Proceedings of the OECD/PACIOLI Workshop on Information Needs for the Analysis of Farm Household Income Issues

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OECD

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The Agricultural Economics Research Institute (LEI) is active in a wide array of research which can be classified into various domains. This report reflects research within the following domain:

☐ Statutory and service tasks
☐ Business development and competitive position
☐ Natural resources and the environment
☐ Land and economics
☐ Chains
☐ Policy
☐ Institutions, people and perceptions
☑ Models and data

II

The assessment of agricultural policies depends more and more on micro-economic data sets. This is especially true for policies with an income objective in a situation where farm households have different income sources. Among others the OECD has stressed this point in recent years with analytical reports. The PACIOLI network yearly brings together data managers and researchers interested in the innovation of data collection in this area. In April 2004 a joint workshop was organised at the OECD in Paris to bring experts together to exchange best practices. This report contains the proceedings of that workshop.

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Preface

Farm incomes are still a dominant objective of agricultural policies. The assessment of such policies depends more and more on micro-economic data sets. This is partly due to the technical progress in making such data sets available, but it is also influenced by demands from the side of the policy analyst. Policies are more targeted to special groups and contain cross compliance clauses. In the case of the assessment of the income aspect of policies it is also very important to use micro-economic data sets, and not only on farm level, but on the household level. This because many farm households have different income sources, farming being only one of them. With more farm women entering (or staying in) the off-farm labour market, less travel time from the farm to urban labour markets and in some regions the increase of multi-activity, the analysis should not be restricted to farm income.

Among others the OECD has stressed this point in recent years with analytical reports. One of the observations of those reports was that data sets differ widely between member countries. The PACIOLI network (www.pacioli.org) yearly brings together data managers and researchers interested in the innovation of data collection in this area. Members of this network are interested in learning from experiences in other countries. In April 2004 a joint workshop was organised at the OECD in Paris to bring experts together to exchange best practices. This report contains the proceedings.

The workshop was organised by the editors of these proceedings: Catherine Moreddu at OECD and, on behalf of the PACIOLI Network, Krijn Poppe at LEI in The Hague. Within OECD Carmel Cahill and Ken Ash contributed to the preparations. Michèle Patterson edited and translated many papers. We are indebted to the USDA - Economic Research Service for their financial support of the workshop and to the Dutch Ministry of Agriculture for supporting the publication of the proceedings.

We would like to thank all the presenters and the participants of the workshop for their contributions to the discussion. We hope that this important type of work will continue in the next years, and that this will be done in a collaborative atmosphere between persons and organisations in OECD member states.

Prof. Dr L.C. Zachariasse   Prof. Dr S. Tangermann
Director General LEI B.V.   Director for food, agriculture and fisheries, OECD

1. Introduction

The workshop on Information Needs for the Analysis of Farm Household Income Issues attempted to increase awareness of the data requirements for the purpose of addressing farm household income objectives with a view to generating momentum for the development of data bases that are better adapted to the needs of policy-makers. It was held on April 29 and 30 in Paris, at the OECD premises in La Défense. The full program of the workshop is given in the appendix to this chapter.

Most of the speakers were able to contribute a text for these proceedings. Chapter 2, written by Catherine Moreddu of the OECD Secretariat, provides an overview to summarise the findings of previous work on farm household issues. It presents what we know - and what we don't know in terms of income parity, incidence and causes of low income with respect to distribution and variability of income.

The first session of the workshop dealt with the issue of specifying the information needs of policy makers. Léon Kirsch and Francis Joret, who work at the European Audit Office, present in Chapter 3 the findings of their assessment of European statistical instruments to measure farm income. The Court concluded that data actually produced does not allow for a precise measurement of disposable farm income, nor does it allow for a comparison of standards of living between the agricultural community and those of other socio-professional categories. A rigorous reorientation of the statistical instruments is needed. In the same session Kazuhito Yamashita (Chapter 4) reported on the Japanese experience, focusing on the role of direct payments.

Session two of the workshop tried to identify information availability and gaps in more detail. Carmel Cahill of the OECD Secretariat provides in chapter 5 an overview for the OECD countries. Pierre Bascou (European Commission, DG Agri) focuses on farm household incomes and the role of Eurostats Income of Agricultural Household Sectors statistic (Chapter 6). Jean-Pierre Berthier (INSEE) reports on the French experience and concludes that no single statistical source is sufficient. Distinctive national characteristics make a single methodology problematic (Chapter 7).

The third session of the workshop started with a discussion on solutions to overcome political, administrative/institutional and budgetary constraints. The main findings of that discussion are reported in the last chapter of these proceedings (see below). The second part of the session contained three presentations to illustrate best practices. Beat Meier (Agroscope FAT, Switzerland) showed how farm household behaviour can be better understood by using micro economic data on household income and cash flow indicators (Chapter 8). Werner Kleinhanβ (FAL, Braunschweig, Germany) showed how micro data are used in Germany to carry out an ex-ante policy evaluation of the reform of the Common Agricultural Policy. Much attention is given to the distribution of direct payments. The same reform has been analysed for Ireland and is presented by Thia Hennessy (Teagasc, Dublin) in Chapter 10. She also reports on effects on labour allocation of farmers: the decoupled single farm payment will decrease the marginal income per hour worked in agriculture and hence make an increase

in off-farm work likely. Detailed micro economic data is needed to model such policy effects. Berkeley Hill (Imperial College at Wye, UK) reviewed the previous three papers in chapter 11 and extents the discussion to indicators of wellbeing. David Harris reports in Chapter 12 on the experiences in the reform of the Australian dairy industry. Also here the development of the adjustment assistance program was difficult due to data limitations.

      The workshop was concluded with a discussion session. Based on all the material available, including the results of the discussions and some contributions to the workshop that were not available as a working paper, the editors of this report have written a policy brief that reports the main findings on best practices in using micro economic data sets for policy evaluation. The target group of this policy brief is the policy-makers in the OECD countries. The policy brief has been published recently by the OECD, and is reprinted here in Chapter 13 as a kind of conclusions of the workshop.

Appendix Workshop Structure and Content

Thursday 29 April 2004

10:00-10:30   Introduction by Stefan Tangermann, Director, Agricultural Directorate, OECD

10:10-10:30   Presentation by the Secretariat to summarise the findings of previous work on farm household income issues, i.e. the need for better information to address income objectives, in terms of income parity, in terms of the incidence and causes of ow income, and with respect ot distribution and variability.

10:40-12:30   *Session 1 Specifying information needs*
- What information do policy-makers need on farm household income, wealth and overall well-being?
- how would such information be used?

chair: Berkeley Hill, Imperial College at Wye, United Kingdom
speakers: Ashok Mishra, ERS, USDA, United States
                Leon Kirsch and Francis Joret, European Audit Office
discussants: Kazuhito Yamashita, Research Institute of Economy, Trade and Industry, Japan

14:30-16:00   *Session 2 Identifying information availability/gaps*
- What is available? What is missing?
- Why is it missing? What are the constraints to obtaining and using the desired information?

chair: Andreas Lindner, Statistics Directorate, OECD
speakers: Carmel Cahill, Agricultural Directorate, OECD
                Piere Bascou, EU Commission
discussants: Jean-Pierre Berthier, chef de la division agriculture, INSEE, France

16:10-17:30   *Session 3 Obtaining the required information?*
              3A How can political, administrative/institutional and budgetary constraints be
                 overcome?
              chair: Krijn Poppe, LEI, Netherlands
              speaker: Greg Strain, AAFC, Canada
              discussants: Thia Hennessy, Teagasc, Ireland

Friday 30 April 2004

10:00-13:00   3B Using data for policy making: illustrations
              chair: Krijn Poppe, LEI, Netherlands
              speakers: Beat Meier, Swiss Research Institute, Tänikon, Switzerland (on
                           the appropriate indicators of income)
                           Werner Kleinshanss, FAL, Braunschweig, Germany (on the dis-
                           tribution of support)
                           Thia Hennessy, Teagasc, Ireland (on the impact of CAP reform)
              discussant: Berkeley Hill, Imperial College at Wye, United Kingdom (on in-
                           dicators of well-being)
                           David Harris, consultant, Australia

15:00-17:00   *Session 4 Where do we go from there?*
              chair: Stefan Tangermann, Director, Agricultural Directorate, OECD
                           Susan Offutt, ERS, USDA
                           Christian Gay, SCEES, France
                           Krijn Poppe, LEI, Netherlands
                           Ken Ash, Deputy Director, Agricultural Directorate, OECD

2. Farm household income issues: where do we start from?

By Catherine Moreddu [1]

2.1   Context of OECD work on farm household income issues

Although the scope of objectives attributed to agricultural policies has broadened, income objectives are still prominent in many OECD countries. Governments support the agricultural sector, often through large transfers, to improve income levels, to alleviate the incidence of low income and to reduce income variability.

The OECD work on farm household income issues aims to assess whether the belief that farm households need to be supported on income grounds still holds and whether current policies are efficient in pursuing stated income objectives. This exercise is part of a mandate given by OECD Ministers to assess current support policies, not only in terms of their effectiveness and efficiency in achieving their objectives, but also in terms of operational criteria such as targeting and equity (OECD, 1998).

A recent publication (OECD, 2003a) contains a comprehensive study of farm household income issues in OECD countries. The findings of this study are summarised below. The policy implications of this study were subsequently discussed by policy makers at an OECD Policy Forum on Farm Household Income held in May 2003. This workshop on information needs for the analysis of farm household income issues was organised to improve understanding of data needs and uses for policy design and evaluation. Experiences were shared in order to identify obstacles to obtaining the desired information and to helping alleviating them.

2.2   Findings of the OECD study on farm household income issues and policy responses

2.2.1   What is the income situation of farm households?

The situation presented below is that which emerges from national statistics; Measurement issues are discussed briefly in annex 1 and at greater length in Hill (2003). Farm household income is the indicator chosen to reflect the income situation of farm households. It includes farm income, defined as net income from farming activities, and income from non-farm activities, investments, social transfers and other sources (figure 2.1).

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[1] Organisation for Economic Co-operation and Development (OECD). Directorate for Food, Agriculture and Fisheries.

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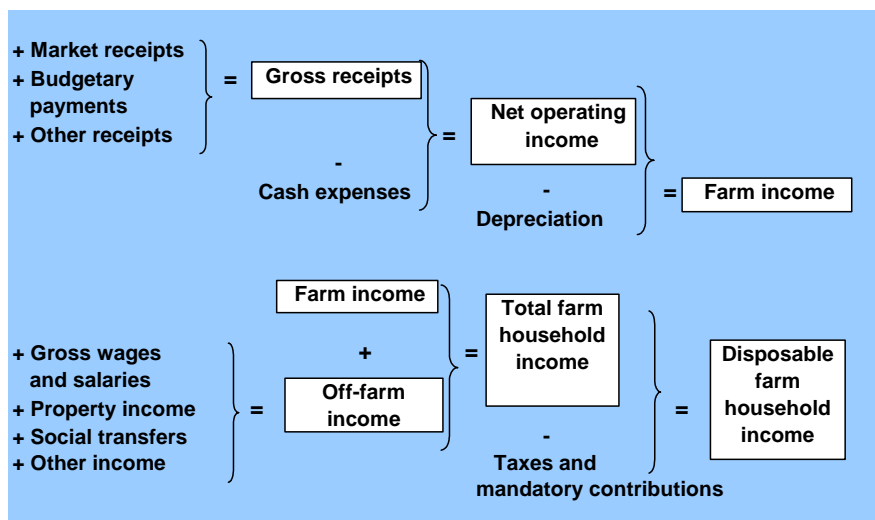
Figure 2.1   Components of farm household income
Source: OECD Secretariat.

Farm households achieve income parity at the aggregate level in most OECD countries

In most OECD countries for which data are available, the average income of farm households is close to the economy-wide average (figure 2.2).
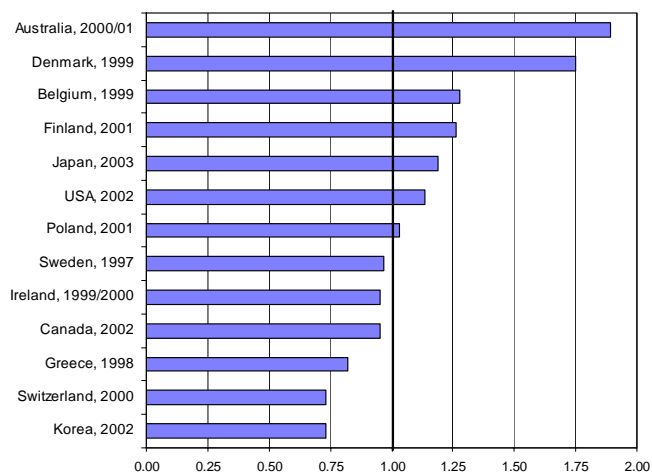
Figure 2.2   Total income of farm households as a ratio of that of all/other households a) (most recent year available)
Data are not comparable across countries.
a) All households except for Japan, where it is workers' households and Korea, where it is urban households.
Source: Secretariat's calculation based on national statistics and Eurostat database (Eurostat, 1999 and 2002). Update from OECD, 2003a.

Farm households derive a significant part of their total income from non-agricultural sources

This is the case even when a very restrictive definition[1] of farm households is adopted (figure 2.3). Where a broad definition of farm households is adopted, farm income is not even the main source, reflecting the diversity of farm households, which include pluriactive, retirement or hobby farm households.
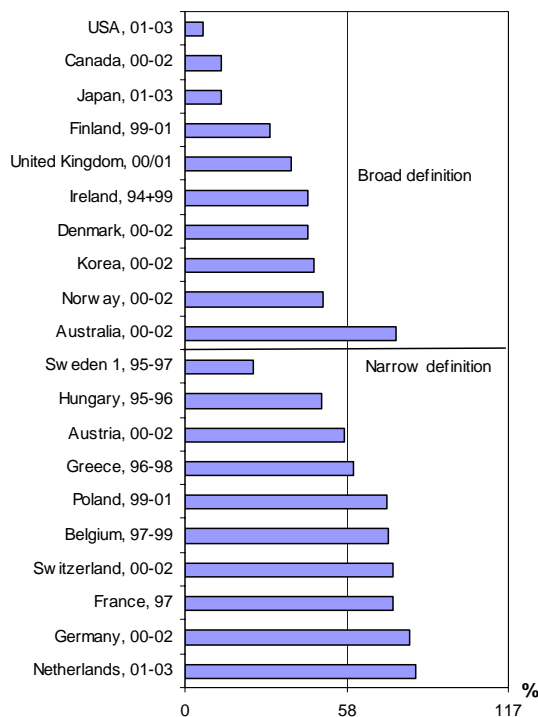
Figure 2.3   Percentage share of farm income in total income of farm households a) (average of the three most recent years available)
Data are not comparable across countries.
a) Income from independent activities.
Source: Secretariat's calculation based on national statistics and Eurostat database (Eurostat, 1999 and 2002). Update from OECD (2003a).

Regardless of definition, wages and salaries were the main source of off-farm income in three-quarters of the countries examined. Often, the farm operator is employed outside the farm but increasingly his/her spouse may also have off-farm employment. Cases where social transfers are higher than salaries and wages are found in countries which restrict the definition of a farm household to the operator, whose main occupation is farming, and the spouse. Fi-

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[1] A more restrictive definition involves the exclusion of smaller farms (based on gross sales or area) and part-time farmers, for whom farm income is not the main source of income or for whom agricultural activity is not the main activity.

nally, property income is the primary source of off-farm income in the United Kingdom only, but comes next in importance in close to a third of the countries reviewed. The results do not generally depend on the year chosen.

There are large income disparities within the agricultural sector

Many factors such as region, the structural characteristics of the farm and the household, and the economic environment, in particular the opportunities for off-farm earnings, affect the total income of farm households. Differences in average income by farm size and farm type in selected OECD countries, based on structural farm account data, are presented here.[1] In most countries reviewed, the average net operating income (NOI)[2] of farms in the top quartile[3] is two to three times bigger than that of the average of all farms (figure 2.4).
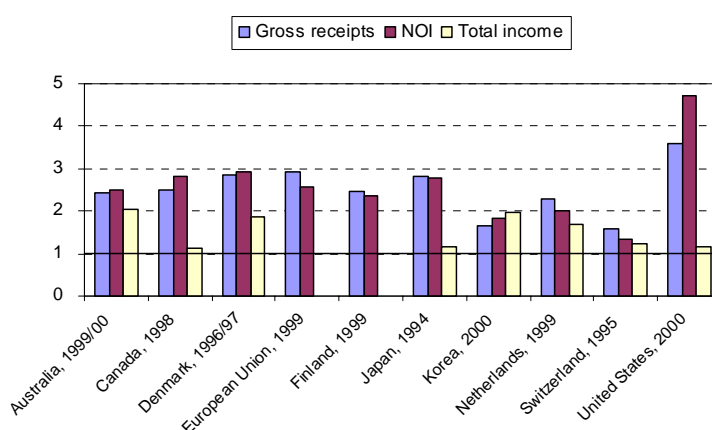
Figure 2.4   *Average gross receipts, net operating farm income and total income of the top quartile (25% largest farms) as a ratio of the average of all farms*
Data are not comparable across countries.
NOI: Net operating income. See Diagram 1 for a definition of income indicators.
Source: OECD structural database (OECD, 2003a).

Owing to differences in farm size, in productivity and in levels of support between commodities, there are also income disparities between farm types although they are not as large as between farms classified by gross sales (OECD, 2003a). Similarly, there are income differences by region, which stem from regional variations in the economic size of farms, type of farming and rate of support for each commodity, and how widely regions are defined. These issues were briefly examined in OECD (1999a). In all cases, when non-agricultural in-

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[1] See OECD (1999a) for a description of the characteristics of national farm account data. Whenever possible, the analysis reported here has been updated to use the most recent data available.
[2] See figure 2.1 for a definition of income indicators.
[3] The top quartile contains the 25% largest farms, based on gross sales.

comes are taken into account, differences in income by farm size, type and region are reduced.

The incidence of low income is often higher among farm households than in the rest of society

In many countries, available evidence suggests that in the mid-1990s the incidence of low income was higher among farm households than among non-farm households. The low-income rate (defined in note a) of figure 2.5) was higher for farm households than non-farm households in 9 out of 14 countries, slightly lower in three (Canada, the Czech Republic and Finland), but significantly lower in two (Norway and the United States) (figure 1.5). The low-income gap was bigger for farm than for non-farm households in all the examined countries (note b) of figure 2.5). When the analysis is repeated using a narrow definition of the farm household, inequality is greater (OECD, 2001). In other words, farm households which rely more on farm activities are more frequently included in the low-income category. This confirms the importance of off-farm activities.
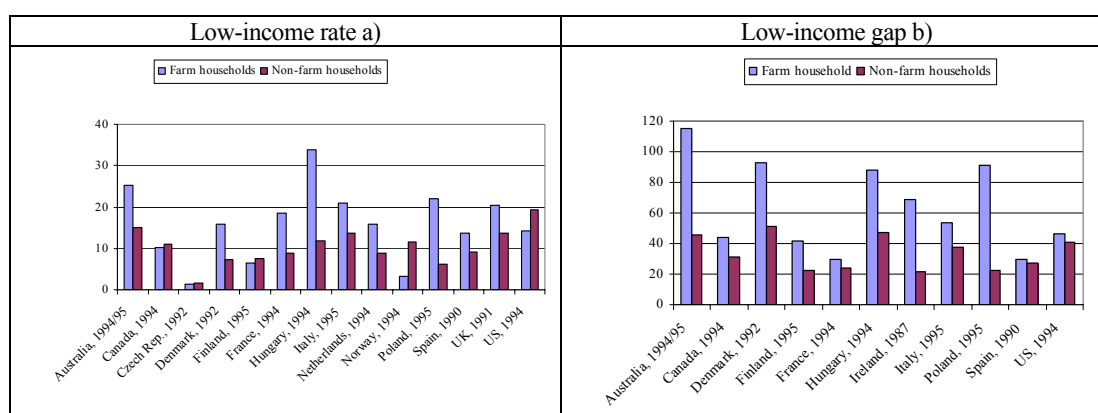
Figure 2.5   Low-income rate and low income gap: farm versus non-farm households
a) The low-income rate is the share of individual farm households with incomes falling below the low-income line (50% of median income of all households); b) The low-income gap is the difference between the average income of the low-income farm households and the low-income line (the average income gap).
Source: OECD, 2001 (LIS data).

2.2.2   What is the impact of fiscal, social and agricultural support policies on farm household income?

Support raises farm household income…

The Producer Support Estimate (PSE) expressed as a percentage of gross receipts explains, in static terms, the share of gross receipts that comes from government support. For example, in the OECD area, one third of gross receipts resulted from support in 2001-03 (OECD, 2004). We cannot deduce from the PSE, however, that farm household incomes would fall by an

equivalent percentage if all government support was removed given that in the absence of support, adjustments would occur.

…but its efficiency in transferring income to farm households is low,

A large share of the transfers generated by agricultural policy and included in the PSE does not necessarily translate into net income gains for farm households. There are two sources of transfer losses that limit the income transfer efficiency of policy measures. The first is economic costs, which result from distortions in the use of resources and its incidence on production and trade patterns. The second source of loss is distributive leakages, whereby some of the benefits of support accrue to groups other than the intended beneficiaries. This latter category includes the costs of administering farm programmes (which are not accounted for in this analysis), the extra purchases that farmers are required to make from input suppliers, the share captured by downstream industries, additional payments to landlords and income transfers to (or from) other countries.
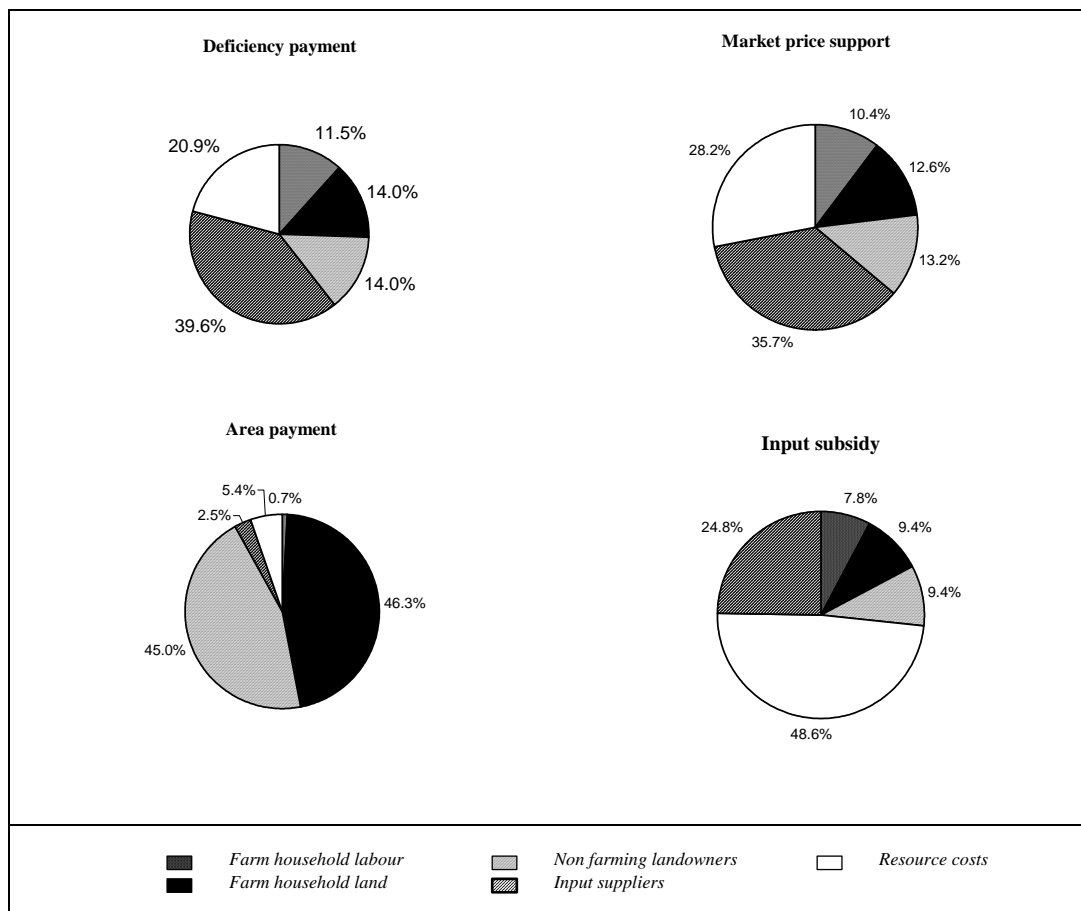
Figure 2.6   Where does the money go? The income transfer efficiency of agricultural support
Source: OECD (2002 and 2003a).

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According to OECD estimates of income transfer efficiency, no support policy linked to agricultural activity succeeds in delivering more than half the monetary transfers from consumers and taxpayers as additional income to farm households. In the case of market price support and deficiency payments, the share is one fourth or less, and for input subsidies it is less than one-fifth (figure 2.6).

In the case of market price support and deficiency payments, the stimulus to output, and hence to input demand, means that much of the increase in receipts is transmitted back to input suppliers or capitalised into land values. Not surprisingly, input suppliers reap most of the benefits of input subsidies. In the case of area payments, nearly all the benefits are absorbed in increased land values.

…and support is unequally distributed: most goes to larger farmers

The static comparison between the distribution of support and that of gross receipts indicates the nature of the impact support has on the distribution of income.[1] Distributions by farm size, farm type and region have been examined for selected countries. Using the same methodology as in OECD (1999a), the distribution of gross receipts, support and income by farm size is compared in figure 2.7, which shows the share of the 25% largest farms in gross receipts, support and income.
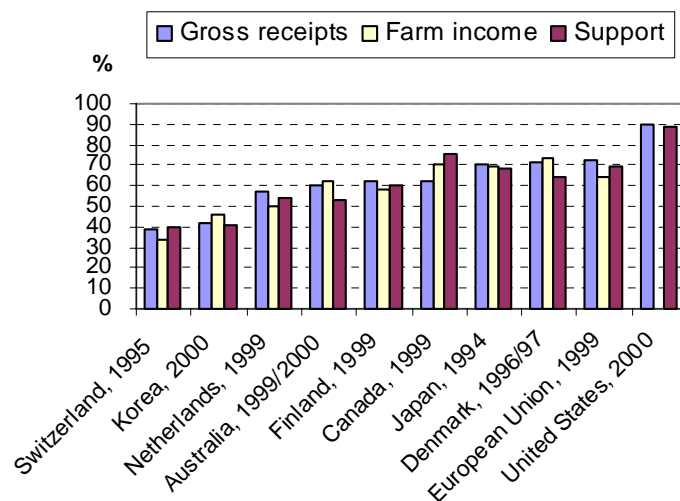
Figure 2.7   Share of the 25% largest farms in gross receipts, farm income and support
Data are not comparable across countries.
Source: OECD structural database.

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[1] It should be noted that support is included in the value of gross receipts.

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The distribution of support by farm size is similar to the distribution of gross receipts. This is because a large share of support in the OECD area is linked to the level of production[1] or the level of input,[2] and also because in many cases, support accounts for a significant share of gross receipts. The largest farms, and often the most prosperous ones, are therefore the main beneficiaries. Figure 2.6 shows that the top 25% of farms receive between 40 and 90% of support. In this sense, support is inequitable. On average, direct payments are more equally distributed than market price support and gross receipts but the difference is generally small. We can conclude overall that, in most countries, support has a rather small redistributional effect by farm size because it is only slightly less unequally distributed than gross receipts.

The impact of support on income disparities by farm type depends on how wide differences in support level are in the country and on how narrowly farm types have been defined. In the European Union, for example, support has widened disparities between dairy and intensive livestock farms on the one hand and field crop and cattle farms on the other. There are, nonetheless, few examples where support narrows disparities between farm types but the effect is relatively small. Overall, support increases income disparities between farm types (figure 14 in OECD, 2003a).

There are also regional differences in the distribution of support. While support linked to output automatically goes to larger farms, direct payments can be targeted to less favoured areas. Although this is done to some extent in Switzerland and the EU, inequality nonetheless persists despite these efforts (OECD, 1999a).

2.2.3   Are policy measures effectively achieving the objectives set for them in terms of the level, variability and distribution of farm household incomes?

Overall, support policies, whatever their objectives, do raise farm income levels to some extent and reduce their variability, but this would seem to be achieved at significantly greater cost to consumers and taxpayers than necessary.

The evidence presented here suggests that there are significant problems in delivering income support to farm households through the types of sector specific measures and policies that have been pursued to date. The main problems relate to *targeting* - the great bulk of the measures used are broad and untargeted in nature - to *equity* - because the measures are still predominantly based on production or factors of production they fail to change the income distribution in any significant way and most of the support that reaches the sector goes to larger farm households, who do not usually need it - and to *leakages* - much of the support is transferred to unintended beneficiaries or evaporates in extra resource costs.

