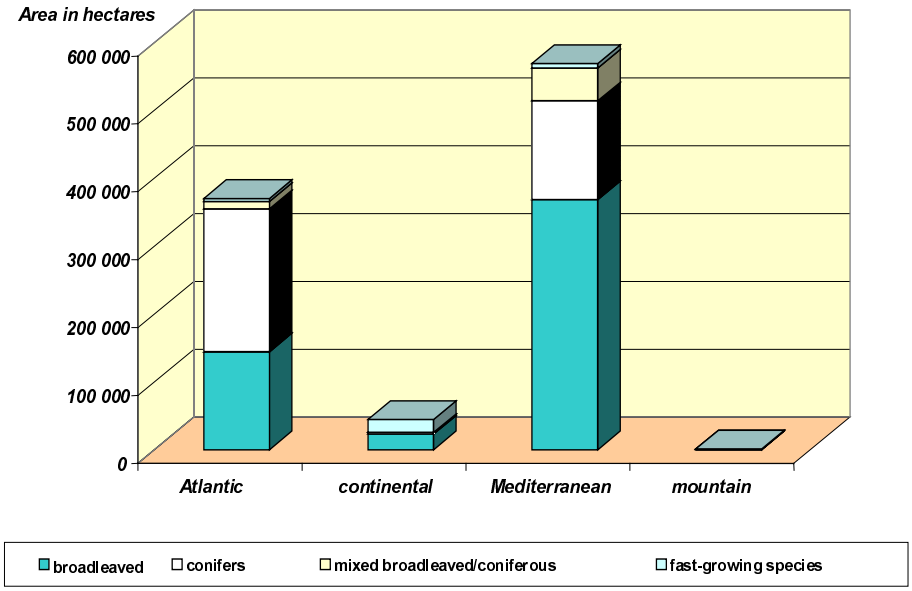
Comments :

- it is therefore broadleaves which are mainly planted on the European scale, representing 68% of the area afforested under Regulation 2080, (with the exception of Ireland, where conifers represent 84%, as the figure shows).
  Oaks are the species most frequently used, whether in the Mediterranean such as *Quercus ilex*, *Q. suber*, or in the Atlantic area such as *Q. robur* or *Q. petraea* ;

- in general, few fast-growing species had been planted ; with the poplars being concentrated in Italy (valley of the Po) and in France (Aquitaine), and the eucalyptus trees in Spain (Galicia).

The figure below shows the distribution by type of afforestation by biogeographical area

Figure 10 : Distribution of the types of afforestation by biogeographical area



Source : cumulative data collected from the national organisations. November 2000
Scale : the eight target countries

Comments :

- 63% of the area afforested under 2080 is sited in the Mediterranean zone ; it consists mainly of pure and mixed populations of broadleaves, mainly in Spain and Portugal ;

- in the Atlantic zone, the distribution between broadleaves and conifers is even, but plantings under 2080 only represent 32% of the areas afforested under Regulation 2080 between 94 and 99 ;

- the continental and mountainous zones are little affected by these plantings (they represent only 5% of the areas afforested under Regulation 2080 between 94 and 99 ;

2.2. Forest improvements

2.2.1. Overall results

Table 6 : Overall results of the forest improvements

TOTAL 15 countries of Europe				
Forest improvement measure	Number of files	ha	Number	km
Infrastructures				
Forest roads	6 546	-		45 510
Enclosures	906	-		7 250
Protection				
Firebreaks	61	10 096		0
Water points	71		25 042	0
Cork				
Plantation, densification and regeneration of cork oak stands	24	96 310		0
Silviculture				
Natural regeneration	4 824	11 460		0
Controlled burning	60	373		0
Drainage	2 090	80 302		0
Fertilizer application	62	526		0
Pruning	72	235		0
Other forestry work	21 728	198 481		0
Total	36 444	397 784	25 042	52 760

Source : cumulative data collected by the evaluators, November 2000
Scale : 15 countries of the European Union

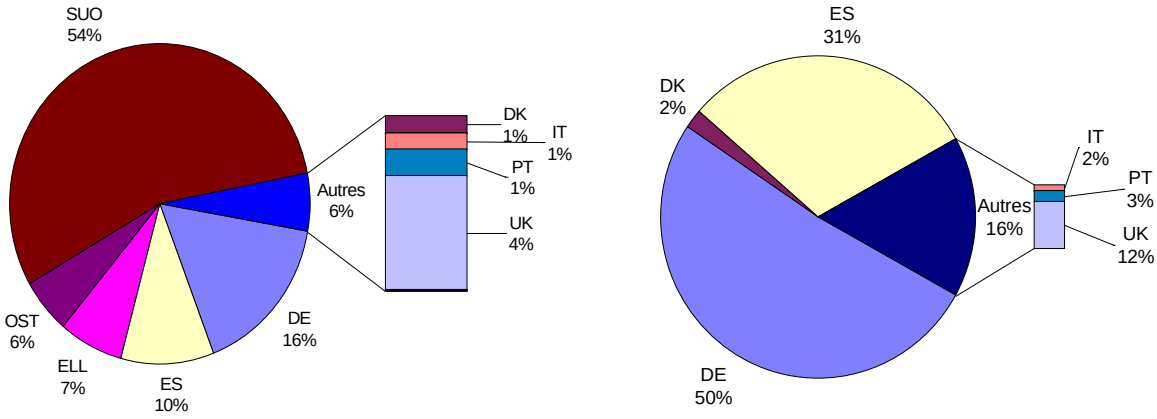
Presentation notes :

This table has been created mainly from information collected in the files of Regulations 2080 and 1054 of the various countries, hence the levels of detail vary greatly.
Finland, for example, entered the operations eligible in great detail, which gives valuable information about the national objectives for improving populations displaying low productivity (drainage, fertilizer application) or even in poor condition (controlled burning, natural regeneration or pruning).
But other countries have supplied less detail.

2.2.2. Results in terms of amounts committed

The breakdown by country of the amounts of the improvement costs eligible for Community part-financing is given in the figure below.

Figure 11 : Breakdown by country of the improvement costs eligible for Community part-financing.



[Autres : Others]

For the 15 countries of the European Union (graphic on the left)
For the eight countries of the study as a percentage of the total costs of the eight countries (graphic on the right)
*Source : information supplied by the Member States under Regulation 1054/94, cumulative balance as at 15/10/99 (*or 30/04/99)*
Scale : 15 countries of the European Union and eight target countries

Comments :

- the predominant part occupied by Finland, which invested a great deal in the improvement operations, can be seen ;

- for the eight target countries, Germany and Spain make up 81% of the amounts committed generally in the improvement operations.

The breakdown of the costs according to the main types of improvement is supplied in the reports of Regulation 2080. The table below therefore gives this breakdown for the 15 countries of the European Union. We would point out that the data are not up-to-date for many countries and that they are spread out between 1996 and 1999.

Table 7 : Breakdown of the costs eligible for Community part-financing, by type of operation and improvement

Forest improvement measure	cost in millions of euro	% of total cost
Infrastructure		
Forest roads	82,61	43,74
Drainage	5,13	2,72
Protection		
Firebreaks	2,51	1,33
Water points	9,18	4,86
Enclosures	0,10	0,05
Improvement of cork oak stands	9,56	5,06
Silviculture		
Regeneration	5,23	2,77
Controlled burning	0,05	0,03
Fertilizer application	0,05	0,03
Pruning	0,04	0,02
Other forestry work	74,42	39,40
Total	189	100,00

Source : reports of Regulation 2080, cumulative balances (from 1996 to 1999 depending on the country)
Scale : 15 countries of the European Union

Comments :

- the main budget item consists of forest roads with 43% of the budget ;

- the other forestry work represents 39.40% of the budget, (but it is very difficult to obtain a breakdown, even a rough one, of the operations financed) ;

- fire protection measures in the true sense with water points and firebreaks only represent 5% of the budget ;

- the revival of cork oak growing affects mainly Spain and Portugal

Note that for the number of beneficiaries, and according to the results of Regulation 1054 (see Annex 2), Germany has 49% of the files completed, for 14% of the budget of the 15 European countries, (as in the case of afforestation, it is the small projects which were financed).

2.3. Breakdown of the types of improvement by country

The improvement operations conducted under Regulation 2080 have been placed in several categories, according to their objectives (see Annex 3) :

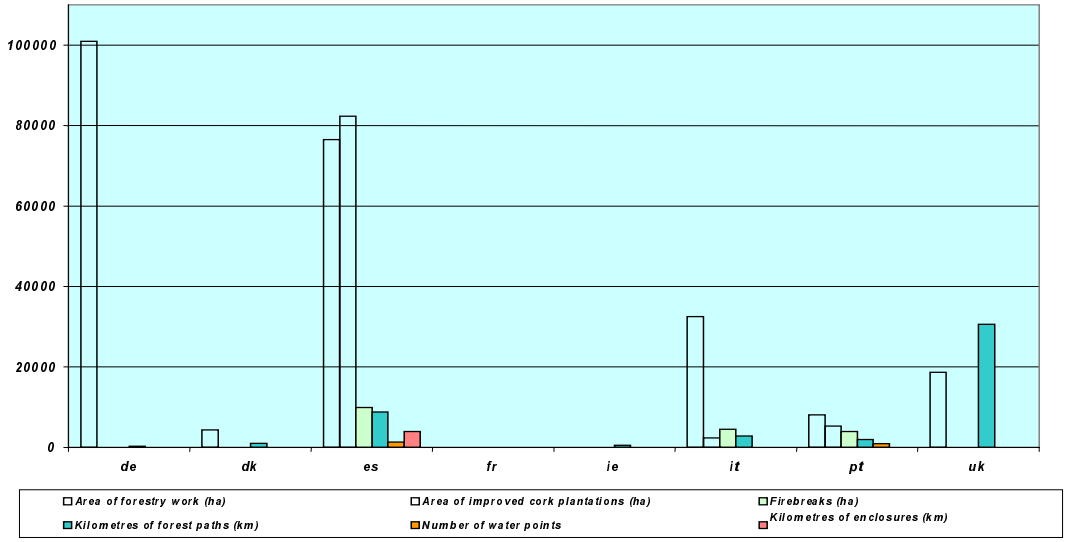
- ✔ improvement of the forest infrastructure (forest roads, drainage system, protection from fauna) ;
- ✔ fire protection : creating the infrastructure for fire-fighting and reducing the combustibility of the stands ;
- ✔ improvement of the quality of the stands : silvicultural measures, conversion of stands, etc.
- ✔ specific measures for improving cork oak plantations ;
- ✔ protection of the stands : improvement of the stability and longevity, controlling acid rain damage, controlling erosion and protection against disease

The quantitative data on the improvements in afforested areas are only available for large types of operation ; improvement in infrastructure, forestry work, improvement of cork oak stands.

The data for Finland, Austria and Greece are taken from the reports of Regulation 1054/94 (cumulative balance as at 15/10/99). For the 8 target countries we have based our investigations on the data supplied by the evaluators in November 2000, which are more detailed, although it is not always possible to quantify them.
We would point out that France did not use these measures.
In the Netherlands and in Sweden, the operations are nil according to the cumulative balance as at 15/10/99 of the 1054/94 report.
In Belgium and Luxembourg, only 4 and 5 files have been produced respectively.

The figure below shows the breakdown of these broad categories between the 8 target countries.

Figure 12 : Breakdown of the types of improvement by country



Source : cumulative data collected by the national bodies, November 2000
Scale : the eight target countries

Comments :

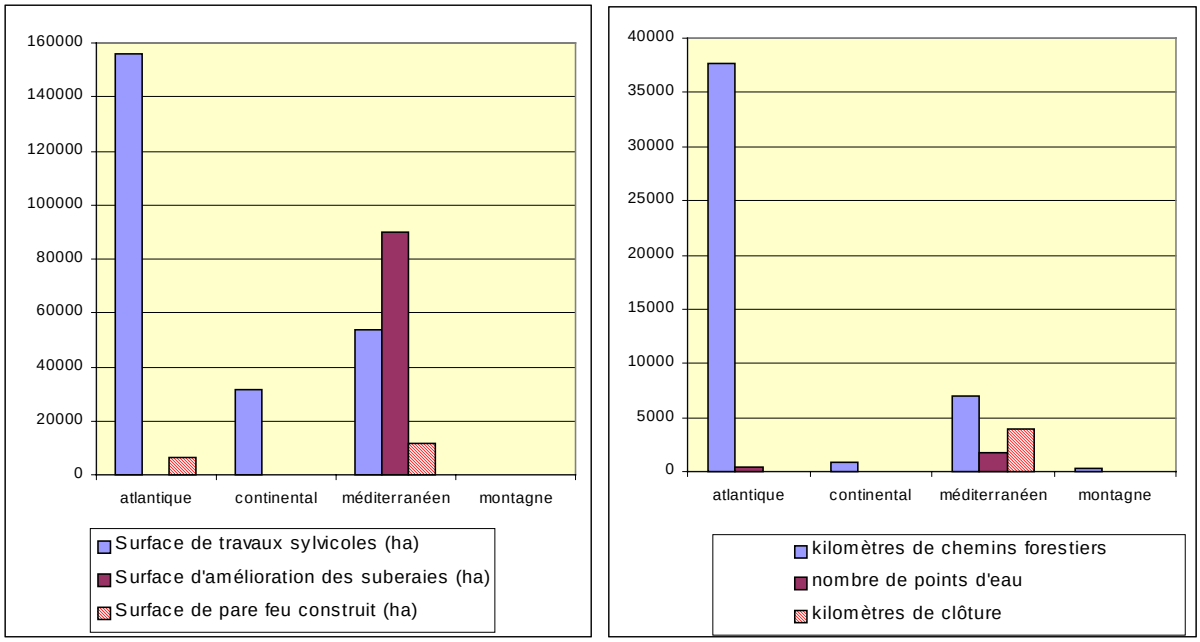
As for afforestation, the situation varies from country to country and according to the biogeographical zones.
Three countries stand out due to the size of their operations :

- Germany, which has undertaken the improvement of 101 018 ha of forests, mainly for the purposes of protection ;
- Spain, which has improved large areas of cork stands (82 405 ha), but also other types of forests (76 538 ha) ;
- Finland, which has concentrated its efforts on the improvement or creation of drainage systems (80 302 ha), as well as on the conversion of not particularly productive plots (11 459 ha).

Readers can refer to Annex 12 for details of the operations in the 15 Member States, and to how they are broken down according to the classification created for this study.

2.2.4. Results by biogeographical zone

Figure 13 : Breakdown of the improvement operations by biogeographical zones



[Surface de travaux sylvicoles : Area of forestry work; Surface d'amélioration des suberales : Area of improved cork plantations; Surface de pare feu construit : Area of firebreaks created; kilomètres de chemins forestiers : kilometres of forest paths; nombre de points d'eau : number of water points; kilomètres de clôture : kilometres of enclosure]

Source : cumulative data collected by the competent national bodies, November 2000
Scale : the eight countries targeted

Comments :

In the Mediterranean zone, the improvements are aimed at rehabilitating abandoned and dying cork stands, mainly in the south of these two countries. The cork oak is in fact indigenous to the Mediterranean (more than 90 000 ha are to be found in Spain and Portugal).

In the Atlantic zone, the forestry work has been carried out on more than 155 000 ha and covers a very wide range of operations, mainly in Germany and in the United Kingdom (where in most cases they were carried out to provide more diverse species and for biodiversity purposes in general).

The infrastructure improvements concerned mainly roads (the objective of providing exits from woods in the Atlantic zone and of protecting against fire in the Mediterranean zone) ; and, in the Mediterranean zone, the creation of enclosures (the objective being to protect young plantations from wild and domestic animals).

We would point out that in Portugal, these infrastructure operations may be combined with and financed within the framework of the new planting projects under Regulation 2080 (in addition to those financed within the framework of the improvement projects).

3. The beneficiaries of Regulation 2080/92

3.1. Breakdown of the beneficiaries by type of aid for afforestation

The European texts define the two categories referred to in Regulation 2080 :

- ✔ farmers : operators who derive at least 25% of their income from farming (Regulation 2328/91) ;
- ✔ other beneficiaries : natural and legal persons who are eligible for the aid from Regulation 2080.

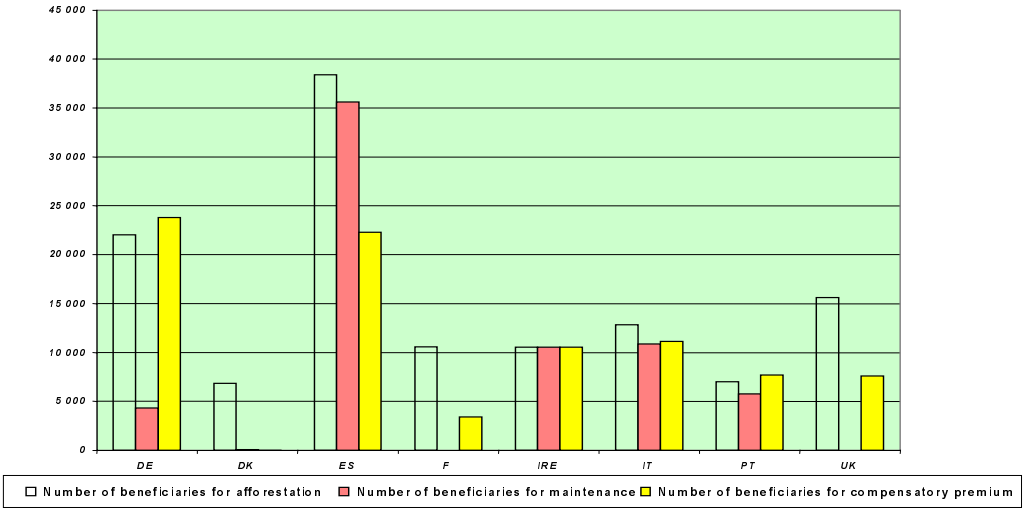
We would point out that this definition of what constitutes a farmer could differ from country to country (Spain in particular gives a threshold of 20% for income from farming), which does not in any way alter the part-financing rules laid down by Regulation 2080.

Table 8 : Breakdown of the information under Regulation 1054

	DK	DE	ES	F	IRE	IT	PT	UK	TOTAL of the 8 target countries	TOTAL of the 15 countries of the EU
	Compensatory premium for loss of income									
Number of beneficiaries	12	23 806	22 298	3 408	10 557	11 155	7 685	7 588	86 509	101 011
Number of hectares	120	25 756	372 089	25 399	97 319	49 841	209 582	52 419	832 525	864 938
- farmers	37	13 207	241 116	12 526	58 817	41 065	187 691	52 419	606 878	624 892
- other beneficiaries	83	12 549	130 973	12 873	38 502	8 776	21 891	0	225 647	240 046
Number of ha/beneficiaries	10,0	1,1	16,7	7,5	9,2	4,5	27,3	6,9		9
% area belonging to farmers	**31%**	**51%**	**65%**	**49%**	**60%**	**82%**	**90%**	**100%**	**72,9%**	**72,25%**

Source : DG for Agriculture
Scale : the 8 target countries

Figure 14 : Number of beneficiaries by type of aid and by country



Source : Regulation1054/94.
Scale : the eight target countries

Comment :

- Germany and Spain together represent almost 50% of the beneficiaries of aid for afforestation, but differ in terms of the average area afforested. In Germany the areas are small (1.2 ha on average) and in Spain they are large (11.96 ha on average), particularly in the case of the plantations in the southern regions of the country (Andalusia and Estremadura) ;

- in the case of Denmark, the number of beneficiaries (6833) also includes those which planted shelterbelt hedges ;

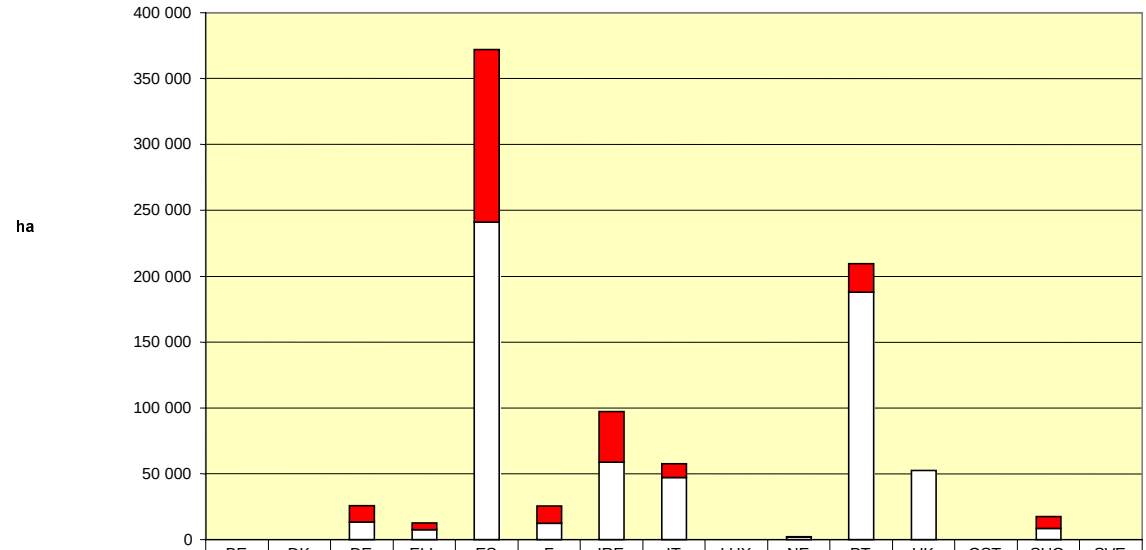
- there are very few beneficiaries of the maintenance premium in Germany because the trees were planted very densely and this required a smaller number of operations ;

- only Ireland used the three types of aid simultaneously for all the beneficiaries.

3.2. Breakdown of the beneficiaries by status (farmer, non-farmer)

Regulation 2080/92 provided for the granting of a compensatory premium for loss of income according to the status of the beneficiary : farmer or non-farmer. Hence we were able to distinguish between the different types of recipient of this premium for the 15 countries of the European Union. The results are shown in Figure 15 below in terms of area (the operations in terms of the number of farmers benefiting is not known).

Figure 15 :Compensatory premium for loss of income : area afforested according to the status of the beneficiaries



	BE	DK	DE	ELL	ES	F	IRE	IT	LUX	NE	PT	UK	OST	SUO	SVE
- other beneficiaries	0	83	12 549	5 083	130 973	12 873	38 502	10 124	4	139	21 891	0		9 173	0
- farmers	15	37	13 207	7 593	241 116	12 526	58 817	47 285	0	1 878	187 691	52 419		8 528	0

Sources : Regulation 1054/94
Scale : the 15 countries of the European Union

Comments :

- it is noted that 72% of the area eligible for a premium belongs to farmers, knowing that one of the innovations of 2080 was to open the premiums to non-farmers, who therefore represent 28% of the area eligible for a premium ;

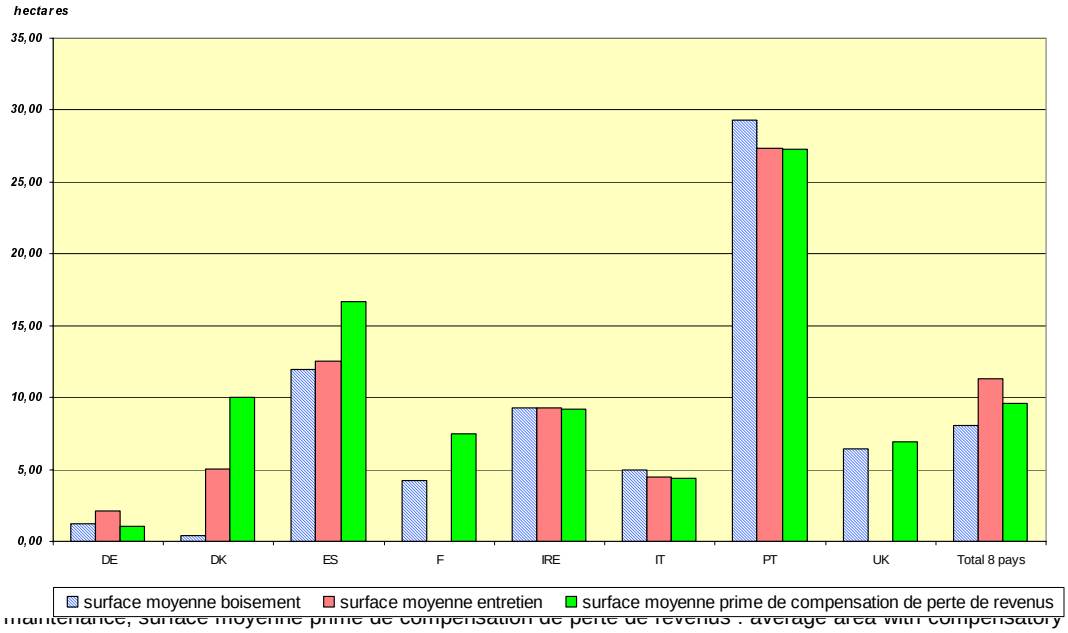
- only the United Kingdom did not grant the compensatory premium to non-farmers ; as for Denmark, it only introduced the compensatory premium in 1997, which explains the low number of beneficiaries ; Austria has not introduced the compensatory premium at all.

3.3. Average size of areas afforested per beneficiary

With an average for the 15 countries of the EU of the order of 8 hectares, the size of the areas afforested varies enormously, from 1 hectare for Germany to more than 25 ha for Portugal ; the

size depends on the structure of the farmers' plots but also on the afforestation policy of the country.

Figure 16 : Average area afforested in the 8 countries studied in the evaluation



maintenance, surface moyenne prime de compensation de perte de revenus : average area with compensatory premium for loss of income]

Source : Regulation 1054/94
Scale : the eight target countries

Comments :

- **In the case of Denmark, the average size of the areas afforested under Regulation 2080,** as calculated with the data under Regulation 1054, **is 9.8 hectares.**
  This average is not representative because hedges were included ; hence the areas afforested are smaller.

4. The national programmes ; conditions for awarding compensatory premiums

Each country decided to apply different conditions, as the table below shows.

Table 9 : Awarding conditions and maximum amounts eligible for the compensatory premium for loss of income

	DE	DK	ES	F	IRE	IT	PT	UK
the premium exists	yes	yes since 1996	yes	yes	yes	yes depending on region	yes	yes
Public beneficiaries	no	no	no	no	no	no	no	no
Private beneficiaries	yes	yes	yes	yes	yes	yes	yes	Yes
Farmers deriving at least 25% of their income from agriculture								
max amount of the premium Ecu/ha/year	714.5	353.3	184.0	163.0	381.6	600.0	85.0	366.4
term in years	20	20	20	5 to 15	20	20	20	10 to 15
non-farmers	yes	no	yes	yes	yes	yes	yes	no
max amount of the premium Ecu/ha/year	306.2	347.4	110.0	63 on average	152.6	150.0	25.0	
term	20	20	20	7 to 15	20	20	20	
Special conditions for granting the premium				Term depending on species, amount depending on agricultural region	Depending on soil quality	Varies according to region		Depending on soil quality

Scale : the eight target countries

Comments :

In Germany the compensatory premium for loss of income is open to non-farmers only in cases where the trees are planted on former grassland.

CHAPTER 3
RESULTS AND IMPACTS

1. To what extent have the forest activities helped cushion the effect of the 1992 reform by promoting rural development ?

Context and framework of the evaluation

The CAP reform of 1992 was characterised by :

- ✔ a reduction in the support prices for agricultural products ; compensation by paying subsidies directly to the farmers ;
- ✔ a reduction in production (a freeze on land, maintenance of milk quotas, control of the production of bovine animals) ;
- ✔ accompanying measures : introduction of early retirement for farmers (Regulation EC No 2079/92), aid for afforesting land to promote the withdrawal of agricultural land (Regulation EC 2080/92), agri-environmental programme (Regulation EC No 2078/92).

This reform mainly affected :

- ✔ the conversion of agricultural potential (reduced production, diversification of activities) ;
- ✔ the social and economic balance of the farms (effect on the employment and income of farmers, small farms and the least productive farms became more fragile) ;
- ✔ the environment and the countryside
- ✔ land use (withdrawal of arable land, development of cultivated areas which had received a premium).

All key elements of rural development, no longer perceived solely as a simple tool of quantitative production, but as a sustainable and balanced force, safeguarding this production but also bearing in mind the long-term reproducibility of all the resources, material, human and environmental, involved in the process.

In this context, the present study aimed to establish whether the afforestation and improvement operations promoted by Regulation 2080 had helped, depending on the case, to consolidate or restore the socio-economic balance of the farms, enabling them to create new wealth, employment, a respect for the environment and to be sustainable in the long term.

In order to do this, the evaluation examined the role of forestry activities on the farms from the point of view of :

- diversification of activities
- maintenance of employment and income
- land use
- the impact of these activities on the countryside.

As the Member States have not introduced specific tools for collecting information on the effects of the afforestation of agricultural land and the management of existing woodlands on rural development, it is not possible to carry out a systematic quantitative analysis of this subject.
Our analysis will therefore be based mainly on the experience of the national evaluators and surveys conducted among the beneficiaries.

