Socio-economic aspects of animal health and food safety in organic farming systems

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Edited by
M. Hovi, A. Martini and S. Padel

SAFO Sustaining Animal Health and Food Safety in Organic Farming
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Sustaining Animal Health and Food Safety in Organic Farming (SAFO)

Co-ordinator:	Mette Vaarst (Danish Institute of Animal Science, Denmark)
Steering Committee:	Malla Hovi (The University of Reading, England)
	Susanne Padel (The University of Aberystwyth, Wales)
	Albert Sundrum (The University of Kassel, Germany)
	David Younie (Scottish Agricultural College, Scotland)

Edited by: Malla Hovi, Andrea Martini and Susanne Padel

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Foreword

Sustaining Animal Health and Food Safety in Organic Farming (SAFO) is a European Commission funded Concerted Action Project with the objective to contribute to improved food safety and animal health in organic livestock production systems in existing and candidate member countries of the European Union. We aim at doing this through exchange and active communication of research results and conclusions between researchers, policy makers, farmers and the wider stakeholder community, including consumers. Workshops form a central part of these activities, documented by the proceedings. This volume with the contributions to first SAFO Workshop in Florence in September 2003 is the first in a series of five proceedings published during the lifetime of the project (2003-2006). Electronic version of the proceedings will also be available at the SAFO web-site at http://www.safonetwork.org.

The Workshop in Florence on "Socio-Economic Aspects of Animal Health and Food Safety in Organic Farming Systems" focused on financial and economic aspects of organic livestock production at the farm level and in the whole organic food chain. The impact of attitudes of various stakeholders on the development of organic livestock production was also covered. The Workshop was attended by 70 delegates from 22 countries, representing a wide variety of expertise and aspects of organic farming from certification activities, marketing economics and social science to animal health and welfare.

It was apparent, from the papers, posters and working group conclusions, that organic livestock producers work within a society and are governed by if not the same – at least very similar - economic constraints as conventional farmers. In addition, they have voluntarily taken onboard the organic rules and values. It is also clear that the interface of the organic values, and those of society and food production at large, can impose complex constraints on production at farm level. For instance, while animal health appears to be an important concept to the consumers in deciding what to buy, there appears to be a discrepancy between the welfare expectations of consumers and the production realities. One of the key issues raised by the workshop was the need to educate the consumer and to focus on the process rather than the product.

Another area where clear messages can be taken home from the Workshop is that, while organic livestock producers need premium prices for their produce to justify the higher production costs, it is difficult to maintain these in the midst of the conventional market place. Political economist Paul Rye Kledal from Denmark threw the analytical net even wider and concluded that that the future development of organic farming is part of the on-going struggle between a more democratic global food regime, and a free-market global food regime with deregulated market and food production.

The location of the Workshop in Italy, allowed us to focus on one of the fastest growing organic markets in the world. A series of papers and posters describing the diversity of Italian organic livestock production was fascinating and highlighted the need to understand local conditions, not just within the European context, but in a single country. Similarly, the presence of delegates and the poster presentations from the EU accession countries highlighted the diversity of socio-economic frameworks within which the organic producers work in Europe. This is, if possible, even greater than the diversity of the climatic conditions!

We wish you a good read.

Malla Hovi, Andrea Martini and Susanne Padel

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The Workshop delegates and the organisers are also in debt to the Tuscany Gouvernment, the Florence Commune, the Faculty of Agriculture and the Green Party Group of the Florence Commune for the realisation of the magnificent plenary session at the Palazzo Vecchio.

We are also grateful to the Mountain Community of Mugello, the Borgo S. Lorenzo Commune, the Breeders Association of the Florence Province and the Agricultural Co-operative of Firenzuola for the organisation of the field trip in Mugello.

Our special thanks go to the two farmers who opened their farms for visits during the Workshop: dairy farmer Giuseppe Pietracito (Cooperativa Emilio Sereni) and beef farmer Adriano Borgioli (Azienda Valdastra).

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Part A:
A framework for organic livestock production: socio-economics, health and welfare economics and marketing chain

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Potential contribution of economics to animal health and food safety on organic farms

A.W.Stott
Animal Health Economics Team, SAC, UK

Introduction

The foot and mouth crisis of 2001 reduced Scottish GDP by between £13.6m (0.02%) and £29.8m (0.05%) (Fraser of Allander Institute *et al*., 2003). The effect on the UK was less than 0.2% of GDP (Thompson *et al*., 2002). These examples are typical of the contribution that economics makes or is generally believed to make to farm animal health. However, on their own such disease cost estimates are of little value in this context (McInerney, 1996). What is really required is the minimum total cost of foot and mouth disease in future, taking into account the costs of prevention and the costs of both losses and control, should the disease break out again. To find this information, it would be necessary to establish the associated set of control activities (e.g. import restrictions, movement restrictions, vaccination policies etc. for details, see Royal Society, 2002). Decision-makers could then be sure that their actions were the best compromise between prevention, control and severity of potential losses at the time of implementation. However, such an approach is difficult in practice because it requires knowledge of the technical relationships between livestock outputs and inputs and the impact of disease and disease control strategies on these relationships, which are generally lacking (Bennett, 2003). Assessment of the relative risk of many possible future outcomes would also be required in relation to a wide range of alternative activities related to the prevention and control of the disease.

In the case of foot and mouth disease detailed epidemiological studies have been carried out, culminating in a range of sophisticated simulation models and decision support systems (see for example Keeling *et al.,* 2003 and Morris *et al*., 2002) that could address the difficulties of establishing economically optimum control strategies. Mlangwa and Samui (1996) explain the theoretical basis of this approach. Rapid advances in information and communications technology in agriculture (Cox, 2002) should greatly facilitate such collaborative work and ensure rapid delivery of results to decision-makers. However, so far, few applications have been developed beyond the research stage. Best known exceptions are described and classified by Morris *et al.* (1997).

The incentives to develop better animal health and food safety in the ways described above are likely to greatly increase in future. Reasons for this are set out in the report of the UK Policy Commission on the Future of Farming and Food (2002). As incomes rise, food price declines in importance for consumers and is replaced by other food product attributes such as quality, safety, convenience, novelty, animal welfare and other ethical issues. Harvey (2001) expresses this as a shift towards 'healthy agricultural trade', which means: 1) being competitive with world supplies, 2) healthy and safe foodstuffs, 3) healthy environments and 4) commercially and socially "healthy" product markets. This trend is likely to give animal-disease control (and the information systems necessary for an associated product attribute) greater importance than might be justified if the objective simply were to reduce food-production costs. Meanwhile, global trade liberalisation will increase competitive pressure. This effect is likely to be especially acute in the EU, as enlargement of the Union will bring more competition from the agricultural economies of the East and hasten the reform of existing protectionist agricultural policies.

Organic farming is seen as an important way for agriculture to respond to these trends (Policy Commission on the Future of Farming and Food (2002)). Although it may enjoy continued Government subsidy as a result, it will still need to innovate in response to increasing competition. Given the close relationship between animal health and productivity, animal welfare, food quality, food safety and environmental protection, development of economically optimal animal health strategies is likely to be a central part of such innovation. This paper, therefore, describes the basic economic framework on which such innovation might be based and outlines some recent developments of it. The focus is at farm-level and on the financial effects of disease most relevant to decision-makers at this level. This leaves out a whole series of 'economic' issues, such as externalities, price distortions, market adjustment, non-market goods, equity, international trade barriers etc., which are important in the context of animal health economics but beyond the scope of this paper. McInerney (1987) provides an overview of these wider issues, while Perry *et al.* (2001) provide the wider context for them.

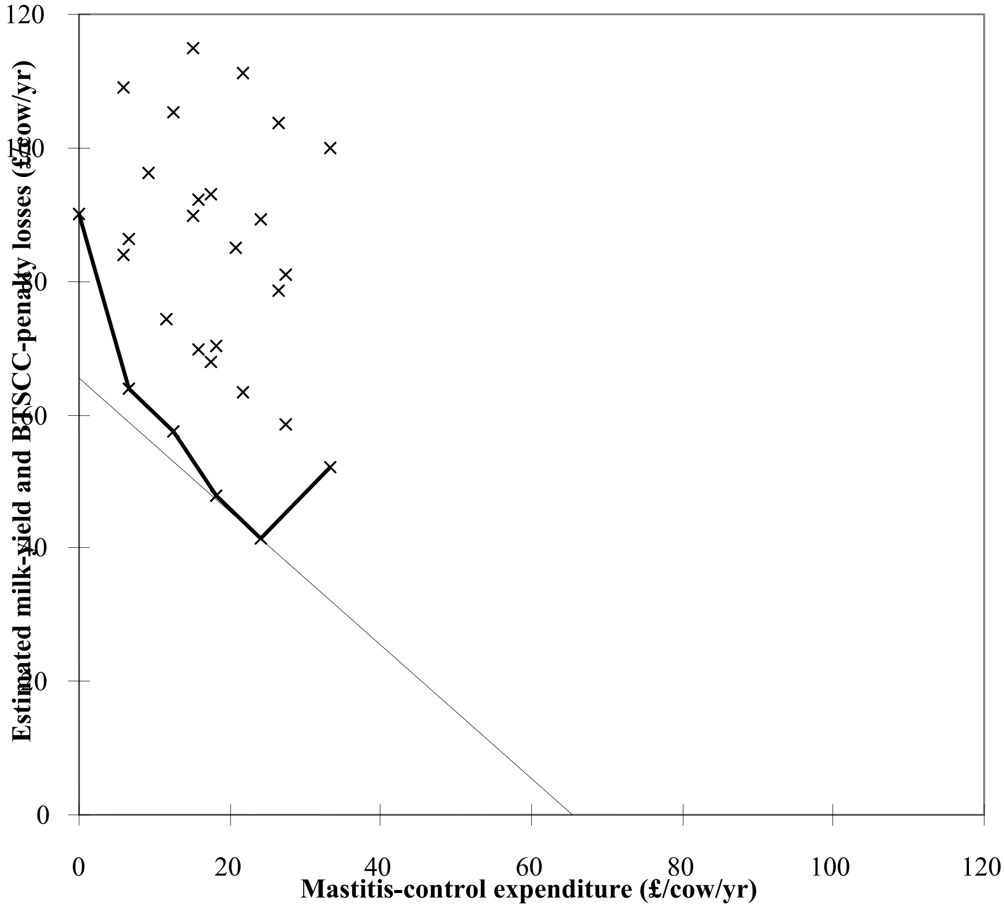
A framework for economic analysis

McInerney *et al.* (1992) proposed a framework for the economic analysis of disease in farm livestock. This framework is based on the concept of a "loss-expenditure frontier". The term loss refers to the direct effects of a disease on the animal production system and includes depressed output, mortality and reduced productivity. Expenditure covers all the extra resources consumed in the treatment and/or prevention of the disease. The objective is to minimise the total cost of disease, which is the sum of the losses and expenditure.

An example loss-expenditure frontier (Yalcin *et al*., 1999) is shown in Figure 1. Each cross on the graph represents a particular mastitis treatment regime and its associated losses due to subclinical mastitis in herds with high bulk tank somatic cell counts (BTSCC), i.e. where mastitis was a threat to farm incomes, food quality and possibly even food safety. Treatmentregimes included any combination of post-milking teat disinfection, dry cow therapy, udder preparation and milking machine testing. Loss was measured as the revenue foregone due to reduced milk production and milk price deductions associated with high BTSCC.

The loss-expenditure frontier in Figure 1 is shown by a solid line. It joins all points with the lowest loss across the range of expenditures. Points above the frontier represent dairy farms where losses from subclinical mastitis were unnecessarily high for their mastitis-control expenditure. On the loss-expenditure frontier, one treatment minimises the total cost of disease. This treatment is identified using the iso-cost line, tangential to the frontier (McInerney, 1996). It is shown as a dotted line in Figure 1 and joins all combinations of loss and expenditure with the same total cost, closest to the origin (lowest) and yet included in the loss-expenditure frontier.

Figure 1: A loss-expenditure frontier for subclinical mastitis taken from Yalcin *et al.* (1999)



Yalcin *et al.* (1999) found that the minimum total cost of subclinical mastitis in their study was £66/cow/year, obtained by adopting all mastitis treatments except udder preparation. The average total cost was £100/cow/year, giving an avoidable cost of £34/cow/year. It is this avoidable cost rather than the average total cost that provides useful information (McInerney, 1996). It demonstrates the scope for improvement and the means to achieve it, thus providing a guide to the relative value of investing scarce resources in subclinical mastitis as opposed to another competing activity.

The study of Yalcin *et al.,* (1999) was based on data from over 750 conventional dairy herds. However, within the sample there was a full range of mastitis treatment strategies, some avoiding dry cow therapy and, therefore, in respect of mastitis control at least, comparable with organic farming practice. Of these, the lowest total cost was £85/cow/year for farms using milking machine testing and post-milking teat disinfection to control subclinical mastitis (Yalcin, 1996). Although no substitute for a survey of organic farms, this result in comparison with the results above gives some indication of an opportunity cost associated with organic farming, thus illustrating the potential of the technique to illuminate relevant issues.

The loss-expenditure frontier represents the limits of technical efficiency at one point in time. Through the introduction of new technologies, the frontier can be moved closer to the origin, increasing the avoidable costs and hence the incentive to invest. In organic farming for instance, introduction of barrier methods, as a substitute for dry cow antibiotic therapy, may reduce the minimum total cost of mastitis (Hovi, personal communication).

Dealing with time

The example framework for economic analysis described above was based on a large sample of dairy farms at one point in time (1993/4). As such it is useful for decision support at national or sectoral level, as described by Perry *et al.* (2001), but fails to take account of the particular circumstances that affect decision making at individual farm level. Here, decisions are complicated by the cyclical nature of agricultural productions systems. Fixed assets, such as land and breeding livestock, are 'harvested' repeatedly so that decisions in one production cycle must be taken with due consideration for their consequences in future cycles. This is particularly important in the case of animal disease, where infection in one cycle often impairs performance in subsequent cycles for example with mastitis (Lucey and Rowlands, 1984), maedi visna (Brodie *et al*., 2001) and paratuberculosis (Whittington and Sergeant, 2001). Susceptibility to disease in later cycles may also be affected by exposure in earlier cycles and in any case, tends to increase with age. Productivity, on the other hand, may initially rise with age and then decline. All these factors must be taken into account when making decisions associated with the replacement of breeding livestock.

Dynamic programming (DP) (Bellman, 1957) provides a framework for the economic analysis of multi-stage decision problems. It has frequently been applied to natural resource management problems, including some in agriculture (Kennedy, 1986). For example, early studies on the optimisation of voluntary cow replacement decisions were based on maximising expected net revenue (McArthur, 1973). More recently, such models have been expanded to examine other important dairy management decisions, including insemination (Van Arendonk and Dijkhuizen, 1985; Delorenzo *et al*., 1992), optimal replacement of mastitic cows (Stott and Kennedy 1993; Houben *et al.,* 1994), the relative value of different mastitis control procedures (Yalcin and Stott, 2000) and milk quota management (Kennedy and Stott 1993). The technique has also provided a useful framework for establishing the economic weight of goal traits for use in dairy cattle breeding programmes (Veerkamp *et al*., 1995).

Stott *et al*., (2002) used DP to establish the optimum replacement policy for dairy herds, taking into account subclinical mastitis caused by the bacteria *Staphylococcus aureus (S.aureus)*. This organism is associated with food poisoning and, in human medicine at least, with multiple antibiotic resistance, so a maximum concentration is set for milk under EC regulations (EC1992/46). It, therefore, provides an example of an important challenge confronting conventional farming that is sometimes used as a justification for organic agriculture (Lampkin, 1990). However, subclinical mastitis caused by *S.aureus* and other bacteria remains a problem on organic farms (Busato *et al*., 2000) to which alternative solutions must be found.

The DP model of Stott et al., (2002) estimated the extent to which the effects of subclinical mastitis might be alleviated by adopting an optimum culling policy that took account of the impact of each cow's future milk yield and somatic cell count (SCC) on the financial performance of the herd in comparison to the cost of replacing the animal with a heifer. The analysis took account of expected trends in milk yield and SCC by lactation number, variation about these trends and the historical performance of existing cows for a herd of given performance (herd average yield approximately 7000 kg/cow/year). Results are summarised in Table 1. The effects of SCC on milk yield and milk price were substantial even in the control herd, prompting 2% more voluntary culling in order to remove older cows with higher SCC. This reduced bulk-tank SCC by 14%. The expenditure on this extra culling, the associated change in herd output and the estimated direct losses from subclinical mastitis reduced expected financial performance by 34%. Corresponding figures for a herd with SCC commensurate with *S. aureus* infection were 7% more voluntary culling, a 42% reduction in bulk-tank SCC and a 61% reduction in expected financial performance.

Table 1: Impact of *S. aureus* infection under the optimum replacement policy on otherwise identical dairy herds either including or excluding the effects of subclinical mastitis on milk yield and milk price. (Based on Stott *et al.*,2002)

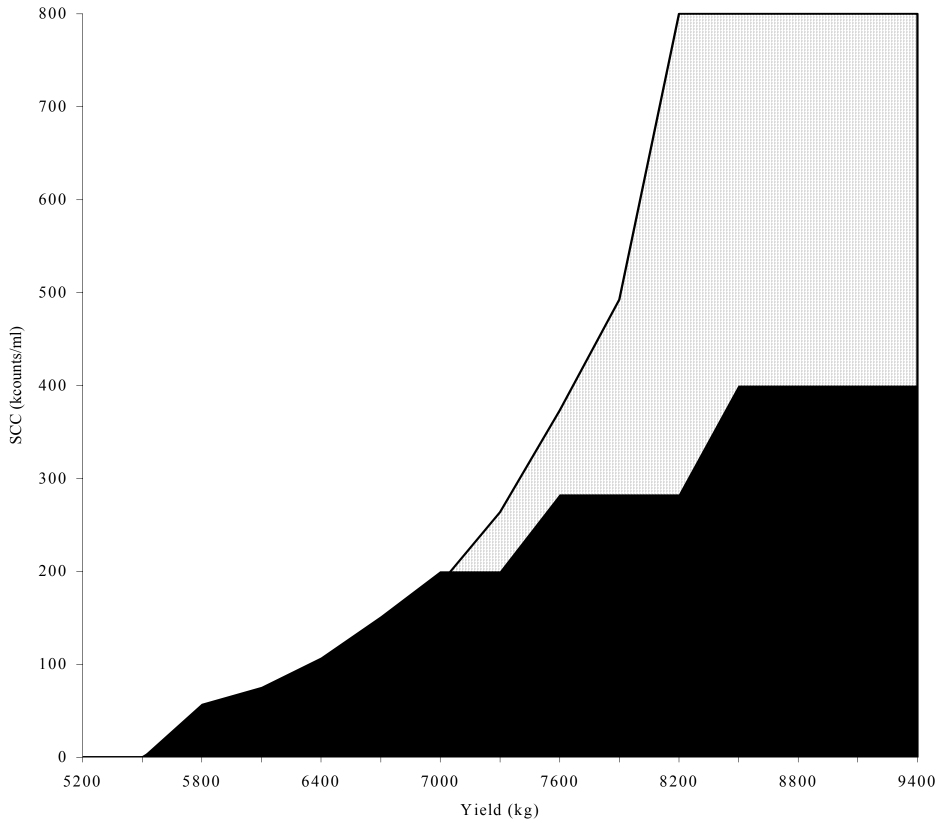
	Control Herd		*S.aureus* Infected Herd	
Effects of subclinical mastitis:	Excluded	Included	Excluded	Included
ENPV*	224	147	224	88
Culling (%/year)	20	21	20	25
Voluntary culling (%/year)	4	6	4	11
Bulk-tank SCC (kcounts/ml)	149	128	329	191

* ENPV: annualised expected net present value from milk production (£/cow/year)

These figures demonstrate the considerable scope for alleviating the effects of subclinical mastitis through appropriately targeted culling decisions. If culling is the only available method of control, or if other methods have already been applied correctly, then the DP approach provides the economically optimum balance between output loss and control expenditure discussed above. This is only true, however, at the given levels of SCC. In practice, the culling regime will alter SCC, which in turn will influence subsequent culling decisions. Removing infected, generally older, cows also affects the SCC averages indirectly by removing a source of infection for other cows; indeed that is one of the aims of such culling. To deal properly with these issues requires a version of the DP linked to an epidemiological model of *S. aureus* spread in the herd so that each culling decision can be based on its consequences for the whole herd, not just the individual cow concerned. Further research is required to establish whether such developments are feasible (Stott *et al.*, 2002). In the meantime, it is likely that output from the current model, updated on a regular basis, is likely to provide useful decision support for UK dairy farmers when combined with existing provision.

Progress might be made without recourse to complex bio-economic simulation modelling at individual farm level. Instead Logue *et al.*, (2000) proposed culling guides based on the work of Stott *et al.*, (2002). An example is shown in Figure 2. It shows how trade-offs between SCC and milk yield may be balanced when short-listing cows for replacement. Of course, other criteria will also be important especially at the borderlines. However, Logue *et al.*, (2000) report that the guidelines reflect best practice and trends observed in the field. The diagram illustrates how much more severe culling criteria may have to be when faced with a *S. aureus* problem. It is likely that organic farmers will wish to combine targeted culling strategies with a wide range of good management and husbandry practices advocated for use in the control of mastitis in preference to the use of antibiotics (Lampkin, 1990).

Figure 2: Culling guide for cows in lactation 5 based on DP results of Stott *et al.* (2002). Cows performing in the shaded area (high yield and/or low SCC) should be retained, those in the unshaded area should be considered for replacement. The darker shading refers to herds infected with *S. aureus* mastitis, lighter shading is for control herds (see Table 1).



Dealing with risk

The loss-expenditure frontier of Figure 1 shows that as expected, higher expenditure on mastitis control tends to be associated with lower losses from the disease. However, the marginal reduction in loss falls with increasing expenditure and may eventually exceed the marginal expenditure. This illustrates the well-known law of diminishing returns, which is at the heart of production economics (see Debertin, 1986). It dictates that an optimum level of disease/risk of outbreak exists and maximum effort to reduce or eliminate disease/risk of outbreak may not always be justified on financial grounds. Even so, calls to minimise the risk from disease by adopting the 'precautionary principle' are made (see for example Royal Society, 2002). These calls are understandable in the UK given recent experiences with foot and mouth disease and BSE. However, they should be made with some knowledge of the minimum total costs of the disease so that the extra resources needed to adopt the precautionary principle can be estimated.

Resources devoted to disease prevention must be diverted from their best alternative use; i.e. there is an opportunity cost of adopting the precautionary principle. Due to the law of diminishing returns, considerable resources can be devoted to disease at the margins for little, if any, additional gain. However, it is difficult to apply the economic analysis framework to potential risks from an infinite array of possible future outcomes. Challenges increase still further where some of these outcomes are perceived to be particularly undesirable (e.g. with BSE or foot-and-mouth disease) and/or include important non-market effects, such as the social distress and disruption caused by foot and mouth disease (Fraser of Allander *et al*., 2003). Under such circumstances, it can be helpful to turn to decision analysis techniques designed to cope with risk (Hardaker *et al*., 1997).

Business decision analysis, sometimes called management science or operational research, recognises the need to find the best possible solution to a problem within the resources and constraints that govern the choices faced (Hackett and Luffrum, 1999). What is best will depend on the individual decision-maker's objectives. Often this will be assumed to be profit maximisation or cost minimisation as implied in the mastitis examples given above. In that case, mathematical programming techniques such as linear programming (LP) (Barnard and Nix, 1979) may be the most appropriate method. However, the increased risk in agriculture associated with globalisation (Harvey, 2001) may increase the emphasis on risk minimisation rather than profit maximisation. This is likely to be particularly important for organic farmers, where the goal of long term sustainability is fundamental (Lampkin, 1990) and probably better suited to an objective of reduced variability (risk) than short term profit maximisation.

Unfortunately, one of the disadvantages of LP is that it does not deal with risk (Barnard and Nix (1979). Problems of data availability and unfamiliarity have in any case limited its use in animal health economics (Jalvingh *et al.,* 1997). This is a common problem. A major development in data collection frameworks (largely in the hands of the veterinary profession) is required so that economic models can be made to fly, and can lead to empirical analyses of specific disease conditions and environments (McInerney, 1996). However, it is possible to use simulation modelling to explore the inherently dynamic and risky nature of disease (Bennett, 1992). Also, LP can be adapted in various ways to allow risk minimization, rather than profit maximization, to be the objective in farm-level economic models (Hazell and Norton, 1986). Stott *et al*. (2003) therefore combined both LP (adapted to minimise risk) and simulation modelling to explore the role that biosecurity against BVD (bovine viral diarrhoea, see Houe,1999 for details) might play in the management of risk on Scottish upland beef/sheep farms. It was found that a substantial proportion (up to 10%) of variance in farm income (risk) could be attributed to BVD (Figure 3). Risk was greatest for low-income targets (limited funds to invest in biosecurity) and where herds were known to be free of BVD at the start of simulations (more serious consequences, if biosecurity fails).

Figure 3: Predicted effect of target income on the proportion of variance in farm income (risk) attributable to BVD in Scottish cow-calf herds. In year zero of the BVD epidemic, either all animals are 'susceptible' (unshaded bar) or the herd is drawn at random from a population where the prevalences of antibody-positive and antigen positive herds were 0.95 and 0.5, respectively (shaded bars). (Taken from Stott et al. 2003)

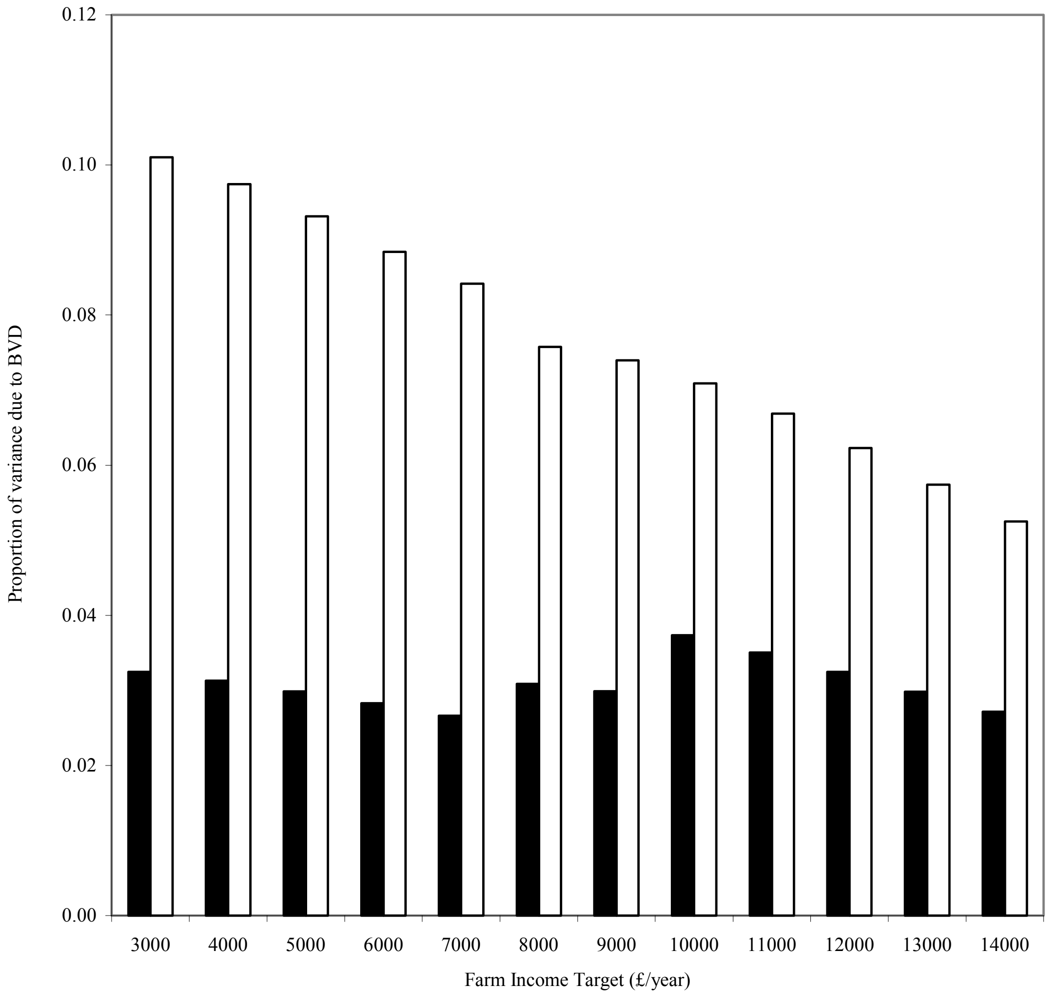


Figure 3 may seem to suggest that freedom from BVD is a bad thing because all animals are susceptible to the disease, exposing the business to additional risk from biosecurity breakdown. However, the overall risk at farm level was similar whether the farm was free of BVD or of unknown BVD status. The difference was that BVD free herds had more to gain from biosecurity and so invested more in biosecurity. This ensured superior herd performance, allowing income targets to be met with fewer sheep and cattle. These results are shown in Table 2. The reduced risk from fewer sheep and cattle and lower intensity of production compensated for the increased proportion of total risk due to BVD. Maintaining farm income from lower stocking rates implies less pressure on fixed resources and therefore potentially more sustainable production based on integrating animal health into whole-farm management. Such an approach is in-line with organic farming principles (Lampkin, 1990).

Table 2: Risk-minimising levels of key activities predicted by the LP model of Stott *et al.* (2003) at different farm-income targets and for two alternative herd BVD-status starting scenarios (Scottish cow-calf herds).

	Farm income target(£/year)					
	3,000		7,500		10,000	
Herd BVD status:	'unknown'	'BVD free'	'unknown'	'BVD free'	'unknown'	'BVD free'
Biosecurity*	0.45	0.85	0.70	0.90	0.75	0.90
Sell surplus heifers (head)	0	0	1	0	12	11
Produce and sell sheep (head)	217	231	527	512	589	584
Labour (hours)	4054	4087	4786	4752	4934	4921

* Probability of avoiding introduction/reintroduction of BVD virus on to the farm in any one year as determined by expenditure on biosecurity precautions.

Conclusions

There are many estimates of the financial impact of farm animal disease (see Bennett *et al.*, 1999 for a useful comparative assessment). However, true economic analysis to determine the optimum allocation of scarce resources to prevent and control animal disease is rare. This is due to lack of collaboration between scientists and economists, which has preserved gaps in the knowledge bases required by the economic models. However, simulation modelling can be used to fill these gaps and at least demonstrate the considerable potential of economic models to contribute to farm animal health and food safety. The examples in this paper show how such an approach increases understanding of the relationship between farm management and farm animal health. Such understanding should be seen as an information resource that can be substituted for other resources in the food production process. This makes it particularly attractive for organic farming where information resources can be used to replace the resources devoted to agrochemicals in conventional farming systems.

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Farm level economics of organic mink and beef production in several European countries

C. Deblitz, E. Deeken and M.D. Izquierdo-Lopez
Institute of Farm Economics and Rural Studies
Federal Agricultural Research Centre (FAL)

Introduction

This paper presents preliminary results of two projects within the Federal programme for organic farming', funded by the German Ministry of Consumer Protection, Food and Agriculture. As the projects will be completed in December 2003, the results are preliminary.

The International Farm Comparison Network (IFCN) provides the organisational framework of the project (see below). The main foci are case studies of typical organic dairy and beef farms in Europe and Argentina. The on-farm analysis comprises a cross country comparison of organic farms and an intra-country comparison of organic vs. conventional farms. Main subjects of analysis are production systems, production costs and profitability of milk and beef production.

International Farm Comparison Network - IFCN

IFCN is a world-wide, long-term network of scientists, advisors and farmers. The main objectives of the network are to develop a sustainable information system for better understanding of agriculture, creating a comparable data and information base for farm and supply chain comparisons world-wide. With this database and the knowledge of the network participants, the following type of analysis is carried out:

- Analysis of production systems;
- Analysis of cost of production;
- Impact of policies and changing markets;
- Analysis of technological change;
- Analysis of farm strategies; and
- Analysing the farmer-consumer supply chain.

More information on IFCN can be found at www.ifcnnetwork.org.

Database

All farm data in this paper refer to the year 2002. Data sets for the farms analysed have either been mounted for the year 2002 or – if the first year of defining the data sets was in 2001 or 2000 – the underlying prices and costs of the farms have been updated to 2002 by projections.

Due to the limited availability of organic farm data, the following data sources were used:

Argentina (dairy and beef)	Advisors, single farm data;
Austria (dairy and beef)	Regional statistics, advisors, farmer groups;
Czech Rep. (beef)	Regional statistics, advisors, single farm data;
Hungary (dairy)	Advisors, single farm data;
Denmark (dairy)	Surveys from Danish Advisory Centre;
Germany (dairy and beef)	1. Cluster analysis of data from certification agencies; 2. Advisors from growers associations / advisory centres
France (beef)	1. ‚Cas-types' from Institut de l'Evage Rennes; 2. Advisors and farmer groups.

It is important to note that the concept of using typical farms and building up a comparable data base world-wide cannot be statistically representative. However, it is an approach that
- covers a certain number of farms in the region selected;
- allows for very detailed analysis due to the detailed physical and economic data sets;
- provides a good input-output relation of scientists labour; and
- has so far no alternative when making world-wide comparisons.

In regard to organic farming, defining data sets is even harder due to there being
- less farms in total;
- more variety of farming systems;
- less specialisation compared to conventional farming;
- more variability in yields; and
- more off-farm and direct sale activities.

As a consequence, the organic farm results presented here can only be seen as a first step and part of a transition period of analysis. To make results more reliable, more farms have to be analysed on a permanent basis.

Farms selected

Table 1 gives an overview of the dairy farms selected for analysis. The numbers in the farm names reflect total cow numbers. The aim was to create similar farm sizes for conventional and organic farms and to have, in each group, a moderate farm size as well as (medium and) large farm sizes. The agricultural income of the farms mostly comes from milk production. Most farms in Austria and Bavaria generate some income from forestry and/or tourism.

Table 2 shows the main characteristics of the beef farms selected for analysis. The table shows the different farm sizes measured in number of finished cattle sold per year. It should be noted that the conventional farms in Germany are above average size that are specialised farms living exclusively from beef production. The origin of animals is either dairy (most conventional farms in Europe) or cow calf (most organic), the organic exclusively from the own cow-calf enterprise.

Table 1: Overview of typical dairy farms analysed. Shaded rows represent organic farms.

Name 1	Region	System 2	Cow number	Milk yield (kg/cow/y)	Acreage (ha) total	Acreage (ha) for milk	Other activities
AT-22	Mühlviertel	conv	22	5,926	27	27	Forest
AT-22	Liezen	conv	22	6,522	25	25	Forest, tourist flats
AT-35	Inntal	conv	35	7,283	34	34	
AT-22	Pinzgau	org	22	4,787	25	25	Forest, tourist flats
AT-30	Flachgau	org	30	6,416	27	27	Forest
DE-35	Bavaria	conv	35	5,576	32	32	Forest
DE-80	Schleswig-Holstein	conv	80	7,921	80	65	Crop, 20 bulls
DE-650	Sachsen-Anhalt	conv	652	8,853	1,700	800	Crop
DE-38	Bavaria	org	38	4,989	42	42	Forest
DE-50	Schleswig-Holstein	org	50	6,940	80	35	Crop, 10 steers
DE-120	Mecklenburg-Vorp.	org	120	7,258	200	112	Crop
DK-80	Jutland	conv	80	8,086	91	61	Crop
DK-150	Jutland	conv	150	8,560	140	113	Crop
DK-90	Jutland	org	90	7,445	117	111	Crop
DK-150	Jutland	org	150	7,750	188	183	Crop
HU-100	Hungary	conv	100	6,324	103	103	
HU-400	Hungary	conv	400	5,927	390	390	
HU-5	Hungary	org	5	6,112	18	15	Forest
HU-535	Hungary	org	535	7,210	864	810	Crop
AR-150	Cordoba	conv	150	3,865	250	270	Crop
AR-350	Buenos Aires	conv	350	5,284	820	460	Crop
AR-1400	Buenos Aires	conv	1400	5,453	3,000	1,229	Crop
AR-350	Cordoba	org	350	5,372	820	600	Crop
AR-1800	Buenos Aires	org	1800	6,358	6,400	3,443	Crop, cow calf, beef finishing

1 Number refers to total number of cows

2 Conv = conventional; Org = organic

Table 2: Overview of typical beef farms analysed (organic farms shaded).

