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**Methodological grids for payment calculations in rural development
measures in the EU**

Review of payment calculations in forestry measures

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List of abbreviations

AEM	Agri-environment measure
AFI	Average felling increment
ARWS	Ameliorative and reinforcing wood species
CZ	Czech Republic
CZK	Czech koruna
DE _{MWP}	Mecklenburg West-Pomerania (Germany)
ELER	Europäische Politik für ländliche Räume
ES _{BC}	Basque Country (Spain)
ES _N	Navarra region (Spain)
EU	European Union
EUR	Euro
FADN	Farm Accountancy Data Network
FI	Finland
GAEC	Good Agricultural and Environmental Conditions
GBP	British Pound
GR	Greece
ha	Hectare
k	thousand
IT _{UMB}	Umbria region (Italy)
LFA	Less Favoured Area
LISS	Low-impact silvicultural systems
LT	Lithuania
LTL	Litas
MoA	Ministry of Agriculture
MB	Mixed broadleaves
n.a.	Not applicable
NBL	Native broadleaves
n.d.	No data
PL	Poland
RD	Rural Development
PLN	Polish zloty
RDP	Rural Development Plan
RDR	Rural Development Regulation
SCO	Scotland
SFGS	Scottish Forestry Grant Scheme
SMR	Statutory Management Requirements
UK	United Kingdom
WFD	Water Framework Directive
WKH	Woodland key habitat

1 Introduction

This report summarises the review of payment calculations in forestry measures as implemented in the partner countries Scotland, Germany, Greece, Czech Republic, Lithuania, Finland, Italy, Spain and Poland. The forestry measures include first afforestation of agricultural land (221), first establishment of agroforestry systems on agricultural land (222), first afforestation of non-agricultural land (223), forest environment payments (225), and restoring forestry potential and introducing prevention action (226).

Since some partner countries, e.g. Germany and Italy, implement their RDPs at regional level, specific regions were chosen as examples to investigate the forestry measures in these countries. For example, the calculation of forest environment payments in Germany was investigated in Mecklenburg West-Pomerania, while in Italy forestry measures were investigated for the Umbria region. Similarly, payment calculations in Spanish forestry measures were reviewed in the Basque Country and Navarra region.

Table 1.1 summarises the investigated submeasures in the different countries and shows the differences in the extent of implementing forestry measures in the RDPs of the partner countries.

Table 1.1 Investigated forestry measures by partner country

Measure	CZ	DE _{MWP}	ES _{N/BC}	FI*	GR	IT _{UMB}	LT	PL	SCO
221	✓	-	✓	✓	✓	✓	✓	✓	✓
222	-	-	-	-	✓	✓	-	-	-
223	-	-	-	-	✓	✓	✓	✓	✓
225	✓	✓	✓	-	✓	✓	✓	-	✓
226	✓	-	✓	-	✓	✓	✓	✓	-

✓ = yes, - = no

* No new schemes for the afforestation of agricultural land will be supported during the programming period 2007-2013. Only commitments made in the programming period 1995-1999 will remain in force until the original commitment ends. The payments for these commitments are estimated at EUR 10 million during the programming period 2007-2013.

As is evident from Table 1.1, there is a high degree of variation in the extent to which forestry measures are implemented in the different partner countries. The range varies from countries such as Greece, where all measures are implemented, to Finland, where no new measures and commitments are implemented. In addition to the difference in the implementation of forestry measures between the partner countries, Table 1.1 also shows that first afforestation of agricultural land (221) and the newly-introduced forest environment payments (225) are the most popular measures, at least for the nine investigated countries. Consequently, this report puts the emphasis on these two measures in the synthesis of the different forestry questionnaires and measures.

The report in principle follows in its comparative analysis the outline of the original questionnaires comparing basic information about measures (including payment differentiation), methods of payment calculations, data sources and problems, solutions and remaining key issues for payment calculations. Some contextual information on the relative importance of the different measures in the partner countries is provided in the annex. The comparative analysis aims to provide answers to set of key questions across the different parts of the review. These key questions are:

Key review questions:

- What kinds of measures exist in the partner countries?
- What kinds of payment differentiations exist in the partner countries?
- What differences exist in eligible criteria and requirements commitments?
- What cost components are considered in the calculations?
- What approaches are used to quantify the different cost components?
- What types of data are used in the calculations and what sources are used?
- What problems are identified in the calculations and how are these dealt with?

2 Comparative analysis

2.1 Basic data of the RD measure

This section starts with a brief overview of the forestry measures followed by a more detailed comparison of the different approaches to payment differentiations. More details concerning the different forestry measures in the partner countries are provided in the tables in the annex.

2.1.1 Overview of forestry measures

The measure afforestation of agricultural land (221) is implemented horizontally in all investigated countries and regions, where this measure exists. As shown in Table 1.1, DE_{MWP} has not taken up the option but it is important to point out that other German regions have implemented this measure. In most cases, standardized payments are provided for woodland establishment, maintenance and agricultural income foregone. There are, however, a few exemptions. In Greece, support for establishment and maintenance is provided on the basis of a percentage share of the actual cost incurred applying RDR payment rates. In Finland, only previously existing commitments with respect to agricultural income foregone payments are fulfilled, while Scotland implemented a specific submeasure for small woodlands with only one aggregated payment instead of three payment components. As can be expected, payment levels per hectare vary significantly with, for example, agricultural income foregone payments set between 54 and 450 EUR per hectare. However, the forestry payments in all countries and regions are conform with the maximum payment limits defined in the RDR and no case has been identified in the questionnaires where suggested payment were above those limits.

The agro-forestry measure (222) has only been taken up in Umbria (Italy) and Greece. Three different agro-forestry submeasures for row plantations on arable land, plantations of uniformly distributed trees on arable land and plantations of wooded pastures are implemented horizontally in Umbria. In Greece, on the other hand, the agro-forestry measure is targeted to the Greek mainland only and excludes the islands. Similarly to measure 221, there are no standardized payments under this measure in Greece. Instead, 80% of eligible costs in specifically-designated areas (mountainous areas, areas with natural handicap other than mountainous, Natura 2000 and WFD areas) and 70% of eligible costs in other areas are paid. Payments in Umbria range from 280 to 1580 EUR per hectare.

The measure afforestation of non-agricultural land (223) is very similar to measure 221 and in most cases calculations for establishment and maintenance payments are carried out in the same way. As this measure is targeted towards non-agricultural land, no agricultural income foregone payments are included. Although similar to 221, a smaller number of investigated countries and

regions have taken up this measure (compare with Table 1.1 in section 1).

Forest environment payments (225) are a new measure introduced through the current RDR for the period 2007 – 2013. These payments are provided in 7 of the 9 investigated countries and regions. Only Finland and Poland decided not to implement the measure 225 in their rural development plans. While few countries and regions such as Mecklenburg West-Pomerania (Germany) target this measure towards specific designated areas (i.e. Natura 2000 areas or special protection areas pursuant to federal state law), most of the other investigated countries and regions are applying this measure horizontally. Payment levels vary between the full range of the allowed minimum (40 EUR) and maximum (200 EUR) payments per hectare. For example, Scotland provides a payment of 40 EUR per hectare, while in other cases, such as Mecklenburg West-Pomerania (Germany) and Greece, payment levels can be as high as the allowed maximum payment depending on the content of the specific contracts or commitments.

The measure restoring forestry potential and introducing prevention action (226) is rather different in design and implementation. Instead of per hectare payments based on a standard cost approach, real costs are reimbursed under this measure on a project by project basis.

2.1.2 Payment differentiation

To review the payment calculations in the forestry measures in the different countries and regions, it is important to compare to what extent existing payments in these measures are differentiated. This comparison is done in two main steps: firstly, a simple overview is provided in which countries and regions payments are differentiated; then, secondly, a more detailed comparison is carried out to identify what (type of) parameters have (has) been used in the payment differentiation. Table 2.1 summarises which countries and regions have implemented differentiated payments under the different measures but, at this stage, does not identify different types of differentiation. As explained above, financial support under measure 226 is based on actual costs on a project by project basis. Thus, the comparison of payment differentiations does not apply and this measure is not included in the table below.