In addition, because much of the support in OECD countries is linked to production or input use, there have been *significant international spillover effects*. Production enhancing support raises domestic farm income but contributes to lower world prices, which in turn depress farm income in other parts of the world. Policies that reduce income risk faced by farmers also affect production decisions, often to the same extent as price support. In addition,

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[1] Over 65% of the PSE in the OECD area came from market price support measures and payments based on output in 2001-03 (OECD, 2004).
[2] In 2001-03, payments based on area planted or animal numbers and payments based on input use accounted respectively for 15 and 9% of the PSE for the OECD area (OECD, 2004).

by reducing adjustment in the domestic market, they transfer domestic instability to the world market and therefore switch the burden of adjustment to other countries (OECD, 2003a).

2.2.4 Which policy instruments would transfer income to farm households more effectively and more equitably?

To design and implement efficient policies, *income objectives have to be clearly defined* in the national policy process. In particular, some income criteria need to be developed to define and identify the targeted households. All sources of income should be taken into account in identifying the households to be targeted, as well as household wealth. For example, criteria could be set concerning the level of income or the variability of individual farm household income that would trigger intervention, if indeed the prevailing policy concerns involve those criteria.

There are several possible policy responses to low-income problems among farm households. Government should first consider ways to *develop market solutions*. It is important to understand the cause of low income in order to find the most effective remedy. If governments are unwilling to see less efficient farmers leave the sector because they provide economic and social benefits that are not, and cannot be, rewarded by the market, the optimal policy would be to give farmers the appropriate incentive to provide these benefits, using for example decoupled and targeted payments.

Similarly, regarding income risk management, government *should encourage the development of contingency arrangements* such as insurance and futures markets, for example through the collection and transmission of information to reduce problems created by information asymmetry; or training programmes in the use of futures markets to reduce income risk. Agricultural safety nets could then be envisaged to address any remaining risk management failure.

From an income transfer efficiency point of view, support that is decoupled from agricultural activity and targeted specifically to income would be much better as a way to transfer income to farm households. Such direct income payments minimise economic distortions and distributive leakages because their effects on production decisions are minimal, and they can be targeted and delivered to those households that are deemed to warrant assistance.

More generally, government could *invest in general services* for the sector, such as expenditures on infrastructure, training, research and development, that improve the functioning of agricultural markets and allow farmers to increase their competitiveness. Low income may be experienced by farm households that are resource-poor and located in areas where there is also a problem of lack of viable economic alternatives. The solution in this type of situation is not necessarily a sector-specific income support scheme. Investment in infrastructure to make rural areas more attractive to investors and transitional assistance to more viable economic activities may be of greater benefit.

Sequencing is important. As policies to address market failures in the agricultural sector will have an impact on the income of farmers, there is a logical case for applying measures that first correct market failures and then address any outstanding concerns about incomes, using the types of measures indicated above. Finally, *general tax and social security systems* are in place in most, if not all, OECD countries. These structures *are well placed to identify re-*

maining low-income problems among agricultural households *and ensure equal treatment* vis-à-vis other classes of households.

It is important, in order to assess the problems and needs of the sector and to implement targeted measures, that comprehensive information on the economic situation of farm households be available. Such information should be collected in a flexible way to allow assessment and monitoring of income deficiencies. More detailed information on the sources of non-farm income would also help to understand the various strategies adopted by farm households and the relationships between agricultural, fiscal and social policies. Available statistics, however, show that in many countries, income support policies have been designed and implemented in the absence of adequate information on the income situation of farm households. This fact must, in part, explain their poor performance.

2.3   Discussion at the OECD Policy Forum

On the basis of the above findings, data requirements to inform policy choices were further discussed at a subsequent OECD Policy Forum, where delegates from Member countries met to discuss the policy implications of the OECD income study. The importance of having adequate indicators that include all sources of income was reiterated. The potential for shifting away from production-based measures to alternative policies or market mechanisms that target farm household income was assessed. Lack of transparency and in adequate information were again identified as major obstacles to reform. Countries' experiences with policy targeting income problems were presented and assessed. In particular, innovative approaches such as Canadian safety nets and the Irish social security scheme to support low-income farmers were reviewed.

2.4   Context and objectives of this workshop

Previous OECD work on income led to the conclusion that to be able to improve policy analysis, more information is needed. The brief discussion on this issue at the Policy Forum was also thought to merit being brought to the attention of a wider audience. The OECD secretariat therefore decided on a joint effort with the PACIOLI network to raise awareness on information needs and deficiencies. As a data user, the OECD's Directorate for Food, Agriculture and Fisheries found potentially useful to provide a forum where experiences could be shared and where potential uses and interests of such information could be illustrated.

This workshop discussed in particular the following issues related to information needs for policy making:
-    what information is needed;
-    what is available? What is missing? What are the constraints in obtaining the necessary information?;
-    how to remove these constraints;
-    how can such information be used for policy making;
-    where do we go from here?

Issues related to farm household income data availability and quality are not just, or even primarily, of interest to analysts. The principal beneficiaries of improved information would be policy makers and the public they serve. Until the coverage, timeliness and consistency of national microeconomic data is improved, policy measures, ostensibly aimed at improving the incomes of farm households, will be implemented without adequate knowledge of the nature, incidence or even existence of the problem that they are attempting to solve.

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OECD, *Agricultural policies in OECD countries: At a glance*, Paris, 2004.

Appendix 1 Definition and measurement issues

What is the appropriate indicator to measure the income situation of farm households?
Farm income provides only a very partial view of the income situation of a farm household. In order to reflect the income situation of farm households, all sources of income should be taken into account (figure 2.1). For a full assessment of the economic situation of farm families, farm and household assets should also be considered in combination with income.

Is the appropriate information widely available?
Another problem concerns availability, quality and access to relevant data. Do the data collected in OECD countries allow income objectives to be systematically and accurately measured? For many countries the answer is no. In some cases the data are seriously out of date. Additional difficulties are created by the fact that in many countries the definitions adopted for households, income, etc., are too narrow to allow the real income status of farm households to be evaluated. The number of farm households in economy wide income surveys is often too small to be representative, which makes it difficult to compare the situation of farm households with that of other households. Finally, farm household income can be underestimated. Income in kind is often not taken into account and there can be problems linked to confidentiality and asymmetric information with reporting income in surveys. Farm self employment income, in particular, might not be fully captured.

Are data comparable across countries?
In general, they are not. First, the definition of farm households varies both with respect to who constitutes a household (which family members) and with respect to what constitutes a farm household (what level of sales, amount of land farmed, share of income from farming or other indicator qualifies a household as a farm household). There are enormous differences among countries with respect to these variables. Second, there are differences in the indicators of income that are reported, although with detailed information on farm accounts a common definition of farm income can be adopted. The coverage of income sources often differs. In particular, there are still many countries in which off farm sources of income of farm households are not reported. For these reasons, comparisons across countries have not been attempted in this report. For each country where data are available, income components are compared between farm and non farm sectors and across various groups in the agricultural sector.

What was used in this analysis?
Macroeconomic accounts of the agricultural sector provide an aggregate measure of farm income (OECD, 1999b). In most cases, these data do not include non agricultural income. A EUROSTAT project collects macroeconomic data on the total income of agricultural households for European Union (EU) member countries (EUROSTAT, 1999 and 2002) and was used in this report for some countries. However, they often refer to a narrow definition of farm households (main occupation farms of a minimum size for example). Consequently, whenever possible, national statistics that define farm households more broadly are used, in order to give a wider picture of the sector. With national account/macroeconomic data, the

level and composition of the total income of farm households can be examined and compared to that of other sectors.

To look at the distribution of income or the incidence of low income among farm households compared to other households, at the change in income over time, and the impact of agricultural, social and taxation policies, microeconomic data were used. They either come from specific surveys (farm, household expenditure, or income surveys), or from tax and social transfers files. Economy wide surveys allow comparison between farm households and other households. In many cases, however, the sample of farm households proves to be too small to allow a detailed and representative distributional analysis. The LIS (Luxembourg Income Study), which contains micro data from national household surveys, allows such a comparison for at least some countries and has been used in the analysis of the incidence of low income in different categories of households reported in OECD (2001) and summarised in this paper. Specific farm surveys provide useful structural information on farm households, allowing the income situation to be related to structural characteristics, but they do not permit direct comparison with other households (unless linked with an economy wide survey). The OECD structural database, which has been used to analyse the impact of support on the distribution of income, contains such data.

3. Development of farm income[1]

By Léon Kirsch and Francis Joret [2]

Summary

The European Court of Auditors audited three statistical instruments currently used in the European Union to measure farm income (FADN, EAA and IAHS). It provides a diagnosis of how these instruments work and analyses their usefulness with respect to the needs within the framework of managing the Common Agricultural Policy (CAP), of which one the major objectives is to guarantee the agricultural community a fair standard of living. For the Court, the data actually produced by the European statistical system does not allow for a precise measurement of disposable farm income, nor does it allow for a comparison of standards of living between the agricultural community and those of other socio-professional categories. The Commission should redefine in a rigorous manner the statistical needs of the European Union (EU) concerning the financial situation of farmers and farm households and, as such, reorient as necessary the current statistical instruments.

3.1 Introduction

The issue of farm income has always been central to the CAP. According to Article 33 of the original EC Treaty, one of the major objective of the PAC is 'to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture'. In order to meet this objective, and in particular to measure the consequences of CAP reforms on farm income, the European Commission needs reliable data on the composition and evolution of farm income.

Three statistical instruments are used by the EU to measure farm income: the Farming Accountancy Data Network (FADN), the Economic Accounts for Agriculture (EAA) and a special instrument devoted to the Incomes of the Agricultural Household Sector (IAHS).

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[1] Special Report n°14/2003 by the European Court of Auditors on the measurement of farm income by the European Commission (Special report on the measurement of farm income by the Commission (article 33, paragraph 1, point b), of the EC treaty) together with the Commission's replies, published in the Official Journal of the European Union n°C 45 of 20.2.2004. The Special Report is also available on the European Court of Auditor's website (http://www.eca.eu.int).

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3.2 Court Audit

The European Court of Auditors based its analysis on the usual criteria applicable to statistical studies.[1]

The Audit covered the collection by Member States of the data used for the FADN, the EAA and the IAHS. The results of the audit on the methods used are summarised from paragraphs 7 to 15 below.

The Court also examined the pertinence of these statistical instruments, i.e. their appropriateness in the context of management of the CAP. These are examined in paragraphs 16 to 38.

The audit was carried out in 2001 and 2002 in six Member States (Germany, France Greece, Netherlands, Austria and Sweden), as well as in the Commission. The most recent available data examined concerned the financial years 1999 and 2000.

3.3 Methodology of the FADN, EAA and IAHS statistical instruments

The concept of the FADN and the observations of the Court

For the Farm Accountancy Data Network (FADN), Member States must select a farm sample so as to collect a harmonised set of accounting data.[2] The sample is made up of approximately 60,000 farms, representing more than 90% of agricultural production in the European Union.[3] The income indicators resulting from the FADN are farm gross value added, farm net value added, and family farm income.[4]

The Court noted that the FADN field size is not defined in a uniform manner in all Member States, that the selection methods of farms in some Member States are not the best,[5] and that Member States rely on different sets of indicators to determine how representative the sample is. In addition, the FADN was designed for traditional family farms and does not provide an indicator for farms that have corporate status, even though the percentage of such farms is constantly increasing in certain Member States (17% in France in 2000).

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[1] The European statistical system, that is Eurostat and the statistical bureaus of Member States of the European Union, have developed a concept of quality which takes into account the following aspects: completeness, exactness, consistency, and comparability over time and among Member States.

[2] The legal basis of the FADN is Council Regulation n°79/65/EEC of 15 June 1965 OJ 109 of 23.6.1965, pp. 1859-1865.

[3] EU-15. The FADN sample, since the enlargement to 25 Member States (1.5.2004), is composed of 80 000 farms.

[4] Family farm income = farm net value added + investment subsidies - salaries, farm rent, and interests paid. See details in *Farm Incomes, Wealth and Agricultural Policy*, by Berkely Hill, Ashgate Publishing Ltd., Hants 2000, Third Edition, p. 160.

[5] In particular, the principle of random selection of farms, which is an essential condition in order to extrapolate valid results from the sample, is not rigorously respected.

The concept of the EAAs and the observations of the Court

The Economic Accounts for Agriculture (EAA), published by Eurostat since 1964, were drawn up within the framework of the European System of Integrated Economic Accounts (ESA) with the aim of providing an estimate of the value of agricultural production and the costs of production. Eurostat calculates three income indicators for each Member State and for the European Union as a whole: an index of the real income factors in agriculture per annual work unit (Indicator A), an index of real net agricultural entrepreneurial income per unpaid annual work unit (Indicator B), and a Net entrepreneurial income of agriculture (Indicator C).

The Court found that EAAs are not based on a standard source of information and that the quality of the data received varied from one Member State to the next. The opportunities for cross-checking have not been exhausted and the end-user of the EAAs has no indicator which would allow him to assess the statistical accuracy of the data.

The concept of the IAHS and the observations by the Court

The debate provoked by the Commission's Green Paper of 1985 showed that it lacked information on the total income of agricultural households. The IAHS project, initiated by Eurostat, sought to create a specific instrument in order to study changes in the aggregate income of agricultural households in Member States; to track changes in the composition of this income (of the percentage that comes from agricultural activity, social benefits, property income, and income derived from other income-generating sources); and to compare changes in farm income with the income of other socio-economic groups.

In so far as the Court is concerned, there is a lack of homogeneity in the data collected by the IAHS project. The latitude given to Member States in their methodological approach is questionable given the differences observed in the results. One Member State (Netherlands) compares income calculated on the basis of a household survey (microeconomic approach) with income calculated on the basis of the economic accounts for agriculture (macroeconomic approach). The difference between the two approaches, 50%, throws some doubt on the credibility on how equivalent the methods are and on the possibility of comparing data collected according to different methodologies. In addition, at the time of the audit, the IAHS project was incomplete and most of the data published no longer up to date.

The cost of collecting the data

In addition to the usual audit criteria (see footnote 1, page 28), the Court added the criterion 'savings' (the difference between the costs and benefits for producing the data) because the question concerning the cost of obtaining data as opposed to its actual usefulness remains a valid one. The Court approached Member States requesting information in order to be able to assess the costs involved with FADN, EAA and IAHS as well as the benefits gained from using such data.

In so far as costs are concerned, it must be noted that two-thirds of the 15 Member States cannot assess, even in very general terms, the costs involved with the EAAs and the IAHS. Information that is at once precise and comparable exists only for the FADN. The fact

that the average cost to obtain FADN data varies significantly between Member States, ranging from 230 euros (Spain) to more than 2,700 euros (Netherlands) per farm, results from the very different ways that each Member State collects data.

In view of the disparate nature of the three statistical systems, which makes any comparison impossible, it was decided by the Court not to publish the data obtained from Member States concerning any benefits gained from using these three systems.

3.4   The pertinence of the statistical tools used by the Commission

How does one define 'pertinent'?

In order for the statistical tool used by the Commission be deemed 'pertinent', it is important that it can verify whether the agricultural sector enjoys a fair standard of living, in accordance with the objective laid down in Article 33 of the EC Treaty.

The concepts of 'agricultural community' and 'fair standard of living' contained in Article 33 of the EC Treaty require nonetheless a precise definition before any such evaluation of the 'pertinence' of the statistical indicators relating to them can be carried out. For this purpose, the Court examined what had been said at major steps in the development of the CAP to clarify the content of Article 33 of the EC Treaty.

Farm income in the early days of the CAP

In the difficult post-war period, the first objective was to increase the productivity of farms.[1] At the Stresa Conference (1958), the Ministers of Agriculture and the Commission decided to encourage productivity by supporting the prices of agricultural products. This support was not only intended to stimulate prices, but also to increase farm income. The European Commission gave this policy a legal framework by creating market organisations for the most important agricultural products.

In Stresa, the Ministers of Agriculture of the Member States drew attention to the relatively unfavourable situation of farm incomes. It was not specified, however, what was understood by 'fair income' or by an 'income level comparable with that of industrial workers'. The question of knowing which income should be measured and what comparison should be carried out remained open.

Similarly, the expression 'agricultural holding' was not clarified. In 1956, the Spaak report still regarded the family holding as the fundamental form of agricultural activity in the EU. In 1960, however, the Commission was already describing an agricultural holding more broadly as 'an agricultural structure in which farms of various types and sizes complement each other, and in which the farm operating with paid labour … will have its place'.

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[1] This also explains the reference in Article 33(1)(b) of the EC Treaty ('thus') to the increase in productivity (Article 33(1)(a) of the EC Treaty.

In short, neither the Council nor the Commission have given a binding definition to the concepts 'agricultural community' and 'fair standard of living'.[1] However, it is clear from the work at the Stresa Conference that 'fairness' is defined in comparison with other sectors.

Successive reforms

In the *Green Book - Perspectives (1985),* the Commission examined the needs for income support for farmers with low or decreasing incomes. The basis for this approach was that structural changes in agriculture should be gradually introduced by protecting farmers from the shock of structural adjustment while at the same time helping them to adapt their farms to market needs.

Farmers were wary of direct income support, which they assimilated with social aid; they also feared that such a regime would prevent them from exercising multiple activities.[2] It is for this reason that the *Mac Sharry Reform* (1992) replaced only in part price support by income assistance.[3] The reform was essentially made up of three measures: lowering production prices, compensating for lower production prices through direct payments to producers, and limiting production, for example by land set aside.

Agenda 2000 emphasises once again the trend towards direct support payments by lowering intervention prices for cereals, beef and dairy products while increasing the level and extent of area and headage payments to compensate for any potential loss in revenue. Two of the five major CAP objectives (Agenda 2000) deal with farm income: to ensure a fair standard of living for the agricultural community and stabilise income gained from agricultural activities and to promote other or supplementary sources of employment and income in rural areas, thus contributing to EU economic cohesion.[4]

In the *mid-term review*, it was stressed that the basic objectives of the CAP remained the guarantee of a fair standard of living for the agricultural community and to contribute towards stabilising farm income. It was also noted that the increase in the average size of farms, the specialisation of farms and the concentration of production in certain regions has resulted in placing pressure on traditional farm production and mixed agricultural systems. Many traditional farms will need more targeted support in order to adapt to the different possibilities offered by the more open market and the higher demand for quality products. In addition, the Commission noted that a minority of farmers receive the greatest share of direct payments and questioned whether such a distribution of direct payments was optimal.[5]

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[1] Berkely Hill, *Farm Incomes, Wealth and Agricultural Policy*, Ashgate Publishing Ltd., Third Edition, Hants 2000, p.28.

[2] Nigel Robson, 'The Changing Role of Part-time Farming in the Structure of Agriculture', *Journal of Agricultural Economics*, Vol. XXXVIII N°2, May 1987, p. 169.

[3] Communication by the Commission to the Council, Background Note on the evolution and future of the CAP, COM(91)100 final, p.12.

[4] European Economic Community Commission, Background Note by the Commission to the Council and the European Parliament, Mid-term Review of the Common Agriculture Policy, Brussels, 10.7.2002, COM(2002)394, p.2, 7 and following pages.

[5] European Community Commission, Proposal for Council (EC) Rule concerning the reform of the Common Agricultural Policy, Brussels, 18.3.1998, COM(1998) 158 final, p. 5 (n°2.1).

Present concerns

The successive reforms have changed as information on the financial situation of farmers has evolved. The Commission is aware that:

> 'the integrated development of rural areas is becoming an ever greater concern of sectoral policy, including agricultural policy ... This generates new needs in terms of statistical data, and particularly the availability of information ... These new requirements are for more detail in terms of the territorial breakdown of data normally collected at national level. They also concern territorial divisions that often differ from the administrative divisions used for most regional statistics. Requirements also extend to information on the non-farming component of the income of holdings and families, particularly activities that supplement farming activity and the community services provided by farmers.' [1]

In summary, to date the general objective of a 'fair standard of living' has been neither precisely defined nor divided into more specific and quantifiable objectives. Nor has the concept of an 'agriculture community' benefited from a strict definition. Nonetheless, at each major step of the CAP different aspects directly related to the agricultural community's standard of living, e.g. the existence and amount of non-farm income or the distribution of farm household income, have been raised.

Possible interpretations of the concepts contained in Article 33 of the EU Treaty

After having reviewed the history of the CAP, and basing its analysis on the work of an independent expert,[2] the Court concludes that the interpretation of Article 33, paragraph 1b of the EC Treaty imposes the following criteria for the development of the Commission's statistical instruments: in the agricultural sector, there is no fair standard of living when the overall disposable income of all members of the family household falls below a certain threshold, which must be determined at the political level, as compared with the households of other types of entrepreneurs. In order to take a firm position on the issue of what constitutes a fair standard of living, the Commission must have at its disposal pertinent information regarding the overall disposable income of individual farm households and comparable households whose head is engaged in entrepreneurial activities. It also needs this information in order to examine other sources of farmers' income or the distribution of income within the agricultural sector.

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[1] Second report of the Commission to the European Parliament and the Council on the progress in the application of Decision 96/411/CE of the Council relation to the improvement the Community's agricultural statistics, point 5.9, p.12.

[2] Professor Stephan von Cramon, University of Göttingen. See the summary of his report in the annex to the Special Report n°14/2003.

3.5 The pertinence of the statistical tools used by the Commission - the Court's assessment

FADN information on farm household disposable income is far from complete

The harmonised microeconomic data base based on farm accounts is the FADN's major point of interest. Farms are classified, in accordance with EU typology, by size, region and activity which make a comparative analysis possible. The fact that the data is easily accessible to researchers via Internet is also an asset.

The FADN concerns farms, however, and not households. With the exception of the farmer's income, no other income of other household members is taken into account. In addition, only income from farm production is included in the FADN. Other income is completely ignored. The data gathered by OECD, however, demonstrates that income from farming represents, in some countries, less than half of total farm household income.[1]

In addition, the FADN is limited to full-time farms. In practice, this means that FADN covers only 65% of all farms in the EU. The economic threshold of farms not always being the same, this percentage varies considerably from one Member State to another: whereas in Austria, the FADN covers only 41.9% of farmers, in Ireland it covers 87.9%.[2]

It should be noted that there are differences between Member States concerning the definition of what constitutes an agriculture community, and on the methodology for choosing a representative sample of the population and selecting new farms (see paragraph 8).

In conclusion, the FADN offers a reliable picture of the disposable income of an individual farmer who lives alone and whose only income is derived from farming. However, where the farm operates under a different legal status, where the household is composed of several professionally active members or where the farmer derives income from sources other than agriculture, the 'family farm income' of the FADN does not accurately represent the actual disposable income of the farm household.

The EAA does not accurately reflect total income of farmers or of farm households

The EEA has the merit of presenting results rapidly. The first EEA estimates are published at the end of each fiscal year it is reporting on.

Nevertheless, the aggregation and income indicators used in the context of the EEA do not represent either the total income or disposable income of the farmer, where the latter has other sources of income than that derived from agricultural activity. Agriculture income as calculated by the EEA is therefore not to be confused with farmer income nor with farm household income.

In addition, the data furnished are average values which do not reflect in any way the distribution of income. As well, as the denominator used in the calculation of indicators A and B (see paragraph 9), and which represents the annual work unit,[3] is not uniform, no compari-

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[1] In 9 out of 15 Member States, only 25 to 60% of total farm household income is generated from farming activity (see Figure 4 in the Special Report 14/2003).
[2] http://europa.eu.int/comm/agriculture/rica/methodlogy2_fr.cfm.
[3] An annual work unit corresponds to the work provided by one full-time worker for the farm (Eurostat, Statistics in Brief, Theme 5 - 2/2003, p.7).

sons of incomes in absolute value between Member States is possible. It is for this reason that Eurostat limits itself to comparing the evolution of income observed in Member States.

Due to problems encountered at the time of implementation, the IAHS has not been able to compensate for the lack of data

This project relates to farm household incomes and was designed to make up for the deficit in information on the real standard of living of the agricultural community. The net taxable income as calculated by the IAHS presents the advantage of not being based on agricultural products or on the farm, but on the household. In addition, it takes into consideration - besides income from capital - income from different sources. Thus, the concept of the IAHS is superior to that of the FADN or the EAA in so far as it assesses the standard of living. Nevertheless, it should be noted that when the IAHS is calculated from a macroeconomic approach, no information concerning the distribution of income can be obtained.

It should also be noted that the IAHS has never resulted in reliable and comparable data given the technical and financial obstacles it must deal with, in addition to the fact that this project is not a high priority for the Commission nor for several Member States.

3.6 Conclusions and recommendation

The court concludes that the EU statistical instruments do not provide sufficient information on the disposable income of farm households to allow for an evaluation of the agricultural sector's standard of living. The Court recommends that the Commission produce a new and precise definition of EU requirements in this field, and that it restructure the existing statistical information accordingly.

In its response to the Report, the Commission recognised that the evolution in the agricultural sector and recent changes to the PAC could result in an increased need for statistics on farm household incomes and that it would be useful to study the feasibility and the cost of a statistical instrument that would measure the standard of living of the agricultural community.

4. Implementation of income objectives in farm policies: a Japanese experience

By Kazuhito Yamashita [1]

4.1 Japanese agricultural policy after World War II

The growing disparity in Japan between farm household and non-farm household incomes due to the rapid development of the industrial sector following the Second World War led to the enactment of the first Agricultural Basic Law in 1961. By this law, the Japanese government sought to increase farm household incomes so that they would be equal to those of workers in the industrial sector.
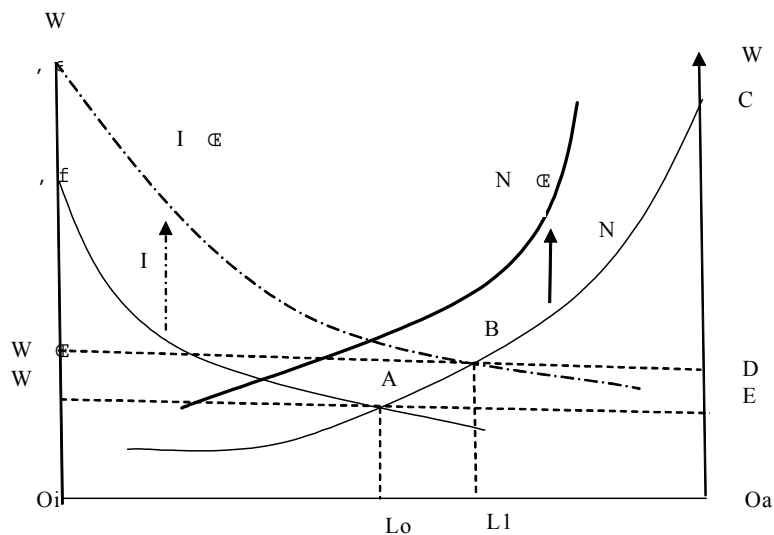
Figure 4.1   Rectification of income disparity between the farm sector and industrial sector

There are two ways to increase agricultural income: either by raising prices or by reducing production costs (or increasing productivity). This can be explained by the specific-factor model in international trade theory. Let us assume that the industry employs capital as a specific factor, and that agriculture employs land as a specific factor. If the price of products or the productivity of industry increases, the curve of the marginal-value-product of labour shifts upward from I to I. If we assume the perfect factor mobility of labour, labour shifts from agriculture to industry. The total income of industry expands from GALoOi to FBL1Oi, while the

[1] Research Institute of Economy, Trade and Industry, Japan.

total income of agriculture shrinks from CALoOa to CBL1Oa and the income accruing to landowners decreases from CAE to CBD. This is the income disparity between the two sectors caused by unequal sectoral development. In order to rectify this, we must shift the curve of the marginal-value-product of labour in agriculture, either by raising prices or increasing productivity.

The 1961 Agricultural Basic Law tried to take the latter path, reforming the small-holding-based agricultural structure to improve agricultural incomes by reducing costs by expanding the scale of farms and improving productivity. In reality, however, agricultural policy increased incomes by raising the price of rice. The result was that consumption decreased, production increased, and a surplus of rice emerged.

Why did the Japanese government resort to price support rather than structural reform? Simply because price support is politically popular as it does not harm anyone. Structural reform policy, however, would have eliminated jobs in the agricultural industry.

Why did the Japanese government resort to price support rather than direct income support or deficiency payments? There are several reasons. First, there are no administrative costs, including those for planning and implementing policies. Secondly, farmers do not want to receive money from the government, but rather earn their income by selling their own products. Third, with the increase in per capita income, Japanese consumers have become indifferent to increases in food prices. On the other hand, a taxpayer-born income payment policy entails a difficult negotiation with the Ministry of Finance.

Has the objective of the Agricultural Basic Law - that is, correcting income disparity between the farm sector and the industrial sector - been achieved? Surprisingly, yes. This is in part thanks to price support and even more so to the remarkable increase of non-farm incomes of the farm households which has been accompanied by economic expansion; indeed, most farm household incomes are higher than non-farm household incomes.