Name	Region	System	No. animals sold p.a.	Breeds	Origin finishing cattle dairy cow calf	Origin finishing cattle own purchase	Other activities
AT-7	Steiermark	conv	7 Steers	Lim x Fleck	cow calf	own	Forestry
AT-30	Nieder Österreich	conv	30 Bulls	Fleckvieh	dairy	purchase	Crops
AT-15	Steiermark	org	15 Steers	Fleck X	dairy	purchase	Forestry
DE-190	Bavaria	conv	120 Bulls 70 Feeder	Fleckvieh	dairy	purchase	Crops
DE-240	Bavaria	conv	240 Bulls	Fleckvieh	dairy	purchase	Crops/Forestry
DE-280	Northrhine-Westfalia	conv	280 Bulls	Fleckvieh	dairy	purchase	Crops
DE-12	Bavaria	org	12 Steers	Fleckvieh	dairy	purchase	Crops/Hens/Hogs/Direct sale
DE-32	Hesse	org	18 Steers 14 Heifers	Lim x Fleck	cow calf	own	-
DE-130	Mecklenburg-Vorpommern	org	130 Steers	Angus/Lim X	cow calf	own	Crops
DE-132	Mecklenburg-Vorpommern	org	132 Bulls	Fleck x Lim/Angus	cow calf	own	Crops
FR-90A	Brittany	conv	90 Bulls	Char / Lim	cow calf	purchase	Crops
FR-90B	Brittany	conv	90 Bulls	Char x Dairy / Normands	dairy	purchase	Crops/Poultry
FR-17	Pays de la Loire	conv	4 Heifers 13 Cows	Charolais	cow calf	own	
FR-41	Limousin	conv	23 Steers 18 Cows	Limousin	cow calf	own	
FR-22	Pays de la Loire	org	6 Heifers 18 Cows	Charolais	cow calf	own	
FR-35	Limousin	org	18 Steers 11 Heifers 6 Cows	Limousin	cow calf	own	
CZ-160A	North-east Bohemia	conv	160 Bulls	Holstein	dairy	own	Crops/Dairy/Hogs & Sows
CZ-780	North-east Bohemia	conv	780 Bulls	Holstein	dairy	own & purchase	Crops/Dairy/Hogs & Sows
-	North-east Bohemia	org	-	Mix	-		Contract work
CZ-62	South Bohemia	org	33 Steers 29 Heifers	Piedmont	cow calf	own	Crops
AR-1300	Buenos Aires	conv	1300 Steers	Angus/Heref. /Zebu	cow calf	purchase	Crops
AR-2700	Buenos Aires	conv	2061 Steers 648 Heifers	Angus	cow calf	purchase	Cow-Calf (breeding)/Crops
AR-600	La Pampa	org	600 Steers	Angus/ Hereford	cow calf	purchase	
AR-1000	Buenos Aires	org	1000 Steers	Angus/ Hereford	cow calf	own & purchase	

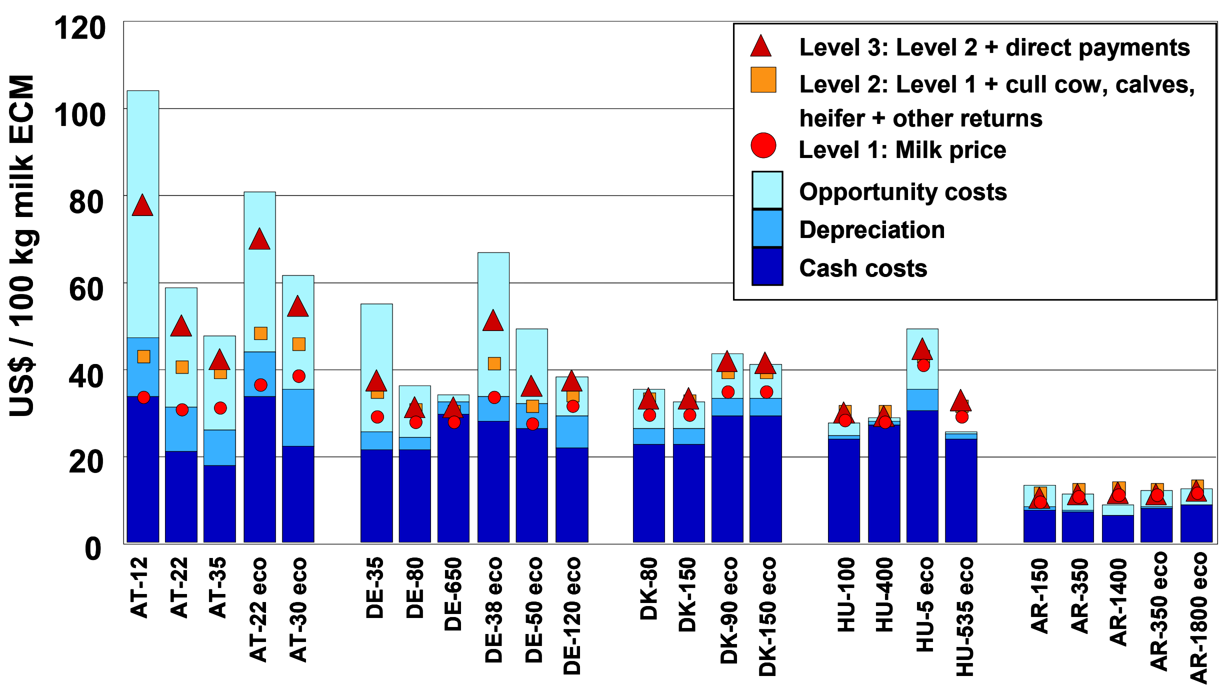
Results: dairy

The limited space available does not allow a presentation of all results in detail. Before going deeper into economic analysis, some major findings on production systems shall be briefly summarised in the following list:

- There is a relatively high degree of specialisation in milk, both in organic as in conventional farms.
- Milk yields are lower in organic than in conventional farms but correlation between herd size and milk yield seems to be more important.
- Replacement rates of comparably sized farms are lower in organic but seem to be clearly correlated with farm size for both conventional and organic (the bigger the herd size the higher the replacement rate).
- The production costs per kg milk are higher in organic.
- Highest costs are found on the small farms in Austria, Germany and Hungary.
- Medium cost levels are found in farms with 100 and more cows.
- Lowest costs are found in Argentina
- Profitability on organic farms appears to be no lower than on conventional farms.

Figure 1 shows the total cost and returns of milk production for the selected farms in 2002. The farms are shown on the x-axis and values are in US$ per 100 kg energy-corrected milk (ECM).

Figure 1: Total cost and returns of milk production in the year 2002



Milk prices

When comparing milk prices within Europe, Germany and Hungary show lower prices than Austria and France for both conventional and organic milk prices. With the exception of the DE-50 farm in Germany and the Argentinian farms, organic prices are higher than conventional. For the HU-535 there is no price premium because of the lack of marketing channels for organic milk.

Non-milk returns

Non-milk returns consist of meat returns from cull animals, returns from breeding heifers sold and direct payments. Premium levels in Austria appear to be particularly high. Farms in Austria can relatively easily accumulate various types of premiums like less favoured area premium, environmental programmes premium (AT-12), additional hill premium (AT-22eco), sometimes combined with a low milk yield that leads to high figures per 100 kg milk.

Cash costs and depreciation (Costs from profit and loss account)

For comparable farm sizes, cash costs and depreciation in EU family farms appear to be comparable and higher in organic than in conventional farms. With the exception of the small organic dairy farm with 5 cows, cash costs in the Hungarian farms are on comparable level with EU-farms as they have to pay almost all of the production factors (former cooperative/state farms). In Argentina, cost and price levels are at a level of three to four times lower than the European farms without significant differences between organic and conventional farms.

Profitability (difference between total returns and cash costs + depreciation)

The picture shows that in the year 2002 almost all EU farms and the Hungarian farms would have made a profit without direct payments. The main reasons are relatively high milk prices and recovered beef prices for cull animals after FMD and BSE in 2001. Taking the direct payments into account, all farms make a profit. The organic farms appear to have at least the same level of profitability as conventional farms.

Full economic cost and profitability

To get an idea about the longer-term perspective of the farms, it is useful to include the so-called opportunity costs into the analysis. This is done by putting a value to the own (family) labour (local wage rate for qualified labour), the owned land (local rent price) and the equity of the farm (an interest of 3% real) which represent the alternative use of these production factors.

The highest opportunity costs, mainly labour, occur in (small) family farms. Low opportunity cost can be seen in former state and cooperative farms (CEC-countries) and commercial farms (Argentina) where most of the production factors are paid. There are only a few farms able to cover full economic cost and make an entrepreneurs profit.

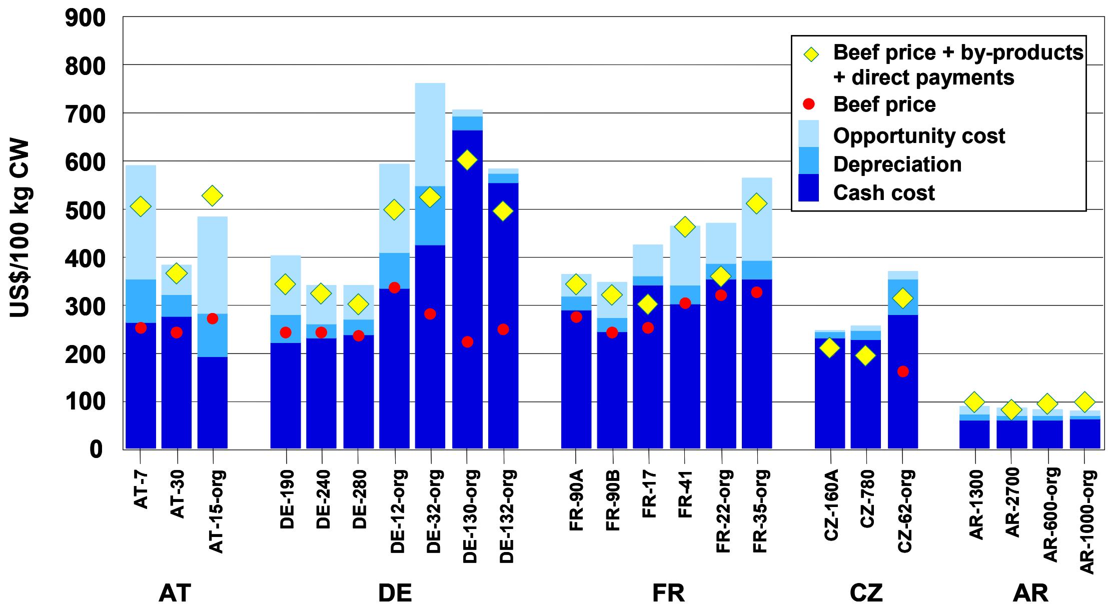
Results Beef

The limited space available does not allow a presentation of all results in detail. Before going deeper into economic analysis, some major findings on production systems shall be briefly summarised in the following list:

- The degree of specialisation in beef finishing is generally not as high as in dairy and lower in the organic than in conventional farms.
- The combination of beef finishing with cow calf production in organic farms is very common.
- The beef-products are very diverse: baby-beef, steers, bulls, heifers, cows.
- Calves/weaners and beef must often be sold on conventional markets.
- (Coupled) Direct payments help to be profitable (but also distort input prices).
- Labour productivity in organic is usually lower than in conventional in comparable size class.
- Land productivity in organic is clearly lower than in conventional systems analysed.

Chart 2 shows the total cost and returns of beef production 2002 for the selected farms. The farms are shown on the x-axis and values are in US$ per 100 kg carcass weight sold per year.

Chart 2: Total cost and returns of beef production in the year 2002



Beef prices and direct payments

Conventional beef prices between Austria, France and Germany are comparable at US$ 250-280 per 100 kg CW. Price levels in Czech Republic are around US$ 200 and in Argentina around

US$ 100. Organic price premiums can be observed in Austria, Germany and France whereas in the Czech farms analysed and in Argentina as a rule no price premium was realised in 2002 (no export). Comparing the FR-17 and FR-41 farms show that differences in conventional prices can be higher than differences between conventional and organic farms. In this case, the FR-41 farm has Limousin cattle and participates in the Label Rouge meat marketing and quality scheme, resulting in higher prices than FR-17 with Charolais production without special marketing.

Direct payments for organic farms in the EU-countries and Czech Republic are higher than in conventional farms, mainly due to the organic premium. However, there is often a link between organic farming and the occurrence of other premiums like the steer premium in DE-130, FR-35 and CZ-62. In France there is no premium for maintenance of organic farming after the 5 years conversion period. Consequently, the premium level of FR-22 producing only heifers and cows is relatively low. And finally, the high premium level in AT-7 comes from the less favoured area premium and the hill premium for managing steep slopes.

Cash costs and depreciation (Costs from profit and loss account)

Conventional cost levels in the EU-countries are between US$ 260 (DE-240) and US$ 350 (AT-7) per 100 kg CW. Cost levels in Czech Republic are slightly lower and at approx. US$ 80 per 100 kg CW much lower in Argentina. Cost levels in organic farming in Germany, France and Czech Republic are higher than conventional. The highest cost of the comparison shows the two Eastern German ex-cooperative farms that have to pay all production factors. In Argentina, no differences in cost levels between conventional and organic exist. The reason is that both systems are very similar and that organic farming takes place in locations with lower land prices than conventional.

Profitability (difference between total returns and cash costs + depreciation)

With the beef price only (without direct payments) none of the EU and the Czech farms analysed would be able to make a profit. Some of the organic farms in Germany, France and Czech Republic would even run into serious cash-problems. Only the farms in Argentina (both conventional and organic) realise a profit.

Adding the direct payments to the price, the situation improves significantly for many of the EU and the organic CZ-farm. However, the two East German organic farms, the farms with no steer production and no organic premium (FR-17, FR-22org) and the Czech farms are not able to realise a profit.

Full economic cost and profitability

When taking the opportunity costs into consideration (explanation see dairy results), costs particularly increase in family operated, small and organic farms (for example in AT-7, AT-15, DE-12, DE-32, FR-farms). Furthermore, comparing full economic cost with total returns of beef finishing shows that with the exception of the Austrian organic and 3 Argentinian farms none of the farms can cover full economic cost.

Market situation for organic livestock products in Europe

U. Hamm and F. Gronefeld
Agricultural and Food Marketing, Faculty of Organic Agricultural Sciences,
The University of Kassel

Introduction

In analysing the European market of organic products, the main problem is that no official statistics exist about production, consumption and international trade. The following contribution is based on data collected within the research project Organic Marketing Initiatives and Rural Development (OMIaRD) financed by the EU within the Fifth Framework Research and Technical Development Programme. Data on production, consumption, foreign trade, farmer and consumer prices were collected by national experts for all EU countries plus the four non-EU-members Czech Republic, Norway, Slovenia and Switzerland for the years 2000 and 2001. All data presented in this contribution are preliminary data, because the data evaluation has not yet been completed.[1]

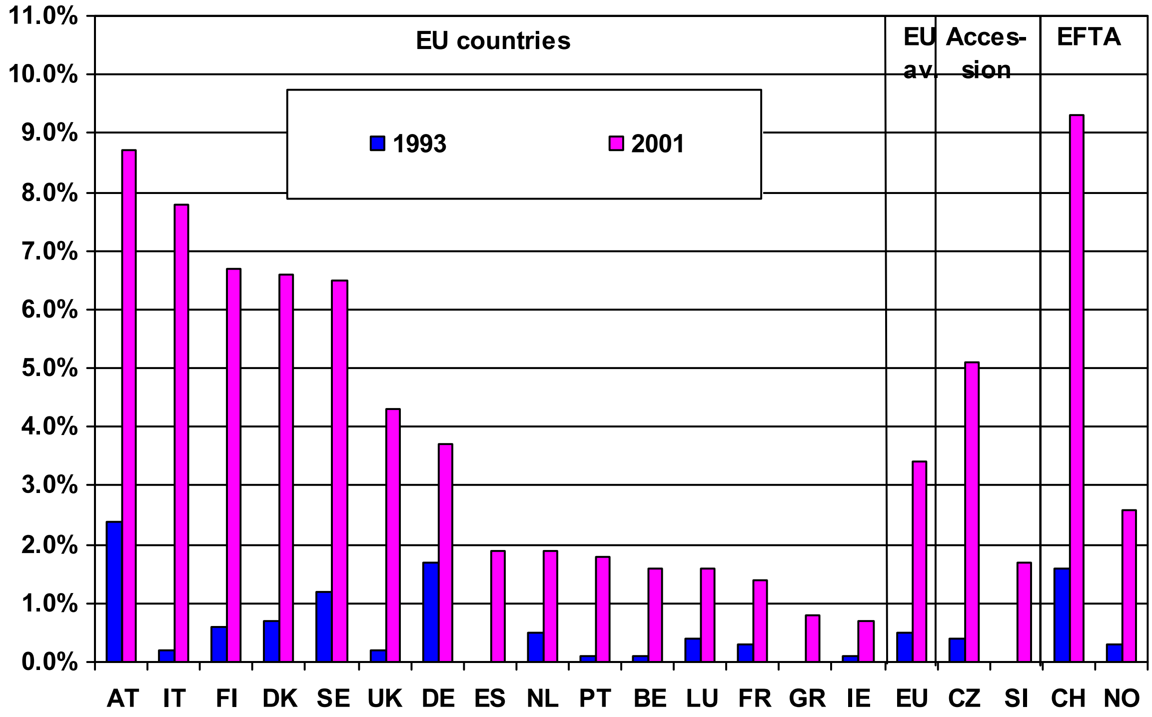
Organic land area and livestock production

Before analysing the production from organic livestock it is useful to look at the development of the organic area as a percentage of the total utilisable agricultural area (UAA). Figure 1 shows that there was a remarkable growth of the share of the organic area between 1993 and 2001 in all countries surveyed, however with very different growth rates. The EU average for the organic area of 3.4 percent of the UAA in 2001 has been far exceeded in Switzerland, Austria, Italy, and the three Scandinavian EU member states, Finland, Denmark and Sweden.

Table 1 shows that the organic animal production in the EU is at a comparatively low level with around 2 percent of the total production for beef and milk, between 1 and 2 percent for sheep and goat meat and eggs, and 0.3 percent for pork and poultry. The figures from the milk column display Austria and Denmark with an organic percentage of more than 10 percent, these two nations stand for half of the total organic milk production in the EU, even though they are comparatively small countries, but with a large organic sector. While the clear leader in organic beef production is Germany standing for 30 percent of the organic beef production in the EU, the highest share of organic beef production of the total beef production was measured again in Austria with nearly 10 percent. Organic sheep and goat meat production reached double-digit percentages of total production in Austria and Finland. However, in these countries, conventional production is at a low level and sheep are mainly used for landscape conservation in environmentally less favoured areas.

[1] If any reader of this contribution knows statistical data for countries where no data (nd) is listed or if a reader has different statistical data, the authors would be very happy about indications and references in this regard.

Figure 1: Development of organic area as a percentage of total UAA between 1993 and 2001



Source: Hamm and Gronefeld (2003)

Table 1: Organic share of total production in 2001

Country	Milk	Beef (incl. veal)	Sheep and goat meat	Pork	Poultry	Eggs
AT (8.7)	12.7	9.6	25.0	0.5	0.5	3.3
BE (1.6)	1.2	1.0	2.2	0.1	0.3	0.5
DE (3.7)	1.5	3.2	6.5	0.4	0.7	1.6
DK (6.6)	10.4	4.4	6.7	0.3	1.5	10.0
ES (1.7)	0.1	2.2	2.1	0.0	0.0	0.0
FI (6.7)	1.0	0.8	15.7	0.5	0.1	2.7
FR (1.4)	1.0	2.2	1.4	0.2	0.4	2.1
GR (0.8)	0.5	1.2	1.1	0.1	0.0	0.1
IE (0.7)	0.1	0.9	0.4	0.0	nd	0.4
IT (7.8)	1.9	1.6	0.0	0.2	0.1	0.7
LU (1.6)	0.5	0.4	5.9	0.6	9.2	2.3
NL (1.9)	1.0	0.3	1.4	0.1	0.1	0.4
PT (1.8)	0.1	0.2	0.2	0.1	0.0	0.0
SE (6.5)	4.0	2.8	4.8	0.6	0.2	3.0
UK (4.3)	1.5	0.7	0.8	0.4	0.2	1.6
EU (3.4)	**1.9**	**2.2**	**1.6**	**0.3**	**0.3**	**1.3**

Organic pork and poultry production is at a very low level in all surveyed countries apart from organic poultry production in Luxemburg where one huge farm is responsible for the high organic share of poultry production. The main reasons for the low percentages of organic pork and poultry production of the total production are relatively high costs of production due to strict regulations for organic husbandry and high costs for organic cereals and oilcakes, so that high consumer price premiums for organic pork and poultry clearly limit the demand. Even though these arguments are the same for eggs, the organic share of the total production is much higher for eggs in all surveyed countries, except Luxemburg. The main reason for the higher organic percentage of eggs lies on the demand side. Demand for organic eggs and the willingness of consumers to pay high price premiums for organic eggs is much higher than for meat. Apart from this, high percentages of organic egg production is taking place in small holdings where the additional costs of the organic production are not as high and from where most of the eggs are sold directly to consumers.

Share of organic products sold as organic

A very important indicator for the success of the organic sector of a nation is the share of organic products that is sold as organic, normally with price premiums for the organic origin. If a greater amount of the organic production must be sold as conventional, normally for conventional prices, this lowers the profitability of organic farms. Table 2 shows that there are sales problems for organic sheep and goat meat, milk and beef in most of the European countries, while clearly more than 90 percent of the EU production of organic pork, poultry and eggs were sold as organic in 2001. The commonness of all organic animal products with sales problems is that their production is based on grassland.

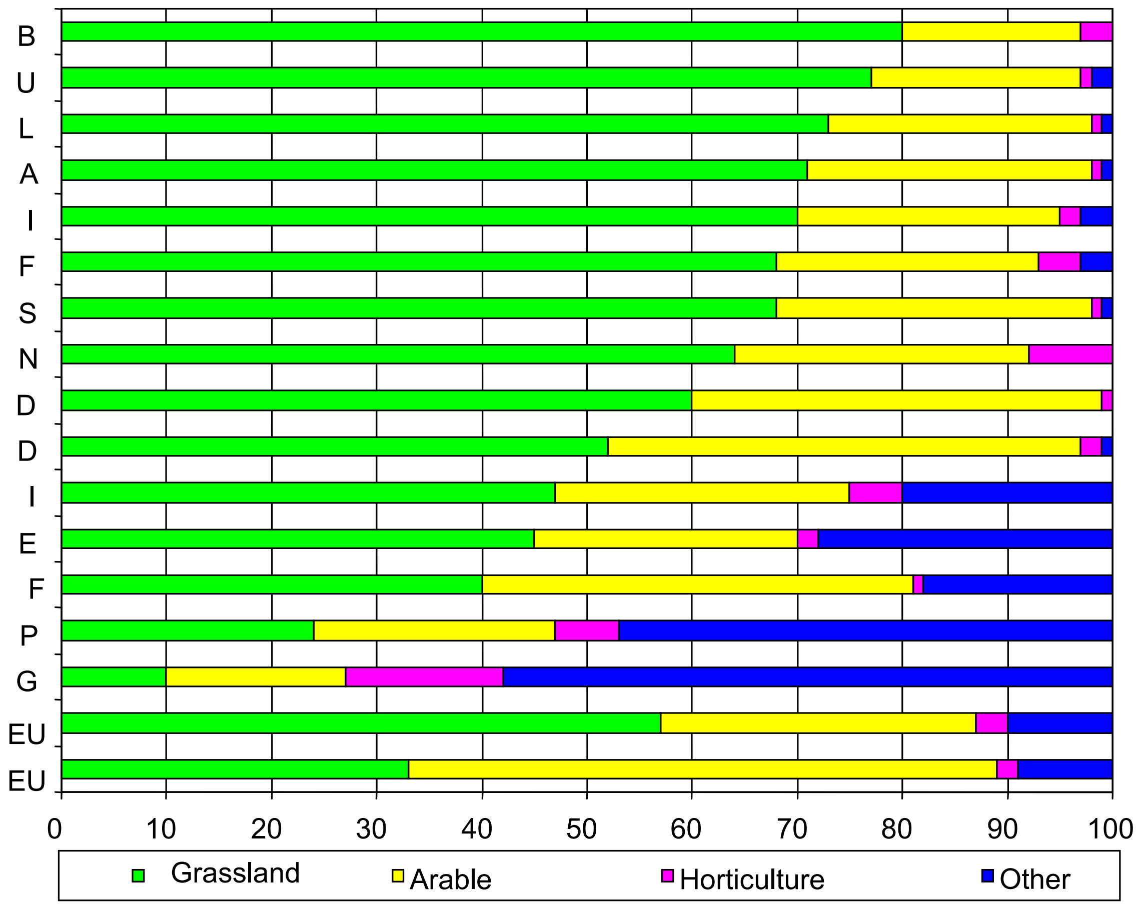
Table 2: Share of sales sold as organic in 2001

Country	Milk	Beef (incl. veal)	Sheep and goat meat	Pork	Poultry	Eggs
AT	54	60	30	97	92	83
BE	100	75	85	100	95	100
DE	82	70	60	97	100	95
DK	31	33	60	75	100	100
ES	60	20	20	90	90	80
FI	100	65	90	75	34	90
FR	87	100	100	100	100	100
GR	40	50	92	100	100	90
IE	100	50	90	100	nd	100
IT	100	60	nd	97	95	100
LU	65	100	50	100	100	100
NL	100	100	90	100	100	100
PT	30	80	80	90	100	100
SE	75	90	100	100	100	100
UK	65	95	80	85	100	90
EU	**68**	**69**	**54**	**94**	**99**	**97**

Organic land use, subsidy structure and imbalances in livestock production

Looking at the organic land use in the EU (see Figure 2), it is obvious that EU-wide a much higher percentage of grassland was converted to organic than arable land. While the total UAA in the EU consists of only 33 percent of grassland and 56 percent of arable land the relation between grassland and arable land for the organic area is nearly opposite: 57 percent grassland and 30 percent arable land. Obviously, it was more attractive for farmers in grassland regions to convert their farms to organic agriculture than for farmers with a high percentage of arable land. This leads to the question of the EU support scheme for organic agriculture by paying area-based premiums for the conversion to and the maintenance of organic agriculture.

Figure 2: Organic land use in 2001



Source: Hamm and Gronefeld (2003)

In several EU countries (Finland, Ireland, Italy, Luxemburg and Portugal) the premiums for conversion are equal for arable land and grassland, although it is known that the costs of conversion are much higher for arable land than for grassland. There are even two EU countries, Denmark and Spain, which have higher payment rates for a conversion of grassland than for arable land. Only in France and Sweden are the area-based premiums for a conversion of arable land more than double as high as for grassland, whereas in all countries not mentioned above the premium for arable land is much lower than 50 percent compared with grassland.

The sales problems for grassland-based organic products have even led to significant re-conversions of farms from organic to conventional in the last few years, especially in Austria, but also in some parts of Germany. It is to be expected that farmers in other European countries with greater sales problems for organic milk and beef will follow, so in Denmark, Sweden and the UK. On the other hand, there are several EU countries reporting that the demand for organic pork, poultry or eggs was higher in 2001 and 2002 than supply (including imports), so for pork in Austria, Belgium, Germany, Spain, Finland, Greece, Luxemburg, Portugal and Sweden, for poultry in Germany, Greece, Luxemburg, Portugal and Sweden and for eggs in Spain, Portugal, Sweden and the United Kingdom. It should also be mentioned that there were some EU countries with a supply deficit for milk (Spain, Finland, France, Greece), for beef (Spain, Finland, Greece, Luxemburg) and sheep and goat meat (Spain, Greece, Portugal). Obviously, trade between EU countries was not able to remedy these supply deficits, although there are some countries with a supply surplus and sales problems at the same time. The reasons could be due to a lack of market transparency or to high transport costs for small amounts of organic products. It is also remarkable that there are a lot of countries expecting supply deficits for animal products in future, above all for pork. Supply deficits were also foreseen for animal feed, especially for leguminous fodder crops and feed mixture.

International trade for organic animal products in total is on a very low level compared with organic plant products. The only animal product group of significance is milk and milk products where Austria, Germany, Denmark and the Netherlands are the main exporting countries while France and Italy are the main importing countries. Main beef exporters are Germany and Austria, main beef importers are the UK, Italy, France, the Netherlands and Belgium. Of the non-EU-member countries, the Czech Republic and Argentina supply some EU countries with beef. Foreign trade for sheep and goat meat as well as for pork, poultry and eggs is on a very low level with amounts of much less than 10,000 tons for all surveyed countries together.

Share of food consumption and sales

Table 3 reports the figures for the organic share of total food consumption for animal products. Due to sales problems of organic products and a different (compared with the conventional trade) share of foreign trade these data are quite different from the production share in many countries. The organic share of total food consumption is highest for beef with 1.7 percent. Organic beef was one of the winners from the BSE-crisis in 2000 and 2001 which has strongly pushed demand for organic products in many countries, while the demand for conventional beef sharply declined at the same time. Combining both developments, the share of organic beef on total beef consumption has increased by 50 percent and more in many countries.[2] A comparably high share for organic beef 2001 was registered in Austria and Germany.

[2] However latest data from consumer panels in some countries show that in 2002 and 2003 the demand for conventional beef turned upwards again and there has been no more growth for the demand of organic beef.

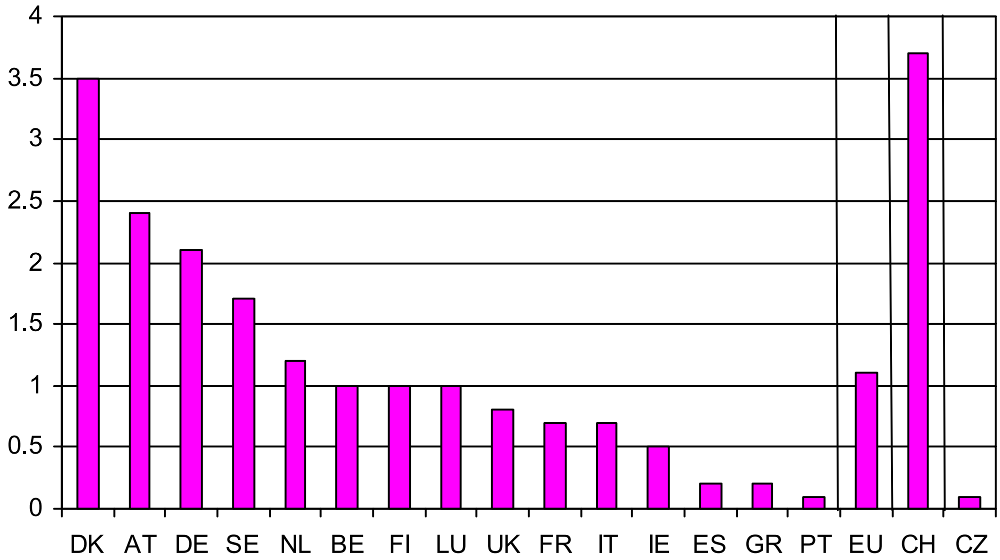
Table 3: Organic share of total consumption in 2001

Country	Milk	Beef (incl. veal)	Sheep and goat meat	Pork	Poultry	Eggs
AT	6.0	6.6	4.8	0.5	0.3	1.9
BE	1.5	1.4	0.3	0.3	0.4	1.0
DE	1.2	3.4	1.5	0.3	0.5	1.6
DK	10.1	1.8	0.9	0.7	2.4	8.8
ES	0.0	Nd	0.4	nd	0.0	0.0
FI	1.0	0.5	5.8	0.4	0.0	2.6
FR	0.7	2.2	0.8	0.2	0.4	1.6
GR	0.2	0.3	0.9	0.0	0.0	0.1
IE	0.1	1.6	1.3	0.0	nd	0.4
IT	1.3	1.0	0.0	0.1	0.1	0.7
LU	1.6	0.6	0.5	0.5	1.0	5.2
NL	1.6	0.7	1.1	0.3	0.3	0.6
PT	0.0	0.1	nd	0.0	0.0	0.1
SE	2.8	2.1	1.9	0.5	0.2	3.0
UK	1.0	0.8	0.5	0.3	0.3	1.4
EU	**1.2**	**1.7**	**0.7**	**0.3**	**0.3**	**1.3**

The share of organic consumption of total food consumption for eggs and milk, which was between 1 and 1.5 percent in the EU in 2001, reached comparably high percentages in Denmark with 10 percent for milk and nearly 9 percent for eggs. The organic consumption share of sheep and goat meat differs strongly between the EU countries. In countries where the total consumption of sheep meat is very low, as in Austria, Finland and Sweden, the organic share is relatively high, whereas in EU countries with a high consumption of sheep meat, e.g. the UK, Spain or France, the organic share is relatively low. The organic share of total food consumption for pork is very low in all EU countries; in no country was a share of at least 1 percent registered. With regard to poultry a consumption share of 1 percent or more was only reached in Denmark and Luxemburg. Supply deficits and high consumer prices have limited the demand for pork and poultry in many countries.

Figure 3 shows the organic share of total food sales in 2001. The data about total food sales contain all organic products, not only the above mentioned product groups, but also plant products, beverages, sweets etc. In Europe there have been two clear leaders in organic food sales in 2001, Switzerland and Denmark reporting 3.7 and 3.5 respectively of the total national food sales. Austria, Germany, Sweden and the Netherlands have also organic shares above the EU average of 1.1 percent, while the Mediterranean countries Spain, Greece and Portugal have organic market shares much below 0.5 percent. In these countries, the domestic organic markets are in their infancy and a lot of organic products are exported to Northern and Central European countries.

Figure 3: Organic share of total food sales in 2001



Source: Hamm and Gronefeld (2003)

Conclusions

As mentioned before the data evaluation and analysis has not yet been completed. It has to be analysed whether the main influence factors on the amount of organic demand are still the same in 2001 as in our analysis for the year 2000 (Hamm *et al.*, 2002). In our previous study the demand for organic products was positively influenced by a high share of total organic food sales through general food shops (conventional supermarkets), by a high share of consumers knowing a common or national label for organic food products, and by low consumer price premiums for organic products over conventional products.

However, some conclusions for the further development of the organic market for animal products can be drawn from the first results of our analysis. There are a number of marketing problems limiting the further market development:

- unbalanced developments of supply and demand in many countries, especially for the grassland-based animal products milk and beef,
- a very low market transparency so that important market signals are not reaching market actors in time
- quick changes in market situations because of the small volatile markets and because of food scandals in the conventional and in the organic sector with huge influences on the short-term development of demand.

Required actions to overcome the marketing problems and to support the further development of the organic animal sector are:

(1) constitution of a European market information system for organic products with up-to-date market data (esp. producer and consumer prices) and data allowing short and medium-term forecasts about the development of production (esp. data about the production of newly converted farms)
(2) adaptation of support policy for conversion of farms to the market situation by the amount of area-based subsidies (for grassland, arable land, horticultural land) and by a new support policy for the cereal-based animal production (e.g. credits for rebuilding of housing units)
(3) more research in all areas of organic animal production and marketing of their products

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Political economy of organic foods

P.R. Kledal
Danish Research Institute of Food Economics

The core of political economy

In neoclassical economic theory the heart of analyses is the market. Supply and demand, prices and costs, producers and consumers are key components with measurable entities. But in a modern society of interdependent people with anonymous exchange, and no obligation other than a contractual one, there is a complex but invisible web of interdependence 'behind' the market.

When Adam Smith, one of the fathers of political economy, used the words 'invisible hand' in *The Wealth of Nations*, he was actually trying to illustrate this hidden complex interdependence of a commercial society behind the seeming array of interdependent anonymous exchanges. The pursuit of self-interest by the butcher, the baker etc., led to the happy outcome of satisfaction of their customers' wants. But of course, behind the baker was a chain of operations – the farmer who grew corn, the miller who ground it, and the transport that delivered the grain to the miller and the flour to the baker via wholesaler. Today, there would be a bakery, which would in turn deliver to the supermarket (Desai, 2002).

> The key analytic focus point in Political Economy is therefore not the market, but the site of production.

Political economy in the Marxian tradition follows this trait from Adam Smith trying to explain the workings of the invisible hand in production. But Marxian approache contains more than that. It is also the study of the dynamics of industrial capitalism with its strengths, contradictions, its limits and uneven development. It is a theory of conflict, trying to uncover and explain the formation of the social relations in production hidden by the seemingly free and independent actors on the market.

Karl Marx himself is generally thought to be a theorist of *industrial* capitalism rather than a theorist of agrarian studies. Yet, even disregarding his writing on pre-capitalist societies, Marx wrote hundreds of pages on agriculture under modern capitalism; in *Capital* alone there are over 400 pages where agricultural production is discussed (Mann, 1990).

Labour time and nature's time

Political economy in the Marxian tradition operates with two important assumptions:

i) Capital needs to accumulate; and
ii) Only labour creates value.

Both assumptions are key components in political economy explaining social, political and environmental problems, as well as the type of constraints agriculture encounters regarding time and space.

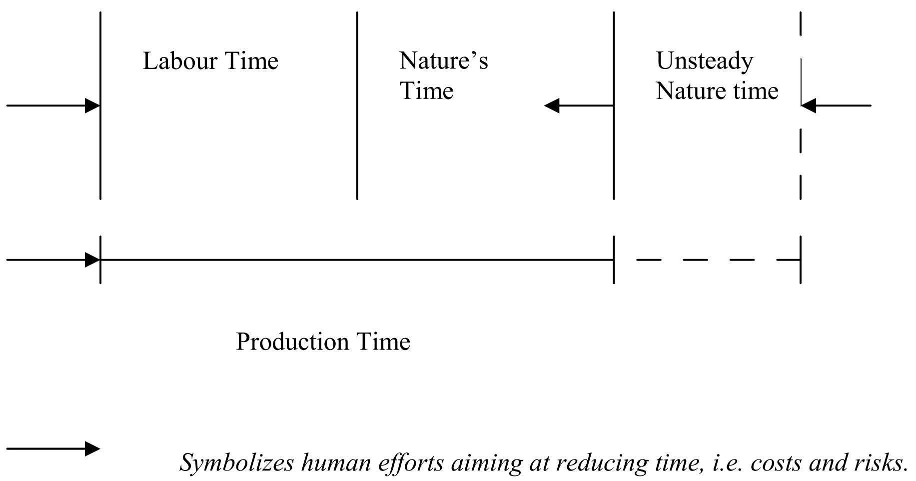
In 1978, James Dickinson and Susan Archer Mann published an article: "Obstacles to the development of Capitalist Agriculture" in the *Journal of Peasant Studies* (Dickinson and Mann, 1978). One of the central tenets of the Mann-Dickinson thesis was that capitalist development progresses most rapidly in those spheres where:

1. *Production time* can be successfully reduced; and
2. Where the gap between *production time* and *labour time* can be minimized.

According to Marx production time consists of two parts: one period when labour is engaged in production, and a second period when the unfinished commodity is being produced by nature itself. Two examples of this could be the maturation of cereals in the field or the gestation period of livestock. Since the intervals when labour is not being used create neither value nor surplus value, there is no accumulation of capital during production time, when it exceeds labour time. Therefore it follows the more production time and labour time coincide, the greater the productivity and self-expansion of capital in a given time period (Mann, 1990).

In Figure 1, production time consisting of both labour time and nature's time is illustrated. Production time can be prolonged due to drought, pests or other more uncontrollable reasons inherent in nature. Therefore, unsteady nature time has been added to production time. The arrows shows the attempts by humans to reduce production time either by shortening labour time or the time it takes for nature to produce a certain agro-commodity. Human attempts will more specifically be innovations from farmers, agro-corporations and researchers as well as govermental economical schemes, all trying to help agro-capital getting a better and less risky turnover. These attempts could also be an indirect pressure from retailers and food processors pressing farmers on price premiums and specific requirements on production size and time deliverables.

Figure 1: Labour Time + Nature's Time = Production Time.



Attempts to make labour time coincide better with production time would typically be specialization, division and enlargement of the agro-production, so the farmer or farm workers only have one or few assembly line work processes. For example, one farm takes care of farrowing, another only producing hogs etc. Shortening nature's time could be the development of GMO crops. Reduction of unsteady nature time could be the implementation of technologies like pesticides, precision farming (GSP: Global Positioning System) etc.

In contrast to an industrial production, made from non-living raw materials, commodities in agriculture are living species that automatically slows down the reproduction (turnover) of capital, due to the long interval it takes to reproduce the productive cycle again. Since capitalist firms extract profits during each turnover of capital, they can only use these profits to replenish and expand their production when the production cycle is over and the product sold.