The judgement criteria and indicators used were as follows :

Criterion 1 : Creation or maintenance of activities and jobs connected with forestry on the farms and in the countryside
- role played by short-term work on the farm connected with the 2080 operations
- type of activities introduced on account of these operations

- significance of the activities carried out by the enterprises

Criterion 2 : Contribution of the financial measures under 2080 to agricultural income
- proportion of the compensatory premium in the gross income of the farm
- degree to which the costs of afforestation are covered by the aid

Criterion 3 : Prevention of land abandonment with the afforestation measures of 2080
- significance of the afforestation on not particularly productive agricultural areas

Criterion 4 : Complementarity with alternative approaches and measures on the region under Objective 1 and 5b
- significance of the operations under 2080 in line with those provided for in zones 1 and 5b

Criterion 5 : Sustainable effect of 2080 on rural development.
- Sustainability of the afforestation
- Sustainability of the afforestation policies

1.1. Creation or maintenance of activities or jobs connected with forestry on farms and in the countryside

1.1.1. Role played by short-term work on the farm connected with the plantation or improvements themselves

Generally a positive contribution…

Afforestation or the improvement of existing plantations under Regulation 2080 is an element of rural development in so far as it creates jobs on the farms concerned or in specialised enterprises further down the line which perform forestry work for the beneficiaries.

Between 1994 and 1999, Regulation 2080 injected 3.6 thousand million euro into the agricultural and forestry sector, 1.5 thousand million of which are from the EAGGF, which enabled the afforestation of 1 million hectares, the maintenance of 794 000 ha and compensation for loss of agricultural income from 864 000 ha.
According to the experts in the various countries, tree-planting, and the first 5 years of maintenance of the plantation, requires 25 to 30 man days/ha. It can therefore be calculated that there is a potential here for the creation of the equivalent of 150 000 full-time jobs over 5 years.
This job potential has saved jobs under threat, employed farmers themselves and created new jobs which are often seasonal.

To this number of direct jobs should also be added the jobs following on from this :

- production and selling of plants in the nurseries : With an average of 1 000 plants/ha, 1.2 thousand million plants were required over 6 years, i.e. 200 000 000 plants per annum on the European scale ;
- production of supplies for afforestation (stakes, tools, fencing, protection, etc.)
- production and maintenance of machinery ;
- afforestation consultancy work : land diagnostics, the putting together of technical and administrative dossiers, monitoring the work ;
- examination and management of the dossiers by the regional and national authorities.

In the long term, it will be necessary to be able to take account of the jobs connected with maintenance of the forests, clearings, farming of the wood, then with the wood processing industry, which can be pin-pointed for several decades.

We can also add to this the other uses and activities connected with forests, such as hunting, products other than wood (fruits, mushrooms, aromatic plants, honey, etc.), which, in the long term, will be able to create jobs which have not been fully developed yet but which could be very profitable in the future.

However, it is difficult to obtain accurate information on this point in the evaluation, with very few exceptions (pine nuts or ground nuts for example, which will be reported on in part 2.1.2.4).

But afforestation requires less work than agriculture and, to a fairly large extent, requires the use of operators other than the beneficiaries.

Forestry activities are in fact less hard work from this point of view than agriculture, and complement agricultural activities, i.e in a « fallow » agricultural period – the survey results are very clear on this point (see Annex 14, illustrating a French study conducted by the IDF in 93).
Furthermore, from the point of view of the calendar, there is far greater flexibility than in agriculture in terms of when the silvicultural work can be carried out.

Above all, the extent to which the beneficiaries work does of course depend very much on the proportion of the work they carry out themselves (in the case of elderly beneficiaries or those who have already retired, afforestation can be an important source of work).
Very clearly, therefore, it appears that in order to be effective from the point of view of diversification, most of the forestry activities have to be carried out by the farmers or their employees.

The beneficiaries particularly carry out preparatory and maintenance work. Above all working the soil (for which farmers often have adequate agricultural equipment) : clearing undergrowth and plants, replanting, installing protection against game, initial prunings and training plants. The time this work takes is generally under-estimated.

On the other hand, it is more frequently the case that a firm is called in to carry out the planting itself (in particular for the farmers), for the following reasons :

- the large afforestation projects require suitable technical means and labour which the farmers do not have in sufficient quantity (particularly as the beneficiaries are often elderly farmers who are precisely reducing their labour force).
- The farmers often have no technical knowledge about forestry which would enable them to monitor the plantings effectively and prefer to have this work carried out by specialists.
- Afforestation enterprises have often been set up to offer this service to farmers (in Spain, Portugal and Ireland)

  All the more so as, according to the Spanish, Portuguese and Irish evaluators, in certain objective 1 regions, the afforestation and maintenance costs were covered 100%, which enabled farmers to call in an enterprise to carry out the work.

Some data from the target countries

In the United Kingdom, on average, afforestation requires 8 farmer days/ha during the planting period.
For plantation maintenance between 2 and 5 years, 3.5 to 5 man days/year are needed on average. This corresponds to a total of 26 to 32 man days/ha.

In Ireland, the time taken to work a plantation on a 40 year rotation is calculated at 137 man days, hence 26 days over the first 5 years.
But most of the beneficiaries (80% in surveys among the beneficiaries) call in service-providers for plot preparation work to maintenance work.

In France, the beneficiaries, and in particular the farmers (working or retired), tend to carry out the planting and maintenance work themselves, which creates a considerable amount of work for the first 4-5 years.

In Germany, the surveys among the beneficiaries (who are 47% farmers) show an increase in the proportion of time they devote to the forestry activities since 2080 was introduced. The level of activity rose from 3% to 10% for full-time farmers and from 9% to 13% for part-time farmers. For the former, 7% of « lost » work relates partly to other non-agricultural activities and partly only to forestry.

1.1.2. Type of work brought about by the afforestation or improvements (silviculture, hunting, honey, fruit, etc.) and estimation of their importance to the farm

The start of a significant dynamic but one that is difficult to quantify

There is little quantitative information available about activities other than wood and cork production. However, the multi-functionality of the plantings is often referred to, in particular by farmers interviewed who have a better relationship with their forestry heritage, as a source of additional work, natural resources (wood for heating or building materials), and products other than wood, (hunting, which is an activity often associated with the plantation, even if it rarely constitutes the main objective of the forest and other accessory products).

We would point out that these secondary activities are not mentioned by the various bodies intervening and advisors in most of the countries, in so far as it is either the forestry authorities which examine the dossiers (generally preferring wood production), or agricultural authorities (who then stress the amount of the premium as additional income).

On the other hand it is often « grey » activities which constitute a « plus » for the farmer.

It is unfortunate that there is this lack of openness in the implementation of the national programmes, in particular in the countries of the south, where the combination of agri-forestry and silvi-pastural activities would enable the plantations to play a truly multi-functional role.

Some data from target countries

Italy is one of the countries which have been able to bring in innovations in the silvicultural plans by planting mixtures of valuable and fast-growing trees (cherry-wood and walnut in 35 to 40 years), with accompanying honey-bearing bush species. These types of plantations – often in rows – are planted in particular in the Veneto and Lombardy, which produce honey within 5 years, but also fruits, wood for heating and stakes, etc.

In Denmark, the reception and agri-tourism activities are quoted among the objectives pursued by the beneficiaries, without however being able to quantify their importance in terms of time or income.

In Ireland, in 1996, within the framework of the « Strategic plan for the development of the forestry sector », a survey was conducted among private foresters, showing that 90% of them were producing wood for working, whereas 45% used the wood for personal purposes (firewood and stakes) and that 42% enjoyed their wood as a place for family relaxation.

In France, relatively few plantations were created with the aim to diversify activities, in order to provide an income or services. A few examples of diversification, which are still marginal, such as for example plantations intended to improve the landscape and for pleasure in order to develop an « on the farm »-style tourist reception activity were however mentioned.

1.1.3. The importance of the afforestation, maintenance and improvement activities carried out by the enterprises

A fairly important development with contrasting effects

The first 5 years of afforestation, from 1994 to 1999, apparently provided the opportunity to create a whole string of enterprises, of considerable size, either by creating jobs directly connected with afforestation or maintenance, or, in countries with programmes which tended to volunteer for the afforestation of agricultural land (Spain, Portugal, Italy, Ireland and the United Kingdom), by the creation of new public and private forestry consultancy jobs.

No quantitative data is actually available today on the number of jobs directly created in the supervisory or consultancy firms. But it is an observation which all the evaluators made and some of them were able to collect the results of studies carried out in some countries which corroborate this (see below).

This observation is also validated by the results of surveys among beneficiaries and interviews with national experts which show that the vast majority of beneficiaries have used :

- either consultants to advise on the soil and the choice of species to plant, before carrying out the work themselves,
- or forestry services to sub-contract all the planting and maintenance work, (mainly in Spain, Ireland, Italy, Portugal, the United Kingdom and Denmark).

Some data from target countries

In a study carried out in 1999 in England, **the United Kingdom** demonstrated that stopping aid for afforestation would lead to the disappearance of 900 direct jobs (36 643 ha having been afforested, this would represent one job per 41 ha).
In another survey, conducted throughout the United Kingdom, farmers said that they had sub-contracted the work to enterprises in 20% of cases, and had asked their employees to carry out this work in 20% of cases. And 60% had planted and maintained their plantations themselves, often when the smallest areas were involved.

In Spain an estimate carried out by the Ministry of Agriculture in 1997, after Regulation 2080 had been in force for two years, showed that 800 000 ha had been afforested and 200 000 ha of improvements had been planned overall in the programme with 75% being carried out by enterprises, should lead to the creation of the equivalent of 46 000 part-time jobs or 23 000 full-time jobs (one job in an enterprise would therefore be created per 35 ha planted).

We would point out in this respect that in Spain, which is the main country to have planted, aid for afforestation and the maintenance premium can, according to the evaluator, be granted directly to the enterprises which then suggest « turnkey » projects. This practice can even go as far as canvassing for « customers » who have land available for afforestation, which are likely to be eligible for the compensatory premium for loss of income (such cases are also found in parts of Portugal, in the north-east of the country in particular).

This use of enterprises, which is common in some key countries for the application of 2080, is considered to be positive for three different reasons :

- as farmers have little or no training in afforestation techniques, the risk of error is therefore less ; furthermore, there is a guarantee of the plants taking in the case of sub-contracting and the possibility of the beneficiary monitoring the quality of the work of the enterprise.
- these enterprises create jobs in rural areas which are often undergoing desertification ; some regions of Italy, Spain, Portugal and Ireland in particular, have, owing to 2080, been able to develop new jobs for managing afforestation and forests.
- At the same time, it would appear, in the opinion of the evaluators, that in the absence of truly structured operating systems in the first few years, the authorities have viewed favourably the role of relaying information from the beneficiaries which these enterprises have finally be led to play.

On the other hand, the national evaluators (always through their discussions with the experts and beneficiaries), highlight certain negative effects :

- ✔ In the case of Spain and Portugal, the huge amount of work created due to the size of the area to be planted, since 1995-1996, and the fact that no structures existed beforehand to meet such a large challenge, this led to public works enterprises converting to afforestation without having the benefit of any training whatsoever ; the level of competence of these companies is therefore often poor and even bad, particularly as there is no requirement to provide certification of quality in this area.
- ✔ This high level of commercial opportunism has been encouraged by the afforestation costs being covered 100% by the aid in certain Objective regions. These enterprises, which

already had heavy civil engineering equipment, were able to set up work sites at prices which defied any competition and prevented the taking on of enterprises which were technically competent but whose rates were far less competitive.

- ✔ The beneficiaries canvassed by the enterprises are not small farmers, but those who have large areas to be planted. A report from the WWF in Spain stresses the fact that it is often large landowners who have afforested to the detriment of extensive stockfarms, in order to promote tourism involving hunting, often without great concertation. This is confirmed by the report from Birdlife International which quotes cases in La Mancha and in Cuenca where extensive grazing land for sheep, bearing quality labels, has been planted with forests.

  We should say that this phenomenon has been far less prevalent in Ireland and Italy, in so far as these countries have had less ambitious programmes, spread more regularly over time.

- ✔ As far as the improvements are concerned, on the other hand, the enterprises are less involved, because it involves work running over one year only, whereas afforestation gives rise to contracts running over 5 years with the maintenance. Furthermore, improvement work requires more expert knowledge, which the forestry work enterprises mentioned earlier do not necessarily have.

1.2. Contribution of the financial measures under 2080 to agricultural income

1.2.1. Proportion of the 2080 aid in the gross farm income

A decisive effect in terms of financial incentives

The data issued by the Farm Accountancy Data Network could be used to draw up this indicator (see the FADN's presentation in Annex 4).

This information is very valuable because there are no adequate tools common to all the Member States which can be used to compare the forestry aspects of farms. However, they have to be approached with care as far as what we propose is concerned :

The FADN sub-sample which we have used for this evaluation only includes farms which have benefited from the aid for afforestation.
It is not certain, however, that the results obtained from this sub-sample of farms is representative in so far as only countries which have a sufficient number of farms benefiting from the aid for afforestation appear in this data (curiously Spain does not appear, precisely because there is a lack of a sufficiently large sample).

Irrespective of these earlier reservations, an examination of the data available nevertheless gives a few interesting tracks to follow, based on the table below :

Table 10 : Proportion of the aid for afforestation in the gross income of farms which have benefited from aid under Regulation2080

Countries in 1998	Ireland	Italy	Portugal	Germany	United Kingdom
Amount of aid for afforestation in EURO	2 369	4 467.92	2 756.76	719.52	2168.26
Usable agricultural area in ha	43	23.6	29.1	37.5	211.9
Area of forest in ha	11.24	9.01	31.18	8.87	14.16
Gross farm income (GFI)	20 468	26 354	12 653	42 306	107 178
Ratio : Aid for afforestation/GFI	11.57 %	16.95 %	21.79 %	1.70 %	2.02%
Ratio : Aid for afforestation/total amount of agricultural aid	17.17 %	32.53 %	53.14 %	5.34 %	3.98%

FADN data - 1998
Scale : target countries

Comment :

By aid for afforestation is meant all the aid together. The total amount of agricultural aid was the amount declared by the farmers during the FADN survey.

According to what the experts and our evaluators have said, we have regarded the aid for afforestation to include significant additional income, as, in percentage terms, the amount of this aid was as high as 10% of the gross farm income (GFI).

In those countries where agricultural income is low, in so far as it generally goes beyond this threshold (Portugal, for example, with almost 22%), the aid for afforestation therefore seems to us to constitute a significant contribution to the beneficiaries' income.

All the more so as afforestation can lead to a drop in the requirement for labour on the farm and therefore lead to a reduction in charges (it is not possible to evaluate this drop because neither the earlier land use, nor the crops produced are known with certainty).

Clearly those countries which had a strategy of encouraging afforestation in farms are those where the ratio between aid for afforestation and gross farm income is greatest. The afforestation aid here represents between 10% and 20% of the gross farm income of the beneficiaries. They are also the countries which have the lowest agricultural income per hectare.

Some data from target countries

In Denmark, the surveys among the beneficiaries showed that the compensatory premium covered 83% on average of the income from renting out land for « good agricultural land ». On «land at risk », it covers the loss of income completely.

In Germany, the amount of aid rose, from 94 to 99, from 4% to 9% of the gross margin of the beneficiaries (which may be explained by the situation in the markets of other agricultural products). We would point out that the amount in euro of the aid for afforestation is lower than in the other countries, simply because German farmers mainly used the aid for improvement, which are lower amounts, and improved smaller areas than in the case of afforestation.

In Ireland, since 1991 the aid for agriculture has been 44% of the total agricultural income ; among this aid, afforestation plays a significant role, representing 5.5% of the total amount of aid for agriculture.

The special case of the compensatory premium for loss of income

From the point of view of tax, the compensatory premium for loss of income is considered to be agricultural income.
Consequently, when afforestation is carried out on land which is being abandoned, where there was no real agricultural income, it constituted a net receipt (Spain is a case in point where the WWF Spain report stresses the fact that some beneficiaries receive this premium when they plant land which has been abandoned for a long time and which does not generate income ; this is also true for Italy where it was open to non-productive land).

When afforestation was carried out on land which was truly productive, on the other hand, it did not totally compensate for the loss of income.

One thing which has been clear from the surveys among the beneficiaries, is that this premium is considered to be more of an aid to maintain the plantations over the long term, for 20 years, rather than an agricultural income in the true sense of the word. And this is particularly the case where

the plantations are based on broadleaves, which require considerable care for almost 15 to 20 years, in terms of pruning and shaping.

Finally we should point out the particular problem encountered in Ireland, where COILLTE TEORANTE, a public body and agency of the Irish state, received the premium for loss of income on agricultural land bought from farmers in order to plant it. This matter was brought before the Court of Justice.

1.2.2. The extent to which the cost of afforestation was covered by the aid

We would point out that, for the question considered, this indicator aims to help with an appreciation of the specific quantitative contribution of the aid to afforestation, compared with the expenditure incurred, and its effects on the overall agricultural income.
Consequently it also provides information on the more or less incentive-related nature of this aid, this point being dealt with more generally in part 7.

For this indicator we estimated that the extent to which the cost of afforestation and maintenance could be considered to be acceptable was upwards of 50%, in the context of a long-term investment, it being understood that these costs were estimated by type of afforestation, and were based on known technical itineraries.
It should be borne in mind that the cost of planting conifers is lower than that of broadleaves because the latter require more investment, more soil maintenance and more care to be taken of the trees.

Some data from the target countries

In Germany, the aid for plantations of broadleaves is greater than that granted for plantations of conifers, but the costs are also greater for the broadleaves (particularly on account of the high densities, connected with German forestry tradition).

Consequently the extent to which the costs for planting broadleaves was covered was lower, as it varied between 25% and 90% depending on the case, instead of 75% to 100% for conifers.

In Denmark, 60% of the beneficiaries said that all of the costs were covered by the aid ; for the remaining 40%, this level varied from 80% to 90%,

In France, it was planned that the aid for afforestation would cover at least 40% of the amount net of tax of the work but some regions paid lump sums, and overall, in the evaluators' opinion, this ratio was clearly higher (up to 70%)

This level of cover – albeit limited – was deemed to be a great incentive, particularly for working farmers, even if it only covered part of the costs.
(The beneficiaries questioned in France declared that they would not have afforested without the aid or would have only planted smaller areas, often in tranches in order to better spread out the investment).

In Ireland and in the United Kingdom, in spite of the modulation introduced according to the potential of the land, and according to the surveys among beneficiaries, it would appear that the compensatory premium did not totally cover the loss of earlier income, even if the cost of afforestation operations was covered by the aid.

In the United Kingdom, the level of cover was 80.3% in the case of the maximum amount of aid being paid out for the afforestation of arable land.

Overall therefore, it would appear that this level differs considerably from one country to another and that the aid ceiling planned in Regulation 2080 puts countries with a high income where the price of labour is high, at a disadvantage.

We would point out that, over all of the aid granted, the aid for the investment appears to be decisive when farmers are deciding to plant trees, and this is for two reasons :

- It enables the owner, if he is carrying out the work himself, to largely cover the expenses (which may then be reduced, in extreme cases, to purchasing the plants, if necessary protection against game and the fees of the works supervisor) ;
- It is obtained rapidly and in the short term, whereas the compensatory premium is paid out later and over the long term.

1.3. Prevention of land abandonment with the afforestation measures of Regulation 2080

1.3.1. Significance of the plantations on agricultural areas with the lowest production levels

The process of abandoning the land is linked to two concomitant developments which have the same consequences in the least directly productive areas :

- A large proportion of the farmers are elderly and over 55 years of age, and sometimes up to 50% of them have no successors and the land therefore becomes vacant,
- Farm specialisation condemns some of the land to no longer being profitable and therefore to be abandoned in the long term.

Afforestation can temper or even change these two developments because the aid offers the possibility of a productive investment, enabling the farmer to retain the asset which the farm is on the one hand, and on the other to obtain an income in the medium term (the compensatory premium is paid from 7 to 20 years).

Consequently the surveys among the beneficiaries confirm that it is the least productive of their agricultural plots which are afforested.

Some data from the target countries

In Germany and Denmark, it was the lower quality land which was afforested by the farmers.

In Ireland, the land most afforested is poor and often humid grassland ; 60% of the beneficiaries said that this afforested land had not been cultivated, was wasteland or rough grazing. Only 6% stated that they had planted arable land or improved grassland.

In Portugal and Spain, many of the plantings were in areas where activity was decreasing, they enabled a dynamic for development to be triggered again and were generally on not particularly productive land.

In France, the largest plantings were in the Pays de Loire, the Central region and the Midi-Pyrénées, on land which was also not particularly productive.

1.4 Complementarity with alternative approaches and measures

1.4.1. Size (in terms of area and number) of the operations under 2080 together with other approaches and alternative measures

We were unfortunately unable to use this indicator satisfactorily from a quantitative point of view, due to the lack of complete and reliable data.

From a European point of view, the programmes likely to involve the same land as that affected by Regulation 2080/92 are as follows :

- ✔ programme 2078/92, relating to the extensification of arable land, a reduction in the level of fertilizers used and the move towards organic farming ;
- ✔ programme 1765/92, relating to the set-aside of arable land in order to limit cereal production ;
- ✔ amendment No 2085/93 of Regulation 4256/88 relating to the planting and maintenance of existing woodlands.

According to the evaluators and experts, it would appear that 2080 has had effects complementary to those of other alternative Community measures existing in Objective 1 and 5b regions ; in particular to those of Regulation 2078 (which was the only one mentioned and which will be the only one considered in this part).

As far as Regulation 2078 is concerned, this complementarity of principle is clear and its effect was felt in a restructuring of the activities of the farms : if the « afforestation » part of 2080 finally enabled certain less productive land to be withdrawn from the agricultural circuit, 2078 enabled productive land to be removed from the same circuit, on which the farmer, in spite of everything, retains an agricultural income.
In addition to this, in most cases the beneficiaries are not the same : tending to be older for 2080 and younger for 2078.
Finally, the two regulations together offer the possibility of acting together to solve environmental problems in the countryside, such as managing marginal land, habitats or landscapes (e.g. hedges and strips of woodland).

But this complementarity of principle between Regulations 2080 and 2078 have been little utilised overall.
Sweden, for example, has excluded from the application of 2080 certain zones which were eligible in 2078.
And the 1998 report of the Institute for European Environmental policy (IEEP) states on this that «poor coordination risks conflict between the various measures and leads to their effectiveness being reduced ».

However, some countries do not follow this trend :

- in Portugal, the national programme states that the beneficiaries of 2080 can be farmers also benefiting from 2078 ;
- in Spain, the Royal Decree, which brought in 2080/92, refers to the need for coordination between 2078 (2080 having been more attractive in terms of the number of beneficiaries than 2078) ;
- in Denmark, the national programme mentions the possibility of combining the premiums of 2080 and 2078, but excluding the possibility of cumulating them.

We would point out that there are other programmes relating to zones 1 and 5b which are financed by the EAGGF, outside the common agricultural policy. These programmes may target the aid to the improvement of existing forests, and in certain cases are aimed at non-farmers.
Very clearly their action is therefore complementary to and not in competition with that of 2080, in so far as they take on improvement operations open to an audience which is not eligible for 2080 (all the more particularly because the aid for improvement is only 4% of the total amount of the aid financed by 2080).

Some data from the target countries

In Germany, there is a whole raft of measures open to owners of forests, whether farmers or not, which encourage the grouping together of smallholdings for using the woods after fires and for protecting the forests from damage. These measures can be applied to new plantings carried out with 2080.

In the United Kingdom, certain regional programmes are complementary with 2080, in particular :

- « Anglia Woodnet project « encourages the management of small plantations in the east of England
- « Coed Cymem », in Wales, has helped sustainable silvicultural practices (regeneration in particular) and more particularly encourages the use of broadleaves to improve the profitability of the stands
- « Tir Cymen » - also in Wales, has been helping farmers for 10 years to improve land use, including from the countryside, cultural or historic point of view.
- « The Challenge Found », in Scotland offers to increase by 50% the aid provided for in the context of the Woodland Grant Scheme (WGS) to encourage farmers and owners to create diversified forests capable of producing wood for industrial use. These plantations have to be larger than 10 ha and be situated on agricultural land or improved grassland.

In France : the regional programmes, which also take into account the whole of the structural financing other than 2080, have generally not drawn special links between the programmes.
Only the Midi-Pyrénées region has supplemented the compensatory premium for loss of income by 57 euro/ha/year in the eligible zones, and the Pays de Loire region has provided lump sum complementary aid for oak plantations or seedlings.

1.5 Sustainable effects of Regulation 2080 on rural development

In order to perceive these effects, we asked ourselves two questions :

- ✔ Will the plantations planted between 1994 and 1999 exist for more than 20 years (the period planned as the maximum term of payment of the compensatory premium for loss of income) ?

- ✔ Will the afforestation policy make it possible to prolong the impetus which was seen between 1994 and 1999 concerning the maintenance and creation of activities, support for income and the prevention of land abandonment ?

1.5.1 Sustainability of the plantations

Let us stress straight away that afforestation intrinsically concerns long-term production because of the maintenance activity it requires, and the harvesting and processing activities which it can generate beyond the term of payment of the premium.

Moreover, in most of the countries concerned it is irreversible, which guarantees this impact long term : national legislations generally prohibit clearing the land and returning it to agricultural use, in so far as the plantations are regarded as a forest, and they have benefited from (European or national or even regional) public aid.
But :

- Uncertainties remain about the types of afforestation, depending on the status they have been given and which differs from country to country (see the section on the protection of plantations against land clearance in point 2 of this chapter).

- Furthermore, the average age of the beneficiaries is approximately 55, and some of them are no longer able to carry out the silvicultural and maintenance operations themselves, which could bring into question the sustainability of the resource.
  Neither is it known who will succeed them nor the extent to which the objectives relating to the afforestation or improvement operations which they have started and the investments needed for them to be sustainable will be continued by their successors.

- Finally we may well wonder about the effect of the plantation on the countryside in the long term in cases where certain beneficiaries appear to be little involved in these afforestation programmes, many of which – at least for the moment – are the business of forestry works enterprises (Ireland and Spain in particular). If the « market » in afforestation aid falls in these countries – which brings us to the next point – there is a risk of these enterprises disappearing, maintenance of the plots being abandoned and the quality of the plantations coming under threat.

1.5.2 Sustainability of the afforestation policies

It is clearly not enough to have planted trees for 6 years to ensure a forest resource and to prolong the impetus started in the countryside around this resource.

Although afforestation has created jobs in the first 5 years of the regulation being applied, these jobs, which are often precarious, are very dependent on the investments made (with the consequences we have raised above).

No long-term strategy appears to have been thought out, nor even more so posted by the Member States, and it is not known to what extent the future afforestation policies of Europe and the Member States will continue to support the impetus given politically and financially.
(In the United Kingdom, for example, the aid is only paid for 10 to 15 years, and silviculturalists are worried about the size of the maintenance costs to be found after the premium has stopped and are therefore not sure whether they can raise them).

To conclude on rural development

In general this contribution seems to us to be significant and positive and 2080 has fully played its expected role of accompanying the reform of the common agricultural policy.

Although it is clear that the impact of the regulation on the maintenance or creation of income and jobs has been particularly marked in the countries of southern Europe, all the Member States have in fact benefited, owing to 2080, from the very favourable effects in terms of the diversification of agricultural activities and the development of socio-economic activities connected with afforestation :

• According to our estimates, the equivalent of 150 000 full-time jobs have been created owing to the afforestation operations.
The forestry activities do not however replace the agricultural activities because they require less labour, and do not require the same know-how ; moreover the beneficiaries, who are on average over the age of 55, often use outside enterprises. A large sub-contracting sector, which in certain cases reflects little involvement by the beneficiaries, has developed in Spain, Ireland and Portugal, mainly for owners of large wooded areas, because of the high demand raised by ambitious national programmes.
However this has been done, these activities have in all cases given rise in some regions to a greater impetus for development.

Nevertheless it is unfortunate that in the implementation of the national programmes there has been a relative lack of openness concerning the combining of afforestation with other activities – in particular agri-forestry and silvipastoral activities in the countries of the south – which would make better use of the multi-functional nature of the plantations and of alternative types of occupation and development of the countryside.

• At the same time, the compensatory premium for loss of income may be as much as 10% to 20% of the gross income of the farm, whereas the national agricultural incomes are low (countries of the south and Ireland) and 2% in countries where agricultural income is high,
Generally the aid covered between 40% and 80% of the costs borne by the beneficiaries ; as the use of broadleaf plantations led to higher costs than would have been the case with conifers and consequently to a lower level of cover.
In the Objective 1 regions the aid for afforestation covered all of the costs,

• Afforestation also meant that marginal agricultural land of poor potential could be used and not abandoned, whatever the countries and regions concerned, as the « afforesting » farmers concentrated their production efforts on the best and most profitable land.

• The actual complementarities of 2080 with other structural measures (such as Regulation 2078 concerning agri-environmental measures), on the other hand, were little used.
In the countries with a national forestry policy, or benefiting from measures in the context of the Objective 1 and 5b regions, examples of synergy appear however to be more in evidence concerning in particular the more marginal forest improvement measures among the rest of the activities.

These real successes should nevertheless be tempered by a certain number of reservations regarding its sustainability.
It is true that the period of payment of the compensatory premium for loss of income (20 years) constitutes a certain guarantee. And in other respects the irreversible nature of the plantations is partly guaranteed by the legislation in force.

But it does not prevent the sustainable nature of the impact of 2080 on rural development being dogged by two major uncertainties weighing on it in the long term :

• No long-term strategy appears to have been thought out, nor even more so posted by the Member States, and it is not known to what extent their future afforestation policies and those of Europe will continue to support the impetus given politically and financially.

Afforestation is an activity which can only develop if the aid is large and particularly if the level of this aid is close to that of the agricultural income. It would appear that several countries will, in the opinion of some national experts, not be able to pay the premiums for 20 years for the large areas.

