AGRIGRID

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

(Project Reference: SSPE-CT-2006-044403)

Specific Targeted Research Project under priority 8.1 Sustainable management of Europe's natural resources:

8.1.B.1.1 Modernisation and sustainability of agriculture and forestry, including their multifunctional role in order to ensure the sustainable development and promotion of rural areas

Task 14 New methods for calculating premiums in the rural development measures

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Report D10
Case study analysis of existing and proposed grids

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Executive summary

In accordance with EU regulations, payment levels for several measures of rural development programs are calculated on the basis of standard cost approaches, using 'typical' or average figures for costs incurred and income forgone. The resulting flat rates have been criticised for some time. Against this background, the objective of this report is to analyse the effectiveness and efficiency of more differentiated standard cost approaches. In particular, the study aims to go beyond other predominantly theoretical discussions on payment level differentiation by quantitatively analysing the benefits of more differentiated standard cost approaches for selected case studies. A specific intention was to integrate stakeholders (e.g., government representatives, farmers union, NGOs) to identify their view on key issues related to payment calculation and differentiation, to discuss results from the case-studies and to evaluate the usefulness of supportive tools.

Literature review

The literature was screened for studies on payment calculation and differentiation for rural development measures to provide an overview of the current state of discussion, and identify key open questions as well as suitable indicators for differentiation. The debates about alternatives to flat-rate regimes in general focus on three different research directions. The first line of argument is favouring to pay farmers for the production of public goods instead of compensating them for participating in specific extensification measures, though most sources acknowledge the existing obstacles in terms of the monetary evaluation of such goods. Other authors concentrate on the analysis of auction schemes with farm individual bids as an alternative to fixed payment levels. However, the performance of such systems in practice is an unresolved issue, with strategic bidding behaviour, high administration costs and the failure to significantly impact on windfall profits as key problems. Both approaches have received intensive attention in research. A third approach addresses the possibilities of improving the performance of standard cost approaches by a further differentiation of payments on, e.g., small-scale regional or even farm level. Though there seems to be a wide consensus of the need to differentiate payment levels according to national, regional and local agricultural conditions, few empirical studies exist which quantitatively examine the potentials of using an improved standard cost approach. Some authors argue for a (small scale) regional differentiation for measures which require additional operations without having major impacts on land use, and for landscape management measures, while for other measures a differentiation according to farm-individual participation costs is suggested. The few - predominantly theoretical - studies existing agree that the challenge is to find farm-specific characteristics which are strongly correlated with participation costs and which can be identified with small administrative effort. In general there are trade-offs between the precision of the policy instruments, their information requirements and related administrative costs. The literature identifies asset specificity, frequency of contracting and point of policy application as the main factors determining the extent of such costs; however empirical evidence of the level of such costs is still patchy.

Methodological framework

The basic idea of differentiating payments is not to offer a single payment level to all potential participants, but rather to try to separate farms (into groups) by their costs of participation. In theory, differentiated payment levels can be significantly lower than a uniform flat-rate and still provide a financial incentive for participation to the same number of farms, thus reducing budget expenditure. Key issues for the analysis of payment differentiation are, firstly, the question of how to evaluate the performance of differentiated approaches, which is closely linked to the discussion of the objectives for differentiation, and

secondly, the possibilities for an effective separation of farms into groups with different costs, or even the approximation of individual costs, which is essentially an empirical question.

Payment differentiation is not an objective in itself, and the motivation for differentiating payments depends crucially on the point of view of the decision maker and the related underlying decision problem. Three main objectives for payment differentiation can be identified:

- For policy makers at EU level, coherency with the general framework of agricultural policies and compliance to international treaties (WTO) play an overarching role. The rationality for payment differentiation thus lies in the attempt to limit the payments to actual participation costs and reduce overcompensation which may arise under flat-rate payment schemes and endanger WTO conformity.
- The national or regional administrations, which are responsible for the design and implementation of concrete measures, often face quasi-fixed budgets for specific policy areas, and the decision problem poses itself as a maximisation of programme benefits under budget constraints. Payment differentiation in this context is an option to increase budgetary efficiency.
- From a more general economic point of view, the comparison of different policies needs to take into account overall benefits and costs for society. In applied welfare economics – the traditional economic cost-benefit analysis – the net contribution of a policy change to society's welfare is analysed, regardless of distributional effects. The performance of payment differentiation is evaluated with respect to its impact on economic efficiency.

The performance and relative ranking of differentiated policies is likely to differ depending on the objective pursued. Simultaneously taking into account the different views raises the usual problems faced in applied multi-objective decision making, e.g. questions of acceptability of trade-offs or appropriate weighting. In addition to separately analysing the effects of differentiation on single indicators, this study simultaneously takes into account the two objectives of minimizing resource costs and limiting unintended transfers, applying an approach suggested by the OECD in its work on implementation costs of agricultural policies. To overcome the problem of valuing the societal benefits of farmers' program participation in monetary terms, this study compares policies which achieve the same result (i.e. same outcome with respect to the rural development objective of the specific measure analysed).

Measures and differentiations analysed

For the quantitative analysis, several stylised examples of agri-environmental measures were developed which reflect key characteristics of many existing measures influencing the potential and performance of differentiated payment schemes. Farm accountancy data is used to identify the costs of participation. Since variances in revenues are generally larger than variances in costs incurred by participation, this investigation focuses on measures where participation costs results from loss of revenues, e.g. reduced yields or changed crop rotations.

The ecological benefit of the participation of a specific farm is dependent on the type of the measure, the environmental states of the individual farms as well as of the total region before the implementation of agri-environmental programmes, and very few studies exist which provide corresponding quantitative information. Therefore, in this study all analyses have been carried out for two different assumptions on the link between ecological benefits and farm characteristics. The stylised examples encompass measures which either deliver the same ecological benefit for each unit of land brought into the programme, or for which benefits are linearly linked to the level of intensity of production before participation and thus with participation costs.

Payments were differentiated on different regional scales, for different farm categories, e.g. farm type, as well as by farm individual characteristics, e.g. soil quality or farm size, and the outcomes compared to those of a flat rate based on the simple standard cost approach. A specific concern relates to administrative costs possibly incurred by the introduction of more differentiated approaches. These costs, also termed policy related transaction (PRTCs), need to be added to the budgetary expenditures for rural development measures and present resource costs to society. Few information on administration costs of environmentally measures exists, and the empirical studies highlight a large variation between measures and regions. For this study, calculations were done with zero and with additional administration costs amounting to 3% of transfers. In addition, break-even points of PRTC's, i.e. levels above which differentiation becomes unfavourable, were calculated.

Data

For this study, information was available from national farm accountancy data networks and supplementary data bases in Germany, Italy, Scotland and the Czech Republic. To avoid yearly fluctuations of variables to distort results, the analyses are based on two- to five-year averages depending on the sample sizes in the individual countries.

- The German FADN covers approximately 11 000 farm accounts. For this analysis, data refers to 5-year averages from the years 2001-2005, matching the contract period of many rural development measures. The calculations were carried out for three federal states to represent the geographically diversity of Germany. Two regional and one farm-specific cost indicator based on soil quality could be tested.
- For the Czech Republic, an additional data collection system which is based on FADN is used, and approximately 300 farms with a significant coverage of the agricultural land were analysed. Data refers to 2-year averages (2005–2006), and allowed the testing of five farm-specific cost indicators plus a regional differentiation.
- The Italian evidence is the *FADN Mini Data Bank.* It covers more than 14 000 farms in total and between 615 and 1283 farms in the corresponding considered three regions. Data refers to 4-year averages of 2003–2006. A regional differentiation on NUTS III level as well as altitude as a farm-specific cost indicator were available.
- For the Scottish case, two data bases were combined for this study. Data refers 5-year averages from 1998–2002. In addition to a regional classification, farm size, type and altitude were tested as differentiation variables.

A sensitivity analysis with respect to the impact of data availability generally shows that basing calculations on shorter time periods seemingly improves the performance of differentiated approaches and will thus overestimate underlying benefits. Care has therefore to be taken to match the data series to the length of the contract period of the analysed rural development measures.

Results from FADN-based analysis

The results show a high degree of heterogeneity with respect to the impact of differentiated payment levels on overcompensation, budget efficiency and economic efficiency.

- Generally, the rate of overcompensation is reduced in most cases, particularly if payments are differentiated at lower regional levels. Exceptions occur in some instances for the farm individual differentiations analysed in Italy and Germany, which is a consequence of the comparatively low correlation of the proxies used for participation costs and true yield levels, and for the regional differentiation at higher levels (i.e. NUTS II) in Germany, as variance of yields within these sub-regions is high.

- If additional administrative costs of differentiated approaches are negligible, budgetary expenditures can be reduced in the majority of cases, particularly if ecological benefits rise with participation costs. However, a comparably high number of cases with increased budgetary spending occur for the Italian case studies, the stylised agri-environmental grassland measure in Germany, and the Czech case study, especially if ecological benefits do not depend on production intensities before participation.
- For the range of analysed measures, flat-rate payments have the best economic cost-effectiveness, a result that is evident from economic theory. All differentiated approaches lead to increased resource costs, especially if ecological benefits are assumed to be constant per ha of land contracted. In many cases, differentiation on lower regional levels significantly reduces economic cost-efficiency.
- In case differentiation causes additional PRTCs, performance is significantly reduced. Budgetary cost-effectiveness is lower than a flat-rate scheme in almost all cases if additional PRTCs amount to at least 3% of transfers, and economic cost-effectiveness if further reduced.

The effectiveness of differentiated payments to reduce overcompensation and increase budgetary effectiveness differs between countries. Generally, the differentiated approaches perform better for the German and Czech case-studies than for the Italian and Scottish ones. If additional PRTCs occur, only in the German case-study budgetary effectiveness was improved in at least some of analysed examples. This highlights the importance of considering regional aspects when designing differentiated payment schemes.

Simultaneously taking into account the two objectives of minimizing resource costs and limiting unintended transfers shows that without any weighting of the two objectives, in most cases no unambiguous evaluation of the performance of payment differentiation is possible. Assigning equal weights to both objectives, payment differentiation is in many cases superior to flat-rate regimes as long as no additional administrative costs are incurred, especially if environmental benefits rise with participation costs. Notable exceptions are the stylised agri-environmental grassland measure in Germany, and some of the Italian and Czech case studies. The level of additional administrative costs incurred by the implementation of differentiated policies proves to be crucial for the evaluation of the performance of payment differentiation. In many cases, administrative cost must not exceed 2-3% of transfers for differentiation to remain superior. Higher PRTCs for the implementation of differentiated approaches can be accepted if a weighting ratio of 2:1 on unintended transfers versus resource costs is applied. Again, there are some marked differences between countries. While a differentiation on a lower regional level is generally performing best for the German and Czech case-studies, a regional differentiation is clearly inferior to flat-rate regimes for the Scottish examples. For Italy performance is more dependent on the chosen region than on the type of approach (regional or farm-individual differentiation).

Workshop-based farm-level analysis

The FADN analysis at national (or macro) level, was complemented by workshop-based analysis using a farm-level case-study as the basis of a multi-stakeholder deliberation on the issues raised by differentiation. This approach sought to test some of the assumptions that were made in the macro level and to assess the acceptability of differentiation since this could have profound effects on the levels of uptake and thus on the effectiveness of payments.

The case-study chosen was conversion to and maintenance of organic production since this was the only measure common to all EU27 states, but also since it encompasses management adaptations seen in other measures. Two scenarios were prepared using the Macaulay Institute

research station as an example of upland mixed-agriculture that faces significant economic and environmental challenges. The particular patterns of land use and management were based either on existing practice (for the conventional system) or consultants recommendations (for the converted organic system). The organic conversion scenario while hypothetical was based on conversions undertaken or supervised by the consultant in similar circumstances. Market prices and costs were as of June 2008. The two scenarios were assessed using a farm-level bio-economic model. This assessed for each scenario the impacts on productivity (outputs of crops and livestock), their use of materials (e.g. fertilisers and purchased supplements), their use of machinery, labour and contractors and their financial implications (via a balance sheet).

A multi-stakeholder workshop was organised in Edinburgh in partnership with the Scottish Government. The workshop was attended by key stakeholders from policy, practice and NGO communities. The workshop was organised both to present the outcomes of the FADN and case-study analyses and to seek discussion of the issues surrounding the benefits and problems of differentiated payments. The workshop process and the materials presented were also evaluated using a post workshop questionnaire. The headline outcomes were that:

- Support payments were seen as a key mechanism for buffering the industry from market volatility.
- Payments rates should include the additional public goods delivered rather than strictly adhering to income forgone and additional costs.
- In some cases the overall budget for measures was seen as a greater constraint to participation than the specific rates pf payment.
- If further differentiation in payments were to be implemented, then the goals (such as increased participation) need to be explicit.
- The potentially redistributive effects of differentiation in reducing wind-falls were accepted but stakeholders wanted to see any efficiency savings used to increase participation not result in smaller overall budgets.
- Stakeholders were open to formulations other than flat rates but their success was seen to depend on somehow ensuring that complexity/cost for practitioners and administrators did not outweigh the benefits.
- The need for mechanisms that to promote cooperation between land managers in delivering (particularly agri-environmental) benefits was identified.

In addition to the Edinburgh workshop two other meetings were held with government representatives. Discussions at these meetings also showed that there is a general awareness that flat-rate payments do not reflect farm-level heterogeneity, but involved authorities prefer flat-rate payments due to administrative simplicity. The high requirements on data quality and quantity for the calculation of differentiated payment levels as well as higher administration costs incurred by differentiated payment levels were identified as key problems.

Conclusions

The results from the FADN-based case-studies show that though overcompensation can be reduced by payment differentiation in most cases, savings in budget expenditures are often small and are even offset by increasing PRTCs. The evaluation of the overall performance of payment differentiation strongly depends on the weights attached to the objective of reducing unintended transfers. Generally, the scope for effective and efficient differentiation depends

on specific measure characteristics. Potential benefits of differentiated approaches are higher if

- variances of participation costs in the universe of farms are high, which is generally more likely for measures which affect output rather than measures which lead to additional costs
- the correlation between costs of participation and environmental benefits are strong, and
- administration costs for differentiation approaches are low.

It is essential that the discriminatory power of the indicators used for differentiation is significant. For regional differentiation, differences between sub-regions need to be high while variances within sub-regions should be low. For farm individual differentiation, the correlation between actual farm individual costs of participation and selected indicators for payment determination must be high.

Future research on the contribution of payment differentiation in the presence of pure windfall profits seems to one promising extension of the approach presented in this report. Further, taking into account nonlinear correlations between participation costs and ecological benefits might change outcomes considerably, though finding an empirical basis for such a specification will remain a challenge.

The workshops with government representatives and other stakeholders indicated a fairly large interest in improving payment calculations and differentiations and identified lack of information as well as the fear of increased administrative burdens as key restraints. Datasets, tools and methods that can look beyond "average values" and that allow a more in-depth exploration, and which structure data and process, were seen as helpful in overcoming these constraints. Future workshops should also aim to include farmers, as acceptance of payment differentiation schemes (e. g., as being 'just') by the target group is vital for the success of the respective rural development measures.

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1 Introduction

In accordance with EU regulations, payment levels for several measures of rural development programs are calculated on the basis of standard cost approaches, using 'typical' or average figures for costs incurred and income forgone. A recent EU report (European Commission, 2005) noted that resulting uniform payment rates contrast with the fact that many member states and regions have schemes covering a fairly large geographical area, and recommends that more work could usefully be done on the efficiency of measures. The related ongoing discussions about introducing more differentiated payment schemes in general focus on three different research directions. The first line of argument is favouring to pay farmers for the production of public goods instead of compensating them for participating in specific extensification measures. Other authors concentrate on the analysis of auction schemes with farm individual bids as an alternative to fixed payment levels. A third approach addresses the possibilities of improving the performance of standard cost approaches by a further differentiation, e.g. small-scale regional or even individual farm differentiation. Whereas the first two approaches have received extensive attention in research (see e.g. Latacz-Lohmann and Schilizzi 2005, for a review of auction schemes in agri-environmental programmes), few empirical studies exist which quantitatively examine potentials of a more differentiated standard cost approach.

This report resumes the discussions of more differentiated approaches to determining payment levels and analyses the effectiveness and efficiency of a payment differentiation according to regional and farm individual characteristics. Particularly, the study aims to go beyond other predominantly theoretical discussions on payment level differentiation by quantitatively analysing the benefits of more differentiated standard cost approaches for selected agri-environmental measures (AEM) using farm accountancy data from selected case-study countries. A specific intention was to integrate stakeholders (e.g., government representatives, farmers union, NGOs) to identify their view on key issues related to payment calculation and differentiation, to discuss results from the case-studies and to evaluate the usefulness of supportive tools.

The remainder of this report is organised as follows: first, the effect of flat-rate payments based on standard-cost approaches is illustrated, followed by a discussion of the motivations for differentiated approaches. Based on a short summary of the outcome of a literature review, the evaluation framework and related indicators are presented in Chapter 3. Then, a short overview of the data used for the numerical analyses is given. Chapter 4 provides an overview of the main results as well as the outcome of sensitivity analyses. Chapter 5 describes the design and outcome of the workshops with stakeholders. The report concludes with a summary of main findings and an outlook on future research questions.

2 Payment differentiation

2.1 Conceptual framework

Many of the rural development measures in the EU offer a fixed per-ha payment to farmers for the compliance with a predetermined set of management prescriptions. The determination of payment levels is often based on standardised values for costs incurred by farmers from implementing the measures, which is explicitly endorsed in the EU regulation[1] for many rural development measures[2]. Figure 1 provides a schematic illustration of the effects of related simple flat-rate payments and more differentiated schemes on uptake and expenditure. Eligible land is sorted by costs incurred by farmers when participating. In favour of simplicity, for the time being we assume constant marginal benefits for each unit of land brought into the programme, and the curve of participation costs represents the 'supply curve' of the public good.

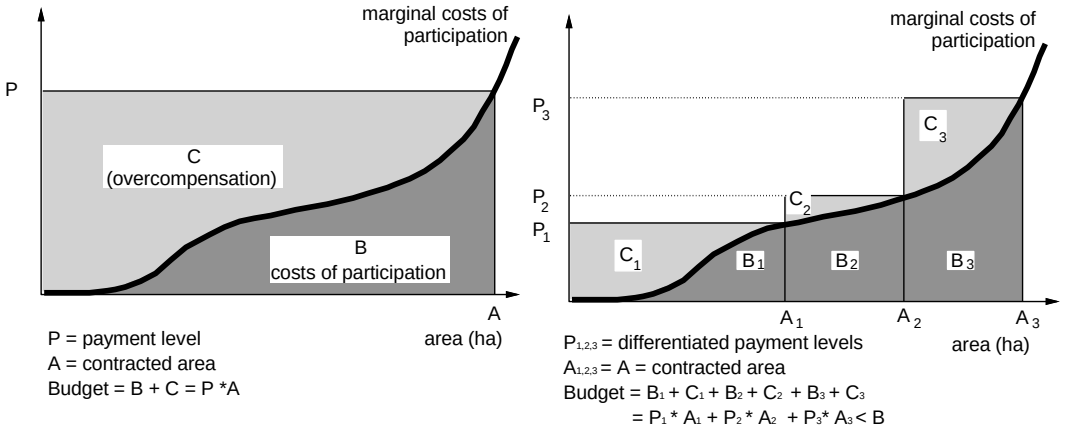

Figure 1: Schematic illustration of the effect of flat-rate vs. differentiated payments

The basic idea of differentiating payments is not to offer a single payment level to all potential participants, but rather to try to separate farms (into groups) by their costs of participation. In theory, differentiated payment levels can be significantly lower than a uniform flat-rate and still provide a financial incentive for participation to the same number of farms, thus reducing budget expenditure.

Key issues for the analysis of payment differentiation are, firstly, the question of how to evaluate the performance of differentiated approaches, which is closely linked to the discussion of the objectives for differentiation, and secondly, the possibilities for an effective separation of farms into groups with different costs, or even approximation of individual costs, which is essentially an empirical question.

[1] EC Reg 1974/2006, §53(1) Where appropriate Member States may fix the level of support [...] on the basis of standard costs and standard assumptions of income foregone.

[2] E.g., agri-environmental, Natura 2000, animal welfare and forestry measures.

2.2 Objectives of payment differentiation

Payment differentiation is not an objective in itself, and the motivation for differentiating payments depends crucially on the point of view of the decision maker and the related underlying decision problem. Three main objectives for payment differentiation can be identified (Table 1):

- For policy makers at EU level, coherency with the general framework of agricultural policies and compliance to international treaties play an overarching role, which is reflected in the meticulous consideration of WTO concerns in the related EU legislation. Several paragraphs of the related legislation are targeted at fulfilling the Green Box requirements detailed in the Uruguay Round Agreement for Agriculture, Annex 2, § 12(b). In addition to almost exactly replicating the wording of the WTO text[3], further specifications of procedures for payment calculations are made to warrant that these comply with the intended objectives and purposes of the WTO text. Considerable effort is spent on detailing requirements for member states to ensure that payment calculations are based on objectives rather than political criteria, and that there is evidence and information on methodology, assumptions and parameters to allow the Commission to review consistency and plausibility of the calculations (EC Reg 1974/2006, §48(2), §53(2)). The rationality for payment differentiation thus lies in the attempt to limit the payments to actual participation costs and reduce overcompensation which may arise under flat-rate payment schemes and endanger WTO conformity.
- In the EU, it is the national or regional administration that is responsible for the design and implementation of concrete measures. On this level, in addition to the general framework for payment calculations being exogenously set, agricultural administration often faces quasi-fixed budgets for specific policy areas, and the decision problem poses itself as a maximisation of programme benefits under budget constraints. Payment differentiation in this context is an option to increase budgetary efficiency.
- From a more general economic point of view, the comparison of different policies needs to take into account overall benefits and costs for society.[4] In applied welfare economics – the traditional economic cost-benefit analysis – the net contribution of a policy change to society's welfare is analysed, regardless of distributional effects. The performance of payment differentiation is evaluated with respect to its impact on economic efficiency.

[3] EC Reg 1698/2005, §39(4): The payments shall be granted annually and shall cover additional costs and income foregone resulting from the commitment made.

[4] This study takes the decision on the general type of policy instrument (i.e. payment for adopting certain management practices which affect provision of public goods) as given.

Table 1: Objectives for payment differentiation

Main objective	Specific objective for payment differentiation
Comply with WTO green box requirements	Reduce overcompensation
Optimise programme benefits under budget restrictions	Increase budgetary efficiency
Optimise Social Welfare	Increase economic efficiency

2.3 Literature review

In all partner countries, the literature was screened for studies on payment calculation and differentiation for rural development measures to provide an overview of the current state of discussion, and identify key open questions as well as suitable indicators for differentiation. Annex IV provides a summary of the main results of the publications identified. In the following, the outcome of the literature review is presented by giving an overview of a) the legal framework of payment levels and differentiation, b) linked phenomena like windfall profits and under-compensation, c) issues of measure suitability for payment differentiation and related parameters d) the topic of transaction costs and e) different approaches of applying payment differentiation.

a) legal framework of payment levels of agri-environmental measures in EU

Generally, the rural development measures of the EU implicitly assume that agriculture creates positive externalities, e.g. public goods. Following this assumption and according to the provider gets principle, beneficiaries of such goods have to compensate farmers for their production. According to WTO green box criteria for EU agri-environmental measures such compensation shall be limited to the extra costs or loss of income involved in complying with government programs (Schwarz et al., 2007). Thus incentive driven support measures do not obtain green box status. Instead it is allowed to consider transaction costs in determination of payment levels (Osterburg and Runge, 2006).

b) linked phenomenon like windfall profits and under-compensation

With respect to the multi-functional role of agriculture there are spatial differences in productivity and, hence, in the production costs of commodity and non-commodity outputs between farms (Lankoski, 2003). Hence, the participation in an agricultural support measure causes different levels of costs which are farm-specific. Costs might differ by overall agricultural conditions, production programs, market orientation and farm manager skills (Isermeyer and Nieberg, 1996).

However, in most of the cases, it is not possible for responsible authorities to depict such farm-specific cost levels and flat-rate premiums on average assumed costs are determined. Often flat-rate premiums are set up for large scale areas, or are adapted to budget conditions and desired area coverage of measure application. If budget conditions allow an increase and if the desired area coverage of a specific measure is not achieved, then premium levels are increased and vice versa. Consequences of those flat-rate premiums are windfall profits and under-compensation. Under-compensation may arise if farmers participate in agri-environmental programmes for moral rather pure monetary reasons, but also often occur as a consequence of the considerable uncertainty which exists with respect to the future income effects of participating in RD measures, especially if these require complex farm adjustments (e.g. organic farming).

Windfall profits are defined as positive income effects resulting in cases where participation does not require adjustments and thus no participation costs occur. In classical cost-benefit analysis or even for welfare analysis those profits are neglected. On the micro-economic valuation level windfall profits are seen negatively because financial sources are withdrawn without bringing additional environmental benefits (Isermeyer and Nieberg, 1996).

Insufficient differentiation together with the fact that farmers which would need to significantly adapt their farming practices often do not participate (high share of per-se introducer and maintainer) lead to high income and low environmental efficiencies of many agricultural support measures. In order to convince farmers with higher adaptation costs to participate, payment levels need to be increased, at least in some cases. However, an uniform payment level would increase windfall profits for per-se introducer and maintainer (Ahrens et al., 2000).

For instance in Italy it has been suggested that many farms entered the organic scheme only to receive an aid, without having to significantly their production systems as production intensity was low before (Berardini et al., 2005). As a reaction to this behaviour the Italian government cut down the economic aid for organic farmers (Povellato, 2005; Berardini et al., 2005) leading mostly to negative income effects of 'effective' organically managed farms.

Specific examples of low performance of flat-rate payments focusing on LFA and payments in Germany, Italy and Czech Republic:

Compensatory allowances are aimed to compensate natural disadvantages which cause higher production costs and lower yields in order to maintain agricultural production in less favoured areas. An interim-evaluation considering these compensatory allowances in Germany shows that for crop production farms average compensation impact of payments amount to only 9%. An equal low capacity in compensating the economic losses by LFA payments (higher costs, lower productivity, lower income) has been observed in Italy. The incidence of compensatory allowances on mean income differential equals to 2% (ERVET, 2006). Further, there seems to be an accentuated "polarization" in the income compensation capacity, e.g. the simultaneous presence of "inappropriate" compensation (premium is added to an already positive income differential) or "overcompensation" (premium is higher than the income differential) and, on the contrary, of low compensation. This judgement of overall low effectiveness of the scheme emerges also from the opinions and "perceptions" of farmers and local stakeholders (Agriconsulting, 2005). The low incisiveness of LFA payments on farm balances is put down to an excessively widespread and undifferentiated appliance (ERVET, 2006). Therefore, there is the need to further develop the differentiation or modulation of agro-environmental support in relation to the different characteristics of regional rural areas (Agriconsulting, 2005).

By investigating Natura 2000 measures in Czech Republic it was detected that most distinct differentiation by type of region (especially altitude) and production structure lead to very distinct management practices causing very different patterns of income and consequently need different payments (Prazan and Koutna, 2004).

c) issues of measure suitability for payment differentiation and related parameters

In general there seems to be an EU-wide consensus of the need to differentiate payment levels on national, regional and local agricultural conditions (Arovuori and Kola, 2005). This differentiation is assumed to be sufficient at least for measures which a) require additional operations or inputs without having major impacts on land use and production and b) landscape management with few or even without agricultural output generated from management activities. Further, measures with homogenous marginal adaptation costs throughout farms and regions do not need a differentiation (Osterburg and Runge, 2006).

However, for some authors a differentiation on national, regional and local agricultural conditions is not sufficient. Though there seems to be a quite high degree of regional differentiation in Germany (about 25 programs on federal state level which are further differentiated into hundreds of different measures) this detailed differentiation is focused on nature conservation measures, though their extend is relatively small compared to horizontal measures (Ahrens et al., 2000).

Looking for instance at Germany at one federal state and one production system and at the same point in time of participation, then this prevailing principle of payment differentiation leads to equal payment levels though different adaptation costs might occur (Ahrens et al., 2000). It is assumed that efficiencies of flat-rate premiums can be improved if total number of potential participating farms can be differentiated into sub groups according to their marginal costs. However farm specific marginal costs are hardly assessable. So there is the need to find farm specific characteristics which can be proofed with quite small administrative effort and which are strongly correlated with farm-specific marginal costs (Isermeyer and Nieberg, 1996).

d) considering transaction costs

Though they might be very important, policy related transaction costs are often not taken into account while evaluating different policies. In general there are trade-offs between the precision of the policy instruments and their information requirements and related administrative costs (Lankoski, 2003). Payments which are locally specific increase transaction costs (on public site) and cause possibly high data requirements (Prazan and Koutna, 2004; Arovuori and Kola, 2005). For instance a regional differentiation of payments forces regional specific data, however an Italian study related to our research topic shows, that in some regions the information was sufficient for accurate elaborations (INEA, 1999).

Though a differentiation among specific farm characteristics can be justified if a strong correlation between marginal farm costs and this characteristic exists even administrative and control costs need to be considered for the degree of differentiation. Being more precise differentiations with relative low administrative efforts might be a) differentiations with respect to the time since adoption of the measure b) differentiations in terms of specific crops or animal species c) differentiations for arable land according to quality of sites d) differentiations for grassland according to stocking rates of ruminants (Nieberg and Strohm-Lömpcke, 2002; Osterburg and Runge, 2006). Additional impacting factors on the downward-pressures of administration costs might be the numbers of agreements made (existence of size economics) and the scheme experience (Falconer et al., 2001).

Generally, the extent of administrative costs of policies depend on a) asset specificity (the higher the asset specificity the higher PRTCs), b) frequency of contracting (the higher contracting frequency the higher is the trust and the low are PRTCs) (the more agents can be treated similarly the lower are PRTCs) and c) point of policy application (is the policy applied to a commodity (and not a public good) then PRTCs are assumed to be low). This leads to the conclusion that PRTCs increase as the schemes become more targeted or precise (Rorstad et al., 2007).

e) different approaches for payment differentiation

Finish literature on auction system performance showed that auction with cost savings outperforms other policies. However, when environmental benefits are not jointly produced by a practice, farmer participation is much more sensitive to how objectives and cost savings are weighted, leading to unwanted swings in participation (Cattaneo et al., 2007). Further, incentive payment programs, which tacitly capitalize on landowners' private knowledge about

the opportunity costs of conservation, may be considerably more cost-effective than traditional top-down regulatory programs (Siikamäki and Layton, 2006).

Latacz-Lohmann and Van der Hamsvoort (1997) found out that competitive bidding compared to flat-rate payments increase the budgetary cost effectiveness of conservation contracting significantly. However, strategic bidding behaviour, which may adversely affect the performance of sequential auctions, is difficult to address by means of auction design. Further, farm specific contracting systems have most probably only scarce impact on windfall profit reductions due to additional costs which occur for implementing those systems. Strategic bidding behaviour emerges if tender frameworks are small (leading to small participating member cycles) and farmers might assess the bid cap and will not orientate their individual bidding limit on farm-specific marginal costs (Latacz-Lohmann and Van der Hamsvoort, 1997). On the other hand, Garforth (2001) concluded that by comparing challenge funding with a fixed-rate payment (a so-called location premium) a flat-rate grant brings in less land but at a lower cost or that a flat rate grant would have brought in the same area of land at lower costs.

However, the performance of such systems remains questionable. While cost effectiveness might increase the issue of strategic bidding behaviour and scarce impact on windfall profit reductions remain and lead to different evaluations of performances in literature.

3 Data and Methodology

3.1 Evaluation Framework

Depending on the objective for payment differentiation, different sets of indicators suited for the comparison of different policies need to be identified. A key problem for the evaluation is that the performance of payment differentiation cannot be evaluated exclusively with regard to one of the three objectives identified above: Independent of the specific motivation for payment differentiation, in all cases the payments are made to pursue a rural development objective, e.g. an environmental benefit, and an comparison of the effect of a policy change needs to take into account the impact on both aims, e.g. reduction of overcompensation and provision of environmental public goods. If, for example, a differentiated payment reduces social costs as well as societal benefits, the corresponding objectives need to be weighted, or, as is often the case in economic analysis, the societal benefits of farmers' program participation need to be valued in monetary terms, which is notoriously difficult. As a solution, this study compares policies which are assumed to achieve the same result (i.e. same outcome with respect to the rural development objective of the specific measure analysed).

In the following section, firstly individual indicators for each objective will be presented, before moving on to the discussion of a common framework which allows to take into account several objectives at the same time.

3.1.1 Reduction of overcompensation

In the context of rural development measures, overcompensation refers to situations in which some producers receive higher transfers than necessary to cover their costs of participation. The term 'overcompensation' is pejorative and in public discussion often seems to imply that 'farmers get too much money'; other terms exist (Figure 2) which describe the same phenomenon but have a very different connotation: In farm economics, the part of payments exceeding costs is part of the profit, or farmers income, and seen as the remuneration of the farmers' resources for the provision of a public good. This point of view is quite similar to the understanding of the more neutral term of 'producer surplus' used in welfare economics. The OECD (2007a) uses the term 'unintended transfers', which also has a negative connotation, but, in contrast to the term overcompensation, seems to put the blame more strongly on policy makers for not using public funds efficiently.

The costs of participation are the farmers' net costs (i.e. balance of revenue and costs changes) from implementing the measures, and have in the literature also been termed 'compliance costs' (Figure 2). The OECD (2007a) in this context uses the term 'intended transfers', which is identical to the costs of participation under a first best policy.

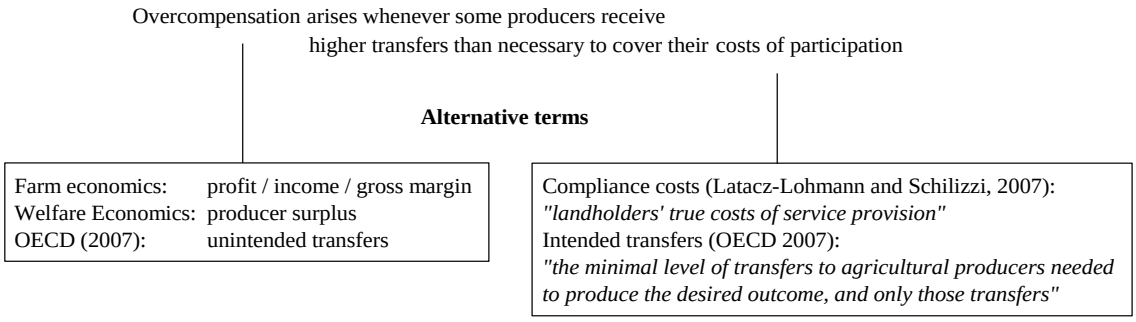

Figure 2: Terminology

Indicators commonly used to measure the performance of a policy in this context are the overcompensation rate (e.g. Latacz-Lohmann and Schilizzi, 2007) and the targeting rate (OECD, 2007a):

$$\text{Overcompensation rate} = \frac{\text{Total transfers}}{\text{Compliance Costs}}$$

$$\text{Targeting rate} = \frac{\text{Intended transfers}}{\text{Total transfers}}$$

3.1.2 Increase of budgetary efficiency

In the case of the rural development measures, the most visible, though not necessarily main, part of the budget is resulting from the payments made to participating farmers. However, economic analyses increasingly raise the issue of transaction costs arising from implementation of policies (e.g. ITAES; OECD 2007a). This aspect is of specific relevance also for this study, as differentiated payments may in many cases entail increased administrative efforts, the costs of which should also be reflected in budgetary considerations.[5]

Budget is thus defined as the sum of transfers and administrative costs

budget = transfers + administrative costs

Whereas budgetary efficiency generally is defined as budget expenditure in relation to achieved results (e.g. Euro spent per kg N abated), in our case, as we compare polices with the same result (see above), the indicator reduces to

$$\text{budgetary efficiency}_{\text{policy B}} = \frac{\text{budget}_{\text{policy B}}}{\text{budget}_{\text{policyA}}}$$

with policy A being our reference policy, i.e. the undifferentiated flat-rate payment.