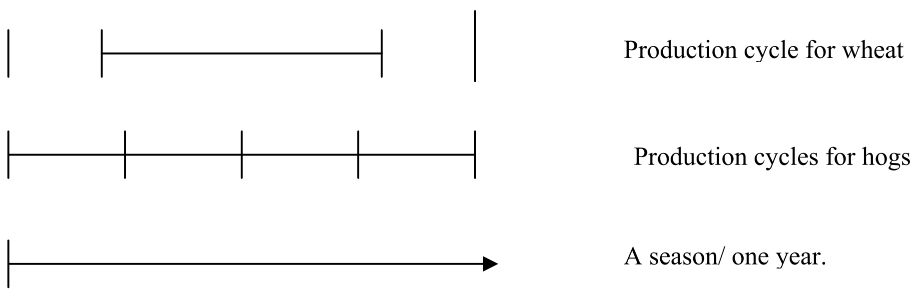
In Marxian theory, this is related to the circuit of capital, where money (M) is invested in commodities (C) (inputs like labour and means of production). The commodities are then used to produce an output sold at the market for an exchange value (price) (M_1) usually larger than M.

$$M \longrightarrow C \longrightarrow M_1$$

However the circuit of capital in agriculture and the relation to turnover time is not only different to the industry of non-living materials. The different agro-commodities also differ considerably from each other both in regard to production and labour time.

In figure 2, the production time of hogs and wheat is demonstrated. The turnover time for hogs can be almost four times a year whereas for wheat it is only one time (in the Northern hemisphere at least).

Figure 2: The amount of production cycles for wheat and hogs during a one year season.



Hog producers can therefore not only extract surplus value more times during the year, they can also replenish and even expand production from the surplus value appropriated. In contrast, wheat farmers must await the annual sale of their commodities, and is not in a position to expand production as often (Mann, 1990).

Labour time, nature's time and organic farming

What relevance does labour time in relation to production time of a certain agro-commodity have for organic farming? First of all, the consequences of agro-capital trying to shorten labour time and/or nature's time will at a certain point lead to different types of constraints on capital accumulation. The constraints could be conceived as environmental, food safety and animal welfare problems. If one then regards organic farming as a social counter reaction to these constraints, you start having an economic foundation for explaining social changes in agriculture. The consequences of agro-capital trying to reduce the circuit of turnover time can in this respect be seen as the reason for different social counter reactions setting up rules and regulations against the agro-capital pressure. The rules and regulations set up by the organic farmers and consumers themselves are in many respect counter reactions that actually *extend* nature's time and thereby total production time. This goes for rules about animal welfare with regard to space and access to the open air, for ban on pesticide use and for limits to the use of fertilizer input.

Secondly, the rules and regulations in organic farming aimed at 'guiding' agro-capital's road to profit maximization, seem also related to what type of agro-commodity is involved. Two hypotheses can be made in relation to the latter:

1. The more production cycles (shorter circuit of capital turnover), the more industrialized a certain agro-commodity will be, the higher probability for a difference between organic and conventional production methods; and
2. The less labour time and production time coincide in a certain agro-commodity, the greater mutuality will be found between organic and conventional production.

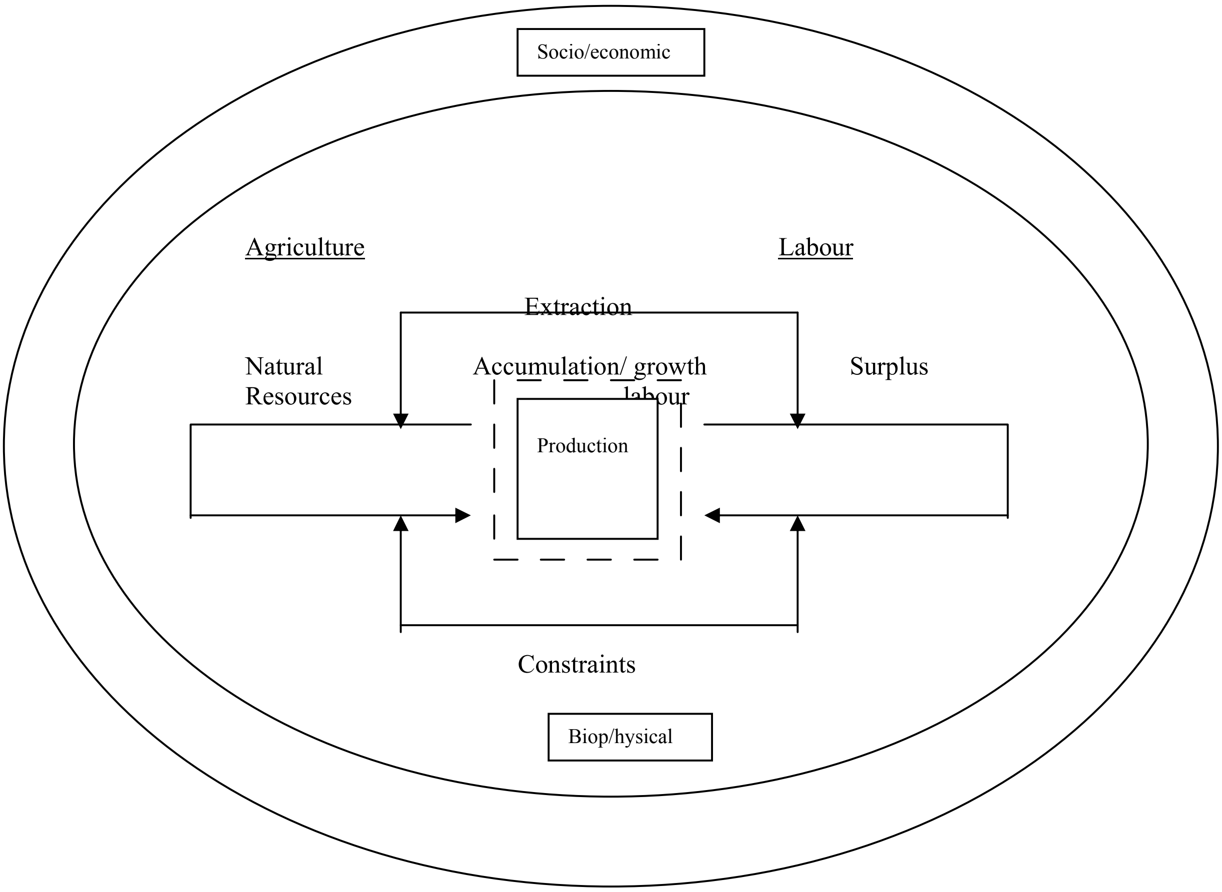
Examples of 1) would be within heavily industrialized productions like hog, chicken, egg, and beef. They are also areas of organic agricultural production where the market is of limited size. If, on the other hand, the difference between organic and conventional production methods is small, it will be easy for agro-capital to choose the lucrative organic production and harvest the price premiums. The conflict and discussions within the organic farm movement about setting up rules and regulations are therefore very closely linked to where and how the constraints on capital should be made.

Examples of 2) could be milk, cereals, fruit and vegetables, but with modifications. Lettuce, for example, with a short production cycle could very easily be found in 1).

Food regimes.

Let us now turn to the other important assumption in political economy: capital needs to accumulate. In a competitive market economy with new innovations, new technologies and a decline of costs, accumulation of capital will *ceteris paribus* take place through expanding production. But when production, in its need for growth, expands, it will encounter two types of constraints: Constraints in space, and as explained above, constraints on time. The compression of space and the speed-up of time are key components in the quest of capital accumulation in the modern era (Hendrickson & Heffernan, 2002) (Figure 3).

Figure 3: Constraints on space and time.



To come closer to what accumulation of capital in the modern era means for agricultural production and food consumption in relation to organic farming, the theories in political economy on 'regimes of accumulation' and 'food regimes' could be very fruitful. The theories are associated with the Regulation School descending from French structural Marxism of the 1970s (Jessop, 1990). Its principal figures, Aglietta, Liepietz, Boyer and others have employed a distinctive set of theoretically generated concepts – regime of accumulation, mode of regulation, Fordism – to explore relationships between capital, labour and the state. The main starting point for these writers is the argument that nation-states play a crucial role in regulating capital accumulation, and they see differing ways in which capitalism is regulated as historically specific 'regimes of accumulation' (Savage & Warde, 1993).

The different regimes are based essentially on the prevailing labour process: manufacture, dominant in the capitalist countries between 1870 and 1940; scientific management (called "Taylorism" after its main practitioner) and Fordism beginning at the turn of 20th century and dominant from 1940 to the late 1970s; and flexible accumulation, or post-Fordism, beginning with the economic crisis of the 1970s and expanding rapidly in the late 20th century. The Regulation School theorized society in terms of development models, their parts, and their transformations: *regimes of accumulation* described the main production-consumption relationships, *modes of regulation* described cultural habits and institutional rules (Peet, 1999).

Basically what the theories claim is that capital accumulation is related to specific historic times, with specific production-consumption relations and specific cultural habits and societal rules and regulations. By analyzing these entities, you can say something about class relations as well as property- and power relations in society, and thereby the ongoing conflict of how surplus value from production is divided. By examining the different interest conflict in relation to agricultural food production in a certain historical setting, you could also say something about possible societal directions.

The concept of a 'food regime' developed in the 1980's. It draws on the regulation theory, recognizing three similar historical periods in international agricultural development, starting with the first regime as a pre-World War I; the second from the 1940s to the 1970s; and the third from the 1980s to the present. Each regime is characterized by particular farm products and food trade structures that link production with consumption and regulations governing capitalist accumulation (Atkins & Bowler, 2001).

The *first food regime* was based on an extensive form of capitalist production relations, under which agricultural exports from white 'settler' countries in Africa, South America and Australasia supplied unprocessed and semi-processed foods and materials to metropolitan states in North America and Western Europe. The introduction of refrigerated ships in the 1880s increased both the range of produce that could be supplied by distant colonies and the distance over which perishables such as butter, meat and tropical products could be transported to the metropolitan economies. European imports of wheat and meat ('wage-foods') were exchanged for exported European manufactured goods, labour and capital (Friedmann and McMichael, 1989) (Figure 4).

The first food regime was undermined by the global economic recession of the late 1920s and early 1930s, but aspects of the regime survive. For instance, food trade in dairy produce, meat and cereals originating in the extensively farmed rangelands of the Americas and Australasia remains largely unchanged. Another remnant comprises the production of sugar, tropical tree crops (cocoa, coconut, rubber, palm oil, bananas) and beverages (tea, coffee) trough quasi plantation systems of production (Atkins and Bowler, 2001).

The *second food regime* developed under US hegemony and with the establishment of two new international agreements: the 1945 Bretton Woods Agreement governing the stability of exchange rates between national currencies (based on the dollar/gold standard); and the 1947 GATT rules on international trade. The former underpinned the international diffusion of the national model of economic growth; the latter excluded agriculture from more liberal trading practices and facilitated the further development of national state protection for agriculture: "the agricultural welfare state".

The second food regime is also characterized by a heavy industrialization of agriculture, resulting in a rapid increase in the average farm size and rural depopulation. Farmers leave for jobs in the growing industrial sector, and are in the same time being replaced by agro-industrial inputs like chemicals, farm machinery and fertilizers. Production intensified on pig, poultry and beef lot farms as well as wheat, and all supported by different national farm price schemes and export subsidies for disposal of surpluses.

The crisis of capitalist accumulation that ended the second food regime can be traced to the oil and food crisis of the early 1970s, comprising global recession, the collapse of Bretton Woods, soaring grain prices, the excessive costs of national farm support programmes, and the antagonism between the national regulation of agriculture and the growing commercial power of globally organized corporations (trans national agro-corporations) (Atkins and Bowler, 2001).

The final form or outcome of the *third food regime* is still uncertain, but several and often contradictory structures and processes have been identified:

- Increased global trading of food;
- Consolidation of capital in food manufacturing;
- New biotechnology;
- Consumer fragmentation and dietary change; and
- Declining farm subsidies (deregulation) or de-directed from farm price support to more environmental or regional support schemes.

The activities of the International Monetary Fund (IMF) and the World Trade Orgnisation (WTO), the successor of GATT, are central to the emergence of a new global regulatory structure. With more liberal trading policies increasing global competition are being brought on those farming regions, food processors and food retailers in developed countries, which, for many decades have been protected by national regulatory measures. At the same time, Third World countries are drawn into new trade and production- consumption patterns, where they are becoming the 'Garden of food producers to a First world Restaurant'.

Furthermore, the processing, marketing and retailing agribusinesses that were formed during the second food regime have become major players in this new competitive environment trading with food. By limiting state farm support programmes, the WTO is extending the corporate power of global agribusinesses relative to national (public) power, but at the same time supervising new forms of regulation arising out of the contest between nation states, the TNCs [what is this?] and popular movements (e.g. consumers, environmentalist, organic farmers), with the latter not formally represented at the negotiations (Atkins and Bowler, 2001).

Simultanously, there are counter movements by individual states joining supra-national trade regimes claiming their own 'regional rights' within the trading blocs (e.g. EU, NAFTA and APEC). While the final dimensions of the third food regime are still uncertain, the outcome seems likely to be influenced by the contest between *private* global regulation shaped by the TNCs and their requests for universal market rules, and a more *democratic* global regulation with the right to differentiated rules on production and environment formally controlled by each supra-national trading regime.

Organic farming in the third food regime

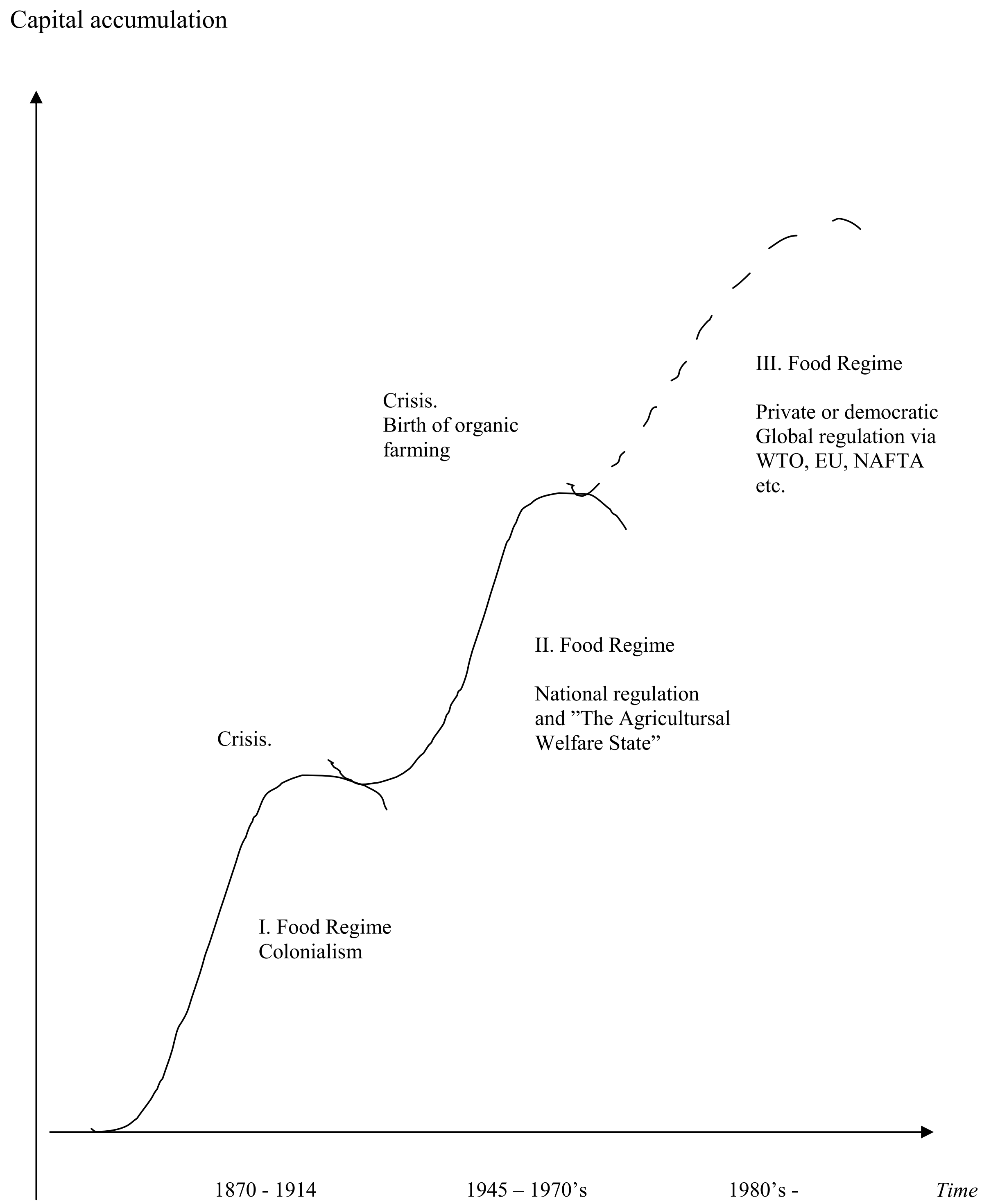
The hypothesis in this paper is that organic farming is born out of the accumulation crisis between the second and the third food regime. The attempts from agro-capital in the second food regime to raise productivity by using more fertilizer, concentrating more animals on fewer farms, spraying more pesticides etc. only increased environmental problems and gave raise to new agro-industrial food diseases.

In relation to these problems, organic farming can be seen as the result of a successful social counter-reaction, creating alliances between farmers and environmentally conscientious consumers. The success of the organic movement lies also in its ability to create alliances within the political institutions and thereby securing societal rules and regulations promoting organic farming on different levels. This could be direct economic support to farmers, economic schemes to organic food manufacturers promoting new products and expanding market opportunities, or building up research institutions or grants helping organic production.

From this point of view, the paradigm and the ideological foundation for organic farming is based on counter moves in relation to production-consumption structures and relations within the second food regime and its crisis in the 1970's and 1980's. But the world is now in a process towards a new food regime with radical changes on regulation on food production and food trade. Power relations within the food chain itself are moving away from farmers and food manufacturers to supermarkets and clusters combined by pharmaceutical, medical and biotechnical corporations. At the national level, government regulators are loosing power to new supra national institutions or non-elected administrators in powerful agencies like the WTO.

The 10.000-dollar question is: where is organic farming moving in relation to these forces and the fighting over the shape of the third food regime?

Figure 4: Food regimes.



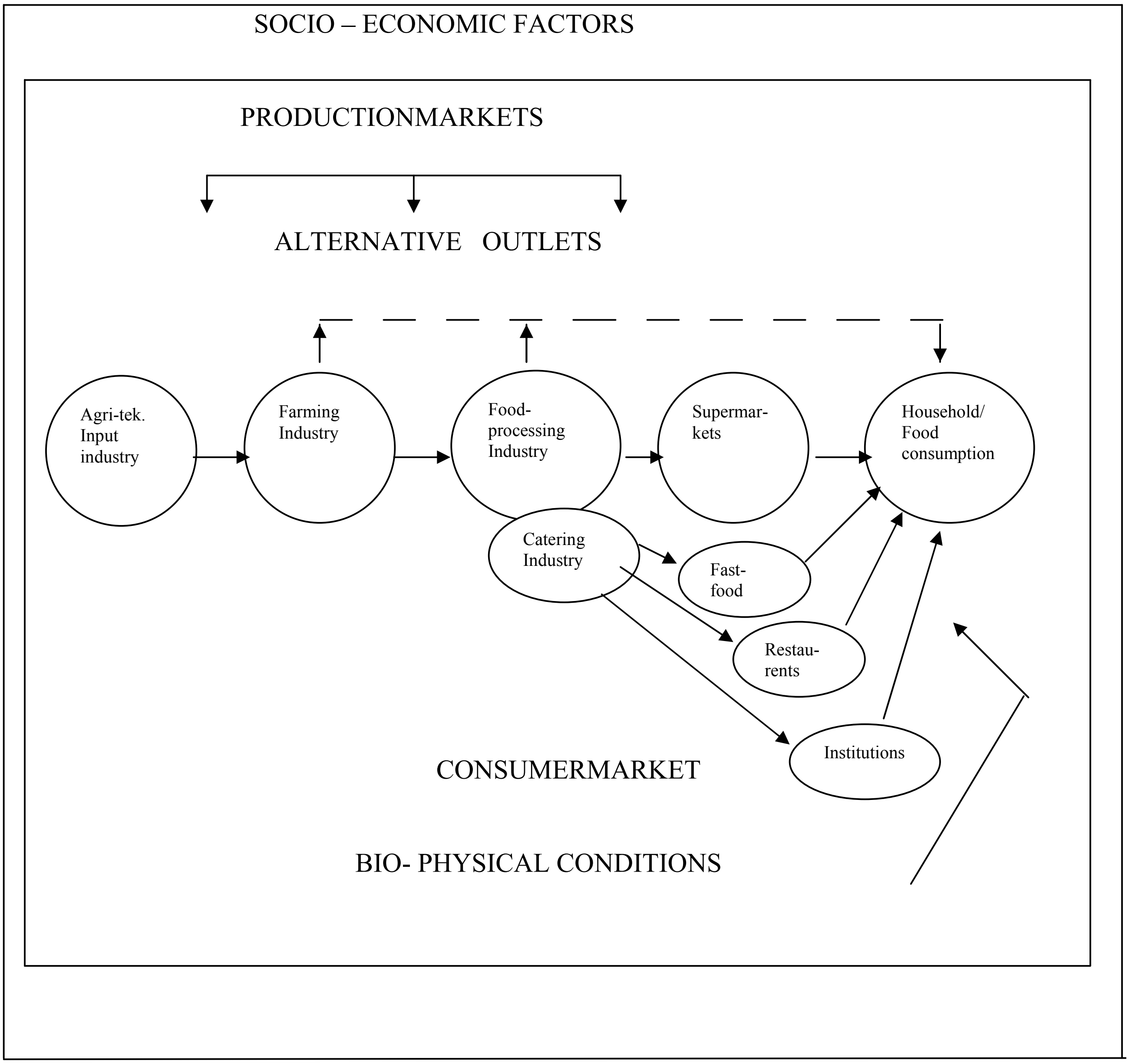
The organic consumer and the new modes of consumption

Following a Marxian reading, analysis of the agro-food commodity chain has been principally directed towards ”uncovering” the social relationships behind the production of a particular agro commodity. The agro-food studies have in general been *production-centered*. This line has especially been influenced by the pioneering work of William Friedland’s (1984) commodity systems analysis. Production is the locus of power and the privileged terrain of political action, and the commodity form acts as a “veil” that conceals exploitative social relations. Consumers, from this perspective, are passive both because they interact only in the non-political sphere of circulation (the market) and because they are unaware of the unequal power relationships obscured by the veil of the commodity fetish.

According to David Goodman and E. Melaine DuPuis (Rural Sociology 42/1-2002, pp.11-12) “The last two decades have seen an increasingly well-theorized challenge to the production-centered approach to economic relationships”. “While the debate over whether and how to integrate consumption into commodity systems analysis continues, consumption as a focus of study has gained a high profile in the social science disciplines...” …”Here it is particularly fruitful to look to those scholars who have remained in conversation with Marx while attempting to reconcile political economy with cultural studies. Many of these scholars come out of the “cultural Marxism” tradition pioneered by Raymond Williams and E.P. Thomson”. The contributions from these scholars (Hall, 1989; Mulgan, 1989), emphasized by Goodman and DuPuis, are, that consumer activism does wield power to shape the food system. They bring forward a particular interpretation of consumption and power grounded in meaning, identity, representation and ideology. For example, the consumers can aspire for power, if power is defined as the ability to set parameters, such as rights, obligations and rules governing processes. Hereby the political economy has a platform to explain the rise and attributions of “the political consumer” or the “organic consumer”, and why food emerges as an arena of struggle.

To contribute to the discussions in the social sciences regarding the shift from production to more emphasis on consumption, this paper presents a new model for commodity chain analysis that contains new *modes of consumption*.

Figure 5: Agro-industrial commodity chain.



In traditional commodity chain analysis, the food supply chain is often described as a simple input-output model with the five horizontal nodes starting with the input industry and ending with the consumer at the household. Sociological studies, however, have shown that new changes are emerging (Warde, 1997). What is occurring among the consumers is a substitution of practices between different modes of provisioning, from

Home to Market.

The substitution of practices between modes has great significance for understanding the social consequences of consumption of food. In contemporary society, there are four common modes of provision, each characterized by distinctive ways of producing goods and gaining access to the fruits of labor. These are:

1. Market (restaurants, hyper markets, fast food outlets etc.);
2. Institutional catering (hospitals, kindergarten, workplaces etc.);
3. Communal (friends, family); and
4. Home (household/individuals).

This paper modifies these four modes and incorporates them in figure xx as shown. Firstly, a whole new industry – the catering industry – has been included and fast food outlets, restaurants and institutional catering have been made subdivisions of the catering industry itself. Go into the kitchen of almost any restaurant today and you will discover shelves and closets filled with prepared and semi-prepared food items from the catering industry ready to be heated in a microwave or a traditional stove. The difference between many restaurants and fast food outlets are narrowing. More and more food products from the catering industry are also finding their way to the shelves and freezers of the supermarkets.

Institutions are besides hospitals, kindergartens etc. also covering the many kitchens at bigger workplaces. More and more people are having a meal or two a day outside the home, and the foodservice industry (catering industry) is one of the fastest growing food industries in terms of money. The new commodity chain model designed here should therefore ‘catch’ the sociological changes that are taken place when it comes to the increasing food consumption outside the home.

Secondly, an alternative link has been drawn from farm and process industry to the consumer. The alternative link should show the many new networks emerging between farmers, small dairies, cheese producers, quality meat producers etc. selling directly to the consumers, either face to face or through different types of subscription arrangements. The alternative production-consumption links exemplify the social countermoves against the consequences of the agro-capital push for making labor time and production time coincide more and more.

Another distinction the model has is between *production markets* and *consumer markets.* Above the consumer, markets have been described more thoroughly with the changing modes of consumption. When it comes to the production markets along the chain, they are very different from node to node. For example, the question on food safety, institutional control and regulations has to be handled very differently whether it is an exchange between the input industry and the farm, from farm to process industry, from process industry to retailers and from retailers to the consumers. Neither are the nodes along the chain similar when it comes to economic size and market power. The chain could be described as an hourglass lying down exemplifying the few companies in the input industry controlling most of that market. The input industry again is selling their products to a lot of farmers, who again are selling to a process industry with a few buyers, who are selling to a small number of retailers, who again sells to millions of non-unified consumers.

Going into the depths of the production markets, therefore, requires an insight into the power relations along the agro-commodity chain. Here clusters between a global oriented medicine industry, biotechnology industry and chemical companies are emerging, and gaining more and more market power upon the inputs to the farms. At the other end of the chain, global market oriented retailers are merging at a high speed favoring farmers and process industries who subordinate their productions to economies of scale (Bonanno, 1995; Heffernan, Hendrickson and Gronski, 1999; Hendrickson and Heffernan, 2002;).

Around the agro-commodity chain, the same rings as in Figure 3 are drawn, containing the socio-economic forces as well as the biophysical constraints that will interact and operate in a dialectic process with the actors along the commodity chain.

What does the future look like when it comes to organic farming and the changing economic power relations along the food chain? Several reports predict that the farm economy will split into two segments – one consisting of a small number of large scale farmers engaged in commodity production who depend on technologies and economies of scale to survive on razor-thin margins. The other segment will focus on the product-oriented, quality conscious consumers when it comes to agricultural production and processing methods (Hendrickson and Heffernan, 2002; Oxford Research, 2001; CALT, 2002). This does not automatically mean that organic farmers can capture the spaces within the two segments without struggles. But if one acknowledge that organic farming is a social countermovement that successfully has created new relationships in food and agriculture based on trust, traceability, equality and global responsibility, it should not be out of work for many years to come.

"It is the development of authentic relationships that have social and ecological components rather than being exclusively exchange oriented that makes firms operating in the global system most vulnerable. While advertising (promoting brands) can create the illusion of connection, it is only within the context of integrated relationships that authencity can be developed. However, the development of these authentic relationships in the structure of our everyday lives is indeed difficult and time-consuming" (Hendrickson and Heffernan, 2002).

Conclusion

Political economy has a theoretical foundation analyzing the economic forces of a market economy that provides explanations as to why organic farming can be regarded as a social countermovement in agriculture. Political economy can also explain why the rules and regulations in organic farming are designed as they are in different agro-commodities. In relation to agro-capital's constant pressure to speed up time and shorten the circuit of capital turnover, political economy delivers explanations as to why organic farming differs from conventional production methods in some agro-commodities more than others.

Political economy offers also an explanation as to why organic farming is born at a certain time in history. The paradigm and the ideological foundation for organic farming is based on counter moves in relation to production-consumption structures and relations within the second food regime and its crisis in the 1970' and 1980's. But the world is now in a process towards a new food regime, with radical changes on regulation on food production and food trade. Power relations within the food chain itself are moving away from farmers and food manufacturers to supermarkets and clusters combined by pharmaceutical, medical and biotechnical corporations. At the national level, government regulators are loosing power to new supra-national institutions or non-elected administrators in powerful agencies like the WTO.

Organic farming is in this paper regarded as a social counter-movement that successfully has created new relationships in food and agriculture based on trust, traceability, equality and global responsibility, in a attempt to combat many of the environmental and distrust problems in relation to the accumulation of economy and production along the nodes of the agro-commodity food chain.

The development of authentic relationships that have social and ecological components rather than being exclusively exchange oriented is the future for organic farming. While advertising (promoting brands) can create the illusion of connection, it is only within the context of integrated relationships that authenticity can be developed. Here organic farming also has to take up the challenge with the new modes of consumption where more and more people are consuming food outside the home.

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Is it easy for producers to market organic beef? The case of BioBourgogne Viande in France

P. Sans*, G. de Fontguyon, B. Sylvander, A. Le Floc'h[1], M. Auersalmi [2] and O. Schmid [3]

1 Institut National de la Recherche Agronomique – Urequa, Le Mans (France).
2 University of Helsinki - Mikkeli Institute for Rural Research and Training Mikkeli (Finland).
3 Research Institute of Organic Agriculture (FIBL) Frick (Switzerland).

Introduction

This paper aims at presenting the results of a French case-study of BioBourgogne Viande, carried out by members of three research teams within the framework of a European research project OMIaRD (Organic Marketing Initiatives and Rural Development)[3]. The overall project examines all aspects of organic product marketing in Europe in order to develop strategies that both satisfy environmentally and ethically conscious consumers, support the development of new jobs and improve incomes in rural communities. The project focuses on the impact of Organic Marketing Initiatives (OMI) on rural development, especially in Less Favoured Areas (L.F.A). An OMI is defined as an organisation of actors (privately or co-operatively owned), involving participation of organic producers and aiming to improve the strategic marketing position of the products by adding value to the raw material through processing or marketing. In order to improve knowledge of success factors (in social and economic terms) of OMIs, 67 narrative case-study analysis were initially carried out in 40 European regions, with a special attention to the selection process (examination of highly diverse OMIs, in different geographical, cultural, agro-ecological and political contexts). In the second phase, researchers implemented a comparative, in-depth case study analysis, involving four selected OMIs located in Austria, France, Italy and the United Kingdom. The in-depth case studies included interviews of internal, external and interface stakeholders.

After a brief description of the region where the OMI is located, we present the main features of the development of BioBourgogne Viande, from its origins to the present day. In a second part, the motivations, cohesion and competencies of stakeholders are analysed in a SWOT-analysis (strengths, weaknesses, opportunities and threats), identifying organisational learning processes through the past ten years.

Presentation of the OMI Biobourgogne Viande

Burgundy background

Burgundy (Bourgogne) is an administrative region with just under 6 per cent of national land area and with 2.75 per cent of French population. It is bordered by Lyon to the south, the Paris Basin to the north and the Nevers area in the east towards Bourges (Figure 1). In the face of the decline of a number of small industrial centres, farming has remained the expression of regional

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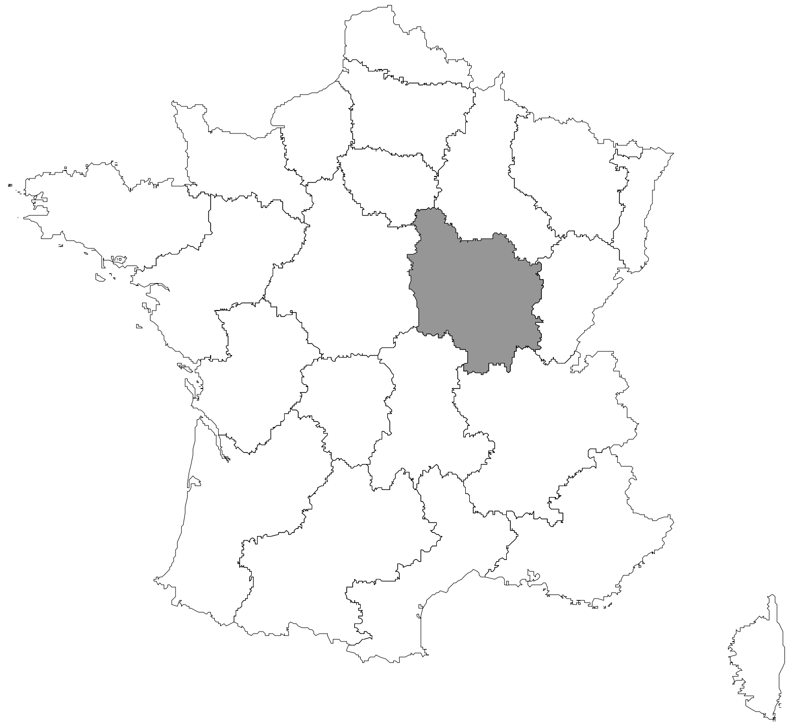
* Ecole Nationale Vétérinaire de Toulouse, 23 chemin des Capelles, 31 076 Toulouse cedex 3 Tel : (00 33) 5 61 19 39 77 Fax : (00 33) 5 61 19 39 24 E-Mail : p.sans@envt.fr

3 A full description of the overall OMIaRD project can be found at the project website http://www.irs.aber.ac.uk/OMIaRD.

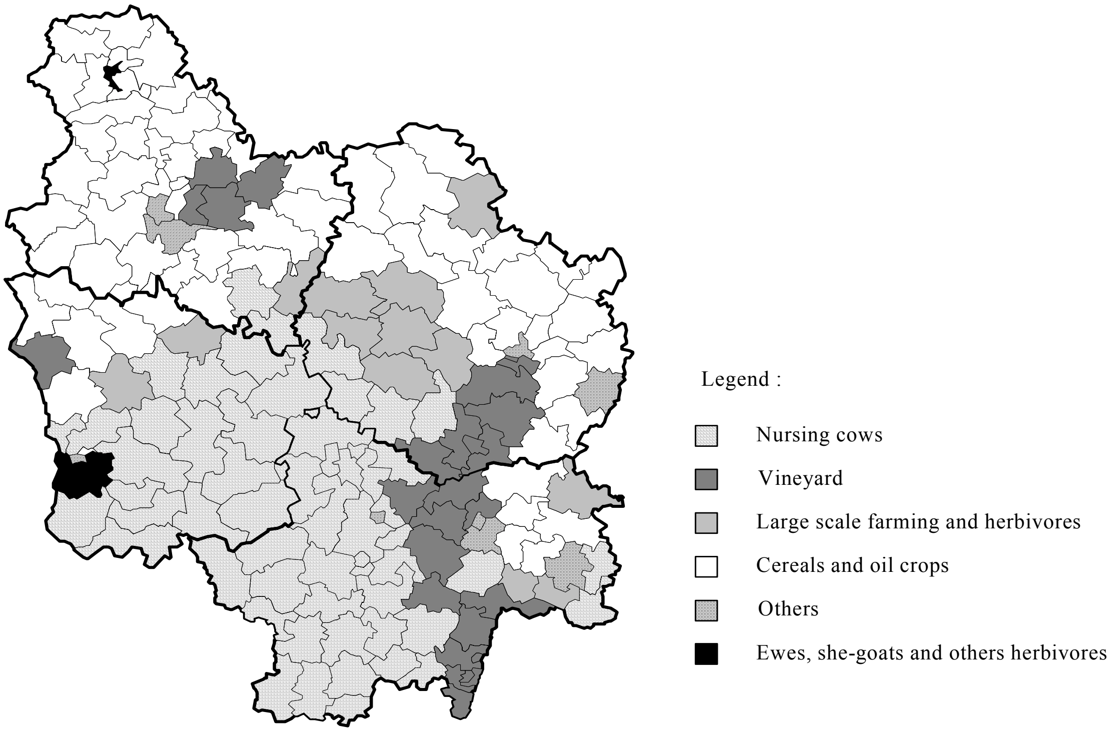
diversity. Agriculture employs almost 9 per cent of the active population, and shows signs of vitality despite continued decline in the number of holdings and an ageing rural population.

Figure 1: Location of the Burgundy (Bourgogne) region in France.



Burgundy features several distinct agricultural areas (Figure 2): the richest, in the north and on the Saône hillsides, is recognised for its vineyards. Bresse is a very wet area, late in being cleared for agriculture, dominated by poultry production. The case study of this paper is located in the south-west of the region, on the Morvan uplands, where pastures have been developed for a distinctive white breed, the Charolais suckler cattle. The decline in livestock farming and the BSE scare hit the region hard. However, meat production activities (sheep-cattle) of quality breeds (such as Charolais), which are well known to consumers, have been maintained under the *Label Rouge* scheme, the official quality system in France and under organic farming.

Figure 2: Dominant productions in the region Bourgogne per canton (2000).