Structural reform of the agricultural industry, however, has not been achieved. Faced with high rice prices, which are greater than the high production costs of small-scale farms, small-scale farmers have preferred to produce rice rather than buy expensive rice on the market, and have not handed their land over to full-time farmers. In addition, the industrialization of rural areas enabled small-scale farmers living in villages to commute to near-by factories or offices. They have become part-time farmers yet remain in the farm sector. As a result, although the average size of French farms has increased by 150% over the past forty years, that of Japanese farms has increased by only 36% (only 17%, excluding Hokkaido). Consequently, while the household incomes of small-scale farmers are much greater than the non-farm household incomes, the household incomes of large-scale farmers are smaller. Contrary to Europe, large-scale farmers do not benefit from price support in Japan. Price support, which is the indirect and inefficient policy that supports income, has created serious side-effects; a surplus of rice, prevention of structural reform, less international competition for Japanese agricultural products and less self-sufficiency in regard to food.

4.2   Is direct income payment, which is decoupled and targeted, easy to implement?

If income objectives are clearly defined and if targeted household are precisely identified by taking into account all sources of income, then theoretically, a decoupled and targeted direct income payment will be the most effective, efficient and equitable policy.

In reality, however, there are serious problems in the planning and implementation of this policy. First, it is desirable to know the income of every household. We have to know all sources of income: farming income, income from non-farming activities, income from investment, wind-fall profits from selling land, which is usually owned by the farm sector more than any other in the economy, and social transfers, such as pensions which are given to aged farmers who have retired from non-farm sectors. But for this to succeed, a lot of human resources are required and Japan has not accomplished this 'mission impossible'. In addition, farmers tend to under-declare their incomes. The administration must have the ability to check such false declarations.

If the individual income of every household were given less attention, then the income patterns of some categorized groups of farmers based on farm size, production type, region and other factors could be given greater scrutiny. This method does not, however, lessen our burden very much. Some farmers specialize in single products, some specialize in multiple products and others change products every year. There are numerous combinations of production types. Even when two farmers with the same farm size produce the same products, their farm incomes may differ due to land fertility or some geographical reasons, such as the slope of the land or the distance from markets. Furthermore, non-farm incomes differ significantly.

If you invested many resources, then you might obtain accurate figures for various types of farm household incomes. In order to compare the farm-household incomes and non-farm-household incomes in real terms, you have to take into account the differences in the costs of living in urban and rural areas. Although price levels tend to be lower in rural areas, there are fewer hospitals, schools and libraries which makes it difficult to live there. We need to obtain accurate, precise and comprehensive data so that we can avoid any criticism of the income payment policy, such as overcompensation, by the non-farming population or by farmers who are not eligible for income payments. In order to know enough to implement income payments, the costs would far outweigh the benefits. Administrative and transaction costs are involved not only for implementation, but also for planning.

Just after I returned from Brussels in 1998, I was assigned the position of director for rural development in the Ministry of Agriculture, Forestry and Fisheries. I was asked to introduce direct income payments to the farmers in less advantaged areas, which was the first time direct income payments had been made in Japan. There was a strong belief that farmers' incomes in these areas should be on par with ordinary non-farm household incomes. I found, however, that there are various kinds of farming and non-farming activities; some grow apples, some grow cucumbers, some keep cows, some work for factories and some work for local governments. The incomes from these farming activities fluctuate every year too. It was next to impossible to identify their income levels. I stopped investigating farmers' incomes and also stopped trying to equate them in these areas with the ordinary non-farm household incomes. I read through paragraph thirteen of Annex II of the WTO's Agreement on Agriculture which states that 'the payment shall be limited to the extra costs or loss of income involved in undertaking agricultural production in the prescribed area.' I noticed that all I had

to do was rectify the disadvantage of farming activities in the area which is mostly characterized by land slope. Paddy fields are an instrument for producing rice and rice is the representative product growing there. We had data for the production costs of rice. I had the sample data rearranged according to the degrees of land slope and measured the cost difference between flat land and sloped land. I let 80% of the cost difference be the amount of payment to a paddy field to avoid overcompensation.

4.3   My suggestions

Since I am not an expert in the field of statistics, there may be ways to increase the efficiency of data collection and enhance its accuracy or credibility that are unknown to me.

Even when perfect data is obtained, however, if a farmer changes his production type, it is difficult to find an accurate amount for a direct payment to him. Or if you change the amount of direct payment for each farmer, it will entail higher administrative costs. Also, if a farmer is satisfied with his direct payment, he may not wish to adopt a more efficient method of production.

Previous OECD work mentions that targeted measures to correct market failures linked to the provision of public goods should be introduced before making an income direct payment. Or when there is plenty of room for improving the efficiency of the farm sector, a policy to enhance it is a way to reduce costs and increase incomes. This sequence of introducing policies is important in order to diminish the difficulties of introducing income direct payments.

In addition, we must keep in mind that income direct payment is not the sole instrument for improving farmers' incomes. When people in rural areas find it difficult to access medical facilities, the best and most targeted policy is building an infrastructure - roads or hospitals - which enables people to have access to them. Income direct payment is an indirect and inefficient policy for addressing this issue. When I planned the direct payment policy for less advantaged regions, I told Japanese politicians and leaders of farmers' groups that this policy was not a panacea, that we should give different kinds of medicine to different patients according to their illness and that it was not appropriate to give eye-drops to a patient with a stomach ache.

When the introduction of income direct payment becomes inevitable, we should keep the scheme simple and avoid overcompensation. For example, when income direct payment is made to compensate price reductions, the amount of price reduction should be measured and the normal ratio of income included in the amount of price reduction based on the statistics of production costs should be specified. The forgone income should then become the amount of the direct payment. Farmers who are not affected by price reduction, such as part-time farmers whose main sources of income are from non-farm activities, should be excluded from this scheme.

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5.   An overview of information availability/gap and use in OECD countries

By Carmel Cahill [1]

5.1   An OECD perspective on income issues in agriculture

Improving the income situation of farm households remains a prominent objective of agricultural policies in OECD countries. If income motivates agricultural policy, we need to know about the total income of the household. Farm income provides an incomplete picture as farm household receive significant income from other sources such as other activities, investments and social transfers.

Income objectives are often not clearly stated and need to be interpreted, but income policy necessarily involves questions related to equity and distribution. Thus, total income and wealth are the parameters of interest.

5.2   What is available? What is missing or patchy or out-of date?

In most countries, systems exist to monitor the income situation of farm households but they are incomplete, often out of date and not consistent between micro and macro data, between different types of farm surveys, between farm and general surveys, and across countries. Income concepts and typologies based on commodity production are outdated and no longer relevant given the increasing diversity in income sources and the trend towards the decoupling of policy measures from production.

Information on farm income, costs and returns of the farm operation, farm size and specialisation is readily available in most OECD countries (from the Farm Accountancy Data Network, FADN, in European Union Member States for example). But off-farm income is often missing, and non-farm wealth is often unreported. Exceptions are the Agricultural Resource Management Study (ARMS) in the United States and some national FADNs in Europe. Moreover, small farmers and pluriactive farmers are often excluded, and it is difficult to compare the total income of farm household to that of other households, even at aggregate level.

Experience from the 2003 OECD report on Farm Household Income - Issues and Policy Responses

The authors searched for data allowing the total income of farm households and that of all or other households to be compared. None were found for ten OECD countries. For another

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[1] OECD, Directorate for Food, Agriculture and Fisheries.

ten countries, data were five or more years old - the most out of date is from 1989. As of April 2004, the most recent data is for 2002.

Slightly more countries collected data allowing the share of non-farm income in total income of farm households to be calculated on a regular basis. It remains impossible, however, to find such information in eight OECD countries. Data were more than five years old in six countries and the most recent data was for 2003 (as of April 2004).

Coverage of non-farm income sources varies, from no coverage to all sources (including the housing cost and on-farm consumption equivalents) from all household members.

Definitions (of households and of income) vary enormously from very broad to very narrow. In some countries, a household includes only a couple and their children under 17; in others, the household encompasses the extended family, i.e. all generations and adult siblings living under the same roof. A farm household can be defined very narrowly as a household whose head earns more than half of his/her labour income from agricultural activities or spends more than half his working time on agricultural activities, or very broadly as a household reporting some sales of agricultural products or farming some land.

Examples of good practice

In the United States, a wealth of information on the financial situation and well-being of farm households is available and can be compared with that for other households. A very broad definition of farm households is used and a comprehensive income source coverage is adopted. Data on farm and non-farm wealth and other characteristics of households are also reported. A modern typology, reflecting contemporary conditions, helps in understanding the diversity of farm households and their behaviour:
-   *rural residence* of which limited resource, retirement and residential lifestyle;
-   *intermediate* of which farming occupation/lower sales and farming occupation/higher sales;
-   *commercial* of which large and non-family.

Information in Canada is also presented using a detailed and modern typology that includes:
-   retirement, lifestyle, low-income;
-   small business focused;
-   medium, large, very large, non-family.

The coverage of farm households and income sources is also comprehensive in Canada, but there are several, not always consistent, sources of data.

Japan and Korea use a broad definition of farm households and a comprehensive and detailed coverage of all income sources. In both countries, data are published rapidly, increasing their relevance.

The situation in the European Union

At the European level, there are two sources of harmonised data on income. Eurostat publishes aggregate information on the total income of the farm household sector, which can be

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compared to the total income of other socio-economic categories of households. For most countries, a narrow definition of farm households is used. The database contains only national aggregates.

Individual farm account data are available from a harmonised version of national FADN, which is maintained by the Commission. Although some individual countries collect information on non-agricultural income, the European FADN does not include off-farm income sources. In individual Member countries, information on off-farm income is collected as part of the farm survey in some countries. In others, it is not. However, statisticians merge farm account data with economy-wide sources of information on income such as household budget surveys (Ireland) or tax files (France), in a way that allows statistically meaningful comparisons across farm and non-farm households. There can be problems with timeliness with such a method as this exercise is not carried out every year.

5.3   Obstacles to obtaining information on farm household incomes

Obstacles are administrative, political and, to some extent, technical. Administrative obstacles may occur when policy-making ministries - the potential data users - fail to communicate their needs to statistical agencies - the data collectors. The costs of designing and setting up new or revised surveys, to take account of new needs, can also be an obstacle. Cost also affects the frequency and timeliness of surveys. There can be legal/confidentiality difficulties, preventing the merging of data from different sources (e.g. farm and tax filer records). Such difficulties often prevent the transmission of information to analysts outside ministries. Finally, to ensure the co-operation of participants in surveys, who are usually volunteers, there are limits to the burden that can be placed on them.

Political obstacles are not negligible. Participants may not understand or agree that it is legitimate to seek information on total income, i.e. on income sources that are not part of the farm business, in particular a spouse's income, investment income and wealth. This affects the rate and quality of responses. Vested interests more generally limit the political will to monitor the full income situation of farm households, as it could threaten the legitimacy of income support. As a result, the status quo is often vigorously defended.

Of lesser importance, there are a number of technical obstacles. Coverage of farm households in general surveys is often not representative because they are so few. This can limit the potential of general surveys for farm household income analysis and for merging with farm account information. Wealth, in particular some types of assets such as livestock, forests or vineyards, is difficult to evaluate although there are International Financial Reporting Standards (IFRS), which include International Accounting Standards on agriculture. Another difficulty in keeping track of a panel is that farms and households are not stable over time.

5.4   Using information on farm household incomes

Even where good, comprehensive data is available it is not often determinant in policy decisions impacting on farm household incomes. It is often partial information on farm incomes

that makes the headlines. In fact, in many countries, farm households still receive large amounts of support that remain largely untargeted. Most is delivered according to production or factor endowments and not in relation to income levels. As a result, larger farms, often the richest, receive most support. The system is, thus, regressive in distribution terms. In terms of income objectives, agricultural policies are both inefficient and inequitable.

Statisticians and economists sometimes fall short in communicating what they know. But even when relevant data and analysis reach policy makers and politicians they do not always use it, partly because they have short term horizons. Moreover, the status quo is vigorously defended. The purpose of this Workshop is to try to overcome some of these obstacles by persuading analysts, policy-makers and politicians that good income policy for the farm sector can only be developed if there is good income data on which to base both the diagnosis of the problem and the prescription of the solution.

6. Information on farm household income: identifying information availability and gaps in the EU

By Pierre Bascou [1]

6.1 Introduction

Statistics on agricultural income are part of the European system of agricultural statistics. The latter has always held a very special, prominent place in the overall European statistical system, reflecting the importance of the agricultural sector - and its closely related sectors - in the economy, its role as a major land user and the Common Agricultural Policy (CAP). Its role is particularly essential in the decision-making process of the CAP, from the conception to the evaluation stage, including the monitoring and the day-to-day management.

Statistics on income are particularly necessary to monitor and evaluate the Common Agricultural Policy, notably with respect to one of the main objective '(thus) to ensure a fair standard of living of the agricultural community, in particular by increasing the individual earnings of those working in agriculture'. These statistics play notably a key role in:

- policy conception: for a good appreciation of the past and current developments in the farm sector; the preparation of short-, medium- and long-term perspectives for the sector (baseline scenario) which will constitute the base for (3) testing and simulating alternative policy scenarios. These income information needs have been particularly important recently as the various policy reforms which have been proposed by the EC Commission - such as the Agenda 2000, the Luxembourg 2003 agreement, the sugar reform proposals etc. - have all been supported by impact assessment analyses (procedures which have become standard practice in the European Commission);
- the evaluation of the CAP: the judgement of policy interventions in the agricultural sector according to their results, impacts and the objectives they aim to reach is now carried out on a systematic basis in order to provide relevant information on the effectiveness, efficiency and the impacts of the measures applicable in agriculture (including market policies and rural development programmes).

As a consequence, the availability of relevant, up-to-date and quality information on the income situation in agriculture is absolutely crucial for the EC Commission in order to deliver and operate a Common Agricultural Policy which is effective, timely and efficient.

These needs have recently been reinforced by profound policy changes. These reforms which represent a complete and fundamental change in the way the EU will support its farm sector and rural economies are expected to shape the EU agricultural sector over the next dec-

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[1] Pierre Bascou is an agricultural economist with the Directorate-General for Agriculture of the European Commission in Brussels.

ade. After the major reform adopted by the Council of Ministers in June 2003, a new reform package covering tobacco, olive oil, cotton and hops was also recently agreed. In July 2004, the Commission should present new proposals for the sugar sector and for EU rural development policy.

The main objective of these reforms lies in the promotion of the European Model of Agriculture, i.e. an agricultural sector which is competitive, sustainable, market-oriented, harmoniously integrated in rural areas and which meets society's concerns.

The introduction a single farm payment, independent (decoupled) from production - with limited coupled elements maintained where Member States consider this necessary, and conditional to the respect of environmental, food safety, animal and plant health and animal welfare standards, as well as to the requirements to keep all farm land in good agricultural and environmental condition ('cross-compliance')- constitutes the main thrust of the new CAP.

All these reforms mean that in addition to its support to agricultural markets - though to a lesser extent than in the past - the future CAP will be more targeted towards producers and will address more intensively its territorial dimension and policy issues related to food quality and food safety, the safeguard of the rural economy and the protection of the environment.

6.2   Information availability on income statistics

In order to monitor income developments, three different types of income statistics are available:
1.   EAA (Economic accounts for agriculture);
2.   FADN (Farm Accountancy Data Network);
3.   IAHS (Income of Agricultural Households Sector).

Whereas the two first groups of statistics only concern income exclusively generated by an agricultural activity, the IAHS statistics focuses on the global income situation of agricultural households (including non-farm income sources).

As regards income statistics for agricultural households, emerging needs recently appeared in response to the changing socio-economic structure of the farm sector (reinforced by the enlargement of the EU) and recent policy developments (with an increasing recognition of on- and off-farm complementary activity as a key component for the long-term viability of agricultural holdings and EU rural regions). These developments have increased the necessity to improve the understanding of producer's production and investment behaviour as well as of the impact of and the adjustment process to policy changes.

Two attempts to develop statistical tools at EU level have been undertaken. The IAHS statistics - focusing on the income of the agricultural households as a sub-sector of the household sector accounts - was the subject of a heavy investment and important efforts from the Statistical Office of the EC Commission (Eurostat).

The Directorate General for Agriculture of the EC Commission tried in the early 1990s to build upon the farm data network and initiated a research project whose objectives was to examine the various aspects related to the collection of information on the pluri-activity and non-farm incomes of agricultural households. The project produced very detailed proposals concerning changes to be adopted as regards the definition of the Farm Return. If the need

and relevance was generally agreed upon by all Member States, various difficulties related to the institutional procedures as well as concerns raised regarding the potentially negative impact such a change could have on the overall quality of the collected information prevented a successful outcome of the project.

As a consequence, the IAHS statistics is currently the only operational statistical source of information on the income situation of agricultural households at EU level.

6.3   IAHS statistics

The main objectives of the IAHS statistics can be summarised as follows:
- monitoring year-on-year changes in the total income of agricultural households at aggregate level in Member States;
- monitoring the changing composition of income, especially income from the agricultural holding, from other gainful activities, from property and from welfare transfers;
- comparing trends in total income of agricultural household against that of other socio-professional groups (per unit, household member and consumer unit);
- comparing the absolute incomes of farmers with that of other socio-professional groups, on a per unit basis.

The concept which forms the core of the IAHS statistics is the net disposable income defined as follows -in accordance with the European System of Accounts (ESA):

Net operating surplus from independent activity	Property income paid
Wages from dependant activity	Net non-life insurance premiums
Property income	Current taxes on income and wealth
Non-life insurance claims	Social contributions
Social benefits	Miscellaneous outgoing current transfers
Miscellaneous inward current transfers	
Total resources	Net disposable income
Social transfers in kind	Net adjusted disposable income

In order to compute the IAHS statistics and allow the comparison with other household sub-sectors, the ESA enables to operate a sub-division of the household sector into five socio-professional groups:

(a)   Employers and own-account workers
    (i) Farmers
    (ii) Others (retail & wholesale distribution, catering)
Employees
    (i) Manual workers in agriculture, industry and service
    (ii) Non-manual workers
(c)   Others (recipients of property income, pensions, other current transfers)
(d)   All households except farmers
(e)   All households

For the purpose of the IAHS statistics, two definitions of agricultural households have been used:

1. the target *narrow* definition where agricultural households are defined as households in which the independent income from an agricultural activity constitutes the main source of the total income of the household's reference person (main occupation of the reference person or mixture of occupation/income can be used as alternative);

2. the *Broad* definition which takes into account all households that derive some income from independent agricultural activity (other than income solely in kind that is of a 'hobby' nature).

From the outset, the income measures have been applied to four degrees of aggregation:
-   entire agricultural households sector;
-   average per household;
-   average per household member;
-   average per consumer unit.

There are three main ways by which measures of net disposable income of agricultural households have been generated in EU Member States:
-   micro-economic data grossed up;
-   macro-economic approach (sub-dividing household sector);
-   hybrid approach.

6.4   Data availability for IAHS statistics

The availability of information on the income of agricultural households greatly varies across Member States. The calculation of IAHS results has now become a regular activity in six EU Member States (Denmark, Greece, the Netherlands, Austria, Finland and Sweden). Interest in such a statistics has been shown and results are (or will be) provided in Ireland and Italy.

In contrast, reserves have been expressed about the IAHS statistics and/or lack of resources for such a statistical project exists in Belgium, Germany (data transmission discontinued), Spain, France, Luxembourg, Portugal and in the United Kingdom.

The state of data availability is rather heterogeneous across the EU as it currently stands as shown below:

Belgium (1987-1999)	Luxembourg (1989)
Denmark (1989-1999)	Netherlands (1981, 83, 85, 88-1997)
Germany (1972-1993)	Austria (1985-2000)
Greece (1982-1998)	Portugal (1980-1989)
Spain (1980-1993)	Finland (1977-1999)
France (1984-90, 1990-95)	Sweden (1989-1997)
Ireland (1987)	United Kingdom (1980-1999)
Italy (1984-1995)	

6.5 Medium-term perspectives for the IAHS statistics

The IAHS statistics has been on the agenda of Eurostat working groups over the last 15 years, but with mixed results. Against this background, Eurostat has recently started to review the need for the IAHS statistics in their present form and to investigate possible directions for future development (taking also into account the conclusions of a report from the EU Court of Auditors).

Decision was taken that work in this domain should continue but a clearer definition of the needs for this type of statistics was felt necessary before proceeding further.[1]

The development of the use of the IAHS statistics for policy purposes still remains affected by problems related to comparability (in terms of household definition & classification, types of approach used etc.), quality, accuracy, timeliness and up-to-dateness. Furthermore, the policy relevance of this statistics is being hindered by the low comparability of certain parameters with other socio-professional groups as well as the mere lack of basic data in some Member States, making impossible the calculation of an EU average and/or aggregate.

However, even if all these problems were overcome, the IAHS statistics can only be seen - in many respects - as a first step in the right direction as the collection of information based on micro-economic statistics is considered as crucial to provide an improved picture of distributional aspects of income in the EU and to allow the identification of income problems per region and type of agricultural activity.

Such information already exists in some Member States (Denmark, Germany, the Netherlands, Finland, Sweden). It is based on various data sources (farm accounts, household budget surveys, tax records etc.). An examination of the development of such statistics was carried out by Eurostat in 1999 within a Task Force, with a specific focus on methodological issues. It was felt that this information was not directly usable at EU level for economic and policy purposes as it often lacked harmonisation and comparability.

In order to boost its usefulness for policy purposes, a statistics on the income of the agricultural population needs first to be improved in terms of quality and comparability (in contrast, its frequency of collections needs not be annual and specific surveys taking place, for example, every five years could well suit that purpose).

An in-depth analysis should be carried out in order to examine what (existing or new) statistical tools would be best suited to generate appropriate data, bearing in mind the limited resources currently available for agricultural statistics, the existing institutional constraints and the risk of deteriorating existing statistical tools while developing new ones.

In the context of this analysis, several pending issues would need to be examined as regards concepts, definitions and household coverage (agricultural households vs. rural households) taking into consideration the fact that income is only one indicator of the well-being of farmers and other rural residents (other variables being living conditions such as unemployment and poverty, housing services, population etc.) and the specificities of each EU Member State (linked for example to the taxation system, the structure of the farm sector and the national statistical system).

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[1] In this respect, it should be mentioned that the IAHS statistics was not considered as a first priority for the statistical programme of the Candidate Countries which will join the EU on 1st of May 2004 (in contrast to the statistics of economic accounts for agriculture).

7.   Difficulties in estimating farm household income: the French example

By Jean-Pierre Berthier [1]

Farm household income, and particularly that which is earned from off-farm sources, is an important issue in the overall understanding of agriculture and yet very difficult to analyse from a statistical perspective. Farm household income issues also have potential implications on the development of agricultural policy. However, it is not the role of the statistician to decide whether it is opportune to take into account the farmer's total income, even if he is aware of the potential usefulness his work may have in this domain.

7.1   The necessity for high quality statistical data

Comparative estimates of farm household incomes have three objectives:
-       to compare income between different categories of households: information on total household income is of interest in so far that it allows one to situate the standard of living of farm households with respect to other households;
-       to compare income with other countries (within the European Union or between OECD countries);
-       to compare income over time in order to analyse developments, if not on an annual basis, at least over the medium-term.

There are large disparities in income, both farm and off-farm. Indeed, farmers are not a homogeneous social category and thus it is very useful to be informed on the distribution of their income.

This is also a highly sensitive political issue. For farmers, any study on incomes is of a sensitive nature, but that State support could depend on factors others than agricultural activity is simply shocking. At the national and community level, this political sensitivity is tied to the stakes involved with respect to the Common Agricultural Policy.

The above observations are generally shared by the European Commission and the OECD. It is necessary, however, to thoroughly analyse the potential consequences.

7.2   No single statistical source is sufficient

The willingness to study overall income distribution, and not just average income, has focused interest on micro-economic sources in order to obtain data on individuals. Three main

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[1] Head of the INSEE Agriculture Division.

sources can be used in France. Each of these sources is important, but none is sufficient in itself:
- *household surveys, and particularly the Family Budget Survey (BDF)*. It is well known that such surveys underestimate both expenses and incomes. The income of those who are self-employed (farmers fall into this category) are particularly affected by this statistical problem. As well, the demographic weakness of farmers and the high cost of such surveys results in that only a small number of farm households take part in the survey (about 200 for the BDF and the new European survey SILC);
- f*arm households'* income tax declarations. These state only that part of the income which is subject to income tax. Moreover, the specificities of agricultural taxation, particularly the existence of lump sum payments to small farm holdings, constitute a serious limitation as to the usefulness of the statistical information gathered from this administrative source;
- *the Farm Accounting Data Network (FADN) which provides farm account data*. This source, an essential one for European agricultural statistics, includes only farm income. In addition, such information is limited only to farms and not households, even though the ties that bind the two are becoming looser.

7.3   An attempt to use these statistical sources jointly

A study is currently underway at INSEE on the best ways to use the available statistical sources. This implies a complex approach that can be summarized in three steps:
- household surveys (tax expenditure surveys) and the use of modelisations (e.g. for social security benefits) supplement information obtained from household income tax declarations which in turn allows actual disposable income to be calculated;
- in so far as incomes are concerned, a merging of information from FADN and household income tax declarations was last done in 1997; this same procedure is currently underway for the year 2003;
- the current study has as its objective to use source a) for non agricultural income of farm households and to estimate agricultural income (as noted above income tax declarations do not reflect the actual sums) from source b).

As this study uses the three main sources of statistics mentioned above, a close collaboration between different services is required. This collaboration should enable estimates of both average incomes and incomes by deciles for farm households on the one hand, and for households in general on the other hand. It will also enable calculations of consumption units that reflect the actual standard of living of households.

7.4   Conclusion

The technical difficulties and the necessity to have highly reliable statistics require complex methodologies to calculate farm household incomes. Distinctive national characteristics, such as lump sum payments in France, but also the wide range of existing sources and current sta-

tistical research makes it particularly difficult to establish a single methodology in addition to making comparisons difficult at the international level.

This last point is particularly problematic in that the definition of what constitutes a farm household depends in part on the statistical source used. It seems likely that the results will depend largely on how broad the definition of farm households used is. As a statistician-economist, I do not believe that one should give the broadest definition possible to include all farm households which have some income derived from agricultural activities.

8. The role of cash flow indicators in understanding farm households

By Beat Meier [1]

Abstract

There is consensus among economists that off-farm income sources need to be taken into account for analysing the economic situation of farming families. If data collection is based on accounting, the analysis can be improved by combining the well-known key figures derived from profit and loss accounts with cash flow indicators. These cash flow indicators should not only cover farm and off-farm sources, but also measure private expenditure of the family. The resulting operating cash flow of the farm household shows the potential for investment, savings or paying off loans. Examples taken from the Swiss Farm Accountancy Data Network illustrate that total investment is covered by the operating cash flow to a large degree, despite the relatively low performance of the farm itself. Aspects of diversity and problems of representativity need to be taken into account.

8.1 The 'income gap': what is the problem?

Family farm income is a net profit indicator derived from farm accounts. By definition it should remunerate the family's input of unpaid labour and capital. The analysis of a time series[2] carried out by the Swiss Farm Accountancy Data Network (FADN) shows that, over a long period of time, family farm income is considerably lower than private consumption. The gap even increases if calculated costs for unpaid labour and for net worth invested in the farm are taken as a reference point (average salaries of employees; average interest on long-term governmental bonds, see figure 8.1). For other European countries, the results would probably be similar. As income objectives for the farming sector are an important element of the agricultural policy in most (if not all) OECD countries, the relatively low income is a common argument for maintaining or increasing public support.

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[2] 1 CHF = 1.5 €,   1 € = 0.66 CHF.