3.1.3 Increase of economic cost-effectiveness

For the analysis of the impact of differentiated approaches for determining payment levels of rural development measures on welfare, the following components of welfare changes are taken into account in this study:

- deadweight losses (welfare triangles): this study focuses on deadweight losses on the production side, as we assume that the changes to payment levels of the rural development measures do not have any impacts on prices
- policy-related transaction costs (PRTCs): the costs of setting-up, maintaining, changing and implementing policies (e.g. information gathering, planning, monitoring) for the administration as well as for the farmers (OECD, 2007a)
- external effects: this study assumes that external effects are limited to the intended provision of societal benefits from farmers' programme participation

Deadweight losses and PRTCs are part of the resource costs to society (OECD, 2007a). Whereas economic cost-effectiveness generally is defined as resource costs in relation to achieved results (e.g. resource costs per kg N abated), in our case, as we compare polices with the same result (see above), the indicator reduces to

[5] In practice, faced with continuous slashing of administrative resources, administrations seem to weigh an increase in administrative costs much higher than a corresponding increase of overall budgetary efficiency.

$$\text{economic cost-effectiveness}_{\text{policy B}} = \frac{\text{resource costs}_{\text{policy B}}}{\text{resource costs}_{\text{policy A}}}$$

The OECD collected in a report on implementation costs of agricultural policies information of different sources about policy related transaction costs. Little information on administration costs of agri-environmental measures exists, and the empirical studies highlight a large variation between measures and regions (OECD, 2007a). No studies were available which specifically identified the additional costs of differentiating payment levels. For the case-studies, all approaches were compared assuming that PRTCs to amount to 3 % of total transfers[6]. Additionally, break-even points, i.e. those levels of administration cost above which differentiation becomes unfavourable level, were calculated.

3.1.4 The OECD framework for evaluating implementation costs of agricultural policies

The performance and relative ranking of differentiated policies is likely to differ depending on the objective pursued. Simultaneously taking into account the different views raises the usual problems faced in applied multi-objective decision making, e.g. questions of acceptability of trade-offs or appropriate weighting. The OECD in its work on implementation costs of agricultural policies (OECD, 2007a) has focused on the two objectives of minimizing resource costs and limiting unintended transfers. In the graphical representation of the problem (Figure 3), resource costs are represented on the X-Axis and unintended transfers on the Y-Axis. Whereas some policies can be unambiguously identified as either inferior (Policy B) or superior (Policy A), we cannot say whether any policy falling in the grey areas is inferior or superior to the reference policy (Policy O). When the choice is indeterminate, policy makers might want to weigh the two types of costs. The OECD suggests, in the absence of any plausible alternative, to assume that a dollar of welfare gain is equivalent to a dollar of transfer, whoever is affected. This would split the diagram along the dotted line, with policies located below the line being evaluated as 'superior' to the reference policy. Interestingly, for our case of payments made for the provision of public goods, and under the assumption that PRTCs arise for the administration only (and are zero for farmers), applying identical weights to the objectives of economic cost-effectiveness and reduction of unintended transfers results in the same ranking of polices as does evaluating by budgetary efficiency.

[6] This assumption is more or less arbitrary but was made to provide a fixed point for comparison. It reflects the assumptions on the level of PRTCs of untargeted (coupled or decoupled) payments made by the OECD for its illustrative calculations on implementations costs of different policies (OECD 2007, Box 2.4, p. 57).

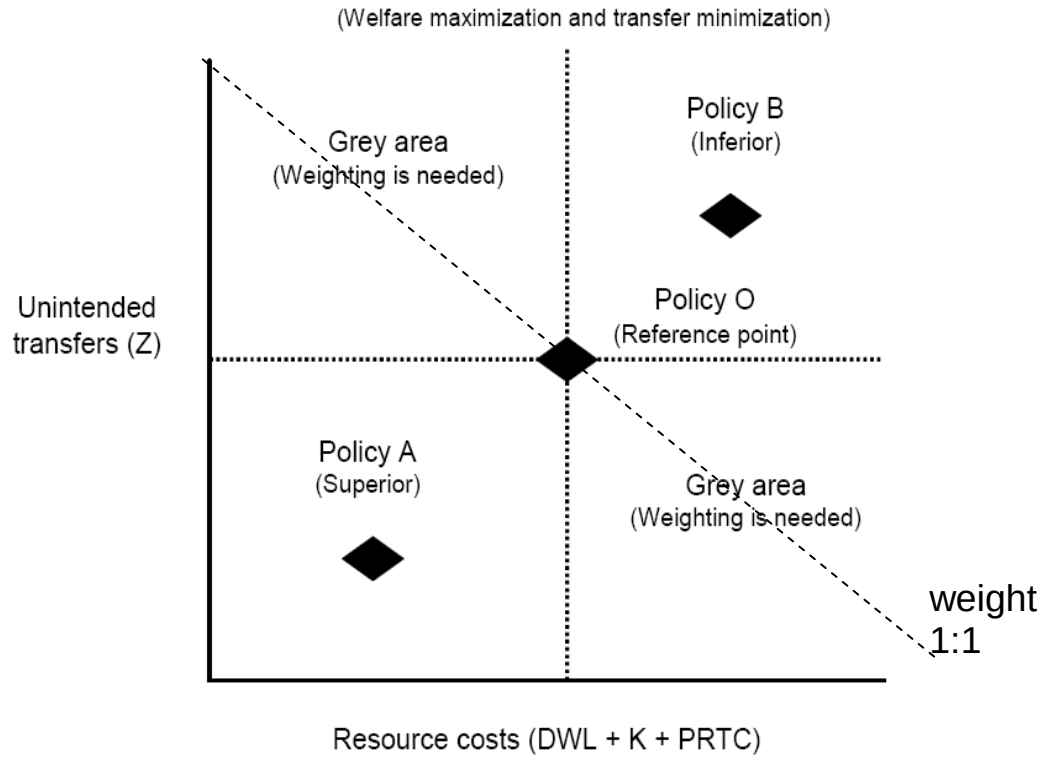

Figure 3: Graphical illustration of the impact of resource costs and unintended transfers for policy evaluation

Source: Modified, based on OECD (2007a), Annex I.3

With respect to the design of payments for rural development measures, there is scope to argue that the objective of limiting unintended transfers has a high political relevance, as failure to do so might infringe WTO requirements and may endanger the provision of these measures in the longer run. The degree of attention paid to aspects of payment calculation in the EU framework regulation for rural development programmes is evident to this hypothesis. Therefore, a sensitivity analysis has been carried out for the empirical examples to identify the effect of a higher weighting of the objective of limiting unintended transfers.

3.2 Measures analysed

This case study is building on earlier work of the EU research project *AGRIGRID*. On the basis of a literature review and expert interviews in ministries and related institutions, all project partners generated a fairly detailed summary report on actual methods of payment calculations encompassing selected rural development measures (Hrabalova et al., 2007). On the basis of this report, several stylised examples are developed, reflecting selected voluntary rural development measures.

The majority of measures are offered region-wide, particularly those measures which are focused on agricultural production processes, while measures focussing on nature protection are often targeted to specific designated areas. We can differentiate between

- measures which affect the whole farm (e.g. organic farming, environmentally sound application of farm manure)

- measures which affect single enterprises (e.g. extensification of total pasture and meadow area, renunciation of herbicides on arable land, crop rotation diversity, conservation/buffer strips on arable land), and
- measures which target specific production activities (e.g. mulch/direct drilling, biological plant protection in fruit growing, cropping with underseeds in vineyards).

In addition, for our analysis it is helpful to distinguish between measures which

- do not (or only to a small extent) affect yields or revenues, and for which compliance costs result mainly from additional machinery, labour and/or seed costs (e.g. environmentally sound application of farm manure, soil analyses, cropping of intercrops). Generally, variances of compliance costs are comparatively small between participating farms for these measures.
- do affect yields or revenues, and for which compliance costs are to a large extent determined by a change in yields resulting from programme participation (e.g. conservation/buffer strips on arable land, conversion of arable land to extensively used permanent grassland, restrictions on agro-chemical inputs). For these measures, compliance costs largely depend on yield levels realised before participation.

Since variances in revenues are generally larger than variances in costs incurred by participation, this investigation focuses on variances in revenues. For the quantitative analysis, we developed stylised examples which reflect key characteristics of many existing measures influencing the potential and performance of differentiated payment schemes. Regarding the impact of agri-environmental measures on revenues, the stylised examples distinguish three cases:

- For measures targeting specific production activities, many of the payment calculations assume a reduction of revenues as a consequence of participation. Generally, in the calculation of agri-environmental payments affecting crop production this reduction is assumed to depend on yield levels (Hrabalova et. al, 2007), which implies that compliance costs will strongly vary depending on the yield level realised before participation.
- For agri-environmental measures affecting all arable land (e.g. renunciation of synthetic fertilisers and plant protection products; flower strips on arable land), often payment calculations are based on the Standard Gross Margin (SGM) of an average crop rotation. We therefore analysed the impact of differences in the SGM of farm individual crop rotations.
- For agri-environmental measures affecting grassland (‘conversion of arable land into grassland’) the calculations are based on the approach chosen for Scottish measure ‘species rich grassland’, and payment levels are derived from SGMs of different cattle categories (e.g. suckler cows, dairy cows and replacement heifers).

We have selected wheat respectively barley and potato yields as indicators of the level of participation costs for measures focussing on arable extensification. Wheat is one of the most important cereals in Germany, the Czech Republic and Italy. In Scotland barley represents the most important cereal. As an addition to wheat yields, we have chosen potato yields for Germany, because this is an example for a crop with high yield differences between farms.

Generally, yields cannot be observed on a farm individual level at reasonable administrative costs. Crop rotational information might be more readily available from the Integrated Administrative Control System (IACS). However, payment levels need to be calculated on a

historical (i.e. pre-participation) basis, which would be difficult for farms which already participated in agri-environmental schemes in the past.[7] The challenge thus lies in approximating these indicators using available data from regional statistics or observable, time-invariant farm characteristics.

A crucial point for the analysis is the identification of the link between (ecological) benefits and participation costs. Outcome-based measures are almost non-existent in agri-environmental programmes in the EU, and action-related measures predominate. Depending on the specific measure, benefits per unit of land enrolled in the programme may more or less depend on individual farm characteristics. Very few studies exist which provide quantitative information on the benefits or ecological effectiveness of rural development measures depending on farm characteristics. Benefits will almost always depend on environmental states of the individual farms as well as of the total region before the implementation of agri-environmental programmes, and targeting is essential. For this study, we assume that measures are targeted and focus on the issue of tailoring.[8] In the simplest case, each unit of land brought into the programme provides the same societal benefit. This relationship is also implied by the flat-rate per-ha payments of EU agri-environmental measures, and could be a plausible assumption for measures aiming to provide landscape elements like flower strips in a homogenous region. However, often, benefits may increase with the production intensity of participating farms and thus in many cases with participation costs[9], e.g. for measures aiming to reduce nitrate leaching.

Therefore, in this study all analyses have been carried out for two different assumptions on the link between (ecological) benefits and farm characteristics:

- E1: Each unit of land brought into the programme provides the same benefit (reflecting, e.g., the impact of agri-environmental measures like flower strips in a homogenous landscape)
- E2: Benefits of programme participation are linearly linked to the level of participation costs (reflecting, e.g., the impact of agri-environmental measures requiring a reduction of production intensity, as effects on nutrient balances or biodiversity will depend on production intensity before participation).

For the reference, i.e. the simple standard cost approach, payment levels are determined based on average values for all sample farms within an 'administrative region'. The definition of the 'administrative regions' is country-specific and has been chosen to reflect the typical administrative level on which rural development programs are usually designed and implemented. Therefore, in Germany references have been calculated on NUTS I level (*Bundesländer*), in Italy on NUTS II level (*regioni*), in Czech Republic and Scotland at national level (though the Scottish Executive has introduced rural priorities for 11 regions). Resulting reference payment levels thus provide a financial incentive for approximately 50% of the eligible area. Analysed differentiated standard cost approaches comprise

[7] In addition, this could induce an incentive to 'distort' rotations if farms plan to enter new measures.

[8] The OECD (2007b) distinguishes 'targeted policies', which aim at specific outcomes, populations or areas, and 'tailored policies' which provides transfers no greater than necessary. For this study, we assume measures are targeted and focus on the issue of tailoring.

[9] Though there may be cases where (initial) contribution may be higher for participation of extensive farms, e.g. for measures aiming at increased biodiversity as some rare species are exclusively connected to extensive land.

A) payment levels determined on lower administrative or geographical levels, i.e. the payment levels equal (assumed) average participation costs within smaller regions (Table 2):

- Germany is consisting of 16 NUTS I regions, and for this report, case-studies were carried out for three different federal states (Bavaria, North Rhine-Westphalia and Lower Saxony) to represent the geographically diversity of Germany. Regional differentiation was applied at NUTS II and NUTS III level.
- The Czech Republic has no further differentiation on NUTS I level. Regionally differentiated payments were calculated for its 8 NUTS II regions and 14 NUTS III regions. Further, a regional differentiation by production area was applied. The production area code divides the whole republic into 5 areas according to their most prominent cultivated crops. Recently, this system has been modified by uniting class 1 and 2 as well as class 4 and 5 to take account changes in production systems and climate.
- The calculations for Italy focused on three NUTS II regions (Veneto, Sicilia and Lazio), and regionally differentiated payments refer to NUTS III level.
- For the Scottish case study, Scotland was broken down into 12 main agricultural areas to accommodate the relatively small number of farms which were available in the sample over several years and to reflect the already available regional differentiation used by the Scottish Executive.

B) payment levels determined on the allocation of farms to certain groups. Farms are categorised according to observable characteristics assumed to influence participation costs.

- For Italy, farms were categorised according to altitude class (mountain areas, hilly areas and plain areas).
- The Scottish farms were categorised according to altitude class, farm type and farm size class.

C) payment levels determined on individual farm level. For a farm individual differentiation, an indicator is needed which serves as a proxy for costs of participation and is easily accessible (i.e. observable at low costs).

- For Germany an example for such an indicator is the LVZ (*landwirtschaftliche Vergleichszahl 'agricultural comparison figure'*), which relates to yield potentials based on soil indices with some corrections for location and climate. The LVZ is easily available for each farm as it is the basis of the agricultural tax system, and it is an accepted indicator for payment differentiation and has in the past already been used in some regions as basis for differentiation of less favoured area payments. As an indicator for the farm level differentiation in respect to grassland extensification the average stocking rates of all cattle categories on a farm have been used.
- For the Czech Republic several indicators were tested, namely soil indicators, altitude levels and farm sizes. The soil quality indicator originates from another data basis and is generally determined on NUTS 4 level. A single weighted soil indicator per farm was calculated, taking into account the individual farm's shares of arable land in specific NUTS 4 regions, and weighting the soil quality index of the corresponding regions with these shares. Nevertheless, it needs to be noted that this soil index has been calculated for the first time, so there are no experiences on suitability, usefulness and stability. A similar approach has been applied for farm specific altitude levels.

- For Italy and Scotland, no promising farm individual indicators for participation costs could be identified.

The stylised examples assume that the hypothetical measures offered require farmers to comply with the specified obligations on one hectare of their land. For the German case-studies, depending on the type of measure, participation costs depend on the revenues of one ha of wheat production, one hectare of potato production, one hectare of arable land which is part of a typical crop rotation (all crops considered are substituted according to their corresponding ratio within the crop rotation), or one hectare of grassland usage depending on stocking rates. Calculations for the other countries focused on wheat (Italy, Czech Republic) respectively barley (Scotland) production.

3.3 Data

Table 2 gives an overview of the sample data, with details about the regional differentiation and the data availability. For this study, information was available from national farm accountancy data networks and supplementary data bases in Germany, Italy, Scotland and the Czech Republic.

Table 2: Sample data and detail of differentiation

Country	NUTS I regions	NUTS II regions	NUTS III regions	DATA availablility	Revenue depending on	Number of farms
Germany[1)]	North Rhine-Westphalia	5	34	2001 - 2005	wheat yield	512
					potato yield	75
					SGM of crop rotation	773
					SGM of grassland	332
	Lower Saxony	4	28	2001 - 2005	wheat yield	472
					potato yield	209
					SGM of crop rotation	1,080
					SGM of grassland	543
	Bavaria	7	66	2001 - 2005	wheat yield	934
					potato yield	254
					SGM of crop rotation	1,475
					SGM of grassland	1,006
Czech Republic[2)]		8	14	2004 - 2006	wheat yield	193
Italy[3)]	Nord-Est	Veneto	7	2003 - 2006	wheat yield	95
	Centro	Lazio	5	2003 - 2006	wheat yield	56
	Isole	Sicilia	8	2003 - 2006	wheat yield	123
Scotland[4)]			12[5)]	1998 - 2002	barley yield	175

1) Germany consists of 16 NUTS I regions 39 NUTS II regions and 429 NUTS III regions.
2) Czech Republic consists of 1 NUTS I region, 8 NUTS II regions and 14 NUTS III regions.
3) Italy consists of 5 NUTS I regions, 21 NUTS II regions and 107 NUTS III regions.
4) Scotland consists of 1 NUTS I region, 4 NUTS II regions, 21 NUTS III regions
5) For the Scottish case study we have been using a differentiation according to 12 main production areas.

To avoid yearly fluctuations of variables to distort results, the analyses are based on two- to five-year averages depending on the sample sizes in the individual countries. Farms which

already participate in rural development measures similar to the stylised ones examined need to be excluded, as corresponding variables (e.g., yields) will be affected. A key problem faced in this respect is that with the exception of organic farming, there is no code in the data bases used which allowed identifying participation in specific agricultural support measures. However, as during the study period participation rates in agri-environmental measure on arable land were low in the case-study regions, only organic and in-conversion farms were excluded from the samples and we operated on the assumption that remaining farms are non-participants in other agri-environmental measures for arable land.

Country-details with respect to data availability and characteristics are described in the following paragraphs. A first evaluation of the variables to be used for payment differentiation has been carried out, highlighting differences between average regional yields and the correlation between differentiating variables and farm specific participation costs. For nominal variables, the Pearson's correlation coefficient (rp) was calculated, while for ordinal variables, the Spearman correlation coefficient (rs) was used.

Germany

The German FADN covers approximately 11 000 farm accounts. The sample is an unbalanced, rotating panel, and on average 8 % of the sample farms are replaced each year. For this analysis, data refers to the years 2001-2005, and only farms present in the sample in all five years have been included. A first evaluation of the variables to be used for payment differentiation shows that:

- While there are differences in regional average yields, yield variances within the sub-regions remain large. As an example, Figure 4 illustrates the distribution of wheat yields of the sample farms in Bavaria. The correlation coefficients between yields or SGM of crop rotation and the soil-climate indicator for yield potential (LVZ) run from rp = 0.2 (potato yields in North Rhine-Westphalia) to rp = 0.6 (wheat yields in Lower Saxony). Reasons for the comparatively low correlation coefficients are seen in the fact that the LVZ is based on estimations from the 1930s, and while soil qualities may be assumed to be rather constant, technical progress, new crop variants and possibly climate change seem to have reduced correlation of LVZ and yields. In addition, yield levels are influenced by farm manager abilities and economic considerations (maximum yield generally is not equal to optimum yield), which reduces the correlation between yields and LVZ.
- The other indicator chosen, the overall stocking rate of a farm, seems to be more appropriate and correlation between the overall stocking rate and participation costs (SGM of grassland) varies around rp = 0.9. For the analysis, farms with average stocking rates below 0.3 LSU per ha were excluded, as we assume targeted measures which exclude farms with pure windfall profits. A key problem with using the actual stocking rate as an indicator for participation costs is that this indicator is not fixed but can be influenced by the farmer (e.g., to artificially increase stocking rates before participation of the program to obtain higher payments). Further, it can be assumed that the reliable determination of the stocking rates potentially causes high administrative costs due to the variability of stock numbers in the course of a year.

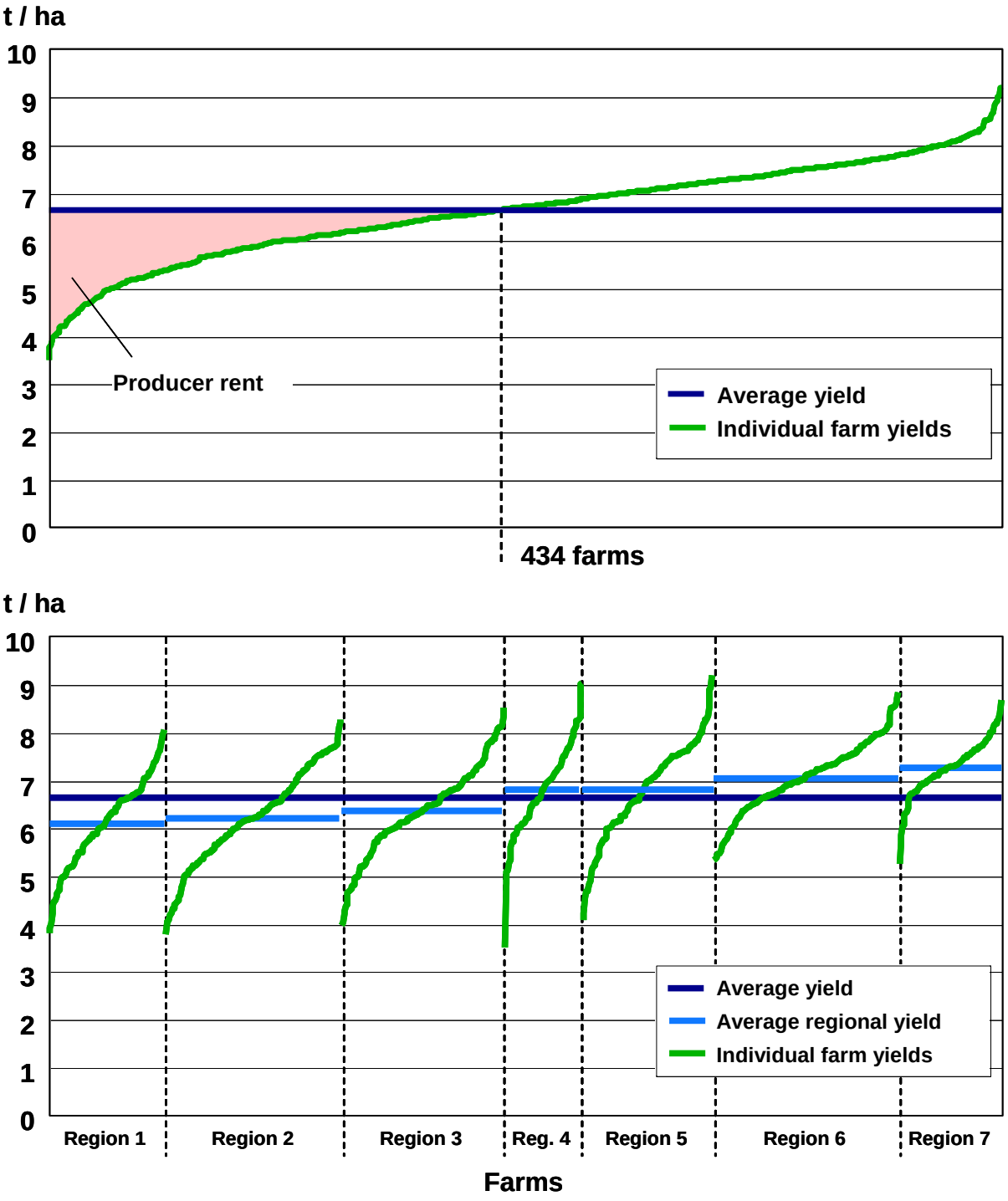

Figure 4: Distribution of wheat yields (average 2001-2005) in sample farms in Bavaria

Czech Republic

For the Czech Republic an additional data collection system which is based on the FADN survey is used. The evidence covers farms also registered in the FADN survey but not necessarily and counts approximately 300 farms with a significant coverage of the agricultural land. In the present design data is collected since 1995, and for our calculations it refers to the years 2004 – 2006. The Czech Republic hardly implemented any agri-environmental measures for extensification affecting cropping on arable land with exception of organic

farming. Other agri-environmental measures applied on arable land (i.e. growing catch crops, growing bio-belts or conversion of arable land into grassland) represent rather a change of land use than direct impact on production (crop yields). Only farms present in the sample in the year 2005 as well as in the year 2006 have been included in the calculations. A first evaluation of the variables to be used for payment differentiation shows that:

- Differences in regional average yields are moderate and run from 3.6 to 5.7 tonnes per ha. However, variances within sub-regions are approximately of the same interval (3.4 – 6.9 biggest interval).
- Correlations between yields and production area codes, modified production area codes, soil indicators, altitude indicators and farm sizes vary between rp= 0.20 (farm size) and rp = 0.57 (soil indicator) (see Table 3). This already indicates the limited scope of most of the tested indicators to reflect farm specific participation costs.

Italy

The Italian evidence is the *FADN Mini Data Bank.* It covers more than 14000 farms in total and between 615 and 1283 farms in the corresponding considered regions (see Table 3). The FADN survey has been set up in 1965, but the present structure of the database has started in 2003. For our calculations data refers to the years 2003 – 2006 and only farms present in the sample in all years have been considered. In all regions analysed, there are three measures dealing with arable extensification: organic farming, integrated farming and extensification. Organic farms were excluded from the analysis. For the other measures, participation rates were marginal except in Lazio sample (Annex II). A first evaluation of the variables to be used for payment differentiation shows that:

- There are significant differences in regional average yields between NUTS II and NUTS III regions. NUTS II regions average yields run from 2.83 tonnes per ha (in Sicilia) over 4.01 tonnes per ha (in Lazio) to 6.33 tonnes per ha (in Veneto). The highest difference between highest and lowest yields within one NUTS III region for Lazio is 2.3 – 7.7 tones per ha, for Veneto 4.8 – 8.0 tonnes per ha and for Sicilia 1.6 – 6.0 tonnes per ha.
- Correlation coefficients between yields of wheat and the altitude class vary between rs = -0.03 (Sicilia) to rs = -0.14 (Veneto) (see Table 3), which indicates that the altitude index of a farm is a poor indicator of farm specific costs.

Scotland

For the Scottish case the evidence covers 378 farms with barley production from the Farm Account Survey (FAS). For our calculation data refers to the years 1998 – 2002 and only farms present in the sample in each of the corresponding years have been considered. Less than 10% of the farms in the survey are organic ones, however unfortunately it was not possible to identify and exclude the organic farms for this study. A first evaluation of the variables to be used for payment differentiation shows that:

- With 4.0 – 5.5 tonnes per ha differences in regional average yields (according to main production areas) are small. The highest difference of yields between farms within one of the 12 main agricultural areas is 3.7 – 7.3 tonnes per ha.
- The correlation between yields of barley and farm types, altitude classes and farm size classes ranges from rs = 0.05 (altitude class) to rs = 0.25 (farm size class) (see Table 3). This confirms the observations from the Italian case study that the altitude class of a farm is a poor indicator of farm specific costs.

Table 3: Correlation coefficients

Country	Regions	Revenue depending on	Farm specific yield indicator	Correlation coefficient	Level	Goodness of fit	Number of farms
Germany	Bavaria	wheat yield	Farm level soilindex (LVZ)	rp	0.4690	0.2200	934
		potato yield	Farm level soilindex (LVZ)	rp	0.3510	0.1230	254
		SGM of crop rotation	Farm level soilindex (LVZ)	rp	0.3660	0.1340	1,475
		SGM of grassland	Farm level stocking rate	rp	0.9730	0.9480	1,006
	Lower Saxony	wheat yield	Farm level soilindex (LVZ)	rp	0.5980	0.3570	472
		potato yield	Farm level soilindex (LVZ)	rp	0.2310	0.0530	209
		SGM of crop rotation	Farm level soilindex (LVZ)	rp	0.2730	0.0740	1,080
		SGM of grassland	Farm level stocking rate	rp	0.9000	0.8110	543
	North Rhine-Westphalia	wheat yield	Farm level soilindex (LVZ)	rp	0.1630	0.0270	512
		potato yield	Farm level soilindex (LVZ)	rp	0.2010	0.0400	75
		SGM of crop rotation	Farm level soilindex (LVZ)	rp	0.4950	0.2450	773
		SGM of grassland	Farm level stocking rate	rp	0.9380	0.8800	332
Czech Republic		wheat yield	Production area codes	rs	-0.3608	0.1302	193
			Modified production area codes	rs	-0.3819	0.1458	193
			Farm level altitude	rp	-0.4152	0.1724	193
			Farm level soilindex	rp	0.5744	0.3299	193
			Farm level farm size	rp	0.1967	0.0387	193
Italy	Veneto	wheat yield	Altitude class	rs	-0.1441	0.0208	95
	Lazio	wheat yield	Altitude class	rs	0.1204	0.0145	56
	Sicilia	wheat yield	Altitude class	rs	-0.0268	0.0007	123
Scotland		barley yield	Altitude class	rs	0.0493	0.0024	175
			Farm types	rs	-0.2113	0.0446	175
			Farm size class	rs	0.2479	0.0615	175

SGM = Standard Gross Margin
rs = Spearman correlation coefficient
rp = Pearson's correlation coefficient

The descriptive analysis of the empirical data already indicates that the examined regional and the farm individual approaches for payment differentiation may be limited in their scope to improve on the simple standard cost approach. Though there are differences between regional average yields, the extent of these differences is often smaller than the remaining yield variances within the sub-regions. The correlation coefficients between yields or SGM of crop rotation and the corresponding chosen farm-specific cost indicators have been, apart from some exceptions, comparatively low.

Sensitivity analysis has been applied to detect how data availability influences calculation results. Specifically for the case-studies in Scotland and Italy several calculations referenced to different time periods. For Scotland, calculations varied from a 2 to 5 year time horizon and for Italy from a 2 to 4 year time horizon. As specifically for the 2 and 3-year time horizons different years could have been encompassed, the focus was on those years delivering the biggest possible sample sizes. In the case of the Czech Republic there has been the need to concentrate on 2-year averages due to smaller sample sizes.

4 Results from FADN-based analyses

In the following sections, the performance of payment differentiation is presented with a view to the single objectives identified in chapter 3.1 for each country-case-study. Subsequently, trade-offs between the reduction of unintended transfers and economic cost-effectiveness are illustrated by applying the framework of the OECD, highlighting the impact of assigning different weights to the objectives as wells as of different levels of administration costs. In Chapter 4.3, the outcome of sensitivity analyses with respect to the level of PRTCs and the availability of data is reported.

4.1 Impact of differentiated payment levels on overcompensation, budget and economic efficiency

Based on the results (Annex I, Table 12) the following tendencies can be formulated with respect to the performances of differentiated payments of our different example countries.

Germany

- The rate of overcompensation is reduced in almost all cases. For the stylised agri-environmental measures on arable land, exceptions occur in some instances for the farm individual differentiation, which is a consequence of the comparatively low correlation of the proxy used for participation costs and true yield levels. Generally, the extent of the reduction of overcompensation is often limited also for the regional differentiation, as the variances of participation costs are high even within small regions. The best performances are observed for the differentiation of payments on NUTS III level, with reductions of the overcompensation rate by up to 11% (17%) in the case of measures targeting potato growing (grassland extensification) in North Rhine-Westphalia and measures targeting the complete crop rotation in Lower Saxony.
- If additional administrative costs of differentiated approaches are negligible, budgetary expenditures can be reduced in the majority of cases, particularly if ecological benefits rise with participation costs. An exception is the stylised agri-environmental grassland measure, where in more than half of cases budgetary cost effectiveness is reduced, especially if ecological benefits are assumed to be constant per ha of land contracted.
- Resource costs increase, especially if ecological benefits do not depend on production intensities before participation. In many cases, differentiation on NUTS III level significantly reduces economic cost-efficiency.
- In case differentiation causes additional PRTCs, performance is significantly reduced. Budgetary effectiveness is improved by differentiation of payments in 19 cases if assumed additional PRTCs amount to at least 3% of transfers. Almost three quarters of these cases can be attributed to the stylised agri-environmental grassland and crop rotation measure.

Italy

- The rate of overcompensation is reduced in half of considered cases. A higher share can be reduced if a regional differentiation is applied. As a consequence of the relatively low correlation of the proxy used for participation costs and true yield levels a differentiation on altitude classes is performing better than flat rate payments in only one third of considered cases (Lazio). Generally, the extent of the reduction of overcompensation is very limited (max. 2.4 % in Sicilia if ecological benefits do depend on production intensities before participation) also for the regional differentiation, as the variances of participation costs are high even within small regions.

- Even if additional administrative costs of differentiated approaches are negligible, budgetary expenditures can be reduced in less than half of cases. Budgetary effectiveness is more likely to be improved if ecological benefits rise with participation costs.
- Resource costs increase, especially if ecological benefits are assumed to be constant per ha of land contracted. The extent of reducing economic cost effectiveness varies between 0 to 2.9 % and is more obvious for regional differentiation on NUTS III level.
- In case differentiation causes additional PRTCs, performance is significantly reduced. Budgetary effectiveness is improved by differentiation of payments in none of the considered cases if assumed additional PRTCs amount to at least 3% of transfers.

Czech Republic

- The rate of overcompensation is reduced in all cases, however, generally, the extent of the reduction is rather limited (max. 1.9 % for a regional differentiation on NUTS III level).
- If additional administrative costs of differentiated approaches are negligible, budgetary expenditures can be reduced in the majority of cases, particularly if ecological benefits rise with participation costs.
- Resource costs increase, especially if ecological benefits are assumed to be constant per ha of land contracted. The most significant reduction in economic cost-efficiency can be observed for a differentiation on NUTS III level if ecological benefits are assumed to be constant.
- In case differentiation causes additional PRTCs, performance is significantly reduced. Budgetary effectiveness is improved by differentiation of payments in none of the considered cases if assumed additional PRTCs amount to at least 3% of transfers.

Scotland

- The rate of overcompensation is reduced for payment differentiations by main agricultural production area, farms size and partly farm type. Generally, the extent of the reduction of overcompensation is very limited (max. 1.0 % for a differentiation according to farm size classes if ecological benefits do not depend on production intensities before participation).
- If additional administrative costs of differentiated approaches are negligible, budgetary expenditures can be reduced by payment differentiations in only three cases. For a differentiation according to altitude classes, budgetary expenditures are similar to those under a flat-rate payment scheme.
- Though, resource costs slightly increase, especially if ecological benefits are assumed to be constant per ha of land contracted, this increase remains under the 1% level. The most significant reduction in economic cost-efficiency can be observed for a differentiation according to farm size classes.
- In case differentiation causes additional PRTCs, performance is significantly reduced. Budgetary effectiveness would not be improved by differentiation of payments in any of the considered cases if the assumed additional PRTCs amount to at least 3% of transfers.