Current state of the organic agriculture in Burgundy

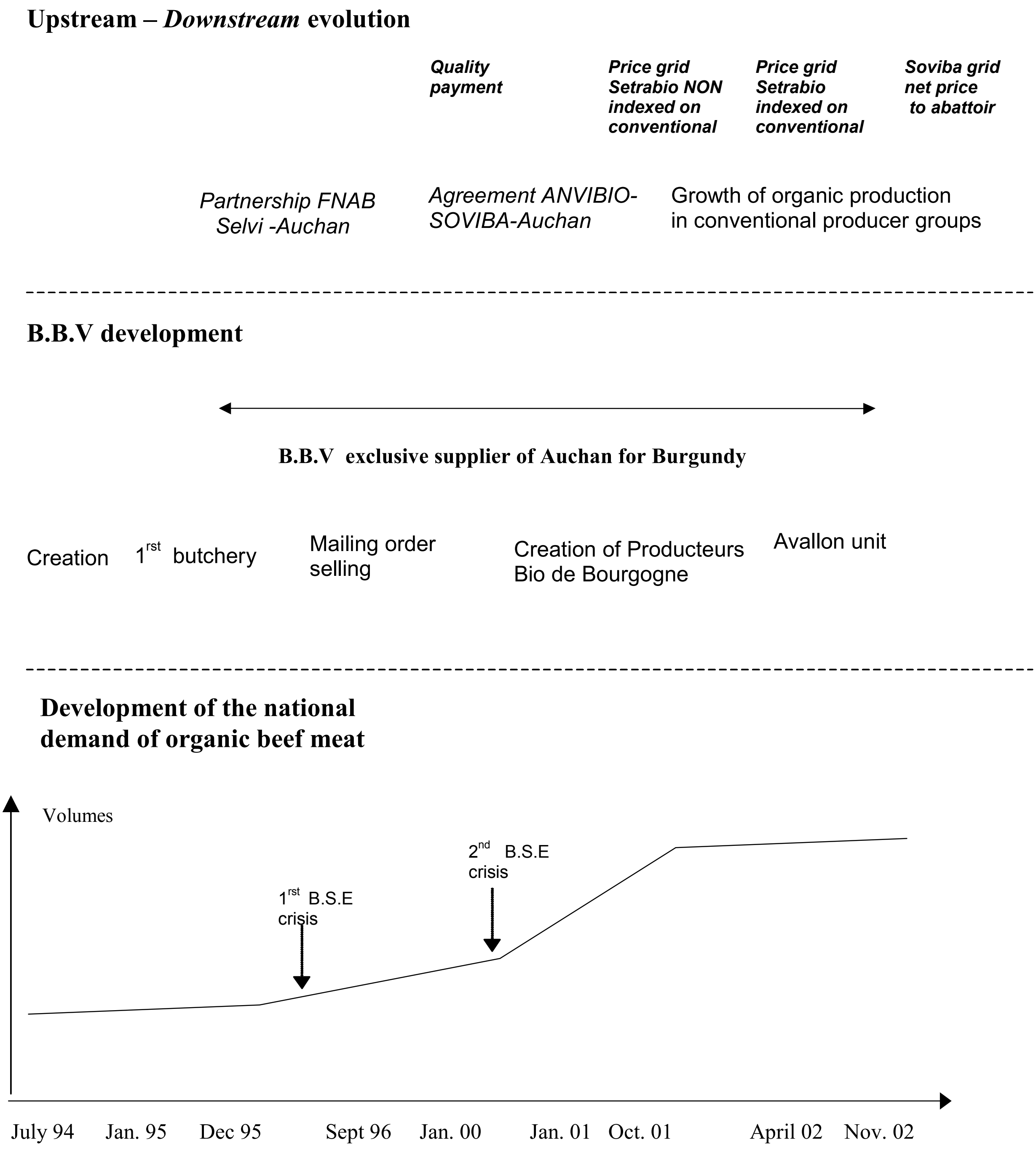
Burgundy is one of the few regions in France where, in opposition to the main trend, conversion to organic farming is increasing. Suckled calf production represents a significant new conversion opportunity for organic agriculture: there are 8,000 producers with significant pasture resources. Existing production systems are already low in intensity. Moreover, economic viability could be enhanced by a relatively homogeneous commercial product based on the predominance of the Charolais breed.

Historical development of BioBourgogne Viande

The BioBourgogne Viande initiative (BBV) is part of a significant and established framework for organic production in the region called BioBourgogne. This brand was registered in 1983 by four organic producers' associations combined in a regional Confederation of Organic Producers. The first stimulus came from organic lamb producers seeking easier access to sales outlets, and was followed by a group of producers wishing to develop organic activity for beef cattle. However, these early efforts were unpromising, with poor marketing leading to little or no premium and even trading through conventional channels, and a rapid saturation of the direct sales market. In July 1994, the original group of 30 organic beef producers established BioBourgogne Viande (BBV) on the initiative of one of the organic breeders, Philippe Cabarat, with support from the Regional Council and also from SEDARB (Service d'Eco Développement Agricole et Rural de

Bourgogne) managed by André Lefèvre, who was the first organic farming advisor employed in France by a Chamber of Agriculture (Figure 3).

Figure 3: Development of BioBourgogne Viande and evolution of its environment.



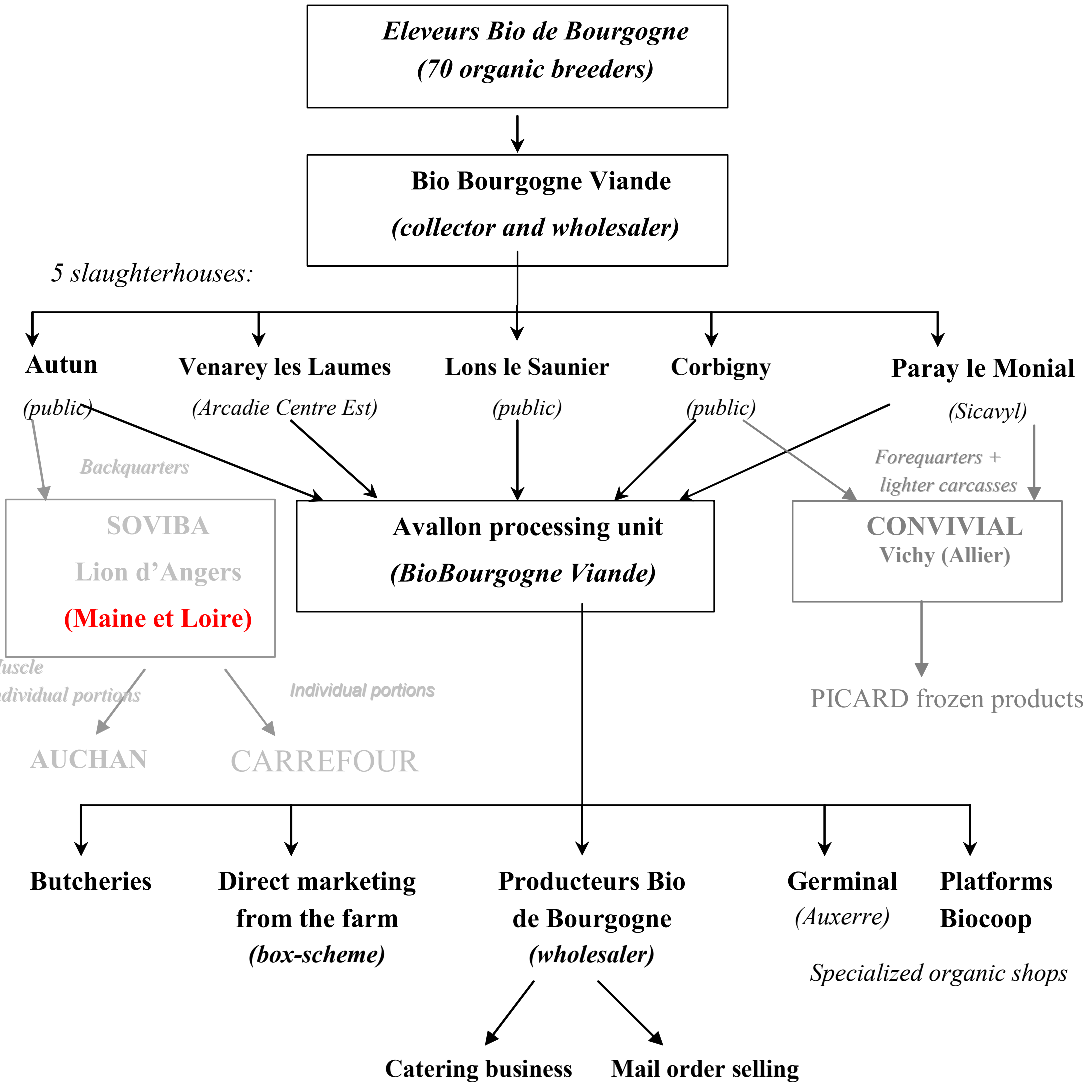
At the beginning, the BBV's central activity was production and first stage marketing of finished animals, an initial step towards co-operative management of production, even though the number of producers was relatively small compared to the significant potential of the region. The original aim was to set up an organisation to collect and co-ordinate widely dispersed members' animals for slaughter, also ensuring that producers would retain control over the marketing of their livestock. From January 1995, BBV had bought three butchers' shops (at Chalon, Dijon, Nevers) and from September 1996, it developed mail order sales. During this first stage (birth of the OMI), it can be considered that BBV's primary economic objective was to build up and organise a regional "filière", or supply chain, to provide sufficient volume for its downstream customers while protecting members' interests.

At the end of 1995, BBV reached a significant agreement involving the multiple retailer Auchan, the wholesaler SELVI (slaughterer) and the Fédération Nationale de l'Agriculture Biologique (national organic producers' union). Auchan provided organic beef with "loss leader product" status, while SELVI provided an interface and quality assurance (in particular, traceability), although this precluded direct contact between Auchan and the breeders. A fixed price grid ensured good returns to producers and healthy margins for the initiative. These conditions allowed BBV to develop and handle 70 per cent of its tonnage through this channel and this three-parts agreement was held up as an example at the time.

The first BSE crisis (March 1996) disrupted the development of the initiative, with an initial drop in demand followed by an abrupt surge, which BBV could not easily accommodate. The initial agreement with SELVI was replaced by an agreement with SOVIBA, one of the biggest French meat processor groups with an established presence in the organic beef sector through a trade agreement to supply Auchan. The objectives of SOVIBA differ from those of BBV, as the former aims to demarcate quality in organic products. However, the economic rationale for the switch was overwhelming, even though the price grid was less favourable, being indexed to prices of the conventional animals (Figure 3).

More recently, the negotiated price altered to one on the basis of net of delivery to the slaughterhouse, making it possible for SOVIBA to diversify its purchases to include other producers' groups that have started to sell organic cattle. The current situation encourages BBV to adopt a diversified marketing policy, selling to supermarkets (especially the major supermarket chain Auchan, which is critical to its future development since this channel accounts for 70 per cent of beef cattle sales), six organic butchers, one consumer co-operative (BioCoop), mail-order sales, and one wholesaler, Convivial, which specialises in frozen meat (Figure 4). Moreover, in 2002, BBV invested in processing facilities, which together with distribution facilities will allow it to consolidate its short distribution channels, as well as increasing added value from ability to sell directly to supermarkets. In the second part of its short history, BBV has to face a "growth crisis" in a difficult context: it involves currently more than 100 producers and has a 2.5 million Euro turnover.

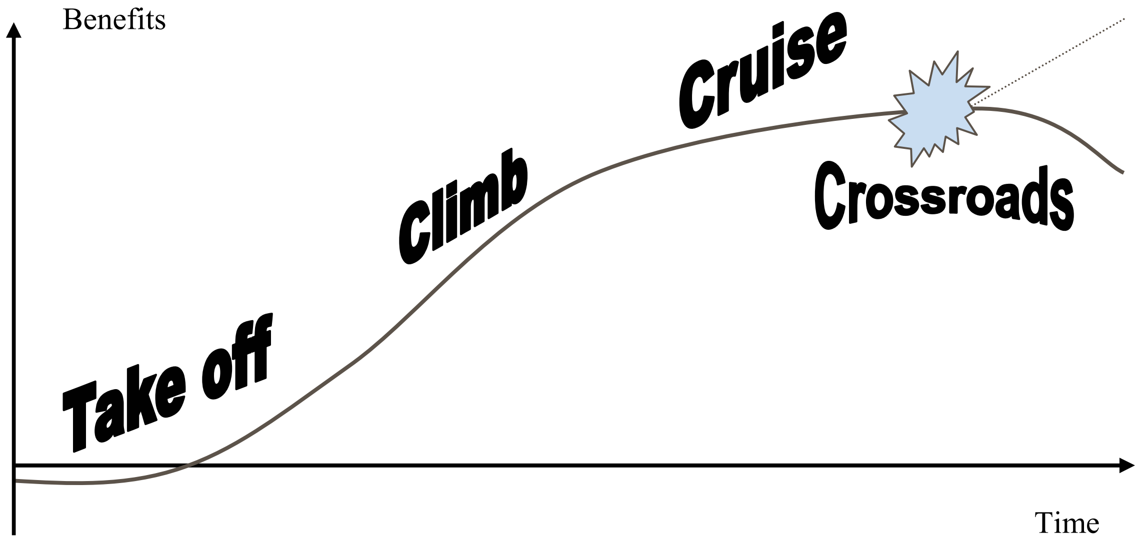
Figure 4: The BioBourgogne Viande supply chain.



Motivations, competencies, cohesion: the learning curve of BBV

The first stage of the development of BBV was, as we saw above, a matter of creating an original model of production against a standard background (intensive farming and industrialisation). In this context, the founders created new businesses, new products and new markets through the strength of their convictions, their vision and their ability to procure the right competencies. However, BBV is now at a crossroads. To use an air-travel metaphor, after the take-off, the climb and the cruising flight, the managers need to do critical decisions and put effort to develop the concept so that a new growth period can be achieved (Figure 5).

Figure 5: The OMI strategic turning point and the air-travel metaphor



This crucial moment leads the organisation to think again its objectives and to reformulate its strategies. By using SWOT analysis, this section sets out to highlight the main changes in:

- the *motivations* of the OMI instigators and farmers or growers (which enables the vision and the project to overcome political, institutional and market conditions, because innovation necessarily challenges established structures);

- the *competencies* engaged and acquired by the OMI in carrying out the project (which are the basis for the day to day management of the OMI); and

- the *strategies and cohesion* necessary to implement the strategy (which both provide long-term direction and explain how and why people are motivated to follow the strategy).

Motivations
The original producers of BBV were all profoundly committed to the basic principles of organic farming. Ethical issues, such as environmental policy and regional development, were also important, with the need to obtain a decent income from farming. Initially, the anticipation was that the initiative's main business would be in selling organic animals, and an important aspect of taking over this function was to stay in as close contact as possible with consumers. The marked team spirit and inclusive communication between the farmers, at this time, was a major contributor to success.

Nevertheless, during the period when BBV had marketing problems, particularly in achieving a good price for every animal, some members had explored other outlets through which to sell their animals, and were willing to switch to other companies if they offered a better price and contracts with a better guarantee of numbers of sales. Also, conforming to general experience, there was some criticism of decision-making in areas such as recruitment of staff or contracts made with different market partners.

Farmers interviewed raised a current dilemma, which is the need to respond to a range of different member objectives whilst retaining the high level of loyalty and commitment to the initiative, a particularly important factor of success in the original phase. There is a need to change business policy to recruit more farmer members, and in this way to increase the volume whilst remaining profitable. One possibility would be to co-operate with conventional marketing groups for selling organic beef or to incorporate new organic farmers (coming from conventional producers groups). But pioneer producers who are more ethical in orientation and value independence and a specific identity, might not accept this balance between pragmatism and principle. In other words, adhering strongly to their initial idealism might reduce membership to the loyal core and slow down the economic development.

Competencies

The ambition of the founders of the initiative was to create a business which would develop along the entire food chain, which would have greater chances of success than the development of a minority organic line within conventional marketing systems. This indicates a certain level of professional pride in being farmers and working entirely within an organic system, as this gives them potential to concentrate in developing organic farming and breeding methods.

Three types of competencies have been developed:

- *Technical competencies*: the initial steps were to organise the collection of organic cattle in the region. BBV developed a good know-how, well recognised by stakeholders (producers, retailers). Nevertheless, in the current state of organic meat supply, some weaknesses become problematic. For example, the supply base is scattered, and currently slaughtering and processing is spread between five locations, so unit costs of production are high. Due to the net of delivery price conditions imposed by SOVIBA, BBV has to work harder to retain members' loyalty. Moreover, BBV does not use a quality-based carcass valuation system (unlike the conventional meat sector) and, thus, loses the opportunity to use incentives for members to improve quality.

- *Marketing competencies*: with regard to the longer supply chain, since they were the first initiative that produced organic meat, long established experience provides them with competence for selling organic meat. During the climbing period, the volume of organic sales through supermarkets increased, so to heighten the profile of the group with customers, opening retail outlets were seen as a solution to the difficulty of expanding direct sales off farm premises. The BSE crisis provided BBV with the opportunity to retain and extend contacts with customers, by reacting more flexibly to special requirements, such as those of the catering sector, and specialist butchery of lighter carcasses. In the short supply chain, farmers have direct contact with distributors and consumers, and can make use of an established collective brand to differentiate their products. The business has adapted to the specific requirements of organic retail sales by investing in their own outlets. The state of art technical facilities in the Avallon unit allows for specialist to maximise the value obtained from light carcasses. More importantly, it is the base for development of direct marketing by cutting and packing meat, which is returned to the farm for sale; it also supports mail order sales and development of the catering market, especially to regional speciality restaurants, in partnership with the “Producteurs Bio de Bourgogne” organisation.

- *Managerial competencies*: during the first stage of its development, BBV used a “group approach” to improve technical knowledge of cattle breeding as well as sharing information on market developments. The difficult and expensive learning period involved in establishing retail butcheries was handled collectively. Little by little, members have all learned what the meat business is. Because they have shared this learning period, all involved have experience of and respect for each other’s roles. Initial management by members of the initiative was based on a personal network and strong solidarity. A drawback was the drain of time and energy caused by the need for the same person to fulfil different functions, Currently, BBV is trying to learn how to manage the processing unit in Avallon. This type of management is no longer efficient; each employee needs a clear professional role if coherence in its functioning is to be achieved. Despite production expertise and knowledge of the market, management faces challenges in two respects: firstly, the administrative board, comprising representatives of the members, has problems of consistency and flexibility in decision-making[4]; secondly, work organisation is far from optimal, with unclear roles and responsibilities (no professional manager), differences in approach between the controlling core of members and employees, and a predominance of part-time staff (no specialised staff work).

The gradual acquisition of expertise from learning by doing, skilful use of support mechanisms (both financial and informational) and strong personal commitment from the several farmers involved have led BBV to the present stage. Whilst making best use of all available resources, they have not had enough money to pay professional salaries for their management and skilled butchery workers. The present situation is satisfactory but may not be sufficient to remain competitive while still adhering to their ethical objectives. Major outstanding questions concern whether the inclusive learning process can continue, the necessity to make their work more professional, especially the main farmers involved in the business activities; the potential for development of strategic alliances with other farmer groups which is complementary and of mutual benefit; and the extent of future diversification of market activities in attractive areas, like gastronomy or the delivery service in a cost-effective manner.

Cohesion

BBV is a good example of ‘learning by doing’. Indeed, since the vision and the project take precedence over a classical strategic analysis, the founders/instigators first have to make the most of the skills already present at the outset and then acquire, in one way or another (learning, recruitment, subcontracting, alliance), those skills that are lacking. An important component in getting past this strategic turning point is the analysis of the internal and external cohesion which will make the decisions to be taken possible or impossible. We make a distinction between internal cohesion (which holds together the internal stakeholders of the OMI, i.e. the producers and employees) and external cohesion, which is evidence of support from external stakeholders.

[4] For example, external stakeholders have criticised the situation in it is difficult to find the right person to negotiate with in order to get decisions taken.

a) Internal cohesion
In the early period of the initiative, one of the main contributory factors to success was the farmers' voluntary ability to co-operate, pooling their energy and knowledge for a common goal. As mentioned several times, the basis of the BBV was developed around a few key individuals. As a result of the experience gained, these core actors in the initiative have become multi-talented businessmen, working simultaneously as farmers or advisors. At the beginning, farmer members were more united and shared common objectives. Commitment to the company depended on personal relationships between farmers, with frequent discussions, daily contacts and joint decision-making. This gave a strong base to run the business together. This foundation, has enabled it to weather crises (such as the BSE crisis in 2000). Some interviewees believed that members' objectives still coincided with those expressed through the initiative, although others perceived a growing gap between personal objectives and the collective orientation. Inevitably, through time, relations will change between people, especially in a dynamic state of development such as experienced by the BBV, and decisions need to be made between choices for future development :

- on one hand, because outside the initiative potential members are waiting to see which way they are going. Within other market organisations, there are farmers either converting to organic farming, or considering whether to convert. They may join the BBV if it is attractive enough for them, particularly in relation to the prospect that the conventional marketing organisations that they currently belong to may start their own organic product line.
- on the other hand, within the initiative there is tension between the core group worried about the diminishing of the ethical objectives of the organic movement, and those members whose interest is in having a profitable business and who emphasise more concentration on direct selling, supplying caterers and increasing the number of their own retail butchers and special shops. In this situation of future uncertainty, personal ties between farmers became more important, with each group trying to convince the other of the preferred direction for development.

The critical question now is whether the BBV can deal with this changing situation in such a way that they maintain current cohesion between members whilst at the same time expand by taking in new members.

b) External cohesion
i. Interface bodies
Interactions between the BBV and the different state authorities have always been good, due to the result of excellent personal relationships. SEDARB (Service d'Eco Développement Agricole et Rural de Bourgogne) has played a key role in the development of organic agriculture in Bourgogne by expanding and organising organic production both downstream and upstream (especially the organic cereals and meat sectors). Supported by public funds, it played the central role in co-ordinating organic cattle supplies for SELVI to meet the original requirements of the major supermarket chain Auchan. Further development of the BBV arose from the recruitment of new members conforming to the criteria of SEDARB and the development of market capacity. Although SEDARB continues to delegate activities to producer initiatives, it continues to support some of the BBV employment costs, with the participation of the state programme supporting work for young people. The DRAF (Regional Directorate for Agriculture and Forests) is the main source of public support for development of organic farming, with a strategy to integrate organic agriculture in schemes for agricultural development. DRAF supports promotion of organic cattle

breeding by part-financing technical support to specialised organic meat producers. It has subsidised the investment costs of the processing unit in Avallon and uses national and European sources to contribute half of its employment costs.

The current (and future) situation is quite different: first of all, due to the development of organic production, there is competition between SEDARB and the traditional structures for public financial support for agriculture, especially where conventional co-operatives are very influential. SEDARB is concerned about being absorbed into the administrative structures of the Agricultural Chambers. Moreover, BBV supporters and other institutional actors are also waiting for the next phase of development («*our baby was born and now it should be grown-up and fend for itself…"*) implying that all possible public support had been given and it is up to the BBV to take it forward and produce results. Now, new stakeholders can legitimately claim to receive subsidies.

ii. Horizontal cohesion

If the current turning point for the initiative requires growth, one way of achieving it is by acquiring new partners, in particular among the conventional groups of the region. Currently, many more of their members are converting to organic farming, allowing them to fulfil increasing demand from downstream customers. As mentioned above, linkages with conventional producer groups in the area are relatively weak, mainly because of a long-standing cultural difference: both conventional marketing groups and the BBV aim to make the best returns from selling organic beef on behalf of their members, although the former deal with the organic meat as a niche product, whereas the latter place more emphasis on the ethical values of products and on an alternative model for the agriculture. In development of a specifically organic food chain, there is a need to maintain the resolute cohesion between the supplying members with respect to production standards, but at the same time extending the sphere of operation through Cupertino and alliances. This may explain the cautious approach with regard to a contract with a conventional group: this type of alliance might bring, along with growth from new sales, lower unit costs for the initiative and greater attractiveness for new members. Conversely, if the BBV remains isolated, other regional structures (recently approved for sales of certified organic animals and with lower costs than the BBV) will develop their organic beef sector and may become vigorous competitors. Potential for marketing almost all of the organic beef of the region will be lost, falling back to nearer 50 per cent.

iii. Vertical cohesion

During the first stage of the development of the BBV, relations with the industrial group SOVIBA and the multiple retailers Auchan were once very favourable for the producers of the initiative: the BBV exclusively supplied Auchan with organic beef from Bourgogne, and the purchasing prices were based on an annual fixed price grid. More recently, this favourable situation has deteriorated: the organic beef market has grown out of niche status, and competition for sales is becoming vigorous. The BBV now has to operate within the norms of the general marketing framework. Retained earnings from the buoyant period of growth in sales have been invested in the infrastructure of retail butchers and the processing unit in Avallon. These investments were made largely as a result of deteriorating relations with SOVIBA. Also, Auchan wish to be less involved in a structure where economic control remains strongly linked to collective action, and consequently it has provided SOVIBA exclusive rights regarding supply of organic meat. This decision illustrates the critical perspective of Auchan on the strategy of the BBV "wanting to control everything" and to take on new functions of downstream involvement, such as processing. SOVIBA currently has a quasi-monopoly on the market for organic beef from suckler herds, preventing commercial involvement of enterprises like the Avallon facility in central national buying structures for multiple retailers, and also with catering chains. This near-absolute dependence on SOVIBA as its main long supply chain outlet and loss of its more profitable relationship with SELVI are clear threats for BBV.

After the crossroads, which strategies?

Our opinion is that development of longer supply chains could be aided by collaboration with local conventional organisations, particularly in order to reduce operating costs the BBV may be a collaboration with a regional producer and industrial groups rather than national industrial conglomerates. A majority of the organic producers of Burgundy, whose objectives tend towards expansion, might support such a contract with a conventional group, and opponents (pioneer producers) might change their views if the financial outcome were to be positive. An alternative way would be to collaborate with organic producer groups located in other regions, within the framework of the national organic producers' organisation, Eleveurs Bio de France. This would provide a stronger position from which to negotiate with SOVIBA, although the appropriate position for negotiation with supermarkets would then be at national rather than regional level.

Although clearly long supply chains depend on large multiple retailers, dependence on a single major purchaser is limiting, and the BBV could find alternatives, particularly in retailers with less centralised procurement, such as the independent group Leclerc. Moreover, sales through other channel might be developed (Convivial/forequarter sales) or initiated (export sales of organic grass-fed calves to Italy) in order to diversify the set of customers.

Further development of shorter supply channels and maintaining value-added through local processing could come from extension of the customer base to the major adjacent conurbations of Paris and Lyon. This might be done through developing new agreements with specialist organic shops (BioCoop), or further development of the initiative's own retail outlets. There is a target to increase sales to the catering sector to 20 per cent of turnover, and there are attractive opportunities in terms of developing the market in regional speciality restaurants, itself a device in the longer term to improve customer loyalty. The means of achieving this could be through Producteurs Bio Bourgogne, as a broader range of products could be sold in collaboration. This could provide the lever for significant improvement in merchandising.

Conclusions

The BBV, the main French OMI involved in meat marketing, provide a good example of what could be called «the organisation cycle theory". By using a qualitative approach (in depth case-study), we highlight the importance of a historical perspective in order to identify the success (and failure) factors [Table 1].

Table 1: SWOT (Strengths – Weaknesses – Opportunities – Threats) analysis of BioBourgogne Viande.

Strengths:

- Dynamism regarding supermarkets' opportunity (producers' "demonising" supermarkets seems to be over).
- Partnership with Auchan (one of the main French supermarket chains) including a price scale: this "supply chain" agreement was very incentive for producers (and so was in favour of a development of production) and it worked well from 1996 to 2000.
- Financial means (institutional supports, financial aid to invest)
- Farmers have every confidence in the policy implemented by the structure.
- Investment in a "cutting-boning" room in Avallon (2002)
- High quality networking with institutitions

Weaknesses:

- Scattered supply (high distance), lack of synergy within the structure: investment in Avallon platform should compensate for this.
- By-products penalize the structure, but so far there has not been no change regarding the initial strategy: BBV wants to supply 100% their butcheries
- Problem with subcontracting (making of organic delicatessen)
- High logistic costs (to solve that, strong will to increase volume)
- Weak guarantee on the quality of the final product, especially regarding maturation / tenderness (which is the opposite of "Label" or certified meat)

Opportunities:

- Persistent interest of Auchan in terms of offering organic beef meat on its shelves (in spite of a deficiency of the supply chain agreement in 2001: supply difficulties due to the economic situation following the 2nd BSE crisis).
- Loyalty to "ready-to-cut" pieces from Auchan outlets on the trunk roads Paris-Lyon du PAD (pieces are now from the cutting room in Avallon, guaranteeing a regularity in quantities as well as in quality
- Emergence of demand in fresh organic meats coming from other supermarket chains: Carrefour, Monoprix, possibly Leclerc (but it would be necessary to prospect outlet by outlet as Leclerc leads a decentralised policy regarding meat products).
- Develop more the image of the product: Charolaise breed, origin Burgundy
- Potential agreement with the regional co-operative group Sicavyl, important supplier for AUCHAN about pieces to grill from beef-cattle. (Bœuf Sélection Auchan).

Continued on next page

Table 1: continued

Threats:

• Fragility: e.g. business disorganisation because of the lack of production and tensions due to price fluctuations, results of the 2nd BSE crisis • Insufficient increase of volumes: continuous of high cost overrun in terms of logistics and meat cutting • Seasonality of production and difficulties in adjusting growths of demand and supply • Increasing supply for AUCHAN supermarkets in terms for organic "industrial unitary portion", to the detriment of purchases in muscle (consequence of supply difficulties in 2001). • Risk to see Soviba increase activities such as "industrial unit portion", which would reduce BBV control and negotiation power on the Auchan market • Quasi-monopoly from Soviba on cutting, boning, and preparation of "industrial unit portion", including fresh minced meat from organic bovine (meat breed). Increase of notoriety of the processor brand, associated with the French organic logo (logo **A**griculture **B**iologique) • Weak guarantee on the quality of the final product, especially regarding maturation / tenderness (which is the opposite of "Label" or certified meat)

The initial aim of BBV was to organise the collection of organic cattle in the Burgundy region, and then to improve marketing in favour of well-organised shorter supply channels (at first within the region itself), keeping close direct contact between producers and consumers (or at least, final retailers). Subsequent developments have had the aim of serving producers' interests, by being specialised, to better defend the values related to organic farming, and by remaining independent from conventional organisations (many organic farmers have now taken advantage of the opportunity to market outside conventional structures). The impact of the BBV on the development of this LFA region can be judged as positive. Improvement of commercial organic beef production has encouraged and facilitated the conversion of Charolais beef breeders, and farms in financial difficulties have been enabled to survive. In addition, the organic distribution centre in Avallon, from which a special delivery service is organised, facilitates direct marketing of products, also supporting breeders to maintain their farms in business. The BBV has created employment in economically unfavourable and fragile zones, such as the slaughterhouse in Autun and the retail butchers it has established in four districts. More generally, its contribution to maintaining other local commercial activities is not insignificant.

Nevertheless, the enterprise itself is vulnerable to foreclosure of accounts, particularly if the overall economic environment weakens or becomes harder (high competition). When demand of organic meat was higher than supply, producers have taken advantage of that situation. Currently, the position is the reverse and, as a result, the BBV needs to focus more on partnership rather than attempting to exploit competitive struggles between downstream operators. This requires a reduction in the initiative's operating costs (only partly due to the scattered nature of supply) in order to continue to remunerate its producers beyond that offered by other producer groups. If initial competencies in organising the production and sale of organic cattle have been maintained, in new areas the farmers involved in BBV have to extend these skills either through continuing education, or by employing competent staff top work with them. The major deficiencies in this respect relate to retail and commercial management (particularly problems of bad results of shop customers) and the difficulties of irregular sales through the mail order service and the development of the regional gastronomy sales to restaurants. Expertise is also needed for the financial management and capitalisation of the recent investment in Avallon, and in employment and management of the staff for the functioning of this unit.

In a changing environment, the BBV is clearly involved in a process of dynamic development (as the investment in processing facilities proves it). At this crucial moment of its life, members needs to think again about their objectives and to reformulate their strategies to pass the crossroads and continue their work successfully. We hope that the analysis carried out within the framework of the OMIaRD project will be useful for the BBV managers.

Acknowledgements

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Current practice and prospects of oraganic livestock production in Greece

G. Arsenos, P. Fortomaris, G. Banos and D. Zygoyiannis
Department of Animal Husbandry, School of Veterinary Medicine
Aristotle University of Thessaloniki

Introduction

The science and practice of livestock production is changing towards sustainable systems with emphasis on animal health and welfare as well as food safety and quality. Organic systems of livestock production have developed to meet the concerns of society for good health and welfare required by farm animals that yield milk and meat as well as the need for safer and healthier products (Surdrum, 2001; Lund and Rocklinsberg, 2001). Since the commencement of organic practices in livestock production, a large volume of information has been published on husbandry practices, health and welfare of animals and the economic viability of such systems of production. The numbers of articles that appear in scientific journals and are related to organic livestock production increase rapidly every year (Wilson, 2002, Lund and Algers, 2003). Moreover, the scientific community is devoting an increasing proportion of activities associated with themes regarding organic production. However, organic production involves many disciplines that must be integrated and there are major differences, particularly in the way that the organic livestock sector is run between different countries (Meeker, 1999, Hermansen, 2003).

Although the idea of organic production has existed from the begging of the last century and has been applied with great success in other European countries, for at least two decades, in Greece it has only recently become the focus of significant attention from governmental and private organisations, consumers and farmers. Regardless of the absence of a long-established consumer market for organic products in Greece, the idea of conversion of existing production systems to organic ones has proven useful and financially rewarding. In 2000, there were a relatively small number of organic farms in Greece. The country has 24,800 hectares of organic farmland representing 0.71 percent of total farmland, one of the lowest percentages in Europe. In contrast, its southern European neighbours, Spain and Italy, have combined 1.38 million hectares of organic farmland, accounting for 38 percent of all organic farmland in Europe. (Duchateau, 2003).

Livestock production in Greece has always been an important sector of agriculture and its development has always been a priority of agricultural policies. It accounts for about 30% of the total value of the agricultural sector. Operating within a continuously changing socio-economic environment, the agricultural sector is gradually losing its relative importance. However, it is still a key factor of the Greek economy employing 17% of the working force and accounting for 6.5% of GDP. According to a recent classification of the Greek agricultural holdings, 75.1% of them are related to crop production, 1.3% are livestock enterprises and the remaining 23.6% are mixed type crop-livestock enterprises (Kaldis and Galanopoulos, 2002).

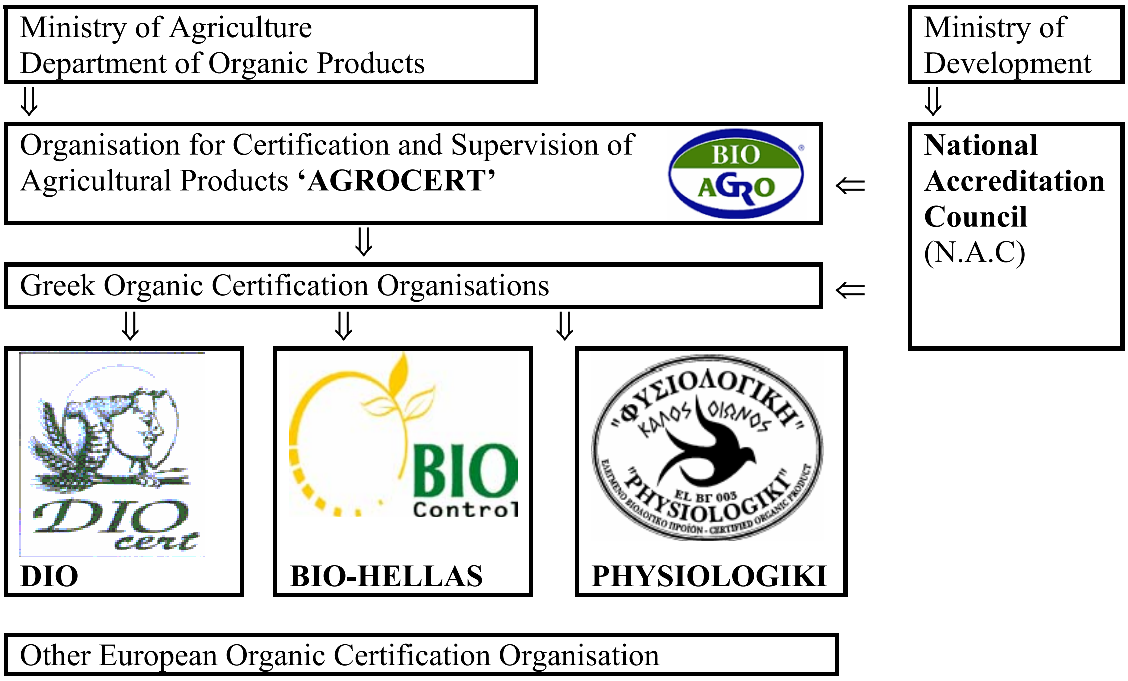
The aim of this paper is to discuss the current practice and the future of organic livestock production in Greece. In our view, organic livestock production, although currently in an embryonic stage in Greece, will show a rapid growth in the next decade. For this reason, our intention is to identify and integrate basic and useful information and to provide a starting point for those interested in organic livestock production in Greece. A brief description of organic legislation as well as organic certification organisations forms the first part of the paper. In the remainder of the paper, we consider existing evidence on the application of organic theory to livestock enterprises in Greece. We recognise that the available information is somewhat general. However, we will use it as a reference point from which to make objective suggestions for possible changes to some of the problems that exist and are likely to constrain the potential for future development of organic livestock enterprises in Greece.

Organic legislation and certification organisations in Greece

Organic legislation (e.g. EC 2092/91, EC1804/99) is a process-oriented discipline. Being process oriented, it provides a conceptual framework within which animals should be raised and a formal set of rules that direct the certification of livestock enterprises. In Greece, the Department of organic production in the Ministry of Agriculture is the governing authority (see Figure 1 for detail) for all aspects of organic production in Greece. It was established in 1993 according to the EC 2092/91 directive, and deals with the implementation of the EU regulations into Greek laws, allocation of subsidies, supervision of certification organisations and other issues of organic production. In addition, a financially and administratively independent organisation was established in 1998 by the Ministry of Agriculture to deal with the certification of a series of quality labels and to take over some tasks of the Department of Organic Production. It was named as “Organisation for Certification and Supervision of Agricultural Products", which was abbreviated to AGROCERT. A third public entity governed by private law is the National Accreditation Council that assesses whether the services provided by the organic inspection and certification organisations are in line with EU regulations and standards. There are also three private organic certification and inspection organisations that have only recently (March, 2002) been officially accredited by the Greek Government to certify organic meat and dairy products (Greek Ministry of Agriculture, 2003). They are: DIO, BIOHELLAS (previously known as SOGE) and PHYSIOLOGIKI. All three organisations can operate at national level and each one has a particular label (Figure 1).