Furthermore, it is not enough to have planted trees for 6 six years to have a forest resource, and prolong the impetus started in the countryside around this resource : although afforestation has created jobs in the 5 years since this regulation has applied, these jobs, often precarious in nature and seasonal, will greatly depend for their long-term existence on the investments made.

• The average age of the beneficiaries, in all the countries, is 55, which poses an undeniable problem for the continuity and quality of the maintenance operations when the latter carry these out themselves (which is generally the case).

Furthermore, in the long term it is not known who will succeed them, nor the extent to which the objectives relating to the afforestation or improvement operations which they have started and the investments needed to sustain them will be continued by any successors.

2. To what extent have the forest resources been increased (improved) ?

The tender specification split this question into 3 sub-questions :

- How significant is the anticipated long-term increase in forest production ?
- Can better product quality/added value be anticipated from the woodland improvement measures ?
- Can enhanced stability and longevity of the tree stands be expected due to the forest improvement measures ?

We will therefore examine these 3 questions, detailing for each the judgement criteria and indicators we have used.

And we will define the forest resources, throughout this part, as being all the wood, cork and other commercial resources, but also as being all the non-commercial resources and services of the forest (from the point of view of the social impact, the countryside and the protection of the environment).

2.1. How significant is the anticipated long-term increase in forest production ?

By the increase in long-term forest production is meant the biological increase in tree stands, for the duration of a forest cycle, which varies according to the type of tree stand.
This increase has therefore been estimated over a cycle of 100 years for long-cycle broadleaves, 50 years for valuable broadleaves and conifers and 15 years for fast-growing plantations (see in Annex 3 the breakdown of the classification of the tree stands on which we have based this assessment scale)

The question examined here is therefore to know whether this increase, obtained due to the aid from 2080, has been sufficiently perceptible in quantitative and qualitative terms on a regional, national and European scale and whether it has been sustainable.

The following judgement criteria and indicators have been used :

Significant increase in the area afforested compared with the area of forest in Europe
- area planted under 2080 and area of forest in Europe
- area planted under 2080 and annual increase in area of forest in Europe
- area planted under 2080 and productive forest in the eight target countries
- area planted under 2080 and areas lost due to forest fires in the 5 most vulnerable countries

Significant increase in production due to the planting and improvement operations
- estimated proportion of 2080 production in the annual production of the 8 target countries
- estimated proportion of 2080 cork production in annual exports of the producing countries
- estimated proportion of 2080 cork production due to the areas improved
- estimated proportion of 2080 production of products other than wood

Significant increase in the quality of the forest resource planted
- type of afforestation carried out in the eight target countries
- type of species used in the eight target countries

Sustainability of this increase
- area planted under 2080 protected against land clearance

- level of success of the tree stands
- estimation of the future quality of the tree stands

2.1.1 Significant increase in the area afforested compared with the European forested area

2.1.1.1. Area afforested under 2080 and European forested area

Regulation 2080/92 enabled the afforestation of a total of 1 041 589 ha in the 15 countries of the European Union (source : Regulation 1054/94, level as at 15/10/99).

As the European forested area in 1998 was 113 million ha (Annex 5 – source : Forestry statistics, 1995-1998 data (2000), the plantations created by 2080 therefore represent 0.92% of the European forested area of 1998

This figure may appear small, but if we bear in mind that this increase in the forested area involves mainly private forests and in particular forest belonging to farmers, it takes on another dimension : **as private forest in Europe covers 70 million hectares, 33% of which belong to farmers, the afforestation under 2080 does in fact represent 1.49% of the private forest and 4.5% of the forest belonging to farmers.** (see source Forestry statistics, 1995-1998 data (2000) – Eurostat 1998, Annex 5).
This latter percentage is over-estimated, since a proportion of the beneficiaries under 2080 are not farmers.

2.1.1.2. Area afforested under 2080 and annual increase in the area under forest in Europe

In 8 years the area under forest in Europe has increased by 18.117 million ha, i.e. an annual increase in area of 2.264 million ha (source : Forestry statistics, 1995-1998 data (2000)).

This increase in the forested area takes place mainly by leaving agricultural or uncultivated land to lie fallow and secondarily by natural afforestation, over 20 to 50 year cycles according to how rapidly the trees grow ; as regards the contribution to afforestation by seedlings or planting, this is much less (in France, for example, there are only 10 000 ha of plantations or seedlings out of 60 000 ha of annual increase). Over the period actually covered by 2080 (1994 to the end of 1999), i.e. 6 years, annual average afforestation was 173 6000 ha/year.

Regulation 2080 therefore made a 7.6% contribution to the annual net increase in the area under forest in Europe, which is a far from insignificant proportion.

If we also consider the official forecasts for afforestation, which had not yet been made by 15/10/99, the afforested area would be 1 269 558 hectares, i.e. 211 593 ha/year. This would then represent 9.3% of the annual increase in the area under forest in Europe.

2.1.1.3. Area afforested under 2080 and area of productive forest in the eight target countries

The afforestation carried out under 2080 was concentrated in the eight target countries of the evaluation which, with 1 002 572 ha (source Regulation 1054/94), represented **96.3%** of the afforested area (the breakdown by type of plantation and by species only covering 986 238 hectares).
It is on the basis of this area, therefore, confirmed by the evaluators, that we have calculated the following percentages (detailed data can be found in Annex 20).
It can therefore be assumed that the results obtained for these eight countries are quantitatively representative of what happened in Europe.

The areas afforested under 2080 were compared with the areas of productive forest in each of the eight countries. The results, obtained from data supplied by the evaluators, are shown in the table below.

Table 11 : Proportion of additional areas by type of planting under Regulation 2080/92

	DE	DK	ES	FR	IE	IT	PT	UK	TOTAL
Additional proportion of coniferous areas due to 2080	0,04%	0,01%	2,37%	0,21%	20,92%	0,35%	3,86%	7,29%	1,66%
Additional proportion of broadleaves due to 2080	0,56%	1,6%	7,79%	0,14%	12,80%	1,66%	5,72%	11,40%	2,50%
Additional proportion of mixed tree stands due to 2080	nd	nd	3,20%	nd	nd	0%	nd	nd	2,42%
Additional proportion of forest due to 2080	0,25%	0,66%	3,80%	0,21%	19,21%	1,21%	5,11%	5,47%	2,03%

Source : data from 2080 dossiers consolidated by the evaluators in November 2000
Scale : the eight target countries

Over the whole of the eight countries, the plantations represent **2% of the productive forest**, which is a fairly small proportion.

There are in fact large variations between the countries, with the most significant impact in terms of area being seen in Ireland, where the plantings were as much as **19.2%** of the productive forest. This was followed by the United Kingdom (5.5%), Portugal (5.1%) and Spain (3.8%), which planted large areas.

In Italy, on the other hand, as well as in Germany and France, the area afforested under 2080 is insignificant compared with the area of productive forest (This does not exclude some significant impacts in certain regions).

Some data from the target countries

In Spain, almost 80% of the area afforested by 2080 is concentrated in 4 regions, these being Andalusia (31%), Castile-Leon (22%), Castile-la-Mancha (16%) and Extremadura (10%). Andalusia is the region in Europe where most afforestation took place, covering 131 000 ha, i.e. more afforestation than was carried out in all of the other 14 countries.
These regions are among the least forested in Spain with afforestation levels ranging from 7 to 22%. The additional percentage of forested area due to 2080 is therefore considerable at regional level, particularly in Andalusia where the plantations represent 11% of the productive forest, and in Extremadura where they represent as much as 14%.

In Ireland, 2080 enabled the afforestation of 121 000 ha, which represents 50% of the current area of productive forest of private individuals (200 000 ha in 1996, source : Forestry statistics, 1995-1998 data (2000)). This is a considerable impact, all the more so as the afforestation of private forest is a new phenomenon. Indeed, 70% of the area of private forest is currently less than 4 years old.

In Portugal, the largest areas of afforestation were in the Alentejo region, but they remain relatively well-distributed over all the regions.

In the United Kingdom, 93% of the plantings were in two regions : Scotland with 67% and England with 26%. These plantings represented 8% of the productive forest in Scotland and 4% in England.

In France, most of the plantings took place in the western half of the country, where 76% of the area afforested was in only 7 regions.
The impact on the resource is measurable in the Pays de la Loire, the region which planted the most with 7240 ha : in 10 years, the level of afforestation rose by 9 to 10%, this is a new

phenomenon ; the area afforested due to the aid represents almost 6% of the forested area in the region and 2.5% of the private forest.

2.1.1.4. Comparison, at national level, of the areas afforested under 2080 and the areas lost due to forest fires in the 5 most vulnerable countries

This indicator should enable us to assess the extent to which the impact of the 2080 plantings on the increase in the area under forest compensated for losses due to forest fires (nevertheless bearing in mind the fact that in many cases the forest is capable of regenerating itself naturally after a fire).

In Europe, 98% of the areas damaged by forest fires are distributed over 5 countries : Greece, Spain, France, Italy and Portugal. These countries have a fire prevention programme.
What, therefore, is the proportion of plantings aided by Regulation 2080 situated in regions vulnerable to forest fires ? What do they represent compared with the areas lost in these same regions ?

In other terms, and knowing that the annual average area lost due to fire in these 5 countries and over the last 6 years is 375 000 ha/year (according to the « common base »), did the 2080 plantings at least compensate for these lost areas ?

We should say that among these areas lost due to fire, only part involved forest. Thus in 1997 286 926 hectares were burnt but only 111 284 hectares were under forest (data collected from the Community information system on forest fires)
Moreover, an area which has been declared as being burnt is not necessarily 100% lost, it may be possible to harvest the wood, even left unscathed in some cases (the effect of the fire may disappear in a few years).
For all these reasons, it is difficult to calculate the real impact of the fires on the disappearance of the wooded areas.
Whatever the case, in terms of size, the area planted under 2080 is larger than the area afforested under 2080 which was lost to fire in the 5 countries, from 1991 to 1997. There was therefore a net gain in wooded areas, in spite of the fires. This is shown in the table below :

Table 12 : Data supplied by the « noyau commun »

Country	AREAS DESTROYED BY FIRE				2080
1000 ha	1991	1994	1996	1997 forested areas	Annual average area 1994-1999
ELL	30 734	73 868	31 116	29 513	22 777
ES	263 181	437 602	77 462	21 547	76 566
F	6 536	24 608	3 118	nd	7 525
IT	49 212	64 542	53 751	49 650	16 667
PT	182 485	77 319	88 869	10 574	34 295
TOTAL	532 149	677 941	254 317	111 284	135 052

source : Regulation (EC) No 804/94
Scale : the 5 countries most vulnerable to fire
Period 1991-1997

We would add that the plantations under 2080 are often more productive than the wooded areas already in existence, which generally have a lower rate of recovery ; and that the plantations are not situated exactly in the areas where fires took place.

2.1.2 Significant increase in production attributable to the planting and improvement operations

Throughout this part by production we mean foreseeable biological increase (in cubic metres per hectare and per year) linked to the planting and improvements, as defined in the first paragraph of part 2.1.
Depending on the type of planting, the rotation cycles range from 10/20 years to 100/250 years.
In order to be able to make comparisons between these various types and in view of the major risks which can affect the plantations, we will examine the annual production.

This annual production will be estimated, for each type of tree population, by the following calculation :
Area afforested under 2080 by type of population (ha) x estimated productivity (m^3/ha/year).
(With productivity being estimated by type of afforestation and by country, according to the species mainly used with Regulation 2080, according to the table in Annex 18).

The estimates are to be balanced by the success rate seen in the first 4 years following planting, itself estimated from interviews with national and regional experts, and confirmed following surveys on the ground.

Caution, therefore, should be exercised when interpreting them, because it is difficult to make a definitive pronouncement on the success of a plantation after only 4 years, in view of the very varied risks which weigh heavily on all the bioclimatic regions of Europe in the long term :

- climatic risks : (storms or hurricanes for the Atlantic and continental zone, fires and drought in the Mediterranean zone) ;

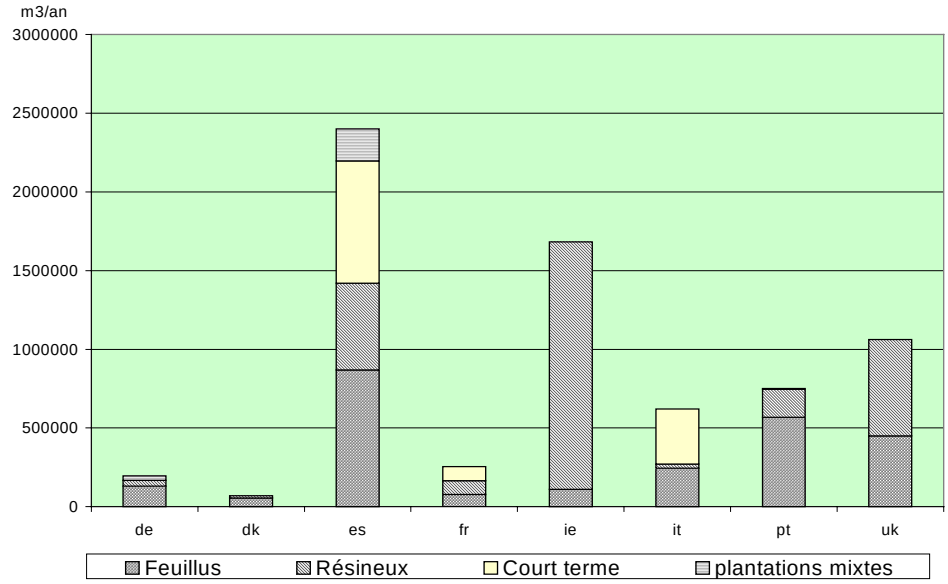
- technical risks of failure beyond the planting phase may be attributed to unsuitable planting techniques, to errors in the choice of species and to lack of maintenance, etc.

2.1.2.1. Expected proportion of wood production in the annual production of the 8 target countries

For the whole of the eight target countries, the total annual production connected with the application of 2080 is estimated at 7 million m^3. The 2 figures below allow this production to be

broken down by types of population in the short, medium or long term for the whole of the estimated production, and by country.

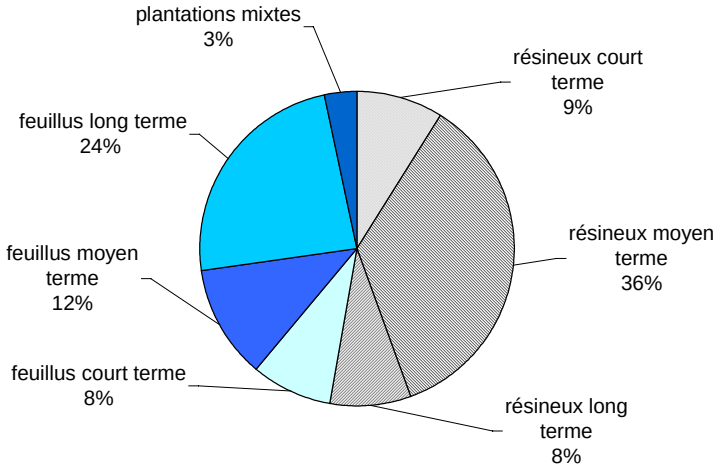
Figure 17 : Annual estimated production by country and by type of planting aided by 2080



[m3/an : m3/year; Feuillus : Broadleaved; Résineux : Coniferous; Court terme : Short-term; plantations mixtes : mixed plantations]

Source : Data supplied by the evaluators in November 2000
Scale : the eight target countries

Figure 18 : Estimated annual production by type of planting, as a percentage of the total annual production of the 2080 plantings



[plantations mixtes : mixed plantations; résineux court terme : short-term coniferous; résineux moyen terme : medium-term coniferous; résineux long terme : long-term coniferous; feuillus court terme : short-term broadleaved; feuillus moyen terme : medium-term broadleaved; feuillus long terme : long-term broadleaved]

Source : Data supplied by the evaluators in November 2000
Scale : the eight target countries

N.B. :

- medium-term species constitute 48% of the estimated production, conifers make a greater contribution (they represent 53% of this estimated production, whereas they only constitute 33% of the area afforested under 2080) ;
- long-term species represent only 32% of this production, whereas the « long-term » broadleaves predominate in terms of areas planted ;
- in spite of the small areas they cover, fast-growing species represent 17% of annual production and are particularly likely to provide a high level of production in Spain, Italy and France ;
- the highest total production is expected for Spain and Ireland.

Table 13 : Proportion of the estimated annual production for 2080 plantings in the total annual production of the eight countries

Country	DE	DK	ES	FR	IE	IT	PT	UK	TOTAL
Total additional production from 2080 in thousands of m^3 (estimate)	195	20	2 400	254	1 683	620	750	1 061	7 032
Total national production in thousands of m^3	88 998	3 200	28 589	92 299	3 450	18 713	12 900	14 590	262 739
Proportion of additional production linked to 2080	0,2%	2,2%	8,4%	0,3%	48,8%	3,3%	5,8%	7,3%	2,7%

Source : Data supplied by the evaluators in November 2000 and Forestry statistics data, 1995-1998 data (2000)
Scale : the eight countries of the study

Over the whole of the eight target countries, the average contribution of the 2080 plantings to the annual production is thought, according to the method used, and with the limitations of the method described above, to be 2.7%, which represents a fairly small impact objectively on the forest resource. This figure nevertheless masks some important disparities :

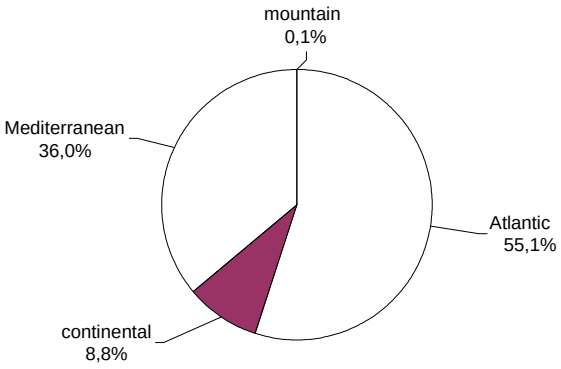
- **In Ireland,** in view of the net annual biological increase of the sitka epicea of 16m3/ha/year, the expected production would be 48% of the national annual production. This should have a considerable impact on the resources for paper manufacturing and timber,
- Considerable impacts are also expected in Spain, the United Kingdom and in Portugal :

  In Spain, pure or mixed plantations of *Quercus ilex* or *suber*, which represent 55% of the wooded area, are not intended primarily for wood production and contribute little to increasing the wood resources.

  In Portugal, particularly in the north where 2080 enabled afforestation with valuable broadleaves, in particular *Castanea sativa*, a positive impact is expected on the wood resources which will help to overcome the current deficit. However, the greatest impact on the resource will certainly be the production of cork in the south of the country.

  Italy, with the 23 000 ha of poplars planted due to 2080 in the Valley of the Po, has seen the largest resource of fast-growing wood, and this has supported a poplar production chain which has been undergoing supply difficulties ; to this, in the medium-term, will be added 19 600 ha of cherry-wood and walnut, woods of high added value.

Figure 19 : Breakdown of total estimated production by biogeographical zone



Source : Data supplied by the evaluators in November 2000
Scale : the eight target countries

According to this figure, calculated from areas of species multiplied by the average productivity established per biogeographical zone, it is clear that the plantings of the Atlantic zone (twice as large in area) achieve a production of the same order of magnitude as the Mediterranean zone, where the latter has planted an area three times the size.

This observation, which is not specific to 2080, takes account of the fact that better bioclimatic conditions have a more favourable effect on the increase in production. Furthermore, in these « preferred » areas, the choice of species is potentially wider, the objectives more diversified and the market requirements more easily met.

2.1.2.2. Proportion of 2080 cork production in the annual exports of the producing countries

The cork oak is the second species planted owing to Regulation 2080 after the evergreen oak. In all, the area planted with it is 106 2000 ha, 70 200 ha of which is in Portugal and 32 000 ha in Spain. 50 805 ha of mixtures of *Quercus suber* and *Quercus ilex* have also been planted (solely in Spain).

We can therefore expect the 2080 plantings to have a significant impact on cork resources in the future.

As the only global data which have been supplied to us on this resource concerns exports, we have therefore assessed the increase in cork production connected with 2080 indirectly through this.

We would point out that the cork production cycle is a long-term matter : the cork oak's cycle *(Quercus suber)* is 80 to 100 years and we have to wait 50 years before the first cork is produced (cork is harvested every nine years, and 5 to 6 harvests are taken on average).

- **In Portugal**, the production of traditional cork plantations, grown according to silvipastoral practices, is estimated to be 150 to 180 kg/ha/year. The area afforested is therefore thought to be capable of producing **10 000 to 12 000 tonnes of cork/year**, i.e. 50 000 to 60 000 tonnes of cork throughout the whole of the tree cycle. **This would correspond to 12.5% of the quantity currently exported per annum.**
  However, the 2080 plantations were planted at higher densities than in these cork plantations, meaning that grazing had to be abandoned in order to obtain better quality and higher quantities of cork.
  We can therefore hope for greater production, but it is too early to be able to quantify it. Moreover, we would have to take account of the mortality rate, but we do not have sufficient information to be able to do this.

- **In Spain,** the production figures supplied by the evaluators range between 350 and 400 kg/ha/year (no information was sent by the evaluators to enable us to take account of this difference in productivity between Spain and Portugal).
  The production can therefore be estimated to be **12 800 tonnes of cork/year**, for pure plantations. For mixed plantations, the proportion of cork oak can be estimated at 50%, this would therefore mean additional annual production of **8 000 tonnes of cork/year. This corresponds to 15% of the quantity of cork exported per annum.**

2.1.2.3 Additional production of wood and cork, estimated for the long term for improved areas

It was not possible to collect much information on the improvement operations (see the classification in Annex 3).

It should generally be borne in mind that most of these operations did not aim to increase the resource :

- **In Spain and Portugal**, improving the cork plantations consisted mainly of increasing the density of the populations by replanting, and promoting natural regeneration by rerunning the crowns of cork oaks. The objective of these operations being to maintain or renew the resource, not to increase it (see details in part 2.2 of this chapter).

- The improvements made on 100 000 ha in Germany mainly had an environmental purpose ; and it is not possible to measure any indirect effect which may be seen in the medium and long term on wood production.

- By providing access to the tree stands, the creation of forest roads, forestry work to be carried out (creating clearings, pruning for health reasons, general pruning, etc) as well as to harvest the work, thereby contributing indirectly to the increase in production. We would also point out that in Portugal and Spain, forest roads built in the Mediterranean zone were for new plantations and their main purpose is to protect against fire, by permitting access to water points and firebreaks.

However, we do not have enough data to evaluate this impact.

2.1.2.4. Proportion of 2080 production involving products other than wood

Parasol pine

In Spain and Portugal, plantations of parasol pine *(Pinus pinea)* are capable of producing pine nuts. The production is annual and, in Spain, it is estimated to be on average 225 kg of pine nuts/ha/year, in plantations specialising in this production (the trees have to be grafted).

Owing to Regulation 2080, 46 000 ha of *Pinus pinea* have been planted (32 000 ha in Portugal and 14 000 ha in Spain), which places the species in fourth position in the list of species planted under 2080.

In actual fact, depending on the area, this species has been used in various ways, which makes estimated pine nut production complex :

- The parasol pine has often been planted not for production, but because it offered an advantageous alternative where the ecological conditions were particularly difficult and where evergreen oak or cork oak could not be planted.

  This seems to have been the case in Portugal, and it is thought that 2080 would not have a significant impact on pine nut production in the country overall.

- In the Alentejo region, on the other hand, 30% of the 17400 ha of parasol pine which were planted were planted for the prime purpose of producing pine nuts, producing 1.17 million kg of pine nuts/year and rendering the impact of the 2080 *Pinus pinea* plantations in this region extremely significant.

Acorns

Another significant crop produced are acorns, produced mainly by the evergreen oak, and to a lesser extent by the cork oak.
Acorns are used to feed pigs in Spain in a silvipastural system, which leads to high-quality production. These practices exist in Andalusia, Extremadura, Castile Leon and Castile la Mancha, which are the regions where most afforestation has taken place.

Given the size of the areas planted, it can well be imagined that the impact, although it is not measurable, must be large, provided that the plantations can be used for grazing again, which should be possible 20 years after planting, when the plants are less vulnerable to damage caused by animals.

2.1.3. Significant increase in the quality of the forest resource planted

2.1.3.1. Types of planting carried out in the eight target countries

For the eight countries forming the scope of the evaluation, the quantitative data collected on the distribution of the planted areas by species is incomplete :
Indeed for Denmark, Ireland, the United Kingdom and Germany, this data was not collected by the national authorities. However, the distribution in terms of plantations of broadleaves/conifers/mixed trees is known and it has been possible to estimate the proportions of the main species.
In Germany and Italy, the evaluators had to obtain data from regional authorities ; some regions were unable to provide this data.
In Spain the national data differ from the regional data and it is the latter which we have used (hence we are basing our calculations on an area planted under 2080 on 453 500 ha instead of 412 800 ha).

In order to make the analysis easier, the species have been regrouped by type of plantation : plantations of broadleaves, conifers, fast-growing species, mixed plantations (see classification of plantations in Annex 3).

In general it seemed to us, in view of the judgements made by the evaluators, that the types of afforestation carried out under 2080 constituted a « plus » from the point of view of the composition and therefore of the quality of the resource created.

The countries fall into several groups :

- Countries which used mainly broadleaved trees
  These were Germany, Denmark, Portugal and the United Kingdom. These countries opted more for an environmental direction, preferring long-term broadleaved species, often mixed.

- Countries which used broadleaves and fast-growing species
  This is the case for France and Italy, mainly concentrating on the production of wood with a high added value.

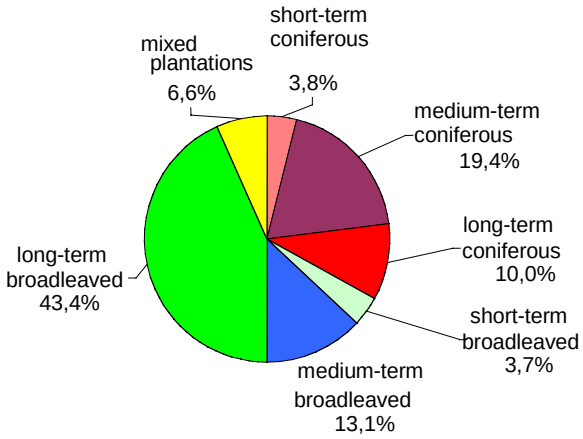
- Countries which used a great variety of species
  This was Spain, whose main objective was rural development, and which carried out an extremely wide variety of operations.

- Countries which mainly used conifers

This was Ireland, whose objective was to produce timber.

The figure below gives a breakdown by area of the various types of afforestation

Figure 20 : Type of afforestation, as a % of the area planted under 2080



Source : Data by species used, supplied by the evaluators in November 2000
Scale : 8 target countries
N.B. for a definition of mixed plantations, refer back to chapter 1 (Section 2.1.5.)

Medium and long-term afforestation (56.8%), 562 142 ha.
Long-term broadleaves predominate with 43% of the area planted under 2080.
This result reveals the way in which Regulation 2080 encourages farmers to plant broadleaved trees, whereas they are more expensive to farm than conifers by a coefficient of 2 to 3. The high costs are in fact partly compensated for by a longer and higher premium, as well as by greater aid for planting and maintenance.
Beyond the encouraging nature of Regulation 2080 and the national and regional programmes, the use of medium-term or long-term broadleaves can be explained by the objectives of the beneficiaries, revealed during surveys in the field :

- to protect the environment ; in the Mediterranean zone, *Quercus suber* and *Quercus ilex* were chosen for their ability to adapt to the ecological conditions
- to produce high-quality wood, sought-after today, with a medium or long-term production cycle
- to preserve/create an asset
- to improve the landscape
- to develop complementary activities, particularly in the Mediterranean region (cork production, the silvipastoral aspect of oak plantations and recreation , etc.)

Broadleaves predominated in all the countries except Ireland. Italy was the country which use most medium-term broadleaves in order to develop wood production, with species such as *Juglans nigra*, *Prunus avium* or *Fraxinus sp*.
We would point out that the Netherlands arranged a higher amount for the compensatory premium when the plots were planted with « noble » species (defined by the national programme as slow-growing broadleaves).

Planting of medium and long-term conifers (32.1%), 317 467 ha.
2/3rds of the conifers planted are medium-term trees which are often intended for wood production, and 1/3rd long-term conifers. In Ireland 86% of the area has been planted with conifers, mainly with medium-term conifers and mainly *Picea sitchensis*, then *Pinus contorta* (Lodgepole pine). This is due to the main objective being medium-term timber production, expressed at national level, but also among most of the beneficiaries, 90% of the people interviewed, according to a study conducted in Ireland in 1996. Most of the trees were planted on poor and humid soil, on which conifers are more readily capable than other species of providing the resource required.
There too, as elsewhere, the aid was higher for plantations of broadleaves than for conifers.
But it is clear that the farmers went for the economic option : with plantations of Sitka spruce they can expect income from the thinning out operations from the fifteenth or twentieth year for a final

income at 40 or 45 years ; in the case of the broadleaved plantations, the return is more long-term, about 60 years for broadleaves such as ash and maple, and 80-90 years for beech and oak. Moreover, the poor quality of the soil is not suited to broadleaves because there is a greater risk of failure.