The effectiveness of differentiated payments to reduce overcompensation and increase budgetary effectiveness differs between countries. Generally, the differentiated approaches perform better for the German and Czech case-studies than for the Italian and Scottish ones. If additional PRTCs amount to 3% of transfers, only in the German case-study budgetary effectiveness was improved in at least some of analysed examples. This highlights the importance that the implementation and design of differentiated payment schemes needs to be carried out on a country by country and even on a case by case basis.

4.2 Performance of differentiated payment levels with a view to unintended transfers and economic cost-effectiveness

The following section investigates the performance of differentiated payments with a view to resource costs and unintended transfers, using the graphical illustration of the OECD framework to highlight the trade-off between the two objectives.

Germany

Figure 5 provides an overview of the performance of differentiated payments in relation to flat-rate payments for the stylised agri-environmental measure for wheat areas in Lower Saxony (excluding additional PRTCs).

- For this example, all of the variants for payment differentiation reduce unintended transfers at higher resource costs, and without weighting the two objectives, no clear evaluation is possible. If ecological benefits are the same for each ha of land contracted, reducing unintended transfers often comes at significantly higher resource costs.
- Weighting both objectives equally highlights the potential of differentiation, particularly if ecological benefits increase with participation costs. Four out of the six differentiated approaches perform better than the flat-rate policy.
- Allocating a higher weight to the objective of reducing unintended transfers (weighting ratio of 2:1) renders all differentiation approaches superior to a flat-rate policy.

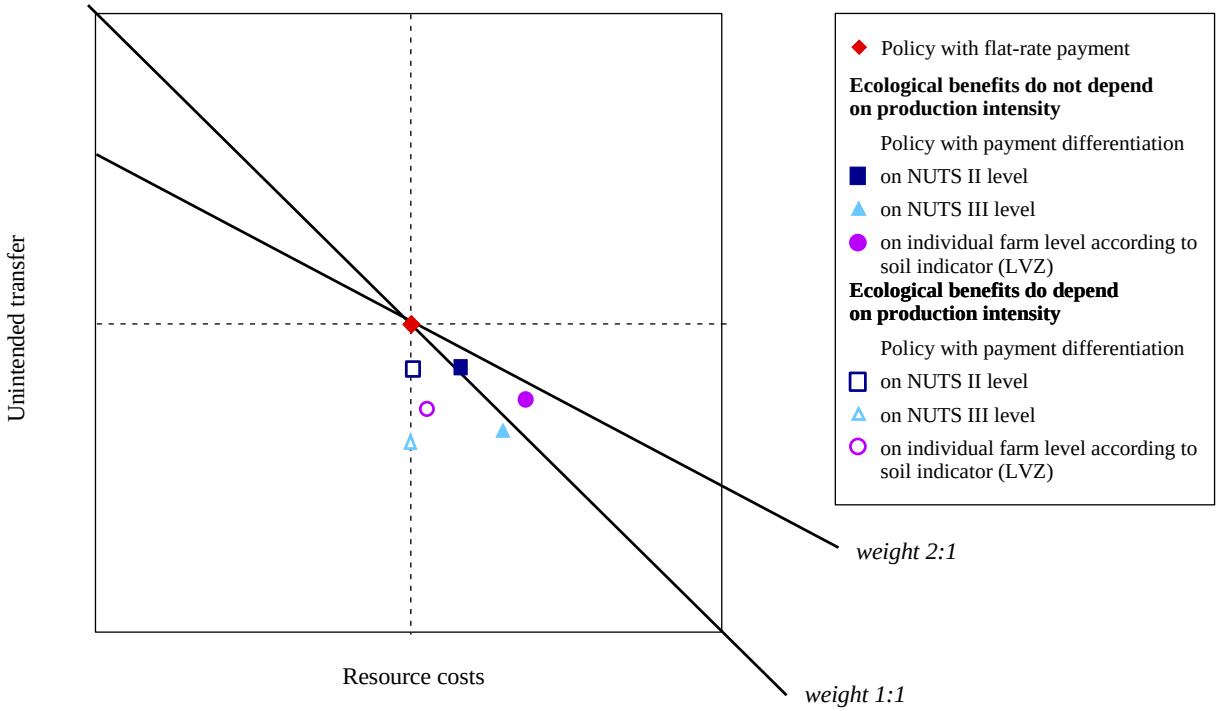

Figure 5: Unintended transfers and resource costs for different approaches to payment differentiation, for an agri-environmental measure targeting wheat areas in Lower Saxony

While this example highlights some important tendencies, the performance of differentiation often depends on region and measure characteristics:

- For measures targeting potato areas, the performance of differentiated approaches is often poor, as variances in farm individual yields are poorly captured by regional classification

or the soil-climate index. Assigning both objectives equal weights, differentiation is evaluated inferior to a flat-rate policy in about half of all considered cases.

- In one quarter of all considered cases even a 2:1 weighting in favour of the objective 'reducing unintended transfers' does not lead to a favourable evaluation of differentiated approaches. This becomes specifically evident for a differentiation on farm and NUTS II levels. Unfavourable evaluations are predominantly observed for measures targeting potato areas and the stylised agri-environmental grassland measures.

Czech Republic

Figure 6 provides an overview of the performance of differentiated payments in relation to flat-rate payments for the stylised agri-environmental measure for wheat areas in Czech Republic (excluding additional PRTCs).

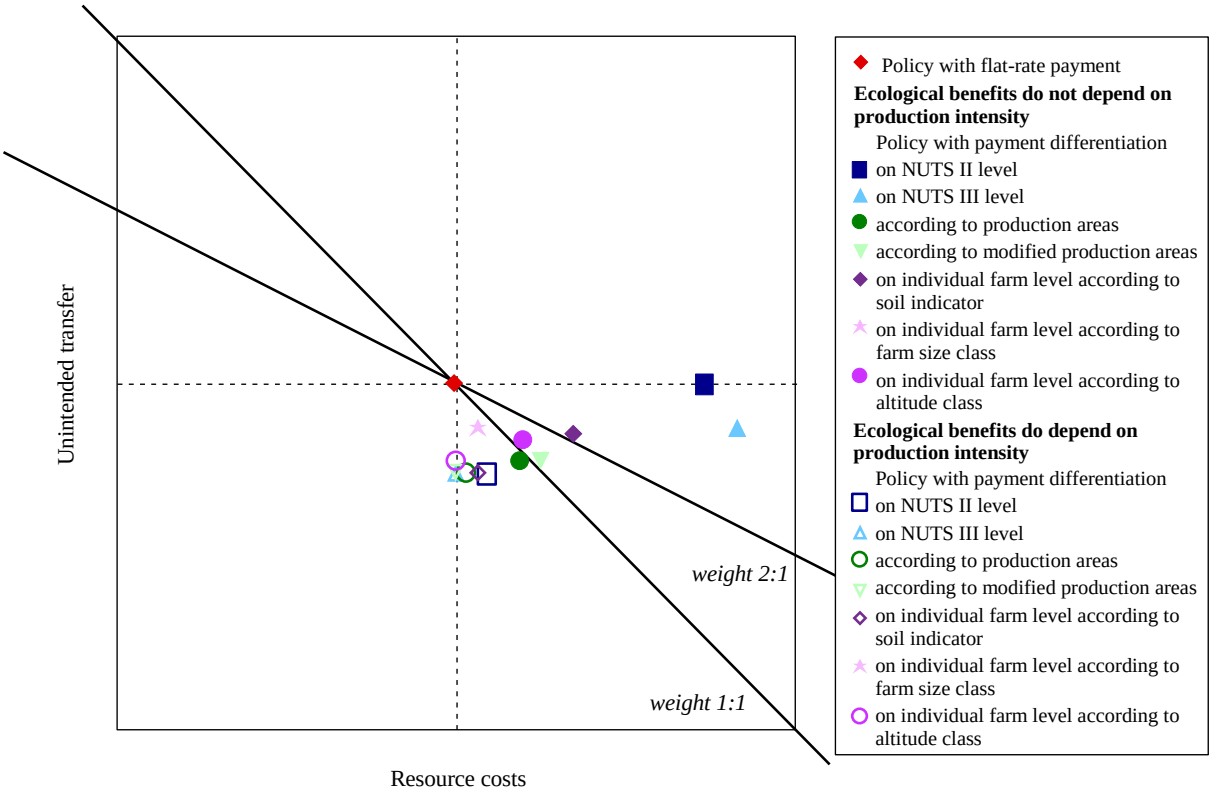

Figure 6: Unintended transfers and resource costs for different approaches to payment differentiation, for an agri-environmental measure targeting wheat areas in Czech Republic

- Assigning both objectives equal weights, differentiation is evaluated superior to a flat-rate policy for all cases if environmental benefits rise with production intensity before participation. However, if ecological benefits are the same for each ha of land contracted, differentiation is inferior in the majority of cases.
- Applying a 2:1 weighting in favour of the objective 'reducing unintended transfers', most differentiations become superior to flat-rate payment. A differentiation according to the farm level soil index and the regional differentiation still remain unfavourable if ecological benefits are the same for each ha of land contracted.

Italy

- Applying this analysis to selected regions in Italy provides a heterogeneous picture. Without weighting the two objectives, in Veneto differentiation according to altitude classes is clearly inferior, whereas in Lazio differentiation on NUTS III level is evaluated as inferior. The differentiation of payments according to altitude classes in Sicilia produces the same results as a flat-rate payment. All other cases are indeterminate.
- Assigning both objectives equal weights, differentiation is evaluated superior to flat-rate policy in slightly less than half of cases.
- Generally, a 2:1 weighting in favour of the objective 'reducing unintended transfers' does not lead to any changes compared to a 1:1 weighting. An exception is the case of Sicilia where all cases (apart from the two equal ones) become superior compared to flat-rate payments.

Scotland

Figure 7 provides an overview of the performance of differentiated payments in relation to flat-rate payments for the stylised agri-environmental for barley areas in Scotland (excluding additional PRTCs).

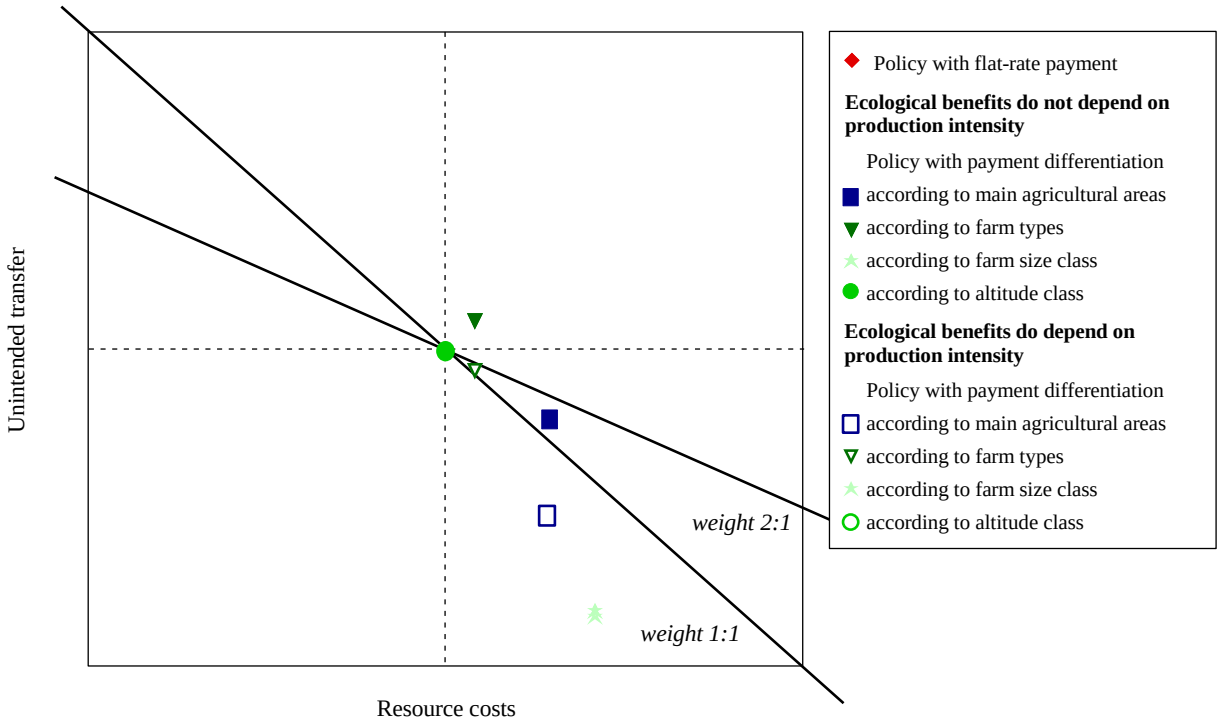

Figure 7: Unintended transfers and resource costs for different approaches to payment differentiation, for an agri-environmental measure targeting barley areas in Scotland

- Without weighting, only a differentiation according to farm types is clearly inferior compared to a flat-rate policy. The differentiation of payments according to altitude classes produces the same results as a flat-rate payment. All other cases are indeterminate.

- Assigning both objectives equal weights, differentiation by main agricultural areas (if ecological benefits do depend on production intensities before participation), and differentiation by farm size become superior to flat-rate payments.
- A 2:1 weighting in favour of the objective 'reducing unintended transfers' leads to an improved evaluation of differentiations by main agricultural areas (if ecological benefits are constant per ha) and of differentiations by farm type.

Again, there are some marked differences between countries. While a differentiation on a lower regional level is generally performing best for the German and Czech case-studies, a differentiation by farm sizes seem to be the best option of the Scottish sample. For Italy performance is more dependent on the chosen region than on the type of approach.

4.3 Sensitivity analyses

4.3.1 Sensitivity of results to variations in policy related transaction costs

The level of additional administrative costs incurred by the implementation of differentiated policies proves to be crucial for the evaluation of the performance (Annex I, Table 13). We calculated the maximum level of administrative costs (as a percentage of total transfers) at which a payment differentiation is still superior to a flat-rate policy.

Germany

In several cases, differentiated payments are already inferior to flat-rate payments even if no PRTCs are considered, specifically for the stylised agri-environmental grassland measure. In most cases with a 1:1 weighting of objectives, PRTCs for measures targeting wheat or potato areas have to be lower than 1 % of transfers for differentiated approaches to be recommendable. The level of acceptable administration costs can often be higher for measures targeting crop rotations or grassland extensification (4 - 5 % crop rotation; 2 – 3 % grassland).

Higher PRTCs for the implementation of differentiated approaches can be accepted if a weighting ratio of 2:1 on unintended transfers versus resource costs is applied. Particularly for differentiations on NUTS III level, PRTCs may amount to up to 18 % of transfers and still be superior to a flat-rate policy. In the case of grassland extensification a differentiation on individual farm level leads to acceptable PRTCs of up to almost 40 % of transfers.

Italy

In about half of cases, differentiated payments are inferior to flat-rate payments even if no PRTCs are considered (specifically for a differentiation on regional level). In cases with a 1:1 weighting of objectives, PRTCs for measures targeting wheat areas can range between 0.9 % and 2.5 %. However, for most of these cases PRTCs have to be lower than 1.5 % of total transfers for differentiated approaches to be recommendable.

Higher PRTCs for the implementation of differentiated approaches can be accepted if a weighting ratio of 2:1 on unintended transfers versus resource costs is applied. Particularly for differentiations on NUTS III level, PRTCs may amount to up to 5% of total transfers and still be superior to a flat-rate policy.

Czech Republic

In general, differentiated payments are neither inferior nor superior to flat-rate payments if no additional PRTCs are considered. In all cases with a 1:1 weighting of objectives, PRTCs for measures targeting wheat areas can range between 0.3 % and 2.2 %. However, for most of the cases PRTCs have to be lower than 1.5 % of transfers for differentiated approaches to be recommendable.

Higher PRTCs for the implementation of differentiated approaches can be accepted if a weighting ratio of 2:1 on unintended transfers versus resource costs is applied. The highest possible level can be applied by a farm-individual differentiation with PRTCs amounting to 3.8 % of transfers and still be superior to a flat-rate policy.

Scotland

A differentiation according to farm types with assuming constant ecological benefits per ha is the only case clearly leading to an inferior evaluation even if no PRTCs are considered. A differentiation according to altitude classes delivers an equal evaluation. In cases with a 1:1 weighting of objectives, PRTCs for measures targeting barley areas can range between 0.3 % and 0.5 %.

Higher PRTCs for the implementation of differentiated approaches and for more of our considered cases can be accepted if a weighting ratio of 2:1 on unintended transfers versus resource costs is applied. The highest possible level can be applied by a differentiation according to farm size classes with PRTCs amounting to 1.4 % of transfers and still be superior to a flat-rate policy.

Without any weighting of objectives it becomes obvious among all countries that in several cases differentiations are already inferior compared to flat-rate payments if no additional PRTCs are considered. However, again Germany seems to have the potential to consider the highest values of PRTCs either for the equal weighting or the weighting ratio in favour of unintended transfers.

4.3.2 Impacts of data availability on results

4.3.2.1 Impacts of data availability on the performance of differentiated payment levels with respect to overcompensation, budget and economic efficiency

Italy

- Using exclusively 2-year averages the rate of overcompensation is reduced in even more cases, e.g. even in cases where we applied a differentiation according to altitude classes. Using 3-year averages, results show the same tendencies as with 4-year averages. An exception is the region of Lazio where for both 2 and 3-year averages, the rate of overcompensation is not improved at all compared to the flat-rate regime. Generally, the extent of the reduction of overcompensation is as limited as for the 4-year averages. An exception is the region of Veneto where 2-year averages can reduce the rate of overcompensation by up to 2.4 %.
- If additional administrative costs of differentiated approaches are negligible, results of the sensitivity analysis depend on the region analysed. While there are no differences between 2, 3 and 4-year averages in the region of Veneto, budgetary expenditures are even not as reduced as with 4-year averages for a differentiation according to altitude classes in Lazio. In Sicilia 2-year averages lead to a reduction of budgetary expenditures in all cases and 3-year averages deliver same results as for 4-year averages.
- Apart from some cases resource costs increase, especially if ecological benefits are assumed to be constant per ha of land contracted, e.g. 2, 3 and 4-year averages delivering same tendencies.
- In case differentiation causes additional PRTCs, performance is significantly reduced for all considered time-periods if assumed additional PRTCs amount to at least 3% of transfers. An exception is the region of Sicilia where under the assumption that ecological benefits do depend on production intensities before participation a regional differentiation

on NUTS III level and considering 3-year averages is leading to an increase in budgetary efficiency.

- As discussed above, the region of Lazio is characterised by a relatively high share of farms participating in agri-environmental measures. Caused by the fact that these farms could not be excluded from our calculations, results show that this might have impacted on analysed variables. Consequently it seems to be necessary to exclude as far as possible all farms participating in extensification measures.

Scotland

- In the majority of the cases using 2, 3, 4 or 5-year averages results in a reduction of the rate of overcompensation. Most of exceptions occur for differentiations according to altitude classes as results are equal to the one of the flat-rate. The extent of the reduction of overcompensation is generally very limited among all considered time periods.
- In terms of the budgetary cost effectiveness and assuming that additional administrative costs of differentiation approaches are negligible a variation of the considered time period does not lead to any consistent tendency. For mediate time periods a differentiation according to farm sizes seems to be less promising than for either very short or very long time horizons.
- In terms of resource costs and the inclusion of PRTCs, results of the sensitivity analysis show the same tendencies as results for 5-year averages.

4.3.2.2 Impacts of data availability on the performance of differentiated payment levels with respect to unintended transfers and economic cost-effectiveness

Italy

Again sensitivity analysis shows different pictures applying a 1:1 weighting of objectives for all three regions. In Veneto using 2 or 3-year averages deliver equal tendencies as the 4-year averages. However, the level of PRTCs can be higher the shorter the time-period considered. For the region of Lazio either by using 2 or 3-year averages PRTCs can not be considered. In Sicilia using 2-year averages increases the level of possible PRTCs whereas using 3-year averages reduces the possibility to consider PRTCs at all.

Higher PRTCs for the implementation of differentiated approaches can be accepted if a weighting ratio of 2:1 on unintended transfers versus resource costs is applied. Using 2 or 3-year averages for the region of Veneto delivers no significant changes, apart from the fact that the possibility to consider PRTCs in the case of a farm-individual differentiation is improved for 2-year averages. For Lazio equal results as for the 1:1 weighting are at hand. Using 2 year averages increases the level of PRTCs for Sicilia and using 3-year averages reduces the possibility to consider PRTCs at all.

Scotland

Without any weighting differentiations according to main agricultural areas and farm types are in most of the cases indeterminate. Differentiations according to altitude classes are developing from clearly inferior (2 years) over indeterminate (3 and 4years) to equal (5 years). It becomes obvious that the longer the time period included in calculations the fewer cases are indeterminate. In cases with a 1:1 weighting of objectives it can be seen that the longer the time period considered a) the lesser cases are superior and b) the more cases are inferior. Exceptions occur in the case of the 3 year time horizon. However, though there are hints that the longer the time period the unfavourable becomes the evaluation and the lower are possible PRTC levels, there are no fix differentiation levels attached to a superior or

inferior evaluation, e.g. either if 2, 3 or 4-year averages are included evaluation results are not attributed to specific differentiation levels but vary between considered time-periods. In general considering a longer time period delivers in some cases higher levels of possible PRTCs but in some other cases reduced PRTC levels.

Higher PRTCs for the implementation of differentiated approaches can be accepted if a weighting ratio of 2:1 on unintended transfers versus resource costs is applied. In all cases it can be seen that the higher weighting is improving the performance of differentiated payments as for the 1:1 weighting.

To sum up, the sensitivity analyses with respect to the impact of data availability generally shows that basing calculations on shorter time periods seemingly improves the performance of differentiated approaches and will thus overestimate underlying benefits. Care has therefore to be taken to match the data series to the length of the contract period of the analysed rural development measures.

5 Workshop-based Farm-Level Analysis

5.1 Introduction

5.1.1 Rationale

Supporting the standardisation of differentiated payment calculations that meet WTO prescriptions across the EU27 is a potentially thorny issue given the range and diversity of bio-physical and socio-economic circumstances that occur. In addition to the macro-economic analysis of payment differentiations presented in Chapter 4, a supplementary analysis was also undertaken using a localized, farm-scale, case-study approach. The rationale for the use of the case-study approach was, to provide a facility for testing some of the key assumptions in a payment calculation to see in which circumstances they are valid. The localised case-study would also serve as a focus for discussion of the acceptability, to farmers/land managers, of differentiated calculation methods. This was argued to be essential if the measures are to be effective as well as efficient. The efficiency of the measures can be addressed by higher levels assessments but effectiveness – both on uptake and implementation of measures runs into a range of technical and socio-cultural factors that need to be assessed exploring through a structured dialogue with stakeholders.

5.1.2 Workshops with government representatives

Within the AGRGRID project, two workshops with government representatives were held. During the first workshop held in Prague on 17th July 2007, government representatives were confronted with a comparative review of payment calculations done for the Rural Development Programme for the period 2007-2013. The ex-post review (Hrabalova et al., 2007) highlighted that, depending on the measure, a wide range of factors is applied to differentiate payments, e.g. land use or animal type (crop, variety, breed, farm structural characteristics (intensity of farming practices, farm size or farming period in case of organic farming), spatial dimension (administrative / regional / territorial differentiation or specific land attributes), productivity of soil (determined by indexes or stocking density), and topography. The second workshop took place in Santorini, Greece, a year later. Ten government representatives from seven project countries as well as the EU project officer attended. Presentations included a presentation on the potential of differentiated payment levels based on standard cost approaches and an overview of the LADSS application in farmer workshops.

Among other issues, the workshops with the government representatives served to identify the administration's view on key issues related to payment differentiation. A number of aspects were raised and discussed:

- there is a general awareness that flat-rate payments do not reflect farm-level heterogeneity, however, participants had the impression that the involved authorities prefer flat-rate payments due to administrative simplicity
- the high requirements on data quality and quantity for the calculation of differentiated payment levels were identified as a key problem
- the higher administration costs incurred by differentiated payment levels and their approval in the complex system of EU notification were repeatedly named as important obstacles
- participants stressed the need to test efficiency (gains) of more differentiated approaches

In addition, the discussion highlighted that often payment levels are not only determined by the methods of calculation used, but to a large extent by external factors such as objectives of other European and national policies, financial considerations, stakeholder influences and payment levels from previous RDPs ("path dependency").

5.1.3 Objectives of the Workshop-based Farm-Level Analysis

The farm-scale part of the case-study analysis was undertaken with stakeholders (from both policy and practice communities) and sought to assess whether both the payment methods and the payment rates "make sense" to stakeholders and aimed to highlight any unintended consequences. Since the only measure common to all EU27 countries was payment for conversion to, and support for organic production and this was chosen as the measure to be assessed. This measure was also of interest since it is entails significant enterprise and management change and as such has significant opportunities for changes to both additional costs and income forgone. The lessons from organic conversion/production are thus relevant to agri-environmental, animal welfare and other measures. The specific objectives of the farm-level case-study activity were to:

- Support an assessment of the implications of different payment calculations by:
- Developing a farm-scale "test-bed" for comparing conventional and organic production – using the LADSS bio-economic model.
- Developing stakeholder contacts to define a realistic comparison "scenario" – with significant enterprise and management changes.
- Generating characterisations for conventional and organic systems of production, activity scheduling, material flows and finance.
- Assess the implications of alternative payment calculation methods with stakeholders using the case-study outputs in a structured workshop process.
- Evaluating the usefulness of the workshop based process and the case-study materials.

5.2 Background

This section sets out the previous research findings that have motivated the authors and shaped the approaches and methods used in this study. It brings together materials from a range of disciplines where there is extensive experience in using research outputs to assess policy options and their practical outcomes. The synthesis of this background material also shapes the interpretations of this study's outputs. The section also provides a brief summary of previous research findings by the authors that while published elsewhere are particularly relevant to this paper.

For complex societal problems (such as agreeing levels of support or compensation), the issue of how best to undertake research such that it is both rigorous and inclusive is one that continues to tax both research and policy maker communities (McNie 2007;Scottish Executive 2005). Marginalisation of either stakeholder experiential or research-based knowledge in important debates can leave the way open for politically powerful vested interests to dominate decision making to the detriment of wider society. The influence of research, however, depends on three closely related factors salience, legitimacy and credibility (Cash & Buizer 2005).

Salience means that research outputs must be seen by stakeholders as relevant to their decision making process. Salience can be seriously compromised when research outputs refer to geographic, temporal or organisational scales that do not match those of decision making.

The localisation of research outcomes through the use of appropriately scaled case-studies has been shown to be a key factor in increasing the apparent salience of research outcomes (Carberry et al. 2002). Research outputs thus have to be couched in units that make sense to stakeholders' management practices. Other limits on the salience of research may, however, be more fundamental. French and Geldermann (2005) identify four issue types, known, knowable, complex and chaotic. For the latter two types all that the outputs of research may be able to deliver is a range of options or a framing of the issues rather than a single definitive solution.

Yet even for knowable problems, researchers have questioned whether more or better quality information inevitably results in better decisions or altered behaviours (McCown 2002b;McCown et al. 2005). McCown's comparison of two mature research fields, industrial and agricultural decision support, concluded that the outcomes of research on complex issues need to be tailored to fit within the social processes of decision making, taking a role that do not detract from the agency of the decision maker. That is for research to be influential it must be seen by stakeholders as legitimate, supporting or empowering decision making processes rather than dictating outcomes. Legitimacy is further complicated when issues involve multiple stakeholders each with direct or indirect interests and influence. For such cases, subjective decisions on the selection and assessment of evidence may be as important as the accuracy of the measurement or forecasting of particular phenomena. In a milieu with conflicting interests, researchers cannot simply deliver discrete packages of evidence but need to provide support for inclusive processes that support deliberation (reasoned-based debate) on particular issues (Dryzek 2000). The role for research is in making explicit the trade-offs either between outcomes, or between stakeholders (Matthews et al. 2006a). Failure to include stakeholder views by adopting technocratic processes of decision making simply means that both the legitimacy of the process and any decisions are simply challenged through other channels such as the courts or in the media (Stilgoe et al. 2006).

However the interactions between researcher, stakeholder and decision maker are organised, a key factor in the research being influential is credibility (McCown 2002a). While the credibility of research based forecasts may partially be met by formal processes of validation and peer review there is also the need for outcomes not to contradict existing stakeholder knowledge of systems gained through experiential learning (Carberry et al. 2002). Credibility has also been seen to depend on the transparency of the methods used and on adequate auditing and quality assurance of models and data (Hutchins et al. 2006;Scholten & Kassahun 2006). While transparency is often used to imply simplicity, this would be to misunderstand what is desired by stakeholders. It is the openness of assumptions (what was excluded as well as what was included), that may be the key to transparency and thus credibility. Two credibility challenges are apparent. The first is overcoming the idea that all uncertainty is the result of errors or mistakes within research processes rather than an inevitable outcome of bounded knowledge, scenarios chosen, model parameterisation, model structure, how the system is represented and practical limits on the availability of data (Rauschmeyer & Wittmer 2006). The second is that, however good the research is, it is still only the currently best available answer, and may be a partial answer where systems are complex. Together these challenges mean researchers need to be careful in managing stakeholders' expectations. This is particularly problematic when vested interests can exploit uncertainty to sensationalise an issue or to preserve the status quo.

Where researchers are seeking to influence or even inform communities of practice and policy the issues of salience, legitimacy and credibility pose challenges for both content and design of processes When both researcher and stakeholder knowledge is partial there are opportunities for cooperation and knowledge sharing. In these processes the role of research-

based information is not as an outcome to be communicated but as a boundary object (Jakku & Thorburn 2004) through which information can be exchanged. Researchers can have a key role facilitating such interactions but need to recognise that the role(s), institutions and epistemologies of an experimentalist, hypothetico-deductive paradigm are much less useful in participatory, action and transdisciplinary research and that alternative ways of conducting research, are more appropriate (Gunderson & Holling 2002;Kay et al. 1999;Walker & Salt 2006). Against this background, the intention of this research was to initiate and demonstrate, a credible process of knowledge sharing on the payment differentiation issue with stakeholders the land use policy and management domains.

5.3 Materials and Methods

This section first sets out the overall methodology used for the research. This methodology uses a multi-scale, integrated assessment process to consider the outputs from both the macro-scale analysis (detailed in Chapter X) and farm-scale simulation modelling (set out below) in a multi-perspective, workshop-based deliberation. Subsequent sections set out in more detail the components of the analysis: the macro-scale analysis, the bio-economic modelling (software tools, the case-study and the data sources used), the workshop processes; the evaluation and post-workshop analysis.

5.3.1 Outline of the Multi-scale Integrated Assessment Process

Figure 8 outlines the processes and the outputs of the multi-scale integrated assessment (MSIA). The assessment is multi-scale in that it tries to bring together two perspectives, macro-economic and farm-scale. Both are very significant for assessing options for payment differentiation. The macro-economic analysis highlights issues of budgetary efficiency, administrative complexity and equity in distribution of possible benefits of differentiations. The farm-scale analysis, however, has the potential to assess in more concrete terms the range of possible impacts of differentiation and thus to be more effective in communicating these outcomes to stakeholders who would be affected. This latter is essential if differentiated payments are to be: acceptable to stakeholders, effective in achieving policy outcomes and are not to generate undesirable side-effects. The integrated assessment approach combines empirical and/or modelling based research approaches with social learning processes where there can be an effective exchange of knowledge between research, policy and stakeholder communities.

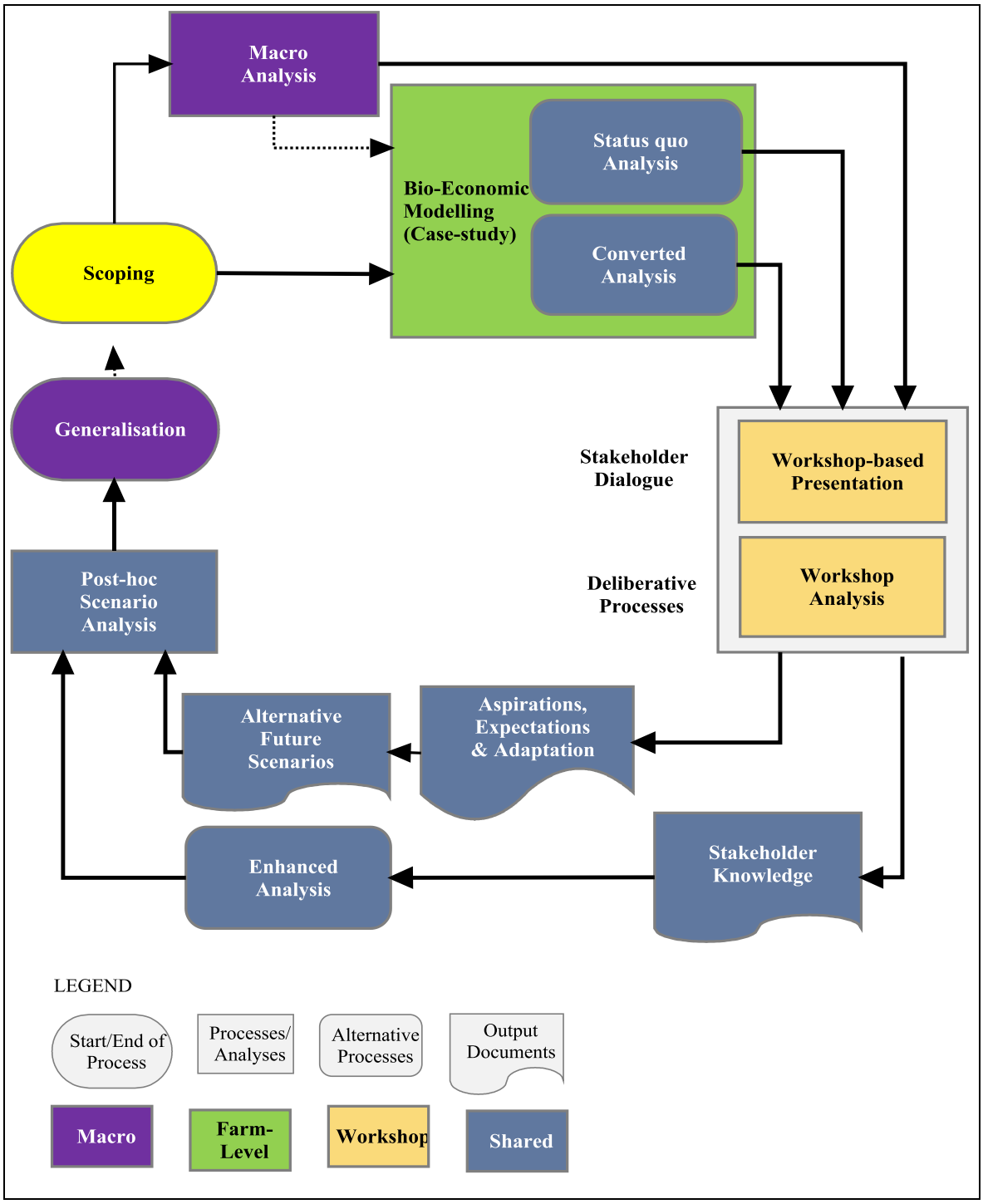

Figure 8: Multi-scale integrated assessment process

As can be seen in Figure 8 the MSIA start from scoping and proceeds through sequential phases of macro and farm-scale analysis, workshop based presentation and analysis, enhanced analysis based on elicited stakeholder knowledge, documentation of stakeholder aspirations, expectations and likely adaptive responses; synthesis of this information into alternative future scenarios, post-hoc scenario analysis and generalisation. The process has the potential to be iterative with the outcomes of the research shaping the scoping of subsequent rounds.