Table 2.1 Existence of payment differentiation

	CZ	DE _{MWP}	ES _{NBC}	FI	GR	IT _{UMB}	LT	PL	SCO
Measure 221									
implemented in RDP	✓	n.a.	✓	✓	✓	✓	✓	✓	✓
not implemented but existed in past	-	n.a.	-	-	✓	-	-	-	-
not implemented but discussed	-	n.a.	-	-	-	-	-	-	-
Measure 222									
implemented in RDP	n.a.	n.a.	n.a.	n.a.	✓	✓	n.a.	n.a.	n.a.
not implemented but existed in past	n.a.	n.a.	n.a.	n.a.	-	-	n.a.	n.a.	n.a.
not implemented but discussed	n.a.	n.a.	n.a.	n.a.	-	-	n.a.	n.a.	n.a.
Measure 223									
implemented in RDP	n.a.	n.a.	n.a.	n.a.	✓	✓	✓	✓	✓
not implemented but existed in past	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-
not implemented but discussed	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-
Measure 225									
implemented in RDP	✓	✓	✓	n.a.	-	✓	-	n.a.	-
not implemented but existed in past	-	-	-	n.a.	-	-	-	n.a.	-
not implemented but discussed	✓	-	-	n.a.	n.a.	-	-	n.a.	-

✓= yes, - = no, n.a. = not applicable

Table 2.1 shows that if measures are taken up in the rural development plans, associated payments have in most cases some kind of differentiation. Only forest environment payments

are implemented without any differentiation in three cases, i.e. in Greece, Lithuania and Scotland. Furthermore, the outcome of the questionnaires suggests that only in one case, Greece, have previous payment differentiations changed and not been taken up in the current programme period. Similarly in the vast majority of the cases, payment differentiations, other than those implemented, were not discussed. The exemption is the Czech Republic, where payment differentiations more suitable for farmers according to their real commitments have been discussed but expected administration difficulties led to the implementation of a simplified approach.

2.1.2.1 Measure 221/223

Going now into more detail concerning the different approaches and types of payment differentiation in the forestry measures, Figure 2.1 depicts a schematic representation of the payment differentiations identified in measure 221 across the investigated countries and regions. Basically, Figure 2.1 summarises the different types of parameters, the main payment (cost) elements and the RDR requirements. The left part of the figure (establishment and maintenance costs) also applies to measure 223.

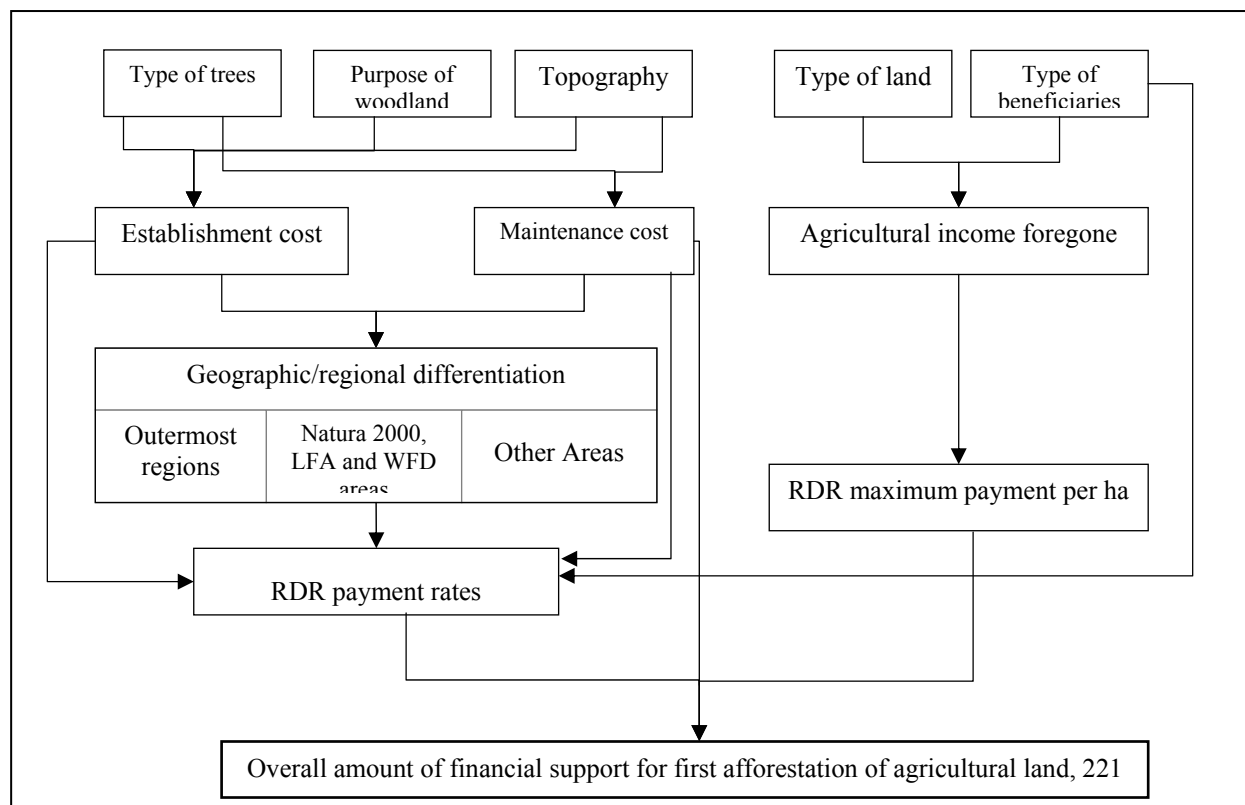


Figure 2.1 Logic representation of payment differentiation in the afforestation measure 221 (& 223)

The top of the figure shows different types or groups of parameters which affect the calculation of the three main payment (cost) elements. In other words, the calculations of establishment costs are differentiated by the type of trees, purpose of woodland or/and topography of the land. Maintenance cost calculations are differentiated by the type of trees and/or topography, while the calculations of agricultural income foregone depend on the type of land and/or type of beneficiaries.

Payments for woodland establishment then have to take into account the RDR payment rates,

either applying a uniform payment rate across the country or different rates differentiated by three regions (outermost regions, Natura 2000, LFA and WFD areas, and other areas). It is important to note that the application of RDR payment rates also depends on the type of beneficiaries as these rates only apply to farmers, other natural persons and private law bodies. Payments for maintenance costs do not need to apply the RDR payment rates, but in some cases, e.g. Scotland (see below), the RDR payment rates are applied and support for maintenance costs reduced accordingly. On the other hand, agricultural income foregone payments have to conform to the given RDR maximum payment hectare. Finally, the sum of all three payment elements is the overall amount of financial support provided in this measure.

To make the logic representation of the payment differentiation in forestry measures more evident, Figure 2.2 and Figure 2.3 provide examples for the Scottish and Polish afforestation of agricultural land measures (221). All text boxes and arrows in bold are relevant for the payment differentiation and calculation and affect the overall amount of support provided.

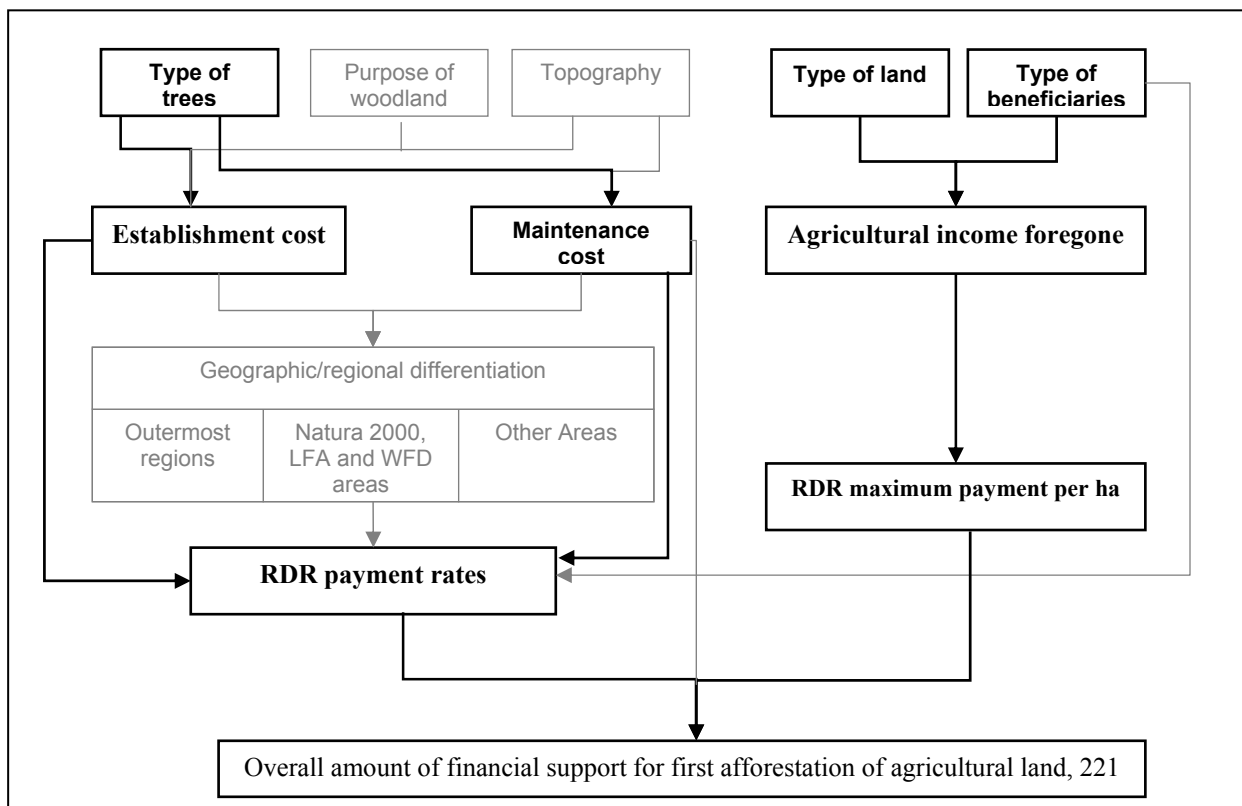


Figure 2.2 Schematic representation of payment differentiation in the afforestation measure 221 (& 223) – The Scottish example

In Scotland, the calculation of establishment and maintenance costs is differentiated by the type of trees and, for both main cost elements, RDR payment rates are applied. However, a uniform payment rate of 70% is applied without regional or geographic differentiation. The agricultural income foregone payment is differentiated by the types of land (e.g. arable land and unimproved grassland) and beneficiaries taking into account the RDR maximum payment rate per hectare. On non-agricultural land, only establishment costs are paid in Scotland.