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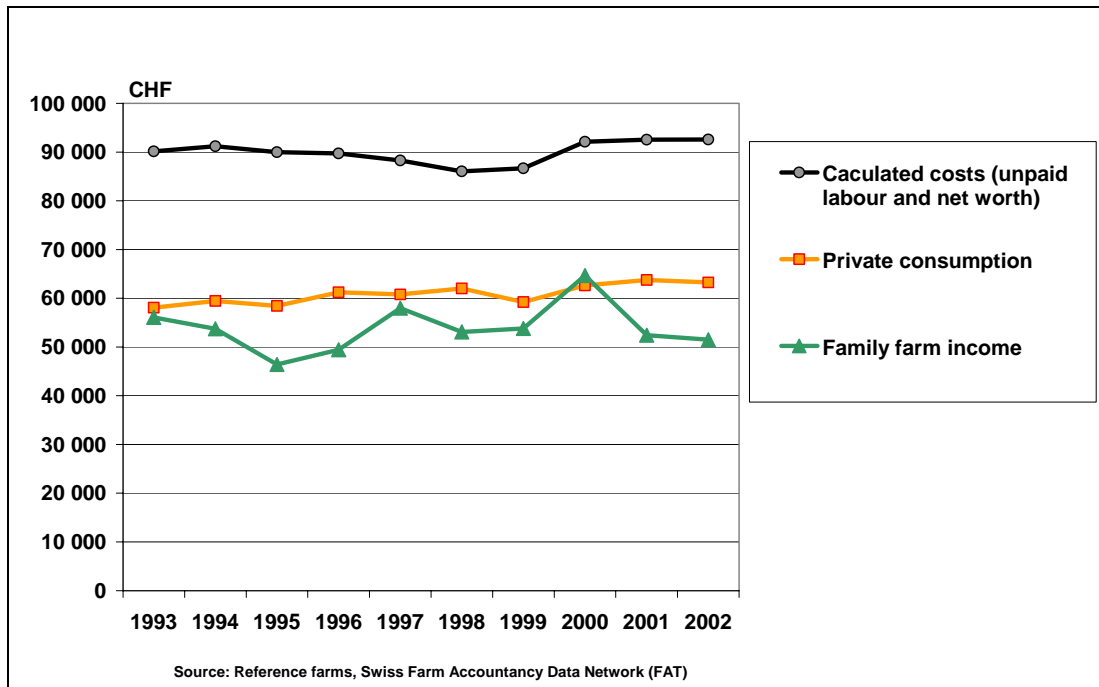
Figure 8.1   Family farm income, private consumption and calculated costs in Swiss reference farms

What are the reasons for this 'income gap'? In a free economy, we could expect that the 'invisible hand' allocates the factors in a way that reduces the gap. This is obviously not the case. Several theoretically and empirically sound explanations exist that might be summarised as follows:

- *economic explanation:* Despite the empirically obvious 'gap', the allocation is optimal because alternatives for off-farm occupation are missing (in other words, true opportunity costs are lower than assumed in the 'calculated costs' of figure 8.1);
- *behavioural explanation:* There are non-economic factors that allow individuals to become or to continue as farmers (tradition, affection to the profession, independency);
- *indicator explanation:* the 'income gap' is based on inappropriate indicators. There are two major problems:
  - cash flow generated by the farm can be very different from income; and
  - the limited farm-focus ignores a part of the reality.

Each explanation contributes to a better understanding. This paper focuses on the third point, illustrating what we can expect from the analysis of cash flow indicators and from extending the view from the farm to the farm household.

8.2 From income to operating cash flow at farm level

According to the International Accounting Standards (IAS 7[1]), the cash flow statement is a basic financial statement (like a balance sheet or income statement). Changes in cash (or cash equivalents) should be classified into operating, investing and financial activities. Operating cash flows can be calculated directly (receipts minus payments) or by using the indirect method where the net profit is adjusted for non-cash items.

The Swiss FADN uses the indirect method for the calculation of the operating farm cash flow. The major non-cash items used in the adjustment of the income/net profit are:
- depreciation;
- changes in stocks;
- changes in livestock;
- calculated labour input for investment activities;
- calculated farmhouse consumption of farm products (in kind); and
- calculated rent for the dwelling house (in the Swiss FADN, farm assets include the farmhouse; the family 'rents' the house from the farm).
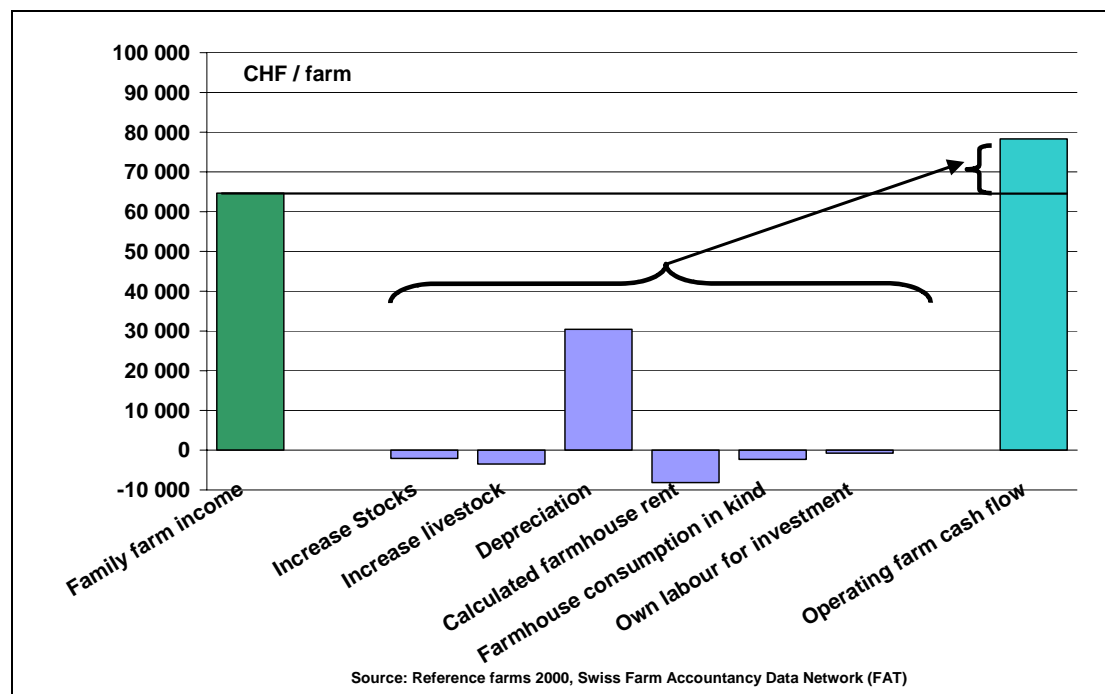

Figure 8.2   Adjustment of family farm income for operating farm cash flow in Swiss reference farms in 2000

Figure 8.2 illustrates the differences between family farm income and operating farm cash flow for a selected year. The adjustment for depreciation determines the overall differ-

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[1] www.iasb.org/standards/summary_ias01to19.asp (26.3.2004).

ence. Depreciation is a calculated cost item derived from the expenses for investments in previous years. Depreciation in the Swiss FADN is based on historical costs and in the EU-FADN on replacement values. Depreciation is deducted in the income statement to show net profit. In the cash flow statement, however, investment activities are separated from operating activities. As a non-cash item, depreciation must be added to family farm income.

Figure 8.3 illustrates long-term development of family farm income and operating farm cash flow. Despite several deductions made for non-cash items from average profit, we see that by adding depreciation farms generate on average considerably more cash over ten years than the income statement indicates as net profit. This is not surprising and it must be kept in mind that this operating farm cash flow cannot be considered as available for private consumption. Investments, repayment of debt or savings must be financed as well. Another important point to note is the relatively low variability of the average farm cash flow from year to year. Whereas depreciation, calculated rent and farmhouse consumption are relatively constant over time, changes in stock and livestock vary considerably.[1] If this was also the case at the individual farm level, it could be important to take operating cash flow into consideration when government schemes to reduce risks in income are discussed. Finally, we suggest taking cash flows into account when accounting results are compared internationally. Major obstacles to comparability are depreciation, valuation of stock and livestock and calculated values for payment in kind, non-cash rents, etc. These obstacles are avoided when analysing cash flow indicators.

Source: Reference farms, Swiss Farm Accountancy Data Network (FAT)
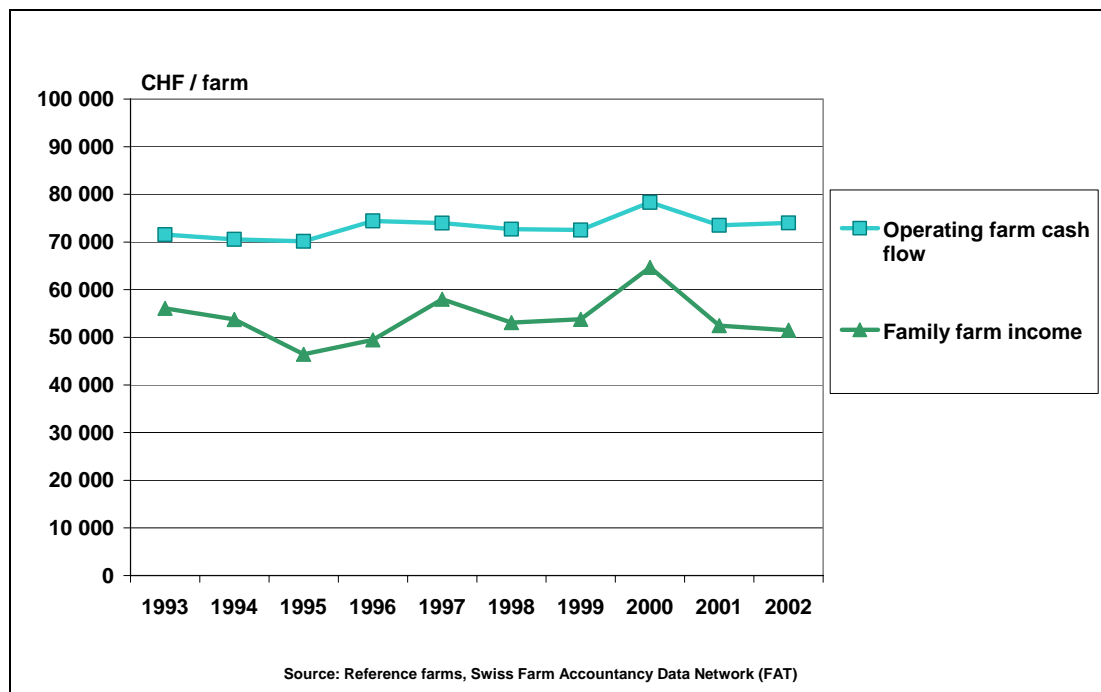
Figure 8.3   Family farm income and operating farm cash flow in Swiss reference farms 1993-2002

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[1] This is the case for the Swiss FADN but not necessarily for other data bases, depending on the methodology for valuation.

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8.3 Cash flow indicators at farm and household level

After having introduced operating farm cash flow from current farming activities, we go one step further and consider the farm as part of the entire farm household (figure 8.4). Adding operating non-farm sources of cash flow from self employed and employed activities, pensions, etc., to the operating farm cash flow, we obtain the operating cash flow before private expenses. If the private expenses are deducted, the result is the net operating household cash flow.

The households of the Swiss reference farms generate on average a cash flow of nearly CHF 100,000. Private expenses are considerably lower than the private consumption indicator used in the profit and loss or income statement. This is due to the deduction of the calculated values for farm products and the calculated farmhouse rent. The change in net worth is the result of the profit and loss statement for the household. In the cash flow statement, the corresponding result is the net operating household cash flow. The net operating household cash flow can be used for investment, paying off debts or savings.

Figure 8.4   Calculation of net operating household cash flow in Swiss reference farms 2000/2002

Figure 8.5   Operating cash flow before private expenses and net operating farm household cash flow in Swiss reference farms 1993-2002

Figure 8.6   Net operating farm household cash flow and total investment in Swiss reference farms 1993-2002
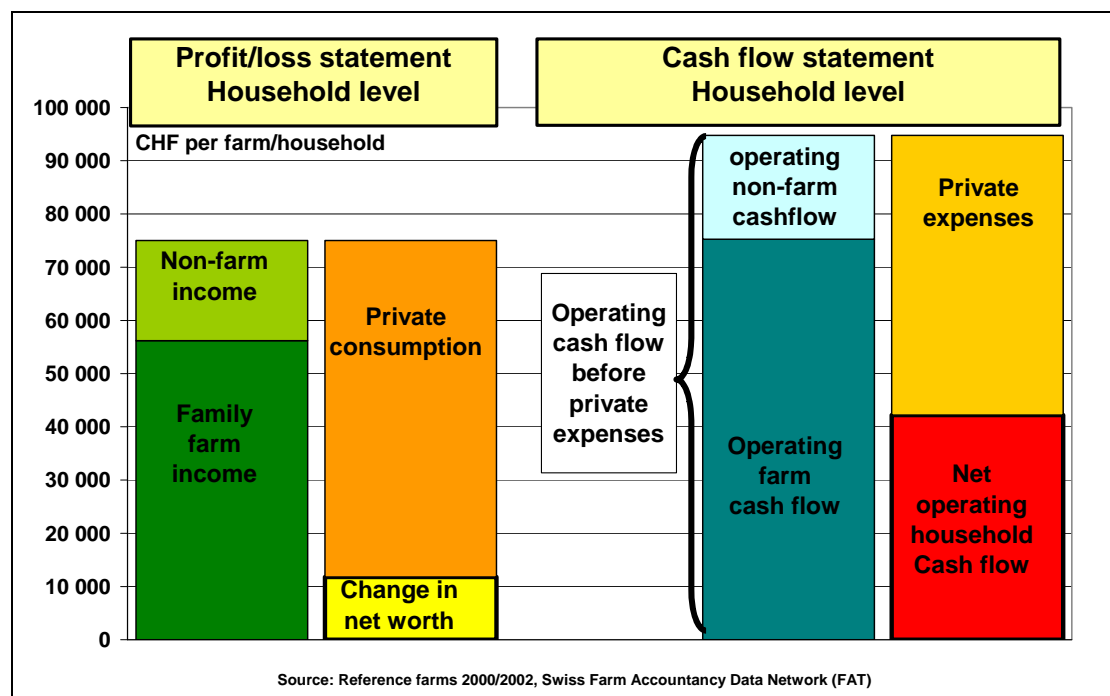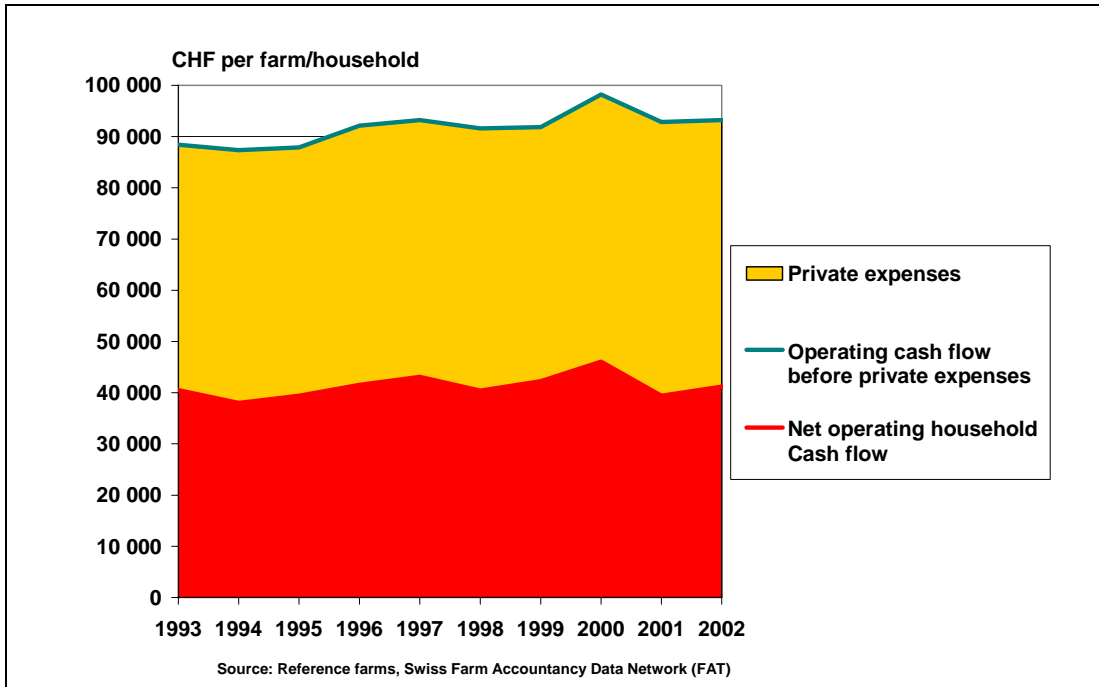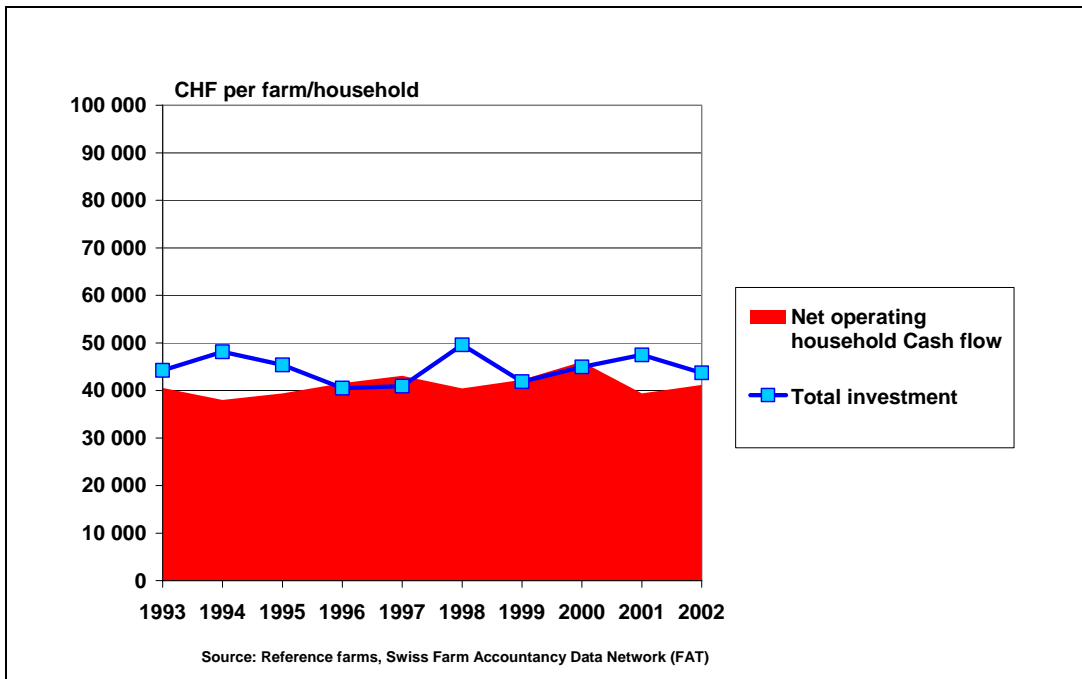
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Over the period from 1993 to 2002, the net operating household cash flow showed little variation (figure 8.5). The average value for all reference farms is close to CHF 40,000. How can we interpret this average amount of CHF 40,000 per year? Is it very high, acceptable or extremely low? A rough answer can be given by extending the analysis of the cash flow statement from the operating activities to investment activities.

As figure 8.6 indicates for the observed period, total investment accounted for CHF 40,000 to 50,000 and was financed by more than 90% by the household's own cash flow. The necessary extra household sources (normally loans) were relatively modest and did not challenge the financial stability of the farm household. The share of borrowed capital remained constant. This rough analysis raises the question of whether investments of CHF 40,000 are very high, acceptable or extremely low. Obviously, any answer will have to take the specific situation of the individual farm or group of farms into account. Without giving the answer, figures 8.8 and 8.9 provide some initial ideas.

All results shown so far represent annual averages for all reference farms. These indicators tell us something about the overall situation, as if there was one national farm holding and the results of all 55,000 subsidiary companies were aggregated together. In reality, the subsidiary companies are independent family businesses, and if one of these has an income or a liquidity problem, it cannot be compensated by outstanding results of other businesses. It is therefore important to investigate the distribution of the indicators and to identify major influences to explain the variability.

The dispersion of net operating household cash flow for two selected years is shown in figure 8.7. About 5 to 6% of all farm households have a negative net cash flow. In these cases, not even private expenses can be covered by cash flows from farm and non-farm sources. Despite the similar averages in the two years, dispersion tends to increase slightly in 2002.

In order to understand the variability between farm households, a simple descriptive analysis of some key cash flow indicators was done. As a first example, the average results were divided into three groups according to the importance of non-farm income sources.

The groups shown in figure 8.8 are defined by the proportion of family farm income in the total income of the farm household. In the first group, the farm generates more than 90% of the total income. This group (32% of all farms[1]) is called 'Farming as only activity'. In the next group, 50 to 90% of total income is derived from farming activities. This group is called 'Farming as primary activity' (51% of all farms). The third group with less than 50% of total income from farming activities is called 'Farming as secondary activity' (18% of all farms). The operating cash flow before private expenses diminishes as non-farm income sources become more important. As private expenses are nearly the same in all groups, the net operating cash flow of the household is smallest in the 'Farming as secondary activity' group. In these households, the cash flow from farming does not even cover total investments. Nevertheless, 90% of the total investment can be financed with the net operating cash flow. Compared to the other groups, households with 'farming as secondary activity' invest less in farm buildings and machinery, but more in the farmhouse.

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[1] 100% = the population for weighting of the reference farms. This population covers about 80% of all Swiss farms and more than 95% of the economic activity of the farming sector.
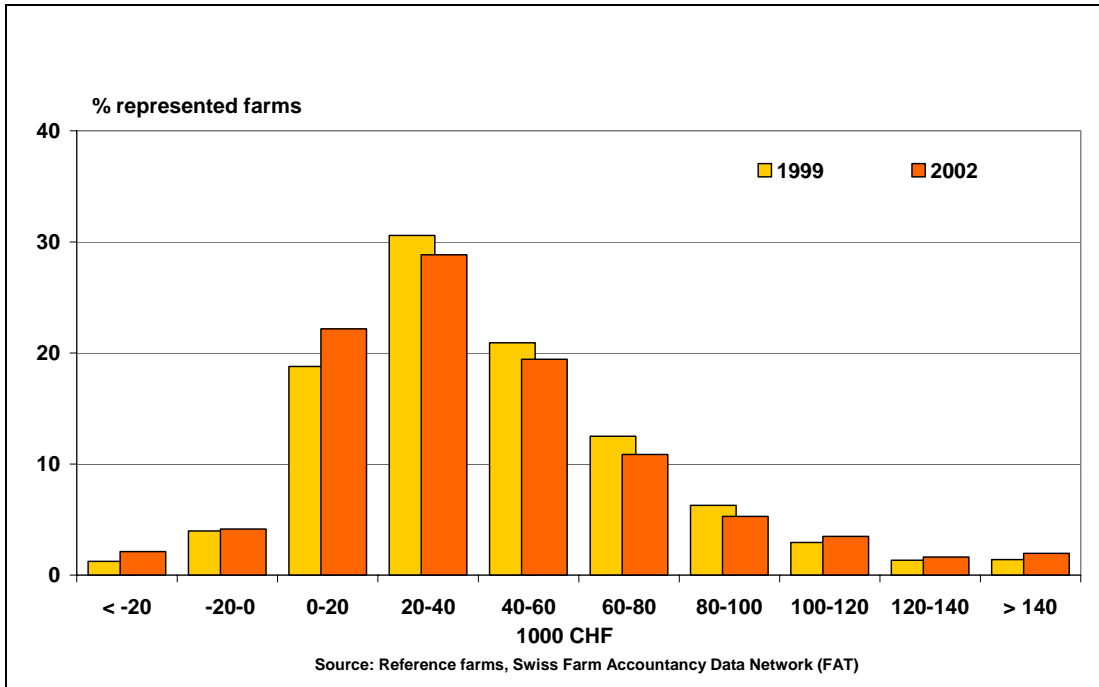
Figure 8.7   Dispersion of net operating farm household cash flow in Swiss reference farms in 1999 and 2002
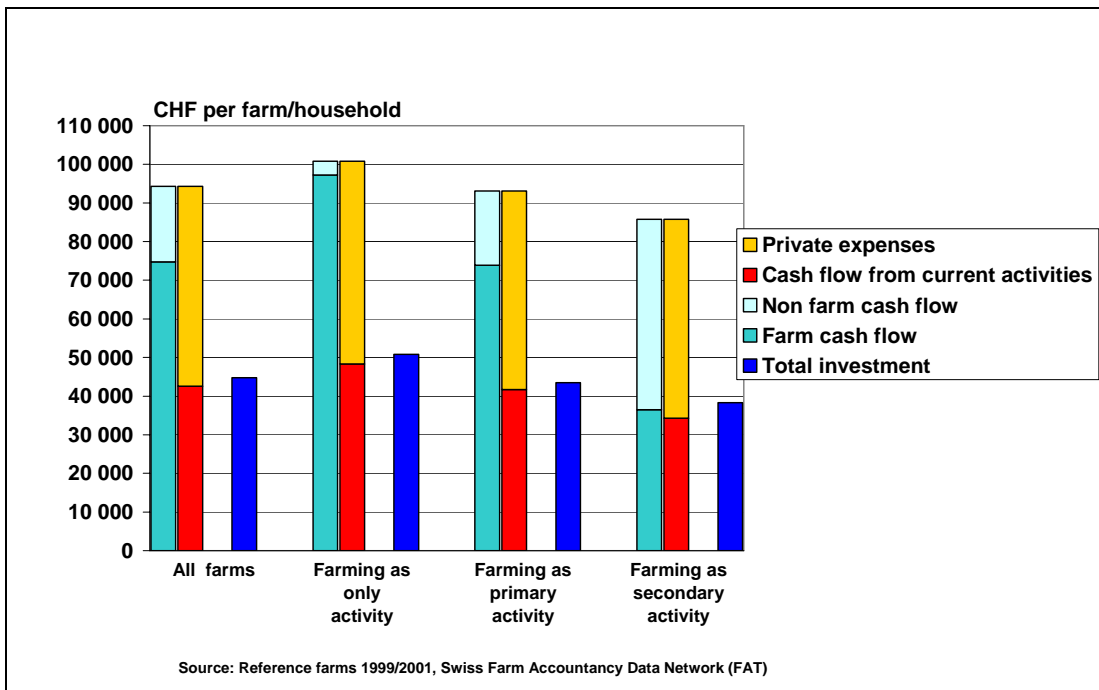
Figure 8.8   Operating cash flow indicators and total investment by socio-economic type in 1999/2001

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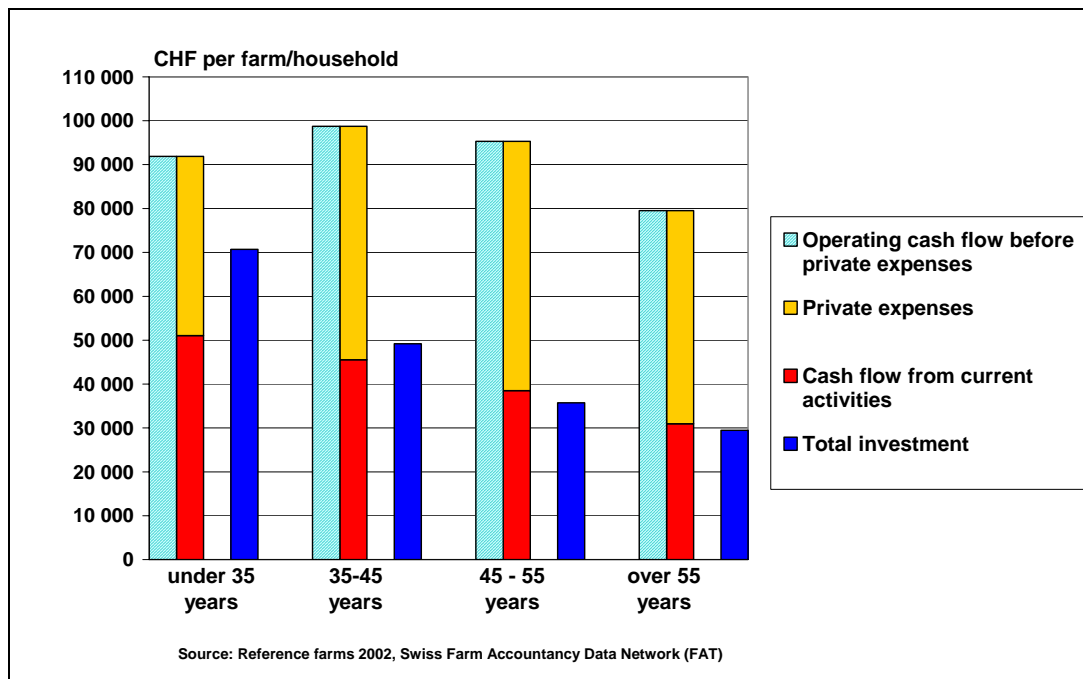
Figure 8.9   Operating cash flow indicators and total investment by age of farm manager in 2002

Another example of a factor with a major influence on the variability of cash flow indicators is the age of the farm manager.

Total investment clearly decreases the older the farm manager. Private expenses reach their maximum when the farm manager is between 35 and 55 years old, and which is explained by the family cycle. In the youngest group, only 72% of total investment can be financed with the net operating cash flow. The older groups, over 45 years, have a cash surplus after investment activities.

8.4   A word on representativity

Analyses of indicators derived from FADN tend to be biased. Major causes are non-random selection or the fact that 'no response' in random samples cannot be ignored. In addition, we must expect a correlation between representativity problems and income indicators, e.g. higher non-response among poorer farmers. Traditional weighting in FADN-analysis adjusts fairly well for farm characteristics, but not for socio-economic criteria.