The scoping phase sets the bounds on the topics considered within the integrated assessment. This can be particularly difficult where there are many factors that impinge on decisions or

the range of possible options. The aim is to set up subsequent analyses that are effective in illustrating ex ante the consequences of alternative decisions, without swamping the process participants with excessive quantities of detailed material or being so rigidly structures that participants are effectively excluded from influencing how the research is carried out or interpreted. For the differentiation of payments the choice of case study was partially driven by necessity (there being only organic conversion and production support common to all partners) yet this was also seen as desirable since it encompasses in a single measure many of the issues relevant to other measures. Previous experience and the literature has also shown that using cases that are "real" without being personal is an effective way of eliciting stakeholders views, while minimising inter-stakeholder conflict and enhancing the potential for compromise and cooperation. The farm-level case study was thus scoped with expert consultants from both organic and conventional production sectors and used a concrete example of conversion in a region and for a farm-type (mixed farming in the uplands/mid-hills of central Scotland) that would highlight a broad range of issues. The scoping document served to refine the analysis in the farm-level modelling and to shape the questions raided in the workshop phase.

The macro-analysis for this process had two roles. First it was directly presented within the workshop process. This contrasts with previous processes run by the authors where the macro-analysis served as an input to the farm-scale analysis, providing quantitative inputs that defined scenarios of change defined in qualitative terms in the scoping phase (Matthews et al. 2006b; Matthews et al. 2008a). The second role was in highlighting some of the possible factors that the farm-level analysis needed to be able to address. The farm-scale analysis needed to be able to assess not just the financial bottom line, but to break this down in terms of the balance between fixed and variable costs, capital requirements (machinery, labour and infrastructure), the range of on farm activities in terms of the skills mix required and the balance of material flows as an indication of the ecological footprint of the farm enterprises.

The farm level analyses were intended to provide a characterisation of the case study, before and after conversion to organic production. Organic production was chosen as the main focus since this seemed the most likely to raise interesting issues of why the payment is made and what the appropriate level of support should be. Conversion has a much clearer justification in terms of income foregone, since the price premium for organic production is not available but the farm is also experiencing the sharpest loss of productivity since the fertility building process of organic rotation has not yet been able to partly offset for the elimination of inorganic fertilisers. The analysis compared for the exemplar farm (detailed in Section 3.4) the existing farming system (with some minor simplifications to make it more typical for such enterprises) with a hypothetical organic conversion defined by an organic farming systems expert.

The workshop based activities present the results of the first phases of research to a multi-perspective stakeholder audience with the intention of engaging with them in a dialogue on the wider issues and a deliberation on merits of specific alternative strategies or policies. The workshop also provides and opportunity for a formal evaluation of the utility of the tools/outputs and the process. The outcomes of the workshop are typically a series of documents. These can usefully be classified as stakeholder specialist knowledge and as aspirations, expectations and adaptations. The former is typically information confirming or amending the data, assumptions or outcomes of modelling. Previous experience of using model outputs with stakeholders means that eliciting stakeholder knowledge is extremely valuable. This knowledge serves to make the modelling results more salient (since they prioritise the outputs of greatest relevance to decision making). The modelling gains legitimacy, since it allows the stakeholders the direct opportunity to question the operation of

the model and to influence the research through the commitment to reconsider and review the analysis in the light of their comments. Finally the results have greater credibility since for the status quo analysis they match with experience reality which in turn enhances the credibility of the alternative scenarios (in this case the organic conversion analysis) since they share either many of the same underlying assumptions or the new assumptions have been deliberated on and agreed. The importance of stakeholders as actors or agents within the system with their own goals to achieve also needs to be recognised within any analysis. They do not passively receive policy measures but dynamically seek to alter their implementation either positively or indeed to circumvent their intended purpose. While multiple perspectives present within the workshop it is possible to identify where there may be conflicts between the expectations of policy makers, the aspirations of land managers and the likely adaptations (or lack of them) that may result. A synthesis of these views and adaptation strategies can be undertaken to derive a series of alternative future scenarios, which may influence wider debate or be combined with the enhanced farm-level analysis to inform a wider range of cases through a process of generalisation.

5.3.2 Macro-analysis

The macro-analysis presented in the workshop focused on the potential for budget savings through the implementation of payment differentiation . The presentation raised alternative options of payment-by-results or auctions but focused on differentiation to sun-national spatial units. Drivers for this analysis were seen as WTO expectations of limiting overcompensation but also economic and budgetary efficiency. A framework within which to consider options for differentiation was outlined that considered the trade-off between the level of differentiation required to achieve a policy objective and the additional administrative costs that would be entailed by a more complex calculation. The procedures and assumptions of the analysis were set out and empirical examples for generic agri-environmental type measures presented using empirical production systems data (to assess levels of over and under compensation). The examples used examples of measures where benefits do and do not depend on existing production intensity and for each of these differentiating by NUTS2 and 3 regions and by Farm Type each with associated break-even values for administrative costs. Explanations were also given for the limited benefits seen in the empirical analyses of differentiations (within differentiation class variability exceeding that the between classes). Conclusions on the challenge to find differentiation variables strongly correlated with costs and with low administration costs were drawn. Finally it was noted that differentiation of payments has a greater potential for those measures where costs depend on existing production intensities (i.e. measures that take land out of production) and where there is a strong correlation between these costs and the environmental benefits derived.

5.3.3 Farm-scale analysis – the tool used

The farm-scale analysis used the Land Allocation Decision Support System (LADSS). This computer-based tool has been developed to support the analysis of the consequences of alternative enterprise mix and management regimen at the whole-farm level. The organic conversion analysis made use of the livestock systems, materials balancing, resource scheduling and financial/material accounting components. Other components such as the interfaced geographical information system (Matthews et al. 1999) and multi-objective optimisation (Matthews et al. 2006a) were not required for the analysis and are shown in grey in Figure 9. It was also decided to rely on consultant inputs as the basis for determining the difference in productivity between the current and converted cropping systems. This is a potentially divisive issue, and little consensus exists in the exact nature of the production loss, what it depends on and what the possible range of values are. In this particular case using the

model to make the assessment would be both time consuming and lack the credibility of the consultant based assessment. The difference assumed in conversion was -30% with a -20% after conversion, this assumes the existing system was not heavily stocked/fertilised.

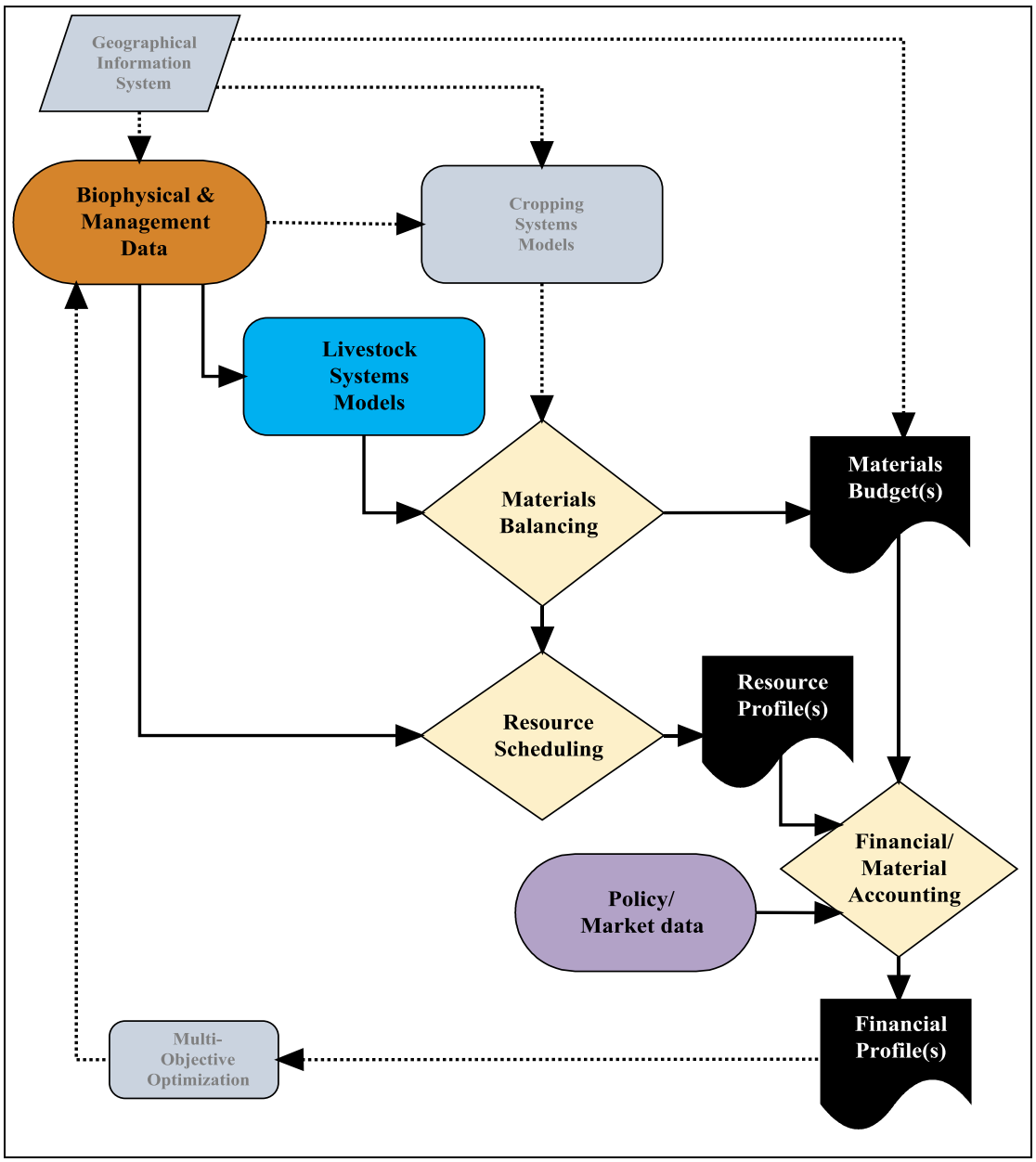

Figure 9: Components of the Land Allocation Decision Support System (LADSS)

The livestock systems model simulates the performance of livestock herds is a The model uses and event-based (weekly time step) approach that tracks cohorts of animals through the a system of herds linked together by decision rules. An example of a livestock systems diagram for the conventional cattle system used in the case study is shown in Figure 10. Livestock systems exhibit considerable complexity both in the range of interconnections possible and the range of management options available within each herd (timings, feeding regimens, targets etc). The system also needs to be able to cope with representing both hard (that mean a system is not allowable, e.g. for welfare reasons) and/or soft constraints (those that indicate that a system many need to be reconfigured to achieve the managers goal). By visualising the livestock systems as a flow-chart with nodes containing the management parameters or decision rules it is possible manage the complexity while enabling the simulation of a wide

variety of systems (see Matthews et al. (2006b) for examples). The outputs from the model are time series of data for each herd and for the materials used (grazing, fodder, supplements etc) and the outputs from the systems (either livestock sold for slaughter or as live sales – e.g. as stores to be finished elsewhere or a replacements).

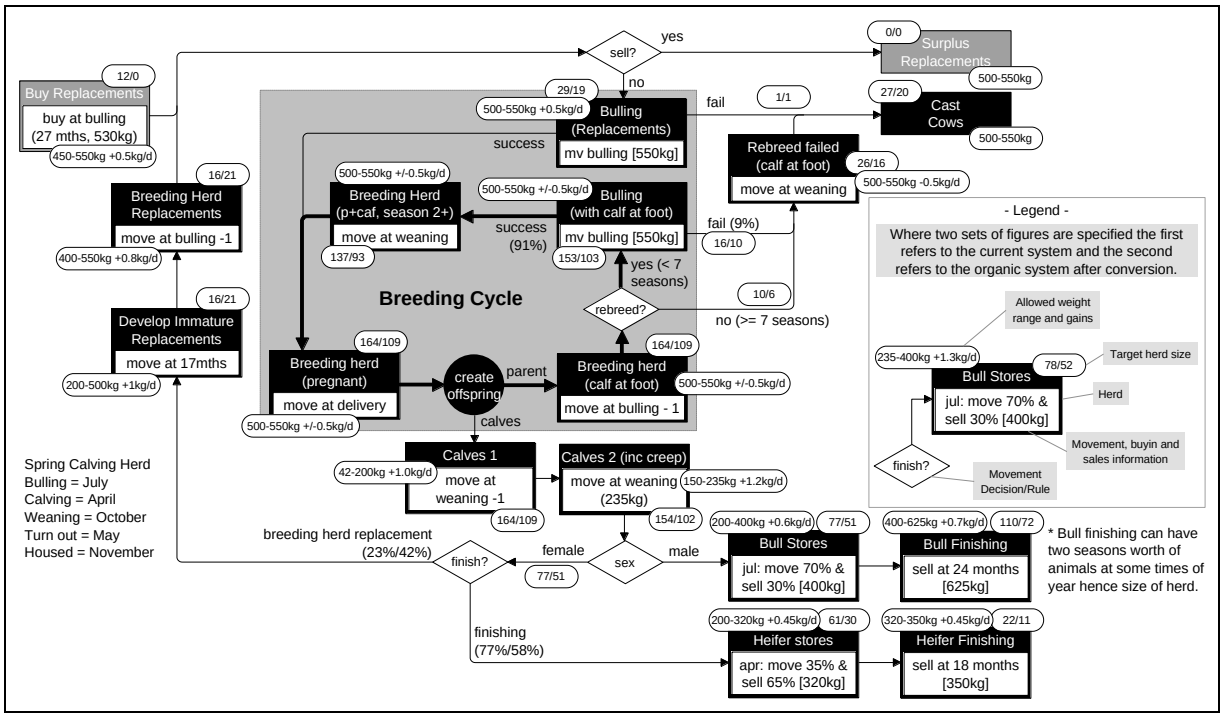

Figure 10: Example livestock systems specification diagram - conventional cattle

The outputs from the livestock systems models and the cropping systems models The logic of this component is that there needs to be a check in place to make sure that there is not a mismatch between materials required and produced by the cropping system and/or bought in from outside. The response to any mismatch is not defined a priori within the materials balancing component since there are a myriad of management options available. Rather the component flags the issues to the user who can then intervene either to increase supply (perhaps allocating more land to a particular enterprise, changing a management regimen, or to bring in more resources from outwith the farm) or reducing demand (by reducing numbers of livestock in particular herd(s) or the target weight gains they are seeking to achieve). The outputs from this component are budgets (on a weekly basis) that detail all the materials involved in the farming-system. These detail the stocks and flows of materials either to productive use, sale or disposal/waste. These are one of the primary inputs for the financial and material flows accounting (examples of the Materials Budgets are shown in Section 4).

The resources scheduling component uses a scheduler to allocate on- and off-farm resources to complete the tasks defined by the management regimen (Matthews et al. 2003). Tasks can be land based, e.g. tillage operations, numbers based e.g. animal feeding or materials based e.g. silage making). Tasks have an overhead (representing set up time) and a workrate. These work rates depend on the labour or machinery availability, and each task is prioritised. Where there are task dependencies these can be specified a start-to-start, or finish-to-start. The system aims to use the minimum resources consistent with just-in-time completion (minimising costs) but can allocate overtime as necessary. Tasks that cannot be completed because of lack of resources (staff time or particular machinery) are contrasted out at standard rates. By assessing the use of on- and off- farm resources it is possible to asses the profile of resource use on the farm and this in turn is one of the main inputs to the financial and material

accounting providing and assessment of the fixed costs for the farming system. As with the previous components the resource scheduler flags warning where tasks are not being completed, again leaving it to the user to make the adjustments necessary (adding resources or making other changes to the management regimen).

The financial and material accounting component takes inputs from the materials balancing and resource scheduling tools and outputs a series of standard financial accounting metrics (FADN). This process also takes inputs from the policy and market data so that it is possible to quickly assess the financial consequences (in the absence of adaptation) of changes in support payments. Used as part of a the deliberation process, however, it is possible to adjust the management parameter inputs in the light of adaptation scenarios suggested by stakeholders, so that the outcomes of the change in support reflect both the direct change in payments and the consequent adaptive response.

5.3.4 Farm-scale analysis – case-study

The case-study used for the research was the Hartwood Farm, a research station for the Macaulay Institute that has been used as the basis for previous studies. The farm is located in central Scotland see Figure 11, at an elevation of 250m. The farm is 245 ha in size which is larger than typical but otherwise is run on commercial lines in addition to undertaking field systems experiments. The farm has an annual rainfall of 1100mm and a mean July temperature of 13.4OC. The principal bio-physical constraint on enterprise choice is soil wetness limiting access for tillage and harvesting operations and the potential for stock to damage the soil structure if out wintered. For the purposes of the workshop, the climatic and soil constraints were relaxed to allow a wider range of crops to be grown consistently.

Figure 11: Case-study - Maps

The farm operates a livestock enterprise typical of a significant marginal (upland) region in Scotland. The conventional and converted land use systems are presented in Tables 4 and 5 and the livestock systems in Table 6 and 7.

Table 4: Conventional Land Allocations

Conventional Rotation	*Management*	*Fertiliser*	*Yield/ ha*	*Biom/ha*	*Area*	*Yield*	*Biom*
Grass Silage	Grass for silage	190 kg/ha	0 0	4500 3500	49	0 0	220,500 171,500
Grass for grazing (Cattle)	Grass for grazing (cattle)	190 kg/ha	*	*	74	*	*
Grass for grazing (Sheep)	Grass for grazing (sheep)	140/kg/ha	*	*	74	*	*
Grass Reseed	Grass Reseed		N/A	N/A	20	N/A	N/A
Spring Barley Whole-crop	Spring Barley Wholecrop	50kg/ha	4600	3500	28	128,800	98,000

Table 5: Converted Organic Land Allocations

Rotation	*Management*	*Fert*	*Yield/ ha*	*Biom/ha*	*Area*	*Yield*	*Biom*
Grass/clover	Silage[10]		0 0	4100 3200	45	0 0	184,500 144,000
Grass/clover	Grazing - cattle[11]		*	*	71	*	*
Grass/clover	Grazing - sheep[12]		*	*	71	*	*
Grass/clover	Reseed		N/A	N/A	20	N/A	N/A
Spring Barley	Fodder/Sale		4600	3500	28	128,800	98,000
Kale	Fodder		0	8000	5	0	40,000
Swede	Fodder		8800	0	5	44,000	0

[10] Assuming 30% drop in yields for silage areas under organic system

[11] Assuming 30% drop in yields for cattle grazing areas – reduction in cattle numbers matches this so area should be sufficient.

[12] Assuming 30% drop in yields for sheep grazing areas – 20% reduction in sheep numbers should easily be contained by the surplus available grass for sheep grazing

Table 6: Conventional vs. Organic Cattle System

Parameter	*Conventional*	*Organic*
Breeding herd size	180	120
Breed	SimmentalxLuing -> Limousin/Charolias	SimmentalxLuing
Max LWT	550	550
Seasons	7	7
First bulling	27 months	27 months
Replacements	12 bought in + 16 homebred	all homebred, no buy ins
Milk Yield	13.6kg/d butterfat 3.6%	13.6kg/d butterfat 3.6%
Breeder Mortality	1.1%	1.1% [Overall? mort recorded as 1.67%]
Non-breeder Mortality	1.1%	1.1%
Breeding failure	9%	9%
Offspring failure before weaning	6%	6%
Calving rate	1:1	1:1
Calf birth weight	42kg	42kg
SIA Schedule	Suckler Cattle (conventional)	Suckler Cattle (organic)

Table 7: Conventional vs Organic Sheep Systems

Parameter	*Conventional*	*Organic*
Breeding flock size	560	450
Breed	Greyface put to Texel rams	Lleyn
Max LWT	73	60kg
Seasons	4	4
First tupping	19	19
Replacements	125 bought in + 40 homebred	all homebred, no buy ins
Milk Yield	N/A	N/A
Breeder Mortality	5%	5%
Non-breeder Mortality	2%	2%
Breeding failure	5%	5%
Offspring failure before weaning	5.72%	5.72%
Lambing rate	160%	160%
Lamb birth weight	5.2kg single, 8.4kg twin	4.3kg single, 6.8kg twin
SIA Schedule	Upland Sheep (conventional)	Upland Sheep (organic)

The specification of the organic system was based on interviews with an organic systems consultant previously employed by the Soil Association (the body that certifies organic production in the U.K.). This specification was derived though a series of meetings, including a farm visit and consultation with the research station manager. The intention was that the case-study should implement a systems specification that was grounded in the reality of real farming enterprises but was not idiosyncratic. Thus values from standard sources were used wherever possible in the parameterisation of the system e.g. feed values from AFRC (AFRC 1993) and management and financial values for the Scottish Agricultural College's Farm

Management Handbook (Beaton et al. 2008). Where such values were not available or easily interpretable, then the authors drew on the experience of expert consultants, for example on work rates. All the data and parameters used within the two simulations were compiled into a system specification document (SSD) (Buchan et al. 2008). The SSD provides a comprehensive side-by-side comparison of the set up used in the two systems and was provided to each of the workshop participants at the workshop. Since this showed the underlying assumptions in considerable detail it was possible for the participants to have more confidence in the model based outcomes. Even where specific figures were challenged the basis for their calculation was transparent and the effects of changing the assumed vales based on the experience of workshop participants could be assessed.

5.3.5 Workshop set-up

The workshop was arranged in partnership with the Scottish Government's Rural and Environment Research and Analysis Directorate. They hosted and participated in the meeting and acted as stakeholder champion for the meeting. This latter role was essential in ensuring that key stakeholders were present for the meeting. Participants included Scottish Government staff concerned with implementing payment calculations with respect to organic farming, SG staff with a wider interest in payment calculations, stakeholders representing organic producers, the Soil Association (who certify organic production) and farming interests more widely (e.g. the farmers union). An England and Wales perspective was provided by a delegate from one of the agencies tasked with developing agri-environmental measures. There were 10 participants in total and these provided a good breadth of perspectives and significant practical expertise in the issues of designing and administering differentiated payments and the practical consequences. The breakdown of the participants is shown in Figure 5.

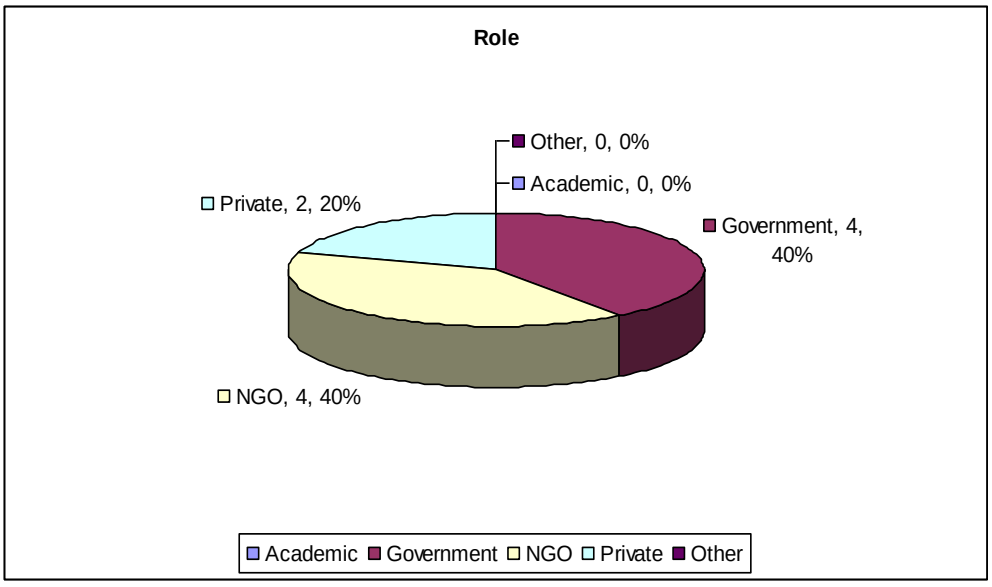

Figure 12: Breakdown of the workshop participants by role.

The organisation of the AGRIGRID workshop programme is shown in Table 8. The programme followed a conventional process tested and found to be effective if previous multi-perspective workshops. As with many events the time available was a constraint on deliberation, particularly considering that both the macro and farm-scale research results were presented.

Table 8: Workshop Programme

Activity	Type/Duration (mins)	Timing
1. Welcome and ice-breaker	Roundtable - 15	1330-1345
2. Introduction to the project + questions	Seminar - 10+5	1345-1400
3. Presenting the macro analysis	Seminar - 20+10	1400-1430
4. Evaluating the implications of the macro-analysis	Breakout groups (2) - 40	1430-1510
5. Presentation of breakout groups findings/debate	Plenary - 10+10	1510-1530
Coffee	20	1530-1550
6. Presenting the case-study analysis	Seminar - 20+10	1550-1620
7. Evaluating the implications of the case study-analysis	Breakout groups (2) - 40	1620-1700
8. Presentation of breakout groups findings/debate	Plenary - 10+10	1700-1720
9. Evaluation forms and depart	Individual - 10	1720-1730

The questions used to stimulate discussion in the break out groups were as follows. Each breakout group had representatives from both policy and stakeholder communities and was facilitated by a member of the research team. Notes of the debate and conclusions were taken by reporters and these were fed back and debated with other participants in the plenary sessions following each breakout. Plenary sessions were recorded.

Breakout 1.

- What are the objectives of supporting organic agriculture?
- Is the current payment regime effective in achieving these objectives?
- Are there unintended consequences?

Breakout 2.

- Could alternative payment calculations have a positive impact?
- Are there key factors that the payments calculations do not or cannot address?
- Would the tools, methods and outputs from the AGRIGRID research be useful in supporting decisions?

5.3.6 Evaluation and post workshop analysis

Formal evaluation of the utility of tools, outputs and processes has been shown in other activities undertaken by the authors to be of significant benefit both to interpreting the outputs from workshop activities and improving communication of information to a wider stakeholder audience and in refining the analyses undertaken (Matthews et al. 2008b). It elicits information that can be difficult or uncomfortable for stakeholder to provide in a face-to-face exchange and is an extremely useful cross check for workshop organisers. For the AgriGRID workshop the evaluation was carried out using a simple check box form (supplemented by a free text comments sheet). This was filled in by all participants on the day. The sheet had two parts. The first part captured information on the utility of the elements of the analysis and the workshop process using a five point qualitative categorisation, this is shown in Table 9. The second part captured information on the background and expertise of the participants, their previous awareness of the research, whether the research has provided new information and

whether the outputs of the research has changed or confirmed their views, this is shown in Table 10.

Table 9: Evaluation Sheet - Part I

PART I

Please check one box to show how useful the tools, information and/or processes of the AgriGRID workshop could be.

Item	Tool/Information	Usefulness				
		Not	Unlikely	Possibly	Definitely	Definitely - Very
1	Macro-scale Analysis	❑	❑	❑	❑	❑
2	Options for Payment Differentiation	❑	❑	❑	❑	❑
3	Performance Indicators	❑	❑	❑	❑	❑
3	Case-study Analysis	❑	❑	❑	❑	❑
4	Material/Resources Profiles	❑	❑	❑	❑	❑
5	Financial Profiles	❑	❑	❑	❑	❑
6	Systems Specification Document	❑	❑	❑	❑	❑
7	Seminar Presentation	❑	❑	❑	❑	❑
8	Break-out Groups	❑	❑	❑	❑	❑

Table 10: Evaluation Sheet - Part II

Part II

Q1. Did you know about the Macaulay Institute's research in support of policy before you attended the workshop?

□ YES □ NO

Q2. How much did you know about payment calculations before you attended the workshop?

□ NOTHING □ A LITTLE □ A FAIR AMOUNT □ WELL INFORMED □ PROFESSIONAL

Q3. Has the workshop provided new information on the topic?

□ NOTHING □ A LITTLE □ A FAIR AMOUNT □ A SUBSTANTIAL AMOUNT

Q4. Have you changed or adapted your views on payment calculations after the workshop?

□ NO □ YES □ CONFIRMED EXISTING VIEWS

Q5. How effective is the workshop format as a way of researchers communicating with policy makers and practitioners?

□ NOT □ MARGINALLY □ QUITE □ VERY

Q6. Where do you work?

□ Academic Institution □ Government □ NGO

□ Private Sector □ Other (please state) .....

Post workshop analysis was the collation and synthesis of the breakout and plenary session materials and undertaking revisions to the case-study analysis in the light of specific comments received during and after the workshop.

5.4 Results

The following sections first provide exemplar results from the farm-scale analysis to illustrate the nature of the outputs that can inform/supplement the debate on the differentiation of payments with practitioner stakeholders. The outcomes of the workshop are then presented and discussed and finally the results of the evaluation of the workshop process are presented.

5.4.1 Farm-scale Analysis Examples

Three examples are presented of profiles that can be derived from the outputs of the simulation models. These profiles are derived using pivot tables within MS Excel to extract and classify individual database records and summarise them. Figure 13 and Figure 14 for example present a comparison of the diets for the livestock in both systems. What is immediately apparent is that while the two systems are both based on pasture and silage, the conventional system is using and producing more on-farm fodder, supplementing winter grass-based fodder with whole-crop silage and using more bought-in supplements. The organic system is less productive (lower yields on a per ha per crop basis), less intensive (fewer supplements and all from on farm sources), but more diversified (a smaller number of ha is devoted to livestock with the remainder producing spring barley for sale).

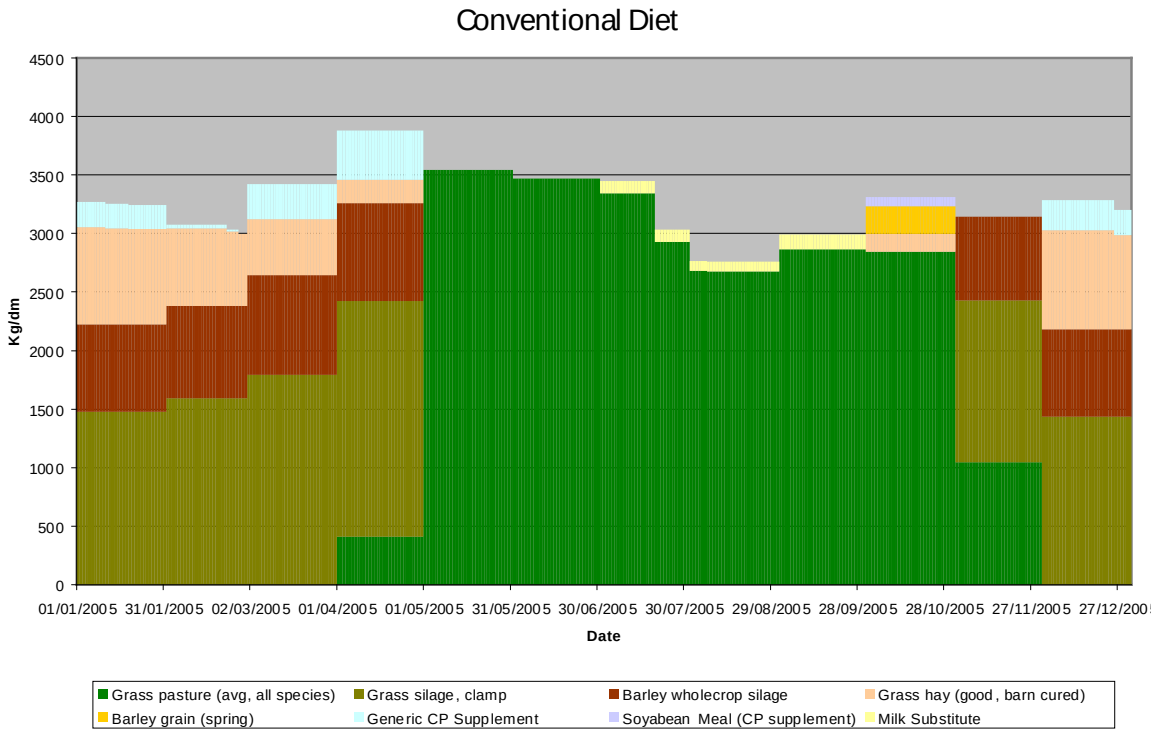

Figure 13: Diet Profile for the Conventional System

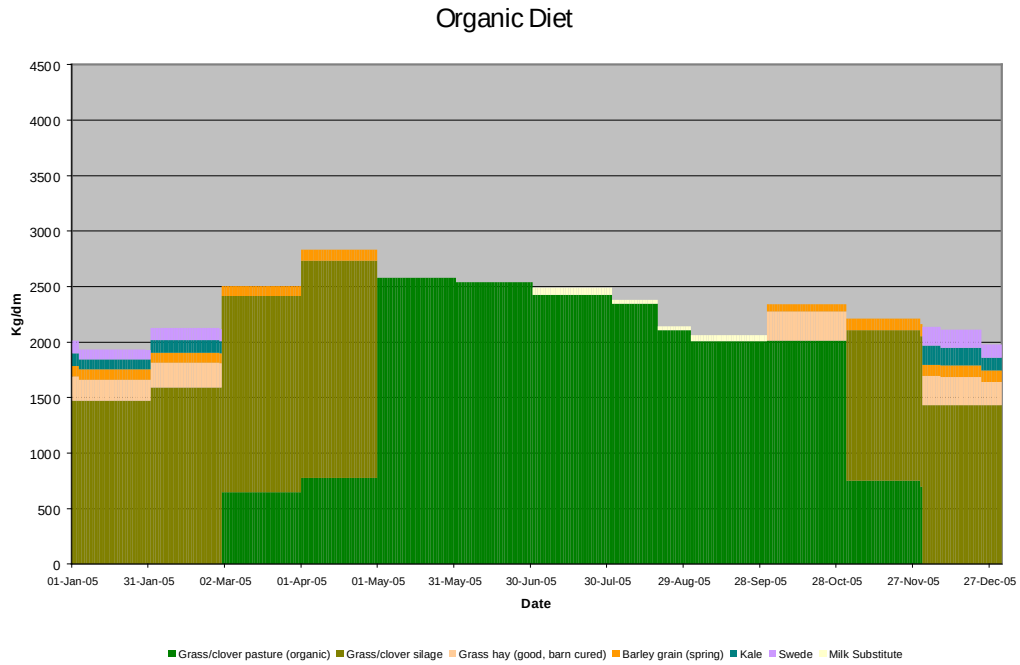

Figure 14: Diet Profile for the Organic System

The sales and purchases of livestock (excluding rams and bulls) expressed in physical terms (kg of liveweight) and differentiated by type are presented in Figure 15 and Figure 16. Again the reduction in productivity in the system is evident (small values for all stock types). The

inclusion of purchases (shown in red in Figure 15), however, shows the dependence of the conventional system on outside inputs and offsets some of the difference in productivity.