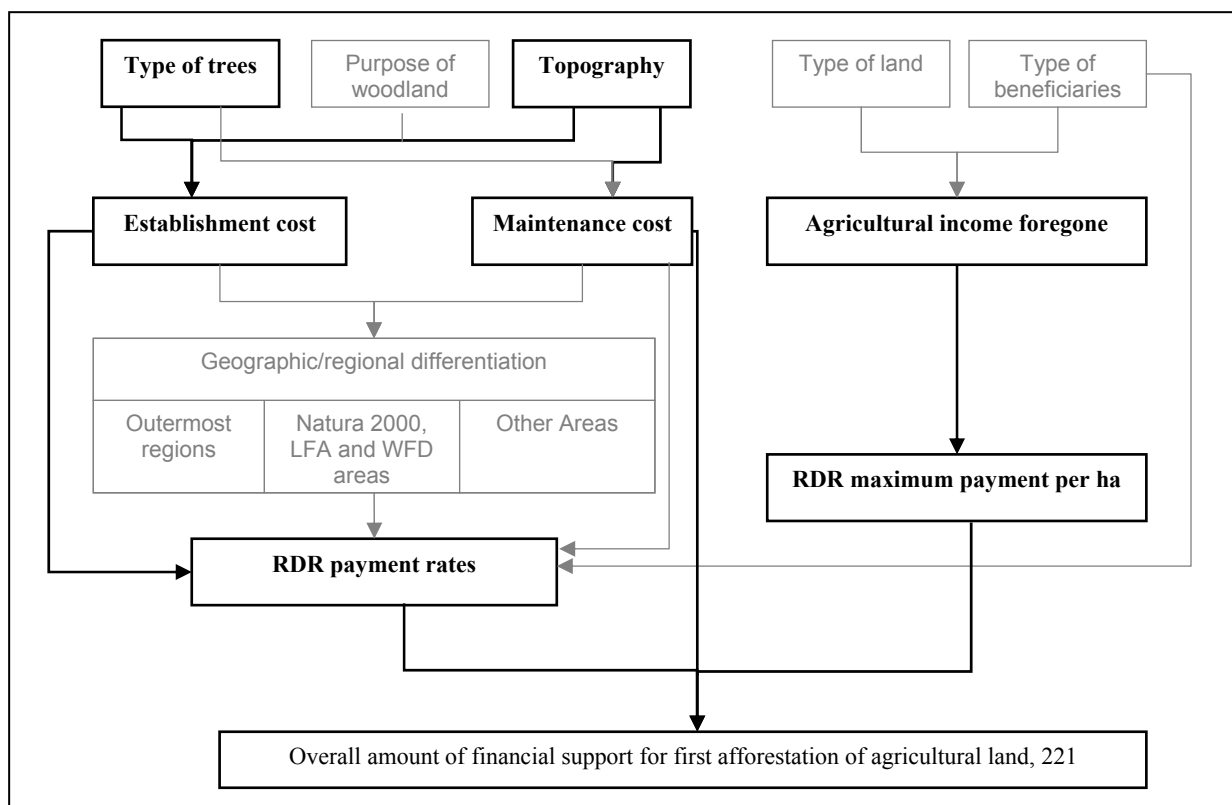


Figure 2.3 Schematic representation of payment differentiation in the afforestation measure 221 (& 223) – The Polish example

In Poland, the calculation of establishment costs differentiates between different types of trees and different topographical characteristics, while maintenance costs are only differentiated by topography. Similarly to Scotland, a uniform RDR payment rate of 70% is then applied for payments for establishment costs but maintenance cost payments are not affected by the RDR payment rates. There is no differentiation with respect to the agricultural income foregone payment. Only the RDR maximum payment requirements are considered.

2.1.2.2 Measure 222

The payment differentiation in agro-forestry measures is less complex. Three groups or types of parameters are considered in the payment differentiation:

Type of parameters used for payment differentiation in measure 222:

- Type of agricultural land
- Type of plants set
- Regional differentiation of payment rates according to RDR requirements

The first two parameter groups are only applied in Umbria (Italy). In Umbria, payments differentiate between plantations on arable land and pastures and, in addition, payments for plantings with plants of small dimensions differ from payments for striplings. The third type of differentiation is applied in both case, Umbria and Greece, with payment rates of 80% for LFA, Natura 2000 and WFD areas and 70% for other areas.

2.1.2.3 Measure 225

As shown in Table 2.1, forest environment payments are the only measure which is in some cases implemented without payment differentiation. While in all other forestry measures payments are all always differentiated in the investigated countries and regions, there is only one payment level per hectare in forest environment payments in Greece and Lithuania. Also in Scotland there is no payment differentiation as such, but additional payments are provided under specific circumstances (see Table A.1.9 in Annex A.1 for more details).

Forest environment payments are differentiated in the Czech Republic, Mecklenburg West-Pomerania (Germany), Umbria (Italy) and the Basque Country (Spain). Parameters used for the differentiation of standardized forest environment payments can be synthesized into the following two groups:

Type of parameters used for payment differentiation in measure 225:

- Type of forest
- Specific tree species and their proportions in the woodland/forest

A rather simple differentiation between mixed forests and other forests is applied in Umbria (Italy). Forest environment payments in the Basque Country (Spain) are differentiated between different forest types such as native woodlands and riparian forests and, in addition, also differentiate between different tree species in the calculation of income foregone due to required limitations in afforestation. In the case of the Czech Republic, payments to improve the species composition of forests are differentiated by the proportion of ameliorative and reinforcing wood species and are set in four percentage categories.

In Mecklenburg West-Pomerania (Germany), the object of agreement of each measure is locally determined by allocation authorities and the applicant (nature conservation authorities are also involved in protected or designated areas). While the level of the payment granted for the renunciation of usage generally depends on the type of tree, the calculations also take into account the volume and quality of the individual trees involved in the agreement. Moreover, different economic potential of land defined by land rents is used to determine payments for temporal renunciation of conducting any forestry operations in designated forests to protect scarce species during brooding and rearing time.

2.1.2.4 Measure 226

Payments in measure 226 in the Czech Republic, Lithuania, Poland and the Navarra region and Basque Country (Spain) are based on actual cost and are set on a project by project basis.

2.2 Methods of payment calculations

This section synthesizes the different methods and approaches used for payment calculations in the forestry measures. The comparison focuses on eligibility criteria, scheme commitments and the different cost components which affect the payment calculations. In addition, this section also investigates problems with payment calculations and their potential solutions and identifies remaining key issues for future calculations. As this report aims to provide a synthesis of the review, it only outlines examples for the payment calculations from the investigated countries and regions. More examples can be found in Annex A.2.

2.2.1 Eligibility criteria

Generally, the eligibility criteria are similar across the investigated countries and regions within the same forestry measure. This finding is not that surprising as many of the eligibility criteria are defined in the RDR and hence given for the member states.

2.2.1.1 Measure 221

For measure 221, afforestation of agricultural land, the eligibility criteria define that beneficiaries can be owners or tenants of agricultural land. Public authorities, however, can only receive payments for establishment costs. Moreover, this measure only applies for agricultural land with a continuous farming use during a certain amount of years (2 - 10 depending on country) before the application. Agricultural land includes arable land and permanent meadows and grassland, and set-aside land. One specific aspect with respect to eligible land worth mentioning from the Basque Country (Spain) is that land must be included in the “Basque Country Truffle Cultivation Plan 2007/2013”. Farmers who are receiving support under the early retirement scheme are generally excluded from support under measure 221 (compare also with section 2.2.5).

Eligibility criteria also define the minimum area which can be subject to an agreement. There are, however, differences in the defined minimum area between the countries and region. In Scotland, for example, a specific submeasure for the creation of small woodlands under measure 221 allows to sign up areas as small as 0.1 hectare, while Poland applies 0.5 hectare as a minimum area. A wide range of different tree species and woodland types such as broadleaves, conifers, mixed woodlands (broadleaves and conifers) and other slow growing trees are eligible for planting. Planting of Christmas trees, however, is generally excluded from support.

2.2.1.2 Measure 222

In principle, this measure provides support for the establishment of silvoagricultural and silvopastoral systems combining agricultural activities with tree planting and management. Required minimum areas vary between 1 hectare in Umbria (Italy) and 0.5 hectare in Greece. The planting of Christmas trees and short term cultivations are excluded from this measure.