Conifers	**15 yrs**	**20 yrs**	**32 yrs**	**45 yrs**			Total up-dated return at 1.5%
Sitka spruce at 16m^3/ha/year	80 m^3 at 15€/ m^3	100 m^3 at 22 €	100 m^3 at 28€	440 m^3 at 46 €			**14 386 €** of which 4 028 € before 40 yrs
Broadleaves	**20 yrs**	**30 yrs**	**40 yrs**	**50 yrs**	**60 yrs**	**80 yrs**	Total up-dated return at 1.5%
Beech at 6 m^3/ha/year	20 m3 at 5€/ m^3	30 m^3 at 5 €	30 m^3 at 20€	40 m^3 at 30€	60 m^3 at 50 €	320 m^3 at 120 €	**14 000 €** of which 500 € before 40 yrs

In terms of up-dated return over the tree cycle, the two scenarios are equivalent, for periods differing from a factor of two. This makes conifers far more attractive, the addition to the outlay being less, the difference in profitability is still increased.

Mixed plantations of broadleaves and conifers (7.1%), 70 165 ha.
(For a reminder of the definition of mixed plantations, see Chapter 1 section 2.1.5)

They are infrequently found and have only been reported in two countries in which they represent a significant proportion :

- mainly in Spain with 67 000 ha, i.e. 13% of the plantations.
  The composition of the mixtures is very variable. Most are plantations based on *Quercus ilex*, with the introduction of various species of pine such as *Pinus halepensis* or *Pinus pinea*. Shrub species, beneficial to the rural heritage, were also used to accompany them.
- In Germany, on 4400 ha, i.e. 16% of the plantations. How the mixtures are made up is not specified.

Short-term plantations (4%), 39 464 ha.
The trees in question are poplars, eucalyptus. They cover small areas for three reasons:

- these species have a fairly restricted area of distribution because of their ecological requirements
- there was little incentive in Regulation 2080 to plant them and the aid was reserved solely for farmers with farming as their main occupation; in some countries, these species were not eligible for aid (poplar in Ireland)
- the plantings under 2080 related mainly to not particularly productive marginal land (see point 3 of this chapter on earlier land use). Consequently little land was suitable for fast-growing species.
  The poplar was planted mainly in Italy then in France.
  In spite of their limited use, these species may become a considerable resource and are fairly highly regarded by farmers as they allow a short-term return (15-20 years for the broadleaves).

For details of breakdown by country see Annexes 17 to 20.

2.1.3.2. Type of species used in the eight target countries

The main species used in the plantations aided by Regulation 2080 are given by country in Annex 17. Like the types of afforestation, they take into account the richness of the resource planted.
Apparent is the predominance of the Mediterranean species, with Mediterranean oaks, *Quercus ilex (14%)* and *Quercus suber (11%)*, planted as a pure crop or in a mixed crop (6%). These are the main species used in Spain and Portugal.

The main coniferous species is *Picea sitchensis*, widely planted in Ireland (where it represents 40% of the area afforested under 2080 in this country) and is also heavily used in the United Kingdom.
Of the ten main species, there are two fast-growing species : the poplar, very much used in particular in Italy, and *Pinus radiata*, planted only in Spain. Also clear is the importance of

Juglans sp and *Prunus sp*., particularly in Italy, which are varieties with a very high added value and rarely found in self-planting forests.
Olea europea (10 000 ha) was planted only in Spain, it is a « forest » species according to the Spanish terms and from a fruit-bearing olive. This point is an important one because olives are part of the surplus production which the Community is attempting to reduce.

2.1.4. Sustainability of this increase

2.1.4.1. Afforested area protected in the long term, in particular by legislation against land clearance

The long term means a period in excess of 20 years, beyond the maximum term of payment of the premium. Most of the areas afforested have to be protected over one cycle in order to have an effect on forest resources.

In all countries the plantings are irreversible because of permanent protection of the forests against land clearance, and felling is subject to administrative authorisation as soon as the land has the status of a forest.
For the most part it seems that the 2080 plantings will acquire this status for the plots considered. There are nevertheless some uncertainties :

- **in Portugal**, the land can be returned to agricultural use after one forest cycle ;
- **in Italy,** fast-growing plantations (poplars, wood-growing plots or walnut plantations) are still agricultural land which can be reconverted without prior authorisation as soon as the wood has been harvested ;
- **in Spain and Portugal,** the status of the *dehesa* is agricultural but partly protected from land clearance by rural heritage and environmental legislation ;
- **in the Netherlands,** in some cases the planted plots (non-noble varieties) can return to their agricultural status 15 years after planting ;
- **in the United Kingdom,** in periurban areas, plantations on agricultural land acquire the status of « industrial land », which leaves the owner with the option of clearing the land after the 20 years of aid, subject to administrative authorisation. Whereas arable land could not be built on, passing through wooded status makes it possible to obtain building land, this is a roundabout way which has been taken advantage of (particularly in Northern Ireland).

There is therefore an important question which should be asked : could farmers be tempted to clear the land if market conditions became more favourable for agricultural production ?

In France a survey conducted by CEMAGREF on plantings prior to 2080 shows that only one part of the agricultural land which was afforested (natural + artificial afforestation) will remain afforested in the long term. For the period from 1992 to 1996, it was estimated that 60% to 80% of the planted areas would remain forested.

In the countries in general one might well think that the plantations which had received aid would clearly be less likely to undergo land clearance than natural forest because of the undertaking made by the beneficiaries and the investments made. A large proportion of the beneficiaries planted trees to obtain an asset, many of them are very much attached to their plantation. We may well think, therefore, that even if these plantations do not produce a return in the short or medium term, they will be preserved.

On the other hand, in countries where the plantations have been 100% subsidised, where forestry enterprises were frequently used and where the beneficiaries were not necessarily directly involved, the risk of land clearance would perhaps be greater, in the case in particular of an economic context which is not favourable to the plantations (Portugal, Spain and Ireland).

In other respects it is harder to anticipate the future of plots which have been planted solely to prevent the land being abandoned (in this case the act of afforestation indicating rather a disengagement from the land ?)

2.1.4.2. Success rate of the plantings

- **In Ireland, Germany, Denmark and the United Kingdom,** the success rate seen at the end of the first 4 years is generally very high. It is estimated to be 95%.
  In reality these figures, supplied by the authorities, consider the plantations after having replaced any missing plants, which hides any difficulties found and leads to a probable over-estimation of this rate.

- **In France**, the success rate is generally equal to 70% before replanting, which is also satisfactory.
  The causes of failure vary, damage from game is frequently mentioned. This damage is generally under-estimated and the afforestation aid is insufficient to cover the costs of protecting the trees.

- **In Spain and Portugal,** the exceptionally dry conditions in 1995 led to many trees dying, of the order of 70%. Special measures had to be taken to replant many plots.
  In the first few years of the programme in particular, failures can also be attributed to the beneficiaries having a lack of information, to a lack of nurseries and specialised enterprises and to inadequate quality control.

  Subsequently the success rates were more satisfactory, being between 70 and 80% before replacing dead plants under difficult climatological conditions, and 90% in more favourable areas.

In view of the generally high densities of planting, we could say that when the success rate is at least 80%, this does not affect future production, as the density of planting takes natural mortality into account as well as future thinning out or clearings planned in the silvicultural systems.

We would point out that, generally in the countries, the authorities pay special attention to replantings, ensuring a sufficiently high density in the plantations.

In Denmark, for example, the second part of the aid is only paid when the plantations are deemed to have been successful, namely if :

- 4000 trees/ha of trees one metre high are alive for the broadleaves,
- 3000 trees/ha for the conifers

To conclude, except for extreme weather conditions in the first two years of 2080, the success rates of the plantations in the first 4 years are sufficient to not have to modify downwards the future production of the tree stands.

2.1.4.2. Estimation of the future quality of the tree stands

We recorded several factors which could affect this quality :

Maintenance of the plantations for the first 5 years

Field surveys revealed the importance of aid for maintaining the plantations in the first 5 years. In the two countries which did not introduce this aid, France and the United Kingdom, the compensatory premium for loss of income was considered by the beneficiaries to be aid for maintenance.

Similarly, in the south of Portugal, in very dry areas where the mortality rate is high, the maintenance aid is insufficient to carry out the necessary replantings. Field surveys have revealed that the beneficiaries considered the compensatory premium for loss of income as being « aid for maintenance », enabling them to finance the replanting.

Maintenance beyond the first 5 years

Uncertainties about quality relate more to the future of the plantations than to their introduction.
The plantations require regular monitoring beyond the introductory phase, the success and quality of the plantations depend on it.
Will the necessary maintenance and thinning out be carried out at the right time by the beneficiaries ?
The thinning out will be all the more necessary as the plantations have been planted very densely in order to obtain high-quality undressed timber (2500 plants/ha for conifers in Ireland, 2200 plants/ha for oaks in France, etc.).

Several factors could in future make it difficult to maintain these plantations properly :

- Planting on agricultural land has certain aspects which have to be taken into account, particularly for fast-growing species, valuable broadleaves (cherry-wood, ash, walnut) and medium-term conifers. In these cases maintenance operations may constitute a heavy workload for the beneficiaries, who may not always have appreciated the true value of this when the project was set up (field surveys).
- In France, a survey carried out at national level by the CEMAGREF on plantations before 2080 revealed a lack of shaping cuts for broadleaves and a lack of pruning for poplars.

- A recurrent problem in the eight countries and one which has already been mentioned is **the average age of the beneficiaries**. Who will take over when the beneficiaries are no longer able to run the plantations themselves ?

- The lack of involvement of the beneficiaries and the lack of experience acquired to then be able to carry out the work themselves was found in countries where outside enterprises were frequently used (Ireland, Portugal and Spain). In Ireland, for example, most of the beneficiaries plan to carry out the work themselves when they no longer receive any aid (1996 surveys). Would the plantations be run properly under these conditions ? The future quality of the plantations will depend very much on the training and awareness campaigns run.

Choice of species and composition of the tree stands

There was a real effort generally in all the countries to use **species which were suitable for the ecological** conditions of each region. The make-up of varieties tends to be very diversified, particularly in Germany and Denmark, which would work in favour of the stability and longevity of the tree stands.
In France and Ireland, however, the monospecific nature of the plantations, encouraged by the national programmes, although it is advantageous from the forestry point of view, could, in the case of large plots of land, lead to greater susceptibility to diseases or extreme weather conditions.
A distinction has to be drawn between the production of biomass and the quality of the products. In Ireland, where the *picea sitchensis* grows between 15 and 16 m3/ha/year, the woods are of poorer quality than the Scandinavian woods which grow more slowly and are destined for paper pulp when thinned out or for processing which provides little added value for the person running the plantation.

Forestry potential

In general, although woodlands have a fairly poor agricultural potential, their forestry potential on the other hand would appear to be satisfactory and often greater than that of the private forests.

Knowledge of and advice on the techniques

A great need for **experimentation and advice** on techniques has been expressed. In Portugal, in particular, the specific needs of the plantations on agricultural land are little known, particularly concerning how stands of valuable broadleaves, which had not been planted much before, should be managed (*Quercus sativa, Prunus lusitanica, Juglans sp. , Fraxinus sp.*).

Awareness and training of the beneficiaries

In several countries (Spain, Portugal, Ireland and the UK), deficiencies have been observed in the level of awareness and training of the beneficiaries. In Ireland, for example, field surveys have revealed problems connected with damage done by game and competition from other vegetation. These problems had not been foreseen because of lack of experience (source : field surveys).
The absence of or only a minor forestry tradition among the farmers who planted forests with 2080 is a general characteristic seen in the eight countries.

Role of outside enterprises

In Ireland, Spain and Portugal, a high proportion of the beneficiaries called in outside enterprises for planting and maintenance (80% of the people interviewed during a study in Ireland in 1996). Although this could be considered to be a guarantee of quality, unfortunate effects have been seen : the quality of the services provided by the enterprises is not always guaranteed.
Very much in demand, they have not always carried out the work with care (lack of precautions taken when working the ground or during planting, unsuitable equipment, etc.)
There is a risk that in ten years time there may be unfortunate consequences connected with the species not adapting well, as the enterprises sometimes made their choices according to the amounts of aid for afforestation (field surveys among forestry enterprises).
For these reasons there may be a considerable degree of uncertainty about the quality of the plantations which may be expected. Unsuitable practices often have consequences which can only be seen years after planting.

Production and origin of the plants

Inadequate supervision in the nurseries has been mentioned in Spain and Portugal.
In Italy, the problem of where the plants come from has often been raised, particularly for species which are new to or little used in the plantations : rare or endemic species, shrub-like species, etc. Risks could well be associated with this type of species (the plants adapt poorly, greater susceptibility to diseases, etc.).
It is probable that this problem has been under-estimated for the other countries due to a lack of information. The uncertainties regarding origin are particularly prevalent in species which have so far been little used for afforestation but which are very interesting from the point of biodiversity as well as in the context of the diversification of activities (species producing fruits, etc.).

Breaking up of plantations

In other respects a large number of the Member States (see Annex 2) have a large proportion of small plantations, which will be a constraint if they have to call in forestry enterprises which prefer large sites.

Specific operations promoting quality

Some programmes have introduced specific measures to ensure quality on plantations.
In France, for example, the regional programme of the Pays-de-la-Loire introduced aid of 600/ha if a forestry expert was called, with 82% of the dossiers benefiting from this, guaranteeing technical support and monitoring for 4 years.
This aid was awarded in two payments, one after planting and the other at the end of four years. This system would appear to have made the beneficiaries more aware of their responsibilities and has resulted in the plantations being of satisfactory quality.

To conclude, although the success rate after 4 years is generally satisfactory, in countries which have planted the largest areas there are concerns about the future of the plantations, both from the point of view of the quality expected of the wood and the stability and longevity of the tree stands.

Furthermore, all the evaluators speak of their fear that the 2000-2006 incentives for afforestation will fall considerably in the future.
A few signs of this can already be seen :

- in Italy, the aid planned in the Italian programme of Agenda 2000 is insufficient to plant new plantations but only to pay the compensatory premiums for loss of income ;

- in Spain, some regions, such as Extremadura, stopped planting in the middle of the programme for lack of sufficient finance (the forward budget already having been totally used up).

2.2. Can better product quality/added value be anticipated from the woodland improvement measures ?

The improvement operations have been described earlier in section 2.2 (see too the Classification in Annex 3).

The forestry products used are wood and cork from plantations improved owing to 2080, and likely to increase in quality due to the improvements.

By quality of the wood and cork « products » is meant a set of favourable characteristics having regard to the market requirements (physical qualities, including diameter and a good cost/product advantages ratio).

We would point out that this quality is partially dependent on the quality of the tree stands.

The improvement of the quality of these products (which is our sole criterion for this question) was determined on the basis of two indicators :

- the size and areas of the improvement operations aiming to improve the quality of the wood products
- the size and areas of the improvement operations aiming to improve the quality of the cork products

We would point out that for a large proportion of the improved areas, it was impossible to obtain detailed information, particularly in Spain, where these operations covered 76 538 ha.
The only information which we are reporting on here is that given by the national experts through the field surveys.

2.2.1 Size and areas of improvement operations aiming at better quality wood products

Construction of 37 932 km of forest roads
Forest roads giving access to the plantations can enable forestry work to be carried out (thinning out, removing dead wood and pruning, etc.) which improves quality and makes it possible to use the woods, which increases the added value. Similarly, the creation of places for depositing wood increases the added value but this action is marginal as it only involves 7 ha in Denmark.
We would add the 10 651 km in Spain and Portugal, mainly devoted to fire prevention and created in new plantations.

Improvement or creation of a forest drainage system
80 302 ha in Finland and 682 km in Denmark have been involved in this type of operation, thereby enabling productivity to be increased and improving the quality of the plantations.

Silvicultural operations
Some types of operation improve wood quality.
The first thinning out in particular plays an important role because it enables trees to be obtained of larger diameters and therefore greatly improves the production and quality of the plantations.
The exact proportion of these operations is not known ; however, out of a total improved area of 260 569 ha, and in view of the fact that in Germany and Denmark protection was the main objective, the areas concerned by improvement in quality can be estimated at around 160 000 ha.

Conversion of not particularly productive or damaged plots.

The main operations carried out to achieve this are carried out mainly in Finland (11 459 ha) and in the United Kingdom (18 679 ha) as well as in Denmark (177 ha) and in Italy and Germany (area unknown).

In Italy, the conversion consisted mainly of converting not particularly productive copses into forests.

In Denmark, we would mention in particular the conversion of not particularly productive plantations of Pinus mugho (75 ha), the conversion of coniferous stands into broadleaves and the conversion of coniferous stands of Picea abies or Picea sitchensis into other conifers such as Abies alba or larix decidua.

Operations in young plantations
These operations which also improved the quality were mentioned in Germany (area not specified) and in Portugal (830 ha). Among other things they consisted of reducing adjacent vegetation competing with the plants, selecting better quality plants and regulating the mixtures of species.

Shaping and pruning operations
These were carried out in Finland (235 ha), the UK and Greece.
We would point out that in Denmark, the prunings and thinnings out were not eligible for aid and that in Portugal these operations were only possible in cork plantations. In other countries (Spain, the UK, Italy and Germany) pruning or thinning out operations could have taken place but we have no details on this.

Fertilizer applications in forests
Finland carried out this type of operation on 526 ha as well as controlled burning (373 ha) in order to improve soil quality, which should be reflected in the quality of the wood products.

2.2.2. Size and areas of improvement operations aimed at cork products

The improvement operations in the cork plantations in the Mediterranean region are likely to have a medium and long-term impact on the quality of cork production.
Regulation 2080 enabled 90 120 ha of cork plantations to be improved, mainly in Spain with 82 405 ha then in Portugal (5 365 ha) and in Italy (2 350 ha).

In Spain, the improvements affected mainly 2 regions : Andalusia (46 684 ha) and Extremadura (33 372 ha).
They consisted mainly of increasing the density of the cork plantations by introducing plants between 3 and 5 years of age accompanied by solid individual protection (metal protective « cage »), conditions necessary for regenerating the cork plantation while retaining grazing.
The extra cost of this operation was therefore large compared with a traditional plantation, but this avoids losing income obtained from grazing (contrary to plantations of Quercus suber, which involves abandoning it, at least for 20 years). The subsidy given to the farmers enabled them to plant approximately 200 plants/ha. This constitutes a higher density than that of existing plantations. There was no minimum density to reach and the farmers planted according to the level of aid granted.
Other improvements have taken place, such as pruning to improve the quality of the cork, and clearing undergrowth, to reduce competition and make access to the trees for harvesting easier, which increases the added value of the product.

In Portugal, the improvements were made mainly in the regions of Lisbon and the Tage Valley and Alentejo.
The operations carried out consisted of supplementing natural regeneration when it was inadequate, by increasing the density of the plantations by 20 to 30%, in such a way as to reach a density of 400 to 450 plants/ha (for a final density in the long term of 80 to 100 plants/ha).
This density, which is higher than in traditional silvipastoral systems (80 plants/ha), corresponds to a forestry situation which aims to produce high-quality cork, at the expense of grazing. This means that the farmer has to redirect his activity toward forestry. In order to improve the quality of the

cork, pruning operations (2537 ha), cutting away deadwood (1666 ha) was also carried out on the cork plantations.

In Italy, improvements on cork plantations were carried out in Sardinia and consisted of increasing the density by planting and promoting natural regeneration.

2.3. Can enhanced stability and longevity of the tree stands be expected due to the forest improvement measures ?

The improvement measures can enable the plantations to :
- reach the time when they can be harvested, by avoiding storm damage (stability),
- increase their ecological stability by helping the trees to resist diseases and insect and fungal attacks,
- reduce the risk of fire,
- increase their longevity by thinning out (reduction of health risks)

These effects are only perceptible over the long term, and thanks to models which are limited by the fact that the risks and uncertainties increase with time.
Here we can do little more then than to evaluate the expectation that there will be an increase in stability and longevity.
Furthermore, in the face of complex processes such as storms, fires and erosion, the improvements are only one of the factors protecting the forests, the direct effects of which cannot be quantitatively distinguished from those of other factors.

The experiences found in the various countries owing to 2080, although not large-scale operations, merit a mention because of their innovatory nature.
We are using the 4 indicators below to take account of their contribution to this improvement :
- kms of forest roads constructed to make the plots accessible for fire-fighting and surveillance (fire, disease, etc.) ;
- areas protected from natural hazards (including fire), owing to 2080 ;
- areas of broadleaved and coniferous plantations which were thinned for the first time and at the right time owing to the aid ;
- quantity of plants with an official guarantee of origin used in the afforestation and improvement operations.

2.3.1. Kilometres of forest tracks created to provide access to the plots, fight fires and allow surveillance (fires, diseases, etc.)

By enabling the plots to be served, the forest roads make it easier to fight and prevent fires and fight diseases, etc. In the 15 countries of the European Union, 48 583 km of forest roads have been constructed.

2.3.2. Areas protected against natural hazards (including fire), owing to 2080

Protection against extreme weather conditions and diseases

The largest area improved was **in Germany**, i.e. 101 595 ha, the main objective of which was to protect the forests by improving their stability and longevity. This represents less than 1% of the forest in this country (10.7 million ha). The effort therefore remains marginal and cannot be regarded as significant.
The principles of the improvement of stability and longevity are mainly based on the mix of varieties, in order to diversify the ways by which to resist the various hazards (weather, disease, pollution, etc.). The various operations carried out in Germany are :

- mixing varieties, by introducing broadleaves into coniferous stands or introducing valuable broadleaves into stands which have been thinned out
- not cutting down to the ground
- preventing the use of chemical products in forests
- neutralising acid soil

In Denmark, there were several innovations but these did not produce a significant impact due to the small areas concerned (49 ha). Several types of action were taken :
- broadleaves were planted (trees and shrubs) on the edge of coniferous plantations
- strips of broadleaves were planted inside the coniferous plantations.
- the draining system has been improved, so that trees get stronger roots, their population is stabilized and their longevity is improved, limiting also the widespreading of root diseases.

Various factors which are also stabilising elements due to the creation of islands which are more resistant to wind.

In Finland and Denmark, the improvement in the drainage systems, by enabling the trees to take better root, helps with the stability and longevity of the plantations by restricting the spread of root diseases.

In Italy, monocultures of broadleaves have been transformed into mixed plantations of broadleaves.

Protection against fire

Various measures have improved protection against fire in Spain, Italy, Greece and Portugal :
- Creation of 12 686 ha and 3931 km of firebreaks, as well as the creation of 21 136 water points in the 4 Mediterranean countries.
- Construction of 10 600 km of forest roads in Spain and Portugal
  In these two countries, the infrastructures protecting against fire were installed mainly in the plots planted under 2080. The roads aimed to serve the plots while providing access to the water points and firebreaks accompanying these plots.

Portugal carried out operations to reduce the combustibility of the tree stands :
- by compartmentalisation (158 ha) which consists of introducing strips of broadleaves into coniferous plantations to create discontinuity in the vegetation.
- by clearing undergrowth (1835 ha), which also creates discontinuity of the combustible material.

2.3.3. Areas of broadleaved and coniferous plantations which were thinned out for the first time at the right time due to the aid

It is well known that plantations which are thinned out too late and planted in high densities risk serious windfall in the early years and even throughout the whole rotation.

Unfortunately we do not have information on the proportion of thinning out carried out. It is therefore not possible to evaluate its impact on the stability of the forests.

2.3.4. Quantity of plants with an official guarantee of origin, used in the afforestation and improvement operations

The use of plants with an origin which is adapted to the natural region, and which has been checked, guarantees better growth, better adaptation to the land and climate as well as better resistance to disease.
The origin of the plants therefore plays an essential role in the extent to which the plantations take, but also on the medium and long-term quality of the plantations. In the longer term in particular,

the seeds of these trees may disseminate which, if they are not of good quality, may pollute endemic populations and destabilise them.
This problem is all the greater for the countries which have planted the most forests (Spain, Portugal, Ireland and Italy). According to the evaluators of these countries, supply and control in this respect would appear to be rather defective.
The heavy and sudden demand for plant material, combined with the under-production of nursery plants, had created a local dearth of material. To remedy this, plants have been imported from within or outside the European Union, where the prices were lower. Batches of plants from countries in eastern Europe (Hungary in particular for broadleaved varieties) crossed the Netherlands, Germany or France on their way to the countries of the south or Ireland, without any guarantee of their quality.

Some specialists advise that forest plant requirements should be anticipated 3 to 4 years in advance so that seeds from suitable origins and varieties can be harvested and so that nurserymen have sufficient time to raise the plants.

We would point out in this respect that Council Directive 1999/105/EC clarifies and specifies certain provisions concerning the marketing of forest reproductive material, within the European Union, and the external quality standards of forest materials.

Conclusions on forest resources :

In general, this contribution appears to us to be of little significance in qualitative terms, with few national and regional exceptions, but in quantitative terms it is positive.

• On the European scale, 2080 is responsible for 10% of the annual increase in afforested area ; and, on the scale of the 8 target countries used (which represent 96% of the area planted by 2080), the area of planting due to 2080 is equal to only 2% of the area of the productive forests.

This impact is not very significant, but is clearly more noticeable however in the Mediterranean zone, and truly important in Ireland, taking into account the number of plantations created.
The national ratios speak volumes in this respect ; the 2080 plantations represent 19.21% of the afforested area in Ireland, 5.47% in the United Kingdom, 5.11% in Portugal, 3.80% in Spain, and 0.21% for France.

The contribution in volume of wood is 2.7% of the European production, and there too the national disparities are considerable (in Ireland, the 2080 plantations will, in the long-term, produce 48% of the current national production).

• In qualitative terms, the choice in the great majority of cases of broadleaved varieties when planting is a striking change-around compared with the planting policies of earlier decades.
These species represent 56.8% of the areas planted and the cork oak and evergreen oak occupy an predominant place in this ; conifers account for 32.1% of the plantings and fast-growing varieties account for 4%.

The frequent planting of mixtures in certain countries and regions is also a valuable addition to the resource created.
Take in particular the example of Lombardy and the Veneto, where new types of plantations have been experimented with and where the planting of valuable broadleaf species is creating expected production of wood with a high added value.

• The provisions of the regulation concerning improvements, on the other hand, has been little used by farmers and their quantitative impact is even less, even if it will be more noticeable in the short term than that of the plantations (10-30 years)

These operations have only taken up 4% of the budget of aid provided for within the framework of 2080. Germany, Finland and Austria were the countries which mainly took these up, emphasising greater diversity of tree stands and improving the composition of the varieties (100 000 ha benefited from this type of improvement in Germany).
For their part, Spain and Portugal developed specific operations connected with protection against fire and the improvement of cork oak stands (we can expect new cork production of the order of 10% to 15%, in particular, of the quantity exported by Spain and Portugal).

These favourable conclusions from the point of view of quality nevertheless have to be accompanied by a few restrictions :

• In view of the young age of the plantations under consideration, it is difficult to assess their future success ; furthermore, a large proportion of these plantations are concentrated in the Mediterranean zone, where the increase is smaller and susceptibility to biotic or abiotic risks is greater.
Above all, the conditions required for this success are not always in place : the accompanying programmes have deficits from the point of view of training and technical advice ; there are cases where the enterprises which carried out the afforestation operations were insufficiently well qualified ; the size of some national programmes, in Spain, Portugal and Italy, have led to the need to import large quantities of plants whose origin, and quality, are not always certain.

• Although over the period 1994-1999, 2080 has, albeit modestly, really created new forestry resources, this period of time is not sufficient to ensure their continuity and increase in the long term.

There is a reservation expressed regarding rural development about the uncertainties connected with the fact that the Member States have no real strategy in this respect : only this could guarantee the long-term continuation of the efforts made, the sustainability of these resources and the implementation of the necessary operations downstream concerning the organisation of production and of the markets.

Doubts have moreover been expressed by the evaluators about the ability of some countries to continue financing plantings at a comparable rate over the period 2000 –2006.

3. To what extent has afforestation contributed to constraining surplus agricultural production ?

To answer this question, we defined first of all what we meant by agricultural surpluses. In this case we considered that they were Community surpluses to be stored and/or exported on the market at the world price.

In 1992 as in 2000, these surpluses related to the following production :
- plant products : annual cereal crops (common wheat, barley and rye) ; perennial crops (wine, olive oil partially), certain fruits (peaches, nectarines, apples, citrus fruits) ;
- animal products (milk, beef and veal).

It is because it reduces the agricultural area, constituting an alternative long-term use, that afforestation can contribute to reducing these surpluses.

We have therefore concentrated the analysis solely on plantations planted on former productive agricultural land (and not on forest improvements), using 3 judgement criteria, namely :
- the reduction of agricultural surpluses attributable to 2080
- offsetting the cost of afforestation by reducing the Community expenditure connected with storing these surpluses
- the nature of the aid system as an incentive for the farmer in terms of this specific objective.

3. 1. Reduction of agricultural surpluses attributable to 2080

It was difficult to use this criterion due to a complete lack of reliable information which could be compared from country to country concerning earlier agricultural use of the afforested land (particularly concerning their level of production and the income derived from this production by the beneficiaries).
None of the national programmes had thought to automatically register the earlier land use and their level of production. Similarly, and it is a significant point, the type of earlier land use, and whether the production in question was of the nature of a surplus or not, are never entered in the definition of the eligibility criteria.

Indeed, no national programme defined priorities concerning production of surpluses to be targeted, except for Spain (for milk producers and winegrowers).

However, with the help of the evaluators, by grouping together this earlier land use by type (see Classification of earlier land use in Annex 3) and using the financial data of the 1054 dossiers (see Annex 6), we were able to pinpoint 2 indicators :
- area of land afforested due to 2080, by type of earlier land use
- agricultural production of surpluses removed due to afforestation by type of earlier land use.