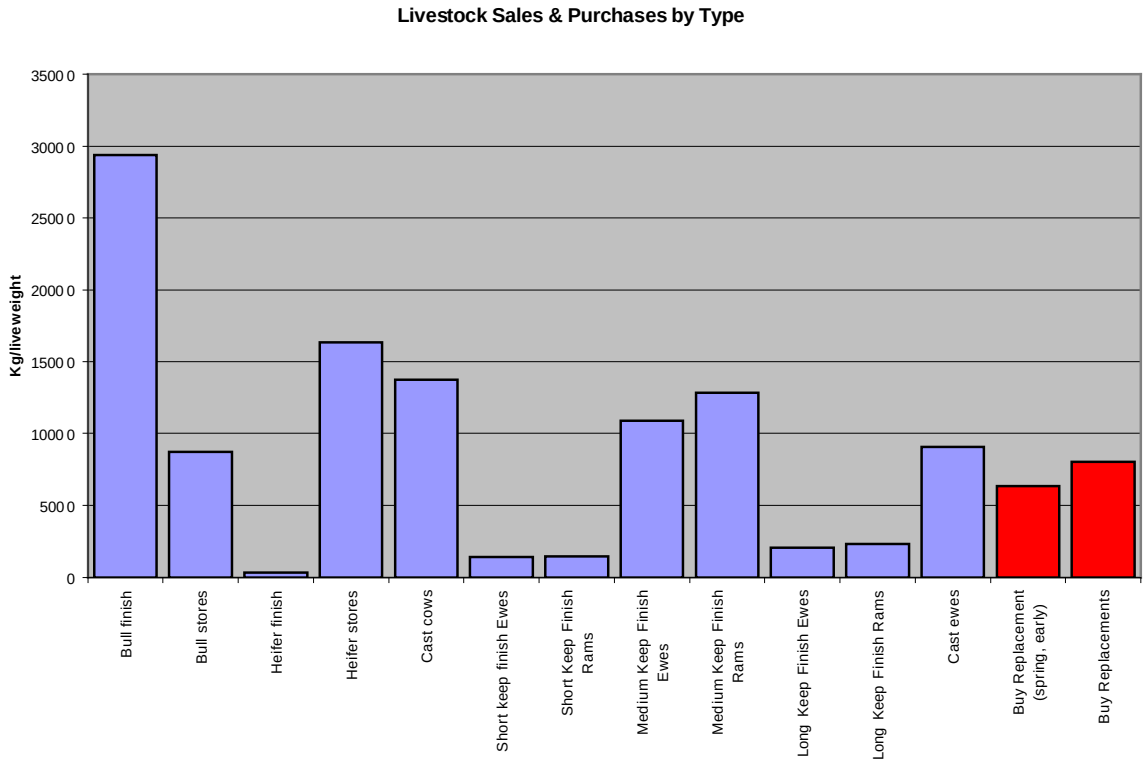

Figure 15: Sales and Purchase Profile for the Conventional System

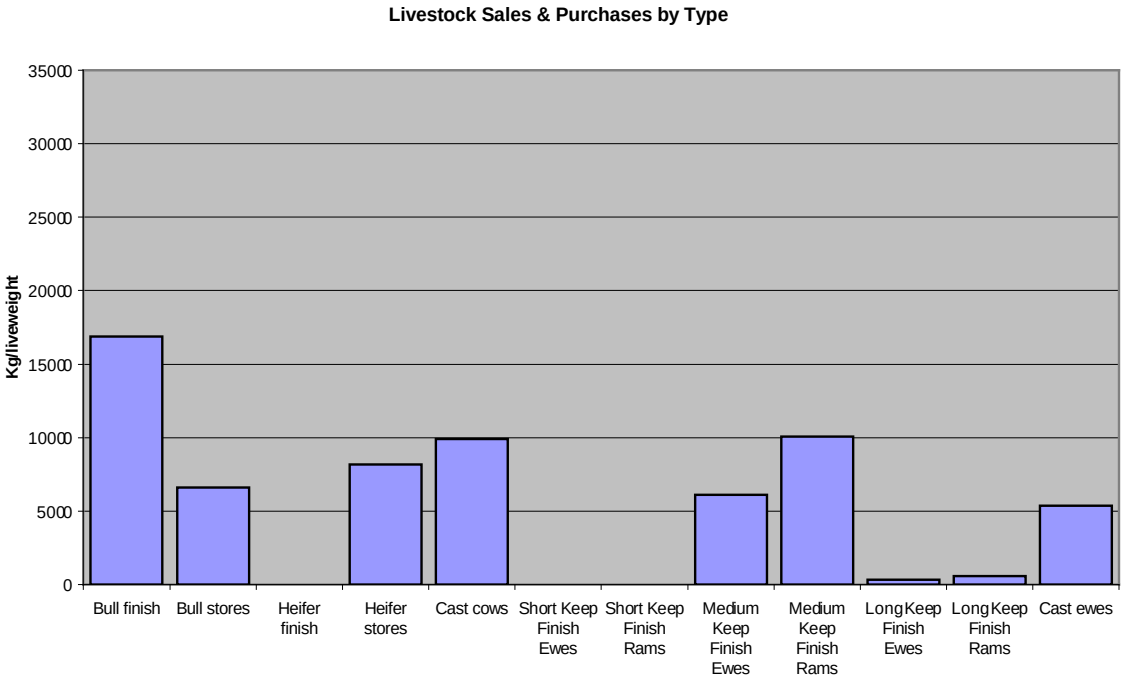

Figure 16: Sales and Purchase Profile for the Organic System

The resource utilisation profiles in Figure 17 and Figure 18 show the number of hours of usage for the capital machinery and the hours worked on identified task by on-farm labour. For labour a conventional 40 hour working week is used and work over this is identified as overtime. In both cases the machinery maintained has been minimised to reduce capital costs. Both systems make extensive use of contactors for operations such as silage making and barley whole crop or grain/straw harvesting. For the conventional system the capacity for fertiliser spreading has been retained since this is very weather dependent but does not require very expensive equipment. In the organic system, the range of equipment required is slightly larger but its use is limits by the relatively small areas of cropping. In both systems, the demand for labour is highly seasonal (requiring seasonal labour in March to May). The conventional system makes greater demands on the labour available. The labour scheduling tool makes allowances for overheads associated with particular tasks e.g. for maintenance of equipment and travel times across the farm, but is does not allow for strategic tasks such as planning, marketing and administration. Maintaining the records that support organic certification may make up the difference in labour requirements shown in the profiles.

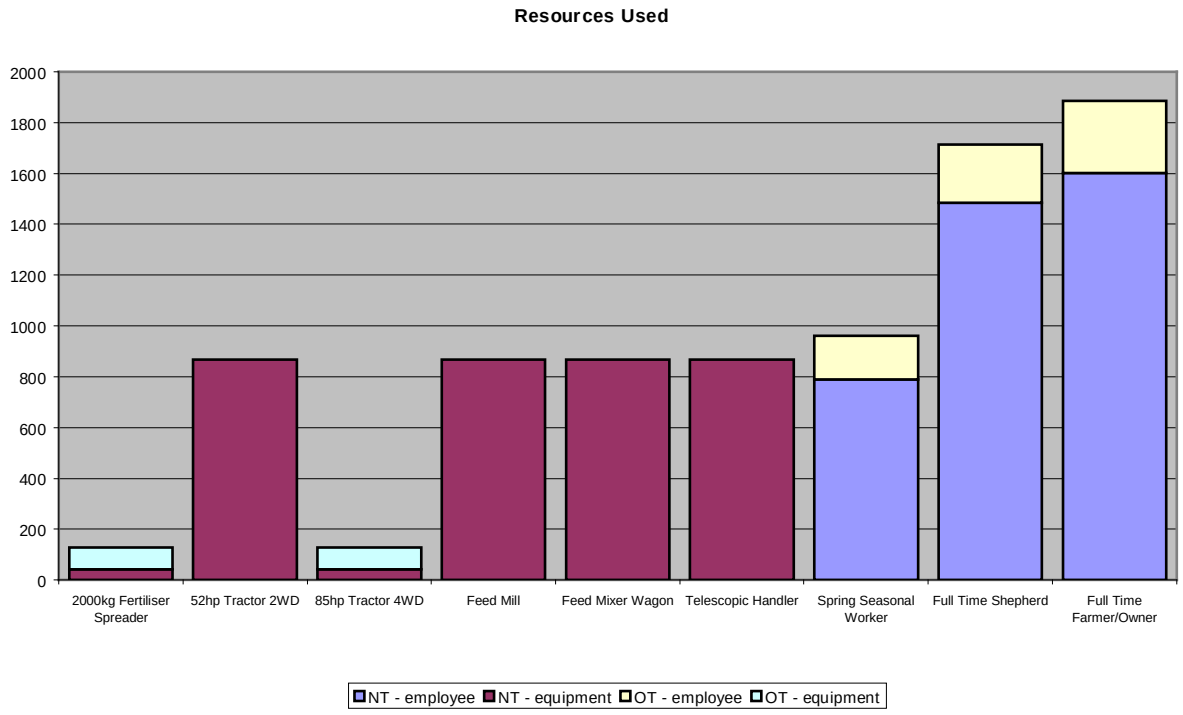

Figure 17: Resource Use Profile for the Conventional System

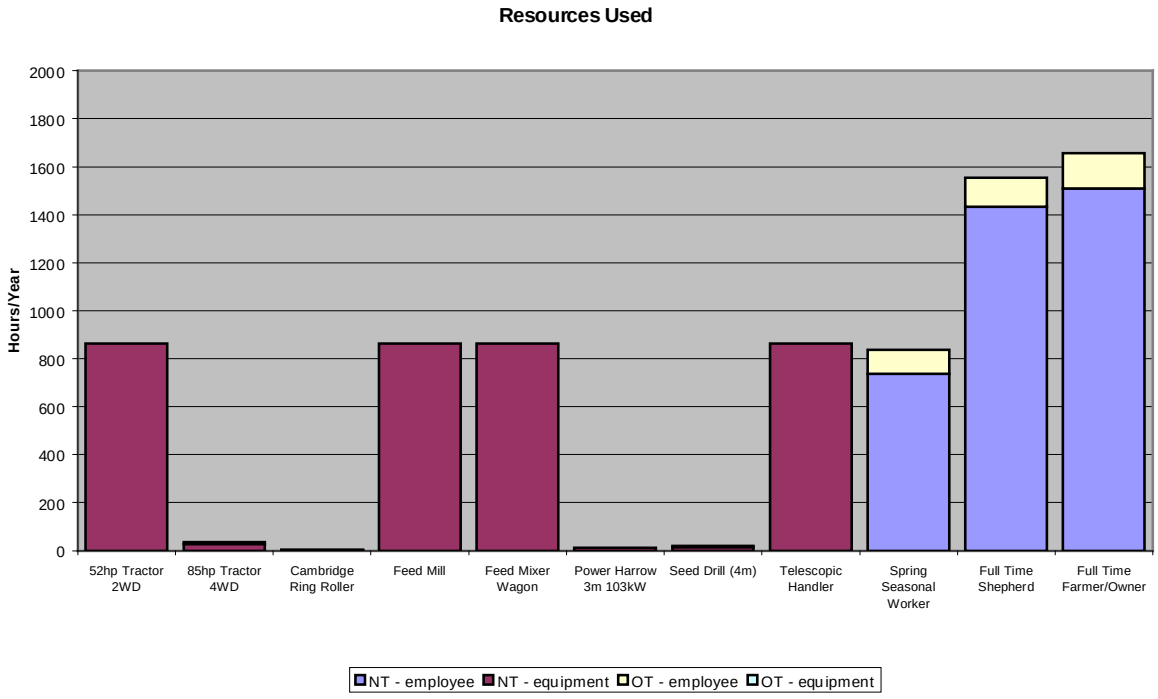

Figure 18: Resource Use Profile for the Organic System

The utility of the profiles is in substantially enhancing the interpretation of the financial summaries. Comparisons across of whole-farm systems involve a complex web of costs and benefits some of which can be counter-intuitive. For a fair comparison to be made, the assumptions within the set-up and modelling of the scenarios need to be open to scrutiny and challenge by stakeholders. A workshop-based approach allows the analysts to ensure that the interpretations within the model are defensible and to elicit improvements from a wider stakeholder group. The inclusion of such improvements within later analyses is essential to ensuring the credibility and legitimacy of the comparisons and the policy decisions that may, in turn, be based on them.

The financial figures shown in Table 11 are organised to present a balance sheet comparison of the two systems. Total Output items reflect the total market value of the output, which is broken down into Farm Use and Sale categories. In addition for livestock there are sale of livestock products (LS Prod Sales) these can be very significant (e.g. milk in dairy systems) or of minor importance (e.g. the wool sales) in the case study. For some circumstances (notably for very small businesses) it can be necessary to add further categories for on-farm consumption but these can safely be disregarded for this case study. The table contains a line for Other Output that could be very important for pluriactive businesses but have a zero value for the case study. The Total Specific Costs are those variable costs attributed directly to production activities and are significantly less than the Total Overhead (the sum of Machinery and Building Costs, Other Direct Inputs and Energy and Contract Work). Taken together these make up the Total Intermediate Consumption. Gross Farm Income is the balance of Outputs minus the Intermediate Consumption plus the balance of Subsidies and Taxes. For this comparison, Taxes are included, the balance of VAT is assumed to be zero and the only Subsidy included is the Farm Payment (need for LFASS?). Gross farm income minus Depreciation of capital machinery and infrastructure gives Net Farm Value Added. The fixed costs of Wages, Rent (imputed) and Interest payments on assumed working capital are combined into Total External Factors. Family Farm Income is the net margin.

Table 11: Balance Sheet Comparison of Organic vs. Conventional Case Study

Item	Organic (£k)	Conventional (£k)	Difference (£k)	%
TOTAL OUTPUT CROPS	36	35	0	101%
CROP FARMHOUSE CONSUMPTION	0	0	0	
CROP FARM USE	25	31	-6	77%
CROP SALES	13	4	8	167%
LS PURCHASES	0	20	-20	
TOTAL OUTPUT LIVESTOCK	160	176	-15	90%
LS PRODS FARMHOUSE CONSUMPTION	0	0	0	
LS FARMHOUSE CONSUMPTION	0	0	0	
LS PRODS FARM USE	0	0	0	
LS PRODS SALES	0	0	-0	94%
LS SALES	94	147	-53	44%
LS VALUE CHANGE	66	48	18	127%
OTHER OUTPUT	0	0	0	
TOTAL OUTPUT	196	211	-15	92%
TOTAL SPECIFIC COSTS	15	64	-48	-214%
MACHINERY AND BUILDING COSTS	15	15	-0	98%
ENERGY	15	15	-1	96%
OTHER DIRECT INPUTS	20	20	0	100%
CONTRACT WORK	22	23	-0	98%
TOTAL FARMING OVERHEADS	72	74	-1	98%
TOTAL INTERMEDIATE CONSUMPTION	87	137	-50	43%
TOTAL SUBSIDIES	N/A	N/A	N/A	
GROSS FARM INCOME	109	74	35	132%
DEPRECIATION	14	14	-0	100%
FARM NET VALUE ADDED	95	60	35	137%
WAGES PAID	60	65	-5	92%
RENT PAID	28	28	0	100%
INTEREST PAID	3	3	0	100%
TOTAL EXTERNAL FACTORS	91	96	-5	95%
FAMILY FARM INCOME	4	-36	40	1170%

It is clear that with the assumptions made on relative productivity and output prices the established organic system is marginally more profitable. However, since taxation is not included in the analysis it is likely that even the organic system is only marginally profitable in the absence of subsidy. The greater productivity of the conventional systems (seen in the significantly greater livestock sales) is offset by the value of the home-bred replacement in the organic system, the premium on the organic outputs (10-20%) and by income from other sources (mainly the arable crop sales). The biggest difference between the two systems, however, is in the total specific costs. In this regard, it the (recently increased) cost of inorganic fertiliser that has serious implication for profitability of the conventional system. There is (as of November 2008) anecdotal evidence that in these upland areas land managers are already reducing their inputs. The future availability and cost of working capital may also have implications for the higher input conventional systems profitability. It is clear from this example that the justification of organic maintenance payments in terms of income forgone or (on-farm as opposed to business development) additional costs is difficult to justify. In policy

terms there are also complex trade-offs to be considered. The reduced "environmental footprint" of the organic system is perhaps offset by reduced supply of materials to processors and ultimately to consumers.

5.4.2 Stakeholder views of differentiated payments – workshop outcomes

The stakeholder views on differentiated payments, using organic conversion and maintenance as the case-study, are structured using the questions specified in Section 3.5.

Q1 – What are the objectives of supporting organic agriculture?

Support for organic farming was seen as trying to achieve a combination of economic and environmental objectives. Conversion payments were needed (in most but not all cases) to overcome the particular problems caused by loss of yield before achieving additional income from premiums for organic production. Conversion payments were thus justified in economic terms as overcoming a market failure to deliver locally sourced materials to a market that has seen very considerable growth over the last ten years. It was noted, however, that while some stakeholders took the view that payment can only be justified if they are "responding to market demand", policy makers are to an extent market-making and in effect designing schemes to meet future or potential demands. "Early maintenance" payments in the years immediately post-conversion were also justified in terms of buffering recently converted business for market volatility when they are still developing robust networks of clients, new products and marketing strategies. Longer term maintenance payments were seen as delivering much more strongly against national (Scottish) priorities for public benefits (agri-environment, water quality, reducing GHG emissions and soil protection). Taken together delivery of these public goods meant that organic farming was a delivery mechanism for sustainable farming. It was recognised by the participants that such justifications for longer-term payments were incompatible with the existing WTO rules. In the long term the success and extent of the organic sector was seen to depend not on the payments regime, however but on the market situation, and perhaps influenced more strongly by food rather than farming policy. Stakeholders emphasised that markets for organic (as well as conventional) products are volatile. One of the key roles of the organic support payment is to buffer market changes and volatility and thus to increase stability for organic producers (in particular during the period of conversion but also in the "early maintenance phase").

Q2 – Is the current payment regime effective in achieving these objectives?

Assessing the effectiveness of payment regimes is significantly complicated by the difficulty of distinguishing cause and effect. The dominant driver in terms of growth of the organic sector is the market opportunities. Organic farming is, however, becoming more mainstream, considered by entrepreneurial managers as one of the viable options as part of a whole farm review rather than a strongly ethical statement. Payments were, however, still seen as a key to the initiation of changes – when no scheme is available, yet can be anticipated then very few conversions occur since it makes financial sense to delay conversion. Those conversions that do occur without support are usually tied very tightly to a specific contract ensuring that investment in conversion can be covered by later profitability. Maintenance payments are seen as a significant "hedge" element in the portfolio of incomes, especially when margins are being squeezed heavily and markets are more volatile. While stakeholders acknowledged that the organic support payment to some extent considers farm type differences in the payment calculations, it was stressed that the payments are insufficient for small hill farms (rough grazing), in particular if they have to buy in organic feed to meet the required standards. The

importance of payments covering additional feed costs was generally emphasised. Gaps between schemes can crate distortions in the numbers of businesses converting and are undesirable. Organic conversion may also be acting as a "gateway" for other agri-environmental measures, since the skills and experience (both practical farming and in terms of navigating the application process) developed in organic conversion stand individuals in good stead for higher-level stewardship schemes.

Overall the schemes are seen as successful but since 66% of applications for maintenance and 50% of conversion applications were unsuccessful then the overall size of the scheme may need to be reconsidered. Other barriers include the complexity of the application process and the fact that is only possible to apply online. In terms of the rates of incentives, these may not be the deciding factor for most managers but rather "a final incentive" that tips the balance. The limitations of long gaps between reviews of payment rates were seen as a generic issue but equally applicable to specifically organic payments. The balance of resources between conversion and maintenance may need to be considered – perhaps maintenance grants used to improve marketing are the key to commercial successes but any increase in maintenance was only seen as coming from the conversation "pot" which was seen as undesirable. There was a need in Scotland to consider how best to support organic production in smaller units on hill land.

Q3 – Are there unintended consequences?

Few unintended consequences were evident all those that had occurred were positive. The support for organic farming was seen as a key element in the rise in the profile of food quality and its direct link to land management. This had increased the visibility of farming through quality assurance and the marketing of food through individual farmer brands. Other spin-offs were in the diversification of farming systems both horizontally and vertically,

Q4 – Could alternative payment calculations have a positive impact?

Any alternative formulation of payments would need to have explicit and specific aims – for example more entrants, more uptake, who participates, where participation occurs, efficiency of use of funds, or equity or effectiveness. Participation is particularly difficult to predict using only financial criteria since there are now a wider range of land owners and management goals (including non-productivist lifestyle and environmental goals where income forgone is difficult to assess). Differentiation based on land quality would affect the type of land and farms which participate, which in turn would result in different economic and environmental impacts and spill-over effects of the support payment. For example higher payments for rough grazing and lower payments for arable land would lower the number of arable farms in the Programme, but increase the amount of rough grazing land under organic support. For the differentiations to be effective they might have to be too complex to be acceptable administratively.

Several participants raised the option of including fixed cost and investment aspects in payment calculations. Potential problems in previous negotiations with the EC were noted since there is the potential for double counting since such activities could be included in Axis 1 measures. Examples exist, however, where the fixed cost have been sufficiently well specified that they have been included in AEMs with the approval of the EC. Transaction costs were seen as under accounted for, particularly where there was the need for collaboration whether between managers (in a cooperative action) or between a manager and consultants.

Options for payment-by-results were seen as difficult to implement, requiring much greater levels of differentiation to reflect the farm specific characteristics. More specific targeting has been implemented through regional/local allocation of resources but not though differentiation within the payment calculations. Scheme complexity in agri-environment measures was seen as a real issue with over 500 options available in one higher-level scheme. Flat rates with regional top ups were seen as having potential but participants also noted the difficulties of significant number of cross-border businesses or "edge effects". The increased volatility of markets also mean that infrequently reviewed payment calculations could result in under or over-compensation and while more frequent payment reviews might be possible this would be incompatible with longer term budgets and planning (for both land managers and policy-makers).

Q5 – Are there key factors that the payments calculations do not or cannot address?

The added value of collaboration between businesses (particularly for agri-environmental and/or diffuse pollution management measures) was repeatedly emphasised. There are some schemes where top-up points are awarded for cooperation but these are little used (too few points for the efforts required) and the administration costs are seen as significant. One option was to include such cooperation costs in transaction costs but this was still seen as undervaluing the potential for significant synergies in outcomes.

Potential conflicts with tenancy agreements affect the participation of farmers, for example in cases of short term leases with a shorter duration than the contract for the support programme.

Stakeholders also felt that payment requirements defined through the EC Rural Development Regulation and the interpretation of WTO agreements limit the scope for new and innovative methods for payment calculations beyond action-based standard cost approaches simply based on additional variable costs and income foregone. In particular, the application of agricultural income foregone to quantify payments for the provision of public goods was seen as inadequate.

More fundamentally the current payment regime (and in fact any payment regime) can not take into account individual attitudes of farmers which affect the participation of farmers and thus the success of the support payment. In order to take into account individual attitudes of farmers, payments would need to be designed and negotiated on a farm-by-farm basis. However, such an approach would cause very high implementation and administration costs. Consequently, stakeholders suggested that one has to accept some degree of generalisation and standardisation in the payment design and calculation.

Q6. Would the tools, methods and outputs from the AGRIGRID research be useful in supporting decisions?

The AGRIGRID tools were in general seen as useful and there was the desire for more information so that a better informed assessment could be made. In particular the opportunity to use tools and datasets that can look beyond "average values" was seen as valuable. The following section supplements these views using the results from the evaluation.

5.4.3 Evaluation of the workshop process

Figure 19 summarises Part I of the evaluation sheets. The overall responses from the workshop participants were very positive, with definitely and definitely-very useful responses out weighing possibly and unlikely responses for all but one of the items. The wording for the top two categories was deliberately challenging to make certain that positive responses could

be clearly differentiated from the more neutral possibly category. Indeed there was only one instance of unlikely and no not useful responses in the whole survey – despite it being filled in and returned anonymously.

Particularly strong positive responses (the difference between definitely and possibly) were seen for the options for differentiation. This may reflect a strong desire for stakeholders to be part of the process of assessing concrete options rather than lobbying for general principles. The case-study analysis and its components were also well received perhaps indicating the utility of tools that allow a more in-depth exploration (including non-financial factors) of the circumstances within which differentiated payments would be applied. It is also perhaps worth noting that the breakout groups were seen as more useful than the seminar elements reflecting that stakeholders want to be actively engaged in debate on the issue event when there is no formal decision making component to the workshop.

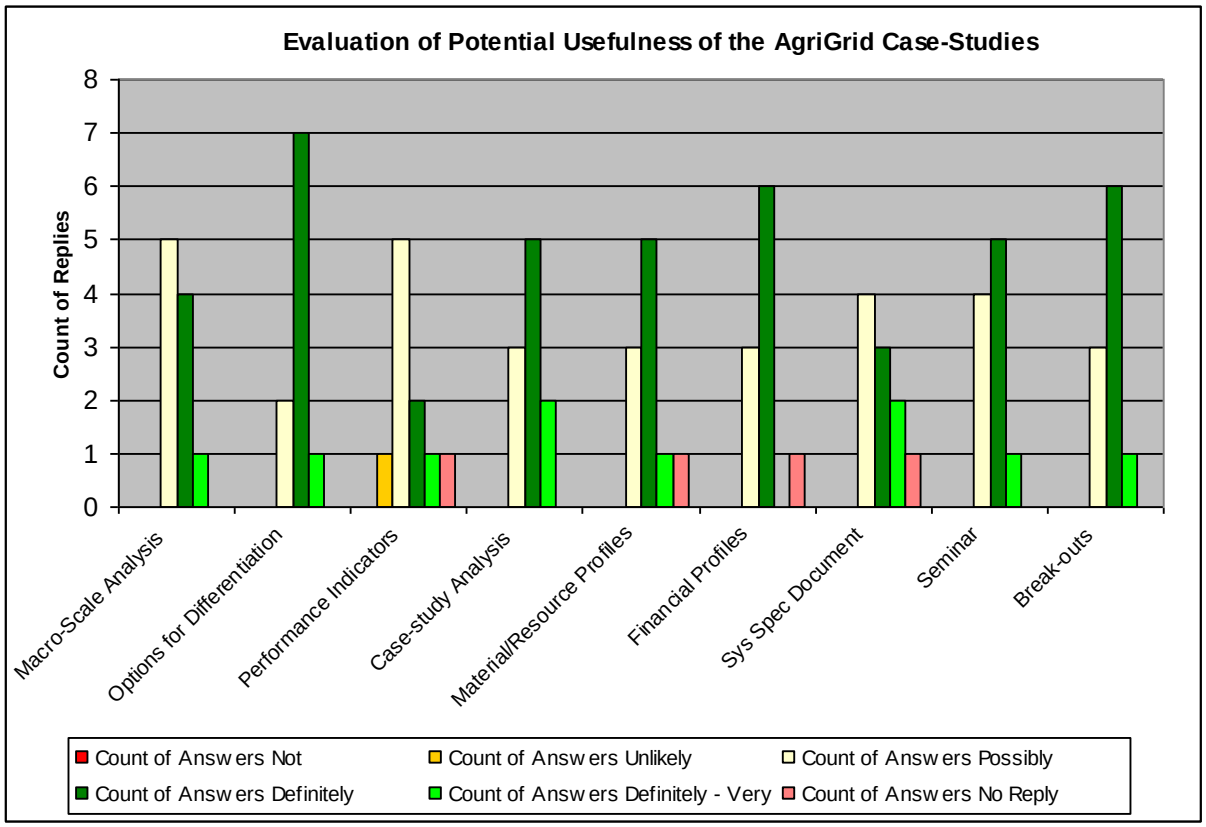

Figure 19: Outputs from Part I of the workshop evaluation.

Figure 20 summarises the responses from Part II of the evaluation. Question on the awareness of the research in support of policy is included to assess the lowest level of potential for the workshop process to act as awareness raising for the research team. In this case the majority of the stakeholder present were familiar with the work of the research team but there were new contacts. Of the stakeholders present Q2 revealed that nearly all have some level of experience in payment calculations and a majority were either professional involved or classed themselves as well informed. This confirmed that the participants were the correct audience for the workshop and that conclusions can safely be drawn from their inputs. Responses to Q3 show that the substantial majority of the stakeholders gained substantial or fair amounts of new knowledge. Of the participants gaining little knowledge two were professional and one well informed and the smaller knowledge gains are perhaps top be expected. The responses to Q4 on changing of views saw a substantial minority change their

views with the others confirming their existing positions. The nature of the changes (in favour or against differentiated payments) was not sought and this is a weakness in the evaluation. Finally Q5 on the effectiveness of workshops as a means of communication with stakeholders and policy makers (50% replying marginal) contrasts markedly with the more positive responses to the individual element of the process (in Part I). This may reflect the very tight schedules that had to be kept to within the half-day format, with participants perhaps dissatisfied with the time allocated to deliberation rather than seminar style interactions.

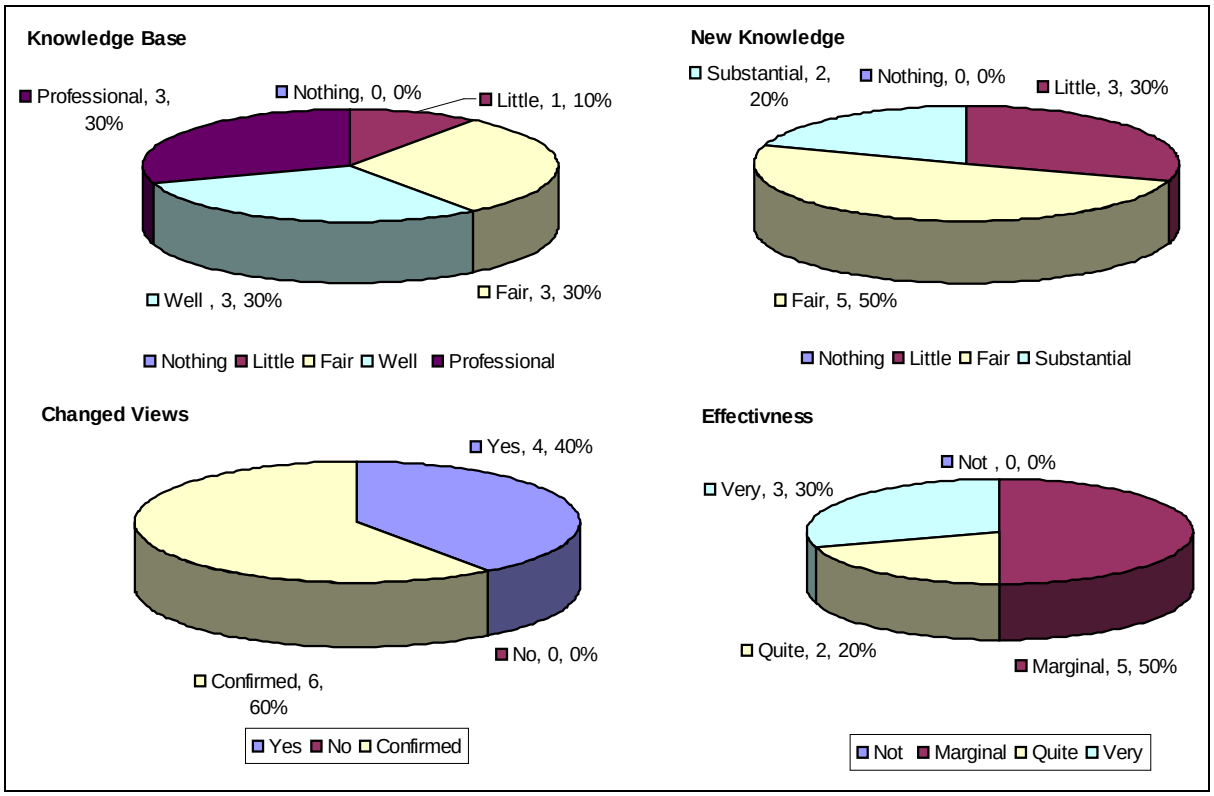

Figure 20: Outputs from Part II - of the workshop evaluation

From the additional comments in the evaluation, there were still reservations on how best to include the results of research in the way payments are calculated. This perhaps means that despite having an effective process for contributing to the debate on the issues of payment calculations there still remains a challenge of how the outputs of research are best incorporated (along with other sources of knowledge) into the decision making process for payment calculations. The interactive use of the payment grids developed within this project (see Deliverable 11) in a multi-stakeholder environment may be one option that is worth testing.

5.5 Conclusions of the workshop-based farm-level analysis

The first objective of the workshop-based farm-level assessment was to support the assessment of different payment calculations. This objective was achieved by undertaking three activities. First, by developing a farm-scale "test bed" that would facilitate the comparison of conventional and organic production. The LADSS bio-economic model was used with a case study in the uplands of central Scotland. The bio-economic model characterises systems in terms of: flows of materials (crops, livestock and direct inputs), schedules for the use of labour, machinery, infrastructure and contractors and the financial balance sheet for the enterprises and the whole farm. The AGRIGRID case-study compared for the same farm the existing a conventional system with a hypothetical converted the

research team made use of expert consultants who had undertaken the conversion to organics in similar circumstances. This ensured that both the conventional and organic systems represented “best practice” in terms land management and made explicit the assumptions that underpin the case study. A series of system characterisations were generated for each systems and these formed the basis of the materials used in the multi-stakeholder workshop.

The second objective of the research was to assess the implications of alternative payment calculation methods with stakeholders using the case-study outputs in a structured workshop process. The outcomes of both the macro and the farm-scale analysis were presented and formed the basis for deliberation in a multi-perspective stakeholder workshop hosted by the Scottish Government. This included participants from government, NGO’s, trade-bodies and practitioners. The key findings of the workshop were that:

- Longer term payments (such as those for maintaining organic production) were seen as a key mechanism for buffering the industry from market volatility with conversion payments required to overcome the particular challenge of immediately reduced yields not being compensated for by increased financial margins. There was, however, a strong view that payments rates should include the additional public goods delivered rather than strictly adhering to income forgone and additional costs.
- For organics the schemes were overall seen as successful, but since they are significantly oversubscribed then the size of the budget was questioned as organic agriculture was seen as delivering public goods that align with national and regional priorities. The potentially redistributive effects of differentiation in reducing wind-falls were accepted but stakeholders wanted to see any efficiency savings used to increase participation not result in smaller overall budgets. Specific issues were raised regarding the most marginal hill farming systems but in general there were perceived to have been few unintended consequences.
- If further differentiation in payments were to be implemented the goals (such as increased participation) would need to be explicit. The ability to include specific fixed costs was seen as desirable but participants acknowledged the need to avoid double counting such investments which can be supported from other sources. Other options such as regional top ups and more frequent reviews of payment rates were identified but their success was seen to depend on somehow ensuring that complexity/cost for practitioners and administrators did not outweigh the benefits.
- The need for mechanisms that to promote cooperation between land managers in delivering (particularly agri-environmental) benefits was identified. The use of transaction cost payments was one potion but this was seen as undervaluing the outcomes of such cooperation.

The final objective was to evaluate the usefulness of case-studies the workshop based process and the case-study materials. This was achieved using an end-of-workshop evaluation sheet filled in by participants. Both the macro and the farm-scale analyses were positively received. The workshop participants were keen to be part of any debate on differentiation and the workshop format was effective in eliciting their views and ensuring that the conclusion drawn in the case-studies were valid. In particular the inclusion of both macro and farm-scale analyses was effective for the multi-perspective audience as it both gave the insights into the national scale outcomes without loosing sight of the effects of differentiation on individuals land managers businesses.