2.2.1.3 Measure 223

Measure 223 provides the same kind of support as measure 221 but targets areas outside agricultural land use. Eligible areas include forests and other areas with non agricultural use but also abandoned agricultural land. Interestingly in Umbria (Italy) and Greece, this measure focuses on afforestation for environmental reasons. Eligible beneficiaries include physical or legal persons who own land which classifies as eligible. Similarly to the previous measure, planting of Christmas trees and fast growing species is excluded from support.

2.2.1.4 Measure 225

Eligible beneficiaries range from private owners and occupiers of forested land (for example Scotland) to including municipalities and communities owning and occupying forests (for example the Czech Republic, Mecklenburg West-Pomerania (Germany) and Greece). Moreover, in Mecklenburg West-Pomerania (Germany) forest areas have to be located within a) designated Natura 2000 areas or b) in special protection areas pursuant to federal state law.

The age of the forest and the size of the forest holding are applied by some countries as

additional eligibility criteria. In the Czech Republic the actual age of the forest inventory unit shall be in a range from 6 to 30 years. Scotland has defined minimum and maximum sizes of forest holdings of eligible beneficiaries. For forest environment payment for small woodlands, the forest holding may not exceed 30 hectares, while for payments for other woodlands a minimum size of the forest holding of 1 hectare is required.

2.2.1.5 *Measure 226*

This measure generally aims to reduce the extent of damage caused by natural disasters and reduce the risk of fire. Eligible areas for this measure include forests and other wooded areas. Beneficiaries vary between private owners and tenants of forests, legal persons representing private owners and all public forest administration authorities.

2.2.2 **Scheme commitments**

A number of standard commitments are in place for most forestry measures which have to be fulfilled by applicants in each country and region. In addition, a few more country-specific commitments are described.

2.2.2.1 *Measure 221 (and measure 223)*

In measure 221 (and measure 223) standard commitments include the development and submission of a forest project plan and the applications need to be approved by the relevant authorities. In addition, applicants have to maintain the forests according to defined national standards for 15 years. In addition, more specific commitments are defined in the investigated countries and regions in relation to:

- Tree species (GR, IT_{UMB}, PL, SCO)
- Stocking density (ES_{N/BC}, SCO)
- Protection and other specific maintenance activities (GR, ES_{N/BC})

Regarding the use of specific tree species, Umbria (Italy) and Poland defined that only native tree species should be used for afforestation. The same applies for small woodland creation in Scotland. In Greece, the applicants have to plant tree species which are appropriate for the local conditions and can choose from a given list. Commitments with respect to specific stocking densities are defined in Spain and Scotland, where minimum stocking density need to be fulfilled. The defined measure commitments in Greece include specific maintenance activities such as clearing of unwanted species, irrigation and pruning. Similar commitments are defined in Spain.

2.2.2.2 *Measure 222*

As this measure is only implemented in two of the investigated countries and regions, the amount of information available is very limited. No specific commitments have been identified in Greece. In Umbria applicants can only use native species suitable to local environmental conditions and as defined in the regional regulation no 7/2002.

2.2.2.3 *Measure 225*

Applicants applying for support under measure 225 have to sign up to long term commitments for up to 25 years. However, the duration of the commitments varies between the different countries and regions. Long durations of commitments between 20 and 25 years have been defined in Greece, Czech Republic and Germany, while in Scotland commitments only exist for

10 years.

A standard commitment found in a number of the investigated countries and regions is the development and submission of a forest plan. Examples here include the Czech Republic, Lithuania and Scotland. Furthermore, a few additional commitments are explicitly defined in relation to the required proportions of specific types of tree species in the Czech Republic and existing conservation plans in Mecklenburg West-Pomerania (Germany).

2.2.2.4 Measure 226

Applicants have to submit a project plan which needs to be approved by the relevant authorities. The submitted project has also to take into account fire protection regulations. However, no other general contractual obligations or commitments are mentioned, as this measure operates on a project by project basis. In addition, a few specific commitments are defined, for example in the case of Lithuania, that support for maintaining forest firebreaks through agricultural activities shall not be granted for areas benefiting from agri-environment support. Another example can be found in Umbria (Italy) where a commitment with respect to restoring forests damaged by fire and natural disasters defines that natural dynamics have to be restored in a way to shortly obtain the re-establishment of efficient forest stands.

2.2.3 Cost components

The synthesis of the cost components and their quantification in the next section focuses on the measures afforestation of agricultural land (221) and forest environment payments (225). As explained in the introduction, these two measures are the most commonly implemented forestry measures in the investigated countries and regions. On the other hand, the agro-forestry measure is only implemented in two of the investigated countries (Umbria (Italy) and Greece) and the afforestation measure of non-agricultural land (223) is similar to measure 221 in many aspects of the payment calculations. Finally, measure 226 does not employ the standard cost approach, instead actual costs are reimbursed under this measure.

2.2.3.1 Measure 221

Concerning measure 221, the review compared the different components explicitly used for the calculation of establishment payments, maintenance payments and payments for agricultural income foregone. First, the different cost components included in the establishment payments are synthesised in Table 2.2. Please note that the table only includes those countries or regions which have implemented measure 221.

Cost components considered in the calculation of the establishment payments are the preparation of the afforestation (or project) plan, establishment costs as such, either as an aggregated component or disaggregated into various specific components, and design and expense allowances. The afforestation plan is only in two countries, Greece and Lithuania, explicitly considered in the payment calculation, while the additional allowances for the design of the plantation (calculated as percentage of total establishment costs) and the expenses (calculated as percentage of fee) are a specific characteristic of the calculations in Umbria (Italy) and are not included in any of the investigated examples. One of the key information provided by Table 2.2 is the difference in the level of detail provided in the calculation with respect to the different components of establishment costs. Greece, for example, only includes an aggregated figure of establishment costs in the payment calculation, while other countries, e.g. Lithuania, Poland and the investigated regions in Spain, differentiate between a range of different establishment cost components such as site preparation, cost of seedlings, labour costs

for planting, replacing seedlings and protection of seedlings (including fencing costs).

Table 2.2 Establishment cost components in afforestation of agricultural land (221)

Cost component	CZ	ES _{NBC}	GR	IT _{UMB}	LT	PL	SCO
Preparation of the afforestation project plan	-	-	✓	-	✓	-	-
Establishment costs	✓	✓	✓	✓	✓	✓	✓
Of which specified: Site preparation	✓	✓	-	-	✓	✓	✓
Costs of seedlings	✓	✓	-	✓	✓	✓	-
Labour costs for planting	✓	✓	-	-	✓	✓	-
Replacing seedlings	✓	✓	-	-	✓	✓	-
Protection of seedlings	-	✓	-	-	✓	✓	✓
Design and expense allowances	-	-	-	✓	-	-	-

✓ = yes, - = no

Similarly, Table 2.3 summarises the different cost components for the calculation of maintenance payments. Again, the level of detail provided in the calculations varies significantly. Examples such as Umbria (Italy) and Scotland only provide an aggregated maintenance cost figure (Umbria) or differentiate between costs for protection and other maintenance costs (Scotland). On the other hand, the calculation of maintenance costs in Greece is rather detailed and includes components for weed control, pruning, replacements of plants and other work such as irrigation. However, in this context, it is important to note that Greece does not provide standardised maintenance payments, but reimburses a percentage of eligible costs, which partly explains the more detailed consideration of different (eligible) cost components.

Table 2.3 Maintenance cost components in afforestation of agricultural land (221)

Cost component	CZ	ES _{N/bc}	GR	IT _{UMB}	LT	PL	SCO
Maintenance costs	✓	✓	✓	✓	✓	✓	✓
Of which: Weed control	✓	✓	✓	-	-	✓	-
Pruning	-	✓	✓	-	-	-	-
Protection	✓	-	-	-	✓	✓	✓
Replacement of plants	-	-	✓	-	✓	-	-
Other works	-	✓	✓	-	-	✓	-

✓ = yes, - = no

The main component in the calculation of the payments for agricultural income foregone is the gross margin loss of agricultural activities. In addition, loss of direct payments (Poland and Finland) and gross margin gains of productive forestry plantations (Greece) are considered in the calculations. While each of the investigated countries and region has based its calculation on agricultural gross margin losses, there are differences in the differentiation of gross margins

from different agricultural land uses and enterprises. The calculation in the Czech Republic differentiates between gross margins of arable land and grassland and, similarly, arable land, improved grassland and unimproved grassland are differentiated in Scotland. A more detailed differentiation can be found in the Greek calculations where a range of different production systems are considered such as irrigated annual crops, vegetables, permanent crops, vineyards, corn, wheat, grassland, etc.