It is clear, therefore, that improving policy analysis is not only a matter of defining new indicators and extending data collection to these items. Sample design, sampling processes and weighting methods need to be checked and improved as well.

8.5 Conclusions for policy evaluation

Low (or high) income from farming activities is an insufficient and potentially misleading indicator for analysing the economic situation of farming families. The 'income gap' between farming and other branches is to a certain extent a measuring problem caused by the selection of inappropriate indicators. Considering cash flow indicators and extending the view to the farm household help us to better understand the economic situation and behaviour of families engaged in farming. This knowledge is a prerequisite for targeted policy design and comprehensive policy evaluation.

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9. Use of micro data for policy analysis of the CAP

By Werner Kleinhanß [1]

9.1 Introduction

Farm accounting data networks allowing the analysis of farm income have been developed since the 1950s as a basis for policy making. The German national network (INLB) has been adapted several times due to the changing role of farming; for example, off-farm income data has been introduced, non-family farm organisations (partnerships, legal companies) have been included, and the sample has been extended to organic farms. This paper will deal with a number of aspects, including the distribution of farm and off-farm income, the share of subsidies in farm income and the distribution of subsidies by farm size and farm type. The impact of policy decisions is discussed using the CAP mid-term review (MTR) and its implementation in Germany as an example.

Farm accounting data from the INLB as well as from the EU (FADN) are the principal sources of information. Statistical methods, simulation approaches and mathematical (non-linear) programming models are used.

9.2 Distribution of income in farm households

Due to the increasing share of part-time farming in Germany, farm income by itself is not an adequate indicator to describe the income situation of farm households. Off-farm income from different sources is included in the INLB, but only for single farms. Although data is available, it must be thoroughly checked before using it. Another problem is that off-farm income is usually obtained from tax declarations which necessarily involve a time lag. Although we have had access to national farm accounting data since 1995/96, only data from a constant sample of two years is used (2001/02 and 2002/03). The sample used in this study consists of about 5,400 farms, or about half of the INLB sample. This sample represents a population of about 130,000 farms (i.e. about half of the number of farms represented by INLB in Germany).

The distribution of farm and total income is shown by the Lorenz curves (figure 9.1). Farm income is unequally distributed (2001/02):
- about 20% of farms earn about half of farm income on a national basis;
- a negative income is indicated for 30% of farms (this share increased in 2002/03).

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Due to off-farm income, total income is more equally distributed:
- 40% of farms earn 20% of total income at the national level; and
- another 20% of farms earn 40% of total income.
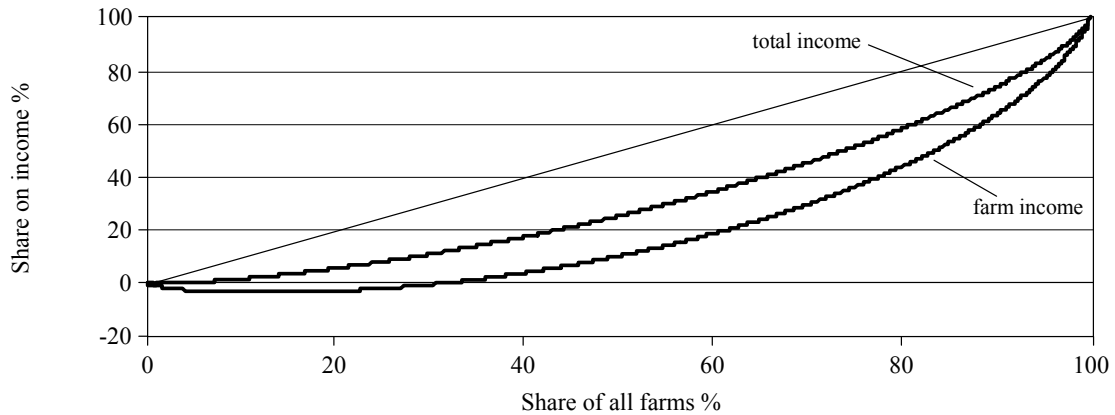
Figure 9.1   Distribution of income in farms in Germany - 2001/02 (Lorenz curve)
Source: INLB, Sample of 5,400 farms, representing 130,000 farms.

It is worthwhile to look at the different sources of income according to farm size and farming type (figure 9.2). If one breaks down the total income of the sample, 55% represents farm income, 30% off-farm income, and about 15% are social transfers.

Compared to the average, income composition is different by farm size and types. Three farm groups of up to 100 ESU[1] have income levels close to the average range. For the smallest farms, (up to 16 ESU), around 10% of their income is from farming activities, while three-quarters of their income is derived from off-farm sources. In the other group (less than 40 ESU), 40% of their income comes from farming activities and another 40% is derived from off-farm sources. In farms with less than 100 ESU, the income composition is the reverse of the smallest group. Farms of more than 100 ESU show higher income levels. It should be mentioned that the share of social transfers is more or less constant for all farm groups.

There are also differences in income composition and total income by farm types. Arable, horticultural, pig and parts of mixed farms show an above average income level, while permanent crops, dairy and other cattle farms are below the average. The ranking of farms changes from year to year. Due to price changes, for example, the income of pig farms can decrease from one year to the next.

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[1] Economic Size Unit: 1 ESU = 1 200 EUR.

Figure 9.2   Structure of income by farm type or size 2001/02
1) 1,200 euro.
Source: INLB, Sample of 5,400 farms, representing 130,000 farms.

9.3   Distribution of subsidies or direct payments in the EU/Germany

During the CAP reforms, direct payments became an important source of income. Subsidies, in this respect, play an important role (figure 9.3) as they account, on average, for more than half of farm income. Direct payments represent 70% of all subsidies, input subsidies 5% and the remaining 25% includes agri-environmental payments, less favoured area allowance and other Pillar-II measures). Direct payments are strongly correlated with farm size and differ by farm type:
-    more than 70% of direct payments are for arable crops and are calculated according to farm size;
-    arable farms and other cattle and mixed farms show the highest level of direct payments, whilst horticulture and permanent cropping farms have the lowest levels of direct payments.

The distribution of direct payments by EU Member States is shown in figure 9.4 and is based on projections for 2006. The distribution of farms related to the level of direct payments is also shown in this figure. In the EU, about half of all farms receive less than EUR 3,000 of direct payments due to their small farm structure, particularly as concerns those located in southern Germany. Only 5% of farms receive more than EUR 50,000.
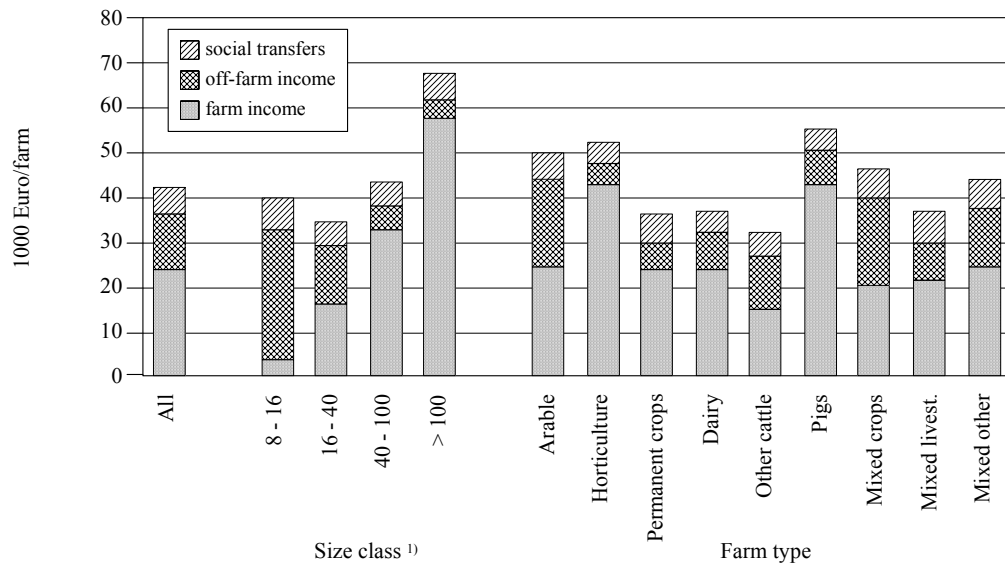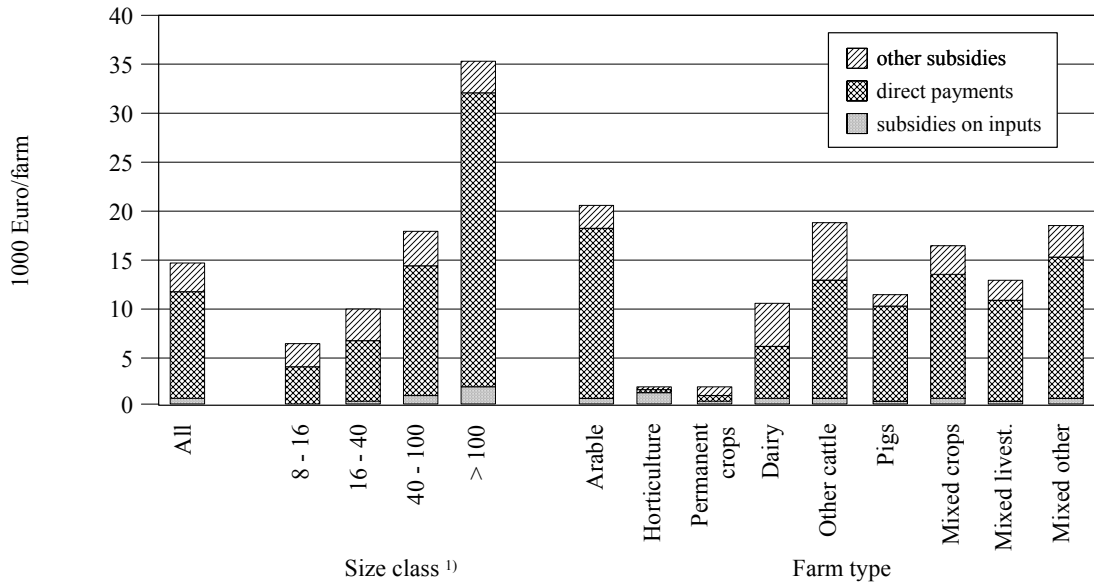
Figure 9.3   Subsidies by farm type or size 2001/02
1) 1,200 euro.
Source: INLB, Sample of 5,400 farms, representing 130,000 farms.
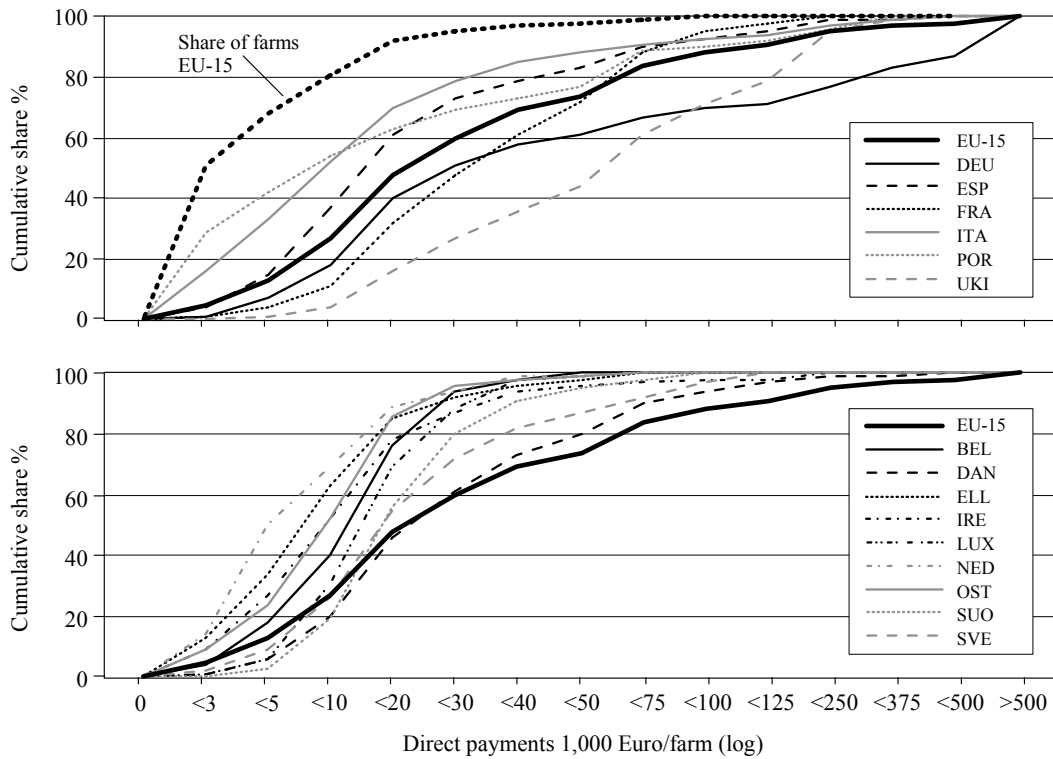
Figure 9.4   Distribution of direct payments in EU-15
Source: Own calculations on base of INLB-EU-GD AGRI/A, 19992000.

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Direct payments are unequally distributed, as:
-    a high share of direct payments goes to farms receiving more than EUR 50,000 per farm and located in Germany, the UK and France; and
-    a high share of direct payments below the franchise within the modulation scheme (EUR 5,000) goes to farms located in Greece, Portugal, Italy, and the Netherlands. This share of direct payments is excluded from modulation.

Based on the above figures, the impact of modulation can be assessed. Modulation seeks to transfer a share of direct payments from Pillar-I towards Pillar-II of CAP. The payment level per farm will be influenced by a franchise (excluded from reductions of premia), capping of premia beyond a ceiling or modifying the premium level with regard to labour input, size and income (as in the former French scheme). Referring to the MTR proposals, the reduction of direct payments by modulation is shown in figure 9.5.
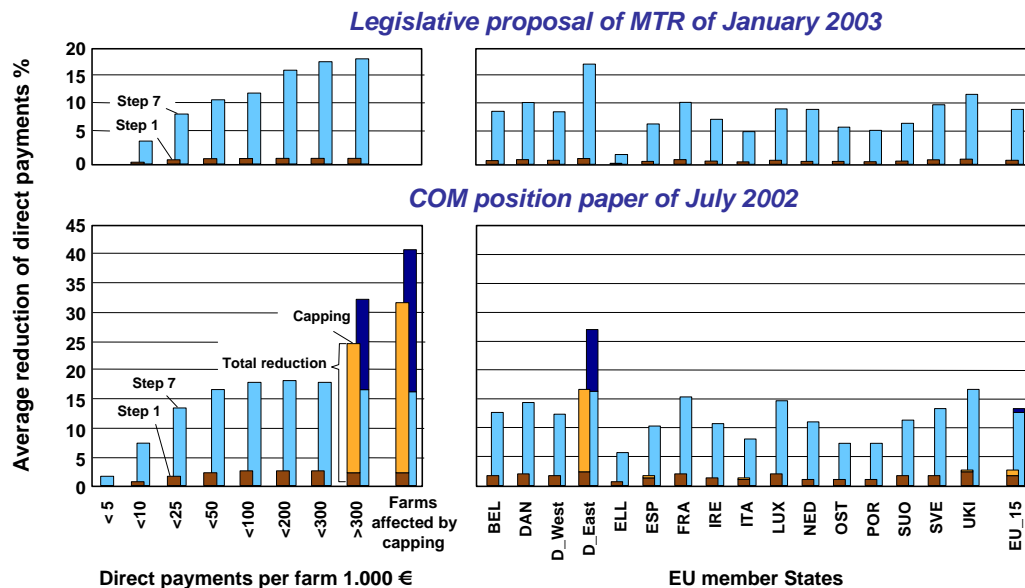
Figure 9.5   *Impacts of different proposals on modulation of direct payments*
Source: Own calculations on base of INLB_EU_GD_AGRI/A 2, Wj 1999/2000.

If one refers to the position paper of the European Commission, it is clear that capping leads to strongly differentiated effects between farms and member States. In the first year, direct payments would be proportionally reduced by 3%, while the premiums above the capping level would be reduced by 100%. On average, premium would be reduced by one third in farms affected by capping.
Since about 4% of farms in the European Union would be affected by this measure, about 45% of the premium volume affected by capping will be paid to farms in East Germany, the most seriously affected region. However, the option of capping was cancelled in

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the legislative proposal. The effects of modulation for East Germany would therefore have been smaller despite the suggested premium shortening of up to 19% under conditions of the legislative proposal. The final decision (3-5% reduction of direct payments beyond the franchise) has no such consequence, and it has lower distribution effects by farm type, size and region. Nevertheless, it is of interest for some policy makers to 'modulate' direct payments with regard to working units, etc., and to reduce or transmit direct payments from Pillar I to Pillar II.

9.4 Policy impacts of MTR and its national implementation on farm income and income distribution

Within the Luxembourg agreement on the MTR, far reaching decisions were made with regard to decoupling and the obligatory modulation of direct payments. In addition to the standard model of decoupling, the Single Payment Scheme (SP), Member States will have the following options of national implementation:
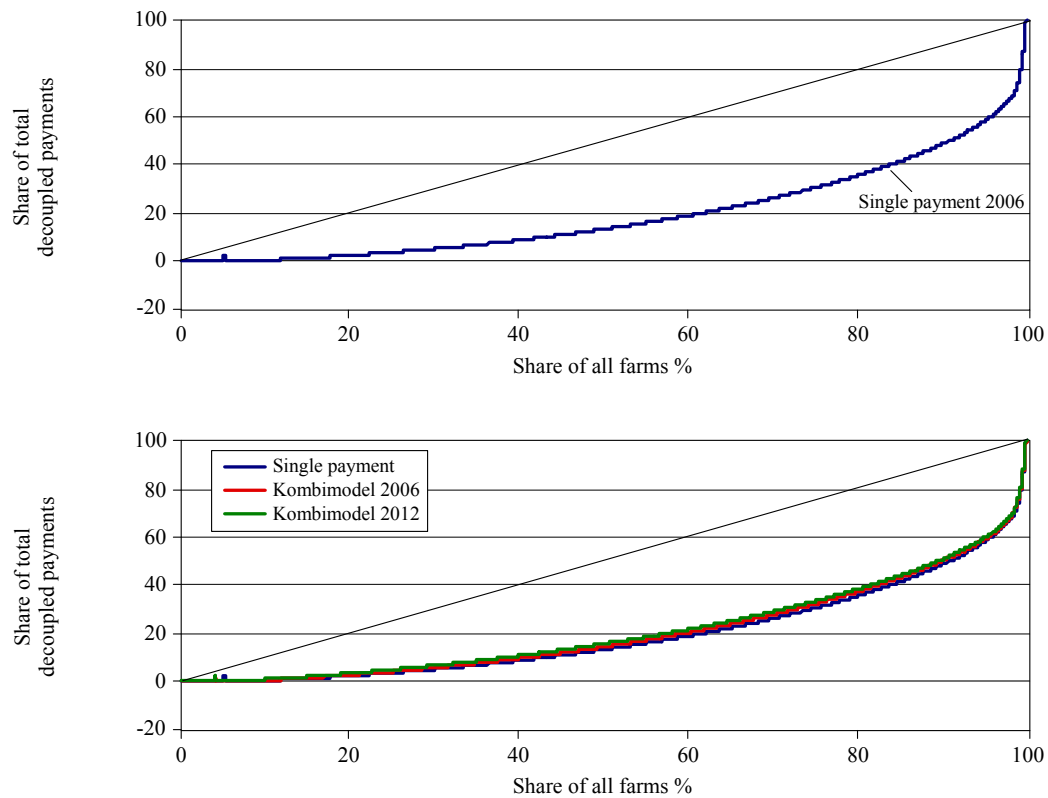
Figure 9.6   *Distribution of decoupled payments under MTR in Germany (Lorenz curve) Projections without Modulation*

Source: INLB 1999/2000, 10,800 farms, representing 250,000 farms.

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- the regional implementation based on § 58 of the regulation (Rat der Europäischen Gemeinschaften, 2003): instead of the individual farm premium level of a specific reference period, entitlements can be calculated on the basis of regional premia plafonds, which must be related to land, so that unified hectare-based entitlements remain;
- the partial decoupling of arable crops and in the livestock sector (besides milk premium);
- all systems (including SP) can be combined.

The German federal government and most of the Länder are in favour of a so-called Kombimodel (BMVEL, 2004) to be introduced stepwise between 2005 and 2012, starting with regionally differentiated premia for arable land, grassland (lower level) and individual farm premia (based on milk premia, special headage premia, etc.). This scheme will end with unified entitlements for agricultural land (differentiated by Länder). The Danish scheme is comparable with the first step of the German scheme.

The German system will have large distribution effects by regions, farm types, intensity, etc., especially in the final stage (Kleinhanss, 2003). These effects, however, cannot be identified at the sector level, or on the basis of the Lorenz curves shown in figure 10.6. The latter indicates a largely unequal distribution of direct payments made mainly to large sized farms in East Germany.

Direct payments at the county level, which are projected on the basis of INLB data, are shown in figure 9.7 for both the SP scheme and the *Kombimodel*. In the first case, there are rather high payment levels in the northwest and the southeast due to a high concentration of bull finishing and milk production. The *Kombimodel* reduces the variances in premium levels between the regions. There are a large number of winners and losers at the regional level.
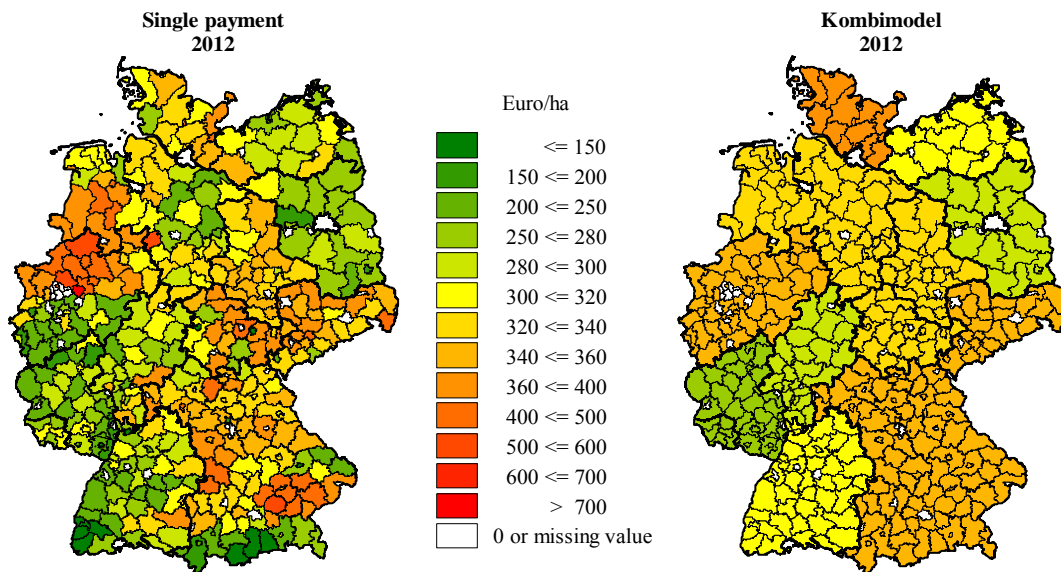
Figure 9.7   Single payment versus Kombimodel
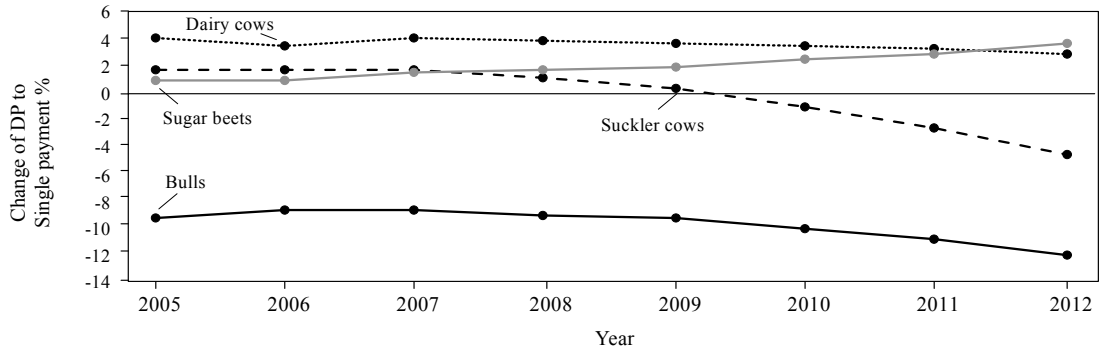
Figure 9.8   Change of direct payments (DP) by the 'Kombimodel' on the average of farms with…
Source: FARMIS, own calculation based of BMVEL-INLB.

Figure 9.8 shows that, on average, farms with milk production will profit from around a 4% higher premia. Farms with suckler cows will profit in the first period, while they will lose in the latter period. Farms with bull finishing will lose about 10% of their premia. Farms producing sugar beets, which were not yet affected by CAP reforms, will gain on the condition that there is no reform of the market regime for sugar.

Changes in direct payments depend largely on the intensity or concentration of production. Figure 9.9 shows that dairy farms with low levels of milk production per hectare of grassland will gain, while farms with high milk production per hectare will lose up to 20% of direct payments in the final stages of the scheme.
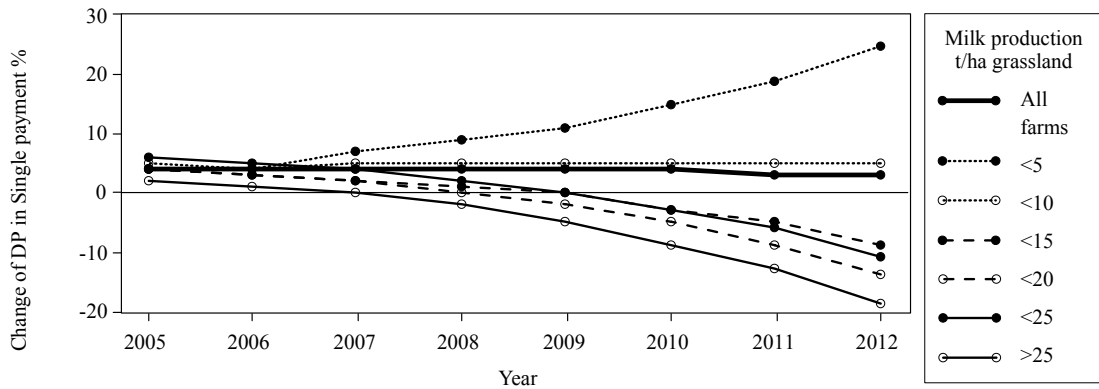
Figure 9.9   Change of direct payments by the 'Kombimodel' for farms with dairy cows
Source: Own calculation based of BMVEL-INLB.

MTR impacts on land use, supply, income and income distribution, as well as impacts on rental values for milk quotas and land are assessed for both the SP scheme and the *Kombimodel*. A non-linear optimisation farm group model, representing the German farm sector, is used (Jacobs, 1998; Bertelsmeier, 2004; Kleinhanss et al. 2003). Four hundred and thirty

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rather homogeneous farm groups are based on INLB. Scenarios are defined for 2010, assuming full implementation of policy measures. A projection of Agenda 2000 is used as reference. Therefore, we do not run the model for the phasing-in period.

Impacts on beef production

The strongest adjustment reactions are predicted for beef production, although no specific price-policy measures were introduced (figure 9.10). Bull fattening and suckler cow holding, previously favoured by high production-related premiums, will be reduced under a decoupling scheme. Bull fattening will be reduced by 26% on average, whereby the adjustments in the north and south will be below average. The number of suckler cows will decrease by about 20%, with adjustments in the north and the centre being more significant than in other regions.[1] Beef production will be stabilised by the constant supply of cow meat as well as the expansion of heifer fattening, which is why the relative change is less pronounced (-14%) than for bull meat. Adjustment reactions occur although a rather favourable development of beef prices is assumed.

   In conclusion, the scope and allocation of production will be significantly influenced by decoupling as long there is total decoupling. The type of decoupling, i.e. the SP scheme or the Kombimodel, will not result in significantly different allocation effects.
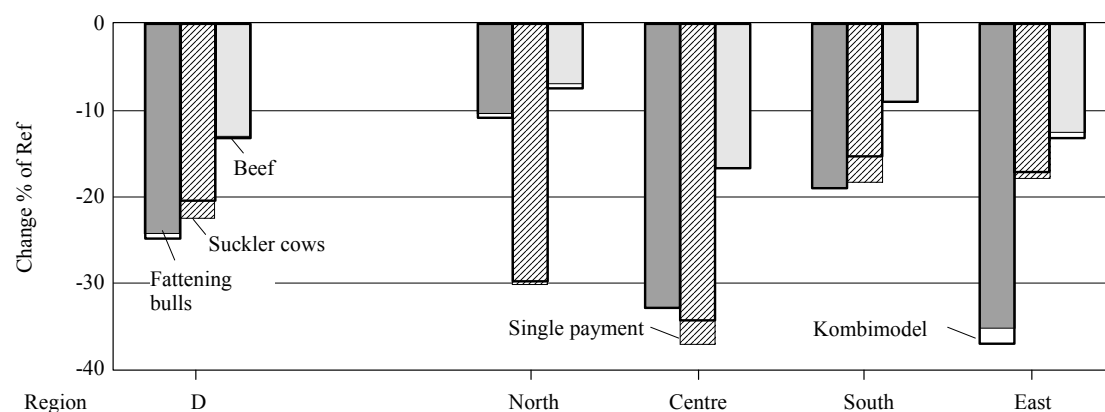
Figure 9.10   Change of beef production - different decoupling schemes
Source: Own calculation based of BMVEL-INLB.