6 Conclusions

The results from the FADN-based case-studies show that though overcompensation can be reduced by payment differentiation in most cases, savings in budget expenditures are often small and are even offset by increasing PRTCs. The evaluation of the overall performance of payment differentiation strongly depends on the weights attached to the objective of reducing unintended transfers. Generally, the scope for effective and efficient differentiation depends on specific measure characteristics. Potential benefits of differentiated approaches are higher if

- variances of participation costs in the universe of farms are high
- discriminatory nature of differentiation is significant
  - for regional differentiation, differences between subregions need to be high while variances within sub regions should be low
  - for farm individual differentiation, the correlation between actual farm individual costs of participation and selected indicators for payment determination must be high
- correlation between costs of participation and environmental benefits are strong
- administration costs for differentiation approaches are low

For the analysed stylised agri-environmental measures it has been assumed that participation causes at least some costs to all farmers, i.e. measures are targeted and the analysis can focus on the issue of tailoring. However, there are specific measures, for example 'diversifications of crop rotations' or 'extensive grassland usage' where usually some farmers already respect the measure requirements and do not face any adaptation costs but obtain pure windfall profits, while at the same time for the administration the unambiguous identification of these farmers is impossible or could only be achieved at prohibitively high costs. Future research on the contribution of payment differentiation in the presence of pure windfall profits seems to one promising extension of the approach presented in this report. Further, taking into account nonlinear correlations between participation costs and ecological benefits might change outcomes considerably, though finding an empirical basis for such a specification will remain a challenge.

The workshops with government representatives and other stakeholders indicated a fairly large interest in improving payment calculations and differentiations and identified lack of information as well as the fear of increased administrative burdens as key restraints. Datasets, tools and methods that can look beyond "average values" and that allow a more in-depth exploration, and which structure data and process, were seen as helpful in overcoming these constraints. Future workshops should also aim to include farmers, as acceptance of payment differentiation schemes (e. g., as being 'just') by the target group is vital for the success of the respective rural development measures.

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Annex I: Detailed results from the FADN-based analysis

Table 12: Impact of differentiated payment levels on overcompensation, budget and economic efficiency

Measure and Region	Differentiation level	Rate of over-compensation	Budgetary cost-effectiveness	Economic cost-effectiveness	Including additional PRTCs: Budgetary cost-effectiveness	Including additional PRTCs: Economic cost-effectiveness
		flat-rate = 100 %			flat-rate = 100 %	
Wheat	*Ecological benefits are constant per ha*					
Germany North Rhine-Westphalia	NUTS II level	98.8	101.2	102.4	104.2	105.8
	NUTS III level	98.3	99.7	101.4	102.7	104.7
	Farm level soilindex (LVZ)	100.2	100.4	100.1	103.4	103.5
	Ecological benefits depend on production intensities before participation					
	NUTS II level	98.8	99.3	100.5	102.3	103.8
	NUTS III level	98.3	98.9	100.4	101.7	103.8
	Farm level soilindex (LVZ)	100.3	99.9	*99.7* [a)]	102.9	103.0
Germany Lower Saxony	*Ecological benefits are constant per ha*					
	NUTS II level	98.6	100.2	101.7	103.2	105.2
	NUTS III level	96.6	99.5	103.0	102.5	106.5
	Farm level soilindex (LVZ)	97.4	101.1	103.8	104.2	107.3
	Ecological benefits depend on production intensities before participation					
	NUTS II level	98.7	98.8	100.1	101.8	103.5
	NUTS III level	96.6	96.5	*99.9* [a)]	99.4	103.2
	Farm level soilindex (LVZ)	97.4	98.0	100.5	100.9	103.9
Germany Bavaria	*Ecological benefits are constant per ha*					
	NUTS II level	98.0	99.4	101.5	102.4	104.9
	NUTS III level	96.5	99.8	103.4	102.8	106.9
	Farm level soilindex (LVZ)	97.8	99.7	101.9	102.7	105.3
	Ecological benefits depend on production intensities before participation					
	NUTS II level	98.0	97.9	*99.8* [a)]	100.8	103.2
	NUTS III level	96.4	96.3	*99.8* [a)]	99.2	103.2
	Farm level soilindex (LVZ)	97.9	98.0	100.1	100.9	103.5
Potatoes	*Ecological benefits are constant per ha*					
Germany North Rhine-Westphalia	NUTS II level	97.6	105.0	107.6	108.1	111.8
	NUTS III level	89.0	106.2	119.2	109.3	123.5
	Farm level soilindex (LVZ)	99.1	99.6	100.5	102.6	104.5
	Ecological benefits depend on production intensities before participation					
	NUTS II level	95.3	98.5	103.4	101.5	107.3
	NUTS III level	89.8	92.5	103.1	95.3	106.8
	Farm level soilindex (LVZ)	99.1	99.6	100.5	102.6	104.5
Germany Lower Saxony	*Ecological benefits are constant per ha*					
	NUTS II level	98.0	98.7	100.8	101.7	104.7
	NUTS III level	90.5	99.1	109.5	102.0	113.4
	Farm level soilindex (LVZ)	99.9	100.9	100.9	103.9	104.9
	Ecological benefits depend on production intensities before participation					
	NUTS II level	98.0	98.7	100.8	101.7	104.7
	NUTS III level	90.4	91.8	101.6	94.5	105.2
	Farm level soilindex (LVZ)	99.7	100.6	100.9	103.7	104.9
Germany Bavaria	*Ecological benefits are constant per ha*					
	NUTS II level	96.8	101.4	104.8	104.4	108.8
	NUTS III level	90.6	101.0	111.6	104.1	115.5
	Farm level soilindex (LVZ)	99.9	101.4	101.5	104.4	105.5
	Ecological benefits depend on production intensities before participation					
	NUTS II level	96.3	96.3	100.0	99.2	103.8
	NUTS III level	90.3	97.5	108.0	100.4	111.8
	Farm level soilindex (LVZ)	100.2	100.0	*99.8* [a)]	103.0	103.8

[a)] Less than 100 % due to integer number of contracts.

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Table 12 (continued): Impact of differentiated payment levels on overcompensation, budget and economic efficiency

Measure and Region	Differentiation level	Rate of over-compensation	Budgetary cost-effectiveness	Economic cost-effectiveness	Including additional PRTCs: Budgetary cost-effectiveness	Including additional PRTCs: Economic cost-effectiveness
		flat-rate = 100 %			flat-rate = 100 %	
Crop rotation	*Ecological benefits are constant per ha*					
Germany North Rhine-Westphalia	NUTS II level	99.9	109.6	109.8	112.9	113.9
	NUTS III level	90.3	97.2	107.6	100.1	111.3
	Farm level soilindex (LVZ)	95.4	95.5	100.1	98.4	103.7
	Ecological benefits depend on production intensities before participation					
	NUTS II level	95.5	95.6	100.0	98.4	103.6
	NUTS III level	90.5	90.6	100.2	93.4	103.6
	Farm level soilindex (LVZ)	95.5	95.3	99.9 [a)]	98.2	103.5
Germany Lower Saxony	*Ecological benefits are constant per ha*					
	NUTS II level	94.8	95.2	100.4	98.1	104.3
	NUTS III level	88.8	92.9	104.6	95.7	108.4
	Farm level soilindex (LVZ)	99.1	99.1	100.0	102.1	104.1
	Ecological benefits depend on production intensities before participation					
	NUTS II level	94.6	94.7	100.1	97.5	103.9
	NUTS III level	88.6	88.5	99.9 [a)]	91.2	103.5
	Farm level soilindex (LVZ)	99.0	99.0	100.0	101.9	104.0
Germany Bavaria	*Ecological benefits are constant per ha*					
	NUTS II level	101.4	101.8	100.4	104.9	104.1
	NUTS III level	95.3	97.6	102.5	100.6	106.0
	Farm level soilindex (LVZ)	99.8	99.8	100.0	102.8	103.6
	Ecological benefits depend on production intensities before participation					
	NUTS II level	101.2	101.1	99.9 [a)]	104.1	103.5
	NUTS III level	95.1	95.0	99.9 [a)]	97.9	103.3
	Farm level soilindex (LVZ)	99.8	99.8	100.0	102.8	103.6
Grassland	*Ecological benefits are constant per ha*					
Germany North Rhine-Westphalia	NUTS II level	106.8	145.9	136.6	150.2	144.1
	NUTS III level	94.7	112.2	118.5	115.5	124.2
	Farm level stocking rates	83.4	96.6	115.8	99.5	120.8
	Ecological benefits depend on production intensities before participation					
	NUTS II level	100.8	101.2	100.4	104.2	105.7
	NUTS III level	94.7	93.4	*98.7* [a)]	96.2	103.5
	Farm level stocking rates	83.0	83.5	100.7	86.0	105.0
Germany Lower Saxony	*Ecological benefits are constant per ha*					
	NUTS II level	99.6	101.1	101.4	104.1	106.2
	NUTS III level	97.1	108.1	111.3	111.4	116.4
	Farm level stocking rates	98.8	119.0	120.5	122.6	126.2
	Ecological benefits depend on production intensities before participation					
	NUTS II level	99.9	99.5	*99.6* [a)]	102.5	104.3
	NUTS III level	96.6	96.0	*99.4* [a)]	98.9	103.9
	Farm level stocking rates	99.5	99.6	100.1	102.6	104.8
Germany Bavaria	*Ecological benefits are constant per ha*					
	NUTS II level	100.8	102.7	101.9	105.8	106.3
	NUTS III level	99.4	105.7	106.3	108.9	110.8
	Farm level stocking rates	84.8	115.3	136.0	118.8	141.0
	Ecological benefits depend on production intensities before participation					
	NUTS II level	100.5	100.7	100.2	103.7	104.5
	NUTS III level	99.6	99.2	*99.7* [a)]	102.2	104.0
	Farm level stocking rates	85.5	85.4	*99.9* [a)]	88.0	103.6

[a)] Less than 100 % due to integer number of contracts.

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Table 12 (continued): Impact of differentiated payment levels on overcompensation, budget and economic efficiency

Measure and Region	Differentiation level	Rate of over-compensation	Budgetary cost-effectiveness	Economic cost-effectiveness	Including additional PRTCs: Budgetary cost-effectiveness	Including additional PRTCs: Economic cost-effectiveness
		flat-rate = 100 %			flat-rate = 100 %	
Wheat	*Ecological benefits are constant per ha*					
Italy Veneto	NUTS III level	98.07	99.14	101.09	102.12	104.36
	Altitude class	100.13	100.13	100.00	103.13	103.30
	Ecological benefits depend on production intensities before participation					
	NUTS III level	97.95	99.01	101.09	101.98	104.36
	Altitude class	100.13	100.13	100.00	103.13	103.30
Italy Lazio	*Ecological benefits are constant per ha*					
	NUTS III level	102.27	102.69	100.42	105.78	104.14
	Altitude class	98.38	98.53	100.15	101.49	103.73
	Ecological benefits depend on production intensities before participation					
	NUTS III level	102.23	102.65	100.42	105.73	104.14
	Altitude class	98.22	98.37	100.15	101.32	103.72
Italy Sicilia	*Ecological benefits are constant per ha*					
	NUTS III level	98.04	100.85	102.86	103.88	106.43
	Altitude class	100.00	100.00	100.00	103.00	103.54
	Ecological benefits depend on production intensities before participation					
	NUTS III level	97.59	97.57	99.98 [a)]	100.50	103.44
	Altitude class	100.00	100.00	100.00	103.00	103.54
Wheat	*Ecological benefits are constant per ha*					
Czech Repulic	NUTS II level	98.96	105.05	106.16	108.20	109.99
	NUTS III level	98.05	104.89	106.98	108.04	110.80
	Production area codes	98.17	99.67	101.54	102.66	105.17
	Modified production area codes	98.19	100.30	102.14	103.31	105.80
	Farm level soilindex	98.42	101.35	102.97	104.39	106.67
	Farm level farm size	99.13	99.65	100.52	102.64	104.15
	Farm level altitude	98.73	100.36	101.65	103.37	105.31
	Ecological benefits depend on production intensities before participation					
	NUTS II level	98.19	98.81	100.64	101.78	104.23
	NUTS III level	98.16	98.12	99.96 [a)]	101.06	103.53
	Production area codes	98.11	98.35	100.25	101.30	103.83
	Modified production area codes	98.30	97.88	99.57 [a)]	100.81	103.13
	Farm level soilindex	98.18	98.65	100.48	101.61	104.07
	Farm level farm size	99.13	99.64	100.52	102.63	104.15
	Farm level altitude	98.50	98.72	100.22	101.68	103.82
Barley	*Ecological benefits are constant per ha*					
UK Scotland	Main agricultural area	99.71	100.08	100.37	103.09	103.80
	Altitude class	100.00	100.00	100.00	103.00	103.43
	Farm types	100.09	100.20	100.11	103.20	103.54
	Farm size class	99.01	99.55	100.54	102.54	103.95
	Ecological benefits depend on production intensities before participation					
	Main agricultural area	99.38	99.75	100.37	102.74	103.79
	Altitude class	100.00	100.00	100.00	103.00	103.43
	Farm types	99.91	100.01	100.11	103.01	103.53
	Farm size class	99.00	99.53	100.54	102.52	103.95

[a)] Less than 100 % due to integer number of contracts.

Table 13: Trade-offs between objectives 'reducing unintended transfers' and 'reducing resource costs' with different weightings and PRTCs

Measure and Region	Differentiation level	Evaluation with no additional PRTCs			Level of PRTCs at break-even point % of transfers	
		Without weighting	Weighting 1:1	Weighting 2:1	Weighting 1:1	Weighting 2:1
Wheat	*Ecological benefits are constant per ha*					
	NUTS II level	indeterminate	inferior	inferior	-	-
	NUTS III level	indeterminate	superior	superior	0.3	1.9
Germany North Rhine-Westphalia	Farm level soilindex (LVZ)	inferior	inferior	inferior	-	-
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	0.7	1.9
	NUTS III level	indeterminate	superior	superior	1.3	2.9
	Farm level soilindex (LVZ)	indeterminate	superior	inferior	0.0	-
	Ecological benefits are constant per ha					
	NUTS II level	indeterminate	inferior	superior	-	1.0
	NUTS III level	indeterminate	superior	superior	0.5	3.6
Germany Lower Saxony	Farm level soilindex (LVZ)	indeterminate	inferior	superior	-	1.1
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	1.2	2.5
	NUTS III level	indeterminate	superior	superior	3.6	7.1
	Farm level soilindex (LVZ)	indeterminate	superior	superior	2.1	4.6
	Ecological benefits are constant per ha					
	NUTS II level	indeterminate	superior	superior	0.6	2.5
	NUTS III level	indeterminate	superior	superior	0.2	3.4
Germany Bavaria	Farm level soilindex (LVZ)	indeterminate	superior	superior	0.3	2.3
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	2.2	4.2
	NUTS III level	indeterminate	superior	superior	3.9	7.6
	Farm level soilindex (LVZ)	indeterminate	superior	superior	2.1	4.2
Potatoes	*Ecological benefits are constant per ha*					
	NUTS II level	indeterminate	inferior	inferior	-	-
	NUTS III level	indeterminate	inferior	superior	-	2.0
Germany North Rhine-Westphalia	Farm level soilindex (LVZ)	indeterminate	superior	superior	0.4	1.3
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	1.5	5.6
	NUTS III level	indeterminate	superior	superior	8.1	18.6
	Farm level soilindex (LVZ)	indeterminate	superior	superior	0.4	1.3
	Ecological benefits are constant per ha					
	NUTS II level	indeterminate	superior	superior	1.3	3.2
	NUTS III level	indeterminate	superior	superior	1.0	9.2
Germany Lower Saxony	Farm level soilindex (LVZ)	inferior	inferior	inferior	-	-
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	1.3	3.2
	NUTS III level	indeterminate	superior	superior	8.9	19.2
	Farm level soilindex (LVZ)	indeterminate	inferior	inferior	-	-
	Ecological benefits are constant per ha					
	NUTS II level	indeterminate	inferior	superior	-	0.9
	NUTS III level	indeterminate	inferior	superior	-	6.7
Germany Bavaria	Farm level soilindex (LVZ)	inferior	inferior	inferior	-	-
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	3.9	7.8
	NUTS III level	indeterminate	superior	superior	2.6	11.4
	Farm level soilindex (LVZ)	indeterminate	inferior	inferior	-	-

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Table 13 (continued): Trade-offs between objectives 'reducing unintended transfers' and 'reducing resource costs' with different weightings and PRTCs

Measure and Region	Differentiation level	Evaluation with no additional PRTCs			Level of PRTCs at break-even point % of transfers	
		Without weighting	Weighting 1:1	Weighting 2:1	Weighting 1:1	Weighting 2:1
Crop rotation	*Ecological benefits are constant per ha*					
Germany North Rhine-Westphalia	NUTS II level	inferior	inferior	inferior	-	-
	NUTS III level	indeterminate	superior	superior	2.9	12.0
	Farm level soilindex (LVZ)	indeterminate	superior	superior	4.7	9.5
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	4.6	9.3
	NUTS III level	indeterminate	superior	superior	10.3	20.8
	Farm level soilindex (LVZ)	indeterminate	superior	superior	4.9	9.7
Germany Lower Saxony	*Ecological benefits are constant per ha*					
	NUTS II level	indeterminate	superior	superior	5.0	10.4
	NUTS III level	indeterminate	superior	superior	7.6	18.9
	Farm level soilindex (LVZ)	indeterminate	superior	superior	0.9	1.9
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	5.7	11.3
	NUTS III level	indeterminate	superior	superior	13.0	25.9
	Farm level soilindex (LVZ)	indeterminate	superior	superior	1.0	2.1
Germany Bavaria	*Ecological benefits are constant per ha*					
	NUTS II level	inferior	inferior	inferior	-	-
	NUTS III level	indeterminate	superior	superior	2.4	6.9
	Farm level soilindex (LVZ)	indeterminate	superior	superior	0.2	0.4
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	inferior	inferior	-	-
	NUTS III level	indeterminate	superior	superior	5.3	10.4
	Farm level soilindex (LVZ)	indeterminate	superior	superior	0.2	0.4
Grassland	*Ecological benefits are constant per ha*					
Germany North Rhine-Westphalia	NUTS II level	inferior	inferior	inferior	-	-
	NUTS III level	inferior	inferior	inferior	-	-
	Farm level stocking rates	indeterminate	superior	superior	3.5	16.5
	Ecological benefits depend on production intensities before participation					
	NUTS II level	inferior	inferior	inferior	-	-
	NUTS III level	indeterminate	superior	superior	7.0	13.2
	Farm level stocking rates	indeterminate	superior	superior	19.7	40.0
Germany Lower Saxony	*Ecological benefits are constant per ha*					
	NUTS II level	inferior	inferior	inferior	-	-
	NUTS III level	inferior	inferior	inferior	-	-
	Farm level stocking rates	inferior	inferior	inferior	-	-
	Ecological benefits depend on production intensities before participation					
	NUTS II level	indeterminate	superior	superior	0.5	0.7
	NUTS III level	indeterminate	superior	superior	4.2	7.9
	Farm level stocking rates	indeterminate	superior	superior	0.4	0.9
Germany Bavaria	*Ecological benefits are constant per ha*					
	NUTS II level	inferior	inferior	inferior	-	-
	NUTS III level	inferior	inferior	inferior	-	-
	Farm level stocking rates	indeterminate	inferior	inferior	-	-
	Ecological benefits depend on production intensities before participation					
	NUTS II level	inferior	inferior	inferior	-	-
	NUTS III level	indeterminate	superior	superior	0.8	1.3
	Farm level stocking rates	indeterminate	superior	superior	17.1	34.1

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Table 13 (continued): Trade-offs between objectives 'reducing unintended transfers' and 'reducing resource costs' with different weightings and PRTCs

Measure and Region	Differentiation level	Evaluation with no additional PRTCs			Level of PRTCs at break-even point % of transfers	
		Without weighting	Weighting 1:1	Weighting 2:1	Weighting 1:1	Weighting 2:1
Wheat	*Ecological benefits are constant per ha*					
	NUTS III level	indeterminate	superior	superior	0.9	2.7
	Altitude class	inferior	inferior	inferior	-	-
Italy Veneto	*Ecological benefits depend on production intensities before participation*					
	NUTS III level	indeterminate	superior	superior	1.0	3.0
	Altitude class	inferior	inferior	inferior	-	-
	Ecological benefits are constant per ha					
	NUTS III level	inferior	inferior	inferior	-	-
Italy Lazio	Altitude class	indeterminate	superior	superior	1.5	3.1
	Ecological benefits depend on production intensities before participation					
	NUTS III level	inferior	inferior	inferior	-	-
	Altitude class	indeterminate	superior	superior	1.7	3.5
	Ecological benefits are constant per ha					
	NUTS III level	indeterminate	inferior	superior	-	0.7
Italy Sicilia	Altitude class	equal	equal	equal	0.0	0.0
	Ecological benefits depend on production intensities before participation					
	NUTS III level	indeterminate	superior	superior	2.5	5.0
	Altitude class	equal	equal	equal	0.0	0.0
Wheat	*Ecological benefits are constant per ha*					
	NUTS II level	indeterminate	inferior	inferior	-	-
	NUTS III level	indeterminate	inferior	inferior	-	-
	Production area codes	indeterminate	superior	superior	0.3	1.9
	Modified production area codes	indeterminate	inferior	superior	-	1.2
	Farm level soilindex	indeterminate	inferior	inferior		
	Farm level farm size	indeterminate	superior	superior	0.4	1.1
	Farm level altitude	indeterminate	inferior	superior	-	0.6
Czech Repulic	*Ecological benefits depend on production intensities before participation*					
	NUTS II level	indeterminate	superior	superior	1.2	2.9
	NUTS III level	indeterminate	superior	superior	1.9	3.8
	Production area codes	indeterminate	superior	superior	1.7	3.6
	Modified production area codes	indeterminate	superior	superior	2.2	4.0
	Farm level soilindex	indeterminate	superior	superior	1.4	3.1
	Farm level farm size	indeterminate	superior	superior	0.4	1.1
	Farm level altitude	indeterminate	superior	superior	1.3	2.8
Barley	*Ecological benefits are constant per ha*					
	Main agricultural area	indeterminate	inferior	superior	-	0.2
	Altitude class	equal	equal	equal	0.0	0.0
	Farm types	inferior	inferior	inferior	-	-
	Farm size class	indeterminate	superior	superior	0.5	1.4
UK Scotland	*Ecological benefits depend on production intensities before participation*					
	Main agricultural area	indeterminate	superior	superior	0.3	0.8
	Altitude class	equal	equal	equal	0.0	0.0
	Farm types	indeterminate	inferior	superior	-	0.1
	Farm size class	indeterminate	superior	superior	0.5	1.4

Annex II: Participation rates of Italian farms in AEM

Table 14: Participation rates of Italian farms in AEM

		Veneto		
		No. of AEM contracts	Total no. of farms	Participation rate
2003	Organic farming	158	82000	0.19%
	Integrated production & other input reduction	529	82000	0.65%
	Extensification	0	82000	0.00%
2004	Organic farming	160	66000	0.24%
	Integrated production & other input reduction	527	66000	0.80%
	Extensification	0	66000	0.00%
2005	Organic farming	154	66000	0.23%
	Integrated production & other input reduction	557	66000	0.84%
	Extensification	0	66000	0.00%
2006	Organic farming	N.A.	N.A.	N.A.
	Integrated production & other input reduction	N.A.	N.A.	N.A.
	Extensification	N.A.	N.A.	N.A.
		Lazio		
		No. of AEM contracts	Total no. of farms	Participation rate
2003	Organic farming	1408	26000	5.42%
	Integrated production & other input reduction	1975	26000	7.60%
	Extensification	673	26000	2.59%
2004	Organic farming	1195	24000	4.98%
	Integrated production & other input reduction	1557	24000	6.49%
	Extensification	702	24000	2.93%
2005	Organic farming	1240	24000	5.17%
	Integrated production & other input reduction	1597	24000	6.65%
	Extensification	700	24000	2.92%
2006	Organic farming	1177	20000	5.89%
	Integrated production & other input reduction	1515	20000	7.58%
	Extensification	664	20000	3.32%
		Sicilia		
		No. of AEM contracts	Total no. of farms	Participation rate
2003	Organic farming	942	54000	1.74%
	Integrated production & other input reduction	13	54000	0.02%
	Extensification	41	54000	0.08%
2004	Organic farming	942	54000	1.74%
	Integrated production & other input reduction	13	54000	0.02%
	Extensification	41	54000	0.08%
2005	Organic farming	942	54000	1.74%
	Integrated production & other input reduction	13	54000	0.02%
	Extensification	41	54000	0.08%
2006	Organic farming	N.A.	46000	N.A.
	Integrated production & other input reduction	N.A.	46000	N.A.
	Extensification	N.A.	46000	N.A.

Source: Rural Development monitoring indicator tables, RDP management authorities.

Annex III: Guidelines for case-study analysis: Preparations and data requirements

Table of contents

1. Introduction

1.1 What are general objectives of WP7?

Following project proposals WP7 is analysing case-studies of existing methods and proposed grids for different Rural Development Programmes (RDPs) for payment calculations and provides outcomes to WP2-WP6. In general existing approaches are analysed in order to identify impacts of data availability and detail of differentiation on calculated payment levels and provides insights into over- and underestimation of costs incurred or income foregone. Specific attention is given to effects of regional or farm individual differentiation. One possible and useful deliverable of WP7 is supposed to be a holistic guideline for payment differentiations in which the suitability of payment differentiation is analysed according to specific measure characteristics.

1.1 What are objectives of extending our case-study analysis to national data of partner countries?

Up to now our case-study analysis focuses on a) EU-FADN data and national data of Germany; b) hypothetical measures, combining different characteristics of various implemented measures, which stress the income foregone component in payment calculations and c) payment differentiation according to different regional scales. However, in the following weeks we seek to extend our analysis.

In order to have at least one example of payment differentiation calculations comparable among different EU-countries we propose to apply our calculations for the example of wheat to as many partner countries as possible.

Further, we analysed effects of payment differentiation by using a) exclusively one possible farm-specific indicator signifying participation costs and b) a regional differentiation of payment levels. Nevertheless, we assume that it might be appropriate to additionally show a) effects and suitability of different farm-specific cost indicators and b) effects of payment differentiation by using other differentiation criteria (farm sizes, farm type).

Payment calculations for RD measures in Germany focus on the income forgone component. However, for preparing a guideline which is documenting for which measure characteristics a payment differentiation might be recommendable it is important to apply our calculations additionally to measures where payment calculations focus on the cost incurred component.

2. Potentials for extension of case-study analysis to national data of partner countries

2.1 Payment differentiation on smaller regional scales among different partner countries

EU FADN regional indicators are generally restricted to 'FADN regions' (NUTS I), which cover a rather large area. Since the German data-basis encompassed variables for each farm on location it was possible to analyse effects of a further differentiation on smaller scales (NUTS II, NUTS III and farm level). In order to show differences as well as synergies between EU- countries in terms of payment differentiation it is highly desirable to apply our calculations, by using mentioned location variables, to the example crop wheat of other EU partner countries.

Nevertheless, it is important for our calculations that we analyse exclusively farms which do not participate in any AEMs (receive payments for AEMs) or apply organic farming techniques. In Germany a specific variable represents the cultivation mode of a farm; a value of 1 classifies corresponding farms as being conventional whereas a value of 2 classifies corresponding farms as applying organic farming practices.

TASK 1: Check if variables stated under point 2.1 Obligatory variables in attached excel file are available in national data basis

2.2 Payment differentiation by different farm-specific indicators of participation costs and various differentiation criteria

A possible variation of our calculations is the application of payment differentiation according to other farm-specific indicators of participation costs. We are specifically interested in variables on for instance site quality (like soil indices) e.g. farm-specific indicators which are quasi-fix and can not be influenced by the farmer. Further, it might be interesting to analyse effects if payments are not differentiated by smaller regional scales but other criteria. For instance a differentiation among the variable farm size or farm type might be a useful addition. All identified differentiation variables have to be available on a farm-specific level.

TASK 2: Check if farm-specific indicators for participation costs are available in national data basis

TASK 3: Check if variables for additional differentiation criteria are available in national data basis

2.3 Payment differentiation in accordance with measures focussing on costs incurred components

So far accomplished calculations series focused on a differentiation of payment levels of hypothetical measures predominantly considering the income forgone component. Since it is highly desirable to obtain a complete overview of relationships between measure characteristics and corresponding suitability of payment differentiation, we need to additionally analyse effects of differentiation in terms of measures with a high importance of the cost incurred component.

Payment calculations for the majority of RD measures in Germany focus on the component of income foregone. This makes it necessary to check if other partner countries offer measures where payment calculations focus on the cost incurred component.

Example:

Cost incurred components for RD measure XY make up the highest share in payment calculations. Additional costs arising from measure participation are labour costs for additional tasks in crop production processes (wheat production).

TASK 4: Check if national RDPs offer measures where cost incurred make up a high share in overall payment calculations processes (exclusively of our chosen example measures).

After the identification of measures with a high importance of costs incurred in overall allowance payment, corresponding cost components need to have a high variance between farms. We assume that the lower the variance between farms the lower is a positive effect of a payment differentiation.

Example:

Additional labour costs for crop production processes (wheat production) for RD measure XY are assumed to vary significantly between farms.

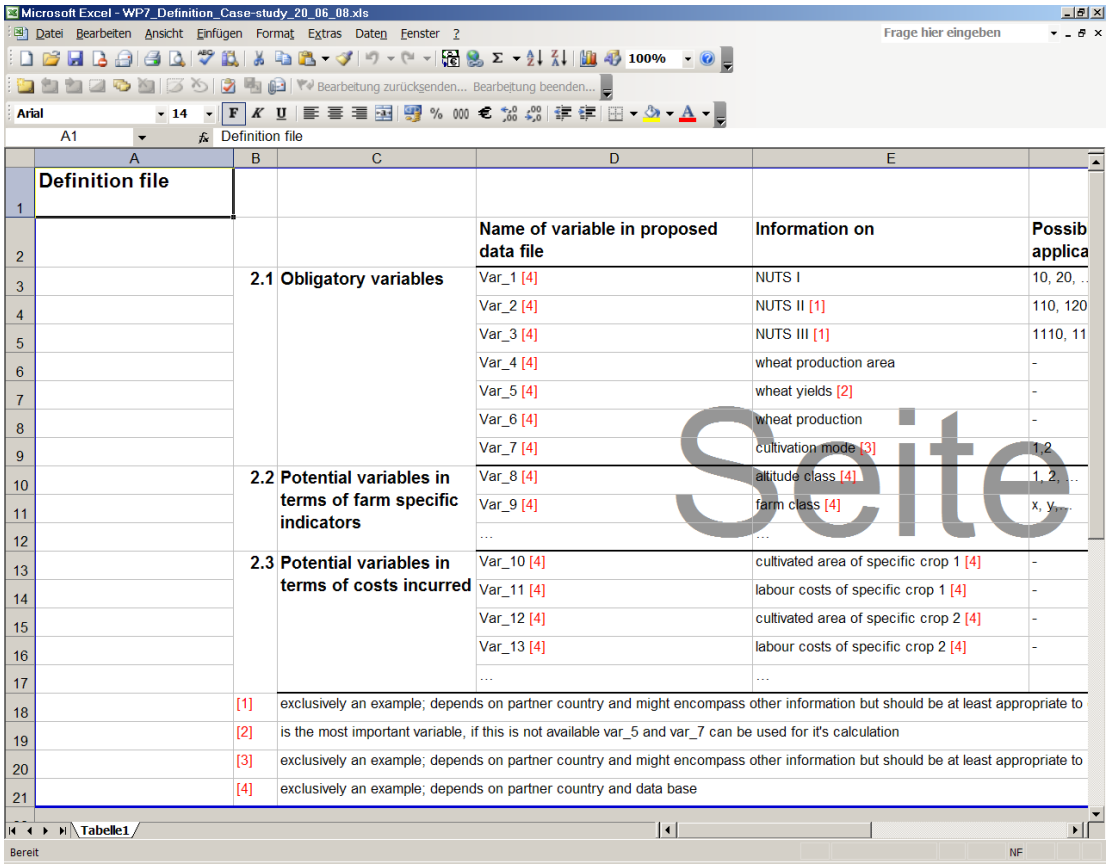
TASK 5: Check if cost components of measures identified under task 4 have a high variance between farms

Data in terms of previously identified costs components need to be available on a farm- and commodity-specific level. In EU-FADN data input costs of farms are highly aggregated. For instance costs for fertilisers are aggregated over all corps and are not available for e.g. wheat. However, to apply our calculations we need these costs for each farm and separated by commodity/ crop/ livestock category/ etc.

Example:

Identified additional labour costs for crop production processes (wheat production) for RD measure XY are available in national data bases a) on farm level and b) differentiated by crop-type (wheat).

TASK 6: Check if cost components identified under task 5 are available on a farm and commodity-specific level in national data basis.



Microsoft Excel - WP7_Definition_Case-study_20_06_08.xls

Datei Bearbeiten Ansicht Einfügen Format Extras Daten Fenster ?