3.1.1. Area of land afforested due to Regulation 2080, by type of earlier land use

Table 14 : Breakdown of earlier land use by biogeographical zone

Biogeographical areas	Atlantic	continental	Mediterranean	mountain	total	%
Area of arable land	48 113	5 979	143 320	166	**197 578**	20%
Other land before	61 961	35	57 287	-	**119 283**	12%
Grassland and grazing	196 694	5 313	276 860	705	**479 572**	48%
Unspecified previous cultivated	78 314	44 842	87 978	175	**211 310**	20%
total	385 082	56 169	565 445	1 046	**1 007 743**	

Source : evaluators
Scale : the eight target countries

Grassland and grazing land was the land most frequently afforested. This category in fact contains marginal land, often being abandoned, which is mainly grassland ; this land is sometimes used for grazing livestock and is classed as « erial a pastos » in Spain or « unenclosed land » or « rough grazing » in Ireland. It covers areas which tend to be poor and tend to be left fallow.
Generally, therefore, the productive land which is likely to be the source of surpluses has not been affected by 2080.
We would however point out that in Portugal some examples have been reported by the evaluators, noting winegrowing areas abandoned in favour of afforestation in the north-west of the country (due, it would appear, to a severe lack of agricultural workers, these being drawn by the more attractive salaries in industry).

3.1.2. Agricultural production of surpluses withdrawn due to afforestation by type of earlier land use

This estimate was drawn up from data obtained during interviews with the beneficiaries, and was based on the type of afforested land, and the earlier productivity of this land, declared by those interviewed.

We selected the production of common wheat, in so far as the Directorate-General for Agriculture is able to supply us with the necessary information in terms of the cost of the storage and export of the surpluses.

We hypothesised that all the arable land which had been declared to have been afforested was potentially capable of producing common wheat at 50% of the average national yield (which over-estimates the result below because not all the arable land necessarily produced cereals).

Table15 : Production of common wheat removed due to afforestation

Country	Yield in tonnes/ha	Yield of afforested land (tonnes/ha)	Usable agricultural area under forests (hectares)	Production withdrawn due to afforestation (tonnes/yr)
DE	7.21	3.6	36197	130 310
DK	7.25	3.6	1720	6 192
ES	3.25	1.6	92027	147 243
F	7.75	3.9	5780	22 542
IRE	8.01	4	0	0
IT	4.88	2.5	26535	66 337
PT	1.03	0.5	14000	700
UK	7.57	3.8	25203	95 771
Others	5.0	2.5	40425	101 063
Total			**197 578**	**570 158**

Source : DG for Agriculture.
Scale : the 15 countries of the European Union

According to this calculation, 570 000 tonnes of common wheat are not produced each year due to the afforestation of 197 578 ha of agricultural land ; out of a production of 94.4 million tonnes in 1998, this represents 0.6% of the production of common wheat. But it represents a level of non-production equivalent to 23% of the surplus apparent as at 30 June 1998.
For the earlier years, we have taken account of the areas afforested at this date, of the average yield in cereals of the hectares afforested, i.e. 2.88 tonnes/ha and of the level of 20% of earlier agricultural land use (see table 14).

Year	End of season stock In tonnes	Contribution of 2080
1995	1 993 000	8%
1996	459 000	60%
1997	497 000	81%
1998	2 451 000	23%

The variation in the end of season stock is very large from one year to another without being correlated to the area of 2080.

After having examined these two indicators we can therefore say that in terms of area, as well as in terms of quantity of agricultural production potentially leading to surpluses, the planting carried out due to 2080 has had an insignificant effect in terms of production withdrawn.

Moreover, surveys carried out among the beneficiaries show :

- that from the farming point of view, the plantings generally lead to a small drop in production, often without this having any effect on income, except in cases where most of the farm is afforested (following the farmer retiring or the non-renewal of a farming lease for example).

- that the types of plot chosen for afforestation most frequently correspond to one of the following criteria :
  - low agricultural potential (sometimes these plots had been set-aside previously)
  - small plots near the production system (grassland or arable land belonging to winegrowers or arboriculturalists, etc.)
  - plots too far away, small plots and sloping plots, etc.

Nevertheless, in spite of the small plots involved, the irreversible nature of afforestation means that the withdrawal from production has an impact which will continue in the long term and which could prove to be more or less significant depending on the demand for agricultural land (locally this impact could therefore become significant).

3.2. Offsetting the cost of afforestation by reducing the Community expenditure connected with storing agricultural surpluses

The data supplied by the Directorate-General for Agriculture enable the expenditure connected with storage and exporting of surpluses to be calculated for the whole of the European Community.
For an area of one hectare of cereals, this expenditure takes into account the cost of the direct aid for production, the storage costs and the export costs. The breakdown of the calculation concerning these three terms of the alternative (afforestation, cereal production or set-aside) and the reasons for choosing the regions appearing in the table below are given in Annex 10.

The budgetary costs of afforestation are calculated on the basis of regional maxima given in the regional programmes and confirmed by the evaluators.

Table 16 : Budgetary cost of one hectare of afforestation, compared with the total cost of one hectare of surplus cereals or one hectare of set-aside

	Cereal yield tonnes/ ha	Term of the compensatory premium	Afforestation over 15 or 20 years (Base 100)	Cereals over 15 or 20 years	Set-aside over 15 or 20 years
Bavaria	5,61	20	100	**114**	76
Brandenburg (region 2)	4,52	20	**100**	78	52
Schleswig Holstein	6,81	20	100	**163**	**108**
Extremadura (part of it)	0,9	20	**100**	28	19
Castilla Leon (Burgos)	4,1	20	100	**133**	89
Wales LFA	5,05	15	100	**107**	71
England	5,89	15	100	**111**	73
Eure	6,59	15	100	**197**	**131**
Pyrénées Orientales	3,48	15	100	**209**	**159**

Source : DG for Agriculture.
Scale : regional
Period : 15-20 years

This table is unusual in a few respects :

In Extremadura afforestation appears 5 times more expensive because of the very low cereal yield of one part of the region.

In Brandenburg the aid for afforestation is the highest (11 780 euro/ha over 20 years).

For Schleswig Holstein and the Eure region in France, afforestation is the least expensive alternative, because of the high yield from the land under cereals and the relative moderation of the aid for afforestation.

In Wales, in England and in Castilla Leon the cost of cereal production is higher.

In the Pyrénées Orientales, the difference between afforestation and the other alternatives is greatest, in spite of a low cereal yield, because of the low level of aid for afforestation.

Apart from Schleswig-Holstein and the two French regions, therefore, set-aside appears to be the most economic solution, given that it avoids storage and export costs.

As for the cost to the budget of production, storage and exporting cereals, it is highest for the European Community in most of the regions.

3.3 The nature of the aid system as an incentive for the farmer in terms of this specific objective

3.3.1. Gross returns from growing cereals (common wheat) compared with gross returns from afforestation, on one hectare

We thought that it would be useful to draw up this ratio to measure any advantage found by the farmer in choosing afforestation rather than cereal production, or the opposite.
The costs of the production of common wheat and afforestation could be difficult to take into account because of the fact that they vary too greatly. We preferred to use the idea of returns, as a basis for comparison, rather than that of gross income or gross margin).

To draw up this comparison, we made the following estimates, for a unit of 1 hectare :

- the gross returns for common wheat were based on the production price in 1998 (source : European Commission, Agricultural statistics 2000), with reference to the same historical yield for the 15 to 20 years of the period under consideration.
- The gross returns from afforestation include only the compensatory premium for loss of income and the afforestation aid (the income from wood being considered to be too far away and hypothetical to be taken into account at this stage).
- The gross returns from set-aside also include solely the premiums paid for setting aside land under cereals.

The choice of regions used is explained in Annex 10.

Table 17 : Compared estimation of the gross returns per hectare, from common wheat cultivation and afforestation

	Cereal yield tonnes/ ha	Term of the compensatory premium	Returns on afforestation over 15 or 20 years (Base 100)	Returns on cereals over 15 or 20 years	Returns on set-aside over 15 or 20 years
Bavaria	5,61	20	100	**184**	76
Brandenburg (region2)	4,52	20	100	**126**	52
Schleswig Holstein	6,81	20	100	**261**	108
Extremadura (part of it)	0,9	20	**100**	53	19
Castilla Leon (Burgos)	4,1	20	100	**252**	89
Wales LFA	5,05	15	100	**176**	71
England	5,89	15	100	**182**	73
Eure	6,59	15	100	**322**	131
Pyrénées Orientales	3,48	15	100	**328**	159

Source : DG for Agriculture 1998, published in 2000.
Scale : regional

From this table it is fairly clear that for the farmers and from a rather simplistic financial point of view, it is better to continue producing common wheat, whether the production goes into surplus or not, than to plant forests.

Only the Estremadura region, where the gross returns from afforestation are 2 to 3 times the returns from other agricultural alternatives, has shown great enthusiasm for afforestation since 2080/92 started.

For most of the regions, therefore, the interest rankings are 1 for cereals, 2 for afforestation and 3 for set-aside.

3.3.2 Comparison of the compensatory premium with the gross returns from common wheat and set-aside

Introducing a little more sophistication to the calculations, it is interesting to compare the level of the compensatory premium for loss of income (by removing the other aid connected with the « afforestation » investment), compared with the gross returns expected by two other alternatives (common wheat and set-aside), still over the period when the premium is being paid out.

Table 18 : Comparison of the compensatory premium for loss of income, with the gross returns on cereals and set- aside

	Term of the premiums	Cereal yield tonnes/ha	Amount of the compensatory premium over 15 or 20 years (Base 100)	Returns on common wheat over 15 or 20 years	Returns on set-aside over 15 or 20 years
Bavaria	20	5,61	100	**303**	126
Brandenburg (region2)	20	4,52	100	**244**	101
Schleswig Holstein	20	6,81	100	**368**	153
Extremadura (part of it)	20	0,9	**100**	91	32
Castilla Leon (Burgos)	20	4,1	100	**417**	147
Wales LFA	15	5,05	100	**244**	98
England	15	5,89	100	**285**	115
Eure	15	6,59	100	**600**	243
Pyrénées Orientales	15	3,48	100	**579**	280

Source : DG for Agriculture 2000.
Regional scale

In any event this table shows that, in most cases, the compensatory premium for loss of income is not attractive compared with the returns from other cereal productions or other premiums, such as those attached to compulsory set-aside ; in spite of the regular fall in the price of cereals for several years, the annual income from common wheat may be up to 6 times greater than the compensatory premium for loss of income. It is only in Estremadura that the low yield makes the compensatory premium look attractive.

In all therefore, the afforestation aid does not appear attractive in financial terms for 15 to 20 years compared with other type of returns ; particularly when we consider, moreover, that the expected benefits from afforestation are still far away and subject to many hazards ; and that afforestation, because of its irreversible nature, prevents the farmer from adapting his agricultural production to the financing and market opportunities and therefore from maximising his profit.

This is confirmation that the national and regional programmes generally accompanied and emphasised the trend started by the general framework of 2080, which led to farmers preferring to choose land which was not directly productive for the afforestation operations.

Conclusions on agricultural surpluses :

The evaluation encountered a major problem – which we have only partially been able to circumvent – namely that it is impossible to know exactly what agricultural use the land afforested by 2080 and by the Member States was put to beforehand ; and therefore it is impossible to compare the earlier agricultural production of the plantations planted or to calculate their impact on any reduction in surpluses.

Nevertheless, and taking these reservations into account, we were able to ascertain that the impact of 2080 on the reduction of agricultural surpluses is not very great.

According to the estimate carried out on a limited but significant example, the agricultural production withdrawn due to the afforestation of 2080 does, indeed, appear to be completely marginal : hypothesising that all the arable land afforested by 2080 was able to produce common wheat, it is thought to represent 0.6% of the annual production of common wheat.

It is very clear that the regulation has been ineffective in encouraging farmers to plant trees on productive agricultural land.
Indeed, and with a few rare exceptions, it was land with a very low yield producing a very low income which was planted in the majority of cases and this was true for all the countries ; as the beneficiaries had all followed the clear logic of not abandoning the most profitable land for production of an irreversible nature and with a hypothetical yield.
We would point out that, for the farmer, the gross returns from afforestation are less than 1.5 to 3 times that of common wheat and the compensatory premium for loss of income is less than 2 to 6 times the gross returns for common wheat.

Hence neither the regulation itself nor the national programmes which have arranged to select dossiers according to this objective, whether this is in terms of zoning, the choice of plots or type of farmers ; and fairly clearly, these same national programmes have overall placed this expectation at the bottom of their list of priorities and have sometimes even posted priorities counter to it

However, it should be pointed out that from the point of view of the Community's budget, the overall estimated cost of 2080 is 1 to 2 times less than that of producing, storing and exporting the surpluses (for set-aside, the comparison is more variable).

4. To what extent have the forest activities helped in alleviating climate change ?

Climate change is defined as a change in temperature due to the increase in polluting gases or to the greenhouse effect in the atmosphere (carbon dioxide, methane, nitrate oxide and carbon hexafluoride).

In view of the context of this evaluation, we thought it relevant to evaluate mainly the extent to which the afforestation and improvements made due to Regulation 2080 contributed to carbon stocked in wood, particularly by 2012 defined in the Kyoto Protocol, as specified in the tender specification.

In order to do this, we used the following judgement criteria and indicators :
Criterion 1 : the contribution of 2080 afforestation to carbon stocking
- the number of tonnes of carbon stocked per hectare afforested
- comparison between the Kyoto undertakings by target countries and the contribution of 2080 by country ;

Criterion 2 : the contribution of 2080 improvements to carbon stocking
- the number of tonnes of carbon stocked by hectare improved
- the size of the operations connected with protection against fire.

We therefore set certain limits to our analysis in the light of the relevant data available :
- methane, nitrate oxide and carbon hexafluoride have not been taken into consideration ;
- we did not take into account the consequences connected with the use of the wood and in different political and industrial scenarios ;
- nor did we consider the marginal cases of plantations on peat bogs.

Method used

Planting trees and natural regeneration makes it possible to reduce the accumulation of carbon dioxide (CO_2) in the atmosphere in that the trees capture the CO_2 and release oxygen during photosynthesis. The tree is therefore a store for carbon because the latter fixes lastingly in the perennial part of the tree (the wood). Furthermore a considerable amount of CO_2 is also stocked in the soil.

This fixation process depends directly on the biomass produced, which is in turn dependent on how productive the tree is. The greater the productivity, the more the tree fixes carbon.
At the beginning of its growth, the productivity of a plantation is low. This increases more or less quickly depending on the species until it reaches its maximum productive phase and finally dies.
Carbon fixation follows the same path : in the early years of a tree, the fixation is very low then it reaches its maximum when the tree is itself in its maximum productivity phase. This period is reached approximately 10 years after planting, for fast-growing varieties such as the poplar or the eucalyptus, 15-20 years for conifers and 20-25 years for the other broadleaves, except for oak where we have to wait at least 30 to 50 years.

Of the areas planted under 2080, 56.8% were planted with broadleaves, 32.1% with conifers, 7.1% with mixed populations of conifers and broadleaves and only 4% with fast-growing species.
These plantations were planted between 1993 and 1999, and, by 2005, only 35 of the plantations will be in the maximum productivity phase. For the conifer plantations we will have to wait until 2010-2020 to be in the carbon fixing period and 2015-2025 for the broadleaves (2025-2030 for the oaks).

The method used to calculate the carbon stocked in the plantations under 2080 is described in Annex 11. It is based on a calculation of the production of biomass of the trees to which we add the carbon stocked in the soil (the largest reservoir of carbon in the forest being the soil and the leaf litter).

4.1. Contribution of the 2080 plantings to carbon stocking

4.1.1. Number of tonnes of carbon stocked per hectare planted

Table 19 : Number of tonnes of carbon stocked per country and per hectare planted

	Carbon stocked* in tonnes/ha/year			Carbon stocked* by the 2080 plantations in tC/year			Participation by country
	Broad-leaves	Conifers	Total ***	Broad-leaves	conifers	Total	
Germany	3,20	2,76	3,12	70 075	14 300	84 375	3 %
Denmark	3,49	3,35	3,47	27 559	4 316	31 885	1 %
Spain	2,20	2,68	2,40	530 307	459 181	989 488	36 %
France	2,64	2,62	2,63	46 215	26 559	72 774	3 %
Ireland	2,10	4,15	3,86	35 857	434 724	470 581	17 %
Italy	3,30	2,68	3,28	279 360	8 427	287 787	11 %
Portugal	2,20	1,94	2,13	271 038	81 125	352 163	13 %
United Kingdom	2,57	3,73	2,99	231 354	190 960	422 314	16 %
Weighted average / Total	2.47 **	3.14 **	2.73 **	1 491 776	1 219 591	2 711 366	100 %

* carbon stocked during the period of maximum growth ** average weighted by the areas of each of the countries,
*** total weighted by the areas of broadleaves and conifers.

Source : data supplied by the evaluators in November 2000.
Scale ; the 8 countries.

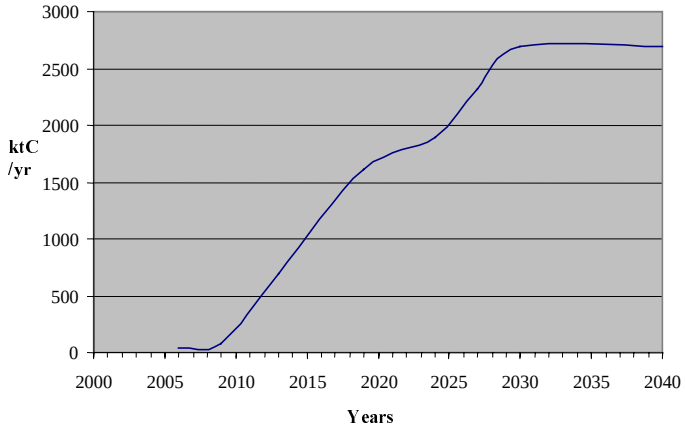
The carbon stocked per hectare and per year, all species together is, on average, 2.73 tonnes of carbon (tC)/ha/year. It varies from 2.13 tC/ha/year in Portugal to 3.86 tC/ha/year in Ireland.

We can therefore estimate that approximately 2.7 million tonnes of carbon (mtC)/year will be stocked as from 2015, for all of the plantations (1 000 000 hectares), when they will be in their period of maximum production.

Two points should be highlighted :

- The degree of carbon fixation varies according to whether broadleaves or conifers are involved. Broadleaves stock on average 2.47 tC/ha /year with variations of 2.10 tC/year in Ireland to 3.49 tC/ha/year in Denmark. For conifers, the average will be 3.14 tC/ha/year with variations of 1.94 tC/ha/year in Portugal to 4.15 tC/ha/year in Ireland
- **The carbon will be stocked in several stages (see figure below).**

Figure 21 : Development of the carbon stocked in the plantations.



Source : Evaluators, November 20000.
Scale : the eight countries of the study

1993-1999 : approximately 1 000 000 hectares planted with Regulation 2080

2003-2009 : the fast-growing plantations enter their maximum production phase. These plantations (4% of the total) are mainly broadleaves, they will fix a maximum of approximately 99 ktC/year in total.

1 000 000 ha x 3% x 2.47 tC/year = approx. 75 ktC/year

2008-2012 : the conifer plantations (29% of the total) enter their maximum production phase and will fix a total of approximately 1008 ktC/year.

1 000 000 ha x 32.1% x 3.14 tC/an = approx. 1 008 ktC/year

2013-2024 : broadleaved plantations other than the oak, i.e. 25% of the total, enter their maximum production phase and will fix a total of approximately 618 ktC/an.

1 000 000 ha x 25% x 2.47 tC/year = approx. 618 ktC/year

2025-2029 : the oak plantations (mainly *Quercus ilex* and *Quercus suber*), i.e. 33% of the total, enter their maximum production phase and will fix a total of approximately 815 ktC/year.

1 000 000 ha x 33% x 2.47 tC/year = approx. 815 ktC/year

By 2012, all the fast-growing plantations (99 ktC/year) and only a part of the conifer plantations will fix carbon. We cannot know exactly the number of hectares of conifers that will be in their maximum production phase. To know this we would have to have the date of planting and the corresponding species. Given that the majority of the plantations were planted around 1995-1997 and that the maximum production period is reached after 15-20 years for the medium-term conifers, part of the plantations of conifers will start to fix carbon between 2010 and 2012. We have assumed that in 2012, approximately 30% of the plantations will be fixing carbon.
Therefore the total carbon fixed in 2012 is calculated at (30% x 1 008 ktC/year +99 ktC/year), i.e. a quantity of between 300 and 400 ktC/year.

As from 2030, total carbon fixation from the plantations will be 2 700 ktC/year, i.e. approximately 2% of the total carbon fixed by the European forests. 58% of the carbon fixation will take place in the Mediterranean zone, mainly in Spain and Portugal, and 38% will take place in the Atlantic zone (mainly Ireland and the United Kingdom).

Carbon fixation by 2012 will therefore be low (less than 500 ktC/year) and will then take place in fast-growing plantations, and the stands of conifers which will be in their maximum production phase.

We would point out in this respect that the objectives of biodiversity, which favour plantations with a high value in terms of rural heritage, are not necessarily correlated to the objective of

carbon stocking in the short and medium term (on the other hand, this correlation is effective in the long term).
We would also point out that no Member State has regarded this objective to be a priority, except for Italy which entered it in 4th place, and actually made a special effort for poplar planting – but mainly to strengthen the wood production of the valley of the Po.

4.1.2. Comparison between the Kyoto undertakings by target countries and the 2080 contribution by country

In the Kyoto Protocol, all the member countries of the United Nations signed an agreement to limit and reduce emissions of polluting gases or greenhouse gases considered to be factors of climate change, in order to promote sustainable development.
In Article 3 of the protocol, the countries undertake to reduce by at least 5% (compared with the 1990 level) their emissions of CO_2 in the period 2008-2012 (over 5 years). From 2005, each country will have to show that it is doing everything it can to achieve this.

The table below compares the total emissions of carbon dioxide calculated in 1990, the level of reduction of the emissions from 5 to 8% of carbon dioxide for the year 2012, according to the annexes of the Kyoto Protocol and for each of the eight target countries, and the calculated contribution of 2080 (a contribution which necessarily only meets a very small part of this objective, which was not assigned to it)

Table 20 : Comparison between the undertakings made by the eight target countries and the contribution of 2080

	Total emissions of CO_2 in 1990		Reduction objective for emissions by 2012 (2)				Carbon stocked (3) by the 2080 plantations		
	In Gg (10^9 grams)	In % (1)	In Gg of CO_2 (10^9 grams)	In Gg of C (4)	A in Gg of C/year 2008-2012	Participation by country	B in Gg of C/year (10^9 grammes)	Participation by country	B/A (5)
Germany	1 012 443	7,4 %	80 995	22 090	**4 418**	36,5 %	**84**	3 %	**0,02**
Denmark	52 100	0,4 %	4 168	1 137	**227**	1,9 %	**32**	1 %	**0,14**
Spain	260 654	1,9 %	20 852	5 687	**1 137**	9,4 %	**989**	36 %	**0,87**
France	366 536	2,7 %	29 323	7 997	**1 599**	13,2 %	**73**	3 %	**0,05**
Ireland	30 719	0,2 %	2 458	670	**134**	1,1 %	**471**	17 %	**3,51**
Italy	428 941	3,1 %	34 315	9 359	**1 872**	15,4 %	**288**	11 %	**0,15**
Portugal	42 148	0,3 %	3 372	920	**184**	1,5 %	**352**	13 %	**1,91**
United Kingdom	584 078	4,3 %	46 726	12 743	**2 549**	21,0 %	**422**	16 %	**0,17**
Total	2 777 619	20,3 %	222 209	60 603	**12 120**	100, 0%	**2 71**	100 %	**0,22**

Sources : The following table shows the figures given in Annexes B and I of the Kyoto Protocol (11 December 1997) and the figures calculated for Regulation 2080.
Scale : the eight target countries

Presentation notes :

(1) percentage calculated for all the countries participating in the Kyoto Protocol (34 countries, with the United States at 36.1% and the Russian Federation at 17.4%).

(2) the eight target countries have as their objective for 2012 total CO_2 emissions equal to 92% of the total given in 1990

(3) carbon stocked during the maximum growth period

(4) the mass ratio between C and $_{CO2}$ is the ratio of the molecular masses of 12 over 44

(5) In order to compare the objectives of the Kyoto Protocol and the results of 2080, we compare the total emission reduction values for CO_2 with the quantities of carbon stocked by the 2080 plantations.
For this calculation, we have used an annual quantity of carbon knowing that the period under consideration (5 years between 2008 and 2012) for reaching the Kyoto objectives, and the period when the 2080 plantations will stock carbon do not coincide (indeed, we will have to wait for the trees to be in their period of maximum growth before they stock the maximum carbon, see below).

Nevertheless, in the last column of the table (column B/A), we compared the carbon stocked annually in the 2080 plantations (column B) and the carbon which will have to be stocked annually in order to meet the Kyoto objectives (column A). If the ratio is greater than or equal to 1, this means that the 2080 plantations help to reach the objectives. On the other hand, when the ratio goes towards 0, this means that the 2080 plantations contribute little towards reaching these objectives.

Comments :

The countries which have the highest emissions of CO_2 and therefore the highest reduction objectives are Germany and the United Kingdom. On the other hand, Ireland, Portugal and Denmark are the countries with the lowest emissions.

Ireland (3.5) **and** Portugal (1.91) have a ratio clearly higher than 1. For these two countries, the CO_2 emissions are very low and the level of 2080 planting is high, therefore we can say that Regulation 2080 plays a large part in reducing CO_2 emissions.

In Spain, the ratio is close to 1 at 0.87. The CO_2 emissions are not very high and moreover the 2080 plantations are many ; Regulation 2080 makes a major contribution to reaching the Kyoto objectives.

For the other countries, the ratio tends toward 0, particularly in Germany (0.02) and in France (0.05). The 2080 plantations contribute very little to the implementation of CO_2 emission reduction.

4.2. Contribution of the 2080 improvements to carbon stocking

4.2.1. Number of tonnes of carbon stocked per hectare improved

Part of Regulation 2080 aimed to improve existing tree stands.
These improvements are of various types, and initially we thought that we could calculate the increase in productivity connected with the improvement, and thus calculate the number of tonnes stocked per hectare improved.
This calculation has not been possible because we had no figures enabling us to estimate this increase in productivity.

Furthermore, the increase in productivity was not the main objective of the improvements made in the context of Regulation 2080 ; the most frequent type of improvement on 350 689 ha improved (90 200 of which are cork plantations) being improvements intended to increase the quality of the tree stand and protect the environment.

However, in order to show a general trend for the contribution of the improvements to carbon stocking, for each improvement, according to the Classification shown in Annex 3, we attempted to evaluate this contribution qualitatively (see **Error! Reference source not found.** below)

Table 21 : The various types of improvement and their consequences on carbon fixation in the short and long term.

Classification of improvements	*Carbon fixing*	
	In the short term	*In the long term*
Improvement of forest infrastructures		
- Creation of forest roads	↘	=
- Construction of storage area	↘	=
- Installation of firebreaks	↘	↗
- Installation of water points	↘	=
- Maintenance or creation of drainage systems	↘	↗
- Protection of plantations against grazing and wild animals	↘	↗
Improvement of tree quality		
- Operations in young plantations (thinning out, etc)	=	↗

- Shaping/pruning	=	↗
- Removal of dead wood	=	↗
- Clearings	=	
Improvement in tree stand quality		
- Conversion of non-productive or damaged plots	↗	↗
- Conversion of conifer stands into broadleaves	↘	↘
- Conversion of coniferous stands with other conifers	↘	↘
- Transformation of a single crop into a mixed plantation of local species	↘	↘
- Introduction of conifers	↗	↗
- More suitable silviculture in ecological terms (natural regeneration, etc.)	=	=
- Renewal pruning	↗	↗
- Improvement of edges of forests by planting broadleaves	=	=
- Planting strips of broadleaves (as a stabiliser against storms)	↗	↗
- Removing undergrowth	↗	↗
- Fertilizer application	↗	↗
- Controlled burning (intended to improve the soil structure)	↘	↘
Improvement of cork plantations		
- Natural regeneration of cork plantations (removal of dead wood)	↗	↗
- Shaping/pruning	↗	↗
- Increase in density	↗	↗
Protection of the environment and tree stands*		
- Installation of shelterbreak hedges (protecting land from erosion)	↗	↗
- Protection measures in young plantations	↗	↗
- Protection against forest acidification (lime treatments)	↗	↗
- Compartmentalisation (fire prevention ?)	↗	↗
- Protection against diseases	↗	↗

4.2.2. Importance of operations connected with protection against fire

One recommended type of improvement was the installation of firebreaks (approx. 16 400 ha). These operations were carried out in Italy (mainly in Sardinia and Sicily), in Spain (mainly in Galicia) and in Portugal (mainly in the south of the country).

Initially the installation of firebreaks is a source of carbon being released into the atmosphere ; but in the medium and long term, this operation, by allowing fires to be better brought under control and therefore to reduce forest fires will lead to a reduction in carbon emission.
In addition to this, the disappearance or reduction of fires, apart from the release of CO_2 into the atmosphere of the vegetation and the soil, also limits :

- the release of N_2O (which creates a considerable greenhouse effect in the short term)
- the release of organic particles,
- soil erosion,
- the destruction of fauna and flora,

It is not possible to anticipate the number of hectares protected, but the fire protection infrastructure played a considerable part in some of the plots newly planted under 2080.
We would, however, point out that in Portugal the firebreaks were not necessarily installed in the areas where forest fires are a major problem, because the forests of farmers in some areas (in northern Portugal mainly) were not eligible for improvement aid, being too far from the farm.