The above private organic certification organisations have played a very important role in the development of the organic sector in Greece since the commencement of their activities in 1993 (DIO and SOGE) and 1994 (for PHYSIOLOGIKI). They have been very effective in defining standards for production, processing and direct marketing. In addition, they have helped to raise consumers' awareness and confidence in organic foods and in so doing contributed to the overall development of the organic sector. They showed a multidisciplinary activity by publishing magazines and books on organic farming, organising seminars for informing and educating organic producers and those interested in converting to organic production, about recent developments in that sector of agriculture (Van der Smissen, 2000). In our view it is essential to ensure that the services of certification organisations can cope with present and future demand and to ensure that high standards of advice provision are maintained. Therefore, it is essential in terms of staffing, to have skilled and qualified personnel.

Figure 1. Organic accreditation and inspection organisations in Greece



State support and subsidies for organic enterprises

In 2001, the Greek government issued a program covering the period between 2001-2006, which aimed at the development of organic production with particular emphasis in livestock production (Greek Ministry of Agriculture, 2001). The program entitled "Rural Development Program" combines legislation with subsidy payments. The aim is to strengthen the competitiveness of agriculture (both organic and conventional) and to promote the sustainable development of rural areas. The budget of the program is estimated at 2,686 million euros allocated at four priority areas:

1. Encouraging young people to take over holding from those taking early retirement (1,150 million euros);
2. Providing support for farmers in mountain or less favoured areas (996 million euros);
3. Agro-environment measures, i.e., countryside and bio-diversity and conservation of endangered animal species (400 million euros); and
4. Restoration of agricultural land, expansion of holding and organic farming (164 million euros).

Within the above program a sub-program entitled "Organic farming" has also been implemented. The program is focusing particularly in the following areas (Greek Ministry of Agriculture, 2001):

- organic farming;
- reduction of nitrate pollution;
- land set-aside;

- preservation of local cattle breeds;
- extensification of agricultural activities;
- implementation of an environmental management system;
- extensification of livestock production;
- combating erosion of slopes; and
- managing six different Natura 2000 regions.

The average financial subsidies to conventional livestock farmers that convert to organic production, for the first time, are shown in Table 1:

Table 1. Planned average payments for conventional livestock farmers in Greece that convert to organic production, for the first time

Type of enterprise	**Payment (Euro/hectare)**
Organic sheep and goat systems	151.78
Organic Cattle production	
Beef cattle	54.10
Fattening calves	186.15
Fattening heifers	122.47
Dairy cattle	110.69
Organic pig production	186.44

Source: Greek Ministry of Agriculture

As shown in Table 1, priority is given to organic sheep, goat, beef and pig production. Further, those investing in the organic farming sector in Greece are also eligible for subsidies from the Development Law 2601/98 that was introduced in April 1998 and covers organic farming businesses as well as processing, packaging or preserving agricultural products, construction of building facilities, purchase of automation systems, etc. The minimum amount of investment to establish or expand businesses is set at 88,000 euros and for modernising an existing plant at 29,350 euros, under the condition that the financial participation of the investor will not be lower than 40% of the total investment (ELKE, 2000).

According to existing evidence (Van der Smissen, 2000), organic agriculture has rapidly expanded since its official establishment, with annual growth rates of between 50 percent and 120 percent, slowing down to 20-30% in 1999-2000. Table 2 shows the projected allocation of organic farms within the "Organic farming" program (Greek Ministry of Agriculture, 2001):

Table 2. Area allocation of organic farms fro the period from 2001 to 2006

	Year					
	2001	2002	2003	2004	2005	2006
Area (hectares)	14,000*	6,500	6,500	6,800	6,500	5,000

* Including 8,000 hectares already allocated
Source: Greek Ministry of Agriculture.

We believe that the introduction of such programs will certainly increase the number of organic livestock enterprises. However, the question is whether this increase will provide a firm basis for a longer-term development or will evaporate after the end of the program subsidies.

Current structure of livestock production in Greece

Greece is a country with varied geoclimatic conditions in a relatively small territory. The fact that the majority of the country is characterized of mountain regions influenced the differentiated structures of livestock enterprises. In the course of the historical development sheep and goat production has been the core of livestock production from an economic and social point of view. However, a certain development policy has never defined and put into practice (Vallerand *et al.* 2001). The use of cattle for meat and milk production was much less important. A significant increase in pig and poultry enterprises together with a significant increase in the consumption of pork and chicken meat has been manifested only in the past 30 years. The significant increase in the consumption of such meat has been largely the result of intense advertising campaigns that were launched in the late 1960's and early 1970's.

Over the last few years, efforts have been aimed at the development of organic livestock production in Greece (Dimitriou, 2002, Papatheodorou, 2002, Wright *et al.* 2002). However, existing data of the Greek Ministry of Agriculture do not contain specific organic figures and it is impossible to compare the structure of organic holdings with conventional ones. Most of the existing data are based on information available by organic certification organisations. The Greek organic certification organisations, DIO, BIOHELLAS, and PHYSIOLOGIKI suggest that there are now about 1200 organic livestock enterprises in Greece. Table 3 shows the number of animals that, according to available data from the above organic certification organisations are reared organically.

Table 3. Numbers of organically reared livestock* in Greece in 2002.

	Number of animals	% Of particular total animals
Sheep and goats	219,628	1.5
Cattle	11,138	1.9
Pigs	1,773	0.18
Layers and broiler chickens	59,453	0.21

*There is also an organic farm with 50 bison located in central Greece.
Source of data: DIO, BIOHELLAS, and PHYSIOLOGIKI

As shown in Table 3 Greece has been far behind other European countries in this sector. So how could a breakthrough happen and such systems become wide spread rather than the isolated exception? In the following sections of this paper we will attempt to look into practical problems and the weaknesses of organic production systems under Greek conditions.

Socio-economic aspects of livestock systems in Greece

Greece has about 10.62 million inhabitants of which 40% comprise the rural population. According to that latest statistics, a significant part, around 17% of the country's work force is employed in the agricultural sector (the allocation of the rest is 22.5% in industry manufacturing and 60.5% in services), whereas the European average (EU-15) was only 4.3%. In Greece there are currently 800.000 holdings on 3.5 million hectares that are being cultivated. It is also important to note that Greece is far from achieving self-sufficiency in products of animal origin (National Statistical Services of Greece, 2002). For example, demands for beef and pig meat are covered only to a very limited extent (Table 4).

Table 4. Self-sufficiency rates of products of animal origin in Greece (2002).

		%
Milk products	Fresh products	93
	Butter	131
Eggs		96
Meat	Including	
	Beef and veal	25
	Pig meat	41
	Poultry meat	79
	Sheep and goat's meat	82

It is not easy to quantify the precise level of the economic contribution of the organic sector in Greek agricultural income due to the overlap with conventional activities (Hadjigeorgiou *et al*, 1998). A recent study focused on the socio-economic aspects of sheep and goat conventional farming in Greece (Zioganas *et al.* 2001). The results showed that the majority of small ruminant enterprises are small in size with a long-established traditional way of life. There are 151,000 families involved exclusively in sheep production and 174,000 families involved in goat production. It is difficult to estimate the precise numbers of those involved exclusively in organic livestock production in Greece because all the available information is not based on official data.

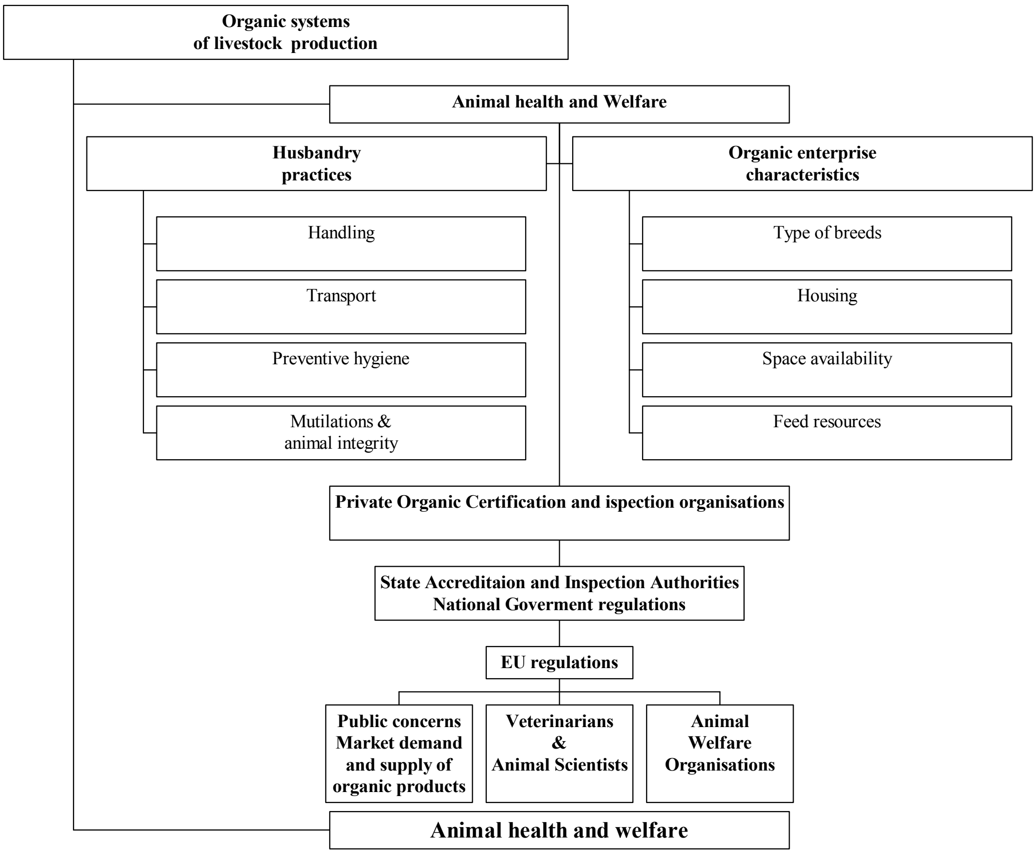
Organic livestock production systems: From theory to practice

Animal health and welfare

Health and welfare of animals reared under organic systems of production are subject to official and obligatory standards. It is evident from the way the organic standards are expressed that the overall aim is to maintain high animal health and welfare status of organic livestock by measures such as appropriate selection of breeds and strains, a balanced high quality diet and a favourable environment. Also suffering of the animals during the production, transport, handling and slaughtering stages should be reduced to a minimum. The application of current organic standards to livestock production systems has been the focus of interest by several research groups throughout Europe. During the last few years, various projects in organic systems have been carried out and there are already proposals on how specific issues should be addressed to improve animal health and welfare in such systems (see reviews by Athanasiadou *et al.* 2002, Hovi *et al.* 2003).

It is not our intention to repeat the findings of these studies. However, it is interesting that most researchers acknowledging the complexity of both identifying and assessing welfare problems in such systems. Hence, they use as guidance the experience from conventional ones (Roderick and Hovi, 1999; Bartussek, 2000; Gray and Hovi, 2001, Alroe *et al*. 2001; Athanasiadou *et al.* 2002). The approach that we have adopted to address animal health and welfare issues in organic livestock production systems, in Greece, is a systematic one and is shown in Figure 2.

Figure 2. Flow diagram showing the basic determinants of animal health and welfare in organic livestock production systems.



As shown in Figure 2, animal health and welfare comprise the starting point as well as the overall outcome of various interacting parameters. We see both as being directly associated with the husbandry practices followed in the organic enterprise and its characteristics whereas at the same time form a basic condition for organic justification.

Organic livestock in Greece includes beef and dairy cattle, dairy sheep and goats, pigs and poultry. With regard to animal welfare the development of organic livestock enterprises requires some basic changes in husbandry practices of organic livestock whilst transport and the structure of slaughterhouses. Issues such as time spent at transport, animal handling facilities and methods (including loading and unloading), design and construction of slaughterhouses, and slaughtering procedures should be addressed in detail. There are serious warnings by the European commission regarding the welfare of farm animals in Greece (EC DG (SANCO)/1060/2000). For example, the majority of existing slaughterhouses do not have the appropriate infrastructure and only a small number conform to quality standards imposed by EU legislation (EC DG-SANGO-8644/2002).

Organic livestock production systems

Among the animals used in organic systems, ruminants have a special role in organic farming because they can operate without significant input from external sources; they can be based on grazing and also provide farm manure, which is particularly desirable in organic practice (Sundrum, 2001; Hermansen, 2003). In this respect, organic ruminant production systems seem the most promising enterprises. The notion is that the introduction of organic practice will bring greater efficiency in small livestock enterprises in the Mediterranean (Wright *et al.* 2002, Kanteres and Papadopoulos, 2002, Ronchi and Nardone, 2003). However, dissatisfaction about the rate of development of organic agriculture in Greece has become evident between farmers (Dimitriou, 2002).

Among the animals used in organic farms in Greece, there are obvious differences in appearance, size and production levels, according to evidence mainly from conventional systems, between and within different breeds (Zygoyiannis *et al.* 1997, Zygoyiannis *et al.* 1999, Ligda *et al.* 2002, Kanteres and Papadopoulos, 2002). Indeed, the question that arises is how indigenous breeds or their crosses differ in efficiency of production under organic systems. We suggest that knowledge of this is essential for the effective design and implementation of management strategies in organic systems. Where relevant information is available, resistance to disease should be also taken into consideration over productivity when breeding decisions are made. We will elaborate on possible answers with regard to organic sheep and goat production systems in Greece.

Sheep and goats

As mentioned in the Introduction section the small ruminant enterprises comprise the majority of organic livestock enterprises in Greece, but in general, the numbers of organically reared livestock have been much lower than the average levels in the EE of 15 (Häring, 2003). The situation in Greece is different, with the organic sector of animal production being the least pronounced. Therefore, there is plenty of room for growth available for the development of organic livestock enterprises. The latter is particularly important for dairy sheep and goat enterprises where Greece has a strong tradition. Both sheep and goats in Greece are reared mainly as dairy animals with meat production being considered as a by-product of lactation (Zygoyiannis, 1994, Zygoyiannis *et al.* 1997, 1999).

However, before assessing the possibilities for conversion to organic it is necessary to understand the current structure of small ruminant enterprises in Greece. For example, some of the indigenous Greek dairy breeds of sheep are considerably small in size and have very low milk yields whereas there are also breeds larger in size and with much higher milk yield. There are about 9.3 million dairy sheep in Greece (FAOSTAT, 2001) reared mainly under the semi-extensive system. The wide range in flock size and associated differences in management strategies has a significant influence on the options for change. The majority of sheep (98%) belong to indigenous Greek dairy breeds and only about 2% are crosses with foreign breeds. Crossbreeding is widely practiced either within the available indigenous breeds and, to increase milk yield potential, to the indigenous Chios breed or to the imported East Friesland breed or the Lacaunne breed. Sheep and goat systems are characterised by overriding priority for milk production and by the traditional preferences for lamb meat from early-weaned lambs. Sheep production covers the domestic needs for milk and 84% of the needs for sheep meat (Zygoyiannis 1994, Zygoyiannis *et al.* 1997). The gross income from sheep production is 49% of the total livestock production and 15% of the agricultural production. There are also 5.3 million dairy goats reared in Greece of which more than 70% belong to the indigenous Greek dairy breed *Capra prisca* (Hadjigeorgiou *et al.* 1998). Current systems of sheep and goat production are classified as (i) home fed, (ii) intensive and (iii) Extensive with or without transhumance.

The potential of indigenous Greek dairy breeds of sheep and goats to produce high quality meat with environmentally friendly methods of production has been confirmed in a series of studies (Zygoyiannis *et al.* 1995, Zygoyiannis *et al.* 1999, Arsenos *et al.* 2000, Stamataris *et al.* 2001, Arsenos *et al.* 2002). Taking account of these results, further experiments begun to consider sensitive approaches to nematode parasite control in sustainable systems for sheep and goat production. A recent study (Papadopoulos *et al.* 2002) assessed the extent of gastrointestinal parasitism in indigenous Greek dairy breeds of sheep and goats reared under traditional production systems, which are characterised by a relative long dry season. The results showed that sheep were more susceptible to nematode infection than goats, which did not have high faecal egg counts (FEC) and seemed not to urgently need any anthelmintic treatment at all. The later is in accordance with previous statements (Papadopoulos *et al.* 2001) that drought and isolation are likely to be the major factors accounting for the development of anthelmintic resistance in nematodes in sheep and goat flocks in Greece.

Currently it seems that sheep and goat production in Greece is going through a period of rival with many young people setting up new farms with elite livestock. Considering the current practices of sheep and goat production and the status of those involved in such enterprises it seems that conversion to organic provides a unique opportunity to establish them on quite different social and economic status from the very beginning. The continuously increasing numbers of those following organic practices represent a dynamic that has to be supported to flourish further. It has been stated that sheep and goat husbandry practices in Greece are very close to organic production, a fact that allows for quick conversion (Dimitriou, 2002). We see the small ruminant sector as the most suitable for organic conversion that offers an excellent opportunity to the farmers to increase their income not only in terms of product value, but also in relation to current CAP subsidy regulations that has allocated in Greece 11,023,000 rights (14.5% of the total) for small ruminants. It is important that such potential is understood in association with its likely positive impact on rural communities. The notion is that keeping sheep and goats in mountain and sub-mountain regions is a suitable practice of maintenance of extensively reared livestock and hence utilising agricultural land which otherwise would lie fallow subject to erosion (Ronchi and Nardone, 2003).

Cattle production

The indigenous Greek breeds of cattle are under extinction and the most commonly used animals are their crosses with imported breeds (Ligda *et al.* 2002). The crossing of the indigenous breeds with foreign breeds was aimed to improve their production traits. The breeds that exerted the greatest influence in this respect were the Brown Switz, the Simmental and the Limousin. The gene pool of the indigenous breeds began to be utilised by that of the foreign breeds and their crosses forced out the indigenous local breeds. The increase of crossbred generation was a consequence of the absence of any controlled program in reproduction. At present Greece holds some 141,606 rights, from CAP subsidies, for extensively reared beef cattle. It is the existence of subsidies that offered space for maintaining such livestock enterprises, which in our view do not deviate from the organic standards. Therefore, conversion into organic of existing herds that are characterised by extensive husbandry conditions with low cost and compliance with ecological requirements, is a simple step process. There are also suggestions regarding the preservation of landscape values and maintenance of rural communities by using organic cattle production systems as prototypes of sustainable production systems (Phillips and Sorensen, 1993, Häring, 2003, Ronchi and Nardone, 2003). In our view, the problems that should be resolved regarding such systems are associated with the handling of animals, permanent identification, and transport to slaughterhouses. Also, issues of preservation of the remaining population of indigenous cattle should be seriously considered in the future policies regarding organic cattle systems in Greece.

Pig production

The organic pig enterprises are similar to those of extensively reared beef cattle, with small family based holdings. It is remarkable that herds of pigs reared under extensive husbandry conditions existed in Greece from the early years of Greek history as described in Homer's Odyssey. At present the most common practice is outdoor housing with wild pigs and their crosses reared in forest of chestnut and oak trees or in farms located in mountainous areas. There are about 15 Certified organic farms. The produced meat is sold either directly by the farmers of through local butchers. Although the demand for such meat is relatively high we are concerned whether organic pig production in Greece is a promising activity. However, our projection is that the number of new organic farms will increase substantially in the near future mainly due to the introduction of specific subsidies.

Poultry production

Poultry production is one of the most developed sectors of animal production in Greece with medium and large-scale enterprises. In addition, poultry rearing in Greece is not concentrated only in medium and large scale enterprises but there are households that keep small numbers of laying hens and their number form a substantial proportion in the production. The latter has been described as "the Greek smallholder poultry model" which is a rather complex operation and focuses on the production of table eggs and broiler chicken meat (Yannakopoulos *et al.* 2003). Considering the current status of organically reared poultry (numbers shown in Table 3), and the dynamic of existing conventional enterprises in Greek agriculture we project that the organic ones will develop in a similar pattern to the organic pig enterprises.

Problems and practicalities

In our view an assessment of disease and production levels of organic livestock in Greece is essential. For example, the bulk tank somatic cell counts (SCC) would be an excellent indicator of milk quality (economic outcome) and incidence of sub clinical mastitis (biological outcome). Also periodic assessment of body condition score is a very good measure of nutritional status of animals. However, to our knowledge there are neither accurate estimates of disease incidence on organic farms nor a comprehensive recording system applied across even a small number of organic farms. These problems will be discussed in detail below.

Pilot study

Before making assumptions about the current status and the future prospects of organic livestock production, in the absence of firm evidence, it is necessary to have some background information about existing practices in Greek livestock enterprises. For this reason we held a series of informative discussions with farmers and key representatives of organic certification organisations and of course those associated with organic and conventional livestock production in Greece, including dairies, abattoirs, food processing units, wholesalers, importers, traditional butchers and supermarkets.

A questionnaire was sent to organic livestock producers in January 2003. The farmers had been selected according to information provided by the existing organic certification organizations. The aim of this pilot study was to gain a general idea of current status of organic livestock enterprises in Greece, particularly ruminant production systems. The questionnaire was structured in five sections with simple questions regarding (i) general information about the farmer, (ii) type of animals and husbandry practices, (iii) type of buildings, (i) feeding practices and preventive measures and health management. A total number of 100 questionnaires were sent and 38 were returned. Further to the questionnaire we also visited some organic sheep and goat farms located in Nothern Greece and discussed with farmers about the problems they encounter in every day practice.

Although this pilot study suffers from the small number of responders it is interesting that the majority of those who responded expressed their concern about the lack of continuous advice and technical support and the shortage of veterinary consultation, which is mainly due to the very small number of vets involved in the Greek organic certification organisations (Arsenos and Zygoyiannis 2002). Farmers that were willing to convert to organic production methods expressed their concerns about possible economic losses. The reported health problems and treatment practices were not different to those encountered in other countries (Roderick and Hovi 1999, Thamsborg *et al.* 1999). The dominant figures in most of the farms were mastitis of dairy sheep and high levels of mortality of newborn lambs and kids (in some cases >30%) whereas parasitism did not seem to be an important problem. In many cases farmers were not aware of what is permitted and what not, as either information was not available or they did not know how to access it. The other important finding was the remarkable low prices of milk and meat produced, which were similar to those of conventionally produced meat and milk. The average price for milk was 0.85 euro/lit for ewe's milk and 0,53 euro/lit for goat milk. The average price for meat was 4.4 euro for lamb meat and 3.81 euro for meat of kids. The reply to queries about the low prices was that those producers have specific contracts with small dairies that collect the milk and in return provide the farms with feedstuffs in reduced prices, veterinary services and advice. These enterprises were also subscribed to the same organic certification authority.

The Greek market for organic products

Supply and demand of organic livestock products

Livestock enterprises operate in a world governed by economics. Supply in economic terms, refers to the quantity of a product that the farmers are willing to produce at a certain price. On the other hand, demand refers to the quantity of a product that consumers are willing to purchase at a certain price. The notion is that the more something costs, the less of it a consumer will buy (Slenning, 2001).

Organic farming is widely perceived to be a "good thing" and the increasing numbers of those choosing to purchase organic foods represents a way of registering their positive support to organic systems of animal production. It should also be noted here that food safety and quality are of great importance to consumer's interest (Kouba, 2003).
To maintain the credibility of organic products it is self-evident that the adoption of hazard analysis critical control points (HACCP) should start from down to farm level (Kouba, 2003).

During the last decade the demand for organic products has risen sharply across Europe revealing public concern about food safety and quality, environmental effects of intensive agriculture and animal welfare (Sundrum, 2001; Hermansen, 2003). However, organic animal products are something new for the Greek market and hence demand is low. They are usually sold through specialised organic food shops that exist even in small cities as well as in weekly outdoor markets in big cities. Organised distribution networks not only import organic products but also export Greek organic products mostly to the UK and Germany. Products exported, are mainly dairy products (cheese and yoghurts).

Processing and trading of organic products

The food processing industry in Greece constitutes the most important sub-sector of the domestic industry. It accounts for about 2.6% of the national GDP employing almost sixty thousand people. The typical characteristic of the industry is small firms (less than 10 employees) with very few large companies. Unfortunately, there are no detailed data available regarding the number of such enterprises engaged particularly in processing organic food. The number is estimated at around 300 and has a continually rising trend. The majority are small size firms targeting at local markets (Kaldis and Galanopoulos, 2002; Duchateau, 2003). Kaldis and Galanopoulos (2002) stated that the marketing of Greek agricultural products is not always up to the standard expected by present day consumers Deficiencies are encountered in packaging, standardisation and conformity with quality criteria. Moreover, the involvement of various intermediates adds to costs without offering the corresponding services and unreasonable discrepancies between producer and consumer prices. There are already concerns raised about such problems in the Greek market for organic products (Krystallis and Fotopoulos, 2002). However, we trust that such problems will be only minor exceptions.

Marketing of organic products is gradually and systematically growing and developing. Marketing organisations have appeared recently and are growing in size. Amongst the organic products produced in Greece, various types of cheese, particularly feta, is the best organised in terms of marketing. Feta cheese was the first organic product produced in Greece and exported mainly in Germany and the UK. The last two years some of the large supermarket chains have started advertising organic products and have also established separate organic sections. Given that organic production in Greece is still limited, supermarket chains sell mostly imported products.

The determining factor regarding the trade of organic products include the geographical proximity to urban areas and market practices, i.e. direct selling of organic products on farms, local markets or contracts with supermarkets (Padel 1999). Greece is high dependent on its trade with E.E., and currently a large amount of meat and dairy products are imported (e.g. organic beef is imported from Germany, organic cheese is imported from France). Given the rising demand for organic products in Greece it seems that the marginal market share of locally produced meat and dairy products represents a challenge for those exporting such products from other European countries. The fact that the volume of organic production in northern European countries is close to covering consumer demand (Sylvander and Le Floc'h-Wadel 2000) implies that a wider and more vigorous competition is emerging. Such developments could hold unfavourable prospects for the future of Greek organic livestock production if it will not be based on a loge-term strategy. For example prise competition from imported organic products, which does not really exist now in Greece, could cancel even the most optimistic prospects.

The future of organic livestock enterprises in Greece

There are several factors that constrain the development of organic livestock production in Greece and could possibly threaten its future. Organic production in Greece has been given a low profile in consumer's appreciation, retailers and supermarket chains. The state services, supervised by the Ministry of Agriculture, showed a considerable delay in undertaking in depth discussions with research institutes, universities and organic certification organizations on the prospects and consequences of a common approach to the development of organic livestock under the particularities of the Greek agricultural sector (i.e. the existing disassociation between livestock production and the production of feedstuffs).

The failure, so far, of the organic sector in Greece to move quickly and parallel to the growth observed in the other EU countries is partly due to the absence of appropriate information at farm level. The development of the organic sector to this date has been a result of hard work carried out by a couple of private certification authorities that were the pioneers in the field. To date, advertising and marketing of organic products has been left to organic certification organisations, individual farmers, local organic associations and small food processing units. The promotion of organic products by supermarkets chains has been largely ignored. Further investigation is needed to assess the input of organic livestock enterprises in Greek Agricultural production and to measure their cost-effectiveness. Data of animal health and production records need to be collected through the adoption of practical systems of inspection that can be incorporated into monitoring and problem-solving models. There is a need to develop a national network using modern communication technologies as well as regular meeting between all those involved in organic livestock production. The latter can be best achieved by cooperative efforts among state and private organisations, organic farmers, veterinary and agricultural practitioners and research institutes and Universities.

Organic livestock production has shown a remarkable concentration on dairy products especially from sheep and goat milk. The challenge for these enterprises will be to move towards the production of high value-added products with standard quality. Such steps will require technology and labour skills. We believe that unprofessional employees and hence low cost labour are not a guarantee for economic efficiency or the effective marketing of organic products. Current production levels do not cover the demand for organic products and hence the number of organic livestock enterprises will gradually increase. However, the plans for development of organic livestock production should be the result of market needs at local, national and international level and prices of organic products should be in line with the country's economy. The latter is important considering that the competitiveness of Greek products and their shares in international markets have room for improvement (Kaldis and Galanopoulos, 2002).

There is a need for organic certification authorities to document the cost-effectiveness of their services for organic livestock management and production. The challenge for the future is to determine what services organic producers need and how the certification authorities can deliver those services economically. In the face of the growing interest in organic livestock production, it is important to identify which systems have the potential for long-term growth in a competitive market for organic products. Long-term growth of the organic livestock enterprises in Greece can most likely result by the ability to help the producer to make the right decision. Those providing consultative advices to organic farmers should restrict their services to specific activities or should be staffed by professionals with expertise on organic production systems. Further to the services to their clients, it would be very rewarding if they were also involved in a common monitoring system. Such involvement would improve the efficiency of organic livestock production systems and the quality and credibility of their products.

Conclusions

One of the problems we faced while writing this paper was the lack of scientific information with regard to research on organic livestock production systems in Greece. Therefore, scientific experimentation that could help quantify the results of organic practice appears to be necessary. Once the information is available, it needs to become available to people interested in it. Such data will form the basis for objective criteria that can be adopted as a general code of practice without requiring unrealistic changes in existing livestock production systems. Current practices have shown that organic livestock production is gradually developing in Greece and may have a promising future if economic efficiency is achieved. However, there are still various problems to be overcome such as the endogenous structural deficiencies, daedal bureaucracy, and insufficient infrastructure. With good cooperation between state and private organisations, effective management programs at farm level, continuous education of the farmer and dissemination of research results, organic livestock production systems in Greece can be both functional and profitable. Bearing in mind that organic livestock production is more advanced in other European countries of the Mediterranean basin, which have similar climatic and soil conditions, it is reasonable to expect that organic products from Greek livestock enterprises will face strong competition within the European market. In our view, the choice of the level at which different organic enterprises will develop rests to the farmers and their advisors, but it will be greatly dictated by market needs, at local, national and international level, and also by the price of organic products, which should be in line with the country's economy.

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Working group report:

Implications of economic constraints and consumer and producer attitudes to standard development, in relation to animal health, welfare and food safety

Compiled by A. Sundrum and V. Lund

Following a short introduction to the topic given by Albert Sundrum, the working group had a lively session with many and diverging views on the topic.

The group was in agreement that there are many agricultural systems in organic farming within the European Union. The differences between the systems often are the cause for differences in disease and welfare problems. However, there is only one set of organic standards across Europe. The group also agreed that it was reasonable to assume that a lack adaptation of these standards to the local and system related conditions is a relevant cause of various animal health and food safety problems observed in organic livestock production.

It was concluded that research is needed to identify problems and bottlenecks in the various systems in relation to the animal health and food safety issues. In addition, research results must be conveyed to advisory bodies and farmers. Consequently, not only production, but organic advisory services and education need to get support from the governments. It was suggested that there are good examples of how advisory services can convey research findings to organic farmers in the UK, in Denmark and in Sweden.

The group concluded that money is often the first limiting factor in farming and that production costs are often markedly higher in organic farming than in conventional production. There were diverging opinions in the group on whether measures aiming to improve health and welfare necessarily imply additional production costs. A majority felt that health and welfare measures may also result in lower costs and better production results. In this case, farmers need to be made aware of that higher health and welfare standards are not always equivalent of higher costs. When this is understood, the farmers may also be prepared to pay for consultancy in animal welfare matters. Costs can also be reduced through the introduction of new production systems. It was agreed that it is crucial for organic farmers to think ‘out of the box’, and not just see organic production as another version of conventional production. However, it was noted that such new systems may cause new animal health and welfare problems that require further new solutions.

On the other hand, the question of higher premium prices as a result of consumer recognition of high animal welfare and health standards was raised. This is obviously necessary if higher production costs are not covered by the current premium prices. However, it was noted that to use this instrument for an increase in income, control criteria and control concepts have to be developed and put into practice in order to ensure that consumer confidence in such high health and welfare standards is maintained.

The members of the group agreed on the following in regard to the current EU standards on organic livestock production:

- The standards *per se* are not sufficient to guarantee high health and welfare in organic systems;
- They must be developed continuously;
- They must be adapted to local, regional and national conditions; and
- The standards must ensure that the differences between organic and conventional agriculture are big enough to motivate consumers to pay a premium for organic products.

The following points about the consumers were agreed:

- It is paramount that consumers perceive organic as better than conventional;
- Consumers want simple messages; and
- At the same time they want (and need to get) qualified information and education.

It was suggested that farmers:

- need strong organizations to keep prices up and to defend the premia against the big actors (*e.g.* supermarket chains) on the market; and
- need advice on how to produce high quality products and ensure high animal health status.

It was also suggested that, in order to maintain price premia and to put more emphasis on animal welfare, diversification within organic farming could be used, for example to allow different labelling showing animal welfare advantages. However, it was also noted that many labels may confuse consumers.

Working group report:

Sheep and beef production: farm level constraints and recommendations for enhancing health, welfare and food safety

Compiled by D. Younie

Farm level constraints and recommendations

The group identified the following as the major constraints to enhancing animal health and food safety at farm level: management skills of the farmer, labour (availability and quality), land, capital, and genotype of stock. Detailed discussion focussed on these issues.

Management skills of farmer

The following recommendations were made by the group:

- Improved advisory support
- Improved training in farm planning, technical issues and marketing
- Improved supply of information; i.e. more research required in technical issues such as parasite epidemiology and non-chemical control measures.

Labour supply

This does not only relate to availability and quality of hired labour. Family labour, including the farmer's own time, must be taken into account, since most farmers work long hours and this almost certainly has an adverse impact on animal health and welfare. The following recommendations were made by the group:

- In research programmes, not only time but also labour quality should be considered as a resource unit.
- Research and advisory programmes should identify potential changes in livestock systems and husbandry practices which will reduce labour demand. One of the best examples of this is the selection of strains of sheep which are self-reliant (sometimes called 'easy-care'), which lamb easily without human assistance, producing strong, viable lambs which have a high genetic resistance to parasites and disease.

Land

Discussion focussed on soil quality to ensure optimum animal health, and land area in relation to ensuring that stocking rate is limited rather than maximised. The recommendations of the group were that:

- There should be a statutory requirement that farmers should undertake assessment of soil and forage quality before starting conversion so that the trace element status of the herbage was known before conversion. There have been examples of farmers immediately withdrawing trace element supplementation from stock on starting conversion, with the result that the mineral status and health of animals has been compromised.

- There should be a link between the granting of direct financial support and the degree of self-sufficiency in feedstuffs on the farm, in order to minimise the temptation to use purchased feedstuffs to maintain a high stocking rate, which could compromise animal health.

Capital
A restriction in the availability of capital is usually reflected primarily in the quality and capacity of buildings for livestock accommodation, and perhaps handling facilities. The group recommended that, where this was the case, animal health and food safety would be optimised by avoiding overstocking. Perhaps the standards need to take account of not only space allocation for livestock, but also the quality of that space (e.g. ventilation, etc.).

Type of animal
In addition to the points made in paragraphs 3 and 4 above, the group reiterated the importance of the requirement in the standards that animals should be adapted to local conditions, in terms of soils, climate, feed quality and quantity. Whilst some research on breeding strategies had been carried out in organic dairy cattle, no research had been carried out on breeding strategies for beef and sheep in organic production. The group recommended that this should be undertaken.

External constraints and recommendations for enhancing health, welfare and food safety
The group identified six major external constraints to enhancing animal health and food safety in organic beef and sheep: more effective marketing, availability of certified abattoirs, veterinary advice, certification procedures, subsidy support and research requirements. These can be categorised broadly into two broad categories: a) market factors and b) institutional support.

Improving the market: supply and market information

The group felt that any expansion in the size of the market for organic beef and sheep meat would lead to an overall improvement in animal health and food safety.
However, negative factors did exist. The marketing of organic beef and sheep is inefficient in some regions because of a poor flow of information between producers and meat processors: information on projected supplies of cattle and sheep for slaughter is not easily available to processors, and reliable estimates of projected market requirements (demand) are not easily available to producers.

- The group recommended that a system to share supply and market information should be established in each country.

Location of approved abattoirs

More directly affecting animal health and food safety, the availability and location of certified abattoir facilities is poor in some regions, leading to animals being transported large distances for slaughter.

- The group recommended that governments or certification bodies facilitate the organic certification of abattoirs in remote areas, e.g. by assistance with certification costs and/or grants for capital improvements in the abattoir.

Veterinary advice

Animal health and welfare on organic beef and sheep farms would be enhanced if improved advisory support from veterinary practitioners was available. The attitude of some vets towards organic farming is negative, most vets have a poor knowledge and understanding of the organic livestock standards, and the charging system for veterinary support may not be conducive to the provision of preventative health management (as opposed to treatment of symptoms). The recommendations of the group were:

- Veterinarians should charge for giving preventative advice rather than solely for treating animals.
- Closer links should be developed between the organic certification bodies and the veterinary profession.

Improved certification and quality control procedures

- The group recommended the introduction of better certification and quality management procedures should be introduced at all levels (e.g. HACCP), combined with improved traceability procedures.

Subsidy support

Availability of financial support for capital items (accommodation, handling facilities, fencing) would enhance animal health and welfare on organic beef and sheep farms (see para 4 above). Historically, payment of EU subsidies on a headage basis has encouraged farmers to stock to their maximum potential, which sometimes has a negative impact on health and food safety. The introduction of the Single Farm Payment (SFP) will remove this link between subsidies and stock numbers, and should lead to an improvement in animal health and welfare. The recommendations of the group were:

- All national Organic Aid Schemes should contain an element of capital grant support for livestock handling, accommodation and fencing.
- The introduction of the SFP should be monitored on organic farms to ensure that this greater exposure to market forces does not have a negative effect on health and welfare.

Research requirements

- The recommendation of the group was that major programmes of research should be undertaken on a) the evaluation of herbal and homoeopathy remedies and b) further preventative health management strategies in organic beef and sheep.

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Working group report:

Dairy farms: constraints and recommendations for enhancing health, welfare and food safety

Compiled by G. Smolders, M. Walkenhorst and S. Padel

The group was split in three subgroups focussing, in the first instance, on identifying the problems dairy farmers have to deal with in allocating scarce financial resources. All subgroups joined to identify solutions.

The following problems were identified:

Subsidies can be a problem because:
- State of development of organic market has impact on milk price and farm income ; and
- There is a lack of policy support for milk production compared with other enterprises .

Marketing is often a problem as:
- State of development of organic market has impact on income;
- Low milk price leaves little profit (it was noted, however, that in most cases dairy farmers are better of than beef and sheep farmers).
- Some of the produce end up in the conventional markets (milk, meat);
- We need to understand how to build up the market for organic products; and
- Social benefits of organic framing are not yet marketed.

Regulations cause problems as:
- There are differences in the implementation of livestock regulation between European countries;
- Interpretation of the standards varies, even by different inspectors of control bodies within the same country or region;
- Investments for housing that meets standard requirements can be a big problem (three different problems were pointed out: no access to pasture, robot milking in combination with cow traffic and tethered housing systems);
- 100% organic rations will increase feeding cost considerably in several countries;
- Some organic systems with high milk yields and high intensity require higher concentrate inputs than allowed.
- There are clear conflicts between the standards and the product quality; e.g. mastitis/dry cow therapy and somatic cell counts, nursing cows and Johne's disease etc.
- Specific problems with intake of fresh grass while grazing in Sweden (local standards require that this is 50% of dry matter intake during summer).