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[1] If agri-environmental measures with a minimum cattle density are applied, suckler cow holdings could be stabilised (agri-environmental measures are not specified in the model). The compensatory allowance for less favoured areas, considered in the model as area premium, has no obvious effect on suckler cow production.

Impact on income and income distribution

The two schemes will have different impacts on incomes. The net-value added at factor costs (NWSF) is used as an income indicator. On average, there will be a small increase in income of 1% for the SP, while income will not change at all for the *Kombimodel*.[1]

Impacts on income distribution can only be identified on a disaggregated level. Figure 9.11 shows income changes in farms with dairy cows, differentiated by the number of cows and regions:
- under the SP scheme, there will be a slight increase in income for small farms (in the west) due to higher beef prices, and a decrease in incomes for farmers operating in the east, due mainly to modulation;
- as a result of the *Kombimodel,* positive income effects can be expected for small farms (in the west) due mainly to higher beef prices, but there will be an increase in income loss the larger the farm (number of cows) and the greater the production intensity (milk production per hectare of roughage area).
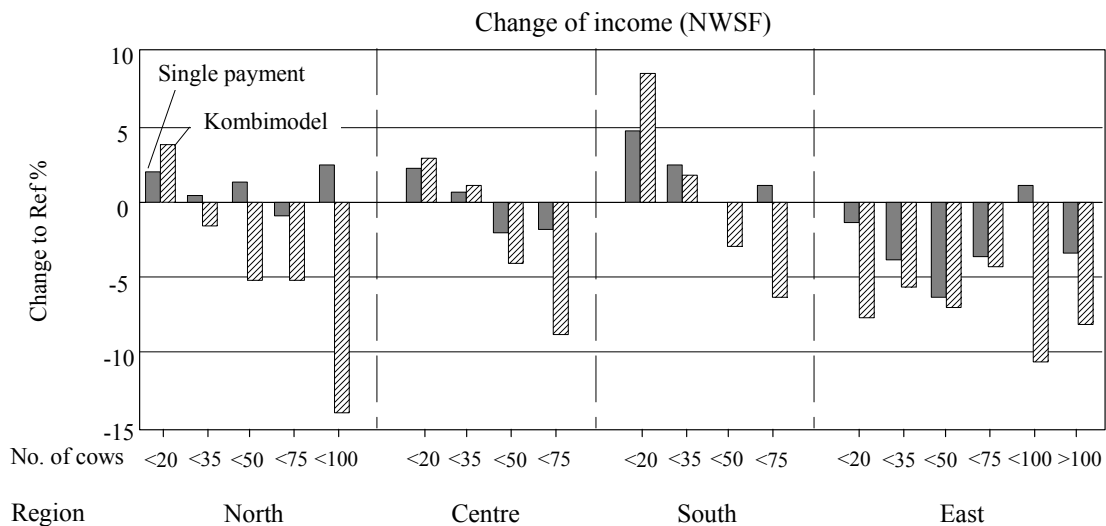
Figure 9.11   MTR impacts in farms with dairy cows (milk price -15% including quota trade
Source: FARMIS, Kleinhanß/Hüttel FAL-BW.

Income effects for farms with beef fattening are shown in figure 9.12. Under the SP scheme, income increases in livestock density are primarily a result of an increase in beef prices and because of necessary farm adjustments. Should the number of beef cattle be reduced, this will not affect the premium level.

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[1] The slightly lower income level is mainly influenced by the fact that entitlements for the *Kombimodel* are derived from a statistical data base on payments, while INLB data are not consistent with this data base.
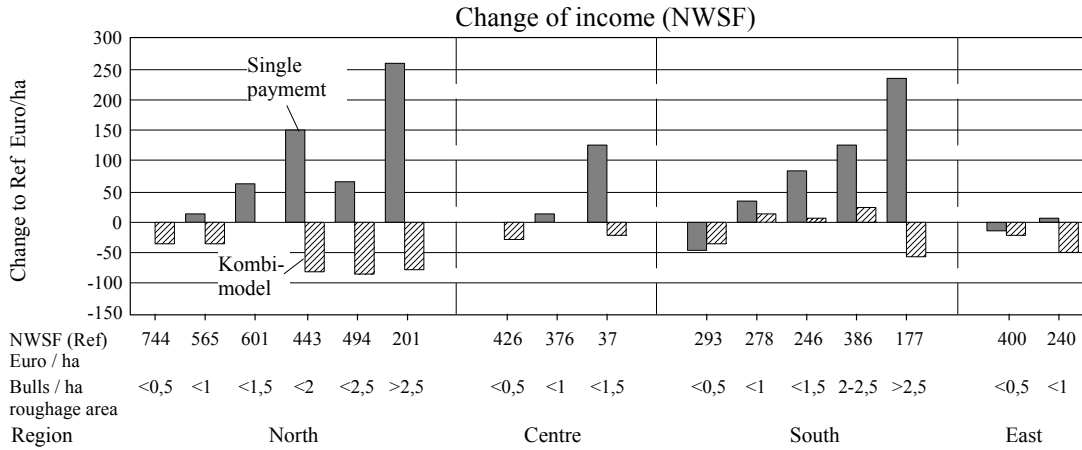
Figure 9.12   Income effects in farms with fattening bull (>10 Bulls, milk price -15%)
Source: FARMIS, own calculations on base of INLB.

Under the *Kombimodel*, premium reductions are so high that the above-mentioned income effects are not only neutralised, but are sometimes even higher. This means that negative income effects remain in farms with a high beef production density.

In addition to changes in direct payments, income effects will also be influenced by beef and calf prices.

Impacts on rental values for milk quota and land

Price policy measures and decoupling will also affect values of land and quota. As such, the farm group model has been extended to deal with quota trade and renting in or out of land with or without transmission of entitlements (Bertelsmeier, 2004).
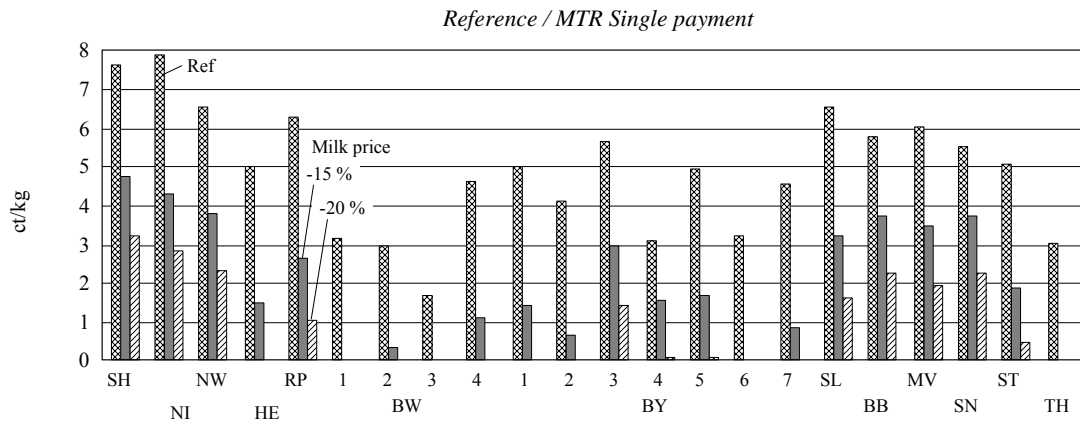
Figure 9.13   Equilibrium prices of milk quota in German trade regions
Source: FARMIS, Kleinhanß/Hüttel FAL-BW.

Figure 9.13 shows that rental values for milk quotas will decrease by more than half due to the CAP reform. Changes of quota prices are mainly influenced by the level of lower milk prices under conditions of decoupled payments (which do not influence producer incentive prices). They are not influenced much by the type of decoupling.

Rental values for land will be influenced as follows (figure 9.14):

- under the SP scheme, rental prices will decrease for arable land and, to a lesser degree, grasslands;
- under the *Kombimodel*, rental prices for arable land will reach a high reference level. For grasslands, rental values will increase significantly in view of the fact that there is almost no land free of entitlements, and the premium level, especially for grasslands, is much higher than present rental prices.

It can be concluded that beef and dairy farms with above average level of production intensity will be affected the most. Income losses are so high, that investments and farm development might be negatively affected. This could be avoided by a scheme such as the Danish one, which is comparable to the first step of the German *Kombimodel*.
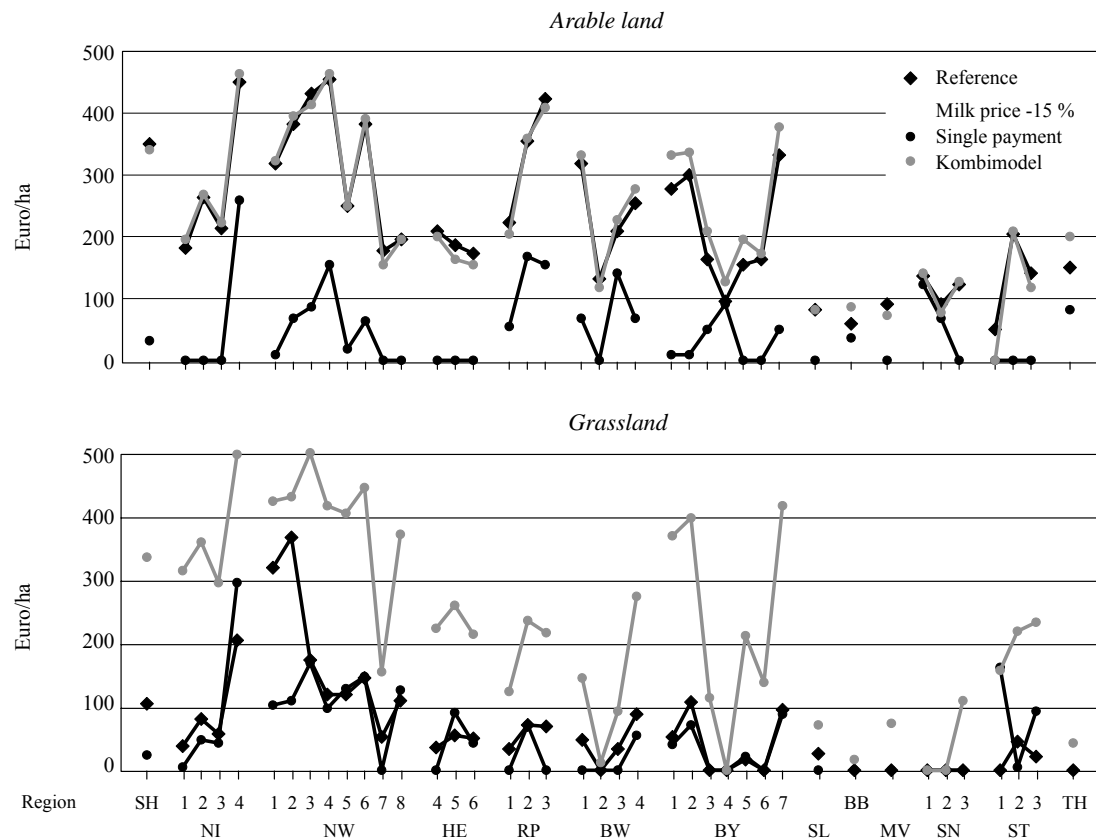
Figure 9.14   Impacts of decoupling on rental value of land at regional level
Source: FARMIS, Kleinhanß/Hüttel FAL-BW.

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9.5 Conclusions

- Individual farm (accounting) data is required for the analysis of farm income and distribution effects of policy reforms. Data is not valid for other income sources (off-farm income, social transfers), which have become more important due to structural changes and economic developments.
- Different methods are required to deal with these questions. Disaggregated farm models, embedded in a network of micro and macro models, are needed to assess the impact of drastic policy changes, such as total decoupling, or the distribution effects of policy intervention, such as capping the premia within modulation or the implementation of decoupled payments as in Germany.
- As economic conditions change, farmers are able to adapt the organisation of the farm. Nevertheless, there are restrictions in farm adaptation, so that negative economic effects could remain. This is especially true for radical policy changes in the short term.

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10. An analysis of the impact of decoupling - using Irish FADN data[1,2]

By Thia Hennessy [3]

Summary

This paper describes analysis that was conducted on Irish FADN data to assess the effect of the Medium Term Review of the Luxembourg Agreement on farm activity and incomes in Ireland and to project the farm-level adjustments that are likely to occur as a result of decoupling.[4] Prices of inputs and outputs following the policy change are obtained from a dynamic partial equilibrium model of the agricultural sector. Linear Programming is used to calculate the maximum profit on farms post decoupling. Labour allocation on farms is estimated using econometric models. Exit from dairy production and reallocation of quota is also estimated exogenously. Results on the future number of full-time and part-time farms under the decoupling scenario versus the baseline are presented. The change in farm income in the baseline versus decoupling are also reported.

10.1   Introduction

This paper describes analysis that was conducted to assess the effect of the implementation of the Medium Term Review of the CAP as agreed in Luxembourg in June 2003. Specific objectives were to examine the effect of the agreement on farm incomes in Ireland and to project the farm level adjustments that are likely to occur in response to the decoupling of direct payments from production.

   The farm level models described in this paper are part of a larger modelling system used for policy analysis that is operated by the FAPRI-Ireland Partnership.[5] The FAPRI-Ireland Partnership operates a set of individual econometrically estimated commodity models, e.g. beef, dairy, sheep, pigs and cereals that are linked and solved simultaneously under different policy scenarios as well as a baseline, i.e. a no policy change scenario. These aggregate models project the potential impact over a ten-year period of a policy scenario on Irish agricultural markets and consequentially on input and output prices. The consequences of the projections of output and input prices at the farm level are examined using a number of modelling tech-

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[1] This work has benefited from the input of Mr. James Breen and Dr. Paul Kelly of Teagasc and Dr. Tahir Rehman of the University of Reading. Any errors or omissions are the sole responsibility of the author.

[2] Futher information on this research project is available from www.tnet.teagasc.ie/fapri

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[4] Farm Accountancy Data Network.

[5] The FAPRI-Ireland Partnership is a joint venture between Teagasc, the Irish Universities, other groups in Ireland, and the Food and Agriculture Policy Research Institute (FAPRI) in the USA.

niques, including budgetary modelling, linear programming (LP) and econometric modelling. The FAPRI-Ireland Partnership has produced analysis of policy reforms for a number of years at the aggregate level (Binfield et al.) and the farm level (Hennessy). This paper focuses on the analysis conducted at the farm level only and for expositional purposes discusses the application of the farm level models to the analysis of decoupling.

10.2 Data

The analysis was conducted using Ireland's National Farm Survey (NFS) data for the year 2000.[1] The dataset employed represented dairy, cattle and sheep farms. It includes 1,040 observations that are weighted to represent 117,243 farms, which represent about 95 per cent of the farming population in Ireland in the year 2000.

Data on resources such as land, labour, animal numbers and crops planted are available for each farm as are financial data on prices received, quantity and cost of inputs along with the value of overhead costs and demographic data such as the farmer and spouse's age, employment and marital status. The total dataset includes 162 variables for each observation.

10.3 Method

The analytical process used to estimate the farm level effects of policy changes begins by initially estimating the effect of the projected prices, costs and policy changes from the aggregate models on the profitability of the various enterprises operated on each farm in the base year. Once the effect on farm profitability has been examined in a static sense, the likely response of each farmer to the changing profitability is simulated. The micro economic adjustments that are simulated include labour allocation between agriculture and other employment, exit from dairy production, switches in farm enterprise specialisation and the decision to become a 'sofa farmer', i.e. completely destock the land and retain it only to activate the Single Farm Payment. The process of simulating farmer behaviour uses a number of techniques and follows seven main stages as demonstrated in a schematic outline in figure 10.1.

Stage 1: Taking Projections from Aggregate Models
The first stage of the simulation process takes projections of the main commodity prices and input costs from the aggregate econometric models in the FAPRI-Ireland Partnership. These projections, as detailed in Binfield et al. (2003), are then applied to each of the 1,040 observations. At this stage a budgetary model can be applied to show the effect of the new policy on income in a static sense, i.e. if the farmer does not change the farm plan.

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[1] The year 2000 was chosen as 2001 was an atypical year due to the de-stocking of a number of farms as a consequence of the Foot and Mouth outbreak. Data for 2002 was not available at the time of publication.

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┌─────────────────────────────────────────────┐
│ Stage 1:  Take projections from aggregate    │
│ models and apply to farm data level data     │
└─────────────────────────────────────────────┘
                      │
                      ▼
      ┌───────────────────────────────────────┐
      │ Stage 2: Estimate Single Farm Payment  │
      └───────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────────────────────┐
│ Stage 3: Estimate maximum income for each farm using         │
│ multi-period LP model                                        │
└─────────────────────────────────────────────────────────────┘
        │                    │                    │
        ▼                    ▼                    ▼
┌──────────────────┐ ┌──────────────────┐ ┌──────────────────┐
│ Stage 4:  Model  │ │ Stage 5:  Model  │ │ Stage 6:  Model  │
│ decision to      │ │ decision to      │ │ allocation of    │
│ produce or be    │ │ switch           │ │ labour           │
│ 'sofa farmer'    │ │ enterprises      │ │                  │
└──────────────────┘ └──────────────────┘ └──────────────────┘
        │                    │                    │
        ▼                    ▼                    ▼
┌─────────────────────────────────────────────────────────────┐
│ Stage 7: Re-estimate farmer behaviour with flexibility       │
│ constraints in the LP model                                  │
└─────────────────────────────────────────────────────────────┘
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Figure 10.1   Schematic Outline of the Modelling System

Stage 2: Estimating the Single Farm Payment (SFP)

In Ireland, all historical direct payments will be decoupled from production from 2005. An individual farmer's decoupled payment will be based on the number of premium claims made in a historical reference period and will be paid across all the acres farmed in the reference period. It will be paid in a lump sum payment known as the SFP. To activate the full SFP, the farmer must farm the same amount of area as previously but need not produce any 'tangible' agricultural products as long as the farm is maintained in good agricultural condition, some may refer to this as the production of a public good. Stage 2 of the analysis involves estimating each farmer's SFP based on the premia claims recorded by the NFS.

Stage 3: Estimating the Maximum Farm Income

Stage 3 involves estimating the highest possible income for each farm in the dataset using a multi-period profit maximising LP model for each of the 1,040 farms. This estimate of farm income is needed as an input into the other models. With this model, net farm profit is maximised subject to the quantity of land and labour available to each farm, the policy constraints associated with 'cross compliance' and the observed levels of technical ability. Using this model, the most profitable farm plan is identified and the associated level of income is calculated.

LP models have attracted criticism because of their normative nature. Morton (1951) claimed that one of the major weaknesses of LP is that it does not enable one to forecast what will happen or to estimate the parameters of economic behaviour; it is only concerned with what to do in order to achieve specified objectives optimally. Profit maximising LP models are not the most appropriate way to model complex decisions such as labour allocation, enterprise choice or the decision to exit farming. To model such decisions effectively it would be necessary to re-estimate the objective function to reflect each farmer's individual utility function. Or alternatively, make the LP models more 'positive' through other means.

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Day (1963) contended that farmers are averse to making large and sudden changes to their production practices and so he proposed the use of flexibility constraints that would limit the variation in each activity. Here the idea of Day's flexibility constraints is extended. The resources in the farm model, particularly labour and milk quota, are not allocated through the LP model based on profit maximisation, instead they are modelled exogenously in econometric models. However before this can be done, it is first necessary to run the LP model to estimate the maximum possible income levels associated with a particular farm in a given policy scenario. The maximum farm income as calculated by the LP model is used as *the opportunity cost of not farming*. The income figure is used as a measure of the return to labour in the model of labour allocation decisions and as the return to milk quota in the modelling of dairy farmer's decision to exit milk production.

Stage 4: Simulate the decision to produce

In a coupled situation, the return to production is composed of the market based net margin plus the direct payment post decoupling, the return to production will only be the market return as the direct payments will be paid regardless. Bearing this in mind, many believe there will be significant reductions in total production post decoupling as producers that previously returned a negative market based net margin will cease production. However, on closer examination of farm data and the details of the Luxembourg Agreement, this may not be the case. To activate the full Single Farm Payment, farmers must retain all of their land and maintain it in good agricultural and environmental condition. This is likely to result in some compliance costs and will mean even the 'sofa farming' option will attract costs. Furthermore, farmers will still incur the majority of their overhead costs regardless of their production decision, interest repayments on loans, depreciation of land and machinery and the bulk of electricity and car costs apply regardless of production. Therefore even if a farmer chooses to produce nothing, he will still incur the majority of the overhead costs and he will still have to retain all of this land.

Clearly, farmers engage in production for non-economic as well economic incentives hence the existence of loss making hobby type farmers. Ideally the decision to engage in production post decoupling should be modelled in some form of utility maximising model. However, in the absence of verifiable empirical data regarding the non-economic incentives to produce this model is based on the economic factors only. It was assumed in this study that any farmer that could return a positive market based gross, rather than net, margin for any enterprise post decoupling, that such a farmer would still engage in production. In other words only those making a negative market based gross margin would become 'sofa-farmers'.

Stage 5: Simulate the decision to exit dairying

The decision to switch enterprise specialisation and the reallocation of milk quota from exiting farmers are also modelled outside the LP framework. The focus is on the decision to sell milk quota, cease dairy farming and enter livestock farming. Traditionally there has been a very low incidence of cattle farmers switching into dairy farmers mostly due to the prohibitively high start up cost of acquiring quota and building milking facilities. Hence the switch in enterprise specialisation into dairy farming is ignored in the model.

The estimation of exit from dairying is based on a profitability analysis. Anecdotal evidence suggests that dairy farmers cease milk production mostly for personal reasons, such as

retirement and lack of a successor, and sometimes for economic reasons. In the absence of verifiable empirical data on these personal reasons, we have assumed that the propensity to cease milk production is *solely* dependent on profitability. Historical levels of profitability and the rate of exit from dairying are examined to identify a minimum level of profitability below which exit has occurred historically. Maximum dairy enterprise income is projected for each farm using the LP model as outlined in Stage 3. Producers operating below the minimum level of profitability are projected to exit production.

Milk quota transfer in Ireland is operated through an administered system. All producers that have leased out their quota for three years or more are required to sell it into a central restructuring pool at an administratively determined price. Sale of quota from the restructuring scheme is operated on a priority basis, where priority is determined by quota size, with top priority going to producers with a quota of less than 157,000 liters. It is assumed that if producers cease milk production, their milk quota will enter the milk quota restructuring scheme and be reallocated according to the priority system. The reallocation of quota in Ireland is spatially ring-fenced and co-operative based. This means that quota belonging to an exiting farmer from North Eastern part of the country, for example, cannot be reallocated to producer in the South. While these regulations are difficult to account for in a national study such as this one, we have endeavoured to allow for regional ring-fencing. Each farm in the NFS has a regional code, in this study it has been assumed that quota belonging to exiting producers can only be reallocated to other producers in the same region.[1] While the regional representivity of farms in the NFS may be questionable and may not lend itself to accurate regional analysis, it is assumed here that the regional codes are sufficiently representative for this exercise. Maximum farm income for farms that have purchased milk quota is re-estimated.

In our analysis similar restructuring prices to those operating at present are assumed to prevail. The future allocation of restructured milk is assumed to follow a similar pattern to 2002. In 2002, 50 per cent of the milk that entered the restructuring scheme was allocated to the first priority group, i.e. those with quotas less than 44,500 (202,300 litres) gallons, 35 per cent of the quota was allocated to the second group, those between 44,500 and 66,000 gallons (300,041 litres) and the last 15 per cent was allocated to those exceeding 66,000 gallons. Within the model it is assumed that farmers who sell their milk quota will continue to farm some other farm enterprise. The allocation of their labour is modelled using the labour model described above and once the level of farm labour is identified then the farm plan and income can be estimated.

Stage 6: Model the allocation of Labour
The allocation of farm labour is econometrically estimated. Using the agricultural household model framework, two econometric models are used to explain the farmers' allocation of time given their individual utility function. The first model is the participation model which explains the factors affecting the decision to work off-farm or not. As this is a binary decision this is modelled using a logit function. Historic data are used to identify which factors influence the participation decision.

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[1] Regional classifications are based on the NUTS (Nomenclature of Territorial Units) classifications used by Eurostat. A full explanation of NUTS codes are available from the CSO, www.cso.ie

The logit model is of the general form:

Logit $(p) = \log(p/(1-p)) = \alpha + \beta_1 X_1$

The second model is a labour supply model. The number of hours spent working off the farm for those involved in off-farm employment, i.e. where $p>0.5$, as estimated in the participation model, is estimated. A standard OLS model is run to examine the factors that influence the number of hours spent working off the farm. Such studies of labour allocation have been frequently applied and many extensions to the model described above have been developed. Many studies have estimated the probability of working off farm simultaneously with the spouse's decision to work off-farm. Many have tested and corrected for sample selection bias, between those self-selecting into the first model and those being modelled in the second, see for example Huffman and Lange, 1989; Gould and Saupe, 1989; Lass and Gempesaw, 1992).

As decoupling is an unprecedented change to policy, it is not possible to quantify the historical relationships between decoupled payments and labour allocation. Within the agricultural household model framework, decoupling is a non-labour income. If a suitable proxy variable could be found for exogenous household income then the historical relationship between that variable and labour allocation could be considered representative. However, the identification of such a variable is problematic. Although the decoupled payment is non-labour income, it is still land based and the farmer has to retain land in 'good agricultural condition' to activate the payment, therefore a variable measuring for example returns to off-farm investment could not be considered comparable. One potentially suitable variable is headage premium; this is a land based payment but has been decoupled from production since 2001. However the problem with this variable is that it is only payable to farmers in less favoured areas and therefore there will be zero payments recorded for some farms, and the distribution of such payments could not be considered random. Another potential variable and probably a more appropriate one is REPS payments. Payments made through the Rural Environmental Scheme are land based but are not dependent on production. Although not all farmers receive REPS payments, all farmers are free to participate in the REPS scheme if they wish. Of the 902 observations, 212 farms received REPS payments in 2002, approximately 25 per cent. The average payment on participating farms was approximately €4,600. Table 6.1 shows the average for the whole sample.

The factors significantly affecting the labour participation and supply decisions are similar to those identified in previous studies. Participation is significantly negatively influenced by family farm income and the number of livestock units but both at a declining rate. The system is significant with dairy farmers being 26 per cent less likely to take an off-farm job. The farmers' age positively influence the participation decision but also at a declining rate. Surprisingly, the local rate of unemployment, the size of the farm in hectares and the spouse's off-farm job status did not significantly affect the participation decision. Unfortunately, the t-statistic implied that the REPS variable was not significant.

The projection of the future allocation of farm labour is made using the parameters from the econometric models along with projections for the significant explanatory variables. The projection for family farm income emanates from the LP model estimated in stage 3. The outcome of the econometric model determines the availability of labour to the farm when the

final farm plan and income are estimated. Information about labour allocation feeds into Stage 7 of the analysis.

Stage 7: Estimate Farm Behaviour
The final stage of the analysis involves the estimation of farmer behaviour or adjustment in response to policy change. A revised level of farm labour and milk quota is estimated for each farm using the labour model and the dairy profitability analysis. Once labour and quota has been allocated and the decision to produce has been simulated, then it is assumed that farmers are profit maximisers and will allocate their farm labour, land and other resources to the most profitable activity. Within the policy proposals on decoupling, farmers are required to retain their land in order to activate their decoupled payment. Therefore we have assumed that farmers will allocate their labour in a utility maximising manner but that if they have to retain their land they will allocate it in a profit maximising manner within the constraints of their labour. A new LP model is re-estimated with the new levels of labour and quota and a new farm plan and income is estimated.