Table 2.4 Agricultural income foregone components in afforestation of agricultural land (221)

Cost component	CZ	ES _{N/BC}	FI	GR	IT _{Umb}	LT	PL	SCO
Agricultural gross margin losses	✓	✓	✓	✓	✓	✓	✓	✓
Loss of direct payments	-	-	✓	-	-	-	✓	-
Gross margin of productive forestry plantations	-	-	-	✓	-	-	-	-

✓ = yes, - = no

2.2.3.2 Measure 225

Three main cost components are considered in the calculation of the forest environment payments. These include the preparation of a forest plan, which outlines the detailed management activities and commitments, the loss of income due to reduced or delayed forest exploitation, and additional forest management cost resulting from the uptake of this measure. Forest plans are considered in the payment calculations in the Basque Country (Spain), Greece, Lithuania and Scotland. The general basis for the payment calculation is the loss of income from forest exploitation with additional forest management costs being explicitly included in the payment calculations in five of the seven countries and regions. Additional management costs include, for example, specific protection measures such as preservation of ecological corridors (Greece) and timber marking (Umbria (Italy)). Finally, additional felling and skidding costs are only included as a separate cost component in the Czech Republic.

Table 2.5 Cost components in forest environment payments (225)

Cost component	CZ	DE _{MWP}	ES _{BC}	GR	IT _{UMB}	LT	SCO
Preparation of forest plan	-	-	✓	✓	-	✓	✓
Loss of income from forest exploitation	✓	✓	✓	✓	✓	✓	✓
Additional forest management costs	✓	-	✓	✓	✓	-	✓
Additional felling and skidding costs	✓	-	-	-	-	-	-

✓ = yes, - = no

2.2.4 Quantification of cost components

Similarly to the previous section, the focus of the synthesis of the different approaches used to quantify the standard costs in the payment calculations is on measures 221 (223) and 225.

2.2.4.1 Measure 221

A range of different approaches are applied to quantify standard costs for the establishment of first afforestations. These approaches include:

Approaches for quantification of establishment costs:

- National evaluation guidelines and Ministry decrees
- Stakeholder evaluations
- Expert studies
- Modelling exercises of different planting models
- Shift from detailed standard cost lists for different activities to a tariff systems

National evaluation guidelines provide, in Lithuania, the methodological framework for accounting and valuation of seedlings, planting and afforestation works, and forest sanitation protection instructions. These guidelines form the basis for the calculation of the afforestation payments and provide information concerning estimated standard costs and suggested payments for establishment and maintenance. In Umbria (Italy), Ministry decrees set the values for design and expense allowances which can be included in the payment calculation.

Expert studies are widely used in payment calculations. For example, in calculations in the Czech Republic, expert studies are used to quantify standard costs for soil preparation, seedlings, transportation of seedlings and labour costs of planting based on data from the previous RDP. Expert studies and stakeholder evaluations have also been used in Scotland to quantify the standard costs for a wide range of different forestry activities for applications in the past and now only provide the basis for the new tariff system. An interesting development concerning the payment calculation has occurred in Scotland, where the payment system has changed from providing a detailed standard cost list for applicants to a simplified tariff system based on seven planting models.

Modelling exercises are conducted developing a set of different planting models which are differentiated by tree species and composition. For example, such modelling exercise is conducted in the Czech Republic, Poland and Scotland where six, four and seven, respectively, different planting models are used to estimate payments. These planting models include assumptions on topography, stocking density, species composition, and amount of labour required for the different activities.

In addition to the standard cost approach, some countries, e.g. Greece, have chosen to reimburse a specific percentage (given by RDR) of the actual costs of afforestation as approved in the project plan.

A similar range of different approaches is applied to quantify standard costs for the maintenance of first afforestations but in many cases fewer cost details are available. Again, the applied approaches include national evaluation guidelines, stakeholder evaluations and expert studies, and planting models. In the context of maintenance costs, planting models include assumptions on required material and labour for different activities such as weeding and protection, and are in some cases differentiated by tree species. Again, the standard cost approach is not used in Greece to quantify maintenance costs; a percentage of the actual costs of afforestation, as approved in the project plan, is reimbursed.

Agricultural income foregone payments are calculated on the basis of gross margin losses and,

in some cases, taking into account loss of direct payments and gross margin gains from forestry enterprise. The following approaches are widely used for the calculation of gross margin losses:

Approaches for calculation of gross margin losses:

- Gross margin losses are calculated by using averages over a number of years (usually 3 years)
- Expert estimates are used to derive cost of non-market goods
- Standardised gross margin figures from expert studies
- Gross margin figures from farm account surveys and databases
- Detailed calculations of reductions in revenue and variable costs

For example, in the Czech Republic agricultural income foregone payments for arable land are based on weighted average gross margins from wheat, barley and rape seed which represent about 50% of the total arable land. On grassland, expert estimates are used to determine prices for hay based on costs of hay production (afforestation of grassland) for the calculation of gross margins for meadows. In Greece, payments are based on the difference between average gross margin from the previously prevailing agricultural activity and the average gross margin from any profitable forest plantation (e.g. chestnut and walnut trees).

The loss of direct payments is included in the calculation in two countries and Poland applies a simple average for the subsidy loss over all production system, while Finland uses an average of all crop systems.

Finally, Table 2.6 provides an example for the calculation establishment costs in measure 221 and 223.

Table 2.6 Calculation of establishment costs for productive broadleaves in Scotland

Operation within Model	Current Standard Cost	Proposed Cost
85% of area planted with productive broadleaves	MB = £600/k = £1860/ha @ 3100 spacing	85% of £1860 = GBP 1581.00 10% of £750 = GBP 75.00 5% of £770 = GBP 38.50 Total Cost of Planting Operations = <u>GBP 1694.50/ha</u> (less 20% maintenance inclusion in SFGS) = GBP1355.60
10% internal unmapped open space	£750/ha	
5% native/amenity broadleaves	NBL = £700/k = £770/ha @ 1100	
Planting must be beat-up and weeded until established	Included in tree planting ops	
Area is protected from livestock and rabbits or deer: Tree Shelters, Vole guards and rabbit control.	Tree Shelters for NBL/MB = £1.60 for each 1.2m shelter. NBL = 5% of ha at 1100 = 55 shelters @ £1.60 = £88.00. MB = 85% of ha at 3100 = 2635 shelters @ £1.60 = £4216.00 Average numbers present in the example schemes. Model 100% = £691.05/ha	GBP 691.05/ha
Site preparation	To be calculated from Average operations, occurrences and units for the example schemes. Model 100% = £205.33/ha	GBP 205.33/ha
Total		GBP 2251.98/ha (Payment £1600 (70%))

NBL – native broadleaves; MB – mixed broadleaves

Source: Information provided Forestry Commission Scotland, May 2007.

2.2.4.2 Measure 225

The forest environment payment is generally determined by calculating income foregone from reduced forest exploitation and higher management costs. However, the review could only find a limited amount of available information regarding the actual calculation process. Two more detailed examples exist from the Czech Republic and Mecklenburg West-Pomerania (Germany), which are outlined below.

The calculation of the forest environment payment for “Improving the species composition of forest stands” in the Czech Republic is based on the assumption of lower income due to lower average felling increment (AFI) in forests with a higher proportion of ameliorative and reinforcing wood species (ARWS). The different calculation steps are as follows:

Main calculation steps (example Czech Republic):

1. Calculation of AFI for stands with minimal rate of ARWS per rotation
 2. Calculation of AFI for stands with increased share of ARWS per rotation
 3. Calculation of AFI difference for whole rotation (multiply by rotation of stands with minimal ARWS)
 4. Total income foregone divided by payment duration of 20 years
 5. Calculation of annual payment weighted by forest type area
- Steps 1 to 4 are carried out for each of the six forest type models before the final payment is calculated as weighted average across all six forest model types.

The second example for the calculation of forest environment payments is “Measures to maintain and develop ecological valuable forest biotopes” in Mecklenburg West-Pomerania (Germany). The main components considered in the calculation process below are:

- Foregone interest income due to renunciation of harvest
- Value loss due to non-usage of trees over a period of 20 years
- Incentive element of 1.1 (until 2006)

The calculation process contains the following three main steps:

Main calculation steps (example Mecklenburg West-Pomerania):

1. The calculation implements assumptions on interest rate, percentage value loss per year, fixed yield, net revenue and present value without exploitation costs.
 2. The sum of the interest and value losses is multiplied by the period of 20 years and discounted to the beginning of the period.
 3. A yearly annuity is calculated which gives the annual payment per tree.
- Taking into account the RDR maximum payment per hectare of 200 EUR, the maximum number of trees per hectare is determined and consequently the final payment per hectare.

2.2.5 Baseline requirements

GAEC and statutory management requirements are not applied for forestry measures in most of the investigated countries and regions. An exemption is, for example, the Basque Country, where the compliance with cross-compliance requirements is specifically established for measures 221 and 225. In principle, however, cross-compliance is also relevant for forest areas and thus in the future, once the exact requirements are defined in each country, some of the GAEC and SMR could apply for forestry measures. Potentially, GAEC requirements in relation to landscape features could limit the scope of afforestation measures. Moreover, there are examples (outside the geographic representation of this project) where GAEC requirements directly address aspects such as tree felling and tree preservation.