Frage hier eingeben

Arial 14

A1 Definition file

	A	B	C	D	E	
1	**Definition file**					
2				**Name of variable in proposed data file**	**Information on**	**Possib applica**
3		**2.1**	**Obligatory variables**	Var_1 [4]	NUTS I	10, 20, ...
4				Var_2 [4]	NUTS II [1]	110, 120
5				Var_3 [4]	NUTS III [1]	1110, 11
6				Var_4 [4]	wheat production area	-
7				Var_5 [4]	wheat yields [2]	-
8				Var_6 [4]	wheat production	-
9				Var_7 [4]	cultivation mode [3]	1,2
10		**2.2**	**Potential variables in terms of farm specific indicators**	Var_8 [4]	altitude class [4]	1, 2, ...
11				Var_9 [4]	farm class [4]	x, y, ...
12				...	...	
13		**2.3**	**Potential variables in terms of costs incurred**	Var_10 [4]	cultivated area of specific crop 1 [4]	-
14				Var_11 [4]	labour costs of specific crop 1 [4]	-
15				Var_12 [4]	cultivated area of specific crop 2 [4]	-
16				Var_13 [4]	labour costs of specific crop 2 [4]	-
17				...	...	
18		[1]	exclusively an example; depends on partner country and might encompass other information but should be at least appropriate to			
19		[2]	is the most important variable, if this is not available var_5 and var_7 can be used for it's calculation			
20		[3]	exclusively an example; depends on partner country and might encompass other information but should be at least appropriate to			
21		[4]	exclusively an example; depends on partner country and data base			

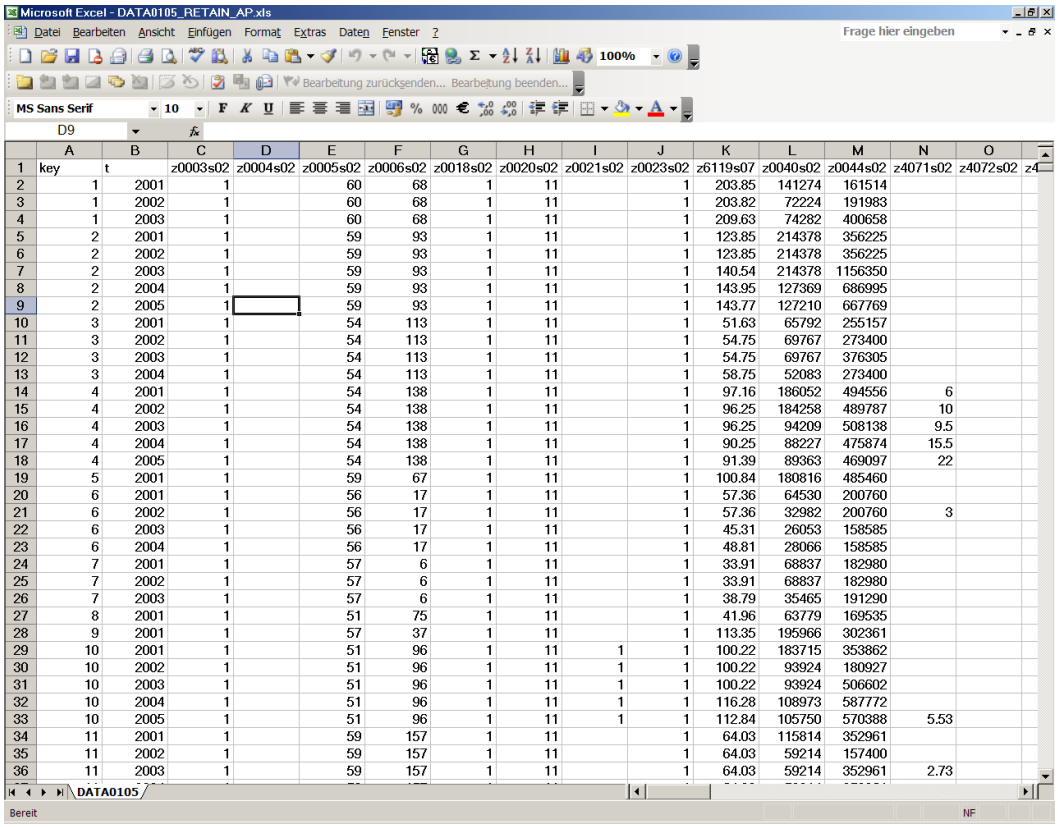
Tabelle1

Bereit NF

TASK 7: Transfer all identified variables with corresponding information in attached excel-file and send file back to us until the 27.06.08

3. Data requirements

In general, we assume that it will be possible to easily transmit your data into our prepared programs. Still, data provided by you need to be processed and conditioned in a specific format. For calculations it is required that above mentioned variables are concentrated in one excel file. However, to be confirmative with our used programming model constructed with the software-tool GAMS, this file needs to fulfil specific requirements. A screenshot of our excel file can be seen below.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	key	t	z0003s02	z0004s02	z0005s02	z0006s02	z0018s02	z0020s02	z0021s02	z0023s02	z6119s07	z0040s02	z0044s02	z4071s02	z4072s02
2	1	2001	1		60	68	1	11		1	203.85	141274	161514		
3	1	2002	1		60	68	1	11		1	203.82	72224	191983		
4	1	2003	1		60	68	1	11		1	209.63	74282	400658		
5	2	2001	1		59	93	1	11		1	123.85	214378	356225		
6	2	2002	1		59	93	1	11		1	123.85	214378	356225		
7	2	2003	1		59	93	1	11		1	140.54	214378	1156350		
8	2	2004	1		59	93	1	11		1	143.95	127369	686995		
9	2	2005	1		59	93	1	11		1	143.77	127210	667769		
10	3	2001	1		54	113	1	11		1	51.63	65792	255157		
11	3	2002	1		54	113	1	11		1	54.75	69767	273400		
12	3	2003	1		54	113	1	11		1	54.75	69767	376305		
13	3	2004	1		54	113	1	11		1	58.75	52083	273400		
14	4	2001	1		54	138	1	11		1	97.16	186052	494556	6	
15	4	2002	1		54	138	1	11		1	96.25	184258	489787	10	
16	4	2003	1		54	138	1	11		1	96.25	94209	508138	9.5	
17	4	2004	1		54	138	1	11		1	90.25	88227	475874	15.5	
18	4	2005	1		54	138	1	11		1	91.39	89363	469097	22	
19	5	2001	1		59	67	1	11		1	100.84	180816	485460		
20	6	2001	1		56	17	1	11		1	57.36	64530	200760		
21	6	2002	1		56	17	1	11		1	57.36	32982	200760	3	
22	6	2003	1		56	17	1	11		1	45.31	26053	158585		
23	6	2004	1		56	17	1	11		1	48.81	28066	158585		
24	7	2001	1		57	6	1	11		1	33.91	68837	182980		
25	7	2002	1		57	6	1	11		1	33.91	68837	182980		
26	7	2003	1		57	6	1	11		1	38.79	35465	191290		
27	8	2001	1		51	75	1	11		1	41.96	63779	169535		
28	9	2001	1		57	37	1	11		1	113.35	195966	302361		
29	10	2001	1		51	96	1	11	1	1	100.22	183715	353862		
30	10	2002	1		51	96	1	11	1	1	100.22	93924	180927		
31	10	2003	1		51	96	1	11	1	1	100.22	93924	506602		
32	10	2004	1		51	96	1	11	1	1	116.28	108973	587772		
33	10	2005	1		51	96	1	11	1	1	112.84	105750	570388	5.53	
34	11	2001	1		59	157	1	11		1	64.03	115814	352961		
35	11	2002	1		59	157	1	11		1	64.03	59214	157400		
36	11	2003	1		59	157	1	11		1	64.03	59214	352961	2.73	

Type of file:

Excel

Name of variables:

If you use your country specific data codes in corresponding excel files we need a translation of these codes. You can use our attached excel file already prepared for task 7 for corresponding information. In general variable names should not exceed the number of 8 characters (please do not use any special characters).

Number of years:

In general, it is highly recommendable to calculate averages of mentioned variables over a longer time horizon to avoid yearly fluctuations. Therefore, we ask you to provide data at least over two and at most over five years depending on your access to time-series of corresponding variables.

Sequences of columns and rows:

Despite the first two columns there is no need to specifically organise rows or columns. As can be seen in the screen-shot it is important that farm codes are mentioned in the first and corresponding years of data-gathering in the second column. If this arrangement is neglected our program is refusing data processing because it assumes duplicate entries. It is appreciated if rows are sorted by key numbers of farms, e.g. the last row of the excel file encompasses the farm with the highest key number. However, this is not necessarily needed.

TASK 8: Prepare a corresponding excel-file of variables identified and collected by task 1 – 6 from national data basis and send excel-file back to us until the 11.07 - 18.07.08.

Annex IV: Literature Review

Guidelines on literature research

By means of **theoretical reviews** and **case-study analysis,** literature research should focus on following topics:

1. General aspects of efficiency and effectiveness of flat rate payments / standard cost approaches

- windfall profits
- under-compensation
- low participation rates of highly intensive farms

2. Performance (impacts on farmer income/ farmer participation/ governmental budgets/ competitiveness of farmers/ effectiveness/ data availability) of different approaches to payment level determination

- tender systems
- auction systems
- flat-rate premiums
- differentiated premiums (e.g. by regions, or farm characteristics)
- differentiated premiums in combination with target oriented approaches which seek to produce 'eco-points' and premiums are paid per 'eco-point'

3. Factors that hamper a differentiated agricultural support measure design

- factors hampering introduction of differentiated premiums/ tenders/ auctions (path dependencies/ administrative costs/ data)
- degree of administration costs of flat-rate premiums/ differentiated premiums/ tenders/ auctions
- degree of farmers' transaction costs of flat-rate premiums/ differentiated premiums/ tenders/ auctions
- premises under which differentiated premiums/ tenders/ auctions lead to increases in effectiveness/ efficiency

4. Studies which have investigated the correlation of individual farmers' costs of participation and the environmental benefit of participation

Literature summaries addressing topics mentioned above should be no longer than one page per source, with title in English, and literature reference (see the German example below). As long as respective articles or reports are a) written in English and b) electronically available as PDF or word documents, it is sufficient to send us the full papers (so you would not have to write a summary).

Literature review Czech Republic

Compensation of limiting of farming and management of fish ponds

Prazan, J. and Koutna, K. (2004): Podklady pro stanovení kompenzace za omezení hospodaření na rybnících a zemědělské půdě. Report to the Czech Ministry of Environment.

Executive summary:

The study focused at calculation of payments in relation to envisaged limits in farming on agricultural land and on fish ponds in framework of Natura 2000.

The study discusses different ways of the payment calculation and aspects affecting the concept and approach. For example the risk of over/under compensation is unavoidable when using average figures for whole sector (e.g. standard costs, standard gross-margin) but the costs associated with more differentiated approach is identified (arguments are rather qualitative). The main part of the study focuses on discussion and application of different approaches to payment calculation for 10 types of management prescriptions on farmland and one type of management prescription on fish ponds. The surveys for missing data were undertaken and payments approach demonstrated. The Natura 2000 prescriptions envisaged at the time of the study execution were rather region/type of regions specific and therefore some payments were specific to certain habitats (e.g. grassland types associated with certain altitudes). The most distinct differentiation was chosen in the case of fish pond management, where type of region (especially altitude) and pond structure (especially size structure) determined very distinct management practices leading to very different patterns of income and consequently to different payments. But in most cases standard costs/gross-margins were used for the whole territory.

Evaluation of selected public goods provided by agriculture

Krumalova, V., Prazan, J., Drlik, J. (2000): Ohodnocení vybraných veřejných statků pocházejících ze zemědělství. Report to the Czech Ministry of Agriculture.

Executive summary:

The study did investigate environmental benefit of farm practices (among other topics grassland management) supported by government while payment was based on calculation of costs incurred.

At that time there was not economic incentive to continue farming on grassland (i.e. low numbers of suckle cows, market with beef declined sharply) and therefore government decided to support costs of cutting grass to promote landscape management and preservation of biodiversity on grassland.

The purpose of the study was to provide evidence that the government spending on landscape management is defendable. This was done by WTP approach where Czech citizens was questioned how much they are willing to pay for landscape management. The definition of the management and relevant goals were drawn according to goals of this policy at that time (payment for cut of extensive grassland to prevent shrub invasion and biodiversity deterioration).

The results were finally compared with government support for landscape management. It revealed that the support (based solely on costs incurred) was lower than actual value recognised by society.

Assessment of economic consequences of implementation of specific farm management for winter stay and nesting of great bustard

Prazan, J. (2004): Posouzení ekonomických dopadů změn hospodaření v zemědělských podnicích s cílem vytvořit podmínky pro zimování a hnízdění dropa. Report to the Czech Association of Ornithologists.

Executive summary:

The main aim of the study was to test potential economic impact of the conservation management for great bustard. The calculation of potential payments to farmers was based on income foregone and costs incurred. As a result the proposal for a relevant scheme was locally focused and the data and payment were locally specific (up to five farms were considered to be involved). The drastic changes introduced to farming required to work with changes in crop rotation which increased transaction costs (on public site).

The study can give evidence of the data requirement and potential transaction costs when the payments are extremely differentiated (site specific).

The transaction costs could be still estimated and compared to non-differentiated payments.

Subsidies for Less Favoured Areas and Farm Size

Štolbová, M. (2007): Platby pro méně příznivé oblasti a velikost zemědělských podniků. Report to the Czech Ministry of Agriculture.

Executive summary:

Differentiation of Natural handicap payments contributes to fulfilment of the LFA measure objectives. Special attention is paid to the compensatory payments differentiation according to the farm size, for this criterion will be introduced as compulsory in 2010. The current system of LFA support in the Czech Republic results in great inequalities among enterprises with regard to the amount of the obtained LFA payments per hectare of agricultural land as well as per annual work unit (AWU). It is suggested that the eligible area should be extended (nowadays the support is only for permanent grasslands). In the Czech Republic the small and medium-sized farms which present the target of the less favoured area subsidies in most EU countries only work on 12% of agricultural land of the LFA. An insensitive application of payments modulations might result in reduced job opportunities and overall attractiveness of the rural countryside of the LFA.

From the point of the reduction of compensatory allowances according to an area of farm it is necessary to compare proportion of big farms and the size structure of farms in LFA and in more favoured areas. From this comparison results that the large farms with high share of grasslands obtain the highest payments.

The reactions of big farms to the differentiation according to farm size could be following: formal separation of company, finding of costs' savings (e.g. regular staff reductions), withdraw of rents of long-distant, small and badly available lands, stopping of the process of grassing and finally afforestation.

The second way of payments differentiation was considered on the basis of AWU on grassland. This variant is focused on social aspect of countryside development with a special

reference to the employment in the rural areas. From FADN were chosen farms with more than 60% of grasslands. Calculated was the share of grassland on one AWU. This variant seems inspirative but the main issue for its acceptance is ability of administrative implementation.

In the Czech Republic a group of small and middle farms covers only a small proportion of agricultural land. The conditions of payment should be focused on preservation of biodiversity and landscape which are attractive for tourism. The solution can be acceptance of more eligibility criteria (max. size of land, land which is separated by boundary cut another time than other grasslands, etc.) and in connection with this there would have to be adjusted the limits for degressive payments in the Czech Republic, either on the basis of area of grassland or according to the number of employees.

More studies deal with this topic. E.g. research study: Štolbová, M.: "Less favourable areas for agriculture in the Czech Republic and in EU (Criteria for its delimitation and payment conditions)", Research Institute of Agricultural Economics 2006.

Literature review Finland

Policies and Measures for Multifunctional Agriculture: Experts' Insight

Arovuori, K. and Kola, J. (2005): Policies and Measures for Multifunctional Agriculture: Experts' Insight. International Food and Agribusiness Management Review 8 (3): 21-51.

Executive summary:

Multifunctionality of agriculture is with the growing importance in agricultural policies. The main argument behind multifunctionality is that agricultural production and thus, the whole agricultural sector has multiple roles, not just to produce food and fiber, but also to provide several non-market commodities. Although agricultural policies in Europe set more and more emphasis on the importance of these non-commodity outputs it is hard to find policy measures designed directly for multifunctionality.

We used the applied policy Delphi method to find out expert's stated preferences on multifunctional agriculture and multifunctionality enhancing agricultural policy measures. Our respondents consisted of 24 experts involved in research, administration, political parties and interest groups and were selected on the basis of multifunctionality: We attempted to find expertise in every dimension of multifunctional agriculture, including agriculture, rural, environment, animal welfare and consumer issues.

Our results show that multifunctionality of agriculture is regarded as an important element for agricultural policies in the future. A wider role of agriculture is highly acknowledged among the experts. However, in its broadest definition, no undivided acceptance for the concept of multifunctionality was found. The policy measures part gives evidence that also the current policy measures included in the EU's Common Agricultural Policy have elements that improve multifunctionality, especially those in the agri-environmental support scheme. Yet, there is a need for targeted measures based on different national, regional and local agricultural conditions. More targeting incurs more transaction costs. Our experts were unfamiliar with policy-related transaction costs and, consequently, incapable of evaluating the costs of more targeted policy measures. In general, however, it is quite clear that targeted measures will be more efficient in achieving clearly defined policy objectives.

In order to fully benefit from and to enhance multifunctionality, wider co-operation between different sector policies and consequently, cooperation between all actors in the whole supply are needed. Environmental aspects of multifunctionality are more an issue in agri-environmental policies, rural viability and employment broadens the scope to rural policies and vice versa, while food safety and quality is more an issue for the whole supply chain. Moreover, there is a need for targeted measures based on different national, regional and local agricultural conditions. In addition, the implementation of these measures needs more cooperation between different sector policies as well as among the different operators in the whole supply chain.

Green auctions with joint environmental benefits

Cattaneo, A., Lankoski, J. and Ollikainen, M. (2007): Green auctions with joint environmental benefits University of Helsinki. Department of Economics and Management. Discussion Papers 19. Environmental Economics. Helsinki, Finland. http://www.mm.helsinki.fi/mmtal/abs/DP19.pdf.

Executive summary:

This paper examines how jointness of environmental benefits and environmental heterogeneity affect the potential benefits of green auctions over flat-rate agri-environmental policies. A sealed bid green auction with two environmental objectives, nutrient runoff reduction and biodiversity provision, is analyzed. The green auction is analyzed analytically and then empirically by using Finnish data.

Auctions that screen farmers' applications according to an environmental index (with and without a cost-saving component) are simulated in the context of two different conservation options. The first option assumes enlarged field edges are located in whichever edge of a parcel, providing only biodiversity benefits, whereas in the second option they are located on the waterfront so as to also reduce nitrogen runoff. Empirical results show that in both cases the green auction with the cost saving outperforms other policies. However, when environmental benefits are not jointly produced by a practice, farmer participation is much more sensitive to how objectives and cost saving are weighted, leading to unwanted swings in participation.

The environmental dimension of multifunctionality: economic analysis and implications for policy design

Lankoski, J. (2003): The environmental dimension of multifunctionality: economic analysis and implications for policy design. Doctoral Dissertation. Agrifood Research Reports 20. MTT Agrifood Research Finland, Helsinki, Finland. http://www.mtt.fi/met/pdf/met20.pdf.

Executive summary:

Multifunctional agriculture refers to the fact that agriculture produces jointly a number of commodity and noncommodity outputs, and some of these noncommodity outputs exhibit the characteristics of externalities and public goods. Thus, multifunctionality provides an integrated framework for the simultaneous consideration of multiple commodity and noncommodity outputs.

Multifunctionality constitutes a complex problem from the perspective of policy design and implementation. Finding out the socially optimal bundle of multiple commodity and non-commodity outputs involves the identification of the important outputs as well as their relative significance, and policies conducive to multifunctional agriculture must simultaneously address several outputs, commodity and noncommodity ones. Moreover, the heterogeneous conditions under which agriculture operates create a spatial dimension in the supply of commodity and non-commodity outputs. That is, there are spatial differences in productivity and, hence, in the production costs of commodity and non-commodity outputs. Finally, there are trade-offs between the precision of the policy instruments and their information requirements and related administrative costs.

The main objective of the present study was to contribute to the understanding of the implications of multifunctionality for effective agri-environmental policy design. The main research question addressed was the performance of various types of policy interventions in achieving the optimal bundle of multifunctional outputs under heterogeneous conditions.

The scope of the present study was restricted to the environmental dimension of multifunctionality. Two commodity outputs and three environmental non-commodity outputs (nutrient runoffs, landscape diversity, and agrobiodiversity) were analysed, taking into account jointness and heterogeneity in their supply and the externality and public good aspects in their demand.

In this study an analytical model was developed, and then empirical results were obtained by calibrating the model to Finnish data. First, the farmer's private optimum was compared to the social optimum where nutrient runoffs, landscape diversity, and agrobiodiversity were valued at their social marginal values. Next, solutions were developed for the first-best differentiated policy instruments and the second-best uniform and semi-uniform policy instruments. Finally, farm income support measures and environmental cross-compliance schemes were analysed.

The study brings out how the design of agri-environmental policies against the background of multifunctionality differs from the individual treatment of the various environmental effects of agriculture. Because of the joint production process, the levels of different multifunctional outputs are linked to each other. Hence, the regulation of one environmental effect necessarily influences the other environmental effects and agricultural production, as well as other dimensions of multifunctionality. These interactions need to be accounted for when designing policies inducive to multifunctionality. It was shown that the optimal policy with respect to multifunctional agriculture under heterogeneous land quality is to use the combination of a differentiated fertilizer tax and a differentiated buffer strip subsidy. The requirement for the use of differentiated instruments arises from the fact that the non-commodity outputs indirectly depend on the heterogeneous land quality through the size of the buffer strips and the amount of fertilizer used. Thus, the first-best solution requires that policy instruments vary over land quality and crop because non-commodity outputs do so. The social welfare difference between the first-best differentiated instruments and the second-best uniform instruments is FIM 64 (10.8 €) per hectare in the case of semi-uniform instruments (crop-specific but uniform with respect to land quality) and FIM 116 (19.5 €) per hectare in the case of fully uniform instruments. Regarding farm income support measures, the results show that pure acreage subsidy and pure producer price support perform poorly in promoting the environmental elements of multifunctional agriculture. However, the performance of these income support measures could be greatly improved by incorporating some environmental cross-compliance mechanisms into them.

To sum up, the combination of differentiated policy instruments is needed to secure the production of the optimal bundle of multifunctional outputs under heterogeneous conditions.

Agri-environmental externalities: a framework for designing targeted policies

Lankoski, J. and Ollikainen, M. (2003): Agri-environmental externalities: a framework for designing targeted policies. European Review of Agricultural Economics 30 (1): 51-75.

Executive summary:

The optimal provision of agri-environmental externalities is studied in a model of endogenous input use and land allocation augmented by their effects on biodiversity, landscape diversity and nutrient runoffs. Whereas biodiversity and landscape diversity are public good aspects of agriculture, nutrient runoffs are negative externalities. We show that fertiliser use is higher and the size of buffer strips lower at the private optimum than at the social optimum. The socially optimal land allocation differs from the private solution as a result of the valuation of diversity benefits and runoff damages. The socially optimal policy under heterogeneous land quality involves a differentiated fertiliser tax and a differentiated buffer strip subsidy. We use Finnish data to characterise empirically the socially optimal design of policy instruments.

Performance of alternative policies in addressing environmental dimensions of multifunctionality

Lankoski, J., Lichtenberg, E. and Ollikainen, M. (2004): Performance of alternative policies in addressing environmental dimensions of multifunctionality. University of Helsinki. Department of Economics and Management. Discussion Papers 4. Environmental Economics. Helsinki, Finland. http://www.mm.helsinki.fi/mmtal/abs/DP4.pdf

Executive summary:

In this paper we examine the performance of alternative policies in a model of agri-environmental multifunctionality under heterogeneous conditions. The theoretical and calibrated models include choice of the used inputs and land allocation with free entry and exit of cultivated land, and their effects on agrobiodiversity (including species diversity and landscape diversity) and nutrient runoff. We show that spatially targeted and tailored instrument combinations are required to implement the social optimum. Given the benchmark of social optimum, we compare area payment, environmental cross-compliance schemes and agri-environmental payments in terms of the use of inputs, environmental performance and social welfare. However, the performance of area payments could be greatly improved by attaching some environmental cross-compliance provisions to them. Thus, reforms of agricultural support towards environmental cross-compliance and more targeted agri-environmental payments is a promising direction for implementing policies inductive to the environmental dimension of multifunctionality.

Potential Cost-Effectiveness of Incentive Payment Programs for Biological Conservation

Siikamäki, J. and Layton, D.F. (2006): Potential Cost-Effectiveness of Incentive Payment Programs for Biological Conservation. Resources for the Future. Discussion Paper 06-27. http://www.rff.org/Documents/RFF-DP-06-27.pdf

Executive summary:

This study assesses the potential cost-effectiveness of incentive payment programs relative to traditional top-down regulatory programs for biological conservation. We develop site-level estimates of the opportunity cost and the non-monetized biological benefits of protecting biodiversity hotspots in Finnish nonindustrial private forests. We then use these estimates to compare and contrast the cost-effectiveness of alternative conservation programs. Our results suggest that incentive payment programs, which tacitly capitalize on landowners' private knowledge about the opportunity costs of conservation, may be considerably more cost-effective than traditional top-down regulatory programs.

Literature review Greece

Employing real options methodology to evaluate the organic agriculture scheme in Greece

Irene Tzouramani, Kostadinos Mattas (2004): Employing real options methodology to evaluate the organic agriculture scheme in Greece. 87th EAAE-Seminar. Assessing rural development of the CAP.

Executive summary:

New policy measures have studied and introduced to transform Europe's agriculture into a more environmental friendly agriculture. Adopting environmental friendly production systems involves risk and uncertainty and to overcome this well designed policy schemes are required. This study attempts to examine the effects of income variability upon the decision on adopting or not environmental friendly production systems in order to evaluate the organic financial incentives to farmers by introducing the real options methodology. The real options procedure revealed that the investment in environmental friendly production systems must be postponed and the option of investment must be kept alive until the expected returns are high enough to offset the risk and uncertainty. Therefore, policy makers have to reconsider the current financial incentives if they want faster adoption of sustainable production systems.

Employing real options methodology in environmental friendly production systems in Risk and Uncertainty

Tzouramani, I. and Mattas K. (2002): Employing real options methodology in environmental friendly production systems in Risk and Uncertainty. In Environmental and Resource Economics edited by E.C. van Ierland, H.P. Weikard and J. Wesseler. Environmental Economics and Natural Resources Group, Wageningen University, The Netherlands.

Executive summary:

New policy measures have studied and introduced to transform Europe's agriculture into a more environmentally friendly agriculture. Adopting environmentally friendly production systems involves risk and uncertainty and to overcome this well designed policy schemes are required. This study attempts to examine the effects of income variability upon the decision on adopting or not environmentally friendly production systems by introducing the real options methodology. The methodology is applied to organic olive oil cultivation in Greece. The real options procedure revealed that the investment in environmentally friendly production systems must be postponed and the option of investment must be kept alive until the expected returns are high enough to offset the risk and uncertainty. Therefore, policy makers have to reconsider the current financial incentives if they want faster adoption of sustainable production systems.

Rural development by afforestation in predominantly agricultural areas: issues and challenges from two areas in Greece

K. Kassioumis, K. Papageorgiou, Ath. Christodoulou, V. Blioumis, N. Stamou, Ath. Karameris, (2004): Rural development by afforestation in predominantly agricultural areas: issues and challenges from two areas in Greece. Forest Policy and Economics 6 (2004): 483– 496.

Executive summary:

In light of the increasing mandate for forest expansion through afforestation of arable and degraded land, this attitudinal study explores the perceptions of landowners in Greece regarding forest planting and forest policy related issues, the efficiency of afforestation schemes as well as how new forests are accepted in comparison with agricultural landuse values. Results of a landowner comparative survey undertaken in two varied rural areas in Greece, seek to enlighten why local landowner groups are resistant to the planting of land with trees. This is partly attributed to the long-driven agrarian character of these areas. To some landowners, forestry is envisaged as antagonistic, rather than synergetic to agriculture and thus not socially acceptable. Although it could also be the result of other factors, such as the administrative barriers or limited knowledge available to farmers, the research establishes grant aid funding for forestry as a continuous and potent impetus for farmers to participate in planting schemes in rural areas. Forest policy should involve decisions more related with the regulation of subsidies to buy contributions of forestry to meet environmental and social objectives in addition to the productive ones.

National Differences in the uptake of EU Agri-environmental Schemes: An Explanation.

Thilo Glebe and Klaus Salhofer (2004): National Differences in the uptake of EU Agri-environmental Schemes: An Explanation. 87th EAAE-Seminar. Assessing rural development of the CAP.

Executive summary:

The number of agri-environmental programs, as well as the share of agricultural land covered under these programs, varies significantly between EU member states. We analyze national differences in the uptake of agri-environmental programs by developing a model of countries' political objective function. Based on this model we identify six factors which may explain the extent to which agri-environmental policies are implemented: environmental benefits, opportunity costs of participation, financial budget pressure, the share of program expenditures financed by the EU, contribution to the EU budget, and political weight attributed to farmers' income. The conceptual approach is then supplemented by an empirical analysis.

Literature review Italy

Rural Development, Multifunctionality and Public Goods: An Assessment of the Literature

Magni C., Costantini V. (2004): Politiche di sviluppo rurale, multifunzionalità e beni pubblici: un entativo di sistemazione. La Questione Agraria 4/2004.

Executive summary:

The role of the Rural Development Policies has become more and more important in the last few years. The aim of this study is to evaluate the impacts of this policies, showing the multifunctional role of agriculture. The first part concerns the main issues of the international debate about the economic aspects of multifunctionality, while in the second part an analysis about the economic dimension of rural policies has been carried out, through data concerning Tuscany Region (2000-2001). The analysis base itself on the Public Choice approach at macroeconomic level (public expenditure methods), because it seems a useful tool to analyse policies supporting the multifunctional role of the agricultural sector, providing benefits to the whole community that could be defined as public goods. The results can be summarized in the following three points:

- policy makers, in order to receive general social consent, aim to decisions which effects are concrete in short terms;
- a better accessibility to these policies for the smaller farms could determine a more relevant diffusion of benefits inside the rural areas;
- the effects of rural development policies involve not only the beneficiary, but also the whole community.

Multifunctionality and Rural Development in the EU: A Comparative Analysis

Henke R., Macrì M.C., Storti D. (2005): Multifunzionalità e sviluppo rurale nell'Ue: un'analisi comparata. La Questione Agraria 2/2005.

Executive summary:

This paper analyses the relationship between multifunctionality in agriculture and rural development policies, with reference to the debate in Europe about possible strategies to emphasize the secondary functions of agriculture. Considering the multifunctionality as the joint production of primary (agricultural) and secondary (externality) goods, it is the sector-based component of rural development that can contribute to the improvement of the multifunctional role of agriculture. The aim of this study is to compare the way multifunctionality has been faced within the rural development programmes of three EU-Countries (Italy, United Kingdom and France), taking into account three parameters: the beneficiaries of the specific actions, the nature of the explicit goals pursued and the possible constraints imposed on the goals. The analysis showed the following aspects:

- an integrated approach of the activities (not only the agricultural ones) in a specific rural area is necessary for its development and innovation;
- the multifunctional role of agriculture has to be promoted through economic benefits, which are connected to production based on the respect of environment and landscape.

Evaluation and Development or Rural Areas: an integrated approach in the evaluation of development policies

Lucatelli S., Monteleone A. (2005): Valutazione e Sviluppo delle Aree Rurali: un approccio integrato nella valutazione delle politiche di sviluppo. Materiali UVAL 7/2005.

Executive summary:

This document shows the main issues discussed during the workshop "Evaluation and development policies in Rural Areas" (Rome, March 10th, 2005). It has been pointed out that the implementation of the rural development policies based principally on the improvement of agriculture and food chain competitiveness and of land management systems. On the contrary, other interventions aiming at creating new and diversified job opportunities and at improving quality of life in rural areas, have been not much considered. The debate made it evident that integrated tools (integrated projects and Leader programme) have been more relevant in both creating a demand for innovative rural development solutions that would transcend sector boundaries and in supplying them. Then, it has been underlined that a territorial approach to competitiveness interventions produces not only a better strategy, but also facilitates the necessary integration between rural development tools and regional development policies. From this debate it came out that policy makers need to integrate rural development policy and regional policy at the strategy, implementation and evaluation levels.

The scenario of organic farming in Italy

Berardini L., Ciannavei F., Marino D., Spagnuolo F.,: Lo scenario dell'agricoltura biologica in Italia. INEA, Working Paper.

Executive summary:

Paragraph 2.2 of this book concerns the economic aid to organic farms, with reference to the agro-environmental measures for the programming periods 1994-1999 and 2000-2006. These aids have strongly increased the competitiveness of the organic sector, encouraging the conversion to organic production. After a description of the application of these measures in the EU-countries, the authors examined the case of Italy. In Italy the application of the Reg. 2078/92 has allowed the diffusion of the organic sector, and the country has reached a leadership position in this sector at European level. But this success differs from region to region, because the application of the regulation depends on the regional government. The analysis concerns the period 2000-2006 as well, underlining the difference between this period and the previous one. It has been remarked that in the period 2000-2006, there has been less space for new agro-environmental measures, particularly for organic farming, so that the agricultural area cultivated through organic techniques has decreased; nonetheless, two aspects must be considered at the same time:

- from the environmental point of view, this decrease damages the positive effects of this kind of production;
- the decision of reducing the aid to the organic sector could be useful, because the previous great rise of organic farms was abnormal; in facts, many farms entered the organic scheme only to receive an aid, without changing significantly their production systems.

A socioeconomic survey for the recovery and exploitation of the terraced vineyards of the Costa Viola (Calabria, Italy)

Nicolosi A., Cambareri D., Petullà M. (2005): A socioeconomic survey for the recovery and exploitation of the terraced vineyards of the Costa Viola (Calabria, Italy). Paper presented at the 99th Congress of the EAAE (European Association of Agricultural Economists).

Executive summary:

The new model of rural development, based on the recognition of the economic, social and environmental function of agriculture, has the aim of developing the competitive ability of agricultural and agro-industrial enterprises and of increasing the economic and human resources. This paper documents the results of a territorial socio-economic investigation, developed with the aim of examining the productive and environmental potentialities of the terraced wine-growing located in the territory of "Costa Viola" (Calabria, Italy). The study starts from an analysis of the territory and identifies a sample of wine-growing farms in order to examine, through specific socio-economic investigations, the actual conditions of the grape-cultivated terraces, the status of the representative vineyard grower and the economic results achieved. The analysis underlines the need of more interventions by the agro-environmental measures, the problem of farm dimension, of high primary costs, of inadequate profits of cultivations and of scarce infrastructures.

Evidence of CAP Support in Italy between First and Second Pillar

Cagliero R., Henke R. (2005): Evidence of CAP Support in Italy between First and Second Pillar. Paper presented at the 99th Congress of the EAAE (European Association of Agricultural Economists).

Executive summary:

The aim of this paper is to trace the composition of the CAP support for Italian farms, with reference to the implementation of the CAP reform. Three case studies have been selected, considering the relevance of the specialisation typologies: Veneto in the North-East (agriculture is largely integrated in the economic system), Valle d'Aosta in the North-West (a typical Alpine region), Puglia in the South (agriculture is based on Mediterranean products). These cases are compared with the national average as benchmark with regards to production specialisation, territorial disadvantages, entrepreneurial choices. The analysis shows, on one hand, that the national level of support's composition is highly in favour of support coming from the first pillar, but on the other side, at regional level, the composition of support changes and, in some cases, it turns in favour of the second pillar of the CAP.

The organic cattle and pig animal husbandry in Italy

Povellato A., (edited by, 2005): La zootecnia biologica bovina e suina in Italia. Ed. Scientifiche Italiane.

Executive summary:

In this book, a few pages focus on agro-environmental measures (pages 32-37). The analysis focused specially on measures linked to organic production. The aim is to point out the existing differences among the Italian regions and the effects of these measures on the organic sector (change of the organic agricultural areas). The data that have been considered, underline the decrease of the economic aid to organic farms. This decrease has been established by the regions and this decision could reduce the opportunities to improve the environment. The authors suggest to aim at the certification of products, in order to improve

their quality; it is necessary for the requirements to receive the economic aids, with reference to the organic production, to be more selective.

Agro-environmental measures in Italy

INEA (1999): Le misure agroambientali in Italia. Working Paper.

Executive summary:

This book aims at analysing the regional application of agro-environmental measures. A regional analysis is more appropriate, because the management of these measures is operated by each region separately. The regional analysis based on data coming out from regional sources, but only in some regions the information was sufficient for accurate elaborations. Anyway it has been possible, for each region and then for the whole country, to underline the strengths and weaknesses linked to the application of these measures.

Updating of the Mid-term evaluation of the Veneto Region RDP 2000-2006

Agriconsulting S.p.A. (2005): Aggiornamento del Rapporto di Valutazione Intermedia del PSR 2000-2006 della Regione Veneto.Report.

Executive summary:

In Chapter V of the document, support for less favoured areas and areas under environmental bindings is analysed. The assessment of economic indicators, concerning the capacity of the scheme to compensate income differences between less favoured areas and other areas, gives the following results:

- the compensation of mean income deficit is very limited (6% for animal husbandry farms and even lower for arable land and mixed farms)
- there is an accentuated "polarization" in the income compensation capacity: in other words, the simultaneous presence of "inappropriate" compensation (premium is added to an already positive income differential) or "overcompensation" (premium is higher than the income differential) and, on the contrary, of low compensation.

This judgement of overall low effectiveness of the scheme emerges also from the opinions and "perceptions" of farmers and local stakeholders.

As regards the analysis of agro-environmental schemes in Chapter VI, the evaluators underline the need to further develop the differentiation or modulation of agro-environmental support in relation to the different characteristics of regional rural areas, with reference to the relationship between farming and environment or, generally, the synergy between protection and growth.

In Chapter VIII the very low refund of family labour costs, within the payments for afforestation of agricultural land, is pointed out.

Updating to 2005 of the Mid-term evaluation of the Emilia-Romagna Region RDP 2000-2006

ERVET (2006): Aggiornamento al 2005 del Rapporto di Valutazione Intermedia del PSR 2000-2006 della Regione Emilia-Romagna. Report.

Executive summary:

In Chapter V the evaluator states that the role of compensatory allowances is quantitatively not very significant: the comparative analysis between beneficiary and non-beneficiary farms shows LFA payment's low capacity in compensating the economic effects (higher costs, lower productivity, lower income) of the higher environmental bindings weighing on farms located in less favoured areas of the Emilia-Romagna Region. The incidence of compensatory allowances on mean income differential equals to 2%. The low incisiveness of LFA payments on farm balances is put down to an excessively widespread and undifferentiated appliance.