Although it is impossible to anticipate exactly the effect of the improvements on carbon isolation, it is undeniable that the global impact is limited, certainly, but favourable.

Conclusions on climate change :

In this evaluation we considered only the quantity of carbon likely to be stocked by the new areas afforested under 2080, whatever the political and industrial scenarios downstream.

And we calculated this quantity according to the predictive models which set limits on which we will make the usual reservations.

Consequently we can say that the impact of the 2080 plantings on carbon stocking is positive, but will be negligible by 2012, and will hardly be significant before 2030, mainly because of the slow growth of the Mediterranean species planted (then it should represent approximately 2 to 3% of the total amount of carbon fixed by European forests, but will remain small compared with Europe's undertakings at the Kyoto Conference).

And if the improvements also contribute positively to this stocking process (in particular the operations aiming to protect the environment and the tree stands, the improvement of cork plantations and the installation of firebreaks), it is to an even lesser extent, in view of how small they are.

We would point out that the national programmes have approached this objective as an induced objective, and that no targeting of species has really been planned (except for Italy, which entered this objective in 4th place in its programme, and actually made a special effort to plant fast-growing species capable of stocking carbon more rapidly and in a larger proportion).

5. To what extent have the forest measures contributed towards biodiversity ?

There are few results available on biodiversity because the national and regional programmes were not specific on these points originally and have not developed tools to monitor the environmental impacts.

Consequently, the impact of the planting on biodiversity is a subject which has to be examined with care, and we will only deal with certain aspects, distinguishing between two scales by which to observe biodiversity :

- Biodiversity of the plantations which depends mainly on the species used and how the plantation is run : mixture of varieties, improvement of planting by not razing the ground, introducing broadleaves into coniferous populations, creating forest borders, etc.,

- Biodiversity of the clumps of trees, which depends on the location and size of the plantations in relation to the existing wooded areas, but also on their possible negative impact on rare open environment habitats (dry greens, heathland, humid areas).

Otherwise we examined part-financed forestry activities which seemed to us to have a positive or negative effect on biodiversity both in terms of flora and fauna :

Positive points for biodiversity :
- planting of broadleaves
- creation of intermixed plantations
- transformation of monospecific plantations into mixed or intermixed plantations
- medium size of the small plots
- creation of forest borders and ecotones
- return to a more natural forest
- planting of rare species
- planting of indigenous species and not fast-growing species
- installing a belt of broadleaves around coniferous plantations
- introducing shelterbreaks
- operations to counteract soil acidity (but the result is positive only if the operation continues).

Negative points for biodiversity :
- planting conifers in certain ways
- planting in areas which are very heavily forested for some regions (possibility of closing the landscape)
- use of plants selected for afforestation (which may possibly damage the genetic diversity of the different forest varieties).

In view therefore of all these points and the problem of accessing some specific qualitative information about them, we have used the following judgement criteria and indicators to answer this question :

Improvement of the biodiversity of the plantations ;
- a number of hectares planted with intermixed species ;
- a proportion of species with high value in terms of rural heritage planted in the plantations or the improvements ;

Improvement in the biodiversity of clumps of trees ;
- degree of closure or opening of the landscape depending on the rate of afforestation ;
- number of kilometres or hectares of forest borders and ecotones ;
- location of the plantations in protected areas, and in particular in Natura 2000 areas and notable habitats

5.1. Improvement of biodiversity at the level of the plantations

5.1.1. Number of hectares afforested with a mixture of species

The plantations created by 2080 represent 1 041 589 ha, 7.1% of which are mixed plantations of conifers and broadleaves, 32.1% are conifers, 56.8% area broadleaves and 4% are fast-growing species.
We have been unable to find out the exact proportion of plantations based on several species, so-called intermixed plantations (of which mixed plantations only form a part), because the various countries do not have sufficiently accurate information on the species planted, except for Spain. In other countries, either the distribution of the areas planted according to varieties is not known in detail or only the dominant variety in the plantation is mentioned.

We were however able to produce a breakdown by main species, on 707 000 ha, i.e. 70% of the area afforested by 2080 (see table in Annex 17)
Otherwise the evaluators in the different countries point out that plantations with mixed species are generally preferred (see below) :

From these national data obtained by the evaluators, it appears that at least 32% of the plantations are mixed plantations, and that this trend predominates in the countries which most applied Regulation 2080.

In **Germany**, the number of hectares planted is small (27 045 ha) but the objective was clearly to reintroduce mixtures of broadleaves and indigenous species rather than fast-growing species ; conifers could only be planted in regions where they were part of the indigenous species.

Furthermore, a large proportion of the improvements aimed to transform monospecific plantations into mixed plantations.

For **Denmark**, there is no specific data at national level on the composition of the plantations, but one of the conditions of Regulation 2080 was the obligation to introduce intermixed plantations. We would also point out that, apart from the shelterbreak plantations already pointed out, some plantations of conifers have been surrounded by belts of broadleaves.

In **Spain**, more than 40% of the areas planted are intermixed plantations, with 25% of plantations with a mixture of broadleaves, 3% with a mixture of conifers and 13% with a mixture of broadleaves and conifers.

In **Portugal**, all the areas planted except for plantations of *Quercus suber* and *Pinus pinea* are intermixed plantations, i.e. 38% of the total.

In **Italy**, there is no detailed data, but according to the evaluator, approximately 70% of the plantations were planted with valuable or semi-valuable broadleaves, mixed with secondary broadleaves ; one of the improvements used mainly by the national programme, then broken down by region, was to transform monospecific plantations into mixed plantations.

In **Ireland**, most of the plantations planted were monospecific to conifers.

To this, we must add the improvements which have often consisted of transforming monospecific plantations into mixed or intermixed plantations. It is impossible to find out the percentage of these, but we know that this type of improvement was made mainly in Germany which accounts for 42% of the areas improved.

5.1.2. Proportion of species with a high value in terms of rural heritage introduced into the plantations and improvements broken down by region (or by country, if they cannot be broken down on a regional scale)

We have already made a part-reference to this indicator while examining in the earlier questions the quality of the resource created, an aspect on which the choice of varieties planted has an important impact.

Here we give more specific details, country by country, of the proportion of species with a high value in terms of rural heritage which are introduced into the plantations, at the same time as explaining the role played in this choice by the national and regional programmes.
By a species belonging to the rural heritage we mean an authochtonic species, generally rare and possibly protected (see Annex 15, the table of species belonging to the rural heritage broken down by large regions).

Germany (27 045 ha planted and 101 000 improved)

- The species most frequently planted in the 2080 plantations is the oak with 38% (*Quercus petraea* mainly), followed by beech (*Fagus sylvatica*) with 19%. The wild cherry (*Prunus avium*), the alder (*Alnus incana* and *A. glutinosa*), the Norway pine and the spruce, each making up 5% of the plantations.
- In all the plantations at least 10 species of trees have been used.
- The national programme placed great emphasis on planting broadleaves, the most important aspect of the German programme being to introduce new forest intermixed varieties and predominantly broadleaves, in order to restore balance in the existing forest structures.

Denmark (9 193 ha planted)

- There is no data at national level. The observations shows that the plantations of mixed broadleaves (*Quercus petraea, Quercus robur, Fagus sylvatica* and *Fraxinus excelsior*) predominate. In most cases the oak is the dominant species. This creates very light plantations and enables other species to grow.
- In all the plantations, a minimum of 14 species of trees have been used. The national programmes encouraged farmers to plant indigenous varieties, giving preference to mixed broadleaves, particularly in shelterbreak hedges.

Spain (412 804 ha planted)

- The species most planted under 2080 as a single crop or a mixture are oak (*Quercus ilex* and *Quercus suber* mainly) with a cover of 45%, followed by Monterey pine (*Pinus radiata*) with 10%. Species such as eucalyptus, olive, walnut, black pine, Alep pine, maritime pine and parasol pine cover between 2% and 5%.
- In all, more than 40 different species have been used for plantations with 14 species which have cover levels in excess of 1%.
- The national programme has encouraged farmers to plant very varied varieties, some of which have a high value in heritage terms, such as *Quercus ilex*, *Pinus pinea*, or *l'Olea europea*. It is important to note that the forests of quercus ilex form part of the habitats in European Directive 92/42/EEC. Moreover the accompanying species, Mediterranean shrubs, were on the lists of Annexes 2 and 3, very valuable in terms of rural heritage, such as *Arbutus undo* and *Genista, etc*.

France (27 674 ha planted)

- The species most planted under 2080 are the poplar with a level of cover of 21%, the laricio pine with 20% and the common oak with 14%. The walnut, red oak, Douglas fir and maritime pine have cover ranging from 5% to 6%.
- In all more than 20 different species have been used for plantations, 15 species of which have levels of cover exceeding 1%

  Some valuable and semi-valuable broadleaves have been planted with cover of 6% for the walnut, 2.3% for the wild cherry and 1.7% for the maple.

- We would point out that the varieties used, varied though they are, were not often mixed but generally found in monospecific plantations.

Ireland (121 841 ha planted)

- In Ireland, conifers predominated with mainly ***Picea sitchensis***, ***Pinus contorta***, spruce and Douglas fir. This country is the only one for which the plantations which dominated in Regulation 2080 are plantations of exotic conifers.

- Plantations planted under 2080 are mainly plantations of a single species of conifer, even if efforts have been made (in the programme 2000-2006) to induce farmers to plant mixtures of conifers up to 20%, 40% or even 60% of varieties other than *Picea sitchensis*. The national programme, which was designed in 1996, provided for 20% of area under broadleaves. Over the period 1994-1999, the proportion of broadleaves-planted areas increased from 3% to 16,7%. Yet, over the period 1997-1999 this proportion was of 20%. Broadly speaking, Ireland has not priviledged the increasing in biodiversity partially, as stressed by the Irish authorities, because of difficult, poor and humid soil characteristics. In some cases, broadleaves might have been planted as an accompanying species.

  It is an observation which led us to conclude that Ireland did not favour the objective of increasing biodiversity (even though with difficult, poor and humid soil, broadleaves could have been used as accompanying varieties).

Italy (87 836 ha planted)

- The species used by 2080 are not species generally planted in Italian forests, but, in the context of « timber plantations », mixtures of valuable or semi-valuable broadleaves with secondary broadleaves.

- The plantations planted under 2080 gave new impetus to broadleaves not often present in Italian forests, such as *Alnus cordata, Alnus glutinosa, Juglans regia, Prunus avium* and *Quercus pubescens* and *Ostrya carpinifolia*.

Portugal (165 110 ha planted)

- The species most planted due to 2080 is *Quercus suber*, the most common broadleaf in the country, with a level of cover of 43%. Then *Pinus pinea* with 19% and *Quercus ilex* with 15%.

- In all, more than 25 different species have been used for the plantations, of which *Prunus lusitanica* is an endemic valuable broadleaf.

- For each of the 11 zonal areas, the species judged to be « particularly interesting » benefited from an increase in the amounts of aid, as the national programme had relatively supported the diversification of varieties.

United Kingdom (87 836 ha planted)

- For this country we only have the list of species recommended in the 2080 plantations, the objective of the national programme being to preserve the different habitats and to promote the use of indigenous species.

For all the countries studied, the 2080 plantations consisted of 61% broadleaves and 39% conifers. Dominant varieties are oaks, including *Quercus ilex* (at least 14% of the area planted), *Quercus suber* (at least 11% of the area planted), a mixture of *Quercus suber – Quercus ilex* (at least 6%).
For the conifers, *Pinus radiata* was planted on at least 5% of the total area. We have no detailed figures for *Picea sitchensis*, but the area planted should be around 6%, according to the Irish data.

We can therefore conclude from the whole of the observations above that the proportions of the mixture of broadleaves and that of the use of species with a high heritage value (in certain plantations, in some countries and on areas which are not always marginal), were relatively important in the plantings carried out due to 2080.

In this respect, 2080 made a large contribution to ensuring the maintenance and even to increase the biological diversity of the plantations.

5.2. Improving the biodiversity in clumps of trees

5.2.1 Degree of opening and closing of the landscape according to the level of afforestation

By the landscape is meant here the « systematic » bringing together of different habitats and types of land use, irrespective of any aesthetic or spatial aspect.

Let us examine the ratio of afforestation 2080 and area planted in the different countries :

Table 22 : Level of afforestation and area planted in the different countries :

	A Area under forest (ha)	B Level of afforestation	C Area planted due to 2080 (ha)	C/A ratio
Germany	10 741 046	30,1 %	27 045	0,3 %
Denmark	420 584	12%	9 193	2,2 %
Spain	10 861 038	21,6 %	412 804	3,8 %
France	13 353 214	24,3 %	27 674	0,2%
Ireland	634 120	9,2 %	121 841	19,2 %
Italy	7 325 801	24,0 %	87 836	1,2 %
Portugal	3 398 810	36,3 %	165 110	5,1%
United Kingdom	2 579 000	10,7 %	141 078	5,5 %
		22,8 %	992 581	2 %

Source : TBFRA 2000 and evaluators, November 2000.
Scale : Target countries.

The countries with a low level of afforestation such as Ireland and the United Kingdom are the countries where the 2080 plantations are the largest. On the other hand, in the countries where the level of afforestation is high, such as Germany, France and Italy, their ratio with the areas planted due to 2080 is of the order of 1%, or even less.

There are, however, marked regional peculiarities, which should be highlighted, whether they confirm this correlation or not :

In Germany for example, 22% of the areas were planted in Bavaria where the level of afforestation is already 36% ;

In Spain, on the other hand, 64% of the plantations have been planted in only 3 regions (Andalusia, Castilla y Leon and Estremadura) which are some of the regions with the lowest level of afforestation in Spain (less than 15%) ;

In France too, 21% of the plantations are in the region of the Pays de la Loire, which has one of the lowest levels of afforestation in France (8%) ;

In Portugal in the same way, 46% of the plantations were planted in the south of the country, where the most heavily wooded regions are to be found (the Algarve and Alentejo).

If the situation is noticeably different from one country to another, in general the plantations were generally planted in areas where the level of afforestation is lowest, except for certain parts of Portugal and Germany, where closing the landscape does not appear to constitute a real risk (nothing was pointed out to us in this respect by the evaluators).

Furthermore, in Italy and Germany, plantations were planted on the plain (this is particularly important in Italy where, for the first time for more than 100 years, plots were planted in the valley of the Po).

In most cases, we can therefore conclude that Regulation 2080 has allowed areas under forest to be increased in countries or parts of countries which generally do not have many forests and the impact on the landscape is generally favourable.

5.2.2. Number of kilometres or hectares of edges of forests and ecotones (km of tracks, km of firebreaks, size of plots reforested or improved)

Table 23 : Improvement of forest infrastructures

	Track	Firebreak	Shelterbreak	Draining ditch	Water point	Average size of plots planted *
Germany	311 km	-	-	-		1,2 ha (0,6 – 5,0)
Denmark	245 km	-	3 973 ha	682 km		9,8 ha (2,1 – 12,4)
Spain	8 752 km	9 905 ha			1 281	11,96 ha (2,0 – 52,4)
France	-	-	-	-	-	7,1 ha (4,1 – 11,2)
Ireland	544 km	-	-	-	-	9,3 ha
Italy	2 853 km	4 469 ha	-	-	-	5,5 ha
Portugal	1 899 km	3 931 ha	-	-	874	29,32 ha (15,8 NW – 45,7 in the SE)
United Kingdom	30 584 km	-	-	-	-	7,0 ha (4,2 – 13,7)
	45 188 km	**18 305 ha**	**3 973 ha**	**682 km**	**2 155**	

Source : DG for Agriculture, date or period under consideration

Note :
- The « average size of the plots » does in fact correspond to the average size of the areas planted per beneficiary. We can assume that one and the same beneficiary can plant on different plots and that, consequently, the actual size of the reforested plots is even smaller, on average.
- In brackets we have given the minimum and maximum average size when these were available.

The edges of the forest and ecotones, created by the tracks, firebreaks, shelterbreaks, ditches, water points, and taking into account the small average size of the plots, have a particularly beneficial impact in terms of biodiversity.
In Denmark, in particular, the size of the shelterbreaks is very significant and really enables new areas where animals can shelter on an agricultural plain.

However this information, with figures, does not enable us to reach a decision on the relevance of these infrastructures in terms of enriching biodiversity, because we do not have essential details about where they are in the countryside.

5.2.3. Location of plantings in the protected areas and in particular in the Natura 2000 zones and in unusual habitats

The Natura 2000 scheme is only just being introduced into most of the countries concerned and no link has been established between the plantations planted under 2080 and the Natura 2000 zones (no national programme makes reference to any restrictions of the application of 2080 in the Natura 2000 zone).

However, the report of the Institute for European Environmental Policy (IEEP) in London cites cases where some of the following habitats have been destroyed, habitats in Annex 1 or 2 of the directive on habitats or in Annex 1 of the directive on birds, connected with the application of Regulation 2080. The areas concerned may vary by several tens of hectares to more than 10 000 ha.

(The two countries concerned by these reports are mainly Spain and Ireland, but others may be affected too).

The Birdlife International report confirms the disappearance of certain habitats situated on the steppes (estepa gipsofila), semi-natural grazing, peat bogs, or garrigues (mattoral) with kermes oak, on areas of the order of 2000 ha. The change in the flora due to plantations of aleppo pines on these sites threatens species such as the hazel grouse, the bittern or the grey eagle.

A report by the WWF in Spain stresses the same problems connected with a lack of planning and monitoring of fragile areas such as habitats.

The drainage operations started due to the Finnish improvement programme are thought to have had negative effects in that they have dried out habitats specific to humid areas.

In general it is actually marginal agricultural areas which have been planted, such as semi-natural grasslands or dry grasslands, which have an important conservation value and, in this respect, it is these which run the most risks. At the same time, the most intensive agricultural areas, those where the environmental effect of afforestation is thought to have been the most noticeable, have been little affected by the afforestation.

With the information currently available, it is impossible to evaluate the relative importance of these findings (which do, however, need to be considered seriously) compared with the positive points raised previously, these being the high numbers of broadleaves and the indigenous species in the 2080 plantings (reversing the trend of previous decades, particularly in Portugal and Spain).

Conclusions on biodiversity :

The member states have not set any precise objective in this area nor do they have specific tools to monitor it.

Given that there is little information available on this, we can nevertheless say that the contribution of 2080 to biodiversity, both from the point of view of the environment and in that of clumps of trees, is generally positive and relatively significant.

The national programmes have in fact all encouraged the use of broadleaves (except for Ireland), the planting of indigenous species with a heritage value (particularly in Spain) and also original types of planting and improvements, based on mixtures of varieties.

Furthermore, the enrichment connected with the plantations is almost automatic in the first few years, owing to the creation of an open environment associated with trees and shrubs.

Nevertheless this assessment should be tempered :

- plantations in the Mediterranean zone have sometimes been thought to have a negative effect on biodiversity and the habitats of certain sheep-rearing environments (in Spain in particular where grasslands constitute 48% of the land afforested under 2080).

- as regards this specific aspect, we can justifiably question the impact of the coniferous plantations in the Irish programme.

6. To what extent have the forest activities enhanced the protective function of forests, especially regarding natural resources

Any afforestation or any improvement – this is an established fact on which the experts agree – is likely to enhance the long-term protection of the soil, help to fix nitrates and store water.
These are three major types of action which we will group here under the term « protection of natural resources ».

In answering this question, we have therefore opted to attach most importance to the area and to the location of the plantings and improvements aiming to protect soil and water.

But we came up against three large problems :
- The lack of information on the location of the wooded areas compared with fragile areas (no maps of the plots planted were available)
- The absence of bases of reference and specific measures, which makes it difficult to carry out any quantitative and precise evaluation of this impact.

We would point out that the national programmes did not mention any specific objective on this point, in spite of environmental impact studies being carried out and various other measures – see part 7 of the present chapter.
We therefore mainly based the presentation of the points below on the opinions of experts collected by the various partners in the project, and also on the working documents of the Standing Committee on Agriculture.

6.1. Soil conservation (and air protection)

In general the forest plays an important role in combating soil erosion, particularly in sloping areas.
But, because of the limits emphasised above, we have no precise and reliable information on this point (having only been able to see that 1046 ha of plantations had been planted in mountainous areas and that the 2080 plantings were in hilly regions in the south of Portugal).

Moreover the erosion of agricultural land mainly affects the Mediterranean regions.
In most cases, afforestation in these areas therefore had a direct positive effect on the protection of soil against erosion by improving its structure and stopping it from drying out, particularly in the arid Mediterranean region.
Heavy irrigation of this land is in fact accompanied by intense evaporation which, by rising up, leads to the formation of a crust of salts on the surface of the land and makes it unsuitable for agricultural production.

Also to be noted are some less direct effects on the soil, but ones which are equally important : certain plantations of broadleaves in the west of Andalusia were intended to capture the « hidden precipitation » of fog or atmospheric humidity. This classical physiological phenomenon saves ground water by reducing transpiration and thus avoiding the damage due to any ions rising from the ground.
In particular for air protection :

As far as air protection is concerned ::
- The afforestation of agricultural land reduces the release of CO_2 and pollution in 2 ways :
  - by reducing farm work and therefore the use of energy and fuel,
  - by reducing the use of fertilizers and pesticides, and therefore the use of energy and substances which are sometimes as dangerous as CO_2.

- The creation of firebreaks and water points to accompany these new plantings, reduces fires and therefore protects the soil (and the air).

We have three reservations which temper this otherwise positive assessment :

- In Spain and in Portugal, soil preparation before planting, which was often carried out by public works companies which had turned to forestry, involved the use of heavy machinery and techniques which sometimes accelerated erosion in the first few years, where the land sloped steeply.
  The BirdLife International and WWF Spain reports both stressed the use of inadequate soil working techniques in sloping areas : the use of subsoiling in the rows of the steepest slopes had the effect of raising the mother rock and destabilising the topsoil. This phenomenon is accentuated by the clearing of earlier vegetation, in cases where the land had already been cleared and on which regeneration had started.

- Otherwise afforestation is beneficial against erosion in all cases where it takes place on arable land (more vulnerable) or after perennial crops (olive groves or certain orchards in Mediterranean areas). Spain has afforested 22% of arable land and 28% of perennial crops but 50% of grassland, which is more resilient.
  In the other countries of the south, the proportion of afforestation on arable land is greater, therefore this reservation may be considered to be less serious.

- In some cases, forest roads may be the source of soil erosion.

6.2 Water protection

This water protection function of plantations can be seen in particular in the absorption of nitrates and phosphates ; the creation of hedges along canals or rivers, for example, introduces buffer zones (and also reduces the release of nitrogen, which definitely has positive consequences for air quality).
The catchment and protection of underground water and the provision of barriers against run-off are also potentially significant and positive effects connected with the plantings.

But here too, the very incomplete and fragmented information make it impossible to carry out a global evaluation of the impact of 2080 on water resources.

Some useful information nevertheless reached us from the target countries :

In Denmark, afforestation is carried out on agricultural land in water-catchment areas (which are thus protected against a massive inflow of nitrates in certain water courses) or else forests are planted near large pig farms
This particular afforestation programme is still in its infancy but it is of great significance and it has the benefit of planning in time and space.

In France and in Italy the poplar plantations help enormously in absorbing nitrates along water courses.

Ireland is one of the countries where the afforestation programme has given risen to clashes with the environmental NGOs, concerning particularly the risk of water acidification in the west of the country.
A study at University College, Dublin, published in January 1998, showed that afforestation and reafforestation with conifers and Sitka spruce made before the implementation of Regulation 2080 exceed the critical acidity levels threatening the survival of Salmonidae eggs in the winter and spring.
Moreover, some NGOs have noted that those in charge of fishing were alerted in 1997 by the damage caused by the planting work on water quality but also on the rate at which it is being carried out (the draining of catchment areas stops the « sponge » effect of the bogs by increasing run-off, releasing more sediment; the use of fertilizers has increased the level of phosphorus).

Conclusions on natural resources :

In spite of the sound arguments sometimes put forward by the Member States in their national programmes, protection of the natural resources did not really give rise to the setting of really specific objectives over the period 1994-1999 (except for the Spanish and Portuguese programmes).

And as regards therefore the operations to improve soil protection, aid for fixing nitrates and phosphates and conserving water resources (which we took as the three major types of protection operation), the monitoring tools were non-existent.
In particular, in the absence of zoning documents, we were unable to locate those 2080 plantations which were likely to have an impact on the zones specifically concerned with the protection of natural resources.

These are all factors which made the evaluation of this impact almost impossible, without taking account of the fact that as the plantations are so new, this considerably reduces the possibility of carrying out a correct assessment over the medium and long term.

We therefore had to limit ourselves to two observations :

- **The plantings and improvements carried out due to 2080 are part of a global step to help to protect soil against erosion and desiccation (particularly in the arid Mediterranean zone) and to protect water by absorbing nitrates.**
  It is impossible to quantify this impact

- There are certain exceptions to this favourable assessment : in Spain and in Portugal, it appears that the planting work has sometimes destabilised the topsoil ; and in Ireland, the planting of conifers has resulting in the acidification of groundwater.

7. To what extent did the implementation of the national and/or regional programmes help to achieve the objectives of the regulation and reach a significant proportion of its potential beneficiaries ?

The multiannual national and regional programmes of the member states implement the aid scheme provided for by Regulation 2080. They can therefore modify the amounts, the term and the conditions for awarding this aid, and target certain types of beneficiary more specifically. They can arrange accompanying measures, put in place zonal afforestation plans and promote certain species of trees.

All these measures adapt and supplement the regulation and help it to reach its objectives : without, however, being the only means by which it will be effective nor constituting the full size of its impact, they will make a contribution to it.

It is this contribution that we are going to try to show, while at the same time assessing the effectiveness, the efficiency and the consistency of these national and regional programmes (a detailed description of which appears in Annex 9)

We therefore finally adopted two major types of judgement criteria for the whole of this question :

- ✔ those permitting an assessment of the effectiveness and global efficiency of the national and regional programmes (assessment partly carried out in questions 1 to 6) :
  - significant nature of their impact on these beneficiaries ;
  - incentive nature or otherwise of the financial modifications introduced ;
  - existence of positive effects of gearing down and the me too effect ;
  - existence of negative effects of the droit d'aubaine.

- ✔ those permitting an assessment of the operational consistency of these programmes :
  - definition of the objectives listed and reliability of the implementation
  - existence of programmes zoned according to the objectives or of targeted choice of species
  - existence of earlier diagnostics and of monitoring and control means
  - existence of training and awareness programmes

Most of these criteria were examined through the qualitative data supplied by the evaluators.

7.1 Significant nature of the impact of the national and regional programmes on the beneficiaries

As a reminder, the potential beneficiaries are defined in the text of 2080 itself :

- ➢ For afforestation, these are the natural or legal persons who plant the trees on agricultural land, whether they are farmers of not, from the public or private sector. (The compensatory premium for loss of income is only directed at farmers who do not benefit from the early retirement scheme and at natural or legal persons under private law)

- ➢ For improvements to wooded areas, it is only farmers with farming as their main occupation who are eligible.

For farmers who are the main beneficiaries who are likely to take part in achieving the specific objective of surplus reduction, we used the two indicators below :

- number of farmers who are beneficiaries/total number of farmers
- comparison of the characteristics of the farms affected by 2080 with those of the national farms

In addition to this, we sought to identify, even roughly, the various categories of beneficiaries according to the objectives of the programme they preferred and to see to what extent these coincided or not, thus creating a third indicator :

- ability of the beneficiaries to help the objectives of 2080 to be met

7.1.1. Number of farmers who are beneficiaries/total number of farmers

The information which distinguishes between the status of farmers and non-farmers is, unfortunately, not available at all or there is very little of it.

As regards aid for afforestation or maintenance, the status of these two categories of beneficiary is not known.
Only a breakdown of the woodlands according to the status of forester is available for all the countries and only with regard to the compensatory premium for loss of income (via the results of Regulation 1054, which provides homogeneous data for the 15 countries of the European Union (see **Figure 15**).

This only shows that, on a European scale, 72% of the areas benefiting from the compensatory premium for loss of income belong to farmers, with this status of farmer being able to cover very different socio-economic situations, which leads us, generally, to treat these figures with care.

(In Spain, for example, the WWF Spain report deplores the fact that most of the farmers who are beneficiaries are not really farmers but rather " country dwellers" who abandon extensive stockfarming practices only to convert large open areas in to forest for hunting as a sport, and collecting fruits and mushrooms, without consulting agricultural professionals).

7.1.2. Comparison of the characteristics of the farms concerned by 2080 with those of the national farms

The table below compares the main characteristics of the farms of the country with those of the farms which have benefited from aid for afforestation (all types of aid together).

Table 24 : Comparison between farms which planted due to 2080 and all farms

	Ireland		Italy		Portugal		Germany		United Kingdom	
	All	Those which planted	All	Those which planted	All	Those which planted	All	Those which planted	All	Those which planted
Usable agricultural area in ha	35	43	12.5	23.6	12.2	29.1	52.6	37.5	131	211.9
Area under forest in ha including 2080 plantings	0.67	11.24	0.71	9.01	3.55	31.18	3.59	8.87	2.24	14.16
Gross farm income in euro	17 646	20 468	21 005	26 354	7 014	12 653	58 595	42 306	81 592	107 178
GFI / UAA (in euro/ha)	504	476	1 680	1 117	575	435	1 114	1 128	623	508

Source : RICA data : available for five of the eight target countries

It transpires that :

- In countries such as Ireland, Italy, Portugal and the United Kingdom, the farms which planted are larger than the national average but have less income per hectare. This confirms the fact that they tend to be farms with non-intensive systems and marginal agricultural land.