Other EU regulations and statutory requirements which have to be taken into account include Fauna, Flora and Habitat Directive and Natura 2000 designations and management plans. In addition, there are a number of national laws and regulations which applicants have to take into account for forestry measures. Examples include UK forestry standards or federal state forestry laws and federal state law on nature conservation in Germany. However, while forestry measures are designed considering forestry standards or other baselines requirements, there is little to no evidence available from the review that existing baseline requirements have been directly considered in the payment calculations.

2.2.6 Linkages or interdependencies with payments in other rural development measures

In most cases no specific linkages or interdependencies between forestry measures and other rural development measures have been identified. As a general rule (RDR requirement) support for afforestation of agricultural land can not be combined with early retirement support. Moreover, mechanisms have to be in place in each country and region to avoid double funding of the same activities or commitments. For example, in the Basque Country (Spain), additional costs in some forestry measures are not taken into account for the final forestry payment calculation if the actions are already support from measures improvement of the economic value of forests (122), infrastructure related to the development and adaptation of agriculture and forestry (125) or non-productive investments (227).

2.3 Data sources and administrative issues

2.3.1 Used data

A list of data sources used in the calculations across countries and regions is quite heterogeneous. Used data can be differentiated into forestry and agricultural data and the data sources the two groups can be synthesised as follows:

Forestry data:

- Expert studies, advisory services and stakeholder evaluations
- Forest inventory and national and regional regulations
- Economic forestry data such as value of standing timber and prices for firewood
- Methodological frameworks for the evaluation of forest values provided by national Ministries
- Academic literature

Agricultural data:

- FADN and national agricultural data sets to quantify gross margin losses
- Expert studies and stakeholder evaluation to quantify input requirements

2.3.2 Missing data

In a number of cases the lack of reliable forestry data has been emphasized. Missing forestry data include economic data and technical specifications for forestry. Moreover, the lack of FADN data for forestry land, current silvicultural data, monitoring data and more detailed spatial data has been pointed out.

Somehow an exemption is the case of the Czech Republic. Evidence from the review suggests that sufficient (economic) data are available. The economic data have been collected by Czech Statistical Office since 1998 and represent 70% of all forests in the Czech Republic. Moreover, comprehensive systems of forestry typologies and guidelines are available in the Czech Republic (including systems of forest types, forest management rules, definition of % ARWS, classifications of tree species and yields, and typical period of rotation, etc.).

2.3.3 Policy administration

Differences in the number and types of organizations involved in payment calculations and verifications in the investigated countries and regions are summarized in Table 2.7.

Table 2.7 Administrative structure involved in payment calculation

	Payment calculation		Payment verification	
	No.	Organisations	No.	Organisations
CZ	5	- Ministry of Agriculture - Ministry of Environment - Research Institute of Agricultural Economics - Silva Tarouca Research Institute for Landscape and Ornamental gardening - Agency for nature conservation and landscape protection of the Czech Republic	5	- Ministry of Agriculture - Ministry of Environment - Research Institute of Agricultural Economics - Silva Tarouca Research Institute for Landscape and Ornamental gardening - Agency for nature conservation and landscape protection of the Czech Republic
DE_{MWP}	1	- Forestry Authority of Mecklenburg West-Pomerania	0	
ES_{N/BC}	2	- Ministry of Agriculture, Fishery and Food - Ministries of Agriculture of Autonomous Communities	3	- Ministry of Agriculture, Fishery and Food - Ministries of Agriculture of Autonomous Communities - Provincial government
FI	1	- Ministry of Agriculture and Forestry	5	- Ministry of Agriculture and Forestry - The Central Union of Agricultural - Producers and Forest Owners - Finnish Forest Research Institute - Ministry of the Environment - Finnish Regional Research FAR
GR	2	- The Rural Development Management Authority - The General Directorate of Forestry in the Ministry of Rural Development and Food	2	- The Rural Development Management Authority - The General Directorate of Forestry in the Ministry of Rural Development and Food
IT_{UMB}	2	- Regional administration - University of Perugia	1	- University of Perugia
LT	2	- Lithuanian Institute of Agrarian Economics - Ministry of Agriculture (MoA)	2	- Ministry of Agriculture (MoA); - Lithuanian Chamber of Agriculture
PL	3	- State Forests - Ministry of Environment - Forest Research Institute	2	- State Forests - Agency for restructuring and modernization of agriculture
SCO	2	- Forestry Commission - Scottish Executive Environment and Rural Affairs Department	3	- Forestry Commission - Scottish Executive Environment and Rural Affairs Department - Independent consultant/contractor

2.4 Problems, solutions and remaining key issues for payment calculations

The review of the payment calculations in forestry measures identified a number of different problems which can be synthesized into four key areas:

<p>Main problem areas:</p> <ul style="list-style-type: none"> • Data availability • Standard cost approach and payment design • Policy administration • RDR requirements

A range of different specific issues have been identified in the review in these main problem areas. Table 2.8 compares the different problems in each of the above areas with the solutions employed by the responsible organizations.

Table 2.8 Problems and attempted solutions

Problem areas	Problems	Solutions
Data availability		
	Lack of reliable economic and silvicultural data for forestry enterprises and existing data are not up-to-date.	- Usage of scientific literature and surveys to obtain required data - Simplified methods of calculation are applied which are less data intensive
	Difficulties to define economic assumptions in calculations, e.g. interest rate	
Standard cost approaches and payment design		
	Standard costs do not take account of wide range of different circumstances and changes in economic data such as price fluctuations	Establishment of Forestry Sustainable Management Plans specifically for the holding as obligatory for receiving the forestry payments
	Discrepancies between payment periods and duration of commitments	
Policy administration		
	Lack of methodological experience of payment administrations	Advice and knowledge has been used from other organizations, both at national and international level
RDR requirements		
	Low amount of calculated payment does not provide sufficient incentives for forest owners and can not be increased through an incentive element anymore	n.a.
	Minimum and maximum amount of forest environment payments does not provide an adequate range of financial support.	n.a.

The most commonly cited problem was a lack of reliable economic and silvicultural data for forestry enterprises and existing data are not up-to-date. Moreover, the inflexibility of the standard cost approach was criticized for not taking into account local and changing circumstances for forestry enterprises. Payment restrictions in the RDR framework were also pointed out as constraints for defining adequate financial support mechanisms at farm level.

Different solutions were employed by the responsible organizations to reduce or solve the outlined problems in the payment calculations, e.g. applying a simplified approach to calculate payments and seeking advice on methodological issues from other organizations. However, a number of key problems remain unsolved and need to be taken into account in future payment

calculations. The remaining key issues can be summarized as follows:

Remaining key issues:

- Lack of data and missing opportunity to test the reliability of results remains an important issue.
- Lack of transparency in the calculation of standard costs
- Problems in relation to the applicability of standard costs in the “real world”
- Problems in relation to the applicability of RDR guidelines
- Testing of the efficiency of more differentiated approaches of calculating payments and their impact on over- and under-compensation
- Large variations in the implementation of forestry measures
- Large variations in the approaches used to calculate payments

3 Conclusion

The review compared the payment calculations in five different forestry measures, with a strong focus on measures 221 and 225, across a third of the EU countries and aimed to provide answers to the set of key questions outlined in the introduction. The findings of the review confirm the expected big differences in payment differentiations and calculations within a measure across the countries and between the different forestry measures. Applied payment differentiations vary from simple uniform payments only considering RDR requirements to rather complex differentiations depending on tree or forest types, topography but also agricultural parameter such as production systems or land type and quality.

While eligibility criteria and scheme commitments are often similar across countries, the level of details in the calculations varies between the different implementations. Taking the establishment payments for afforestation as an example, the standard cost approach can be as simple as using an aggregated figure for establishment costs or can include a number of different cost components for a range of required forest activities. Similarly, approaches used to quantify the different components vary from using expert studies or opinions to more detailed modeling exercises. However, the findings of the review seem to suggest that information on the quantification of cost components in forestry payments is rather limited, in particular in comparison to other RD measures such as agri-environment and Natura 2000 measures. Lack of suitable data often implies that simple calculation methods based on expert studies and opinions have to be used to estimate standard costs for forestry payments.

In fact, lack of suitable and current data is one of the identified key problems in relation to the calculation of forestry payments. Other remaining key issues to be taken into account in future calculations are, for example, the limitations of standard cost approaches and constraints resulting from RDR requirements. Discussions with government representatives confirmed the constraining effects of RDR requirements, additional data requirements, transparency of calculations and the need for suitable incentives at farm level.

The differences in payment calculations between the investigated countries and regions emphasise one of the main challenges in developing methodological grids: trying to create a harmonised method for payment calculations which, at the same time, allows consideration of regional circumstances and maintains relatively low administration costs. On the other hand, the review also showed that it is possible to synthesise similarities across the countries and to develop groups or types of parameters which provide a starting point in developing methodological grids for payment calculations.