10.4   Results

The full results from this model are available from Breen and Hennessy (2003a,b). Here some example results will be presented. Figure 10.2 presents the percentage of national milk quota projected to enter the restructuring scheme over the next ten years. The 'baseline' scenario is where Agenda 2000 continues, the milk quota is unchanged, and there are no new trade agreements. The 'scenario' is where the maximum amount of decoupling that is provided for in the Agreement is done; i.e. no payments are left coupled where there is an option to do this. The quantity of quota entering the restructuring scheme is projected to be approximately 2 per cent per annum in the baseline throughout the projection period. The quantity projected under the scenario is much higher due to the declining profitability of dairy farming. From 2004 onwards, compensation proposed under the Luxembourg Agreement is decoupled from production and therefore is not considered in the profitability analysis. Any dairy farmer
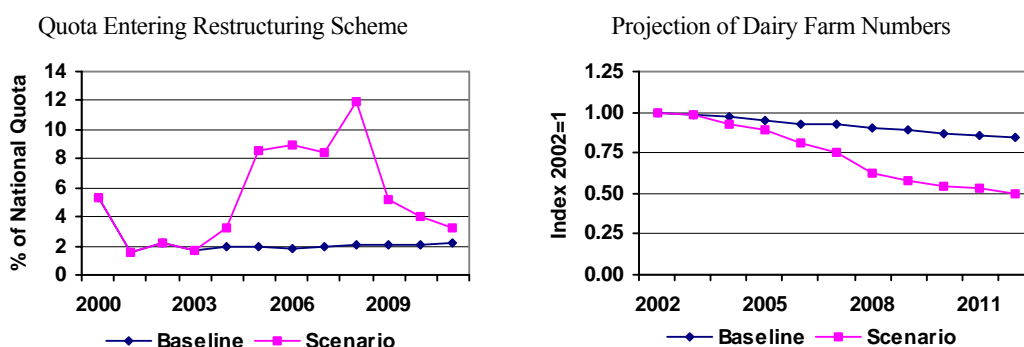
Quota Entering Restructuring Scheme   Projection of Dairy Farm Numbers

Figure 10.2   Projections of Restructured Quota and Changes in Supplier Numbers
Source: FAPRI-Ireland Farm-Level Model (2003).

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exiting production in 2005 will still receive the decoupled payment. This provides the incentive for many farmers to cease production, thereby increasing the quantity of milk quota available for restructuring from 2005 to 2008. From 2008 onwards the amount of 'restructured' milk returns to historical levels.

Figure 10.2 also shows projections of dairy supplier numbers in the baseline versus the scenario. In the baseline, approximately 2 per cent of farmers are projected to exit production each year. This results in a 15 per cent decline in dairy suppliers over the projection period. The decline is greater following the Luxembourg Agreement. Farm supplier numbers are projected to be 35 percentage points lower in 2012 following the Luxembourg Agreement than under the baseline. Data from the Department of Agriculture and Food, there were approximately 28,000 dairy farmers in 2001, the projected number of dairy farms in 2012 under the baseline is 23,000 compared to just 15,000 in the scenario. A decrease in farm numbers results in an increase in the average quota per farm for the remaining farms from 46,000 gallons (209,120 litres) in 2004 to just over 70,000 gallons (318,226 litres) in 2012 under the scenario compared to just over 50,000 gallons (227,304 litres) in the baseline.

Figure 10.3 presents projections of the percentage of cattle farmers working off-farm. Under the baseline, the number of 'part-time' cattle farmers is projected to increase by 5 to 10 percentage points. The projected increase under the scenario is more significant. More farmers are likely to work off-farm under the scenario as the returns to farm labour declines considerably relative to the returns to off farm labour. By 2012, the proportion of part-time cattle farmers is projected to increase to 60 per cent, that is approximately 10 per cent more than the baseline.

The results of the labour allocation model suggest that, despite the deterioration in returns to farm labour relative to off farm labour, a complete shift to part-time cattle farming will not occur because of the farmer age structure. Although, retirement and succession is occurring during the projection period, the number of farmers aged 60 and over increases from 23 per cent in 2002 to over 30 per cent in 2012. While the historical data shows that farmers are unlikely to work off-farm when they are aged 60 or over, it also shows that they are unlikely to retire from farming at the age of 60 Farmers can work to an older age on the farm than off it and therefore, the presence of these 'retirement farmers' poses an impediment to rapid increases in part-time farming.
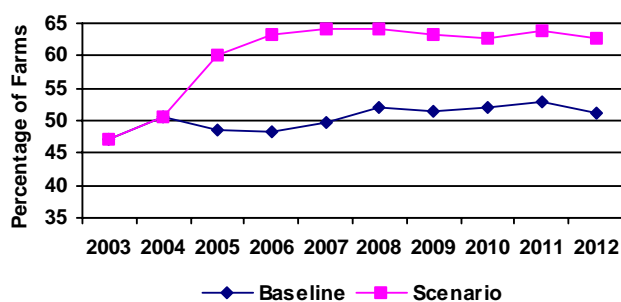

Figure 10.3   Projections of Participation of Cattle Farmers in Off-farm Employment
Source: FAPRI-Ireland Farm-Level Model (2003).

Figure 10.4 presents projections of the number of cattle farmers that choose the 'sofa farming' route. The vast majority of cattle farmers should be able to operate at least one enterprise at a gross profit post decoupling, given their current levels of efficiency and the projected changes in prices and costs. Only a minority, 10 per cent, will find the sofa farming route the most profitable option.
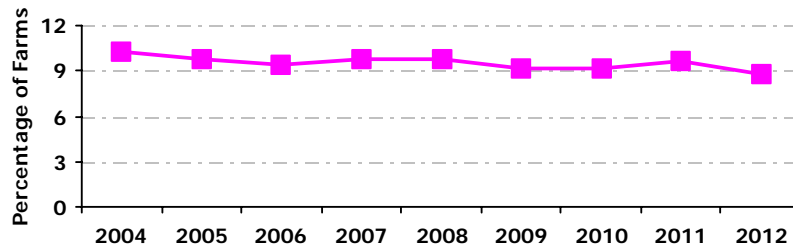

Figure 10.4   Projections of 'Sofa' Cattle Farmers
Source: FAPRI-Ireland Farm-Level Model (2003).

During the projection period cattle prices are expected to improve and intuitively we would expect that the number of sofa farmers would decline as more farmers would find production more profitable.[1] However, increasing costs of production negates most of the price increases leaving the number of sofa farmers relatively static throughout the projection period.

The farm level modelling system can also show the number of farmers that benefit financially from such a policy choice. Figure 10.5 shows the income effects of decoupling on Irish cattle farms.

In 2004, 25 per cent of full-time cattle farmers have lower incomes under the Luxembourg Agreement than the baseline. The majority of farmers that have lower incomes are those that are specialising in calf production and those that have not yet maximised their premium claim. While total direct payment receipts on these farms are unchanged in the baseline versus the scenario, the market margin is falling. Calf prices are projected to be 15 per cent lower in the scenario in 2004 than in the baseline. For those that have not yet maximised their premium claim, there is some opportunity to increase income in the baseline through this option but not in the scenario. By 2012 the proportion of farmers worse off due to decoupling has increased to one third. This is mainly due to modulation. The market margin for cattle production is due to rise so the income decrease can only be explained by the loss of direct payments through the modulation scheme. Nevertheless, the majority of cattle farmers benefit from decoupling even when modulation has been considered. The farmers that are 50 per cent better off or more are typically very small farms with income of €5,000 or less, or farms that were making a significant market loss. For those making significant market losses, the sofa farming route is usually the most profitable.

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[1] Projections of commodity prices are available from Binfield et al. (2003). Cattle prices are expected to increase later in the projection period as the volume of production is expected to decline in the long-term after an initial increase in slaughtering.
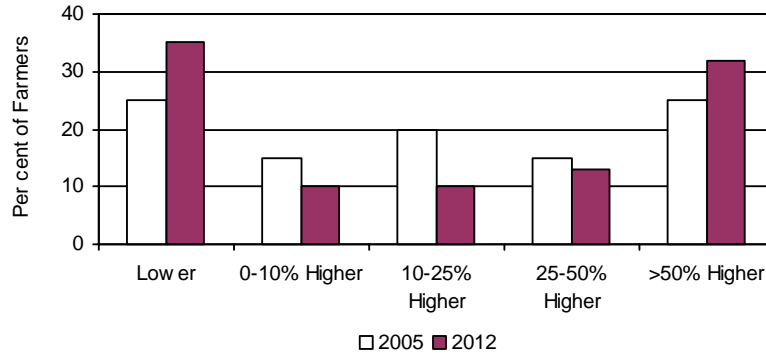
Figure 10.5   Income Effects Due to Decoupling on Full-time Cattle Farms
Source: FAPRI-Ireland Farm-Level Model (2003).

10.5   Discussion

This paper describes a modelling system which was developed to show the effects at the farm level of a policy change. While the model has been successful and has informed the policy debate in Ireland for a number of years, like all models continued development is required.

There are a number of weaknesses that need to be addressed. There is scope for major improvement in the modelling of when and why farmers cease farming, (exit). Exit from dairy production is currently specified as a function of profit in the dairy model. Such an assumption attracts all the criticisms associated with normative studies. In the absence of any further empirical data on the exit decision, it is difficult to foresee how this element of the model can be improved. Furthermore, the issue of exiting from farming altogether has been ignored in the system. Appropriate methods of modelling the exit decision need to be explored.

The decision to produce post decoupling has been modelled purely from a pecuniary perspective. There are reasons to believe that loss making enterprises may still be continued post-decoupling. This modelling system needs to be developed to account for this. A separate model of retirement and succession has been developed. This model estimates the probability of a farm being continued on a full or part-time basis or not at all when the current farmer retires. It is proposed to link this model to the modelling system described here to get a more holistic view of policy's effect on structural change.

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11. Using data for policymaking on indicators of wellbeing

By Berkeley Hill [1]

The three papers in this session illustrate ways in which data on farm household incomes can be used in different situations to throw light onto policy-relevant issues. Without using a household approach (in contract to a farm-only approach or one based on sector production) the analysis would have been less satisfactory and potentially misleading. The studies confirm the validity of concentrating on the household-farm as the basic unit in such work.

A particular feature is of the paper from Switzerland is the relevance of the choice of income indicator (cash flow rather than accounting income) to the outcome of assessing the income situation of farmers. A general lesson is the need to match indicators, built on sound concepts, to the policy problem in hand, something underlined by Bonnen in his work on information system (in AAEA 1972 and Bonnen 1975 to 1990).

There is an inherent tendency among analysts, pressed for time, to make use of whatever indicators can be found, even if they are not particularly appropriate. A prime example in the EU is the prominence given to the indicators of residual reward from agricultural activity when discussing the evolving economic situation in the farming industry (the aggregate measures derived from the Economic Accounts for Agriculture and, from FADN/RICA, Farm Net Value Added and Family Farm Income). These have often been used to imply what has been happening to the living standards of farmers, which of course they are incapable of doing when so many agricultural households have other sources of income. The issue of what is the appropriate indicator for policy purposes can be traced back at least to Peterson (1933) and has gathered momentum in the 1990s (see, for example, Hill 2000).

If the indicator is to relate to the well-being of the agricultural household, this implies a very wide coverage, as well-being is a function of both economic and non-economic factors (including the ability to control one's own environment, social interaction, political freedom, etc.). Often statisticians concentrate on the economic elements that contribute to welfare, simplified into the resources flowing towards households and their stock of assets that, together, provide a potential command over goods and services. Cecora (1986) has mapped all these, demonstrating the need to take into consideration not only monetary flows but also income in kind provided by capital and labour, gifts, and so on. Measurement is possible at various points in the process (such as income or expenditure) and with various degrees of completeness (for example, own-production of food might be ignored).

The nature of the household has also to be considered. Socio-economic factors (demographics, households composition and size) are important in affecting the well-being of the household in relation to the resources it commands. The papers in this session draw attention to the significance of such information when using household-level data in ex ante or ex post policy analysis exercises.

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Even if coverage is restricted to the items conventionally included in drawing up accounts of personal income for agricultural households (money income plus some important capital services, such as the imputed rental value of owner-occupied housing), there are circumstances in which only subsets of items should be taken. For example, if the problem is the short-term ability to buy consumer goods, cash flow might be an appropriate indicator. However, if the interest is in the lifetime rewards to farm families, it would me more appropriate to move to a measure that not only deducted capital consumption but that also included capital gains. The length of the period under consideration is critical in the choice of indicator, as is also whether the view is an ex ante or ex post. The European Commission has encouraged thinking on the choice of indicators for different circumstances (see Hill, 1991).

In discussions about indicators concepts appropriate to sector accounting are sometimes set up against similar concepts in microeconomic accounting as if one version is inherently superior to the other. This is misguided. Concepts of aggregate net disposable income (as used in Eurostat's Income of the Agricultural Household Sector statistics) are based in the System of National Accounts (SNA93) and contain elements that are necessary to describe the flows from the households sector to other institutional sectors. An example is when donations by households to charities are considered a negative item in the estimation of disposable income. However, a microeconomic approach would normally see such donations as something typically made from disposable income, not an element in its calculation. Empirical evidence (e.g. for Ireland) can show that the importance of such macro/micro differences can easily be overstated. Furthermore, given adequate information on the items in the database, disparities can be minimised by judicious adjustments.

Another critical element in the use of indicators, encountered in each of the papers in this session, is the group of households to which it applies. Other discussions in this workshop have drawn attention to the debate on the nature of the agricultural household with, at one end, a broad coverage that encompasses all households that are engaged in at least some minimal amount of agricultural activity (which might be what separates hobby gardening from production for financial reward or subsistence) to, at the other, some highly selective 'narrow' coverages that include only those producers that are target groups for agricultural policy. The typology developed for the US by the ERS is a prime example of detailed disaggregation of the 'broad' approach, whereas Eurostat's preference for a single 'narrow' definition comprising households where farming is the main source of income of the head of household is a pragmatic response that reflects National Accounting guidelines. Again, the choice of 'broad' or 'narrow' coverage (of which there will be many varieties) cannot be separated from the purpose to which the indicator is to be put. Much confusion is created when coverages are used inappropriately or where a particular coverage is employed simply because statistics exist on this basis.

Empirical evidence shows that a 'broad' coverage (as used in the USA and available for some years for selected EU Member States (see Eurostat 2002) will produce a picture in which non-farm income is much more important to agricultural households than if a 'narrower' coverage is adopted. But even among the 'narrow' estimates that basis of selection can have a substantial impact on the number of households deemed to be agricultural and on their income composition (see, for example, the alternatives explored for Ireland in Eurostat, 2002). Income fluctuations can have a similar impact if classification is carried out annually,

and the methodology of Eurostat's IAHS statistics encourages the use of devices (such as classifying on the basis of income averaging over three years) to reduce this problem.

The enlargement of the EU to include agricultural structures that are very different from the traditional family farm model of the existing Members will challenge conventional coverages. In particular, people who are employees on large-scale units would not normally be covered by indicators for agricultural households as they are not farmers in the sense of being self-employed. Yet they exist in substantial numbers and are usually thought of within their countries as a target group for agricultural policy. Eurostat has made proposals for how the households of such workers may be accounted for, but further debate is needed.

Then there is the issue of basic data by which indicators can be generated. Ideally researchers and statisticians should have access to datasets that are comprehensive and that can be used in a flexible manner to create the different indicators required by different circumstances. The three papers in this section report situations where farm household-level data are available. However, a glance at recent OECD reports on agricultural household income (summarised in OECD, 2002) suggests that, at microeconomic level, the list of countries that are reasonably well provided with basic data on the incomes of their agricultural households is only a little better than was found by Slattery in 1966 when an attempt was made to compare the relative income situation of farm households. True, some advances have been made (for example, Ireland and Italy), but the fact remains that many EU countries are currently very poorly provided with data sources on their agricultural households. For example, at present neither France nor the UK can describe satisfactorily the distribution of incomes of their farm households. Though Eurostat has encouraged the development of a microeconomic extension of its IAHS statistics to complement and expand the usefulness of sector-level results, this has not been taken up because of the lack of data in many Member States.

Given that indicators relating to the income situation of agricultural households are generally seen now as being of importance, how is it that they have received so little attention from statisticians in the past? Why in the US, where data have existed for a considerable time, has information which shows the advantageous income and wealth position of farmers as a group not made the substantial impact on domestic policy that might be expected? In the EU there seems to be a number of explanatory factors:

- politicians have not requested this information, perhaps because of a too-simple perception of the agricultural industry, or a fear of the electoral consequences of drawing attention to it;
- the fact that agricultural policy has operated apparently successfully for many years without such information;
- government departments for agriculture have taken a pro-farmer stance and would not wish to draw attention to anything that might lead to a reduction in support for the industry;
- the administration of income support systems has never required the data (though some tests of eligibility have been applied within individual structural schemes);
- in countries where it has not been conventional to ask questions on non-farm income, agencies that collect data have been reluctant to ask new questions about non-farm income.

From this list it is clear that tools of political economy are involved in explaining the lack of indicators (and the data necessary to generate them) for agricultural households and the lack of impact of the information they contain on policymaking. However, in the EU changes observed in both the nature of agricultural and rural policies and in the rhetoric coming from actors in the policymaking process (notably the European Commission) suggest that the possibility of filling data gaps is greater now than for many decades. The greater attention given in international meetings of policy analysts, farm business experts and statisticians to the household-firm suggests that the recognition of its importance will be permanent.

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12. Adjustment assistance for policy reform: a case study on the Australian dairy industry restructuring package

By David Harris [1]

12.1   Introduction

There have been a number of industry specific policy reforms in Australian agriculture over the past 10-15 years. Several reforms involved the liberalisation of trade policies such as border protection measures and market access conditions. In other cases there were reforms to domestic marketing arrangements that provided support for industry returns. Reforms were usually phased-in and announced with an implementation date that gave forewarning of changes.

WTO and bilateral trade commitments have been the key driver of several policy reforms in recent years. However, in some industries the impetus for reform was driven by domestic developments. For example, requests for assistance in response to low returns have often led to an investigation of the industry circumstances. In many cases the results of the investigation recommended a need for regulatory reforms to improve industry competitiveness.

Most of Australia's rural industries face continual adjustment pressures in responding to changes in world prices. Policy reform has been a significant source of additional adjustment pressures in several industries. The initial effect of reduced net returns and lower farm income is experienced across the entire industry. The adjustment pressures have often led to requests for government assistance to off-set the impact of the reform.

In some cases the Government response has largely relied on market forces in conjunction with general 'safety-net' assistance measures. In other cases, Government established industry specific adjustment programs. The assistance was transitory and often tied to the implementation of policy reform. Australia does not use longer term assistance measures such as income support payments.

Australian industry adjustment assistance has generally been concerned with two types of change. First, there have been programs to assist non-viable producers to either exit the industry or diversify into other agricultural activities. Second, there have been programs to improve producer competitiveness and adjust to lower market returns. Some industry adjustment packages have incorporated both types of programs.

12.2   Recent examples of Australian industry adjustment assistance

Recent examples of significant policy reforms in Australia have involved the dairy, sugar, citrus and pig meat industries. Each of these industries were experiencing adjustment pressures driven by changing market conditions before the reforms were implemented. The government

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response in each case has varied. Generally the response involved public inquiries into the circumstances surrounding the requests for assistance.

The Productivity Commission (PC) is often asked by the Federal Government to investigate industry requests for assistance. Typically a PC Inquiry will evaluate industry claims about a decline in financial performance. This will involve an economic analysis of the reasons for the decline in performance and the magnitude of the effects on producer returns and farm incomes.

PC Inquires provide an independent assessment of the need for government assistance. The case for assistance is examined in the context of cyclical behaviour in industry returns. For example, fluctuations in world prices or increased import competition may be part of the typical market environment and do not justify Government adjustment assistance. The final report will often include recommendations for policy reform.

The Commission in not required to design assistance programs but often makes recommendations on the type of assistance that may be appropriate. Requests for assistance by the citrus and pig meat industries were referred to the PC for evaluation. The sugar and dairy industries have also been subjected to various public investigations over the years. The inquiries use any available information on the industry structure and the financial performance of producers.

Assistance programs are usually developed by the relevant industry Department in consultation with Government. The Australian Bureau of Agricultural and Resource Economics (ABARE) conduct annual surveys of producer financial performance for selected major rural industries - beef, sheep dairy and cereals. The survey data is used as an input in evaluations of the need for assistance. For other industries the evaluation has to rely on other survey information or develop approximations of financial performance based on data for producer returns and the structural characteristics of farm units.

12.3   A case study - adjustment assistance for the Australian dairy industry

The most significant policy reform implemented in recent times involved the dairy industry. Adjustment assistance related to the elimination of all support arrangements affecting the supply and domestic pricing of milk. Deregulation was implemented over-night on 1 July 2000.

There had been considerable industry adjustment during the lead up to dairy deregulation (Harris, 2004). This adjustment primarily reflected fluctuations in producer returns due to global market developments. It also reflected a gradual reduction in price support for manufacturing milk which began in the mid-1980s.

The adjustment involved resource movements out of the industry and on-farm developments to improve producer competitiveness. Some of the livestock and land resources of those exiting the industry were purchased by those who remained in the industry. In other cases land was directed into other agricultural industries or purchased for non-agricultural uses.

Producers adjusted by increasing their scale of operations and improving farm productivity. Average herd sizes and milk output per farm increased considerably. Some farmers

increased their land base to accommodate a larger herd. In other cases the pasture base was developed to improve the productive capacity of the farm.

Restructuring assistance for dairy deregulation

By the late 1990's there was considerable pressure for further policy reform. Legislation for manufacturing milk price support was due to end in June 2000. All State Governments were reviewing their fluid milk regulations under the National Competition Policy (NCP) review process. The peak producer body developed a proposal to simultaneously end all regulations on 1 July 2000 in conjunction with adjustment assistance to manage the impact on producer incomes.

The Federal Government announced a AUD 1.8 billion industry restructuring package. The package was designed to provide transitional assistance to manage the initial impact on the financial performance of producers. It was funded by a levy of 11Ac/litre on domestic sales of fresh milk. There were three programs:
- the AUD 1.63 billion Dairy Structural Adjustment Program (DSAP) which provided direct assistance to all producers;
- a voluntary Dairy Exit Program (DEP) to assist farmers exiting the industry; and
- Dairy Regional Adjustment Program to manage the impact on dairy communities.

The DSAP component of the restructuring package was developed by the industry and refined after consultations with the Government. Restructuring grants were provided to all producers and the amount of assistance reflected their exposure to the two support policies. The size of the grants was based on industry assessments of the expected impact of deregulation on producer returns and farm incomes.

At the time the package was developed (early 1999) price support for manufacturing milk was equivalent to 6-7% of the market price. Across the States regulated prices for fluid milk were 100-150% above manufacturing milk prices. There was a general consensus that fluid milk prices would decline substantially after deregulation occurred. Industry estimates suggested there would be significant falls in farmer incomes overnight. The biggest impact would be for producers focused on fluid milk production.

Development of the producer assistance program

The methodology used to calculate the DSAP grants was based on the expected farm income effects of the policy reform. Individual DSAP grants were fixed payments linked to actual milk production in the 1998-99 season. The level of assistance was calculated to approximate the loss of income that was likely to occur during the first 2-3 years of deregulation.

The DSAP grants had two payment components - 46.23 Ac/litre for fluid milk and 8.96 Ac/litre for manufacturing milk. All producers supplied both types of milk but at differing levels. The separate payment rates ensured the assistance was targeted towards those with a high proportion of drinking milk in their total farm output. Individual payments were capped at AUD 350,000 and treated as income for tax purposes.

The process of developing DSAP is an interesting case study of the practical aspects of designing an adjustment assistance program in response to the income effects of policy re-

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form. The circumstances required the industry to develop the program. Government and Departmental advisers subsequently refined the proposal and implemented the complete industry restructuring package.

The initial proposal was developed two years before deregulation occurred. There were X steps in the DSAP development process:

Step 1 Evaluate the likely initial annual impact of deregulation on the average prices received for fluid milk and manufacturing milk based on market outcomes in 1997-98. This was done on a State basis because the regulated price for drinking milk was set at different levels in each State.

Step 2 Evaluate the average per farm effect on the gross milk income of producers based on State production levels for the two types of milk in 1997-98. This was done to demonstrate there was a case for transition adjustment assistance.

Step 3 Calculate an average price and income effect across Australia and disaggregate the effect between the fluid milk component and the manufacturing milk component.

Step 4 Calculate the total $m impact of deregulation for fluid milk and the manufacturing milk. Adjust the estimates by a factor of three. This was done to achieve an objective of providing adjustment assistance broadly equivalent to 2-3 years of the value of the regulations.

Step 5 Convert the respective estimates to an Ac/litre adjustment payment for fluid milk and manufacturing milk.

In effect the payment components were based on estimates of the average value of price support from the alternative policy arrangements at the time of deregulation. The initial estimates were based on 1997-98 State data for prices, production and farm numbers. This was the most recent data available at the time the proposal was developed. After consultations with the Government the proposal was subsequently refined to reflect 1998-99 data.

Initially ABARE survey data on average dairy farm performance for each State was used to assess the value of the regulations. However, the lag in ABARE data availability and difficulties in reconciling survey results for average prices received with actual market prices required an alternative approach.

State based estimates of average prices and gross milk income were derived from data on farm numbers, production of manufacturing milk and production of fluid milk. For each State actual market prices for the two types of milk were adjusted to reflect industry levy payments, freight, etc to obtain estimates of the average price received by farmers.

The initial impact of deregulation on average milk income per farm would depend on the change in prices received for the two types of milk. The effect on manufacturing milk prices could be calculated from the price support payment that was expected to be paid in the final year of the policy arrangements (1999-2000). A firm estimate of the size of this payment (1.693 Ac/litre) was available from the industry authority that managed the scheme, the Australian Dairy Corporation.

There were several views on the likely impact of deregulation on fluid milk prices. ABARE expected fluid milk prices to immediately fall to the manufacturing milk price level. Industry experts maintained that prices would fall but a premium would continue to exist to reflect the value/cost of year round milk supplies. The size of any price premium was likely to vary in each State because of a range of factors.

The industry consensus was that fluid milk prices would be determined by the price received in Victoria. More than 60% of Australia's milk output is supplied by seasonal producers in Victoria. Opportunities for interstate trade would ensure fluid milk prices in other States reflected the Victorian price. This would be determined by export returns for manufactured dairy products and a premium for supplying milk year round. Adjustments for interstate milk transport costs would affect price levels in other states.

An alternative view was expressed by the Productivity Commission in a submission to the NCP review of Victoria's fluid milk regulations. The Commission suggested a milk premium of 4.2 Ac/litre was likely to exist in the absence of any support arrangements. The premium was expressed on a factory door basis and required an adjustment for average freight costs to obtain an equivalent farm gate price. The Commission's estimate of the premium was smaller than the views expressed by some industry representatives.

These alternative views were used in the initial development of the DSAP grants. It provided three scenarios of the impact of deregulation on per farm incomes of dairy farmers. Table 12.1 shows the calculations that were used for the initial DSAP proposal for the three main dairying states. It showed the total effect on per farm milk incomes would be significantly higher for producers focused on fluid milk production under any scenario.

Gross milk incomes fell by A$70-74,000 in NSW and Queensland under the worst case scenario - loss of the entire market milk premium. Producers in these two states were predominantly focused on supplying fluid milk. Per farm milk income fell by around A$25,000 in Victoria where farm output is dominated by seasonal production of manufacturing milk.

The industry expectations on fluid milk price premiums after deregulation were more optimistic than the views expressed by ABARE and the Productivity Commission. Consequently the impact on average milk incomes was smaller. These calculations assumed no change in average farm production. It also assumed there was no adjustment assistance provided by the government.

The calculations indicated that producers in NSW and Queensland were likely to experience a fall in gross milk incomes of at least 20% in the first year of deregulation. The loss of income would be substantially greater (30-40%) if the fluid milk price premium declined to negligible levels.

The purpose of the calculations was to assess the initial effect of deregulation on average per farm gross milk income. It was also used to develop an acceptable formula for calculating the total amount of adjustment assistance that reflected the producer benefits from the two types of regulations. During the Government consultation process the Productivity Commission view on the size of the deregulated fluid milk premium was considered to be the most likely outcome.

Estimates of the individual State impacts of deregulation were used to determine an average price and income effect across Australia. This was necessary as the Federal Government is required to treat all States equally when providing adjustment assistance. DSAP grants had to be based on a 'common' rate of adjustment assistance.