With regard to farm resources, the following problems were identified:

- Further breeding and existing high prevalence of Holstein-Friesian and/or high yielding cows that are not adapted to "organic" rations, especially in early lactation;
- There is less income from selling animals as breeding stock if the heard is not high yielding;
- Intensive farms with high stocking rates need more land when converting to organic in order to maintain same herd size with a reduced stocking rate.

Information provision for organic dairy systems is problematic as:

- You are dealing with a complex system – holistic systems require information about the system as a whole, not only the underlying parts.
- Attitudes of veterinarians to organic dairying as a system, and especially towards alternative therapy, are sceptical; and
- With few research supporting the use of alternative therapy the use is considered to be problematic.

The following solutions were suggested:

Figure 1 presents the influences/interests of stakeholders on the different chains in organic dairy system. The different lines and arrows stands for different functions in the total dairy chain. The stakeholders are described by function or influence in CAPITAL LETTERS.

In regard to subsidies:

- They should not only be based on the number of animals or areas cultivated but should support good practise, e.g. good animal welfare and inclusion of all-day grazing could attract higher payments (it was, however, pointed out that the judgement of animal welfare could be difficult, and further research would be needed).

As far as marketing is concerned:

- Understanding the consumer is important, i.e. what does she/he want and what does she/he expect from organic products and organic farming? Why do they buy organic products and have different motives for different product groups?
- Differentiation of markets and marketing strategies could help, i.e. change communication about organics and move towards new and innovative products.

In order to solve the problems with regulations:

- Preventive management (system approach) should be promoted in favour of specific input substitution.

In terms of farm resources:

- Money was seen as an/the instrument for achieving change, e.g. giving bonuses for good (low somatic cell counts) and penalties for bad (high somatic cell counts) management;
- More research is needed do define animal welfare and product quality; and
- Breeding aims should be identified by the farmer for his specific circumstances. Breeding results should be evaluated under organic conditions to clarify the suitability of breeds for organic farms.

With regard to information:

- It is necessary to improve the information to the public (who are the taxpayer and pay the subsidies) about organic farming as a system, that improves animal health and welfare
- Consumers must get accurate information about the organic products the buy.
- Producers should be informed about organic farming before they convert (so they know what to expect): they should be told about the regulations and pointed to the available information about organic farming.
- Veterinarians should be informed (part of the teaching curriculum in vet schools) about the holistic system, the importance of preventive health management on organic farms and about alternative treatments.
- In communication to the policy makers (the government), organic farming should be presented as a different farming system and not as a conventional system with some alteration.

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Working group report:

Poultry production: constraints and recommendations for enhancing health, welfare and food safety

Compiled by W. Zollitsch

Common features of organic poultry production in different EU countries
The group accepted, as a starting point to the discussion, the fact that organic poultry production shows a high variability throughout Europe. This variability is particularly important in the economic importance of poultry to the organic farmer and is reflected in the stage of specialization, the structure of production and marketing, the average flock size and the farming conditions, etc.

Despite these regional differences, it was agreed that there are some aspects that European organic poultry producers have in common:
- Traditionally, on organic farms, poultry were kept in small flocks alongside other livestock species. During the last decade, a number of organic farmers have started to specialize in poultry production and to manage larger flocks of both layers and broilers (from 500 to several thousand birds per flock). At the same time, large scale conventional producers have begun to diversify into organic farming, seeing this as a promising market opportunity.
- This development has been accompanied by changes in marketing strategies: while traditional organic poultry farmers mainly rely on marketing directly to consumers, specialized organic poultry farmers supply super markets and retail chains with organic poultry products.
- Typically, higher premiums can be gained for organic broilers than for organic eggs. There tends to be more competition between the organic egg market and other “free-range” systems.
- In some countries, organic poultry production has been organised through vertical market integration. While this cannot be considered to be a "typical organic structure", vertical integration may have advantages with regard to managing scarce resources.
- Despite regional differences in organic poultry production, the main problems reported by farmers seem to be very similar in different countries and involve both external (e.g. availability of suitable breeds and organically raised pullets) and internal resources (e.g. high-value protein feedstuffs that are produced on farm, information about optimized management systems).

Problems and solutions
Both external and internal resources may be factors that limit animal health and welfare, food safety and the economic profit of poultry producers.
- Feather pecking and cannibalism: the question of breeding goals and breeding programs for organic laying hens still remains unsolved. A sound concept for rearing of organic pullets is also needed in order to solve this problem.
- Animal welfare and product quality: While there is relatively little contradiction regarding systems for organic layers, there is a need for the further development of husbandry systems

and management concepts for broilers (e.g. use of perches, litter management). Parasites and breast blisters were highlighted as main problems in this respect.
- While suitable broiler breeds are more readily available, there is an urgent need to clearly define the term "slow growing birds" within the organic standards. It is felt that, currently, there are no breeds available that are suitable for organic turkey production.
- The disposal of spent laying hens is quite different in different countries. It is proposed that markets for products from spent hens should be developed (this includes slaughter houses for spent layers as a very specific problem in some countries) rather than developing methods for "animal friendly euthanasia".
- Nutritional needs of poultry: A very critical factor is the shortage of feedstuffs rich in protein to cover the high requirement of poultry for essential amino acids. While some farmers advocate the use of synthetic amino acids, it is strongly recommended that the focus should be on identifying and utilizing internal resources (such as cakes from different oilseeds, extracts from algae and other plants, soybeans) rather than relying on external resources.
- Economic constraints: There is a major concern that the higher price for organically raised pullets will not be compensated for by premiums on organic eggs. A further critical point is the increasing demand for organic feedstuffs, which will inevitably lead to higher prices. The concept of "horizontal integration" could be a system-compatible supplement, or even an alternative, to vertical market integration. Both formal and informal linking of farms and resource and cost sharing may assist organic farmers to gain a better control over external resources and, hence, improve efficiency, while ensuring advances in the health and welfare of poultry flocks.

Part B:
Italy: a case study in the development of organic livestock production

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The activities of Regional Agency for Development and Innovation in the Agro-forestry sector (ARSIA) for the development of organic agriculture and livestock productions in Tuscany.

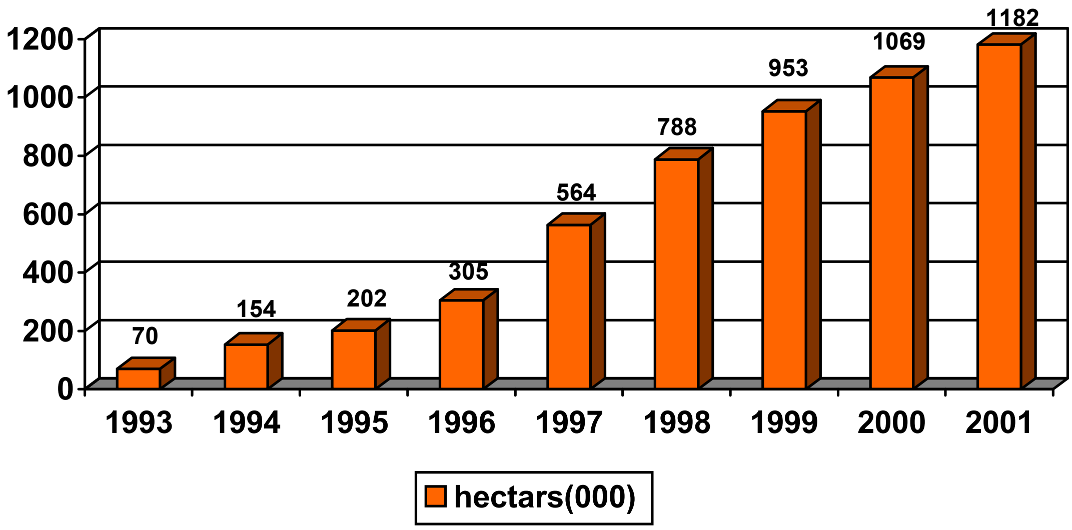
M. Bonanzinga[1], P. Bottazz[2] and C. Mearini [3]

[1] ARSIA: Agenzia Regionale per lo Sviluppo e l'Innovazione nel settore Agricolo-forestale [Regional Agency for the development and the innovation in the agricultural and forestry sector], loc. Ex Enaoli 58010 Rispescia (GR), [2] ARSIA, loc. Ex Enaoli 58010 Rispescia (GR), [3] ARSIA, Via Pietrapiana, 30 – 50121 Firenze

Introduction

Italy is the leading country in Europe, in terms of agricultural surface converted to the organic system. As presented in Figure 1, in 2001, the overall surface dedicated to organic agriculture was 1,182,000 ha; compared with the organic hectarage of 70,000 ha in 1993. Data for the last two years (2002-2003) are not yet available, but we can unofficially affirm that there was a stasis, with a reduced increase in organic growth.

Figure 1: Surface area converted to the organic system in Italy(hectares per year)



The organic agriculture is mainly developed in the islands and in the southern regions: Sardinia (313.000 hectares), Sicily (195.000 hectares) and Apulia (130.000 hectares) are the Italian regions with the most organically cultivated surfaces.

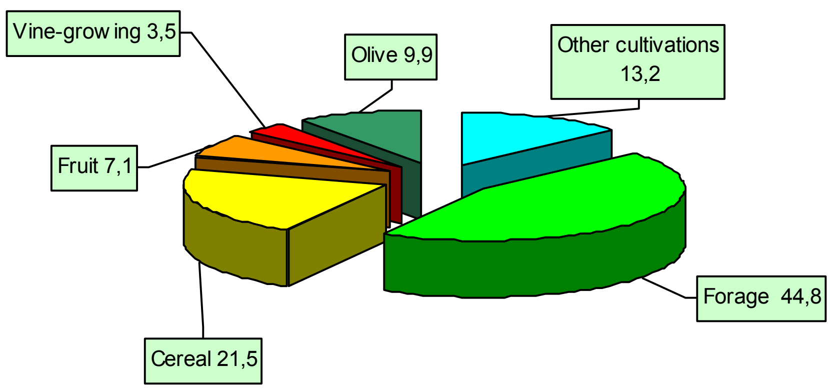
As far as the surface distribution according to different land use, the following breakdown is registered (Figure 2):

- 44.8% of surfaces is assigned to forage cultivations (50% of them are concentrated in Sardinia);

- 21.5% is assigned to cereals, mainly to durum wheat (47,7% concentrated in Apulia, Sicily and Sardinia);
- 13.2% is assigned to other cultivations (vegetables and industrial cultivations);
- 9.9% to olive;
- 7.1% to fruits; and
- 3.5% to vineyards.

Data on organic livestock production are still incomplete, and the situation is continuously changing: in 2001, in fact, there were about 3,500 enterprises that agreed complied with organic animal production standards, but the number of enterprises is rapidly growing, particularly in regard to beef production.

Figure 2 : Surface distribution of organic land in Italy according to different production systems



The activities of the ARSIA in organic agriculture

ARSIA is principally engaged in the following two sectors:
1) control and supervision; and
2) promotion, experimentation and transfer of innovation.

Referring to the activity of control and supervision, in Italy this task has been assigned to the Regions; in particular, the Tuscan Region assigned it to ARSIA. In order to do that, ARSIA established a structure dedicated exclusively to the activity of control. The technicians realise controls respecting the volunteer prescriptions of quality, on the basis of a manual, drawn up according to the ISO 9001.200 rules. Every year, all the certification bodies and a sample of organic producers/operators in Tuscany are inspected.

Concerning the activity of promotion, experimentation and transfer of innovation, ARSIA initiated, for every food chain, a “consultation group”, formed by researchers, representatives of agricultural producers and enterprises, the competent departments of the Regional Council, environmental associations and associations of consumers. The “consultation groups” aim at identifying priorities, objectives and contents of researches promoted by ARSIA.

ARSIA has about 70,000 hectares and 2,700 farms converted to organic agriculture. Many projects have been promoted by public calls for proposals, whose content was about both diffusion and research. The tool of the call for proposal is another innovation that the Agency has promoted in the last years to commit diffusion and research projects in a transparent way. In particular, the following projects were realised by call for proposal:

- *Projects for the activity of diffusion in organic animal productions*;
  This call produced six diffusion projects, whose value was 20,000 € each, financed 100% by ARSIA. The length of each project was four months.
- *Organic and biodynamic Tuscan agriculture finalised to plant-animal production activity (analysis of constraints and technical, managerial, entrepreneurial opportunities for the exploitation of the organic meat).*
  The project was assigned to the University of Pisa, department of agronomy and management of agro-eco-system, and foresees a total cost of 274,400 €, co-financed by ARSIA with 149,600 €; the project lasts 3 years (2002-2005). Topics of the research are animal welfare, techniques of feeding (with a relation to the integration fattening and grazing, too), quality of forages (with particular attention to nutritional, sanitary and conservative aspects), management of dejections, quality of carcasses and meat, and economic evaluations.
- *The organic and biodynamic Tuscan agriculture in relation with systems aimed at vegetable production.*
  The project was assigned to AIAB Toscana and foresees a total cost of 173,427 € and a co-financing of ARSIA equal to 129,986 €; it lasts 3 years (2002-2005). Topics of the research are defining systems of cultivation for Tuscan environments, according to soil and climate; evaluation of systems mainly referred fertility conservation and weed control; comparison among green manures and among manures; economic evaluations.

Projects with a smaller total cost , have been directly assigned; in particular:

- *Homeopathic methodology and animal welfare in dairy cattle*; and
- *Organic sheep breeding and homeopathic veterinary science*;
  These initiatives have been both realised in collaboration with the International Superior School of veterinary homeopathy “Rita Zanchi” of Cortona (AR).
- *Productive performance and meat quality of calves born from Charolais and Maremmana cows and reared with the traditional or organic method*
  Realised in collaboration with the University of Pisa, Department of animal productions of the Faculty of veterinary medicine.

As far as the innovation experiments are concerned, ARSIA directly manages the Centre for the Technical Innovation Experiments of Grosseto (ex Enaoli resort, Alberese) in the natural park of Maremma, on the land of the agricultural regional farm of Alberese. In the Centre, that has an overall surface of 20 hectares, all converted to the organic system, evaluations are realised on rotations-systems of cultivation, comparison of varieties, test of anticryptogamic defence, evaluations of green manures and tests of managing organic matter.

In terms of technology transfer, ARSIA created the service “Agrinnova Trasferimento (TRANSFER, www.agrinnova.it), aiming at favouring the meeting between the demand and the offer of technical and technological innovation in the agricultural sector. On the web site of TRANSFER, there are some pages dedicated to “Bioinnova”, concerning organic agriculture. In the framework of “Bioinnova, a database has been created, with the involvement of promoters and owners of innovation. The database contains specific pages with descriptions of innovations immediately transferable to farming, with links to other information about seminars and technical meetings, farm walks, guided visits, training and updating courses for technicians and publications, including cd-roms and videos.

Outputs from ARSIA editorial activities are listed below:

AA.VV. (1997) Annuario dei mezzi tecnici per l’agricoltura biologica. [Yearbook of technical tools for the organic agriculture]; edited by ARSIA and CEDAS – (FC).

AA.VV. (1988) La commercializzazione dei prodotti biologici. [The commercialisation of organic products]; edited by ARSIA and written by M. Miele (University of Pisa).

AA.VV. (1999) L’omeopatia negli allevamenti di bovini da latte. [The homeopathy in the breeding of dairy bovines]; edited by ARSIA and written by F. Del Francia (International Superior School of veterinary homeopathy “Rita Zanchi” di Cortona - AR).

AA.VV (2003) Zootecnia biologica. [Organic zootechnics]; Edagricole, edited by V. Ferrante (Univ. Milano). Publication realised in collaboration with the Regions Abruzzo, Emilia-Romagna, Lazio, Lombardia, Toscana e Umbria.

Impact of economic investments on animal welfare: a case study

C. Contini[1], A. Martini[2], V. Ferrante[3], L. O. Zorini[1], P. Migliorini[4], G. Lorenzini[2] and S. R. Bellière[4]

[1] Department of Agricultural and Land Economics, University of Florence; [2] Dipartimento di Scienze Zootecniche, University of Florence; [3] Istituto di Zootecnica, University of Milan; [4] Dipartimento di Scienze Agronomiche e Gestione del Territorio Agro-forestale, University of Florence

Introduction

The interest towards the problems of animal welfare in the last few years has not only increasingly involved the scientific community, but also public opinion, becoming the object of debates and discussions between producers, consumers and all those who, in different ways, work in the sector.

To change the structures and the management of a farm to improve the welfare of the animals generates costs for the producers. These costs are only partially covered through an increase in revenue as a result of quantitative and qualitative improvements in production and to a greater willingness on the part of the consumers to pay for animal friendly production.

Part of the costs remains at the producers' expense, as a result of the presence of consumers whose willingness to pay for products obtained with an attention to the animal's welfare does not compensate the greater costs sustained by the producers. Here we are referring to those consumers that do not share the concerns about animal welfare or due to budget constraints choose less expensive products (Alroe and Kristensen, 2011; Appleby, 2001; Bertoni and Calamari, 2001; Rollin, 2001).

For these reasons, even in the presence of adequate information regarding the methods of production, the free market alone does not seem capable of insuring adequate standards for animal welfare. Thus, to improve the rearing conditions for all animals, it would be necessary for animal welfare to be considered as a collective social good and for society to bear the costs of the externalities deriving from the adaptation of the farm's structures and organization with the aim of bettering animal welfare (Harper et al, 2001; Miele and Parisi, 2001).

On the one hand this presupposes a definition of minimal standards for animal welfare on the part of policy makers, and on the other hand, the evaluation of the measure of the economic value of animal welfare. The first point has been of great interest to the European Community for a long time. The EU has, since 1976 until today adopted a series of directives aimed at defining the minimum requirements of animal welfare in intensive livestock rearing. Among these directives it is worth mentioning those referring to calves, swine, laying hens. In regard to dairy cows, no specific norm exists but we usually refer to the directive 98/58/EC of the Council regarding the protection of animals in farms, a directive accepted in Italy with the legislative decree n.146 of March 26, 2001. To this, one must also add the regulation (EC) 1804/99 and the relative

Ministerial Decrees in which the word welfare is a recurring element without any precise indication regarding either what is intended with the term welfare or the systems to adopt for its evaluation.

The fact that the rearing of livestock with an organic method has as one of its most basic principles the objective of guaranteeing the welfare of the animals through systems of rearing that are more adequate to the typology of the animal being reared, respecting the behavioural characteristics and the physiology, does not on its own allow for the attribution of higher profitability to this system of rearing. It is necessary to equip one with the instruments fit for a scientific evaluation of the level of welfare that are simple, practical and reliable.

In regard to the evaluation of the measure of the economic value of welfare, there are studies that have been conducted using the method of contingent evaluation through the willingness of the consumers to pay. From the results of these analyses, it is not clear that they express the economic value that people attribute to animal welfare as much as they measure the consumer attitude on an arbitrary monetary scale (Bernett, 1995; Bernett, 1997; Bernett and Larson, 1996; Bernett and Blaney, in press). As an alternative, the economic value of animal welfare can be measured through the growth in the costs due to the investments and to the changes in the management of the production systems designed to improve animal welfare.

Objectives

This study analyzes the efficiency, in terms of animal welfare, of the investments completed in a dairy farm with the aim of conforming the company structure and organization to the EC regulation 1804/99.

When applied to Italy, the study can be of use to the livestock farms that in the next few years will find themselves having to bear the investments necessary to comply with the EU regulation on organic livestock production. This refers to both conventional farms that choose to convert to organic production (the growing necessity for the qualification of food production is in fact determining a strong interest in the livestock sector for organic production), and the numerous organic farms that are currently in derogation but must comply by 2010 with the regulation (one indication regarding the number of these farms can be given in reference to the Region of Tuscany where about 10% of the 3,506 of Italy's organic livestock farms are situated (Lunati, 2002) and where it is estimated that 28% of the farms are currently in derogation regarding the structures and use of pastures, while 6% of the farms are in derogation regarding access to outdoors. [5].

In the European context, the evaluation of the annual costs born by the farm to obtain adequate levels of animal welfare compliance can supply a measure of economic value of this good, indispensable to the policy makers in formulating the policies relative to the safeguarding of animal welfare.

[5] ICEA data

Materials and methods

Methodology

Concerning the economic analysis, the costs of the investments that have affected animal welfare have been evaluated, taking into consideration the investments carried out by the farm from 1999 to today. The investments relative to building improvements are calculated by the actual cost of reconstruction, those relative to the equipment are calculated according to current prices. The cost of manual labor is relative to the cost of work actually sustained by the farm. The cost of off farm services is valued according to current prices.

The annual cost, relative to every investment, has been calculated (as a sum of the amount of depreciation, the amount of interest on the capital, the variable costs and the annual amount of maintenance). When the investments have been geared towards the betterment of the already existing structures (such as the flooring or the multiple boxes for the nurse cows and the calves), the increase of the annual cost of the investments was calculated. It is reasonable to expect that these investments had a positive impact on the production. However, in our analysis we did not take into consideration the impact of all the investments on the production because it was difficult to separate these effects from those produced by other variables (i.e. rearing techniques and the animal's feeding).

Concerning the evaluation of animal welfare in a livestock farm, in the last few years there has been a development of diverse methods in different European countries. The greatest possible use for such methods is that of an instrument of management for the producer who wants to improve the conditions of the life of his animals, as integrated systems regarding the certification of products or as real legislative instruments. An example of the use of these systems of evaluation of welfare for the purpose of certification is represented by the ANI35 (Bartussek, 1999) that is utilized in Austria for the certification of organic livestock production. The ANI35 was adopted as an index of evaluation regarding the efficiency of the farm's investments in terms of animal welfare in this study.

The method of evaluation begins with the desire to have a simple system that can be standardized, univocal and capable of being applied to all the situations in the field (Bartussek, 2000). The system is essentially based upon the evaluation of the structures of the livestock farm, upon the possibility of social contacts and the relationship between humans and animals. The advantage of this method for the producer is that he can obtain an immediate analysis of the points where the welfare of his animals is being compromised: for example, a structure can be extremely modern with ample space for the animals, excellent light and ventilation, but the animal welfare can be compromised by a lack of care by the stockperson, as evidenced by dirty animals and structures, the presence of neglected lesions etc.. In the same way this method gives the possibility of scoring all the different situations in a way that makes it easy to improve animal welfare by verifying the critical points and acting upon them gradually (Verga & Ferrante, 2001).

The case study farm

The study was carried out in Mugello, a hilly-mountainous region located in the North-Eastern sector of Tuscany, in the province of Florence. In this region livestock farming is very diffuse, so much so that the area is the most important point of reference for the Dairy Center of Firenze, Pistoia and Livorno. The extensive character of the agriculture and the traditional high quality of the systems of production have created a widespread interest on the part of both producers and consumers regarding agricultural production in general and that of livestock in particular that is respectful of the quality of the environment.

The farm in this study is a tenancy cooperative (whose members are salaried) with a dairy cows enterprise. The cooperative has operated as a certified organic farm since its conversion which took place between 1992 and 1995[6]. Its entire production is bought by the Dairy Center of Firenze, Pistoia and Livorno and the current farm gate milk price is 0.48 € per liter[7]. The farm employs 13 full-time agricultural workers, a high number when compared to the herd size, but this choice is due to maximize employment in order to positively affect the timeliness of its operations. The farm's total surface (being rented) is 352 hectares. A total of 280 heads of the Italian Holstein breed are reared (see Table 1). The daily production of milk is 3.5 tons. The milk composition averages 3.55% fat, 3.13% protein and 200,000 somatic cells per milliliter.

Table 1: Herd composition on the study farm

Stock type	Proportion of the herd
Lactating cows	43%
Dried off cows	11%
Heifers	18%
Young stock	28%

The stock is managed in open housing, with cubicles for the adult animals and deep litter beds for the young. The stable dimensions are 100 meters in length and 20 meters in width. It has 200 cubicles covered with hay and an external paddock (3,800 square meters) part of which is grovel ground and part is concrete. The exercise areas are in concrete. Before the investments started (1999), the concrete surface did not offer good grip to the animals and this led to possible problems of slippage. Before 2003, the calves were kept in single cages until one week of age, before being returned to the part of the stable designated for the calves. This area had boxes and external paddocks. Before 1999, the stock had no access to grazing.

Results

The investments, realized almost exclusively with the farm's manual labor, were made during three years: 1999, 2001 and 2003. For all of its investments the farm received public contributions covering 50% of the costs, contributions that derived from funds destined for the improvement of farming structures (Plan of Rural Development of the Region of Tuscany Measure 1, Legislative Decree of the Italian Republic 173 of 1988, Regulation EC 2081/93

[6] According to regulation EEC 2092/91, the cooperative is certified by the CCPB (Cooperative for the Certification of Organic Products) that since 1993 exercises control over the organic method of production and certifies the product, with the authorization of the MiPaf (Ministry of Agricultural and Forest Policies).

[7] Dairy Center utilizes the milk for the brand of fresh whole milk from organic agriculture as well as to obtain organic fruit yogurt: "Podere Centrale" label.

Objective 5b).

In 1999 the investments were:

1. Pasture for the heifers and dried off cows:
   2.5 hectares of land for grazing upon irrigated land previously occupied by an orchard. The pasture is fenced in with zinc and plastic-coated barbed wire held up every 2 meters with chestnut poles. Inside there are two non-freezing drinking troughs and one hay bale feeder. The cost of the investment was 16,280.50 € and the annual cost of the investment was 4,616.78 €.

2. Stable flooring and that of part of the external paddock with hexagonal concrete blocks that offer good grip to the animals. The cost of investment was 33,172.50 € and the annual cost of the investment 700.13 €.

In 2001, the investments were:

3. A wood shelter with a tile roof was erected inside the pasture for the heifers and dried off cows. The shelter has a walking surface of 90 square meters and a covered surface of 117 square meters that is open on two sides. The cost of the investment was 24,417.00 € and the annual cost of the investment was 2,174.34 €.

In 2003 the following investments were made:

4. Pasture for the dairy cows: 2.5 hectares of pasture upon irrigated land previously occupied by an orchard. The pasture is fenced in with zinc and plastic-coated barbed wire held up every two meters with chestnut poles. Inside there two drinking troughs. The cost of the investment is 14,963.57 € and the annual cost of the investment is 5, 890.71 €.
5. The boxes for the nurse cows and the calves. There are two boxes, each with a walking surface of 30 square meters and a covered surface of 20 square meters. The structure is made of prefabricated, zinc-coated iron and covered with varnished, compressed wood panels. The roof is made of double-layered sheet metal, with a layer of expanded polyurethane coinhibitor that assures good thermal isolation. The floor is composed of litter and inside of every box there are small cup-shaped cast-iron troughs and a zinc-coated iron feeder. Behind the structure the animals have access to a grassy and wooded external surface (of 600 square meters). The cost of the investment is 5,496.33 € and the annual cost of the investment is 224.17 €.
6. Cow brush for the dairy cows the cost of which is 1,250.00 €, the annual cost of which is 344.17 €.
7. Fans in the stable: there are 13 electric fans, supplied with acclimatized humidifiers. The system is equipped with a thermostat and the fans begin functioning at 25°C, while the humidifiers begin working at 30°C. The cost of the investment is 15,000.00 € and the annual cost is 3,708.55 €.

The fans had an effect upon the welfare of the animals that is directly reflected in their production, as it keeps the production of milk constant even when the temperature is very high. Supposing that in a place like this, without ventilation, it is possible to verify a fall in the production of 5% for 1.5 months, the presence of fans would determine an increase in capital that over ten years would completely repay the cost of investment.

For the other investments it was not possible to make direct connection in terms of monetary gain since, as we have already mentioned in the methods, such effects are difficult to separate from the general context of the farm.

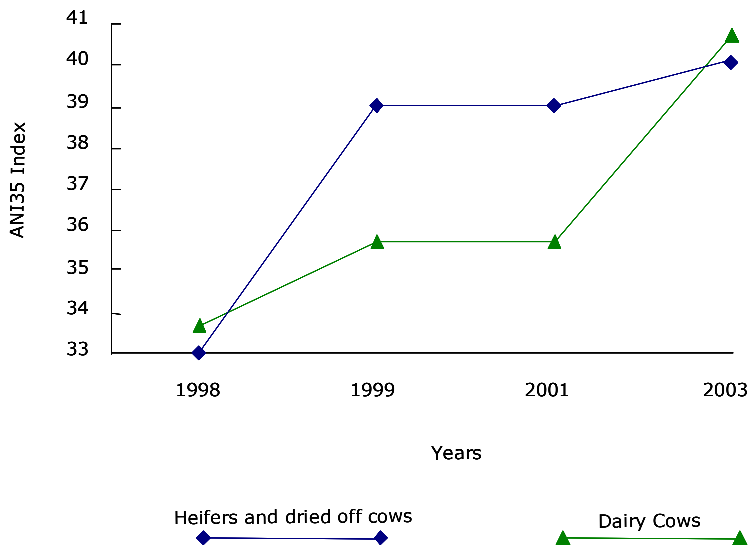
The complete cost of the investments undertaken from 1999 up to the present is 110,579.90 € and the respective annual cost is 17,658.86 € (Table 2).

Table 2: Cost and annual cost of the investments realized from 1999 to 2003 by the case study farm.

Year	1999		2001	2003				Total
investments	Pasture	stable's flooring	shelter	pasture	Fans	boxes	cow brush	
beneficiaries	heifers and dried off cows	the whole herd	heifers and dried off cows	dairy cows	the whole herd	nurse cows and calves	dairy cows	
cost of the investment (€)	16,280.50	33,172.50	24,417.00	14,963.57	15,000.00	5,496.33	1,250.00	110,579.90
annual cost of the investment (€)	4,616.78	700.13	2,174.34	5,890.71	3,708.55	224.17	344.17	17,658.86

The analysis of animal welfare was carried out for the dairy cows, for the dried off cows and for the heifers. The results demonstrate that, in terms of variation in welfare, the effects of the investments undertaken in the past six years are the same for the three groups. In fact, on the ANI35 scale that goes from –9 to +45.5, the dairy cows pass from a score of 33.5 in 1999 to 40.5 in 2003, with a total growth of 7. This is the same total growth as the heifers and the dried off cows that pass from 33 to 40 points (Figure 1).

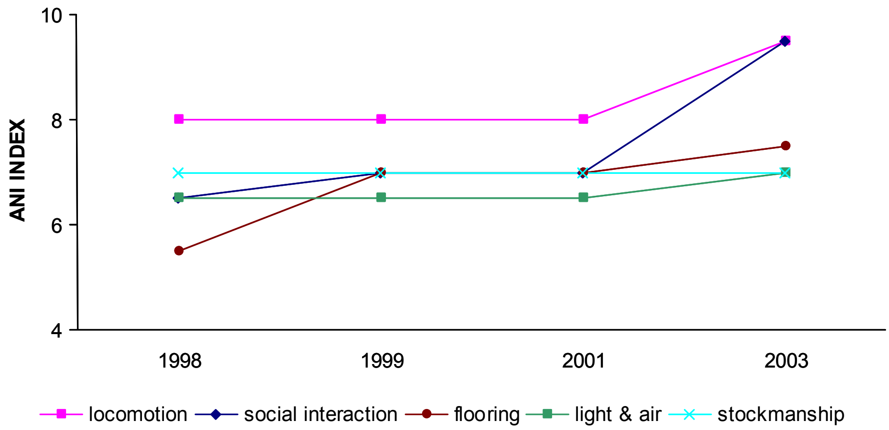
Figure 1: Increase of animal's welfare from 1999 to 2003 on the case study farm, based on ANI35 Index.



The initial difference in points between the group of dairy cows and the other two groups is due to the different composition of the groups, with those of the heifers and dried off cows based upon age, and that of the dairy cows which are kept in herds of mixed ages. Another difference regards the shifts in points relative to animal welfare that occur over time and are due to the different time in which the groups had use of the pasture.

With reference to the dairy cows, the changes in the different aspects of the ANI 35 Index on the case study farm are presented in Figure 2.

Figure 2: Changes in the different aspects of ANI35 score on the study farm with reference to the dairy cows.



The investments undertaken by the farm in the past six years resulted in an increase in animal welfare for the dairy cows, for the dried off cows and for the heifers equal to 7 points that have determined an annual cost per liter of milk produced of 0.0134 €. In particular, the pastures were principally responsible for better animal welfare, realizing an increase in the score equal to 4 points while, when looking at the costs, the pastures had an annual cost per liter of milk equal to 0.0080 €. Another substantial investment for welfare was the flooring of the stable (+2) that has determined an annual cost of 0.005 € per liter of milk; the boxes for the nurse cows and the calves have added 0.5 points to the welfare score, determining an annual cost per liter of milk at 0.0002 €, and the fans have augmented the welfare by 0.5 points, determining an annual cost per liter of milk equal to 0.0028 €. Considering all the investments analyzed in our work, the amount of the annual costs that determined an increase of 1 point in the ANI35 scale is 2,522.69 € per ANI score .

The highest efficiency was reached by the flooring of the stable, followed by the boxes for the nurse cows and the calves, while the pasture and the fans reveal themselves to be less efficient investments. Finally, the shelter for the pasture and the cow brush result as environment enrichment and thus reveal them to be of secondary importance in respect to the other innovations (Table 3).

Table 3: The efficiency of the various investments in terms of animal welfare on the study farm.

	pasture	stable's flooring	shelter	fans	boxes for nurse cows and calves	cow brush
ANI35 score/€	0.38‰	2.86‰	0‰	0.13‰	2.23‰	0‰

Discussion and conclusions

To highlight those aspects of rearing and husbandry that have influenced animal welfare, let us refer to the shifts in the curve of welfare for the dairy cows, keeping in mind that the same considerations also apply for the other two groups.

Before the farm made the investments in 1999, the ANI score on the farm was 33.5, giving an excellent score (the ANI score goes from -9 to + 45.5). Considering in detail the different aspects, one can notice that as far as the possibility for movement is concerned, compared to an adequate possibility for movement in passing between a lying and a standing position and the presence of an external paddock utilized throughout nearly the entire year, the cows did not have an optimal surface inside the stable and, above all, completely lacked access to grazing. Closely linked to this situation is the score relative to the flooring which was lower due to the absence of pasture and to the presence of gravel yard that, in the case of adverse climatic conditions, could not have guaranteed good footing for the animals. Beyond this, one must also consider that both points of passage and the rest areas also presented themselves as moderately slippery and therefore not in optimal condition. From a structural point of view, when faced with the possibility of using an open space for more than 230 days a year and for more than 8 hours a day, the animals lived in a structure that guaranteed a fair amount of light with good air quality. On the other hand, the occasional presence of air currents in the rest area and of noise that could be a source of stress for the animals affected the welfare score negatively.

When considering the animal's social interactions, one notes how the welfare score was lowered as a result of the available covered space for the animals; this is in relation to the fact that the cattle, although they are social animals, require their own individual space to be maintained in order to prevent the rise of social stress (Houpt, 2000). From the point of view of the structure of the herd, the solution employed was not ideal, even if it can be considered a good compromise in a context that also has to be productive. Within this very same context the score was also penalized as a result of the management of the young, even though there is not yet any scientific evidence that demonstrates the necessity of the calves to be in constant visual contact with the herd. Finally, regarding the attitude of the stockperson, one can observe that the level of attention was optimal as witnessed by the level of cleanliness of the animals and their surroundings, as well as by the condition of the hooves. One must note that within this context the instrument of evaluation appears incomplete, as a more correct evaluation of the human-animal relationship should also take into account the level of fear towards humans on the one hand, and on the other, the attitude of man towards his animals during, for example, eating or other routine practices. However, the method is considered appropriate for this study, with a focus on the investments (in terms of farm's structures and organization) rather than on the attitude of the stockperson.

Following the investments undertaken in 1999 the score rose to 35.5. The result is essentially attributable to the changes relative to the flooring that was modified. The farm equipped itself with new flooring that, having reduced the slipperiness of the walkways and of the external paddocks, augmented the ANI score. This was a demonstration of how this system of evaluation immediately reveals the positive effects of even small interventions upon the overall welfare.

In 2003, one sees a noticeable jump in the welfare score, with the introduction of pasture for the dairy cows. This improvement allowed for a rise in score to 40.5, as the presence of pasture favorably affected, not only the organism of the animal allowing it to function better and thus improve its overall state of health, but also upon social interaction as the animal is better capable of managing both its individual space as well as its relationships of dominance and submission. In the last observation year the quality of the air has improved by to the installation of the fans that are beginning to assume a role of fundamental importance given the extremely hot weather during the observation period.

Our results, if confirmed by further analysis, show that with regards to the organic market, the costs sustained by the farmers for the improvement of animal welfare could be easily internalized, as it is reasonable to expect that the consequent (fair) increase in price of the milk would not mean a decrease in the demand on the market. The problem can be raised when considering the hypothesis of developing regulations to better the condition of breeding even in the conventional farms. In this context, if applied also to other typologies of farms, the analysis carried out in our study can give the policy makers the information on the value of the positive externalities produced by the farmers that operate in the respect of animal welfare. This information could help to set up measures for the internalization in the market prices of the externalities or (as an alternative) to evaluate the cost of the incentives for producers.

Finally, when considering the extension of the European Union and the consequent shortage of the resources available for the financial backing of agriculture, it is possible to expect that there will be a growing selectivity in the usage of the resources. In this context, this analysis could provide the farmers with a method of self evaluation for the betterment of the effectiveness of animal welfare inputs.

Further developments of our work should include the analysis of the relationships between the investments we have taken into account and the growth of the production. This could allow to highlight how different aspects of animal welfare relate to the production side and to assess the annual costs of the investments deducted out of the income increase.

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Sustainable production methods and economic development of the marginal rural zones of the Italian Central Apennines

F. Ansaloni and V. Cammertoni
Department of Veterinary Sciences, University of Camerino, Via Fidanza 15, 62024 Matelica (MC), Italy

Introduction

The development of traditional farming and local food processing methods in the rural Apennines, in Central Italy, could contribute to the economic growth in these areas. In recent years, demand for food and non-food products produced with sustainable production methods, particularly by organic farming (OF), has increased. Local agricultural workers and food processors have responded to this demand by producing traditional food and textile products, along with offering rural tourism either alone or integrated with traditional tourism, and by activities aimed at preserving the natural environment.