Annex

Annex A.1 Overview of forestry payments country (region) by country (region)

Table A1.1 Czech Republic

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha	% in calculated level of payment	
Measure 221				
221.1. First afforestation of agricultural land	Yes			
a) First establishment of forest stand	Yes	1954.07 – 2961.32	70 - 80	Horizontal
b) Establishment forest stand management (for a period of 5 years)	No	436.48	100	
c) Compensation for the termination of farming (for 15 years)	Yes	148.57 – 293.78	50.6 - 100	
221.2. Planting of fast-growing tree species (FGTS) designed for use in energy generation	Yes	2551.71 – 3307.14	70 - 80	Horizontal
Measure 225				
Improving the species composition of forests	Yes	20.15 – 97.37	25 - 100	Horizontal / protected areas
Measure 226				
Restoring forestry potential after disasters and introducing preventive action	Yes – according to particular projects	No fix payment level – depends on project.	100% of eligible expenditure	Horizontal

* An exchange rate of 29,784 CZK = 1 EUR has been applied.

Source: RDP of the Czech Republic for 2007-2013 (version from January 2007) and interview with MoA representatives.

Table A1.2 Mecklenburg West-Pomerania (Germany)

Name of forestry scheme or measure	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha	% in calculated level of payment	
Measure 225				
Measures to increase ecological stability of forests by support of contractually defined usage and cultivation agreements which: a) conduce to a sustainable conservation and improvement of protective and ecological roles of forests and b) go beyond the legal conservation requirements (guideline for support of forest measures within the ELER framework)	Yes	40 - 200	100% (Premium calculations are locally determined and case-specific)	a) Designated Natura 2000 areas or b) Special protection areas pursuant to federal state law.

Source: Interviews with representatives from the Ministry of Agriculture, Environment and Consumer Protection,

Table A1.3.a Basque Country (Spain)

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha	% in calculated level of payment	
Measure 221				
First afforestation of agricultural land				
a) Establishment payment	Yes	Max. 850	70 - 80	Horizontal
b) Maintenance payment	No	150	100	
Measure 225				
Forest environment payment	Yes	100 - 200	100	Horizontal
Measure 226				
226. Restoring forestry potential and introducing preventive action	Yes – according to particular projects	No fix payment level – depends on project.	100	Horizontal

Source: RDP of the Basque Country for 2007-2013 (June 2007)

Table A1.3.b Navarra region (Spain)

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha	% in calculated level of payment	
Measure 221				
First afforestation of agricultural land				
a) Establishment payment	Yes	2394 - 4558	70 - 80	Horizontal
b) Maintenance payment	Yes	114 - 470	100	
c) Agricultural income foregone payment	Yes	65 - 600	100	
Measure 226				
Restoring forestry potential and introducing preventive action	Yes – according to particular projects	No fix payment level – depends on project.	100	Horizontal

Source: RDP of the Navarra region for 2007-2013 (June 2007)

Table A1.4 Finland

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha	% in calculated level of payment	
Measure 221				
First afforestation of agricultural land				
Agricultural income foregone payment	Yes	100.91 – 327.97	n.d.	Horizontal

Table A1.5 Greece

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha	% in calculated level of payment	
Measure 221				
First afforestation of agricultural land				
a) Establishment payment	Yes	n.a.	70% to 100% of incurred costs	Horizontal
b) Maintenance payment	Yes	n.a.	70% to 100% of incurred costs	
c) Agricultural income foregone payment	Yes	150 – 700	n.d.	
Measure 222				
First installation of agroforestry systems in agricultural land	Yes	n.d.	70 – 80	Continental Greece (Not the islands)
Measure 223				
First afforestation of non-agricultural land				
a) Establishment payment	Yes	n.a.	70% to 100% of incurred costs	Horizontal
b) Maintenance payment	Yes	n.a.	70% to 100% of incurred costs	
Measure 225				
Forest environment payment	Yes	40 - 200	n.d.	Horizontal
Measure 226				
Restoring forestry potential and introducing preventive action	Yes – according to particular projects	No fix payment level – depends on project.	100	Horizontal

Table A1.6 Umbria region (Italy)

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha	% in calculated level of payment	
Measure 221				
First afforestation of agricultural land				
a) Establishment payment	Yes	3200 - 5500	70 - 100	Horizontal / focused
b) Maintenance payment	No	420	82 - 100	
c) Agricultural income foregone payment	Yes	92 - 700	67	
Measure 222				
First installation of agroforestry systems in agricultural land	Yes	280 - 1580	70 - 80	Horizontal / not focused
Measure 223				
First afforestation of non-agricultural land				
a) Establishment payment	Yes	3200 - 5500	70 - 100	Horizontal
b) Maintenance payment	Yes	420	82 - 100	Horizontal
Measure 225				
Forest environment payment	Yes	40 - 200	79 - 98	Zonal / not focused
Measure 226				
Restoring forestry potential and introducing preventive action	Yes – according to particular projects	No fix payment level – depends on project.	100	Horizontal / focused

Table A1.7 Lithuania

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha*	% in calculated level of payment	
Measure 221				
First afforestation of agricultural land				
a) Establishment payment	Yes	1050 - 3600	70 - 100	Horizontal
b) Maintenance payment	Yes	1500 - 2500	70 - 100	
c) Agricultural income foregone payment	Yes	25 - 113	100	
Measure 223				
First afforestation of non-agricultural land				
a) Establishment payment	Yes	1050 - 3600	70 - 100	Horizontal
b) Maintenance payment	Yes	1500 - 2500	70 - 100	
Measure 225				
225.1 Payments for not conducting final forest cutting operations in identified WKH	No	170	100	Horizontal
225.2 Payments for non-clear forest cutting operations instead of clear ones	No	85	100	Horizontal
Measure 226				
Restoring forestry potential and introducing preventive action	Yes – according to particular projects	100,000 and 400,000	100	Horizontal

* An exchange rate of 3.4528 LTL = 1 EUR has been applied.

Table A1.8 Poland

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha*	% in calculated level of payment	
Measure 221				
First afforestation of agricultural land				
a) Establishment payment	Yes	1094 – 1647**	70	Horizontal
b) Maintenance payment	Yes	50 - 357	100	
c) Agricultural income foregone payment	No	415	100	
Measure 223				
First afforestation of non-agricultural land				
a) Establishment payment	Yes	447 – 1647**	70	Horizontal
b) Maintenance payment	Yes	50 - 539	100	
Measure 226				
Restoring forestry potential and introducing preventive action	Yes – according to particular projects	No fix payment level	100	Horizontal / focused

* An exchange rate of 3.8 PLN = 1 EUR has been applied.

** In addition, a payment of EUR 681 per hectare is provided for fencing.

Table A1.9 Scotland

Name of forestry measure (i.e. sub-measures, or schemes)	Is payment somehow differentiated? Yes/No	Level of payments		Targeting
		EUR/ha*	% in calculated level of payment	
Measure 221				
221.1 First afforestation of agricultural land: Creation of small woodlands	No	3750	70	Horizontal
221.2 First afforestation of agricultural land: Creation of other woodlands				
a) Establishment payment	Yes	945 – 2362**	70	Horizontal
b) Maintenance payment	Yes	525 – 1207	70	
c) Agricultural income foregone payment	Yes	90 – 450	100	
Measure 223				
First afforestation of non-agricultural land				
a) Establishment payment	Yes	945 – 2362**	70	Horizontal
Measure 225				
225.1 a) Sustainable management of small woodlands	No	42	100	Horizontal
b) Agricultural income foregone payment for livestock removal	No	61.5	100	Horizontal / focused
225.2 Sustainable management of forests and woodlands	No	42 (84)***	100	Horizontal

* An exchange rate of 1.5 EUR = 1 GBP has been applied.

** In addition, a payment between EUR 3 – 10.5 per meter is provided for fencing.

*** There is no payment differentiation as such, but a top-up of another EUR 42/ha/year is provided, where areas of high level of public access overlap with native woodlands or areas of low-impact silvicultural systems (LISS).

Annex A.2 Examples for payment calculations from the different countries and regions

Annex A.2.1 Examples for payment calculations in measures 221 and 223

Table A.2.1.1a Example for calculation of establishment costs in the Czech Republic: Conifers

Components	EUR/ha*	Data source	Reference period
Additional costs			
Soil preparation	112.01	Expert study – based on the Report on the State of Forests and Forestry in the Czech Republic	Expert study is from 11/2005 and contains updated data coming from the year 2003
Seedlings - Average (6050 pc.) of two version of minimal pieces per ha	1058.35	Expert study – based on data from “Forests of the Czech Republic, state enterprise”	Expert study is from 11/2005 and contains updated data coming from the year 2003
Labour costs for planting - average costs per one tree	869.09	Expert study – based on data from “Forests of the Czech Republic, state enterprise”	Expert study is from 11/2005 and contains updated data coming from the year 2003
Transportation of seedlings	106.70	Expert study – based on the Report on the State of Forests and Forestry in the Czech Republic	Expert study is from 11/2005 and contains updated data coming from the year 2003
Forest improvement - increase by 30% due to necessity to keep recommended number of trees according to national rules for state supporting contributions and to renew tree losses as well	643.84	n.a.	n.a.
Total additional costs	2789.99		
Proposed amount of payment (70 – 80% of calculated amount)	1952.99 / 2231.99		

* An exchange rate of 29.784 CZK = 1 EUR has been applied.