- The gross farm income (GFI) per hectare of the farms which planted is generally less than the average GFI of all the farms and ranges from 435 euro/hectare for Portugal to 1128 euro/hectare for Germany.

- Farms which planted have areas under forest which exceed the national average, which shows that they often have woods attached to the farm.

7.1.3. Ability of the beneficiaries to take part in meeting the objectives of Regulation 2080.

This qualitative indicator was drawn from the field surveys and from the interviews conducted with the beneficiaries.
The following main categories can be listed :

- Generally elderly farmers (over the age of 55), who want to prepare for their retirement and reduce the workload on the farm, while retaining their land with a view to improving the rural heritage.
- Part-time farmers who, through afforestation, want to convert the activities of their farm .
- Farmers who want to obtain a stable income from forestry production by preferring to plant conifers and poplars.
- Land owners who no longer want to rent their land out, and take advantage of afforestation to withdraw the land from the circuit (the premium often being 2 to 3 times higher than income from tenant farmers).
- Land owners from great landed estates who plant large areas with a view to developing hunting and tourism activities (particularly in the countries of southern Europe).

If we compare these objectives with those of Regulation 2080, we obtain the table below, which shows the areas where these objectives were more or less « covered » :

Beneficiaries' objectives Objectives of 2080	Forest production	Diversification of agricultural activities	Improvement of the heritage
Rural development	**	***	**

Forest resources	***	*	*
Agricultural surpluses	-	*	-
Environment	*	***	***
Countries and/or regions concerned	Denmark, Ireland, Italy (valley of the Po), France (conifers)	Southern Spain, Portugal, Italy	Germany, Italy, United Kingdom, France (oak), Denmark (hedges)

*** : direct strong correlation ** : secondary correlation, ** : weak correlation, - : no correlation

It transpires that :

- Forest production is a perceptible objective particularly in the cases of beneficiaries who have planted conifers or poplars, i.e. plantations which can be harvested in less than 20 to 40 years. The income can be expected at a time compatible with the age of the beneficiaries.

- Diversification of the activities is specific to the countries of the south, where agricultural yield is less, and where the woods are likely to produce other activities from which a return can be obtained (honey, cork, hunting, mushrooms, pick-your-own, etc.).

- Improvement of the heritage relates to small plantations such as in Germany and the United Kingdom, the planting of oaks on the Atlantic coast, planting hedges in Denmark and intermixed plantations in Italy.

7.2 Incentive nature of the modulation of the aid and premiums introduced by the national and regional systems

National and regional programmes for awarding aid (amounts + award conditions) have a considerable effect on motivating beneficiaries to plant trees or improve existing plantations, and, by doing so, meet the various objectives of the regulation.

We have already analysed this effect in detail for each of the objectives of 2080 dealt with earlier and have shown the way in which these programmes have relayed and even increased some fundamental impacts of the regulation, namely support for agricultural income, the improvement of not particularly productive land, and the creation of a forest resource which is mainly based on broadleaved species.

Here are a few key points in this respect ;

✔ Without the aid created by 2080 over many years, therefore supported by the national and regional programmes, farmers would have turned to reversible solutions, such as set-aside, which offers financial compensation fairly close to the aid offered by 2080 for afforestation, without the disadvantage of irreversibility.

One of the major innovations made by 2080, namely the increase in the compensatory premium for loss of income from 150 ecus to 600 ecus for farmers, in addition to the aid for afforestation, was the triggering factor for afforestation on land which was mainly non-productive ; the amounts of this premium not being sufficient to persuade producers of potential surpluses to plant productive land with trees.

This effect was mainly seen in countries with a low agricultural income, such as the countries of southern Europe and Ireland, where the aid represented up to 20% of the gross farm income (and where, in this case, the compensatory premium played its role to the full).

On the other hand, the ceiling set by the European Commission did not make the premium attractive in countries with high incomes such as Germany or France, where afforestation is often performed in response to other types of objective, and the compensatory premium for loss of income is generally regarded as being to support maintenance, as the afforestation aid only covers the initial investment.

- ✔ The use of long cycle varieties, mainly broadleaves, is not due to the fact that the beneficiaries are especially attached to them, but because they are lured by the attractive amounts of aid as well as the longer period over which the premium is paid and that they have responded to the encouragement issued about this by most of the member states and the regions

  We do not rule out the possibility that there were beneficiaries who, by choice and irrespective of any financial consideration, preferred these varieties (the surveys show us that a considerable proportion of the farmers want to enhance their landscapes to use them for tourism or hunting purposes, in which case broadleaves were generally more suitable).

- ✔ Without the aid, therefore, the beneficiaries would not have planted as large an area of land as rapidly and they would have spread the expenditure and time of work connected with the afforestation and maintenance over several years (the surveys corroborate this observation)

On these three points, the national and regional programmes have, overall, emphasised the impact of 2080.
As for the rest, they modified the impact according to their context and their priorities and we would refer the reader to the earlier parts and to the summary at the end of Chapter 4.

As an indication, the table below gives an overall view of the national modifications introduced country by country, in relation to the finance range imposed by 2080 ; it is clear, taking into account all that we have just said, that their nature as an incentive is not due to the value of the amounts offered compared with the Community norm, but to the value of these same amounts compared with the standards of living and national incomes (this is very obviously the case for Portugal and Spain).

Table 25 :Incentive nature of the national aid and premium systems

2080 objectives/target countries	Aid for afforestation	Compensatory premium for loss of income for farmers	Compensatory premium for loss of income for non-farmers	Improvement aid for existing plantations
DE	***	***	***	***
DK	**	*	**	**
ES	**	*	*	**
F	*	*	*	-
IE	*	**	**	*
IT	***	***	***	***
PT	*	*	*	*
UK	**	**	**	**

*** : amounts of aid close to the maximum provided for in the regulation
** : intermediary amounts of aid
* : amounts of aid close to the minimum provided for in the regulation
- : no aid provided for

7.3 Existence of «me too» effects

These effects are real. All the countries stress the « snowballing » effect of the afforestation of agricultural land, which often constitutes a novelty in the agricultural landscape, particularly in regions where there are few forests.
Farmers who do not have any experience of afforestation are generally hesitant about launching themselves into this long-term « adventure », which is unfamiliar to them and which involves irreversible choices : being able to derive support from others reduces their ignorance about it and therefore also their mistrust.

We would point out that, in order to be effective, this proximity effect requires new plantations to « cover » enough of the territory to enable the farmers to gradually become familiar with it.

7.4 Existence of the effects of the droit d'aubaine

It is very clear that no effect of the droit d'aubaine has been reported.

And it would appear to be clear for all evaluators that no farmer would mortgage his land over such a long period without external aid, only relying on the long-term return. Most of the beneficiaries asked said that without 2080 they would have continued growing crops or would have left the land to lie fallow.

7.5 Specification of the texts and national and regional programmes and faithfulness to the objectives in 2080, for the 8 target countries

An analysis of the official implementing texts of 2080 in the different countries reveals the diversity of the interpretations of the regulation, and how its objectives are modified according to the national or regional afforestation strategies (in turn dependent on the contexts and perceived needs).

We thought that it would be useful to list below the objectives of the 8 target countries, taken from the working documents submitted by the member states to the Standing Committee on Forestry during 1994. We would point out that a few revisions to the national programmes initially posted

were made between 1994 and 1999 ; unfortunately we were unable to have sufficiently detailed access to the information on this.

Denmark

- Main objective : « to double the area under forest in one generation of trees divided equally between public and private plantings, and evenly between broadleaves and conifers ».

Then :

- Protect and preserve tree stands and beauty spots within forests
- Increase the ecological value of the forest and enhance their image as an open air site
- Increase the proportion of broadleaves and plant protective plantations of broadleaves (objectives specific to shelterbreaks).

Spain

- First objective : « create a profitable alternative to the use of agricultural land through afforestation" .

Then :

- Help to reduce serious soil erosion and desertification problems.
- Plant specific species, detailed in 3 annexes.

Portugal

- Main objective : « create a profitable alternative to the use of agricultural land through afforestation ».

Then :

- Promote association between producers to attempt to turn them into forestry operators.
- Improve the living conditions for people in the least-favoured areas
- Suggest the forestry alternative to abandoning farming, particularly on marginal land.

Italy

In addition to the 4 objectives listed in 2080, the Italian programme has the following objectives :

- Main objective : « to use land abandoned by agriculture and alternative use of agricultural land ». (it is stated there very clearly that it will not be productive land which will be afforested as a matter of priority)

Then :

- Monitoring rainwater and preventing erosion
- To limit the flight from the land

Ireland

- Main objective : to plant 30 000 ha per year

Then :

- Of the 120 000 ha planned, assign 5000 ha to recreational activities
- Plant 20% broadleaves

As far as Germany and France are concerned, the documents do not refer to special objectives other than to those mentioned in the regulation itself.

This rapid survey of the 8 target countries enables us to see that the details of the texts varied greatly from country to country.

We would point out that in the great majority of cases, the objective concerning the reduction of agricultural surpluses was ignored. The programmes do not refer to it directly and they sometimes state the opposite, clearly indicating that afforestation is an alternative to abandoning agricultural land (the case for Spain), and that afforestation should preferably be on marginal land (the case for Portugal).

For the rest, generally the objectives of rural development tend to be advanced by the countries of the south of Europe and those concerning forestry resources and the environment tend to be preferred by the countries of northern Europe.

7.6 Existence of zonal programmes and/or targeted choice of species compared with agricultural production, the silvicultural potential and the environmental stakes

Overall we have seen a generalised lack of zoning and planning, enabling any particular objective listed in 2080 to be targeted more specifically.
However, the countries did take account of the specific nature of the regions and encourage farmers to plant certain species rather than others compared with the silvicultural (value of the species), environmental (biodiversity) and greenhouse effect stakes (carbon stocking) and often linking the amount of aid with them (see earlier parts in Chapter 3)
We would simply say that, as far as the « forest resources » objective is concerned, the national programmes promoted long-term and medium-term broadleaved and often valuable species (such as the walnut and the wild cherry in Italy, France and Spain) : under certain maintenance conditions, these forest varieties should lead to wood production of great value and a resource much sought after.

This selection of species also had a beneficial effect on the other objectives, varying from country to country :

Spain distinguished between three types of species (Annexes 1, 2 and 3) which each of the regions could prefer to a greater or lesser extent, and which were eligible for different amounts :

Annex 1 : species of trees, particularly conifers, for which aid is planned for wood production over more than 18 years.
Annex 2 : broadleaved species, the planting of which aims to restore or create permanent forest ecosystems
Annex 3 : broadleaved species of special interest in each autonomous community, (reasons ; valuable wood, rare species or species which are becoming extinct)

Varieties	Amounts of afforestation aid per hectare
Annex 1	919 Ecu
Mixture of species Annexes 1,2,3	1051 to 1313 Ecu
Annex 2	1576 Ecu
Protected species and mixed with species in Annexes 2 and 3	2101 Ecu

France did not plan any zoning at national level, but the municipalities who so wished did have the opportunity to create it; this was particularly the case in departments where the level of afforestation is high and where agriculture is under-valued.
A list of species which can be subsidised was also adopted, modified from department to department, but which corresponds to the silvicultural specifications of the Fond Forestier national, and is not peculiar to the afforestation of agricultural land.

We point out the example of the Pays de Loire, where plantations of poplars were zoned along the valleys, during the programme, to protect the environment and the landscape ; indigenous or acclimatised species were also strongly encouraged : oak plantations (the common or pedunculated oak) were preferred owing to higher aid (1273 euro/ha instead of 682 euro/ha, and the oak was actually the first variety planted after the laricio pine in this region, whereas generally in France the pine is preferred to the oak.

Portugal has defined 11 zonal plans, defining the species which have priority from the ecological point of view – mainly broadleaves – accompanied by a description of their cultural and economic uses.

In the United Kingdom aid from managing the plantations was planned in the case of plantations which had a specific environmental value :

- Improvement of reception facilities for the public for recreational purposes
- Improvement of the structural diversity, opening up space, encouraging the growth of grasses and small bushes and identifying trees
- Encouragement to create plantations close to towns for « informal use by the public ».

7.7. Existence of diagnostics prior to the implementation of the national or regional programmes and monitoring and control measures

Preliminary diagnostics and monitoring and control measures are traditionally the three additional tools enabling the evaluation of the results obtained compared with the objectives listed, in order to compare what was expected with what was actually achieved (in quantitative and qualitative terms) and to intervene if there was a discrepancy.

What was it for the implementation of 2080 ?

7.7.1 Existence of preliminary diagnostics

In none of the partner countries in the evaluation were there any real preliminary diagnostics, except for France, where this was performed by a working party set up to examine the farmer's forest (furthermore, on the more directly operational aspects of Regulation 2080, the Chambers of Agriculture set up a working party in 1992 to make proposals).

7.7.2. Monitoring and control measures

This information did not reach us automatically for all the target countries.
We did however have a few interesting insights, both from the point of view of financial monitoring and control and from that of technical monitoring and control:

Regarding administrative and financial monitoring and control

The cumbersome administrative and financial aspects of the procedure and in particular the slow payment of the aid (which, it would appear, can cause delays of one to two whole years) is condemned; and it would appear that the change in the payment procedure of 2080 - caused by transferring the charges from the EAGGF Guidance Section to the EAGGF Guarantee Section, is partly the cause of these problems.
It is a general phenomenon common apparently to most of the countries, which would appear to be linked to the superposition of several levels of administrative authority between the State and the regions (which causes endless toings and froings of validations and authorisations) ; and also to the fact that 2080 is of less importance than other agricultural measures and that it is rarely treated as a priority when processing dossiers.

In Italy, Spain and Portugal, authorities which were unable to carry out regular checks at the beginning of the programme have only been carrying out checks during the last two years.

These checks have sometimes given rise to certain beneficiaries being asked to reimburse the aid (as the plantations had failed due to lack of maintenance or because the species planted were not suitable or were not those indicated on the aid application).
The fact of passing from no controls to a sometimes rigorous control has created a feeling of lack of understanding which has made beneficiaries hesitate before planting any future plantations, in Italy in particular.

In Ireland, the afforestation programme aimed to plant 20% of broadleaves, but only 16% were planted from 1994 to 1999 (national average). The COILLTE, a national forestry organisation, itself only planted 10%. Some NGOs therefore asked for the control procedures to be reinforced.

Regarding the technical monitoring and control measures

Monitoring and control of the quality of the afforestation operations and how they are run

In France, the State received the work in the autumn following planting, then checks were planned according to a statistical sampling method for 15 years.
Monitoring is not systematic therefore, but the beneficiaries frequently use a technical aid which ensures the technical quality of the work for the first 3 to 4 years of the plantation.
In the Midi-Pyrénées, two thirds of the beneficiaries surveyed used a supervisor for the plantation and for the monitoring ; in the Pays-de-la-Loire, 82% of the dossiers were accompanied by an approved expert, owing to aid granted by the Region, implying that the plantations were successful and that the beneficiaries were satisfied.

In Ireland, local authority checks apply for plantations 25 hectares and larger. Between 1993 and 1999, only 8% of the projects came into this category.
With reservations we can quote the report of Mr Tony LOWES (Natural environment Committee, 14/03/2001) stating that refusals for financing by the local authorities had fallen from 90 to 14 between 1993 and 1999, not because of an improvement in the projects but due to a lack of human and administrative resources.

In Spain and northern Portugal, the beneficiaries sometimes grouped together so that the afforestation project became larger and so that the technical coordination would be easier. But according to the Spanish Ministry of Agriculture, these provisions would have led to the beneficiaries, who were not very motivated, benefiting from the aid without really taking on the responsibilities of maintenance

Monitoring and control of the environmental impact of the plantations

The working documents of the Standing Committee on forestry throw up certain important points concerning these measures.

Spain
The environmental impact is made obligatory in Estremadura from 50 ha and from 25 ha for Castilla de la Mancha, for the plantations after grazing, cork plantations or *dehesa*. The NGOs deplore the fact that the control only starts for large areas and criticises the incomplete way in which these measures are applied.

France
A landscape impact study was asked for projects involving over 100 ha. The introduction of various local broadleaves in a mixture of varieties is recommended for cultural, aesthetic and countryside reasons.
When the compensatory premium for loss of income was granted, each prefect was asked to take into account « the objective of maintenance of increase in biodiversity, of the quality of the landscape, of the protection of water resources and the reduction of soil erosion ».

Greece
An environmental impact study is provided for plantations larger than 10 ha.

Italy
All the measures connected with 2080 have to be carried out limiting to a maximum their repercussions on the environment, including :
- Using disease-resistant poplar clones,
- Preventing excessively extensive wood-cutting in terms of area
- Limiting afforestation in areas covered by environmental and protection plans,
- Development of forest cover hilly and mountainous areas after human activity has been abandoned.

Ireland
The judgement C – 392/96 of the European Court on 21 September 1999 revealed the failure of the transposition of the European Directive 85/337/EEC to the Irish law, especially as far as forest development is concerned.
The compulsory threshold for the EIAs was initially of 200 hectares and was reduced to 70 hectares in 1999. Yet, in its judgement, the Court asked for an EIA to be carried out as soon as the environment is significantly threatened, irrespective of the area concerned.
Moreover, according to the same above-mentioned document, the afforestation measures took place in areas which were not determined in the projects although they are acknowledged in the Habitat Directive and provide shelter and corridors for wild fauna.

The other countries did not specify in detail their framework for controlling the environmental impact of operations connected with 2080.

7.8 Existence of information, training and awareness programmes for the potential beneficiaries

These programmes fell within the competence of the member states, and most of our evaluators, with only a few exceptions, emphasised the same deficits in the measures provided for :

In Portugal, it was found that :

- There was no link between the existing training system and the objectives of the regulation; the beneficiaries had had a very inadequate training, or even none at all, and in all cases not a very suitable one ;
- The fact that the training instruments used were mainly agricultural, and so far had little competence in forestry.

And this more especially as the problem of the competence and the know-how of the beneficiaries in the area of forestry is perceived as being important (in view, in particular, of their age bracket and sometimes their lack of direct involvement in the afforestation projects).

In Spain, the findings were the same (lack of real training and awareness programmes ; very few teaching materials, either for the operators, the technicians or the administrators monitoring the planting operations ; even when there is a great need for training (for the same reasons as in Portugal).

In Ireland, we can see the disproportion between the means assigned to the regulation and those assigned to training and it is clear that it is a problem for the future, insofar as the main objective is to increase the forest resource.

In Italy, the training systems are considered to be inadequate and unsuitable.

In Germany, Denmark and France, on the other hand, it seems that the existing training (and advisory) measures, both agricultural and forestry, have met the demand created by the 2080 plantings relatively well – while being true that this demand is generally smaller than in the countries above.

It has unfortunately been impossible to find exactly any « good practices » or exemplary schemes in this area.

We would, however, point out the creation of a European network, within the framework of the « BOISTERRA » concerted action, specifically dedicated to the exchange of experiences and the creation of training tools and methods applying to the afforestation of agricultural land.

Conclusions on the implementation of the national programmes :

Global effectiveness and efficiency of the national and regional programmes

• It was unfortunately impossible to evaluate the significance of the proportion of agricultural and non-agricultural beneficiaries affected by 2080 due to a lack of reliable data which could really be interpreted.

We were only able to note that the farmers were the main beneficiaries (at 72%) of the compensatory premiums for loss of income – given that this designation covered a fair degree of different situations from country to country.
Mostly, these farmers have non-intensive farms with a gross farm income lower than the national average, with marginal agricultural land, and generally larger areas under forest than the national average.

The objectives of the beneficiaries (whether they are farmers or not) partly cover those of 2080 according to the different categories of beneficiaries concerned; but we do not have sufficiently detailed data to be able to draw up a real « typical profile » of these beneficiaries, country by country, and a classification of their expectations of 2080 and their afforestation strategies.

Whatever the case, if we believe the field surveys, all were satisfied with the way the projects were progressing and their technical implementation, insofar as they met their objectives and that they were represented.

• On the other hand we were able to ascertain very clearly that the modifications introduced by the national and regional programmes broadly relayed and even amplified certain basic trends driven by the general framework of the regulation, in particular with regard to the support for agricultural income, the improvement of not particularly productive land and the creation of a forest resource mainly based on broadleaved species.

As for the effects of the droit d'aubaine, they were not seen anywhere (almost no beneficiaries would have planted without the aid from 2080). The 'me too' effects of the afforestation projects were real but impossible to quantify.

Operational consistency of the programmes and relevance of their implementation

• Overall, the national and regional programmes interpreted the objectives of 2080 in the light of their contexts and their priorities (very roughly, the countries of the south of Europe generally put forward the objectives of rural development, those of northern Europe the silvicultural and environmental objectives)
These programmes, which vary very much in their levels of precision, generally did not draw up diagnostics prior to the application of the regulation, not did they really plan zoning measures which would have enabled the objectives of the regulation to be targeted (only a few measures relating to the choice of species planted went some way towards this).

• The cumbersome nature of the administrative and financial procedures for implementing these programmes is fairly often criticised by the beneficiaries interviewed, as well as the fact that they are difficult to operate, which in some cases has halted afforestation (in Spain, Portugal and Italy in particular)..
The slow payment of the aid (which sometimes causes delays by up to one or two full years) is particularly condemned, as is the apparently too rigorous – and even dissuasive – control measures considered to be indispensable, implemented in the middle of the programme (Spain and Italy).

• As for the technical monitoring of the plantations, it is generally based on existing development and technical advice measures – more or less suitable and adequate according to the size of the demand.

The monitoring and control of the environmental impact of 2080 was actually the subject of the drafting of a number of measures, but no information is available at the moment for enabling us to check their application and their effectiveness.

• The awareness and training programmes, particularly in the countries of the south where the afforestation programmes were large, are often deemed to be unsuitable and inadequate both from the point of view of implementation (the sectoral nature of which is a handicap), and from that of teaching resources and skills mobilised.

Elsewhere, the existing training (and advisory) measures, both agricultural and forestry, were able to meet the requirements relatively satisfactorily.

CHAPTER 4
GENERAL CONCLUSIONS

Regulation 2080 offered the Member States a compulsory framework within which each had the freedom to show preference for certain objectives and certain beneficiaries, and to adjust the aid according to its strategy and financial means.

This adjustment according to national contexts and priorities was all the more important because Regulation 2080 has sometimes been seen as an « all-purpose » regulation, listing many objectives and different and sometimes even contradictory levels.

Indeed, a large range of projects can be seen, of relatively little significance at European level, apart from a few exceptions, but which are often innovative, varied and which create a very positive dynamic, whether this is from the point of view of rural development, forestry resources or the environment.

Although it has not been possible to show evidence of good practice exactly, and in spite of the fact that the Regulation, initially planned for a Europe with twelve member states, was not necessarily suitable for a Europe with fifteen Member States, the overall impact of these projects, in terms of their relatively low cost to the budget at Community level, can be considered to be positive.

Projects and key figures

One million hectares of agricultural land were afforested between 1994 and 1999 owing to Regulation 2080.

As far as the beneficiaries are concerned, a rapid review of the characteristics of the operations carried out reveals a typical picture: the « 2080 forester » is a Mediterranean farmer, more Spanish than anything else, over 50 years of age, who has been growing 56.8% broadleaf species, preferably *Quercus suber or Quercus ilex,* on an area of 8 hectares very probably devoted to low productivity grazing.
He did not do the work himself (even less so if the area he afforested was larger), but the costs of the operation were totally covered by the aid if the plantation was in an Objective 1 region. The compensatory premium for loss of income has brought him almost 20% of his gross farm income.

As far as the countries are concerned, one of the ends of the range of operations can be seen in Spain and Ireland which have had ambitious afforestation programmes, with a strong impact, partly connected with the higher Community part-financing in an Objective 1 region; these two countries have to some extent played the role of « pillars » of the application of the Regulation, hence taking on the risk of environmental counterparts which may perhaps be less positive.

At the other end of the range, Germany, where the impact of the Regulation in terms of afforestation has been considerably more limited, has developed many operations for improving the environment or enhancing the rural heritage.

Contribution of Regulation 2080 to rural development

Overall this contribution appears to us to be significant and positive, and Regulation 2080 has fully played its expected role accompanying the reform of the common agricultural policy.

Although it is clear that the impact of the Regulation on the maintenance or creation of income and employment has been particularly prominent in the countries of southern Europe, all the Member States have in fact benefited, owing to Regulation 2080, from very favourable effects along the lines of diversification of agricultural activities and the development of socio-economic activities connected with afforestation.

- According to our estimates, 150 000 full-time equivalent jobs have been created owing to the afforestation operations, even if forestry activities do not replace agricultural activities because they require less labour and do not require the same know-how. Furthermore the beneficiaries, who are over the age of 55 on average, often use outside enterprises. A large degree of sub-

contracting – which in some cases reflects little involvement of the beneficiaries – therefore developed in Spain, Ireland and Portugal, mainly on the land of landowners with large areas under forest, because of the high demand created by ambitious national programmes.
Whatever the methods, these activities nevertheless led to considerable spurts of development in some regions.
It is nevertheless a shame that in the implementation of the national programmes there was a relative lack of opening to combining afforestation with other activities – in particular agri-forestry and pastoral activities in the countries of the south – which would enhance the multi-functionality of the plantations and alternative uses and development of the countryside

• At the same time, the compensatory premium for loss of income can be as much as 10% to 20% of the gross farm income when the national agricultural income is low (countries of southern Europe and Ireland) and 2% in countries where agricultural income is high.
Overall the aid covered between 40% and 80% of the costs borne by the beneficiaries (100% in the Objective 1 regions), with plantations of broadleaves leading to greater expenditure than conifers, leading to a lower level of cover.

• Afforestation has also made it possible to occupy marginal agricultural land with lesser potential, thereby preventing this land from being abandoned, whatever the countries and regions concerned, the « foresters » having concentrated their production efforts on the best and most profitable land.

• The real additional benefits of Regulation 2080 to other structural measures (such as regulation 2078 concerning agri-environmental measures), on the other hand, are fairly poorly exploited.
In countries with a national forestry policy, or benefiting from measures within the framework of the Objective 1 and 5b regions, the effects of synergy could, however, be seen more clearly, regarding in particular the forest improvement measures, more marginal in terms of volume of activities.

This real success nevertheless has to be tempered by a certain number of reservations as to its sustainability.
It is true that the period over which the compensatory premium for loss of income is paid (20 years) does constitute a certain guarantee in this respect. Moreover the irreversible nature of the plantations is partly ensured owing to the legislation in force.

But it does not prevent the sustainable nature of the impact of 2080 on rural development from being threatened by two major uncertainties hanging over it in the long term:

- It would appear that no long-term strategy has been thought out nor posted by the Member States, and we do not know the extent to which their future afforestation policies, and that of Europe, will, in political and financial terms, continue to support the impetus given. Afforestation is an activity that does not develop unless the amounts of aid are considerable, and in particular if the level of this aid is close to that of the agricultural income. And it would appear that several countries will not be able to pay the premiums over 20 years for large areas.

- Moreover, 6 years is not long enough to ensure a forest resource and prolong the dynamic started in the countryside around this resource : although afforestation has created jobs in the first 5 years of the application of the regulation, these jobs, which are often precarious and seasonal, will depends very much on the investments made if they are to last.

- The average age of the beneficiaries, in all the countries, is 55, which poses a definite problem as regards the continuity and quality of the maintenance operations when these people carry them out themselves (which is usually the case).

- Furthermore, in the long term it is not known under which conditions they will be succeeded, nor the extent to which the objectives concerning the afforestation or improvement operations that they have started, and the investment needed for them to be sustainable, will be taken up by their successors.

To summarise :

Positive impacts	Weaknesses and obstacles

Maintenance or creation of jobs and income • Creation of specialist forestry activities and enterprises in the rural areas to an equivalent of 150 000 direct jobs • Contribution to the maintenance of the rural population, particularly farmers of retirement age • Improvement of farmers' short, medium and long-term income, via large financial incentives: all premium together, and for a ceiling amount, the amount of the payments was multiplied by 4, going from 4 800 euro/ha over 20 years in 1989 to 17 900 euro/ha over 20 years in 1992 *Diversification of the activities and development of socio-economic practices connected with the afforestation* • Creation of attractive short and long-term opportunities due to afforestation; • Significant incentive and me too effect (farmers being made aware of the introduction of new plantation management practices) *Prevention of land abandonment* • Prevention of marginal land being abandoned or left fallow through afforestation in a bid to improve the rural heritage *Complementarity with other structural measures* • Real complementarity, regarding the beneficiaries targeted and the objectives *Sustainability* • Legal guarantees as to the durable nature of the plantations Payment over 20 years of the compensatory premium	• Jobs created often precarious • Heavy use by beneficiaries of sometimes inadequately qualified subcontractors (Spain, Portugal and Ireland) *Complementarity with other structural measures* • Restraints on the use of 2080 in traditional agro-forestry and silvi-pastoral activities, these activities having been removed from the national programmes *Sustainability* • Absence of long-term strategy, and uncertainty about the duration of the support of national and regional investments, and about the potentially negative consequences on retaining the jobs created Possible problems of continuity of the maintenance operations and succession, connected with the average age of the beneficiaries (55)

Contribution of Regulation 2080 to improving forest resources (in quantitative and qualitative terms)

Generally, in quantitative terms, this contribution seemed to us to be not very significant – with a few national and regional exceptions – but in qualitative terms it was positive.