The two case histories in this paper focus on the agro-environmental economic growth possibilities by developing a wider use of organic farming methods. The first case history studies the development of organic farming in an environmentally protected area, the Monti Sibillini National Park (MSNP). The second case history analyses the natural textile production chain in the Marche, Umbria and Tuscany regions in Central Italy[8].

The Sustainable Agriculture Project (SAP)

A project on environmental farming in a national park is an original concept in Italy. National Parks and protected areas in the country are the result of conservation needs. The SAP is a service that the National Park Authorities offer to operators for the years 2002 to 2005 to assist the growth of rural sustainable methods and their integration with the agro-food and non-food industries, including traditionally manufactured products, tourism and other services (Renieri et al., 2001; La Manna et al., 2002; La Manna et al., 2003). Some of the problems considered in this project are environmental conservation and protection, promotion of the area and the use of human resources in traditional production methods.

On the one hand, the SAP aims to safeguard the entire environment of the Park (flora, fauna and local traditions). On the other hand, as the project developed, it was found necessary to intervene in the actual management of natural resources by creating an agricultural system with a high sustainability level that would allow growth and development in the rural marginal areas in order to raise the income of agricultural manufacturers. This latter goal was deemed necessary, as there was no overall agricultural sustainability policy in the area.

[8] Grateful thanks for the data and the information provided with inside documents and communications are to C.A.Graziani, C.Renieri, A.Virgili, V.Vizioli, V.La Manna, T.Roscioni, D.Pancotto and E.Pagoni on the PAS and to M.Antonini and for the natural manufactured articles textile chain of the Consortium *Arianne*.

According to the intentions of the Co-ordinating group for the SAP, this project is a first step towards favouring the growth of organic farming adopted voluntarily by the producers. A further aim of the project is to create a multi-functional farm that combines several aspects of agricultural production, environmental protection offered by external agents to preserve the natural surroundings and recreational facilities to round out and promote local agricultural products and services to meet local demands.

The following are still felt to be necessary by the Co-ordinating group:
- maintain the MSNP as an umbrella organisation;
- facilitate the development of a Producers Association under the aegis of the MSNP to market agricultural products;
- work towards the creation of an Organic Farming Consortium to protect their products by controlling farming methods and product source tracking.

In 2002, after a long initial management period begun in 1994, four specialised technicians put SAP methods into operation in the MSNP area. The action model for the project is based on the advice of the Co-ordination Group, the activities of the technical committee and the participation of the individuals involved and the social network. The practical instruments of the projects are meetings with various participants, "Case del Parco", Co-operatives, local trade shows and extra-territorial events, etc. along with hard copy and computer generated informational supports.

Project activities have been subdivided into general and specific areas. The former concern the joint activities of various private and public professionals in the various production sectors. The later is the pilot project for the development of highly environmentally sustainable farming practices (Table 1).

Table 1: Sustainable Agriculture Project (SAP) actions

General	• Project information • Technical assistance to producers ("*Case del Parco*" informative windows) • Professional training • Market services • Analysis of MSNP agricultural resources

S **Agricultural farming:**

p . minor cereals (spelt, bare barley, millet, "*polenta*" maize, durum wheat)

e . Leguminosae grain

c . Castelluccio di Norcia lentil

i . lucerne and other forage farming

f . vegetal origin natural fibres

i . officinal plants

c

Breeding:

. swine extensive breeding (open air)

. conservation and repopulating of "*fario*" autochthonous trout (*Salmo trutta trutta*) of Appenninic stock

. exploitation of fresh and transformed sheep and goat meat

Food transformation:

. exploitation of sheep and goat milk transformation

. conservation centre and genetic amplification of *Sopravissana* sheep breed

. exploitation of honey production

. exploitation of animal origin natural fibres transformation

. marketing development of wild animal meat

. development of a typical products exploitation centre in Norcia

Undoubtedly one of the principle success factors to facilitate the achievement of the stated goals is the National Park's commitment to the preservation of its natural resources and the adoption of Organic Farming practices. The area has neither derivative pollution sources nor external pollution, as there are very few and distant industrial plants. In addition, human generated pollution is limited. In 2002, there were 16,000 residents or 22.8 inhabitants per square kilometre in this area. Furthermore, organic farming practices represent life in harmony with what the tourist expects to find in a Park of this nature. There are over 15,000 hectares set aside for semi-activity while 25,000 hectares have been designated as pasture (Table 2).

Table 2: – Protected area concerned “Parco Nazionale dei Monti Sibillini” (*From*: La Manna – Pagoni - Pancotto - Roscioni 2003; http://www.sibillini.net)

Soil utilization	Hectare (n.)	%
Wood	26.489,96	38,13
Arable land	15.636,6	22,51
Primary or natural pastures (over 1750 m above see level)	3.321,27	4,78
Secondary pastures (1000 - 1750 m above see level)	22.244,24	32,02
Other	1.785,37	2,56
Total	69.477,44	100,00

The various townships that share in the Park’s administration cover an area larger than the protected area. According to the 2000 agricultural census data of the overall township area, there are 78,657 hectares, of which 45,495 hectares can be used for farming. In the overall area (78,657 hectares), 10.16% is certified under organic farming (13.86% of the agricultural land in the Park area). The percentage of the total organic area in the township where organic farming predominates is extremely variable and disconnected, ranging from a minimum of 1.0% to a maximum of 27.1%. The percentage of farming land is even more variable and concentrated. Land percentage, where organic farming methods predominate, ranges from 0.9% to 33.7% or on average 16.4%.

There are 2,429 farms in the Park, according to the 2000 census for the townships. Of this total, 173 practice organic crop production and 37 organic livestock production. In townships that practice organic farming, the percentage of organic vegetable farms ranges from a minimum of 0.4% to a maximum of 36.3% with an average of 10.8%. There are very few organic farms in Umbria, and they concentrated mainly in the townships of Preci and Norcia. This, according to some observers, is due to wide local promotional activities. Furthermore, limited organic farming practice on livestock farms is probably due to the recent application of animal rearing standards.

Based on the results of a recent research carried out by SAP technicians, there are a total of 230 professional farms of which 55 practice organic cultivation and 15 organic livestock farms [Pancotto 2003]. The total number does not include those small farms where annual turnover does not guarantee an adequate standard of living to the farmer and the farmer’s family.

Natural textile production chain

Products in the natural textile chain (traditional, handicraft and industrial textiles) include clothing, fabrics, rugs, bedspreads, curtains, knitwear, etc. which do not use fibres containing chemical processing residue, are organic or use environmentally friendly products such as natural vegetable dyes. From a technical point of view, textile manufacturing requires a farm–industry integration. Raw fibre can be obtained from organically managed sheep, from naturally coloured Merino fleece and other animals.

A common form of organisation is made up of the following stages (Figure 1):
1 - animal rearing
2 - fibre processing into yarn and/or textile products at small local craft mills;
3 - sale of products directly by the farm with the additional service of rural tourism or other opportunities to meet with customers such as environmental courses, weaving techniques, internet selling, etc..

Animal rearing includes selection of breeding stock aimed at improving wool quality, colour and cleanliness. Raw materials include natural animal fibres such as wool, mohair and alpaca, or vegetable fabrics such as hemp, linen and gorse along with natural plant dyes, for example the dyer's wood *Isatis tintoria* (AA.VV., 1999; AA.VV., 2001).

Raw fibre processing consists in washing and spinning followed by dying with natural vegetable dyes. Wool from various local producers or that purchased on the open market may be blended together.

As far as wool production is concerned operators in this sector are sheep and goat farmers specialised in forage production, sheep and goat rearing farmers who produce wool, agro-tourist workers who sell craft products directly and sheep and goat animal rearing associations. At the present time the textile chain is a short one from farm to customer. There is no business relationship between raw fibre producers with the processors at the present time (Figure 2).

At the processing level, the individuals involved come from small-medium companies and craft work shops which do the washing, carding and spinning, textile producer associations and artistic handicraft associations for textile production and the diffusion of weaving techniques. The principle difference between local craft processing compared with industrial processing is the small amount of raw fibre handled and the use of traditional techniques by recovering and widening the professional skills in the area. The processing techniques can satisfy, with limited changes, sustainable production criteria and quality certification standards such as Eco label and brand labelling.

Finally and as far as the state of textile product distribution, these products are characterised by their local nature and the high level of production and processing sustainability.

Fig. 1- Farm operative stages organization chart

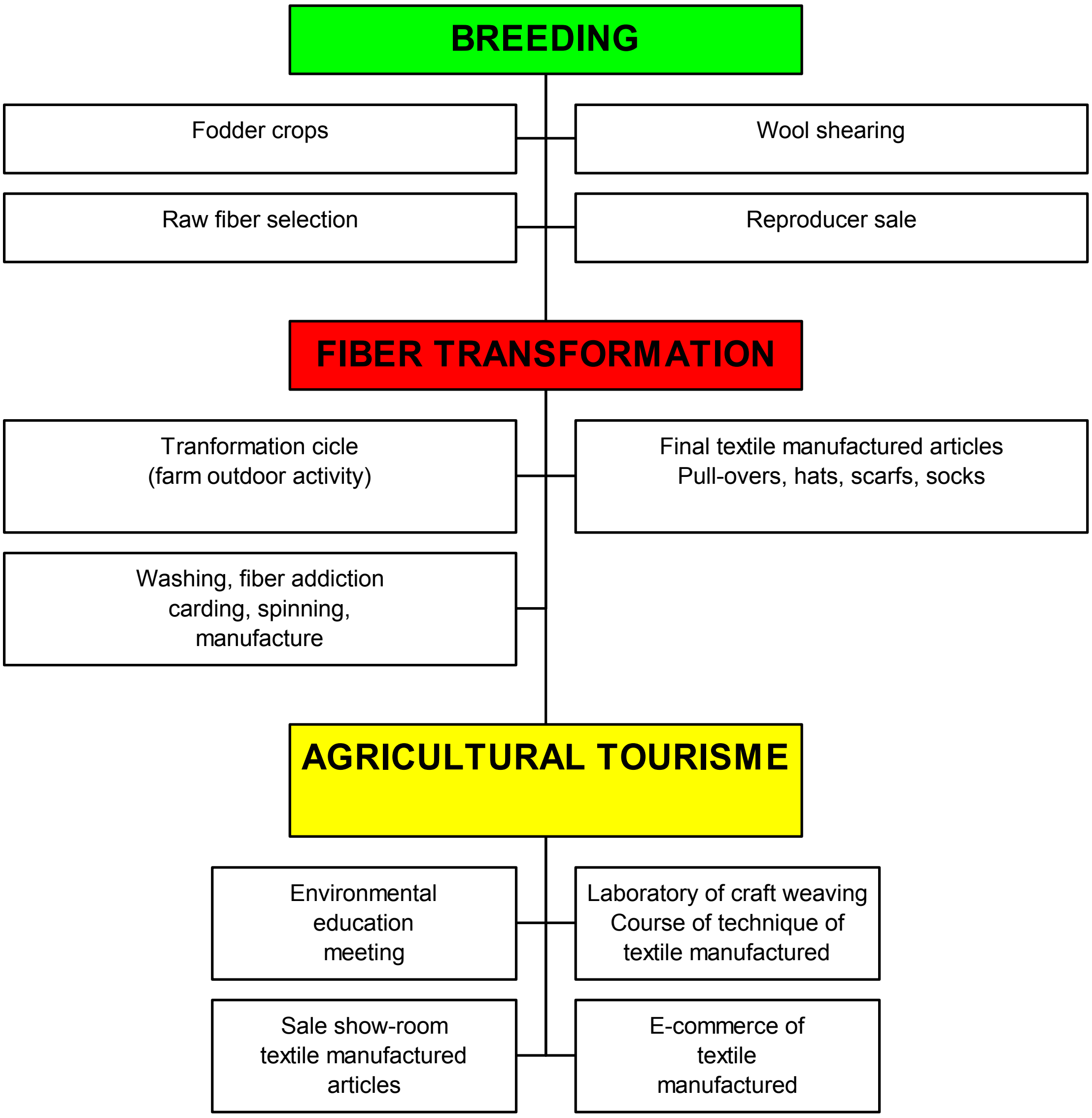
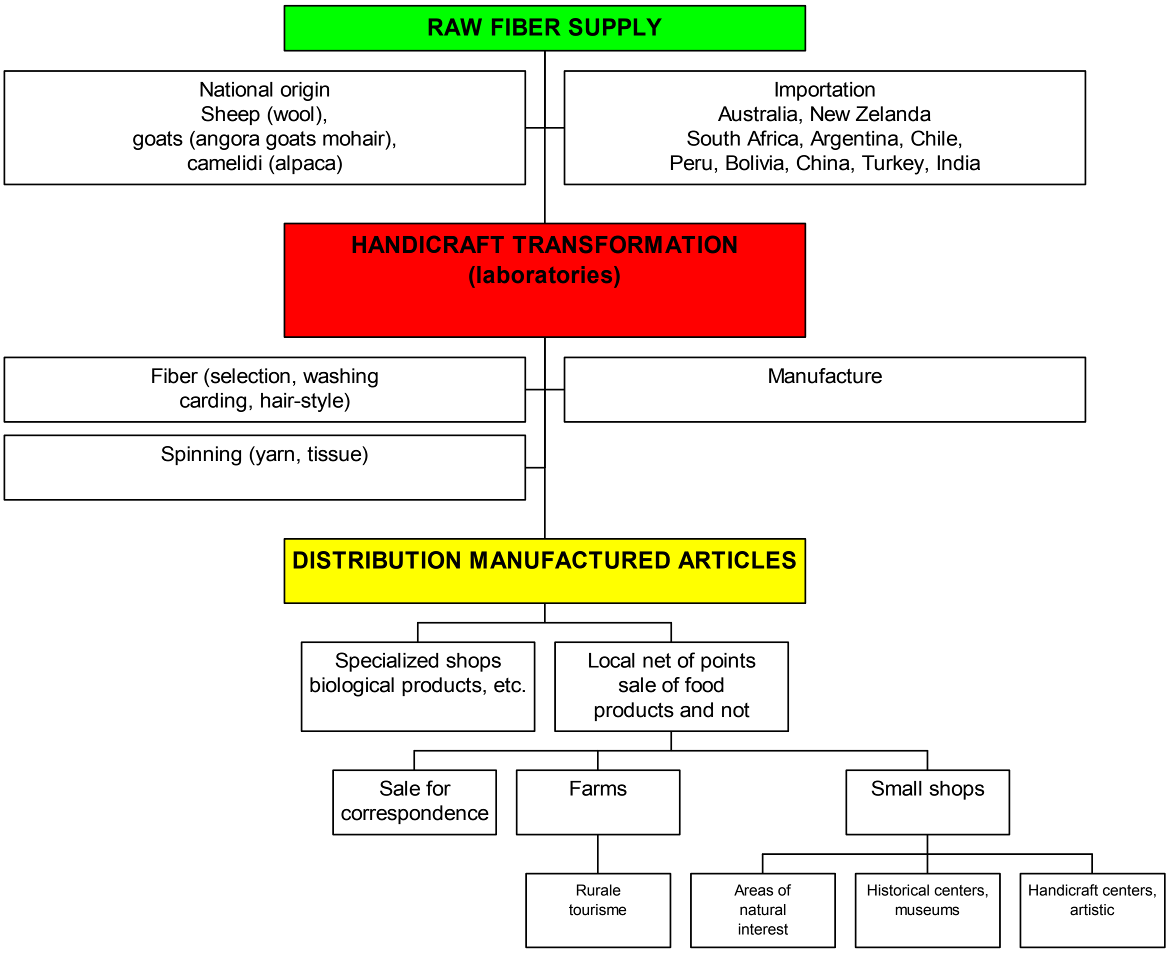


Fig. 2 - Organization of the stadiums of the natural textile manufactured articles chain



Market demand is for natural textile products of both local and non-local production. Target market is made of consumers in the middle to high income bracket who are not necessarily concerned by the amount of warmth the textiles provide. Factors influencing demand are sustainable production methods, aesthetic quality and raw materials used in the product being an original and typical product of a particular geographic area.

Agro-tourism is a significant factor in the growth of textile production. Rural services attract customers, develop initial cash flow and help maintain farm income constant. From a geographic point of view, agro-tourist farms in central Italy are located in beautiful surroundings with hilly country, lush pasture lands and free range animals in addition to being near historical, cultural and culinary traditions necessary for the tourist trade. The multi-functional farm is another factor in pulling in business, the interdependence of the farm sector and the sale of its non-food products.

As proof of the economic viability of raw fibre processing for manufactured textiles, it is useful to take a look at the 2000/2001 income analysis of a small family run farm located in northern

Umbria. This farm offers textile products manufactured from alpaca and mohair fibre produced on the farm itself in addition to providing rural tourism. The high cost of raw fibre production is offset by processing activities and sale of finished products (Table 3).

Table: 3 – Production costs and prices of "Maridiana" small family farm (euro average value per unit of 2000 and 2001 years) (Ansaloni and Pyszny, 2003)

Farm sector and corresponding product	Unit of measurement	Production cost	Price cashed by the farm
BREEDING - Raw fiber	kg	110	*
TRANSFORMATION - Textile manufactured articles (sweaters, hats, socks, scarves, etc.)	Manufactured article	59	90
AGRICULTURAL TOURISME - Renting weeks	week	672	774

(*) Raw fiber is transferred (sold) to transformation sector.

Constraints to local fibre and textile production

The external environment in this area, which constitutes an influencing factor, is the presence of several small and medium textile companies and craft workshops for textile processing. The weak points of the natural textile product chain are at consumer level and market demand for raw materials. For the consumer, it is very difficult to recognise and find a local natural product with certified production method and provenance.

Demand for natural raw materials is weak due to inconsistent and spotty quality. For this reason, the sheered wool is often left unsold and stocked at farms and consequently goes from being a natural resource to being an animal origin special refuse cost. Today, raw material producers have no clientele willing to pay the high price necessary to cover production costs and, therefore, the more advantageous policy for the farms is to convert raw wool into yarn and then sell products on their farms that have been produced by locally outsourced small and medium industries.

At the processing level, there are two problems, the difficulty of obtaining local raw fibre and the absence of a real business relationship between the farms and the distribution channels. As far as the former is concerned the farms purchase ordinary produced raw material from Australia, New Zealand, South Africa and South America, while OF produced raw material comes from Turkey, Peru and India.

As far as the distribution problem is concerned, there is a notable absence of distributors and sale representatives needed to promote and sell the products to retailers. Currently, the distribution channel is the small craft work shop and direct sale of products by the farms that also provide rural tourism services. For the future, it is possible to foresee a wide network of points of sale to market typical agro-food products and textiles. These shops would be located in the major natural, historical, craft, artistic and rural tourism areas.

The Consortium *Arianne*

In 2002, Arianne, an international consortium for the study of natural vegetable and animal fibres and production systems and processing was set up at the University of Camerino, in the Marche. This project took its original thrust from the small private farms and textile industries in Umbria and the Marche to co-ordinate research in the field with farm activities. These enterprises were particularly sensitive to customer demand for sustainably produced product, manufactured from naturally coloured fibres, dyed with vegetable dyes and of local origin.

The common elements that must characterise naturally produced textiles are the type of product and the production technique. For the type of product, the geographic origin must identify raw material, the yarn and the products. As far as production technique is concerned, the adoption of organic farming or Eco Label methods is advised.

The public research centres that support the initiative worldwide are: Italian National Agency for New Technologies, Energy and the Environment (ENEA) in Rome, the University of Jilin Changcung in China, the Catholic University of Cordoba Argentina, the El Alto State University in La Paz Bolivia, the University of Gottingen in Germany, Swarthmore College in Philadelphia USA and a non-governmental organisation, DESCO, in Peru. Among the private enterprise within the project, there are five farms and five yarn processing and packaging industries. The National Park of Monti Sibillini (Macerata), the CNA (Craft Industry Association) of the Marche, the Craft, Artistic and Trade Association (Macerata) and AIAB (Association of Italian Organic Farming) contribute to the project.

The activities of Arianne are dedicated to the development of research and service projects for the enterprises. UNICAM and ENEA have, for a long time, carried out specific programmes for the exchange of knowledge, the development of agricultural systems and sustainable processing in the hill and mountain areas of the Italian Apennines in addition to drawing up protocols aimed at improving natural textile quantity and quality. It is hoped that the enterprises will be able offer product protection consultation, that is, raw fibre and product production according to norm, product quality certification with relevant certification manual along with technical, commercial and training consulting services for the enterprises themselves.

Organic farming methods and rural marginal zones of the Italian Central Apennines

Among the specific success factors are product differentiation and lower adaptation costs compared with products from other Italian intensive farms and farms in this area using organic farming methods. Product differentiation depends on product originality, that the product is a craft product, producer’s talent, geographic origin, sustainability, organic farming production methods and attractiveness to the consumer. These farms are in fact located in beautiful countryside near historic, cultural and local wine and culinary delights.

Among the common success factors are the higher price that organic products command compared to conventional products along with the product's intrinsic superior and aesthetic quality. Consumer purchase decisions are influenced more by new social and economic needs, especially intangible and symbolic aspects. Processed goods have become increasingly less basic necessities and more style-of-life indicators where mere material aspects disappear creating profound changes in various different social behaviours (Fabbris 1995 in Del Giudice 2000).
The main weaknesses that affect the spread of the organic farming methods are that demand exceeds supply and there is little attention paid to the local institutional context.

As long as demand exceeds supply for local products the following concepts remain unchanged:

1. products will succeed in the market depending on their geographical origin; and
2. products are *de facto* organic.

Today high demand has eliminated the need to differentiate products with the organic faming method in a market where the premium price that organic products command makes little or no difference and only creates numerous additional costs. These costs are created by lower yields, certification and training, compliance with production technical strictures such as farm finances, animal rearing, health and hygiene and processing and the costs related to blending farm produced fibres with outsourced conventional fibres. In particular, the National Park's decision to promote sustainable production methods, instead of organic farming, is a compromise to satisfy the varied and different needs of the parties involved in order to activate the SAP programme for the 1991-93 three year plan for protected areas in the territory. From an agricultural point of view, the spread of organic farming methods is seen as a punitive measure against conventional farmers. The common feeling that local production and animal rearing are *de facto* organic impedes the development of a guaranteed product policy with its certification process carried out by competent authorities.

Other causes that confirm this situation are represented by the fact that the agricultural producers are poorly informed about the market opportunities of organic products and the technical ways to adopt the method of the organic agriculture; this depends on the scarce offer of services of specialized public technical support in organic farming and in the lack of a developed commercial net.

Insufficient official attention to organic farming methods is manifest in the indifference towards what has been proposed by professional organisations. For example, there is a need to consider the difficulties caused by the fact that the organic farming consulting committee of Umbria continues to have, on the one hand, the heavy responsibility of checking on farms and, on the other hand, has very little effectiveness with tobacco growers in reducing fertiliser use and with influence on the agricultural policies.

National resources used in cultivating fodder and sheep rearing are substantially without any alternative economic solution capable of guaranteeing higher incomes. For this reason, the organic farming method to orient product towards greater differentiation and "made in" brand and quality product management may be one of the opportunities for growth and development.

In more general terms, problems in this field are above all the lack of co-ordination between workers in the various sections of the quality chain. As in other cases in these areas, organic products such as fodder, cheese and milk are sold at conventional product prices and processing industries that purchase organic raw materials are located at a distance from the production areas creating high transport costs for the farmer.

SAP has observed three problems:

1. in order to meet the objectives, personnel and financial investment are inadequate;
2. farmers are diffident about the project because of conflict with the Park in the past and because of other factors such as advanced age and farming as a second income;
3. creating a balance between the natural environment and the livestock rearing is difficult and regarding this, the excessive number of wild boar must be taken into consideration.

Conclusions

The development of the Central Italian rural marginal areas, which are characterized by numerous typical niche products in addition to having a high tourist population, could be enhanced by organic farming methods as a means to differentiate farm products and generally improve the area by making it a real ecological oasis, characterized by the high environmental balance that tourist are seeking. The primary condition to be met in order to reach this objective is that farmers must abandon the notion that it is enough to certify the origin of a product to make it successful and therefore must adopt organic farming certification on a large scale as a means of product guarantee.

The actions to be undertaken to develop local organic farming productions can be shared by both the public and the private sectors. The former are the supply organisation, product quality protection and certification. The aim of the supply organisation is to increase production and concentrate warehousing in local and/or inter-regional storage facilities. This would make it possible to reach a minimum industrial processing level to increase the producer's market power and create co-operation quality chain among all the links of the chain, particularly between producer and small to medium-sized local processors.

Certification regards OF production methods, geographical origin of the raw material and final products and product quality.
Public action would be aimed at making the consumer aware of product provenance and developing associations and consortia for quality certification and technical assistance to improve product quality.

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Why are consumers buying organic meat and milk? A qualitative study of the Italian market[9]

D. Gambelli, S. Naspetti and D. Vairo
DIIGA, Università Politecnica delle Marche, Via Brecce Bianche, 60100 Ancona, Italy

Introduction

Consumer interest in organic food in Italy has grown rapidly over recent years. Because of an increasing interest in quality and safety of food products, this trend is expected to continue in the future. Particularly in the light of various food scares that have emerged throughout Europe, consumers have become more and more concerned about the safety of food they are eating. Nevertheless, besides a growing demand for food that is produced in a healthy way, organic consumer motivations are still unknown in most cases (Zanoli and Naspetti, 2002). Although existing research has generally stressed a positive attitude towards organic products, consumer perceptions of organic food have not been researched in depth and, more surprisingly, "the few studies conducted in this field have shown that there was little concern about animal welfare, generally, and least concern in food production" (Miele and Parisi, 2003). More specifically, most existing surveys – even the most recent – were interested in testing whether there was higher awareness of organic food amongst consumers but they did not explore the level of product knowledge in any depth.

One of the major problems in organic food distribution is that consumers awareness (knowledge of the *existence* of organic products) and product knowledge (knowledge of *what* organic products *are, what characteristics they have, how are they produced and what are the consequences associated to their use*) is low (Zanoli, 2002). In Italy, studies refer to a generalized lack of visibility of organic products: even though recent surveys show that consumer awareness of organic products is relatively high (90%: Zanoli *et al.*, 2001b; Colussi, 2003), the level of information and knowledge about organic products and their production is still low. Even among current organic consumers, there is still a lack of information about product characteristics, certification bodies, labels, etc.
Regarding motivations for buying organic products, health aspects seem to be the most important motives mentioned by Italian consumers, although studies often do not explore such motives very deeply (Zanoli *et al*, 2001c; Zanoli and Naspetti, 2002). Recently, the growing number of food scandals and the fear of GMOs (Finzi, 2001) are often cited as reasons for recent interest in organic products, however some other key factors influencing consumer orientation are emerging.

[9] EU funding (QLK5-2000-01124) "Organic Marketing Initiatives and Rural Development – OMIaRD" for part of this work is gratefully acknowledged. This paper does not necessarily reflect the Commission's views and in no way anticipates its future policy in this area. The authors would like to thank Prof. Raffaele Zanoli for his valuable help in improving the final draft of this paper. Whilst the authors are collectively responsible for the overall framework of the paper and for the introduction and conclusion, the authors worked independently on each of the sections, as follows: Gambelli (§: "*Scenario analysis*", "*Results scenario analysis: possible future trends in the consumption of organic animal products*"), Naspetti (§: "*Laddering*", "*Results laddering: motivations and barriers in organic animal products consumption*"), Vairo (§: "*Focus group*", "*Results focus group: the attitudes and perceptions of Italian organic meat and dairy consumers*").

Consumer interest, especially for organic meat and dairy products, has grown during recent years. This is due to meat scares experienced by consumers as a result of the BSE scandal and emphasized by the media. As a consequence, concerns about animal rights and animal welfare issues has grown. Nevertheless, Italian consumers are less concerned about animal welfare than consumers in northern Europe, as reported by Naspetti (2001) and Miele and Parisi (2001). In Italy consumers rarely put animal welfare among their food concerns; they mostly refer to animal well-being because of the impact that the life of the animal can have on human health. The relationship between animals and health is reaffirmed in the consumer request for healthier and tastier products. (Miele and Parisi, 2001).

A greater level of guarantee for consumers and the greater attention paid to animal welfare by producers could also be a consequence of the application in Italy of the EC Regulation 1804/1999 which represents a new opportunity for breeders.

In this paper we present some results concerning the perceptions, attitudes and behaviour of Italian consumers regarding organic milk and meat[10]. The study considers present patterns of consumption of organic products in terms of consumer types, points of sale and motivations and barriers, and then pinpoints possible future trends in consumer attitudes towards organic products. The study aims to identify the Italian organic meat and dairy consumer (with ideas coming from consumers about consumers) and his shopping preferences. It also aims to investigate motivations and barriers related to buying organic dairy products, for Italian organic consumers, in order to better understand their decision-making process. Finally it analyses future trends in organic marketing, focusing in particular on the key factors that may play a role in the future development of the animal products market.

Methodology

Focus groups

12 focus group discussions11 were conducted in order to understand consumer attitudes and perceptions relating to organic food. Six group sessions were conducted in the Apulia region and six group sessions were conducted in the Marches region. Between 8 and 12 participants were present in each group: six groups were made up of consumers who regularly buy organic food, the other six groups were made up of participants who either buy organic occasionally or who never buy organic12.

Other criteria for recruiting and quota were as follows:

1. Aged 18 to 55 plus (at least 25% of each 18-35, 36-54, 55+)
2. Male/female mix (25-40% male)
3. Participants with children (at least 25% have children younger than 14)
4. Mix of full time and part time employment (at least 25% are working full time)

[10] Most of the results presented here are partial outcomes of the international research project “Organic Marketing Initiatives and Rural Development (OMIaRD)”, financed by the EU and involving a large group of researchers from all the EU countries as well as EEA members and Switzerland. Within the scope of the project, one objective was “investigate consumer expectations, attitudes and behaviour intentions with regard to organic food in Europe“.

[11] For an introduction to focus groups as a qualitative market research method see Greenbaum (1998)

[12] Consumers who makes at least one organic purchase a week are considered as regular consumers; consumers who buys organic occasionally (occasionally is understood as two purchases a month) or who never buy organic are considered as non-regular consumers.

5. Different levels of education (at least 50% not university educated)

Group sessions lasted approximately two hours, each focus group session was recorded in order to have a transcript of the discussion for analysis. In what follows, parts of the text written in italics comes from the transcript of the focus group discussion. After a pre-test, a discussion guide was used by the focus groups moderators. The guide had been designed and agreed by the research coordinators on the basis of the findings of national reports on literature review and then translated into the national language.

Laddering[13]

A total of 104 interviews were conducted in Italy between February and April 2002. Both consumers and non-consumers of organic products were interviewed, in similar proportions: 51% declare themselves to be regular buyers of organic food and 49% to be occasional or non-buyers of organic food14. In order to compare different consumer types, potential respondents were recruited in three main areas of Italy. Approximately half of the respondents (54%) were interviewed in central Italy (Marches) and the remaining 46% of the sample was shared between a northern region (Veneto) and a southern one (Apulia). Consumers were also recruited in different proportions depending on their locality: approximately 65% lived in urban areas (Lecce, Ancona or Padova), while the remaining lived in rural areas.

Regarding preferred point of sale, 41% of respondents state that they make most of their (organic) food purchases in supermarkets, 39% prefer to buy in specialised organic shops, whilst the remaining consumers buy organic food at open air markets. Data for consumer means-end chains were collected empirically by means of face-to-face ("soft") laddering interviews15. Through the questions used in the interviewing process, consumers were asked to build ladders for four different product categories – dairy, fruit and vegetables, cereals and pasta and meat products. Due to the small number of consumers, meat products could not be analysed. As a direct consequence of the lack of national legislation on organic animal products until 2001, the market for organic meat products is at an early stage of development.

In order to discover what personally motivates consumers to choose dairy products, as opposed to other product types, consumers were asked to give reasons for buying (or refusing) organic dairy products and to link these motivations to product attributes and their consequences in order to reveal their underlying beliefs, feelings and desired ends.
Once all the interviews had been carried out, they were professionally transcribed. Subsequently, the interviewers decoded them into chunks of meaning. These chunks were then listed in ladder forms following the iterative coding procedure suggested by Reynolds and Gutman (1988) which yielded ladders composed of links between attributes, consequences and values. Two independent judges then classified each of the chunks for all the laddering interviews, using a jointly developed set of codes. The index of reliability between the judges (Perrault and Leigh, 1989) was 0.80, exceeding the recommended guideline (inter-rater-reliability $\geq$ 0.70, the theoretical

[13] For a full account of means-end chain analysis and the laddering interviewing technique see Reynolds and Gutman (1988).
[14] The national survey is part of a large EU study (OMIaRD). This part involves other 7 EU countries: Austria, Germany, France, United Kingdom, Finland, Denmark, Switzerland. The laddering study has been developed to gain greater insight into the European organic consumer, together with focus groups conducted in the same countries. For a full account of the research results and discussion see Zanoli *et al.* (2003d).
[15] "Soft" laddering is a procedure where the natural flow of speech of the respondent is restricted as little as possible, as during face-to-face interview; "hard" laddering refers to interviews and data collection techniques where the respondent is forced to produce ladders one by one, and to give answers at an increasing level of abstraction .

maximum being 1). All disagreements were resolved by discussion. Out of 104 consumers interviewed, meaningful and valid ladders were extracted for 28 consumers describing motivations and for 53 consumers describing barriers16. The coding of ladders describing motivation made use of 42 codes, whilst ladders describing barriers made use of 51 codes.

A new software package called MECanalyst was developed by the authors17 and was used to derive the implication matrices and the relevant Hierarchical Value Maps (HVMs) for both the complete group of consumers and each relevant subgroup (regular vs. occasional buyers; urban vs. rural; income levels; levels of product knowledge; consumers with children aged less than 10 vs. consumers with no or older children).

Scenario analysis

In order to investigate the possible future trends of the organic market, a scenario analysis was used to identify hypothetical situations that could be considered as possible descriptions of the organic market in the future. Scenario analysis has been developed in management literature as a tool for systematic strategic thinking and planning, in order to identify the forces that drive the system and examine the interaction of current trends and uncertainties within a given market domain and time frame. It can be considered as a way of defining a suitable strategy for forecasting problems in complex and rapidly changing social systems.

In this context, scenarios are tools for strategic analysis and summarise large amounts of information about the future from different sources, with special attention to actors, aims, mechanisms and causes and effects of change. They should not be considered as mere forecasting techniques, but rather as tools to support decision making, that may predict likely policy options given different possible future situations. Multiple scenarios may be used to characterise the limits within which the future is likely to evolve.

There is a wide variety of methodological approaches to scenario analysis, ranging from more intuitive and qualitative to more structured models. In what follows, we present the results from two scenario analyses referring to the future of the organic market in Europe by 2010, one using a semi-quantitative cross-impact method based on fuzzy logic (Zanoli et al., 2000), and the other based more on a qualitative, intuitive-logic approach (Gambelli and Zanoli, 2003)18. Both models were not explicitly built for the specific analysis of organic meat and dairy products, bur rather for a more general analysis of the forces influencing the organic market in general both from perspective of supply and demand. Nevertheless, significant and relevant trends and key issues may be extrapolated and referred to the livestock sector, given the fact that many consistencies emerged from the focus group and laddering analysis.

[16] For milk products, consumers were split in two groups, according to their self-declared frequency of purchase; those who stated they were frequent or regular users, purchasing organic dairies products more than once per week were asked for motivations. Those consumers who stated they were occasional users were asked for barriers to purchase.

[17] MecAnalyst is a windows-based software package for laddering developed jointly by Skymax-DG, R. Zanoli, S. Naspetti, E. Thelen and M. Botschen (http://www.skymax-dg.com/mecanalyst/index.html).

[18] The two scenario analysis have been developed respectively within the two EU projects OMIARD and Organic Farming and the CAP FAIR3-CT96-1794

Results focus group: the attitudes and perceptions of Italian organic meat and dairy consumers

The perceived consumer
The Italian organic consumer is perceived by regular and non-regular consumers as:
- well-informed;
- ethical;
- concerned about health;
- wealthy.

We have listed those statements made by consumers about consumers which had wide consensus in the focus groups19. For several non-regular consumers, information seems to be an important factor, allowing them to distinguish between a conventional product and an organic one: in this way the consumer becomes aware of the food choice they are making. Information about rules, certification bodies, logos, benefits of organic farming, differences between natural and organic products and so on are fundamental if one wants to avoid simply following a trend and to make a rational choice.

In a similar way, several regular consumers consider that widely circulated information is fundamental to building a proper culture around organic food, and information is currently perceived as insufficient. As a result of the BSE crisis, information on food and nutrition has grown but,
"… now the emergency is over, everything has gone back to the way it was before…"

Since consumers of organic food do not feel satisfied with, or do not trust conventional products, they consider conventional food as being of low quality, inferior to organic food. These consumers have an ecological, ethical attitude towards quality of life in general: consuming organic is a way of behaving ethically. From this perspective, some regular consumers stress the fact that it is necessary to guarantee natural and appropriate animal husbandry, which implies no cruelty towards cows and no intensive breeding.

People consume organic products because they are afraid of the damage conventional food could do to their health or because they are worried about their children's health: organic food is synonymous with healthy nutrition. Furthermore, organic food is sometimes used by people with allergies or health problems, such as those suffering from disease or illness.

To guarantee that consumers are able to eat wholesome food, some regular consumers emphasise the importance of ensuring appropriate animal husbandry, as mentioned above, which is possible if intensive breeding and conventional medicines are avoided.
In addition, some regular consumers, in order to avoid illness or allergies derived from the use of dairy milk, have suggested that goat's milk be produced.

The cost of organic products is high and for this reason only those with a higher income can afford the expense: organic products seem to be aimed at an elite. For regular and non-regular consumers, low income is the main reason that limits the regular purchase of organic products.

[19] For more details see Zanoli and Vairo (2003a), (2003b)

Preferred point of purchase
Several regular consumers prefer to buy organic meat and milk in specialized shops, because they feel they have a greater guarantee of product quality: they have no doubt that the product is a genuine organic one. These results are also confirmed in the laddering study20. Regular organic consumers have expressed some doubts and mistrust in dairy and meat products from new brands. More specifically, regular organic consumers feel worried about the large number of organic farms that appeared after the BSE problem: they think that organic farming has only grown because people have seen a business opportunity in this area.

For many non-regular consumers, buying organic products in supermarkets is more practical: it is a matter of habit and involves spending less time and effort shopping. Concerning products themselves, some consumers prefer to buy meat in supermarkets, where they think meat is subjected to stricter controls; moreover in supermarkets there is usually a butcher's section where you can have the same relationship you would have with an independent butcher. However, an equal proportion of consumers believe that meat should be bought in a known butcher because the problem is

"…who is able to guarantee the product I buy?…":

if the consumer knows the owner, he can ask where he buys the meat and this is perceived as a form of guarantee.