Producers eligible for adjustment assistance applied for DSAP grants from an industry authority set up to distribute the grants. Production records for all dairy farmers were available from the mechanisms used to deliver the support payments that were due to terminate. This enabled verification of the size of the restructuring grants for each producer. The average

Table 12.1   Price and income scenarios on the impact of deregulation

		Victoria	NSW	Qld
Regulated price outcomes, 1997-98				
Number of farms	no.	8,084	1,817	1,642
Manufacturing milk price a)	c/litre	24.4	26.8	25.7
Market milk price b)	c/litre	46.24	44.541	53.98
Total milk	m litres	5,866	1,242	822
Manufacturing milk	m litres	5,377	641	442
Market milk	m litres	490	601	380
Total milk income	$m	1,538	439	319
per farm	$'000	190	242	194
Best case				
Manufacturing milk price c)	c/litre	22.7	25.1	24.0
Market milk price c)	c/litre	30.0	33.0	39.0
loss of premium	c/litre	16.2	11.5	15.0
Total milk income	$m	1,367	359	254
per farm	$'000	169	198	155
Per farm impact on gross milk income	$'000	-21	-44	-39
per farm effect	%	-11.1	-18.2	-20.2
Productivity Commission perspective				
Manufacturing milk price c)	c/litre	22.7	25.1	24.0
Market milk price d)	c/litre	24.9	27.3	26.2
loss of premium	c/litre	21.3	17.2	27.8
Total milk income	$m	1,342	325	206
per farm	$'000	166	179	125
Per farm impact on gross milk income	$'000	-24	-63	-69
per farm effect	%	-12.7	-26.0	-35.5
Worst case - full loss of market milk premium				
Manufacturing milk price c)	c/litre	22.7	25.1	24.0
Market milk price	c/litre	22.7	25.1	24.0
loss of premium	c/litre	23.5	19.4	30.0
Total milk income	$m	1,332	312	197
per farm	$'000	165	172	120
Per farm impact on gross milk income	$'000	-26	-70	-74
per farm effect	%	-13.4	-29.0	-38.1

a) Factory price plus manufacturing milk support payment of 1.693 c/litre; b) Price received by farmers net of industry levies and freight; c) Price unchanged, no manufacturing milk support payment; d) Based on Victorian manufacturing milk price plus net seasonal premium of 7.3 c/litre - transport premium for NSW and Qld; e) Derived as manufacturing milk price plus 4.2 c/litre seasonal premium less 2 c/litre transport.
Source: Bonlac Foods Ltd, private communication.

DSAP grant per farm reflects the approach used to develop the assistance program (table 12.2).

Eligible producers received an assessment of their total DSAP entitlement. It was calculated from their 1998-99 production of manufacturing milk and fluid milk and the respective

Table 12.2   DSAP producer adjustment assistance for Australian dairy deregulation

		Market milk	Manufacturing milk	Total
Total DSAP payments a)				
NW	A$m	276	62	338
Queensland	A$m	181	39	220
Victoria	A$m	235	530	765
Australia	A$m	893	740	1,633
Average DSAP payment per farm b)				
NSW	A$'000	160	36	196
Queensland	A$'001	117	25	142
Victoria	A$'003	30	68	98
Australia	A$006	69	57	127

a) State estimates from 1998-99 milk production & DSAP payment rates; b) Per farm calculation based on the number of registered dairy as at 30 June 2000.
Source: Dairy Australia, private communication.

DSAP payment components. The total entitlement was divided into 32 quarterly installments and a fixed payment right was issued for an eight year period commencing in 2000-01.

There were no conditions on how producers could use their restructuring grants. DSAP eligibility was conditional on the completion of a Farm Business Assessment. It was a requirement imposed to ensure all producers considered the consequences of deregulation for the viability of their farm business. The sudden impact of deregulation would require longer term decisions about adjusting to change in market conditions.

The DSAP grants were a fixed stream of government guaranteed payments. Financial institutions developed facilities that enabled producers to convert their quarterly entitlements into an up-front payment. This enabled farmers to obtain the discounted present value of their total entitlements by assigning their fixed quarterly assistance payments to the bank offering the facility.

The option of obtaining a single payment strengthened the restructuring objectives of the DSAP grants. Producers may have been more likely to view the fixed quarterly payments as an income or price support payment if that was their only option. This could have diluted the impetus for on-farm restructuring which was expected to require new investment in the farm business.

Most producers made the conversion to an up-front payment (Harris, 2004). It encouraged many farmers to consider options for substantive farm developments to improve their viability. In other cases it was used for debt reduction purposes and to finance farm diversification activities.

Dairy industry adjustment since deregulation

Deregulation in conjunction with the restructuring assistance accelerated the industry adjustment process that had been evident for some time. After three years of deregulation 2,234 farms have left the industry, a decline of 17%. The impact on fluid milk producers has been

greater but adjustment has occurred in both sectors of the industry. In Victoria over a thousand producers have left the industry. This compares with 435 retirements in NSW and 420 in Queensland where the industry is largely focused on fluid milk sales.

Milk production declined in the first year of deregulation due to poor seasonal conditions and farm retirements. Production recovered in 2001-02 and retirements in fluid milk regions slowed. In 2002-03 milk production declined again but this reflected severe drought conditions across all dairying regions.

After a limited initial impact, adjustment in Victoria accelerated despite strong export prices for manufactured dairy products. Victorian farm numbers fell by 6% in year two of deregulation, well above the average exit rate of 1.2% during the 1990's. Improved farm asset values may have encouraged some farmers to leave the industry.

Producers made various adjustments to improve farm productivity in response to deregulation. Recent survey results have confirmed that most producers have used their DSAP restructuring grants for on-farm developments (Harris, 2004). To off-set the decline in income producers have increased milk production. Average output per farm increased by 6% in 2000-01 and almost 14% in 2001-02.

Table 12.3   Change in average farm incomes in selected dairying regions a)

Year ended Une	Milk income b) (% change)	Milk price per litre b) (% change)	Farm income (% change)	Off-farm income (% change)	Total cash income c) (% change)
Northern Victoria					
1998-99	22.1	-2.5	19.8	108.1	21.3
1999-00	3.8	-10.8	7.2	19.1	7.5
2000-01 d)	19.8	25.9	14.7	43.5	15.6
2001-02	42.2	12.4	42.9	-4.1	41.0
2002-03 p e)	-41.3	-22.1	-33.2	5.8	-32.2
Northern New South Wales					
1998-99	-18.1	-4.3	-13.4	231.5	-7.8
1999-00	16.4	0.2	10.9	-38.3	6.8
2000-01 d)	5.5	-20.7	13.9	55.3	15.9
2001-02	39.4	18.8	29.3	40.6	30.0
2002-03 p e)	14.6	6.6	13.9	-0.8	12.9

a) Annual change in average per farm performance. Year to year changes in sample size and survey population affect the comparability between years; b) Bases on total milk receipts net of freight; c) Derived as farm income plus off-farm income; d) Poor season and deregulation on 1 July; e) Widespread drought conditions.
p = Preliminary.
Source: ABARE, Australian Farm Survey Reports.

Production growth was driven by a combination of expanding the scale of operations and improving the productive performance of primary inputs - land and livestock. Average herd sizes increased and some producers purchased more land. Feed input quality also im-

proved - feed supplements, pasture development, etc. - as the milk yield of cows and land has increased.

ABARE farm survey data was used to assess the impact of deregulation on financial performance in two regions (table 12.3). As expected there was a significant impact on fluid milk producers. In northern NSW the average price received declined substantially but production growth off-set the impact of lower prices. The improvement in gross farm income since deregulation shows that these producers have made adjustments to off-set the effects of the policy reform.

Manufacturing milk producers in northern Victoria have also experienced an improvement in gross farm income. Milk output increased and the average price received increased due to strong rises in world prices. The improvement in export prices during the first two years of deregulation helped to alleviate the impact of the reforms on manufacturing milk producers.

12.4 Concluding comments

The regional impact of dairy deregulation has varied and a large number of farmers decided to exit the industry. The adjustment has affected both sectors of the industry although the impact on average prices and farm incomes has been much greater for fluid milk producers. The post-reform evaluation demonstrates that dairy farmers have successfully made adjustments to improve their financial situation in response to a substantial policy reform.

Adjustment assistance was used rationally and helped producers to make the transition to a deregulated market. On-farm adjustments focused on two main developments. Producers are running more cows to increase the scale of production. They have also increased the quality and supply of feed inputs to improve carrying capacity and herd productivity. Expanding the land base to support a larger herd has also contributed to the adjustment process.

Development of the adjustment assistance program (DSAP) was a difficult exercise because it required judgments about the expected impact of deregulation on the prices received for milk. Data limitations and delays in the availability of ABARE survey data on financial performance meant the level of assistance had to be based on State estimates of the average farm impact. Given the circumstances - complete deregulation overnight - and the size of the adjustment pressures for fluid milk producers it was not a realistic option to develop a post-reform adjustment program.

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13. Farm household income: towards better informed policies

Introduction

Improving the income situation of farm households remains a prominent objective of agricultural policies in many OECD countries. Concerns are often expressed in response to year over year declines in national farm income levels or to fluctuating world commodity prices. Increasingly, however, attention is moving away from such partial indicators of household well-being towards a more comprehensive concept of farm household income which encompasses all income sources available to family members as well as their accumulated wealth.

Policy objectives for farm household income are rarely defined precisely or quantitatively. Do farm households achieve, on average, income levels on a par with the rest of the economy? Is the incidence of low income higher in agriculture than in other sectors? How large are income inequalities within the sector? Is income variability over time higher among farm households than other households? If such problems exist, is a specific solution for this sector appropriate or can they be solved by general tax and social security policies? Given the high levels of support in many OECD countries, governments need to know the impact their policies are having on farm household income levels, composition, distribution and variability.

What information is needed?

Governments need information on individual households using as wide a definition as possible of the farm household. This would allow policy makers to select the most appropriate group of households for analysis and comparison depending on the question to be answered. In some cases this might be households whose main occupation and source of income is farming, but in others, it might include all households with any income from farming. Depending on the policy question, the appropriate comparison might be with rural households, urban households, all non-agricultural households, or households running small family businesses.

Income from the farm provides only a partial view of the income situation, as most farm households derive a significant share of their income from other sources, such as non agricultural on-farm or off-farm activities, investments or social transfers. In fact, an increasing number of farm households earn more of their total income from non-farming sources than they do from farming. All sources of income in the household should be taken into account, preferably on a comparable basis across the whole economy. Farm and non-farm wealth should also be recorded as it can translate into income and consumption. Measures of well-being would encompass household consumption and other social and personal factors such as health (figure 13.1).
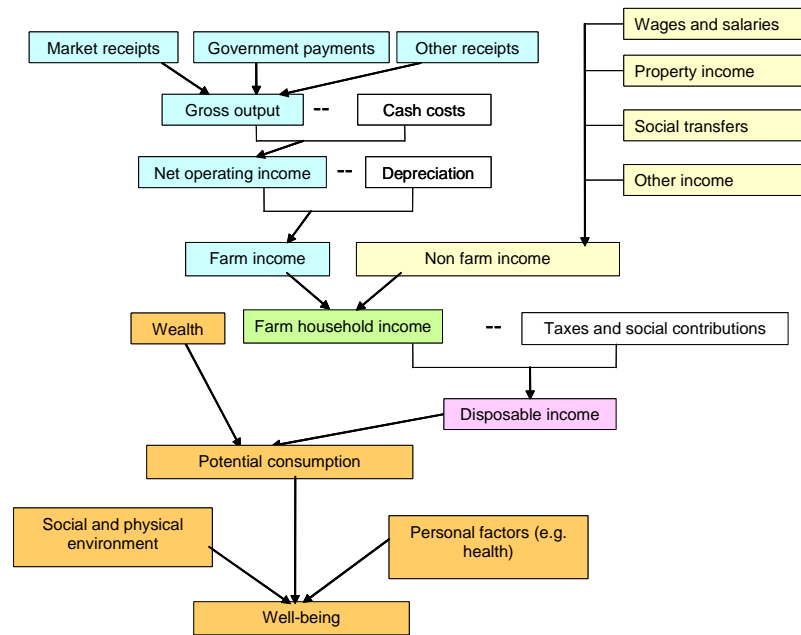
Figure 13.1   Indicators of income and well-being for a farm family
Source: OECD Secretariat.

In order to understand and monitor the variability of farm receipts at the individual household level, panel data need to be collected. Panel data cover a (usually large) number of cross-sectional units and a (usually small) number of time periods. Multi-year averages (excluding extremes), which smooth farm income fluctuations and provide better estimates of the income situation, can then be calculated.

Policy makers also need information about the structure and behaviour of farm households if they are to identify the cause of individual income problems and design appropriate remedies. Classification of farm household units is increasingly based on both business and household characteristics, and not on commodity production. This type of classification helps in understanding the likely behaviour of households as they adjust to reform. Statistics can become policy management tools. In some countries, for example, it is not uncommon for one farm to support two or more households; this is an additional reason to focus on the household instead of the farm.

Information about the total income of farm households can inform policy makers of the income status of the sector, but its usefulness does not stop there. This information is also needed if policy makers are to be able to measure how effective and efficient social, fiscal and agricultural policies are in meeting any income objectives. Particularly when evaluating the effects of agricultural policy, governments need to be able to measure the impact of other types of policies affecting household income and thus need to collect appropriate data, including social payments and tax flows.

Such comprehensive data at household level also make it possible to construct models of household behaviour and to integrate these into economy-wide analysis to help understand household adjustments to market developments and to policy reforms.

What information is available?

Most countries have systems in place to monitor the income situation of farm households but they are often incomplete and out of date. There is often a lack of consistency between micro and macro data, between different farm surveys, between farm and general surveys, and between countries. Income concepts and typologies based on commodity production are outdated and no longer relevant given the increasing diversity in income sources and the trend towards the decoupling of policy measures from production.

Information on farm income, costs and returns of the farm operation, farm size and specialisation is readily available in most OECD countries, for example via the Farm Accountancy Data Network (FADN) in European Union member states. But off-farm income is often missing, non-farm wealth is often unreported - notable exceptions are the Agricultural Resource Management Study (ARMS) in the United States and some national FADNs in Europe - small farmers and those with income-earning activity off the farm are often ex-

Small Family Farms (sales less than USD 250,000)

- **Limited resource:** Any small farm with gross sales less than USD 100,000, total farm assets less than USD 150,000, and total operator household income less than USD 20,000. Limited-resource farmers may report farming, a non-farm occupation, or retirement as their major occupation.

- **Retirement:** Small farms whose operators report they are retired (excludes limited-resource farms operated by retired farmers).

- **Residential/lifestyle:** Small farms whose operators report a major occupation other than farming (excludes limited-resource farms with operators reporting a non-farm major occupation).

- **Farming occupation/lower sales:** Small farms with gross sales less than USD 100,000 whose operators report farming as their major occupation (excludes limited-resource farms whose operators report farming as their major occupation).

- **Farming occupation/higher sales:** Small farms with gross sales between USD 100,000 and USD 249,999 whose operators report farming as their major occupation.

Other Farms

- **Large family farms:** Farms with sales between USD 250,000 and USD 499,999.

- **Very large family farms:** Farms with sales of USD 500 000 or more.

- **Non-family farms:** Farms organised as non-family corporations or cooperatives, as well as farms operated by hired managers.

Figure 13.2   Typology for Farm Households used in the United States
Source: USDA (2000), ESR Farm Typology for a Diverse Agricultural Sector, Economic Research Service, Agriculture Information Bulletin No. 759, September.

cluded, and it is difficult to compare the total income of farm households with that of other households, even at an aggregate level.

The ARMS is a good example of an effort to include policy-relevant information in a survey. A modern typology of different farm households, reflecting contemporary conditions, is used (figure 13.2). The fact that it does not contain panel data is, however, a limitation for impact analysis. Canada also collects income data using a broad definition of farm households, comprehensive income coverage and a modern typology, but the different sources of information are not always consistent, nor comparable.

Household expenditure surveys exist in many countries, but the number of farm households included is often too small to be able to compare them with other types of household. Tax files are another potential source of information, although in some countries specific taxation regimes for income from farm activities limit the relevance of such sources for income studies. Some countries match farm-specific information (e.g. farm account surveys) with other general sources on an *ad hoc* or a regular basis to give a more rounded picture. Ireland matches its household expenditures survey with FADN, while France brings together taxation records, household surveys and FADN. In Sweden and Finland, administrative and tax data are brought together.

What are the obstacles to obtaining and using the desired information?

There are a number of potential obstacles to obtaining and using full information on farm household income. They fall broadly into three categories - administrative, technical, or political.

Administrative obstacles may occur when policy-making ministries, which are potential data users, fail to communicate their needs to the statistical agencies that collect the data. The costs of designing and setting up new or revised surveys to take account of new needs can also be an obstacle. Cost also affects the frequency and timeliness of surveys. There can be legal/confidentiality difficulties that prevent the merging of data from different sources, such as farm and tax records. Such difficulties often prevent information from being transmitted to analysts. Finally, there are limits to the burden that can be placed on people taking part in surveys, particularly as they are usually volunteers.

There are also a number of technical obstacles, though none are insurmountable. One problem is that coverage of farm households in general surveys is often not representative because there are so few farms. This can limit the potential use of general surveys for farm household income analysis and for merging with farm account information. Wealth information, in particular assets such as livestock, forests or vineyards, is difficult to obtain and to evaluate, even though there are International Financial Reporting Standards (IFRS), which include International Accounting Standards on agriculture. Another difficulty in keeping track of panel data is that farms and households are not stable over time.

Political obstacles are not negligible. Participants in surveys may not understand or agree that it is legitimate to seek information on all sources of farm household income, including sources that are not part of the farm business such as a spouse's income, investment income, and wealth. This affects the rate and quality of responses. Vested interests more generally can limit the political will to monitor the full income situation of farm households, as it

could threaten the legitimacy of income support. As a result, the *status quo* is often vigorously defended.

How can these obstacles be overcome?

Pressure to overcome these obstacles can come from several sources. The need to evaluate whether policies are achieving their desired objective, which can be made compulsory, and demands for better accountability for public funds play an important role. Increasingly, improvements in data collection are requested by government audit offices. This has happened in Canada and more recently in the European Union.

In terms of costs, budget constraints and the resulting need to improve policy targeting should work as incentives for improving data collection, rather than obstacles. Changes in policy should prompt changes in data collection systems. The cost of evaluating a policy should be attached to its funding. Specific data may be generated by the implementation of a policy and the collection cost should be part of programme funds.

There are many ways to reduce the cost of collecting and transmitting data, for example the use of existing administrative or non-agricultural data sets and the use of telephone interviews or Internet for filling questionnaires or accessing data. Collecting adequate data at the national level can also be considered as cost-saving for the government and for surveyed farmers, as individual researchers or local government would not need to collect the same data several times. The cost-benefit ratio of collecting data would also improve if surveys covered a broader scope and information was available at the individual level as there would be a higher number of potential uses and users (including from the private sector).

Communication on income issues should be simple and effective so that the need to monitor the income situation and evaluate policies is understood by all. It should focus on key players who can influence political, policy or funding decisions. Efforts should be particularly concentrated on improving communication between statisticians, policy makers, and the industry.

International estimation and definition standards, when they exist, can contribute to solving technical estimation problems and ensuring a certain degree of international consistency. Information technology facilitates access to information through web sites ensuring confidentiality. Data from the FADN and the Luxembourg Income Study can, for example, be accessed on-line through the Internet. Information technology also helps to reduce the time lags in making data available to the public and in answering requests.

How would such information help policy makers?

More detailed, comparable information on farm household income could be used by policy makers and analysts at several stages in the policy process:
- to assess the nature, cause and extent of income problems. The share of income from agriculture in the total income of farm households is a key element in understanding the income situation of farm households (figure 13.3);
- to define policy objectives with measurable targets, for example transitional support policies that would help those households negatively affected by policy reform to adjust and to develop new income opportunities;

- to design new programmes that are suited to specific, observed or anticipated, income problems. A recent example is the design, in addition to general safety-nets, of a temporary assistance programme in Australia following the deregulation of the dairy industry;
- to evaluate current policies with regard to their income objectives;
- to improve current programmes. For example, Canada uses its micro-level data to refine the design and parameters of its safety-nets every three years;
- to assess the impact of reform on farm household well-being. Models of household behaviour integrated into economy-wide analysis, as developed in ongoing OECD work, can shed light on how households adjust to reform and on the distributional impact of reform after adjustment;
- to compare alternative options, for example specific agricultural safety-net or the general social or fiscal systems.
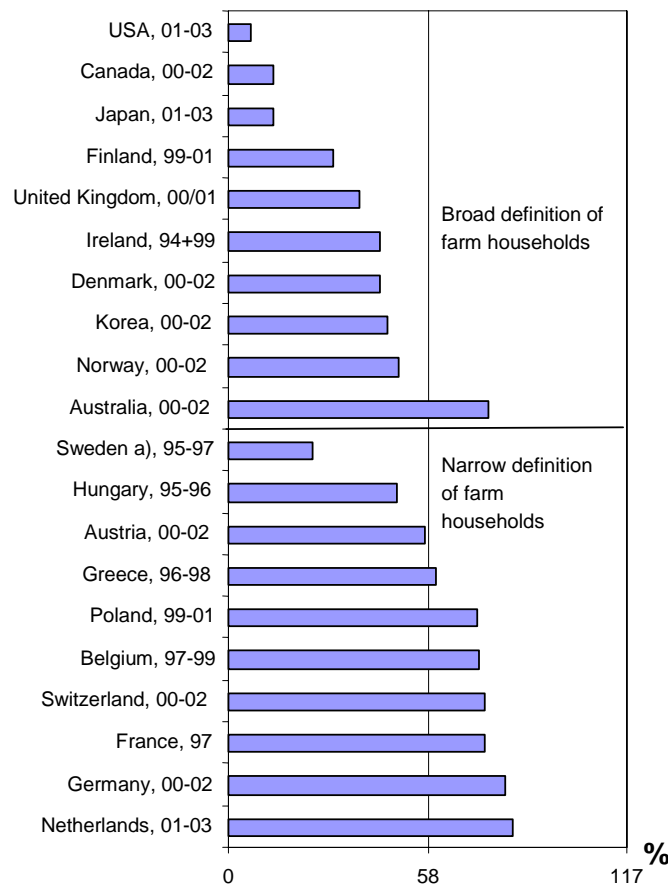

Figure 13.3   Percentage share of farm income in the total income of farm households in selected OECD countries (average of the three most recent years available)
Data are not comparable across countries.
a) Income from independent activities.
Source: Update from OECD (2003), Farm Household Income: Issues and Policy Responses, Paris.
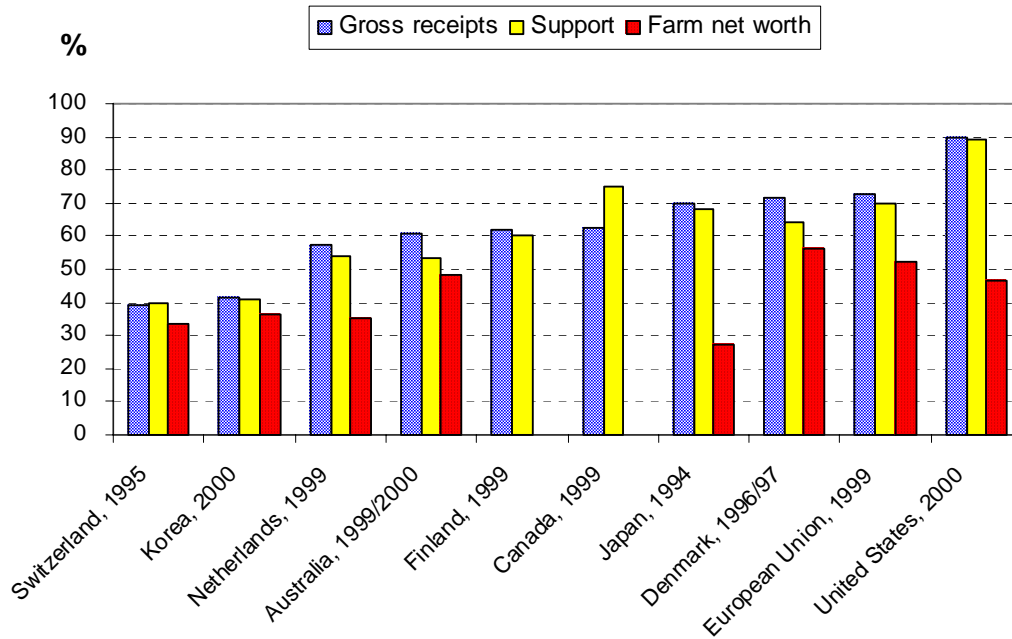
Figure 13.4   Percentage share in gross receipts, support and net worth of the 25% largest farms (as measured by gross sales)

Data are not comparable across countries.

Source: Derived from OECD (2003), Farm Household Income: Issues and Policy Responses, Paris.

Collecting data is not enough, however. Even where comprehensive data is available it does not always have sufficient influence on policy decisions. Partial information on aggregate farm income levels or declining commodity prices often makes the headlines and most support is still delivered on the basis of production levels, area planted or animal numbers. As a result, the largest farms with the most production, highest incomes and greatest wealth receive most of the income support (figure 13.4). More effort should be made in disseminating accurate information on the income situation of farm households and communicating the result of analyses on the impact of policies on income levels, distribution and variability.

What can be done to improve farm household well-being?

The OECD highlighted many unintended and undesired effects of current farm policies in its report *Farm Household Income: Issues and Policy Responses*. The report also pointed to serious deficiencies in data needed to monitor the income situation of farm households. The process of designing and monitoring agricultural policies would be enormously helped if better data were available and the OECD is now looking at how that might be achieved.

There is widespread acknowledgment of the need to evaluate domestic policy at both the national level, in terms of public accountability, and the international level. Policies are evolving and statistical systems also need to adjust. This is a long-term process requiring careful planning and implementation, but the sooner work on improvements begins the sooner

things will get better. In the short term, analysis will continue with existing, imperfect information.

Compared to the costs of the policies to improve the income of farmers, the cost of collecting necessary household data is minor. Technical problems can be overcome with sufficient will and resources. Good co-operation between policy makers, analysts and statisticians is essential, but co-operation between countries is also needed. In international fora, such as the OECD, national statisticians, policy makers and analysts can work together to harmonise definitions and systems, and exchange best practices. Awareness of needs can be raised and practical examples of data usefulness can be exchanged.

The OECD participates in a number of international networks active in this field. Among them, the Inter-Secretariat Working Group on Agricultural Statistics (IWG-AGRI) organises regular meetings of statisticians from international organisations and countries, together with users. The PACIOLI (Panel in Accounting for Innovation, Offering a Lead-up to the use of Information modelling) network brings micro data providers and users together annually. The academic community also organises *ad hoc* meetings on the diversity of farm families, their well-being and the implications for their ability to adjust to reform.

All of these efforts are important and should continue. But national governments themselves are responsible for designing and managing their farm policies, and it is national governments who have both the greatest need and the ability to generate the necessary information on farm household income and well-being.

For further information

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This Policy Brief reflects discussion at a joint OECD/PACIOLI *Workshop on Information needs for analysing farm household income issues* in Paris on 29-30 April 2004. This workshop brought together experts to review the state of the art with respect to data availability on the incomes of farm households and to consider opportunities to improve data collection and relevant policy analysis. For more information on the workshop, see www.oecd.org/agr/policy under publications and documents, then events and meetings.

Information on other meetings of international networks active in the field of farm household income can be found at:

Eighth *IWG.AGRI* Seminar on Perspectives for Agriculture and Rural Indicators and Sustainability, Paris, 21-22 November 2002: www.oecd.org/std under Economic accounts for agriculture, then publications and documents, then events and meetings.

IWG - International Task Force on Statistics on Rural Development and Agriculture Household Income, 30 June - 2 July 2004, Verona: pilar.univr.it/taskforce/

MEXSAI, Third International Conference on Agricultural Statistics, (ICAS III), Cancun, 2-4 November 2004: www.nass.usda.gov/mexsai/

PACIOLI-13: Micro Economic Data on Farm Diversification, Rural Businesses and the Intra-generational Transfer, Hardingasete (Norway), 5-8 June 2005.

PACIOLI-12: Income Issues in Farm Households and the Role of the FADN, Paris, 28 April 2004.

PACIOLI-11: New roads for farm accounting and FADN, Prsyziek (Poland), 5- 8 October 2003, www.pacioli.org/

European Association of Agricultural Economists Seminar 'From households to firms with independent legal status: the spectrum of institutional units in the development of European agriculture', Imperial college at Wye, United Kingdom, 9-10 April 2005: /www.eaae.org/

For further reading

Farm Household Income: Issues and Policy Responses, 2003. ISBN: 92-64-09965-4, €21, 84p.

Agricultural Policies in OECD Countries: A Positive Reform Agenda, 2002. ISBN: 92-64-19967-5, 40p. Available at www.oecd.org/agr/policy

The Incidence and Income Transfer Efficiency of Farm Support Measures, 2002. Available at www.oecd.org/agr/policy

Low Incomes in Agriculture in OECD Countries, 2001. Available at www.oecd.org/agr/policy

Income Risk Management in Agriculture, 2000. ISBN: 92-64-18534-8, €46 ,150p.

Distributional Effects of Agricultural Support in Selected OECD Countries, 1999. Available at www.oecd.org/agr/policy

Factors Conditioning the Transfer Efficiency of Agricultural Support, 1996. Available at www.oecd.org/agr/policy

Adjustment in OECD Agriculture: Issues and Policy Responses, 1995. Available at www.oecd.org/agr/policy