• On a European scale, 2080 accounts for 10% of the annual increase in area under forest; and, on the scale of the 8 target countries used (which represent 96% of the area planted by 2080), the area of plantations attributable to 2080 is equal to 2% of the area of the productive forests.

It is not a very significant impact but clearly more noticeable in the Mediterranean zone, and definitely important in Ireland, in view of the number of plantations created.
The national ratios speak volumes in this respect: 2080 plantations represent 19.21% of the area under forest in Ireland, 5.47% in the United Kingdom, 5.11% in Portugal, 3.80% in Spain, and 0.21% for France.

The contribution in terms of volume of wood is 2.7% of European production, and there too the national disparities are large (in Ireland, the 2080 plantations will in the long term produce 48% of current national production).

• In qualitative terms, the very predominant choice of broadleaved species is a striking reversal of the trend followed by afforestation policies in previous decades.
These species represent 56.8% of the areas planted, and the cork oak and the evergreen oak predominate; conifers represent 32.1% of the plantations, and 4% of the plantings have been with fast-growing varieties.

The frequent introduction of mixtures in certain countries and regions also considerably enhances the resource created.
We mention in particular Lombardy and the Veneto, where new types of plantations were experimented with and where the planting of valuable broadleaved species creates the expectation of wood production with a high added value.

• The provisions of the regulation concerning the improvements have been little used by the farmers and their quantitative impact is even less, even though it will be noticeable in a much shorter time than that of the plantations (10-30 years)

These operations only took up 4% of the budget of aid provided for within the framework of 2080. Germany, Finland and Austria used them mainly, placing the emphasis on a greater diversity of tree stands and improving the composition of the varieties (100 000 ha benefited from this type of improvement in Germany).
For their part, Spain and Portugal developed specific operations connected with protection against fires and the improvement of cork oak stands (we are expecting new cork production of the order of 10% to 15% of the quantity exported by Spain and Portugal).

These favourable conclusions from the point of view of quality nevertheless have to be accompanied by a few restrictions:

In view of the young age of the plantations under consideration, it is difficult to assess their future success; furthermore, a large proportion of them are concentrated in the Mediterranean zone, where the increase is smaller and vulnerability to biotic or abiotic risks is greater.
Above all, the conditions necessary for this success do not always come together; the accompanying programmes have deficiencies from the point of view of training and technical advice; there are cases where enterprises which have carried out afforestation operations were inadequately qualified; the magnitude of certain national programmes, in Spain, Portugal and Italy, made it necessary to import large numbers of plants, the origin of which, and the quality, are not always certain.

- Although over the period 1994-1999 2080 really, albeit modestly, created new forest resources, this period is not sufficient to guarantee their continuity and growth in the long term.

This is the same reservation which was expressed with regard to rural development, regarding the uncertainties connected with the absence of a real strategy of the Member States in this regard: only such a strategy could guarantee the durability of the efforts made, the sustainability of these resources and the implementation of the necessary action downstream in terms of the production and market organisation.

Doubts have moreover been expressed by the evaluators on the ability of certain countries to continue financing the plantations at a comparable rate over the period 2000-2006.

Positive impacts	Obstacles and weaknesses
Quantitatively • Increase in the forest resource small on average, but significant in Ireland, Spain, Portugal and the UK and in some parts of Italy. *Qualitatively* • Major use of long-cycle broadleaves such as oaks (except for Ireland), and increase in the proportion of broadleaves in certain regions (Portugal, UK). • Diversification of the composition of the forests *Regarding the improvements* • Improvement of the resource and quality of cork in Spain and Portugal. It is hoped that the natural hazards in Spain and Portugal will be reduced owing to the improvement work. • Improvement of the stability and longevity of the forests in Germany with mixed stands and a better vertical structure.	• No guarantee of success of the plantations after 5 years, especially in the Mediterranean zone where the risks of inclement weather are high. It is difficult to ascertain the rate of success. • No uniformity of control, Europe-wide, of seeds and plants and risks of genetic pollution (Spain and Italy in particular) • Few beneficiaries preferred the objective of producing constructional timber • Heavy use by beneficiaries of sometimes inadequately qualified sub-contractors (Spain, Portugal and Ireland), with repercussions on the quality of the operations and resources *Regarding the improvements* • The improvements of existing plantations are insignificant on a national scale *Sustainability* • Lack of long-term strategy of the Member States to increase and prolong the resource created, and implement the necessary action downstream

Contribution of Regulation 2080 to reducing agricultural surpluses ?

The evaluation encountered a major problem – which we have only partially been able to circumvent – namely that it is impossible to know exactly what agricultural use the land afforested by 2080 and by the Member States was put to beforehand; and therefore it is impossible to compare the earlier agricultural production of the plantations planted or to calculate their impact on any reduction in surpluses.

Nevertheless, and taking these reservations into account, we were able to ascertain that the impact of 2080 on the reduction of agricultural surpluses is not very great.

According to the estimate carried out on a limited but significant example, the agricultural production withdrawn due to the afforestation of 2080 does, indeed, appear to be completely marginal: hypothesising that all the arable land afforested by 2080 was able to produce common wheat, it is thought to represent 0.6% of the annual production of common wheat.

It is very clear that the regulation has been ineffective in encouraging farmers to plant trees on productive agricultural land.

Indeed, and with a few rare exceptions, it was land with a very low yield producing a very low income which was planted in the majority of cases and this was true for all the countries; as the beneficiaries had all followed the clear logic of not abandoning the most profitable land for production of an irreversible nature and with a hypothetical yield.
We would point out that, for the farmer, the gross returns from afforestation are less than 1.5 to 3 times that of common wheat and the compensatory premium for loss of income is less than 2 to 6 times the gross returns for common wheat.

Hence neither the regulation itself nor the national programmes which have arranged to select dossiers according to this objective, whether this is in terms of zoning, the choice of plots or type of farmers; and fairly clearly, these same national programmes have overall placed this expectation at the bottom of their list of priorities and have sometimes even posted priorities counter to it

However, it should be pointed out that from the point of view of the Community's budget, the overall estimated cost of 2080 is 1 to 2 times less than that of producing, storing and exporting the surpluses (for set-aside, the comparison is more variable).

Positive impacts	Obstacles and weaknesses
• In Ireland and in Portugal the percentage areas of agricultural land planted are 2% and 4% respectively, which is considerably more significant than the average estimated • In principle, each hectare planted will no longer be for agricultural use, irreversibly, which in absolute terms reduces the possibility of the production of surpluses • After a rough calculation, the afforestation measures are 1 to 2 times less of a burden on the budget plan than the production, storage and export of agricultural surpluses	• Some national programmes have posted the objective, in contradiction to the one on reducing surpluses, of planting marginal land which is being abandoned (Italy, Spain and Portugal) • The national programmes do not contain any specific measures for targeting this objective specifically • The comparative economic calculation carried out among the beneficiaries was clearly against this objective • The reduction of the agricultural surpluses is not correlated directly to the reduction in the area of agricultural land • In some cases, production was intensified on a smaller agricultural area

Contribution of Regulation 2080 to the environment

As with the previous objective, very few special clauses or measures were provided for in the national programmes of Regulation 2080 on the mitigation of climate change, biodiversity and the protection of natural resources.

Hence, no specific tool was available to measure the environmental impact of 2080, and we had to rely mainly on the use of predictive models, the opinions of experts and the advice of our evaluators.

Contribution of Regulation 2080 to alleviating climate change

In this evaluation we considered only the quantity of carbon likely to be stocked by the new areas afforested under 2080, whatever the political and industrial scenarios downstream.

And we calculated this quantity according to the predictive models which set limits on which we will make the usual reservations.

Consequently we can say that the impact of the 2080 plantings on carbon stocking is positive, but will be negligible by 2012, and will hardly be significant before 2030, mainly because of the slow growth of the Mediterranean species planted (then it should represent approximately 2 to 3% of the total amount of carbon fixed by European forests, but will remain small compared with Europe's undertakings at the Kyoto Conference).

And if the improvements also contribute positively to this stocking process (in particular the operations aiming to protect the environment and the tree stands, the improvement of cork plantations and the installation of firebreaks), it is to an even lesser extent, in view of how small they are.

We would point out that the national programmes have approached this objective as an induced objective, and that no targeting of species has really been planned (except for Italy, which entered this objective in 4th place in its programme, and actually made a special effort to plant fast-growing species capable of stocking carbon more rapidly and in a larger proportion).

Positive impacts	Obstacles and weaknesses
• The plantations fix the carbon as the trees grow; their impact on climate change is small but favourable; • The improvements generally follow this trend; furthermore, the new 2080 plantations in the Mediterranean zone have often been accompanied by fire protection measures	• In view of the varieties planted, 2012 is not a relevant timescale for assessing the real contribution of 2080 to carbon stocking in Europe • The fire protection measures were not always carried out in the most vulnerable areas (the case of Portugal)

Contribution of Regulation 2080 to biodiversity

The member states have not set any precise objective in this area nor do they have specific tools to monitor it.

Given that there is little information available on this, we can nevertheless say that the contribution of 2080 to biodiversity, both from the point of view of the environment and that of clumps of trees, is generally positive and relatively significant.

The national programmes have in fact all encouraged the use of broadleaves (except for Ireland), the planting of indigenous species with a heritage value (particularly in Spain) and also original types of planting and improvements, based on mixtures of varieties.

Furthermore, the enrichment connected with the plantations is almost automatic in the first few years, owing to the creation of an open environment associated with trees and shrubs.

Nevertheless this assessment should be tempered:

- plantations in the Mediterranean zone have sometimes been thought to have a negative effect on biodiversity and the habitats of certain sheep-rearing environments (in Spain in particular where grasslands constitute 48% of the land afforested under 2080).

- as regards this specific aspect, we can justifiably question the impact of the coniferous plantations in the Irish programme.

Positive impacts	Obstacles and weaknesses
• The afforestation of agricultural land has a positive effect on biodiversity in the first few years in view of the richness of open environments associated with trees and shrubs *Biodiversity in afforestation* • Major use of broadleaves in the planting and improvement operations • Use of autochtonic, endemic and heritage varieties (introduction of rare broadleaves into the forest; introduction of local species of shrubs in Spain and Italy) and intermixed plantations • Creation of wooded strips, hedges (on marginal areas) *Biodiversity in clumps of trees* • Most of the new plantations were planted in areas with few woods and on the plain (Germany, valley of the Po) • Making farmers aware of the advantages of biodiversity, with me too effects (Germany, Denmark)	• In Ireland, the concentration of the monoculture of conifers can have a negative effect on the areas concerned, by destroying the habitats in the Birds Directive. • In Spain, habitats in Annex l and 2 of the Directive on large areas would appear to have been destroyed.

Contribution of Regulation 2080 to protecting natural resources

In spite of the sound arguments sometimes put forward by the Member States in their national programmes, protection of the natural resources did not really give rise to the setting of really specific objectives over the period 1994-1999 (except for the Spanish and Portuguese programmes).

And as regards therefore the operations to improve soil protection, aid for fixing nitrates and phosphates and conserving water resources (which we took as the three major types of protection operation), the monitoring tools were non-existent.
In particular, in the absence of zoning documents, we were unable to locate those 2080 plantations which were likely to have an impact on the zones specifically concerned with the protection of natural resources.

These are all factors which made the evaluation of this impact almost impossible, without taking account of the fact that as the plantations are so new, this considerably reduces the possibility of carrying out a correct assessment over the medium and long term.

We therefore had to limit ourselves to two observations:

- The plantings and improvements carried out due to 2080 are part of a global step to help to protect soil against erosion and desiccation (particularly in the arid Mediterranean zone) and to protect water by absorbing nitrates.
  It is impossible to quantify this impact

- There are certain exceptions to this favourable assessment: in Spain and in Portugal, it appears that the planting work has sometimes destabilised the topsoil; and in Ireland, the planting of conifers has resulted in the acidification of groundwater.

Positive impacts	Obstacles and weaknesses
Soil protection • Afforestation helps to reduce the risk of soil erosion and helps to prevent soil desiccation by capturing moisture from fog (in Spain and Portugal). • Soil improvement by liming in Germany reduces soil acidity and enriches the potential of the environment *Water quality* • Afforestation helps to improve the water and soil quality and groundwater by absorbing nitrates (plantations along water courses in France and Italy or near catchment areas (Denmark)	• Few national programmes provided for specific operations to protect natural resources • In Ireland, the high density plantations of pure conifers (2500 plants/ha) risk acidifying the soil and water in humid zones • In Spain and Portugal some planting work is thought to have caused superficial soil erosion

Contribution of the implementation of the national and regional programmes to the objectives of 2080

This contribution has been assessed from two complementary points of view:

✔ The global effectiveness and efficiency of the national and regional programmes

In particular it was a question of evaluating the significant nature of the impact of these programmes on the motivation of the beneficiaries and the incentive nature or otherwise of the financial modulations introduced, taking their objectives into account; then to judge any secondary effects of these modulations (positive effects of demultiplication and me too effects, negative droit d'aubaine effects).

✔ The operational consistency of these programmes

We attempted here to show the faithfulness of the application compared with the objectives listed, the existence of preliminary diagnostics, monitoring, control and zoning measures and the implementation of training and awareness programmes

Global effectiveness and efficiency of the national and regional programmes

• It was unfortunately impossible to evaluate the significance of the proportion of agricultural and non-agricultural beneficiaries affected by 2080 due to a lack of reliable data which could really be interpreted.

We were only able to note that the farmers were the main beneficiaries (at 72%) of the compensatory premiums for loss of income – given that this designation covered a fair degree of different situations from country to country.
Mostly, these farmers have non-intensive farms with a gross farm income lower than the national average, with marginal agricultural land, and generally larger areas under forest than the national average.

The objectives of the beneficiaries (whether they are farmers or not) partly cover those of 2080 according to the different categories of beneficiaries concerned; but we do not have sufficiently

detailed data to be able to draw up a real « typical profile » of these beneficiaries, country by country, and a classification of their expectations of 2080 and their afforestation strategies.

Whatever the case, if we believe the field surveys, all were satisfied with the way the projects were progressing and their technical implementation, insofar as they met their objectives and that they were represented.

• On the other hand, we were able to ascertain very clearly that the modifications introduced by national and regional programmes broadly relayed and even amplified certain basic trends driven by the general framework of the regulation, in particular with regard to the support for agricultural income, the improvement of not particularly productive land and the creation of a forest resource mainly based on broadleaved species.

• As for the secondary effects, we would point out that the effects of droit d'aubaine were not seen anywhere (almost no beneficiaries would have planted without the aid from 2080). The me too effects of the afforestation projects were real but impossible to quantify.

It seems to us therefore that, overall, this effectiveness and efficiency were real, even if they were difficult to measure.

Operational consistency of the programmes and relevance of their implementation

- Overall, the national and regional programmes interpreted the objectives of 2080 in the light of their contexts and their priorities (very roughly, the countries of the south of Europe generally put forward the objectives of rural development, those of northern Europe the silvicultural and environmental objectives). These programmes, which vary very much in their levels of precision, generally did not draw up diagnostics prior to the application of the regulation, nor did they really plan zoning measures which would have enabled the objectives of the regulation to be targeted (only a few measures relating to the choice of species planted went some way towards this).
- The cumbersome nature of the administrative and financial procedures for implementing these programmes is fairly often criticised by the beneficiaries interviewed, as well as the fact that they are difficult to operate, which, in some cases, has halted afforestation (in Spain, Portugal and Italy in particular).
  The slow payment of the aid (which sometimes causes delays by up to one or two full years) is particularly condemned, as are the apparently too rigorous – and even dissuasive – control measures considered to be indispensable, implemented in the middle of the programme (Spain and Italy).

- As for the technical monitoring of the plantations, it is generally based on existing development and technical advice measures – more or less suitable and adequate according to the size of the demand. The monitoring and control of the environmental impact of 2080 was actually the subject of the drafting of a number of measures but no information is available for the moment enabling us to check their application and their effectiveness.

- The awareness and training programmes, particularly in the countries of the south where the afforestation programmes were large, are often deemed to be unsuitable and inadequate both from the point of view of implementation (the sectoral nature of which is a handicap), and from that of teaching resources and skills mobilised.

Elsewhere, the existing training (and advisory) measures, both agricultural and forestry, were able to meet the requirements relatively satisfactorily.

Positive impacts	Obstacles and weaknesses
Effectiveness and efficiency of the programmes • Most of the beneficiaries interviewed are satisfied with their projects, and consider the afforestation of agricultural land to be a success. • The national and regional programmes have emphasised the effects expected from 2080 regarding support for agricultural income, the improvement of not particularly productive land and the creation of a forest resource mainly based on broadleaved species (56.8% of species planted). • Regulation 2080 has had real me too effects, even if they are not quantifiable. • Absence of the effects of the droit d'aubaine: the beneficiaries would not have planted trees under the same conditions without the aid. *Operational consistency of the programmes* • Targeted choice of species according to certain objectives	*Effectiveness and efficiency of the programmes* No special incentives for the forestry improvement measures between 1989 and 1992 *Operational consistency of the programmes* • Multiplicity of the 2080 objectives. The Member States have concentrated on one or two objectives to the detriment of others. • No segmentation of the objectives of the beneficiaries • Absence of diagnostics before the implementation of the national and regional programmes. • Lack of information and beneficiary awareness programmes in Portugal, Spain and Ireland. • Lack of qualifications in the private enterprises • Unsuitable, even cumbersome administrative and financial procedures. • Designing the projects was very complicated and often required the support of specialists (Spain, France, etc.). Serious delays in payment for dossiers (Ireland, Italy).

Table 26 : Summary of the impacts of Regulation 2080 in the 8 target countries

	Germany	Denmark	Spain	France	Ireland	Italy	Portugal	United Kingdom
Rural development								
Diversification of activities	0	0	0	0	+	++	+	++
Increase in the income expected from forest activities	0	0	+	0	++	+	+	+
Fight to prevent land abandonment	0	0	++	0	++	+	++	+
Retention of the rural population	0	0	++	+	+	+	+++	+
Support for beneficiaries' income	+	+	++	+	++	++	++	+
Complementarity with programmes 1 and 5b	+	+	+	+	+	+	+	+
Forest resources								
Biological increase	0	+	+++	0	+++	+	++	++
Increase in wood production	0	+	+	0	+++	+	++	+
Increase in cork production			++	0		0	+++	
Improvement of farmers' forests	+	0	+	0	0	0	0	0
Reduction of agricultural surpluses	0	0	0	0	0	0	0	0
Environment								
Carbon stocking	0	0	+	0	++	+	+	++
Increase in biodiversity	+	+	+	0	--	0	+	+
Protection of natural resources	+	+	+	0	-	+	+	+

0 : barely significant impact, + : fairly significant impact, ++ : significant impact,
+++ : very significant impact

Programme implementation								
Targeting of potential beneficiaries	0	0	0	0	0	0	0	0
Effectiveness of aid modulation	+	+	++	+	0	++	++	+
Effectiveness of the programmes in relation to the 4 objectives	-	-	-	-	-	--	-	-
Awareness, training	+	0	--	+	--	+	--	-
Me too effect	+	+	+	+	+	+	+	+
Droit d'aubaine effect	0	0	0	0	0	0	0	0

-- : very poor contribution, - : poor contribution
0 : barely significant contribution, + : fairly significant contribution, ++ : significant contribution

CHAPTER 5
RECOMMENDATIONS

Taking into account the earlier conclusions, the evaluators have three types of recommendations to make concerning the future development of Regulation 2080 and the national and regional programmes connected with it:

- re-target the objectives which have been posted so far
- ensure the sustainability and growth of the resources created by 2080
- improve the implementation of the national and regional programmes

It is of course necessary to set a large part of these recommendations in the context of the new rural development regulation and of the evolution of the common agricultural policy, in the spirit and letter of which they fall very directly.

In particular, with regard to certain principles and measures put forward by Regulation No 1257/1999 (Chapter III, VII, VIII and IX):

- compatibility and consistency between all the support measures in favour of rural development
- diversification of agricultural or agriculture-related activities in order to create multiple activities or income alternatives
- protection of the environment with regard to agriculture, silviculture and the management of the countryside
- support for silviculture and afforestation of agricultural land
- training

These recommendations could also be made more specific and be enriched in the light of the prospective accession of new Member States (a number of countries in central and eastern Europe – Hungary, in particular, having large programmes for afforestation of agricultural land) ; and also in the light of the characteristics and objectives of the countries which became members after the objectives of 2080 had been defined (Austria, Finland, Sweden).

1. – Re-target the objectives of Regulation 2080

Recommendation No 1; Place the emphasis on rural development

We have seen the extent to which rural development is the objective of 2080 for which the impact of the regulation was one of the most visible and the most significant. This objective could, in our view, be strengthened by the development of the following actions:

- **Encourage farmers to develop multi-annual diversification projects around forest activities**
  The scope of 2080 is vast, ranging from the creation of new plantations to the improvement of what is already there; it would enable us to envisage an increase in the strength of the forest activities of the farmers in the context of multi-annual forest improvement projects. These projects would optimise the existing situation, from planting to the improvement of natural encroachment, to the development of agri-silvi-tourism projects; they could give rise to collective investments and economies of scale from the point of view of infrastructures and would allow better account to be taken of the associated measures for the protection of the environment. At the level of the farm, they would provide a regular resource spread out over time and would have a knock-on effect on the rural economy.

- Improve the synergies with certain complementary activities, in particular agri-forestry and silvipastoralism in the areas where these activities are traditional. This effect of synergy was almost non-existent in the context of 2080, whereas it could be a very efficient tool with which to diversify agricultural activities, subject to the agricultural and forestry legislation of the countries concerned being adapted accordingly.

Recommendation No 2: Target the environmental objectives more specifically

- **Specify these objectives in a much more operational way and place the priorities in order of hierarchy** so that suitable measures can be introduced.

For example, in order for the objective concerning the reduction of greenhouse gases to be reached to a significant extent in 2012, it would be necessary to choose species which are in part contradictory to the objectives of 'the enrichment of biodiversity', since one would have assumed that the trees to plant would be fast-growing varieties and that these types of plantation should be encouraged by more attractive aid packages.

- **Develop specifically plantations on agricultural land with a view to controlling nitrate pollution?** This role could receive a far higher profile than it does at the moment.

- **Make better use of the natural colonising varieties** to improve biodiversity. The multi-annual projects of the farmers could include a part on the development of the silvicultural aspects of the encroachment of the forest – i.e. natural woodland growing on fallow land.

- **Coordinate more effectively the application of the afforestation measures for agricultural land, agri-environmental measures and measures for protecting natural areas,** by targeting areas which are really well adapted to afforestation

- **Improve European and national legislation and its application on the control of seeds and plants** in particular for rare, endemic and shrub species used in mixed planting systems. Most of the countries have made a real effort to diversify the species; it would be detrimental if this were to be thwarted by a lack of vigilance regarding the genetic quality of the varieties introduced.

Recommendation No 3: Use other regulatory tools to limit agricultural surpluses ?

The present evaluation clearly shows the limited effectiveness of aid for afforestation in limiting the production of agricultural surpluses.
In our opinion, the importance of this as a direct objective of Regulation 2080 should be decreased, as it is not adapted to it insofar as the other objectives applied partly contradict it; and other regulatory tools, either already in existence or to be created, would perhaps be more suitable.
In any event, the following provisions would enable it to be taken into account to a much greater extent.

- **Better target productive agricultural land and earlier use of the agricultural land**

- **Consequently adapt the amount of the compensatory premium for loss of income, in particular it could be relevant to take into account in the amount of aid the cost of the irreversibility of the planting.**
  This cost could be evaluated as the hope of profit derived from better agricultural speculation compatible with the potential of the plot considered.

2. – Ensure the sustainability and growth of the forest resources created by Regulation 2080

Recommendation No 4: Ensure the durability of the plantations and of their maintenance and development

- **Guarantee absolutely in the coming 10 years the maintenance and management of the million hectares afforested due to Regulation 2080.**
  It is a sine qua non condition to ensure the quality of these plantations, that of the forest products derived from them and not to lose the human and financial investment already made. In particular, in the areas most vulnerable to natural or biotic risks (fire, erosion, flood, etc.), it would seem sensible for the plots planted due to 2080 to benefit more systematically from

track creation measures, firebreaks, water points and protection against domestic or wild animals, as was done in Portugal.
In the Mediterranean biogeographical area where the plantations grow more slowly, we could also arrange payment of aid for maintenance, not every year for 5 years but in 5 instalments spread out over 7 to 8 years, in order to take into account incidents such as droughts, such as those of 1994 and 1995 in Spain and Portugal.

- **Define a long-term strategy and guarantee the financial means for this**
  This is about prolonging the afforestation effort in order to anchor its positive effects over time on the forest resources and on rural development. In particular :
  - define long-term objectives
  - use the financial aid needed to continue the dynamic started during the period 1994-1999
  - tailor the annual rate of afforestation to the resources and skills available, so as to guarantee the quality of the investments
  - anticipate and take the action necessary for the downstream production chains to be adapted and developed

Recommendation No 5: place emphasis on the improvement operations

- **Encourage improvements**
  This part of 2080 was generally under-utilised and little promoted, whereas it gave rise to many innovatory initiatives.
  In particular, the silvicultural operations involved in the improvement of the encroachment of natural forest following abandonment of agricultural land could be supported (in this case a small investment meant that the forest plots concerned could be made productive more rapidly than if they were left in their natural state and the trees of the future could be selected). We would however point out that this type of intervention can be drawn from the new regulation 1257/99, under forestry operations with an environmental purpose.

- **Differentiate between types of aid and increase the amount of this aid**
  Just as there are three types of aid for afforestation corresponding to different types of plantations or beneficiaries, in order to be attractive, the improvements could be the subject of such provisions.

3. – Improve the implementation of the programmes

Recommendation No 6: Segment the beneficiaries, differentiate between types of aid and introduce suitable zoning

Throughout this evaluation, the absence of such provisions has been glaringly clear, both from the point of view of the effectiveness of the implementation measures and in terms of their impact.
In order to make the projects both more targeted and clearer, four broad categories of beneficiaries could be differentiated between according to their priority objectives :

1. Wood production aiming to provide substantial and regular income, with industrial processing downstream.
2. Diversification of agriculture by creating complementary activities around the forest and the wood, including the use of associated practices such as agri-forestry or silvipastoralism.
3. Full utilisation of the rural heritage in the context of total or partial withdrawal from agricultural work, upon retirement for example ; continuation, through personal choice, of an activity maintaining existing or newly created woods. Improvement of the countryside and environmental conditions (habitats, animal biotopes, soil and water quality).

Types of improvement

Segmentation of targets	Productive forest	Diversification of agriculture	Utilisation of the heritage
Objectives pursued	Creation of an industrial resource	Agri-forestry and silvi-pastoral practices, use of natural forest encroachment Creation of artisanal activity connected with the production or processing of wood	Utilisation of the heritage, use of forest encroachment, of the landscape and of the environmental conditions
Operations concerned	Afforestation and improvement	Priority improvement	Improvement and afforestation
Nature of aid	Aid for initial investment and the acquisition of small plots	Annual aid for plantation maintenance and aid to create forest wood workshops	Aid for initial investment and maintenance over 5 to 7 years. And premium compatible with the agri-environmental measures provided for in Regulation 2078.
Size of plantation	Project of 20 ha minimum	Multi-annual project of the order of 10 ha minimum long-term	No minimum size
Zoning	Forest zone already equipped with infrastructure	Recognised environmental area (landscape, biodiversity, water quality and management, erosion, vulnerability to fire)	No special zone
Varieties	Industrial production, conifers and broadleaves as a compulsory minimum %	Valuable varieties	Valuable and heritage varieties

Recommendation No 7; Consolidate and develop the accompanying measures

- **Develop and adapt the information, awareness and training campaigns**
  This evaluation revealed serious deficiencies in this area, in particular in countries where the afforestation programmes have been ambitious and where it is all the more important to overcome this.

- **Guarantee the quality of the advice and technical support for afforestation** through recognised training courses which enable people commissioning services to select service-providers on a clear and recognised basis, with certification or on an approved list. All the evaluators agree that there is a need to implement a quality policy for forestry work, with training programmes and a system of certification .
  We would point out that Regulation 1257/99 constitutes a notable advance in this respect since the accompanying measures are now eligible within the same framework as the afforestation measures.

Recommendation No 8 ; Equip oneself with analytical and monitoring tools

Again and again this study revealed the acute lack of common tools in the Member States, which would enable better monitoring, management and evaluation of the forestry measures.
The following steps would appear to be more than desirable:

- **Create tools for collecting homogeneous technical data at regional level** (earlier land use and quantity produced, type of soil, varieties planted, density, objective(s), topography.

- **Draw up samples of farms enabling data to be collected at farm level in order to examine rural development or the environment.**
  The FADN could fulfil this role, but the samples are currently not specific to afforested agricultural land. We would however point out the existence of on-going work aiming to take into consideration the accounting information connected with the forest activities, in particular of the farmers (MOSEFA programme : Monitoring the Socio-economic Situation)

- **Improve the understanding of the « systems »**
  In our view it would be useful to shed more light, and in more qualitative terms than we have been able to do, on all this quantitative data, by a strategic analysis of the actors, the stakes and the politics of afforestation .