Literature review Scotland

Principles for the Provision of Public Goods from Agriculture: Modelling Moorland Conservation in Scotland

Hanley, N., Kirkpatrick, H., Simpson, I., and Oglethorpe, D. (1998): Principles for the Provision of Public Goods from Agriculture: Modelling Moorland Conservation in Scotland. Land Economics 74: 102-113.

Executive summary:

This paper is concerned with policies for the supply of public, environmental goods from the farm sector. In particular, we characterize the buying of these goods by the public from farmers using the "Provider Gets Principle." This principle is well established in OECD countries, as we demonstrate. Results from ecological-economic modelling of the conservation of heather moorland in northern Scotland, using this principle, are described. This model enables us to identify spatially differentiated ecological targets, and to calculate the minimum necessary payments needed to achieve these targets.

An investigation of policy administration costs using panel data for the English Environmental Sensitive Areas.

Falconer, K., Dupraz, P., Whitby, M., (2001): An investigation of policy administration costs using panel data for the English Environmental Sensitive Areas. Journal of Agricultural Economics 52 (1): 83–103.

Executive summary:

This paper explores transaction costs in the context of agri-environmental policy schemes based on management agreements. While transaction costs encompass a wide range of organizational costs, the focus here is on the public sector administrative costs of policy implementation. Empirical administrative cost functions were estimated to investigate the factors affecting the magnitude of such costs, using panel data spanning five years for the 22 English Environmentally Sensitive Areas. The extent of participation appears to be important in explaining administrative cost variability across areas. The data suggested the existence of size economics with regard to the numbers of agreements made in any one ESA, and a significant effect of scheme experience in exerting downwards-pressure on administration costs. Policy budgeting and evaluation should take into account the non-trivial costs of organization, particularly if agri-environmental schemes based on the procurement of conservation goods through management agreements are to be extended in the future.

Review of Targeting Mechanisms

Garforth, M. 2001. Review of Targeting Mechanisms. Report to the Forestry Commission.

Executive summary:

Garforth (2001) undertook a study of challenge funding for the FC. He assessed the budgetary costs of each challenge fund as compared with a fixed-rate payment (a so-called location premium) set 20% below the bid price. The assumption was that applicants would have accepted a price 20% lower as a trade-off for the additional costs of bid preparation, the risk involved and some overbidding. His conclusions present a mixed picture: For the Grampian CF they were inconclusive, with a flat-rate grant calculated to bring in less land but at a lower cost. For the Central Scotland CF he concluded that a flat rate grant would have brought in the same area of land at lower costs. (Taken from Latacz-Lohmann, U. and Schilizzi, R., 2005).

Auctioning Conservation Contracts: A Theoretical Analysis and an Application

Latacz-Lohmann, U. and Van der Hamsvoort, C. (1997): Auctioning Conservation Contracts: A Theoretical Analysis and an Application. American Journal of Agricultural Economics, Vol. 79, No. 2 (May, 1997), pp. 407-418.

Executive summary:

Auction theory is used to analyze the potential benefits of auctions in allocating contracts for the provision of nonmarket goods in the countryside. A model of optimal bidding for conservation contracts is developed and applied to a hypothetical conservation program. Competitive bidding, compared to fixed-rate payments, can increase the budgetary cost effectiveness of conservation contracting significantly. The cost revelation mechanism inherent in the bidding process makes auctions a powerful means by which to reduce the problems of information asymmetry. Strategic bidding behaviour, which may adversely affect the performance of sequential auctions, is difficult to address by means of auction design.

Economics and the design of nature conservation policy: a case study of wild goose conservation in Scotland using choice experiments.

Hanley, N., MacMillan, D. Patterson, I and Wright, R. (2002): Economics and the design of nature conservation policy: a case study of wild goose conservation in Scotland using choice experiments. Animal Conservation, Volume 6, Issue 02, May 2003, pp 123-129.

Executive summary:

This paper applies the ‘choice experiment’ method to investigate public preferences over the design of wild goose conservation policy in Scotland. We argue that this method can shed useful light on the design of conservation policy, allowing policy-makers to take account of people's preferences, be they members of the general public (whose taxes often pay for conservation actions), local residents more directly affected by the policy, or visitors to wildlife areas. Preferences can be quantified in economic terms, so that the costs and benefits of different policy designs can be compared. In our study, we find that the general public, local residents and visitors have very different preferences for the conservation of geese. Whether geese are shot, the endangered status of geese, the spatial targeting of conservation and the size of the goose population all have impacts on the perceived benefits of conservation. In general, though, people are willing to pay for wild geese conservation.

Literature review Germany

Optimal differentiation of agri-environmental contracts

Glebe, T. (2006): Optimale Vertragsdifferenzierung in der Agrarumweltpolitik. *Agrarwirtschaft* 55 (4): 188 - 195.

Executive summary:

This article deals with the optimal differentiation of agri-environmnetal contracts based on a self-selection mechanism. The paper demonstrates that both economic efficiency and effectiveness of public expenditures can be increased, if a menu of combinations of farming practices and payments are offered. However, there is a trade-off between efficiency and effectiveness, sine the optimal program minimising government expenses does not simultaneously minimise farmers opportunity costs. A numerical example of differentiated agri-environmental contracts, aiming for the reduction of nitrogen fertiliser in wheat production, illustrates that efficiency and effectiveness gains can be substantial. Furthermore, it is shown that economic rents for agricultural producers do not necessarily shrink as a result of contract differentiation, if the latter aims for the minimisation of public expenditures.

Targets of agri-environmental policies are to accomplish pareto efficiency, this is where marginal utility of environmental improvements is equal to marginal opportunity costs caused by such agri-environmental policies. Decision makers need to augmented consider budget impacts by designing practical policies due to increasing requirements of policy measure effectiveness. In order to be effective environmental targets need to be achieved with minimal expenditures. Contrarily pareto-efficiency intends to maximize overall social welfare. Degrees of competition between efficiency and effectiveness targets are determined by available budgets.

Efficiency and effectiveness gains:

- Positive correlations of efficiency and effectiveness occur if increased effectiveness causes up-rating of budget constraints and a previously lower environmental target value can simultaneously be increased.
- Higher efficiencies might be additionally obtained if set-free funds are used to overcome market failures in any other branch.
- Efficiency gains occur if improved effectiveness causes tax-saves and thus costs for tax collection can be reduced.
- Overall social welfare can be increased even if reduced public expenditures do not influence environmental targets or tax collection costs. This is due to reductions of opportunity costs caused by environmental policies (cost-efficiency).
- Lack of effectiveness and cost efficiency of agri-environmental programs among other aspects is caused by uniform premiums which orientate on average costs by applying extensification measures. As a matter of fact heterogeneous characters of agricultural sites cause efficiency losses and windfall gains.

Methods to improve efficiency:

- To tender and allocate agri-environmental contracts to such applications that can offer or achieve corresponding environmental targets with lowest efforts or costs.

- To regional differentiate agri-environmental contracts though effectiveness gains are constraint due to a) even high variability of extensification costs on-farms within small scales and b) higher administration costs for region-specific premiums.

This article concentrates on differentiating agri-environmental contracts with the help of a mechanism of self-choice. Thus mixtures of environmental performances and corresponding payments are chosen in such a manner that inefficiencies due to information asymmetries and adverse selection are minimized.

Problems of windfall profits of agri-environmental and extensification measures

Isermeyer, F. and Nieberg, H. (1996): Zur Problematik der Mitnahmeeffekte bei Agrarumwelt- und Extensivierungsprogrammen. Stellungnahme für das Bundesministerium für Landwirtschaft 25p. Internal report by the Federal Agricultural Research Centre to the German Ministry of Agriculture.

Executive summary:

Aim of this study is to analyse the complex problems of windfall profits to test if a policy change favouring tender systems can be recommended.

Important results of this study are:

- There is no general accepted definition of windfall profits; therefore room for interpretations is given:
- The term windfall profits is used mainly in connection with support or subvention programs. However, even other policy instruments can evoke positive income effects without any adaptation reaction of some agricultural farms.
- In some literature sources the term windfall profits is additionally used if farmers have to adapt in a specific manner, however adaptation costs are over-compensated by income increases.

Even about evaluation of windfall profits we found different views:

- in classical cost-benefit analysis windfall profits are more or less neglected because income transfers have rather distributive than allocation consequences; for welfare analysis windfall profits are not that relevant and in such a point of view a policy with higher administration effort but lower windfall profits would not be preferred.
- in a more micro-economic valuation approach the dominant question is how to obtain maximum target achievement with available financial budgets; in such a point of view windfall profits are seen negatively because they withdrawal financial means without benefiting environmental effects.

If one concentrates on the question on how to reduce windfall profits the analysis shows that by tender systems of agri-environmental measures most probably only small amounts can be reduced, to balance additional costs due to the tender systems.

Relatively small success-expectations can be explained as follows:

- to accumulate utility for the environment, frameworks of agri-environmental programs require specific stability and constancy
- if frameworks are held constant and if participating member cycles are rather small then respective farmers will know how to assess the bid cap within a few years and will not orientate their individual bidding limit on farm-specific marginal costs anymore.

- conversion to a tender system can put off supply curves more to the top. This effect in combination with higher administrative costs might cause requirements of budgetary means in order to increase environmental targets even within the tender system in comparison to subvention system.
- an assumed more suitable policy variation to reduce windfall profits is to group participating farmers into separate categories of effortless conductible farm-specific characters which reflect different levels of marginal costs. Such parameters might be a) region affiliations, b) affiliations to specific structural characteristics or c) characteristics of production technique.

Use of such parameters is exclusively reasonable if such characters are a) sufficiently correlated with farm-specific marginal costs and b) obtainable with relatively low administrative efforts.

Further it needs to be clarified if additional regional or farm-specific differentiation is not causing problems in other policy fields.

Conclusions:If governments want to follow specific environmental targets with performance oriented payments they have to give incentives to farmers which are going beyond adaptation costs. Due to high heterogeneity in structure of agricultural enterprises high windfall profits are unavoidable. The change-over to tender systems might reduce a small portion of these windfall profits. On the other hand administration has to face cost-intensive side-effects. Therefore other more suitable alternatives to improve efficiencies of agri-environmental measures need to be found.

Support of organic farming in Germany -Development and outlook-

Nieberg, H. and Strohm-Lömpcke, R. (2001): Förderung des ökologischen Landbaus in Deutschland: Entwicklung und Zukunftsaussichten. Agrarwirtschaft 50 (7): 410 - 421.

Executive summary:

Further development of area-related premiums

In accordance to reduced budgets and with respect to the political target to support organic farming schemes it is reasonable to discuss issues of flat-rate premiums. Focal points are increases of expenditure efficiencies.

Introduction of specific agri-environmental measures causes different levels of costs on different farm types. Cost differences are caused by site-specific conditions, production programs, market orientations and the ability of the manager to convert with minimal costs. Constipating authorities are not able to estimate farm-specific adaptation costs for a large number of farms. Therefore farm specific premium levels are not applicable. Common are flat-rate premium level specifications on basis of large scale averages with rough calculations with respect to budgets. Premium levels determine the area coverage. If area coverage of measures do not achieve desired levels allowance levels are increased; if they extend desired sizes premium levels are going to be reduced.

Efficiencies of premiums can be improved, if total numbers of potential participating farms can be differentiated into sub groups in accordance to assessable marginal costs. According to subgroups a cost oriented premium level could be offered. Unfortunately farm specific marginal cots are hardly assessable. Therefore it is necessary to find farm specific characteristics which can be proofed with quite small administrative effort and which are strongly correlated with farm-specific marginal costs. Differentiations of premiums lead to

increased conversion areas with equal budgets or equal area coverage with minimised budgets. However, administrative and control costs need to be considered for the degree of differentiation.

Differentiations with relative low administrative effort are:

- Differentiated premiums in first two years of conversion
- Differentiated premiums for arable land according to quality of sites within implementation phases
- Differentiation of premiums for grassland according to stocking rates of roughage fodder consuming large stock units.
- Differentiation of premiums for organically farming refinement farms.

Considerable expanding of organic farming might induce prices reductions of organic products which cause premiums to be not adequate to fully cover income losses. Therefore conversion might be a risky action which keeps several farmers from introducing organic farming measures. Consequently premiums require respectively high risk supplements.

Further tender systems are seen as solutions for a more suitable differentiation of premiums. However, benefits in terms of saved costs can not be foreseen to oversize additional administrative costs.

Agri-environmental programs -Using auctions to select participants-

Holm-Müller, K., Plankl, R. and Weis, J. (2002): Umweltfördermaßnahmen in der Landwirtschaft – Teilnehmerauswahl durch Ausschreibungen? *Agrarwirtschaft* 51 (2):112-120.

Executive summary:

Agri-environmental programs offering uniform payments to farmers achieved only low participation rations in some regions whereas, in other regions, windfall profits arose. Auctions leading to individual payments equal to farmers' bids could solve this problem. Simulations showing auctions' efficiency gains are based on critical assumptions though. In this article the validity of these assumptions is discussed for different auction designs and different subprograms. We find that extensification programs offer the best conditions for successful auctions. However, it seems counterproductive to use auction for choosing among different areas in environmental contraction.

This paper depicts which assumptions are critical, for which measures such assumptions are of high importance and which consequences arose for adequate formulation of tender systems from discrepancies of those assumptions. Further we discuss under which premises tender systems for agri-environmental measures lead to efficiency increases and which practical restrictions might be faced.

The four important assumptions are:

- non-existing transaction costs
- non-existing common knowledge
- symmetries among applicants or bidders
- competition among applicants or bidders

Context between different assumptions:

If problems of lacking competition are in place it seems to be recommendable to apply synchronisation of different tender rounds. However, this causes time-dependent delays for adaptation reactions for preferences and frame conditions.

Other configuration elements for tender systems show that they suit some assumptions and clash with others. Large scale programs are faced with moderate transaction costs and serve for enough competition. However, problems arise if bidders are equipped with asymmetric characters further the risk of building up common knowledge is higher than for other alternatives.

Regionalised tenders are more suited for asymmetric characters of bidders but building up of common knowledge is a high risk and establishing of adequate competition might cause problems.

Tender systems where prices are set at the beginning and choices are done thanks to content or measure supplies counteract the problem of common knowledge. Even asymmetries among bidders can be minimised. Contrarily to already discussed elements these configurations cause extremely high transaction costs for bidders which might result in low uptake rates and thus low competition. Though each configuration has its advantages and disadvantages there are possibilities to minimise obstacles by a clever choice of configurations.

Implementation effects of agri-environmental programs pursuant to directive EEC 2078/92 on competition of agriculture under specific considerations of forage production in federal states of Germany

Osterburg, B. (2000): Auswirkungen der Umsetzung der Agrarumweltprogramme gem. Verordnung (EWG) 2078/92 in den deutschen Bundesländern auf die Wettbewerbsfähigkeit der Landwirtschaft unter besonderer Berücksichtigung des Futterbaus. Schr Ges Wirtsch Sozialwiss Landbau 36: 195 - 204.

Executive summary:

Comparisons of agri-environmental programs of different federal states show strong differences in terms of design, implementation and financial equipment. This might influence competitiveness, even if the assumption holds true that the incentive component amounts exclusively to 20%. Expectations of income effects come up due to the concentration of claims on disadvantaged and less productive sites. From farm-specific analysis we could proof a correlation between environmental premiums and positive income effects. However, specifically farms specialised on beef production faced reduced production outputs and thus losses of market shares.

Restrictions of stock numbers in agri-environmental programs give incentives of additional area rentals to gain premiums even without de-stocking. Income effects of program participation have additional positive impacts on liquidity statues and serve for successful actions within area rental markets.

In general environmental programs are impacting income and competition. While some farmers of specific products, who participate in environmental programs, like beef-production loose market shares, framers of other production segments, like rental markets or milk production, gain market shares or obtain benefits due to participation.

Interim-evaluation of compensatory allowances in less-favoured areas 2000 -2002 Bavaria

Bernhards, U., Doll, H., Klockenbring, C., Plankl, R. and Rudow, K. (2003): Zwischenbewertung der Ausgleichszulage in benachteiligten Gebieten 2000 - 2002 in Bayern. Kapitel 5.6.2.1 Beitrag der Ausgleichszulage zur Kompensation von Einkommensnachteilen bzw. -verlusten. 30-39. Internal report by the Federal Agricultural Research Centre, Braunschweig, Germany.

Executive summary:

Contribution of compensatory allowances for compensation of income differences

Compensatory allowances are aimed to compensate natural disadvantages which cause higher production costs and lower yields in order to maintain agricultural production in less favoured areas. Assessment criterion (compensation for income deficits which are caused by natural disadvantages) is quite relevant but hardly operational. Difficulties occur for derivation of program indicators and reference groups. As a program indicator the share of compensatory allowances on income deficits is determined. The program can be claimed as successful if the ratio of compensatory allowances to income differences is higher than respective target values. Differences in increased costs and lower yields are caused mainly by natural disadvantages; however, even other factors as management, market situation, farm structure, investment costs and lack of production alternatives have an impact. For calculations we used as income parameters profits plus labour costs and supplemented cost and yield indicators as well as further yield impacting factors.

Another program indicator is supposed to indicate efficiencies and effectiveness of measures. This is obtained by analysing the degree of compensation which is achieved on different farms. Therefore farms are grouped in three categories, farms with compensations of less than 50%, farms with compensations between 50% and 90% and farms with compensations above 90%. Further shares of these farm categories on total farm number are determined. Additionally another farm group has been determined which obtained higher incomes compared to averages of farms in less favoured areas even without compensatory allowances. For those farms negative shares of compensatory allowances on income differences occur.

Bavaria decided to use as reference groups corresponding farms located a) within and b) outside disadvantaged areas. However, to obtain more differentiated results even other reference groups have been compared.

Compensatory allowances show different effects according to different reference groups. Average compensation impact of payments amount for crop production farms to scarcely 9%, for fodder production farms to approximately 40%. Effects of compensatory allowances are less strong by low LVZ's (in Germany compensatory allowances are differentiated by an indicator which describes natural production conditions LVZ 'Landwirtschaftliche Vergleichszahl': the higher the LVZ the lower the payment amount). For LVZ's above 26 over-compensation is possible. Considerably low has been the effect of compensatory allowances for farms with LVZ's between 16 and 21. Farms in mountain areas showed a high portion of overcompensation. This might be due to relatively high grassland portions as well as higher premium levels in this area category. Impacts of compensatory payments of different agricultural zones depend on characters of such areas. Is the zone characterised by high portions of mountain areas equal tendencies as for mountain areas can be derived. Is the zone characterised by low LVZ and relatively high portions of arable land, under-compensation is common.

Interim-evaluation of compensatory allowances in less-favoured areas 2000 - 2002 Germany

Bernhards, U., Doll, H., Klockenbring, C., Plankl, R. and Rudow, K. (2003): Zwischenbewertung der Ausgleichszulage in benachteiligten Gebieten 2000 - 2002 in Germany. Kapitel 5.6.2.1 Beitrag der Ausgleichszulage zur Kompensation von Einkommensnachteilen bzw. -verlusten. 30-39. Internal report by the Federal Agricultural Research Centre, Braunschweig, Germany.

Executive summary:

Contribution of compensatory allowances for compensation of income differences

Compensatory allowances are aimed to compensate for natural disadvantages in less favoured areas due to higher production costs or lower yields which cause income losses. Due to compensation it is aimed to maintain agricultural productivity in such areas. Differences in increased costs and lower yields are caused mainly by natural disadvantages; however, even other factors as management, market situation, farm structure, investment costs and lack of production alternatives have an impact. For calculations we used as income parameters profits plus labour costs and supplemented cost and yield indicators as well as further yield impacting factors.

Old federal states of Germany:

55 up to 80% of supported farms could compensate less than 50% of income losses by obtaining compensatory allowances. On the other hand more than 30% of farms have been supported, although they obtained higher incomes per ha than the average of non-disadvantaged farms even without compensatory allowances. Compensatory allowances strongly depend on stock numbers and are not differentiated by farm-specific factors. Therefore overcompensation can hardly be avoided. A differentiation according to farm-specific factors could reduce such effects, however, this would be related with higher administrative afford and thus costs.

New federal states of Germany:

High differences in incomes between farms in less-favoured areas and non disadvantaged areas caused that in one federal state (Saxony-Anhalt) not even one farm could compensate more than 50% of income losses. In MWP similar tendencies occurred, 8% of supported farms could compensate 50% of income losses. Contrarily in Brandenburg, Saxony and Thuringia half of supported farms got compensated for 50% of income losses. Comparable to old federal states some supported farms obtained higher incomes per ha than the average of non-disadvantaged farms even without compensatory allowances. This portion makes up 33% in Brandenburg, 25% in Saxony, 17% in Thuringia and 8% in MWP. Reasons are a) high variances within farms, b) partly different structural endowment differences between supported and non-supported farms, c) small income differences of farms in less favoured areas and non-supported areas (Brandenburg, Saxony).

Target-oriented rewarding of species-rich grassland with tenders – Scientific baselines and implementation of pilot projects in Northeim, Germany-

Bertke, E. and Richter, A. (2006): Die ergebnisorientierte Honorierung artenreichen Grünlands per Ausschreibung -Wissenschaftliche Grundlagen und Umsetzung eines Pilotprojekts im Landkreis Northeim. *NNA Berichte* 19: 211 - 221.

Executive summary:

Target oriented environmental goods are for example obtaining species-rich grassland, arable land or arable side-strips. Within those categories we distinguished different ecological goods (for example three different grassland types with different qualities in terms of nature conservation). Rewarding of those goods is according to EU law permitted if production of these goods needs adaptations within agricultural production processes.

The rewarding system includes general economic elements like a demand function of ecological goods and obligatory supply of goods by farmers. Biodiversity or structural diversity is a public good and therefore demand functions are not private and implementation of spontaneous markets can be neglected. Consequently demand needs to be organised collectively, this is done by the regional advisory board which includes different stakeholders. This causes the implementation of public opinions and decision making and reflects a realistic public demand of ecological goods. Initial market situations can be described as monopsons with various suppliers and only one institutional demander. To cause competition among suppliers of ecological goods a tender system is implemented. Contrarily to flat-rate premiums rewarding levels are individual and calculated on basis of farm-specific production costs which cause different supply prices. Subsequently public institutions have the possibility to satisfy demands of a specific ecological good to choose suppliers offering the lowest prices.

Goods which are in view of environmental aspects of higher quality are reasonably scarce. They cause a higher demand and therefore deliver higher rewarding levels. Consequently there is a differentiation of payment levels according to supply costs and scarcity. This differentiation causes different advantages:

For goods with relatively low requirements the participation number of farms is assumed to be high

For goods with high requirements and high values additional incentives are given

According to the region, there might be the desire to obtain all possible goods of a good group or to obtain specifically one of these goods. For each ecological good the advisory board needs to determine a specific budget. This allows for effective regional focus point setting. Efficient input of financial means as well as high nature utility can be obtained simultaneously. Regional knowledge is used due to decentralised character of tenders and a high target orientation can be assumed.

Generally tender-systems are suitable for target-oriented rewarding of species-rich grassland. Additionally to a high degree of effectiveness this system increased sensibility of farms for species-richness of their plots contrarily to action-oriented approaches. Renunciation of regulations increased acceptance and participation in agri-environmental measures. Due to regionalised tenders even public budget efficiency has been increased. In comparison with federalised flat-rate premiums same performances could be obtained with lower prices. Farmers demanded differentiated prices according to their particular farm-specific conditions.

Agri-environmental measures in Germany -Their evolution in practise and new approaches to strengthen efficiency-

Osterburg, B. and Runge,T. (2006): Agri-environmental measures in Germany. Their evolution in practice and new approaches to strengthen efficiency. Paper presented at the *workshop on information deficiencies in agri-environmental policies*. Paris, June, 2006.

Executive summary:

Discussion on efficiency of agri-environmental measures

Fixation of suitable payment rates is hampered by a) unknown realistic marginal adaptation costs of participating farms and b) heterogeneity of farm conditions. Flat-rate payments calculated on basis of average farming conditions lead to higher scheme uptake on farms with land use intensities below the average, e.g. on marginal land or with low livestock densities and thus lower adaptation costs (keyword: adverse selection).

As a precondition for green box status of support, according to WTO agreements, agri-environmental payments have to be limited to considerations of additional cost or losses of income caused by scheme participation. Incentive–driven support measures cannot obtain green box status. Up to 2007 EU allowed for an incentive component of usually up to 20% of the compensation of losses and additional costs. From 2007 onwards private transaction cost can be considered in payment calculation levels simultaneously the 20% incentive element has been abolished. Furthermore, tender systems are accepted as an alternative way for fixing payment levels.

Remuneration of ecological outputs draws attention towards scarcity of environmental resources, especially wildlife biodiversity. Instead of action–oriented measures, support should be based on results according to a system of eco-points and flat-rate payments per point. To diminish windfall profits farms maintaining extensive land use practices need to be excluded from support. However, certain incentives and windfall losses due to heterogeneity of farms are difficult to avoid. Auction systems will not serve to reduce over-compensation substantially due to strategic behaviour and learning about bid caps.

Several authors recommend payment level differentiation according to regions, farm structures, or technical farm assets, as long as a) these characteristics show a sufficient correlation to the marginal cost of scheme participation and b) monitoring and control of characteristics is feasible.

Measures costs will not vary substantially between farms or regions which a) require additional operations or inputs without major impacts on land use and production and b) landscape management with few or even without agricultural output generated from management activities. A differentiation is further not justified for measures with almost homogenous marginal adaptation costs throughout farms and regions.

Environmental impacts might vary even for measures for which a flat-rate payment seems appropriate depending on farm and regional conditions. Thus appropriate targeting is another field for improving efficiency. In order to counter-balance the tendency of higher participation in less favoured areas and the low uptake in more intensively farmed regions would require implementation of differentiated payments. However, impacts on cost-effectiveness are not clear as payments increase while environmental effects are not necessarily as positive. So far non-differentiation of payments though suggestions have been made from several scientists might be caused by a) path-dependencies after once having introduced this system, b) expectations that public administration costs will increase when differentiating the payment system, c) risk of higher decision-making cost and d) lower acceptance when virtually treating

farmers unequally. Further the author discusses developments and improvements of existing agri-environmental support systems by comparing:

- Result-oriented measures versus action oriented measures
- Tenders versus flat-rate payment
- Cooperative models versus top-down implementation

Auctions for conservation contracts: a review of the theoretical and empirical literature

Latacz-Lohmann, U. and Schilizzi, S. (2005): Auctions for conservation contracts: A review of the theoretical and empirical literature. Report to the Scottish Executive and Rural Affairs Department. (Project no: UKL/001/05). Scotland, UK.

Executive summary:

We reviewed case studies of conservation auctions covering the USA, Australia, continental Europe and the UK. For each auction, we reviewed the problem addressed, objectives, auction design, auction outcomes, and lessons learned. The schemes reviewed differ in their policy goals, their ways of setting reserve prices and their methods of assessing environmental benefits and ranking bids.

The **Conservation Reserve Program (USA)** has multiple objectives ranging from erosion control through habitat improvement to income support for farmers. Under this program, landholders bid for government funds for retiring their lands from farm production for a period of 10 to 15 years. Current CRP auctions employ an environmental benefit index to compare bids. This index accounts for land quality heterogeneity and weights various environmental objectives according to their relative importance. Currently (2005), approximately 33.5 million acres of farmland are enrolled in the CRP. Each contract covers an average of 74 acres with an average rental rate of $45.95 per acre. From its beginning in 1986, the CRP was conceived as a multiple sign-up scheme. This has allowed landholders to learn where the (implicit) bid cap lies and to gradually adjust their bids to this cap, eroding the cost-effectiveness of the auction.

The **Bush Tender pilots,** carried out in 2001-2003 in Victoria, Australia, were designed to test the idea according to which auctions could efficiently purchase public environmental goods from private landholders. The good in question was biodiversity as captured through improved 'bush' (i.e. native vegetation) management. Expressions of interest were first called for, then government officers visited the farms and the land areas up for tender. Ecological data were collected on these areas and analysed by scientists to devise a Biodiversity Benefits Index (BBI). Bids were ranked according to the BBI/bid ratio, from highest value per dollar bid down, until the budget constraint was hit. Subsequent **analysis** of first round results claimed a benefit of 700% of that which would have been obtained through a fixed-price scheme. We question the validity of this figure because of the 'non-standard' way in which it has been computed. Transaction costs for the first round of BushTender, which included on-site research, ecological scoring and auction administration costs, amounted to roughly 50% to 60% of the amount spent in the auction. The involvement of government officers and their dedication to explain to farmers the ins and outs of this new payment system were found to be important for securing sufficient participation and thereby the level of competition necessary for the auction to play its efficiency role.

The **Auction for Landscape Recovery** (ALR) aimed at securing multiple benefits from land management improvements in Western Australia, namely biodiversity enhancement, salinity control, and groundwater recharge abatement. Landholders who had expressed interest were encouraged to submit a tender describing their proposed management activities, anticipated environmental outcomes and a bid. The tender process was communicated as rewarding those who deliver the greatest environmental benefit per dollar. Tenders were evaluated using a regional metric of 'biodiversity complementarity' within a systematic conservation planning framework. This metric, unlike the BBI, accounts for synergistic aspects due to number, size and distance of several areas; the BBI focuses on the individual value of each land area. Some interesting outcomes emerge from this experience:

• Cost-effectiveness of the ALR compared to that of a uniform price scheme varies between 315% and 207% in round 1 and 165% and 186% in round 2, depending on whether the fixed price scheme is input-based or output-based.

• There was no evidence to show that the auction imposed higher administrative costs than equivalent schemes using the same amount of information to underpin the selection process. This was because most of these costs were not linked to the specifics of running an auction.

• The building by natural scientists of a comprehensive scoring index for ranking multidimensional auctions is an exercise fraught with pitfalls. Subjectivity cannot be avoided, even if it is buried in the appearance of an objective measure (the scoring index).

Eco Tender, carried out in the state of Victoria, Australia, is an offshoot of BushTender and similar in intent to the Western Australian Auction for Landscape Recovery (ALR), in that it aims to secure multiple environmental benefits, including improvements in salinity control, biodiversity enhancement and water quality. A specific feature of EcoTender is that it uses information from catchment-based modelling to estimate both local and catchment-wide impacts on environmental outcomes as a result of changed land use and management. Bids can be lumped or separate; that is, a landholder can submit a bid for a number of areas or separate bids for each. Pooled bids across several farmers are also allowed. Payments are not only input-based (management actions), but also include an output-based element. This is an ongoing programme for which no results are yet available (2005).

Challenge Funding was introduced into Scottish forestry policy in 1997 – with the launch of the Grampian Challenge Fund and the Central Scotland Challenge Fund. These funds operated under the umbrella of the Woodland Grant Scheme (WGS) and offered additional grants to the standard WGS grants for extending the woodland area in specific geographical areas. They were competitive in that applicants were required to submit bids to the Forestry Commission (FC) for this additional money. Both funds were closed for applicants in 2002. Currently only one challenge fund is in operation. This is the Woodlands In and Around Towns (WIAT) Challenge. A judging panel awarded grants to those applicants whose plans best met the aims of the Challenge and offered the best value for money. The panel selected high-scoring, low-cost bids first. Beyond that they traded off score against cost in a subjective way. The funds were very successful in rapidly expanding the land area under forestry. Subsequent analysis of the data showed that, to secure all the bids with a fixed-rate premium would have required a budget 33% to 36% above that spent under Challenge Funding. Forestry Commission staff reckon that operating the challenge funds took 20 per cent more staff time per application than fixed-rate incentives. A subsequent survey revealed some dissatisfaction with a grant scheme based on tendering. The main comment was that it was 'unfair' in some way. There was a consensus from stakeholders that challenge funds were too uncertain for the applicant and that they should be replaced by location premium (i.e. fixed rates per ha).

The focus of the **Grassland Conservation Pilot Tender** (Germany) was on maintaining low-intensity grazing systems. The conservation agency had initially offered fixed-rate payments. After only very few farmers had signed up, an auction was run to determine the excess payment required to induce broader participation. A bid cap of 53 per cent of the fixed-rate payment was imposed for the first round. All bids below that reserve price were accepted. The reserve price was not known to the bidders before auction. Fewer farmers than expected (15 in each of the three bidding rounds) submitted a bid, implying that the scheme was not effective in encouraging broader participation in agri-environmental management. Subsequent analysis revealed that uncertainty over yield losses and the impacts of the latest CAP reform were key deterrents to participation.

Conservation auction performance

Conservation auctions are still in their infancy and data from the field are scarce. Anecdotal evidence on auction performance is often spurious and intuition unreliable. There are claims that the amount of biodiversity benefits acquired through the first round of BushTender auctions would have cost about seven times as much if a fixed price scheme had been used instead. A study is in the process of evaluating the Scottish 2001 fishing vessel decommissioning exercise, and preliminary results suggest that the gains from the auction relative to a budget-equivalent fixed price scheme are not nearly as high. These results are more in line with findings reported in Latacz-Lohmann and van der Hamsvoort (1997) who simulated farmers' bidding behaviour in a hypothetical conservation programme. They found efficiency gains ranging from 16 to 29%, depending on how the auction was implemented and how winners were selected. These figures compare to Challenge Fund's 33 to 36%. However, White and Burton (2005) find efficiency gains between 200 and 315% for the Auction of Landscape Recovery (ALR) pilot in Western Australia. Some care has to be taken in interpreting all these figures: because they are based on different counterfactual fixed-payment rates, they cannot be compared to each other. These variations suggest that it is probably too early to make a robust assessment of the costeffectiveness of auctions in agri-environmental management. However, there is unanimity in the empirical literature that bidder learning poses a substantial threat to the efficiency of multiple-round conservation auctions. Both experimental studies and agent-based simulation studies have confirmed the experience with the US Conservation Reserve Program: when bidders have the opportunity to learn from preceding bidding rounds, they will use that information to update their bids and reap higher rents – at the detriment of auction performance.

Agri-environmental policy in Germany -Understanding the role of regional administration-

Eggers, J., Laschewski, L. and Schleyer, C. (2004): Agri-environmental policy in Germany – Understanding the Role of Regional Administration. Institutional Change in Agriculture and Natural Resources (ICAR) Discussion Paper. 4: 1-26. Department of Agricultural Economics and Social Sciences, Humboldt-Universität zu Berlin, Berlin, Germany.

Executive summary:

Within agri-environmental schemes a rather divers uptake and lack of effectiveness and efficiency can be observed. We suggest that the ineffectiveness and inefficiency is inherent to the way those schemes are currently institutionalised in European agricultural policies. Within a boarder research project so-called agri-environmental forums were installed in two districts in Brandenburg to integrate local actors for designing and implementing local agri-environmental schemes to improve their economic and ecological efficiency. Though this has been a success the local scheme did not become part of the Rural Development Plan in Brandenburg. We argue that the process of designing agri-environmental schemes in Germany can be conceptualised as a rather complex negotiation process at Laender level. Institutional settings in which negotiations take place shape possible outcomes and the design of the schemes. Due to compulsory complex bureaucratic procedures on part of the EU there are no incentives for the administration at Laender level to actively support those approaches. We can not expect to wipe out ineffectiveness and inefficiencies completely from agri-environmental policy framework. Therefore environmental issues can not be solved through agri-environmental schemes alone.