Source: RDP of the Czech Republic for 2007-2013 (version from January 2007) and interview with MoA representatives.

Table A.2.1.1b Example for calculation of maintenance costs in the Czech Republic (measure 221)

Components	EUR/ha*	Data source	Reference period
Additional costs			
Weed control	268.60	Data from the Report on the State of Forests and Forestry in CZ	updated data coming from the year 2003
Protection against animals	117.51	Data from the Report on the State of Forests and Forestry in CZ	updated data coming from the year 2003
Protection against rodents	33.58	Data from the Report on the State of Forests and Forestry in CZ	updated data coming from the year 2003
Other protection	16.79	Data from the Report on the State of Forests and Forestry in CZ	updated data coming from the year 2003
Total additional costs	436.48		
Proposed amount of payment	436.48		

* An exchange rate of 29.784 CZK = 1 EUR has been applied.

Source: RDP of the Czech Republic for 2007-2013 (version from January 2007) and interview with MoA representatives.

Table A.2.1.1c Example for calculation of the agricultural income foregone payment in the Czech Republic: Afforestation on grassland (measure 221)

	CZK/ha*	Data source	Reference period
Income foregone			
Gross Margin (GM) from grassland with fertilisation level around 40 kg N/ha			
Costs of fertilizers	450	data from “Costs of agricultural products in CZ”	Average of years (2001- 2004)
Costs of seeds	97	//	//
Costs for crop protection	26	//	//
Other direct material	101	//	//
Others directs costs and services	393	//	//
Cost of baling	900	own (VUZE) survey	2005
Total variable costs	1 967		
Hay yield (ton/ha)	3.40	scientific literature + research + own (VUZE) survey	1989, 1993, 2004 + 2000–2004 + 2005
Sale prices of hay (CZK/ton)	1 880	“Costs of agricultural products in CZ” + expert estimate of price margin + own (VUZE) survey	Average of years (2001 - 2004) + 2005 +2006
Total income	6 362		
Total income foregone (GM)	4 425		
Proposed amount of support	4 425 (148.57 EUR/ha)		

Source: RDP of the Czech Republic for 2007-2013 (version from January 2007) and interview with MoA representatives.

Table A.2.1.2a Example for calculation of establishment costs in Poland: Payment calculation process for afforestation of agricultural and non-agricultural land in areas with favourable configuration (measures 221 and 223)

Costs	Costs PLN/ha	
	coniferous	broadleaf
1. Preparation of soil (average cost) - ploughing up lanes with a stump cutter (95 PLN x 12h) - complete deep ploughing (PLN 55 x 8h) - complete deeper ploughing (55 PLN x 9,5h) - ploughing up and cultivating of furrows (PLN 55 x 13.5h)	715	
2. Seedlings - coniferous (8000 x PLN 0.32) - broadleaf (600,0 x PLN 0.49) - bonitation shrubs (500 x PLN 0.35)	2560	3115
3. Seedlings used for replacement in the second year of cultivation (20%) (1600 x PLN 0.32, 1200 x PLN 0.49)	512	588
1. Supply and heeling in of seedlings (40 km x PLN 2, PLN 140 – unloading, loading and heeling in) / 2 ²	110	
5. Planting (coniferous PLN 10 x 200 h, broadleaf PLN 10 x 220 h)	2000	2200
6. Replacement of seedlings (coniferous PLN 10 x 60 h, broadleaf - PLN 10 x 65 h, supply – PLN 220/2)	710	760
Total costs of establishment of a forest culture	6607	7488
Payment (70% of investment costs)	4625	5241
Payment rate suggestion	4620 (EUR 1215)	5240 (EUR 1378)

Source: Calculation of payments for measure “Afforestation of agricultural land and non-agricultural land”, Rural Development Plan 2007-2013. Draft of June 2007, Annex 15, MARD, Warsaw 2007.

Table A.2.1.2b Example for calculation of maintenance costs in Poland: Calculation of payments for maintenance of a forest culture in areas with favourable conditions (measures 221 and 223)

Costs	Costs PLN/ha
1. 1-3-year-old forest culture - cutting out of weeds (twice a year, PLN 10 x 40 h) - cultivation of soil around the seedlings (1 operation per 2% of the surface area, PLN 10 x 8h)	480
2. 4-5-year-old forest culture - tending felling (1 operation in mixed cultures PLN 10 x 46 h)	460
3. Protection of the forest against insects and fungi	27
4. Protection of the forest against fires	10
Average cost of forest culture maintenance	977
Payment rate suggestion	970 (EUR 255)

Source: Calculation of payments for measure “Afforestation of agricultural land and non-agricultural land”, Rural Development Plan 2007-2013. Draft of June 2007, Annex 15, MARD, Warsaw 2007.

Table A.2.1.2c Example for calculation of the agricultural income foregone payment in Poland (measure 221)

Cost specification	Costs PLN/ha
1. Lost gross margin for land of poor quality (bonitation factor up to 0.85)	1,029
2. Average direct payment lost	560
Total income foregone	1,589
Payment rate suggestion	1,580 (EUR 415)

Source: Calculation of payments for measure “Afforestation of agricultural land and non-agricultural land”, Rural Development Plan 2007-2013. Draft of June 2007, Annex 15, MARD, Warsaw 2007.

Annex A.2.2 Payment calculations in measure 222

Table A.2.2 Example for calculation of the payment in measure 222 in the Umbria region (Italy): Plantation of uniformly distributed trees on arable land

Components*	EUR/ha**	Data source	Reference period
Additional costs			
Establishment costs	216,07 – 797,39	Umbria and Lombardia Regions' price lists	2002 2005
Purchase of plants	67,50 – 526,00	UmbriaFlor price list	2006-2007
Total additional costs	283.57 – 1323.39		
Proposed amount of payment	280 – 1320		

Source: Umbria region RDP, draft June 2007 and interviews with government representatives.

Annex A.2.3 Payment calculations in measure 225

Example Mecklenburg West-Pomerania: Measures to maintain and develop ecological valuable forest biotopes

Calculation of profit cuts for maintenance and development of tree habitats, deadwood and 'islands' of old trees

The calculations are based on the forest valuation guidelines 2000 (WaldR 2000) of the Federal Ministry of Finances, using the annually updated valuation software 'silval'.

Conditions

Trees have reached their financially exploitable stage (=ready for harvest) (or else no loss exists). Selected and marked trees or tree groups are by contract excluded from usage for a period of 20 years. Economic values of trees (revenues minus harvest costs) are calculated according to 'WaldR 2000'.

Method considerations

The forest owner renounces the harvest of a tree for a specific time period. Thereby he loses income in terms of interest, which he could have obtained by investing the net profits. After 20 years he could harvest the tree. However, he does not obtain the present value of the tree but a lower one caused by physical deterioration. Actual net returns decline. The sum of income losses (interest loss and value loss) of single trees determine the losses per ha.

1. Interest loss for non-usage: Interest loss due to renunciation of harvest

Forgone interest income for non-usage with an interest rate of 3% for the period of consideration (factor $1.03^{20} = 1.806$).

2. Value loss due to impairment of wood quality in 20 years

Non-usage of trees for 20 years leads to an average value loss of 10% (e.g. 0.5% p.a. real) up to 20% in specific cases depending on the tree species.

3. Calculation example

Tree species beech tree; value loss of 1% per year

Fixed yield: 10 m³

Calculated net revenue without exploitation costs: EUR 30/m³

Present value without exploitation costs: EUR 300/tree

1. Interest loss

At most annual opportunity costs of $300 \times 0.03 = 9.00\text{€}$ emerge under the assumption a) of an alternative interest rate of 3% and b) that annual interest income is re-invested and not consumed.

2. Value loss

The value loss after 20 years is 1% p.a. e.g.: $300 - \frac{300}{1.01^{20}} = 54.14\text{ EUR}/20\text{ years}$ respectively on average 2.70 €/a.

Result

The sum of interest- and value loss is to be paid in five homogeneous instalments in the first five years. Therefore annual opportunity costs (1) and value loss (2) need to be added and afterwards multiplied by the period of consideration 20 years:

$(9.00\text{ EUR/a} + 2.70\text{ EUR/a}) \times 20 = \text{EUR } 234$

The total loss is discounted up to the beginning of the instalments.

$$K_0 = \frac{K_n}{1.0p^n} \qquad K_0 = \frac{234.00\text{€}}{1.03^{20}} \qquad K_0 = 129.56\text{€}$$

Hence we need to calculate a finite, yearly annuity in advance:

$$K_0 = r * \frac{(1.0p^n - 1)}{0.0p * 1.0p^n} \qquad r = \frac{K_0}{0.0p * 1.0p^n}$$

$$r = \frac{129.56}{0.03 * 1.03^5} \qquad r = 28.52$$

This value is the effective income loss due to forgone interest and value loss. Up to now no financial incentive exists, which causes the optional uptake of the forest environmental measure despite high risks. Therefore, until 2006, an incentive element of 1.1 was applied, leading to an annual payment of EUR **31.37/tree**. For an annual possible payment of 200€/ha/year about **6 trees** could be taken under contract in this example.