Importance of origin
There is general agreement amongst regular organic consumers that knowing the origin of meat and dairy products is important during purchase: this makes product traceability very important.
Non-regular consumers are interested in knowing the origin of organic products because it gives them a greater guarantee: this is true for both organic and conventional products but
"…since I pay more for an organic product, knowing its origin is even more important…".
In general, regular and non-regular consumers prefer meat which comes from Italy. In fact, some consumers have noticed that they have given more weight to product origin since the BSE problem.
In particular, some consumers think that meat should come specifically from the Marche region (for those consumers coming from this area) because, ever since the BSE problem, they only trust local meat:
"… Chianina cows [a breed of cow] are famous throughout Italy …".

Results laddering: motivations and barriers in organic animal products consumption

Organic food perceptions previously investigated using focus group research has been analysed further and in greater depth using means-end chain analyses to understand some specific reasons which differentiate purchase behaviour for organic dairy products from organic products in general.

[20] Data and results on shop preferences, measured with means-end chains, are not shown but are available from the authors.

As specified above, organic products are still perceived by regular consumers as healthy, tasting good, expensive and "clean", but some product-specific perceptions make it possible to gain a greater understanding of the reasons that differentiate purchase behaviour for dairy consumption from that of other products. When buying organic products, milk and dairy products do not tend to be the first products consumers choose (Hill and Lynchehaun, 2002). Consumers usually prefer to take fruit and vegetables. Compared to other food categories, consumers assign a symbolic content to milk, that is retrieved partly through product knowledge but that goes deeper into their minds and is linked to the past. As we will see, the great majority of values indicate that respondents justify their preferences in this way and is most probably a sign of their great familiarity with dairy products.

The HVMs for buying motivations of regular consumers and barriers of occasional buyers, are presented in Figure 1 and 2, respectively. They both show the means-end chains listed by at least 4 respondents (cut-off = 4). The codes at the top of the maps (in bold) represent the consumers' final motivations or values. Arrows show how they are linked with the lower levels: consumer benefits or positive consequences (in CAPITAL LETTERS), and product attributes (in italic). Each code block contains the code label, the number of chunks it represents and the percentage of subjects that have named it. Bolder arrows refer to links mentioned by a larger number of respondents.

Figure 1: HVM for Buying motivations of organic dairy products

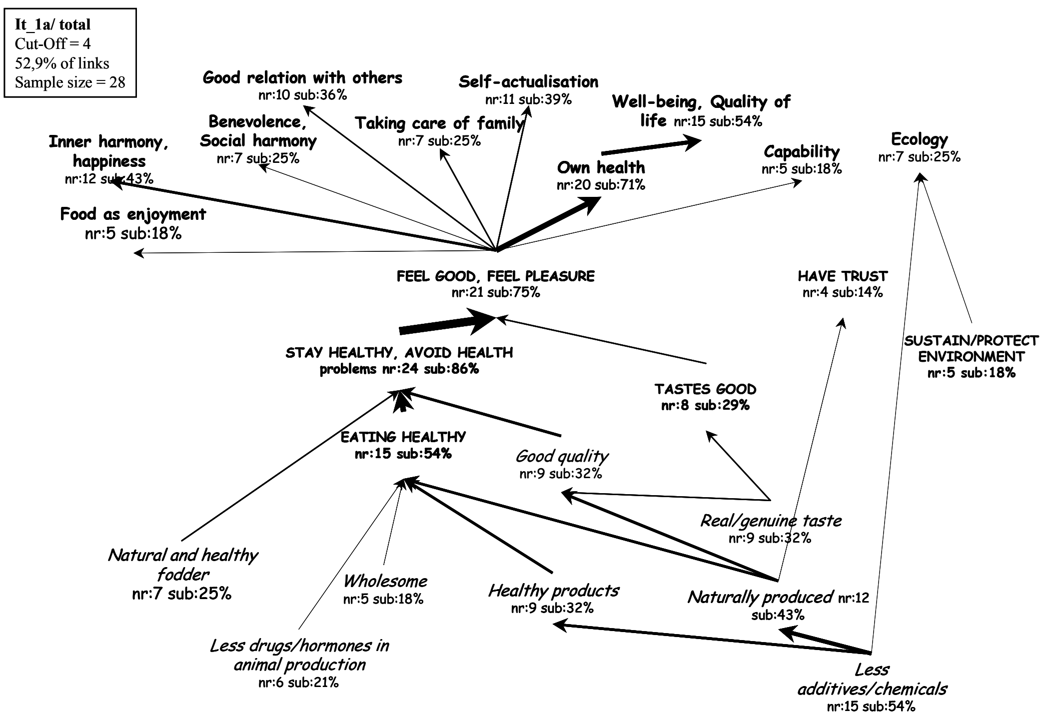
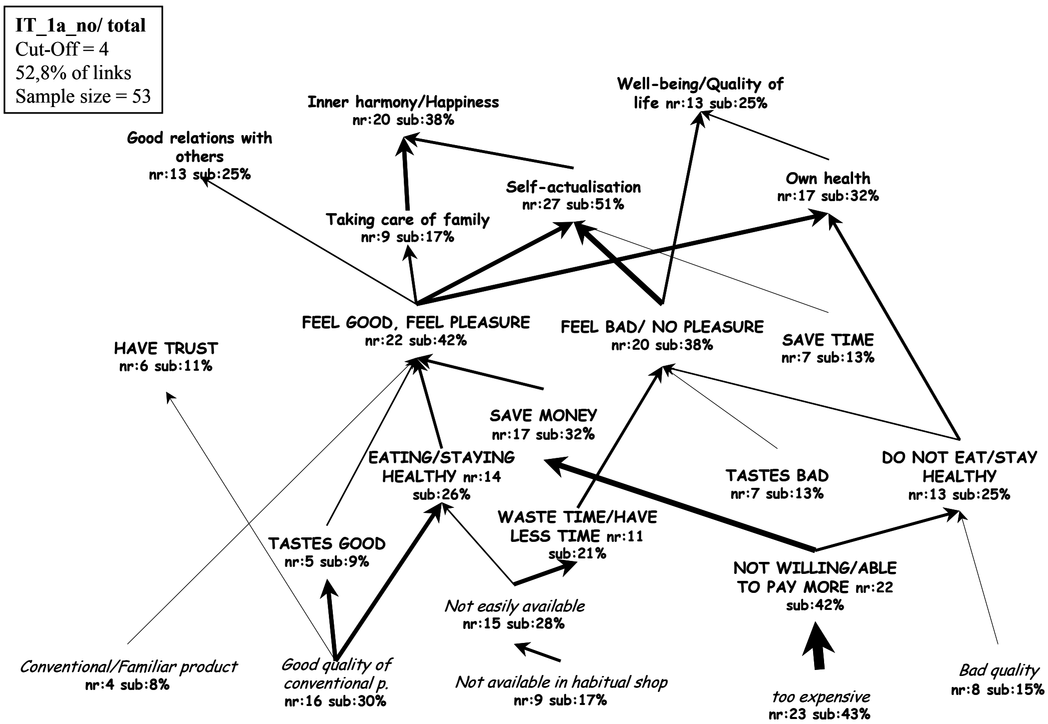


Figure 2: HVM for Buying barriers of dairy products



Besides mentioning some general motivations and barriers which connect consumer purchase behaviour21, the following discussion uses the main groups of values present in the maps to analyse and compare the two HVMs.

Health and well-being values

In agreement with previous cognitive studies (Zanoli and Naspetti, 2002), when making reference to general motivations for buying organic products, Italian consumers above all mention aspects associated with health and well-being. With respect to all other motivations, health is clearly the most relevant for consumers22.

At the attribute level, regular consumers explain the positive influence of organic products on their own health and well-being. They base their claim principally on the assumption that organic dairy products are naturally produced since they contain less chemical additives. Choosing organic helps people to eat good healthy food and to stay healthy thus avoiding illnesses. This reasoning regarding the purchase of organic dairy products puts taste as a secondary nodal point.

The results also show that health is a discriminating factor between the choices of the two groups of respondents: regular and occasional consumers. When looking at barriers, the presence of the

[21] Data and maps on other group categories, such as fruit and vegetables, cereals and pasta, are not shown but available from the authors

[22] Relevance is determined by the strength of the link in the ladders, which is measured in terms of importance, not simply by the number of respondents mentioning the attribute.

health issue in two contrasting codes and risks (eating/staying healthy and do not eat/stay healthy) indicates that non-habitual consumers are aware of the risk of not eating healthily (eating healthy) when giving up organic products in favour of other purchases, but also have doubts about the quality of organic products and ask for reassurance.

The fulcrum of reasoning for all consumers is the sense of well-being, which links the attribute level to the value level.

Self-centred values
Regular consumers are particularly attracted by motivations linked to personal satisfaction: Self-actualisation, Well-being, Quality of life and Happiness, Inner harmony. Only when satisfaction is obtained through the product's sensory characteristics, is a chain produced that addresses hedonistic motivations – feel pleasure, feel good → Happiness, Inner harmony or Self actualisation. As a result, the organic product cannot be chosen without taking its sensory attributes into account. In other words, organic products should necessarily have a good taste (tastes good), which can be traced back to a desire for the real/genuine taste of organic food. To regular consumers, organic milk, and also yoghurt and certain Italian cheeses, are also good quality products for two reasons. Firstly, there is a difference in the production process, organic dairy products are naturally produced. Secondly, they have superior sensory characteristics; the taste is distinctive, less watery and less industrial (real/ genuine taste).

Looking at barriers to purchase, better distribution and a wider range of organic products in conventional shops would help to increase the demand for organic products, as might be expected theoretically. However, when looking at maps with higher cut-off levels, respondents seem to acknowledge their desire for independence (self-actualisation) in order to reach a higher level of satisfaction and to be happy. They can obtain these advantages and have more freedom to choose thanks to having greater knowledge about organic products. Non-regular consumers ask for more information as an instrument for better trust because organic products are not mass-produced and so consumers are not so familiar with them.

Social and altruistic values
Most of the value codes which generally motivate organic consumption can be ascribed to values of self-enhancement or other egotistic motives, according to Schwartz's (1992) classification, but regular organic consumers sometimes link dairy products with more altruistic goals: three altruistic and self-transcendent values appear on the map - Taking care of family, Benevolence/Social harmony and Good relations with others.

Influenced by the high frequency of children inside the family (68% of cases) respondents express their interest in social ties. For this reason, organic products are associated with taking better care of the family and, specifically, of children's health, through better nutrition. In addition, organic products are linked to greater respect for others, a desire to help others and most of all to better (good) relations with others. [Figure 1].

The Taking care of family value also acquires more importance in the occasional consumers subgroup. Those consumers with children who regard the family as an important final motivation (Taking care of family) believe that, in choosing conventional products, their children eat good and healthy food, and so are relaxed about their children's health. Consumers without children link their main barriers, prices and availability, to more concrete aspects and obviously, to self-centred and less altruistic motivations. Their main interests are to have greater freedom and success.

Environmental values

As other studies have shown and in contrast to consumer behaviour in other European countries (Grunert and Juhl, 1995; Makatouni, 2002; Zanoli and Naspetti, 2002), environmental motivations, which are also usually linked to the consumption of organic products, are not as important for Italian consumers. Consumers in Italy are little inclined to non-consumption and austerity (green consumers), but pay great attention to eating and "global well-being" (Calvi - Eurisko, 1993). This resolves the tension between hedonistic and environmental motivations at the level of well-being.

The "environmental" motivation is only found amongst regular consumers, those familiar with organic products, and is not even a dominant characteristic. Therefore it is hard to distinguish the figure of a truly "green" consumer, from the point of view of consumption choices. Previous results regarding consumer scepticism about organic consumption are to be confirmed (Zanoli and Naspetti, 2001) by looking at the wide incidence of values related to personal motivations. From all this, the figure of a traditionalist and non-innovative consumer emerges. The research therefore reveals a consumer still reluctant to widen the horizons of what they consume towards organic food products, solely on the basis of "environmental" motivation.

Pleasure value

At the value level, Italian consumers also give importance to the pleasure of eating good food (Food as enjoyment). Respondents who regularly buy organic dairy products address food quality (good quality) by referring to the characteristics "perceived" in the. They tend to think of dairy products as having the "quality of times past". It is important to bear in mind that milk is the food on which children are first raised; thus, consumers are transported back to past tastes and situations which somehow give them pleasure and, at more abstract levels, lead to Inner harmony and Happiness23. This link with the past is to be considered as a further sign of consumer familiarity with these products and confirmation of the importance of dairy products in the consumer's mind.

Some other key factors, such as those mentioned by Hill and Lynchehaun (2002), influence organic milk purchase and could affect future marketing strategies:

Quality

As mentioned previously, Italian organic milk products are considered to be good quality products. Among quality aspects, the most important characteristic organic consumers assign to organic products is the lack of chemical substances in the product and the production process.

Additionally, regular organic consumers also explain their choice of organic because they have a preference not just for healthy products but also for foods that promote physical well-being and have better nutritional properties. The nourishing attributes of organic dairy products, together

[23] Even if the code *Reminds me of past/childhood (CP)* is not mapped, it is reasonable to assume the consumer's unconscious feelings supporting their behaviour.

with elements of quality, continue to be relevant in consumers' minds, even if they are not scientifically proven (Zanoli and Marino, 2002).

For non-regular consumers, the perceived good quality of conventional products is a reason for not choosing organic food. Consumers do not believe that organic products are better quality and have a better taste than conventional ones. They are convinced that they can find products that look and taste good and which are also wholesome from the conventional range of products. Since consumers with less experience of organic products do not seem to perceive the differences between organic and conventional products, a greater effort should be made to increase consumer familiarity with organic products. Past studies (Zanoli and Naspetti, 2002) also demonstrate that the level of experience has a deep influence on consumer perception and in this case products tastings could help the spread of organic products.

Price

Among non-regular consumers, higher prices24 of organic products do not seem to affect fully-employed respondents or those with higher knowledge but slightly discourage purchase for those with low incomes. Consumers are somewhat unwilling to pay for organic dairy products, due to the fact that they do not consider such products as having good value for money. However price reduction does not seem a strategy for increasing sales since the price barrier is not perceived at a deep level: although occasional consumers complain that spending much more for food purchases would mean not having enough money for other needs or priorities, they also make a link with health risks, which are understood as a result of not having the financial possibility of buying and eating healthy food. An educational strategy would be a better solution and could make consumers aware of the whole organic method.

Availability

Non-habitual organic milk buyers, besides stressing the higher prices of organic products, mention the availability issue as having the same weight as the issue of reliability of conventional products (good quality of conventional product). Their purchases are influenced not only by the convenience of using habitual shops close to home, but also by hygienic standards and the prospect of obtaining high-quality products25. These consumers seem to reject organic products for practical reasons: non-availability in the habitual shop represents an unfeasible and uncomfortable way of shopping in the consumer's mind and makes organic purchases more difficult (not easily available).

Despite the fact that organic products are available on the shelves in 95% of supermarkets and many of them (namely COOP and Esselunga, Carrefour, Conad, Crai, Despar, Pam, Billa and Selex) have their own private label for organic products, the range of products sold is not very wide and so consumers still complain about the availability issue. As might be predicted

[24] Higher prices of organic products are mentioned by many of the non-regular consumers (about 42% of respondents for each product category) and the importance of this aspect in consumers' cognitive structures is relatively high, however findings do not always show a genuine relationship between consumers' willingness to pay and their incomes. Further, the percentage of occasional consumers linking higher prices to an unfavourable influence on family budget is not very high.

[25] During the last ten years many milk producers have been supplying the market with high-quality conventional milk. Communication about these products has been widespread, focusing on the fact that there is better processing and that products keep longer, and has deeply influenced the preferences of Italian consumers.

theoretically, better distribution and a wider range of organic products in conventional shops would help to increase demand for organic products26.

Knowledge
Compared to regular dairy consumers, most of whom have a high level of knowledge (86% of the cases); occasional consumers do not want to be driven by the market. They want to eat healthy but, at the same time, are not keen to give up life's pleasures. For non-regular consumers, those with lower level of knowledge want to have more freedom of choice and to be better informed about the methods of organic production and processing and about how organic products can be recognised. Finally, non-regular consumers are not willing to change their food habits unless they are certain products are of higher quality.

The fact that those consumers that are more familiar with organic products seem to have a more idealistic cognitive structure than occasional consumers – see the higher presence of more altruistic values – and that occasional consumers give more practical reasons for rejecting organic product, seems to confirm the idea that organic products are "think and not feel" products. In other words, organic products are not linked to an emotional feeling, but to a logical and rational thought process. For occasional consumers, this perception may be considered a symptom of a lower emotional participation in food choice which seems to be related to a lack of information.

Non-regular consumers, who mention negative aspects of buying organic products, ascribe the barriers to their choosing organic food to their lower level of knowledge. They refer to a general lack of information which de-motivates them or, at least, influences their organic choices in a negative way. Scepticism concerning organic products could be solved by having more information. Greater knowledge could make choices more rational and potential consumers could have more trust in organic products.

Results scenario analyses: possible future trends in the consumption of organic animal products

Though the scenario analyses we refer to were not explicitly focused on the organic livestock products market, some results can be singled out and extended to this specific sector of the Italian market. In particular, two main groups of factors influencing the demand of organic livestock products can be distinguished: a general set of "macro" factors, and a more specific set of "micro" factors.

The first group of factors are general macro-economic and social aspects which may affect the demand of meat and dairy products, in particular:

- supply of organic products in general and of livestock products in particular;
- liberalisation process of markets and the regulatory framework of CAP;
- development and growing presence of GMOs and of processed livestock food products obtained by new and "controversial" technologies;
- attitude of consumers and society in general towards ethical and environmental issues.

[26] Shop preferences and consumer attitudes towards different shopping places are analysed in depth in Zanoli and Naspetti (2003)

The second group of relevant factors can be considered more directly related to the process of consumer choice of organic livestock products, and refer mainly to:

- product range and availability,
- livestock product quality;
- promotion and advertising of organic livestock products;
- media coverage of the organic sector in general and of organic livestock in particular;
- consumers' attitude toward livestock products of regional origin.

The scenario analyses (for details see Zanoli *et al*., 2000 and Gambelli and Zanoli, 2003) depict how these factors are actually strictly interrelated, and produce a wide range of different future situations for the Italian market of organic animal products. The per capita consumption of meat products in general in Italy is among the highest in the EU, and after stagnation due to the BSE scandals, it still shows positive trends. Nevertheless, the overall consumption of organic meat is still at low levels, due mainly to the low availability of organic meat. In fact, although Italy is one of the most important producers of organic fruit and vegetable products, the lack of a national regulatory framework concerning livestock until 2001 has strongly discouraged livestock breeders from converting to organic. Furthermore, the recently approved national regulation concerning organic livestock is perceived as quite restrictive for breeders, which has, of course, not favoured a strong increase in national livestock production.

Under such circumstances, it seems that there is potential for substantial growth of foreign organic meat products in the Italian market (including products from outside the EU), which could be favoured by increased market liberalisation and directly affected by EU enlargement.

Nevertheless, wild liberalisation processes and EU enlargement are also likely to produce controversial effects on the demand of meat products, due mainly to consumer food scares in general, and to the issue of traceability of the organic meat filière in particular. The recent BSE crisis has shown how reactive consumers may be to scandals in the meat markets, and has also raised the level of attention that consumers pay to the origin of meat products, creating very favourable conditions for the development of organic meat market. Highly liberalised markets may nevertheless increase the risk of scandals also taking place in the organic meat sector, mainly due to the difficulties in the control of organic animal feeds. In any case, recent events seem to show that demand for organic meat products seem to be more influenced (positively) by scandals in the conventional food sector (such as BSE), than (negatively) by scandals in the organic sector (such as the German organic feed scandals).

Another aspect that may counterbalance the increase in imports of livestock products, in particular from new accession countries, is the general diffidence of Italian consumers to trust the quality of livestock products from eastern European countries: the Chernobyl disaster and the impression of a general lack of standards guaranteeing quality still have a negative effect on the attitude of consumers to food products in general coming from Eastern Europe.

Concerning dairy products, a distinction must be made between mass market products such as milk, yoghurt and cheeses produced on industrial level, and products of regional origin and typical products, usually locally produced. In the first case, the growing liberalisation and the EU enlargement process will produce a considerable increase in imports of organic milk and processed dairy products in the EU and in Italy; in the second case, it seems much more unlikely that non-Italian dairy products erode market share significantly, given the particular attention that Italian organic consumers pay to the origin of products. In fact, the image of originality and authenticity, traditionally associated to locally produced regional products is in Italy strongly related to the concept of products obtained using environmentally safe methods, and typical dairy products are therefore “naturally” preferred by organic consumers.

A further effect of the potential increase of organic livestock products due to higher market liberalisation is the risk of confusion amongst consumers, especially if there are no strong and reliable certification standards and logos. This aspect is related to the more general issue of the need amongst consumers of organic livestock products for more information about both the organic sector in general (i.e. how organic products are produced, the differences with respect to conventional practices, the actual beneficial effects of organic livestock and farming for society and environment and so on) and about meat and dairy products in particular. There is a requirement for more advertising and promotion of organic products, and is an aspect related to private sector initiative – especially from processors and traders. The lack of adequate mass media coverage and promotion for livestock products and labels has been singled out in the scenario analyses as one of the strongest barriers to the expansion of demand, and such results have been confirmed by the in depth analyses on consumer motivations discussed above.

Closely related to the issue of promotion of organic livestock products is that of quality and of the certification and labelling system. Consumers associate organic products with the concept of quality, and would like such quality to be certified clearly using labels that are easy to see, in order to support them in the process of choosing products. The results from the in-depth analysis of consumer motivation show how personal satisfaction is among the most important forces driving the preference for organic. This evidently hinges upon the consumers assumption that organic products have higher quality standards, in terms of “environmental content” and/or of taste and nutritional characteristics. The quality issue is therefore a key element affecting the future competitiveness of organic livestock products, and although there is an implicit trust on the part of consumers, at least of regular ones, there is little still scientific evidence concerning the actual superiority of organic products with respect to the conventional ones. If, in the future, such evidence was to emerge and become widely acknowledged, this would be likely to boost the demand for organic products, particularly amongst non-regular consumers. On the other hand, if studies and comparisons between organic and conventional products were to find no significant differences, an important competitive element of organic products could be lost.

From this point of view, well developed and reliable certification and labelling services can be considered crucial to increasing market transparency in the organic livestock sector, in order to avoid free-riding practices by increasingly commercial service organisations. One step towards market transparency is surely the recent approval of the European logo for organic products, but the links between organic farming and consumers could be further increased by a pan-European campaign showing the positive impact of organic farming and processing on the environment and on public health. Efficient and visible labelling services could also be a strategic tool to exploit new marketing possibilities related to the development of organic products also certified and labelled as regionally produced food.

Finally, a further important motivation for consumers choosing organic livestock products seems to be, quite predictably, the ethical and environmental concerns. The scenarios show that these concerns have positive influences on the demand of the organic products, and in some cases are strictly connected to the preference for typical and regional products. The results of the laddering analysis seem nevertheless to indicate that these aspects may have been slightly overestimated in the scenario analysis, and prompt further examination of this issue.

Conclusions

This study contributes to reducing the lack of information concerning the factors which affect the consumption of organic animal products in Italy, by distinguishing the basic characteristics of consumers, their personal motivations during the purchase process, and the key factors that might play a central role in determining future demand in the organic animal products market.

The focus group analysis distinguishes four main aspects that can be attributed to the Italian consumer of organic animal products: information about products, ethical concerns, attention to health, adequate income level. It also analyses the role played by the point of sale and by the origin of products in the way consumers approach the purchase of organic animal products.

The laddering analysis investigates the cognitive characteristics of consumers leading to the purchase of organic animal products, exploring in detail the role played by health issues, social values, self actualisation and environmental concerns. Italian organic consumers seem to be influenced mainly by hedonistic motivations, and show a rational rather than an emotional approach to the choice of organic animal products. The main barriers to the purchase of these products by non-regular consumers are the lack of knowledge about organic products in general and animal products in particular, perceived quality and high prices.

The scenario analysis shifts the focus from the individual attitudes to the social behaviour of consumers, exploring the key factors that might influence the demand for organic animal products in the Italian market. Liberalisation of world market, EU enlargement and GMOs are closely related factors that might boost the demand for organic products due to an increase in food scares: organic animal products might become strongly preferred as they represent a safeguard for consumer concerns about health. Furthermore, action taken to increase the amount of information available around the organic sector and organic products, such as visible labelling, media coverage, advertising, may prove effective in supporting the demand for organic animal products in the future.

The three approaches used to analyse motivations for buying organic animal products therefore lead to a common core of results that essentially point towards consumer attitudes toward health and food safety as the major factor motivating the purchase of organic animal products. Critical elements for the enlargement of organic demand share for animal products are linked to the requirement of more information about the actual differences between the quality of organic and conventional products that might reassure and support consumers when shopping for food.

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Analysis of organic dairy farm revenue for the period 1999 – 2002 in the province of Bologna, Italy

D. Sarti and P. Vanelli
IBIMET - Istituto di Biometeorologia - Sezione di Bologna, Consiglio Nazionale delle Ricerche (CNR), Unità Operativa Economica dei Sistemi Agro-Territoriali, Via P.Gobetti, 101 - 40129 Bologna (Italy)

Introduction

As a result of the re-organisation of the Italian National Research Council (CNR), the Centre for Analysis and the Management of the Agro-territorial Systems in Bologna has become the Economic operative unit for in Bologna section of the Institute of Biometrology (IBIMET). This centre, from its very beginning in 1971, has worked on financial data and the analysis of farm management in the regions of Tuscany, Emilia Romagna and the Triveneto and is still carrying out research aimed at promoting rural development in the farm areas, the subject of this paper.

The systematic elaboration of farm data under study at the centre has, with the help of global management indices and analysis of financial data covering the main processing stages in Tuscany and Emilia Romagna, furnished original documentation of undeniable importance that gives an objective and overall picture of interest to a number of individuals including farm owners, technicians who actually run the farms, researchers in farm economics and managers of various public enterprises.

Materials and methods

In consideration of the hill climate and environmental difficulties in the area, it was decided to analyse productive activities that could stimulate farming economy and check on the changes that community policy would create in the economy of the farms. The objective of this study was to evaluate the costs and revenue of two different types of dairy cattle systems for companies in the Bolognese hill area. Of the sixty farms under financial study, six were selected. The annual balance sheets from 1992 to date of these six farms were available at the CNR centre and they contain similar characteristics as defined by the objectives.

Farm structure and production factors
The common characteristics of the cases studied are the following:

- family owned and run operation;
- organic farming since 1992;
- main product: fresh milk for human consumption;
- vegetable production: Alpha-alpha and cereals produced and reemployed in the farm;
- the young livestock, that replaces the animal heads to end career, is nurturer, is nurtured inside the farms.

Since 1995, four of the six livestock farms and co-operative members have sold organic milk to the Consorzio Cooperative GRANLATTE in Bologna. The other two produce conventional milk that is then delivered to the GRANDUCATO processing plant in Florence. The differences between the two systems are outlined in Table 1.

Table 1: Farm resources

		Production method	
		Organic	Conventional
Case histories	N	4	2
Animal housing	Type	Free range with a milking parlour	Non range with a milk conduit
N° of dairy cows	n.	25 – 35	13 - 12
Cultivated area	hectares	50	31
Woods area	hectares	30	-
N° of workers	hectares	2	1.5

Recently three of the four organic dairy farms have renewed the cow-sheds. The new barn which has a milking parlour and milking machine hook up has enabled the farmer to widen the production area. In the remaining two farms, new barns became active in the year 2000. The two farms that produce milk in accordance with conventional methods are very similar to those spread over the area. They have a traditional barn with a common housing built in the late sixties with an on-site milking station.

The average arable area of the organic dairy farms is around 50 hectares, of which two thirds is taken up with forage or alfalfa, while the remaining area is used for the cultivation of grain and high protein grain such as barley and bean crops whose production has been reemployed in the farm.

Only the products exceeding the dairy farm’s own need are sold on the market as organic products. In addition, the dairy farms have around 30 hectares of woods. The dairy rearing farms that produce conventional milk have a little over 30 hectares of land of which four fifths are cultivated for forage and the remaining hectares are used for grain cultivation. Crops harvested from fields using organic methods yield slightly less than those using traditional methods. Alfalfa crops yield from 6 to 8 tonnes per hectare, while grain crops yield 4 –5 tonnes per hectare.

Stock are pure bred Italian Holsteins. One of the farms also has pure bred Brown Swiss cows. In the four year period from 1999 to 2002 on the organic farms, the average number of milking cows in production increased from 25 heads in 1999 to 35 in 2002 (a 40% increase). In the same period in conventional rearing farms, livestock decreased from 13 to 12.

The average number of family members engaged in the work was two individuals per organic dairy farm, while conventional farm average was 1.5 individuals. These figures remained unchanged during the entire study period.

Data analysis
Revenues and expenses were organised by category in examining the financial budget of the farms. Data were collected and reported for milk quantity and expressed as averages over the two year periods 1999-2000 and 2001- 2002 to insure a well-balanced comparison of the production types. In the first two year period, the chronological comparison as per MacSharry (Ansaloni F. e Ali) can be seen. The second two year period reports the effects of the Agenda 2000 and, as far as the cases under study are concerned, new livestock buildings were in operation.

The revenue includes resources from milk (inclusive of VAT), other revenue (includes gross income from the barn[27] and European Community subsidies.

Costs include forage and reemployed grains, feed and other purchased feed stock, medicine, veterinary expenses, insemination costs, materials, miscellaneous such as fuel, electrical energy, insurance, services and transport, farm equipment expenses, barn maintenance and general expenses including organic certification costs and lastly the amount of capital re-invested. Cost of reused forage was debited from the barn expenses on the bases of the estimated value, which takes into account local market prices. Therefore, the cost of alfalfa hay was estimated at 100€ per ton and grain at 150 € per ton.

Above costs do not include labour costs of the owner, his family nor property or investments of the owner. Capital and work income has been calculated on the difference between income and costs as described above.

Data collection by technicians and accountants from the farms required numerous and systematic meetings with the farmers for proper and correct information retrieval, for example to have a clear understanding of the amount of products used, storage and to understand the reasons behind farm owner choices and their economic expectations.

Milk payment is based on a reward and debit system, based on whether or not certain requirements are met. In order to formulate an estimate of economic results over a five year period in accordance with the reform, it was necessary to evaluate the components that make up the price of the milk and possible variations. Milk prices paid to the farm are made up as follows:

- base price which includes the value of the milk agreed to at regional level among dairy farmer associations and the main milk industries;
- greater or lesser value that private and co-operative industries accredit to raw materials in certain areas of production in relationship to need which may vary even a great deal in the various months of the year and from year to year;

[27] Increase in the weight of the animals over a year period as the difference between the value of the final inventory plus sales and the initial inventory added with purchases.

- milk quality price based on meeting certain regional technical parameters, which above all in the summer months may give a negative reading;
- premium price for organic products which generally has been set by the milk processors or industries based on their needs and in particular the price that they have been able to obtain on the market;
- lastly price formulation for milk must take into consideration penalties or rewards based on the amount of product delivered daily (0 to 50 litres –33,05 €/ton; 51 a 100 litres –16,53 €/ton; 101 to 200 litres –9,30 €/ton; from 201 to 300 litres no deductions; from 301 to 1000 litres +1,55 €/ton; from 1001 to 3000 litres +2,58 €/ton; over 3000 litres +4,13 €/ton). No penalties are applied for organic milk.

Results

Income

Total revenue per tonne of milk varied greatly over time (between the two year periods) depending on the type of production (Table 2). Overall revenue from the organic farming enterprises for the two year period 1999-2000 was about 500€ per tonne, an increase of 12% over that of conventional farming. In the following two year period, organic milk increased over 23% while conventional method increased by 5%.

In determining capital and labour income, price received at delivery was extremely important as was milk quality. In the two year period 1999 – 2000, both organic and conventional milk averaged around 430 € per ton. Only in the last two year period did organic milk reach 485 € per ton or an increase of 12%. The incidence of this income on the total income varied considerably. Organic milk registers a lower percentage (9-12%), and in both cases income was lower by 8 –4 percentage points in the second two year period due to a proportional increase in other income.

The price increase (inclusive of VAT) for organic milk up to 30 March 2000 was 45.04 € per tonne and progressively increased to 56.29 € per ton from 1 April 2000, 73.10 € per ton from 1 April 2001 and 84.44 € per ton from 1 April 2002. Price was based on conventional milk quality standards together with the increased value attributed to the milk itself by the co-operative GRANDUCATO and matched most of the price increase achieved by organic milk up to the year 2000. For this reason, average unit price for milk from both types of production in the first two years differed only by 4 € per ton.

Table 2: Technical and economic analysis of milk production in the Bolognese hill country - € per ton
(*Source*: own data)

Description	Organic		Conventional	
	1999-2000	2000-2002	1999-2000	2000-2002
Revenue ®	**550.31**	**679.24**	**491.77**	**518.33**
. Milk	433.09	485.36	429.06	432.21
. other income	98.24	159.63	59.57	82.87
. subsidies	18.98	34.25	3.15	3.24
Expenditures ©	**415.60**	**436.60**	**398,23**	**424,82**
. reemployed forage and grain	182.49	186.60	195,82	199,82
. purchased feed and feed stock	118.90	114.56	102.70	105,62
. other costs	71.25	73.40	63.42	73.68
. supplements	42.96	62.04	36,29	45,70
Capital and labour income ®-©	**134.71**	**242.64**	**93,54**	**93,51**
Average Capital and labour income for labour unit in dairy farm (€)	10.325	24948	4.460	3.845

Other income, mainly gross income from the barn varied from a minimum of 60 € per ton to a maximum of 160 € per ton with a greater effect (18–24% against 12-16% conventional) on organic milk revenues as opposed to conventional milk revenues. From the first to the last two year period, milk prices increased 50% because more animals (biological increased from 6 to 12 heads) were kept for fattening and also because of the increase in beef prices once the BSE crisis was settled. European Union funding for livestock and butchering increased on average by 6 € per ton for organic production and little more than 3 € per ton for conventional production. For organic production and starting from the year 2000, to this amount EU financial subsidies for fodder pastures explicitly for organic livestock rearing must be added. The total amount of these subsidies for the farms under study is on average 27 € per ton of milk.

There were no significant difference in costs for each type of production. Overall costs in the two types of production in the first two year period total on average 414 € per ton of milk. In the second two year period, there was an increase of 21 € per ton or 5.1% in organic milk production and 45 € per ton or 10.9% in conventional milk production. In general, feed costs were on average 72% of the total costs. In organic production, feed costs exceed the amount of that calculated for conventional production. Other costs total on overage 17% of the total.

In the first two year period, re-integration costs of the investment for both organic and conventional milk totalled 40 € per ton, in the second two year period costs increased 44% and 26% respectively for organic and conventional milk. The major cost for the last two year period was due to the forced reduction of milk produced in order to stay within the milk quotas.

With organic milk production, capital and labour income per tonne from the first to the second two year period increased by 80.1%, to 242 € per ton. With conventional milk, however capital and labour income remained at 93 € per ton. Overall income with organic milk increased almost 250% from the first to the second two year period going from 29.651 € to 49.897 € compared to conventional milk which decreased by 14% from 6690 € to only 5767 €.

Preventive analysis of the effects arising from the application of income reform

Based on production results from the year 2002 and preceding years, forecasts of obtainable economic results for the period 2003–2008 have been made. The following are the forecasts:

- consistent production yield for the entire period;
- price stability for technical equipment purchased on the market;
- consistent costs for farm equipment including machinery and services;
- conservation of current production techniques;
- conservation of price increase for organic milk of 84.44 € per ton (VAT included) based on the agreements between the Dairy Farmer Associations and the Consorzio Co-operative GRANLATTE.

Over and above these, the Agenda 2000 guidelines have been applied along with the OCM guidelines updated in accordance with the Fischler reform dated 26 June 2003 regarding dairy products. These include:

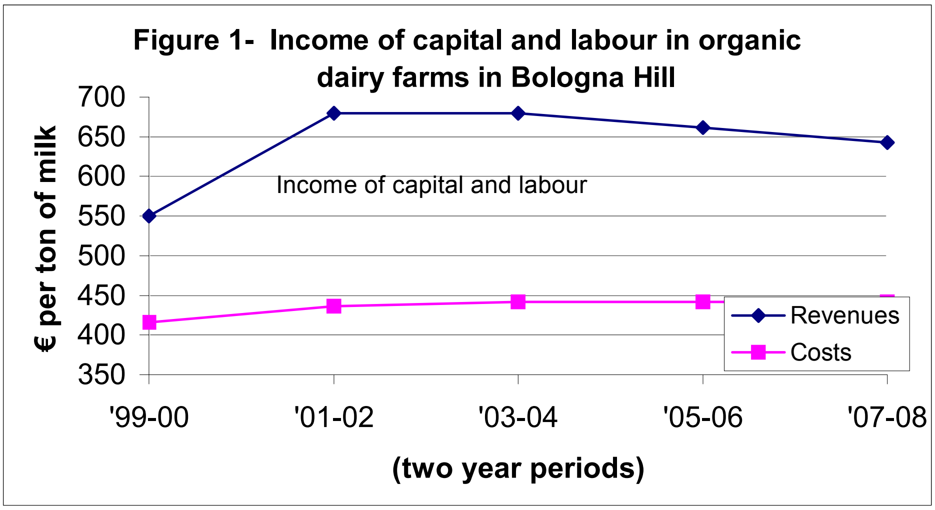
- abolition of recommended pricing;
- intervention of price reduction (25% less for butter and 15% less for skimmed milk) which translates into a 15% price reduction for milk equally distributed over three years beginning with the year 2005;
- no increase in milk quotas
- de-coupling and modulation when the reform is fully introduced with a 3% reduction of subsidies in 2008;
- direct assistance for milk produced in accordance with the CE Directive 1255/99 dated 17 May 1999, Chapter IV article 16 and integrated by Italian adaptations according to what is set out in the subsequent article 17. According to article 18 of the same community directive, the overall amount (premium for dairy products and additions) granted per individual tonne of milk may reach and not exceed 13.9 € in 2005, 27.7 € in 2006 and 41.7 € in 2007. Subsidies taken into account in the forecast analysis totalled 8.2 € per tonne for 2005, 16.4 € for 2006 and 24.6 € for 2007.

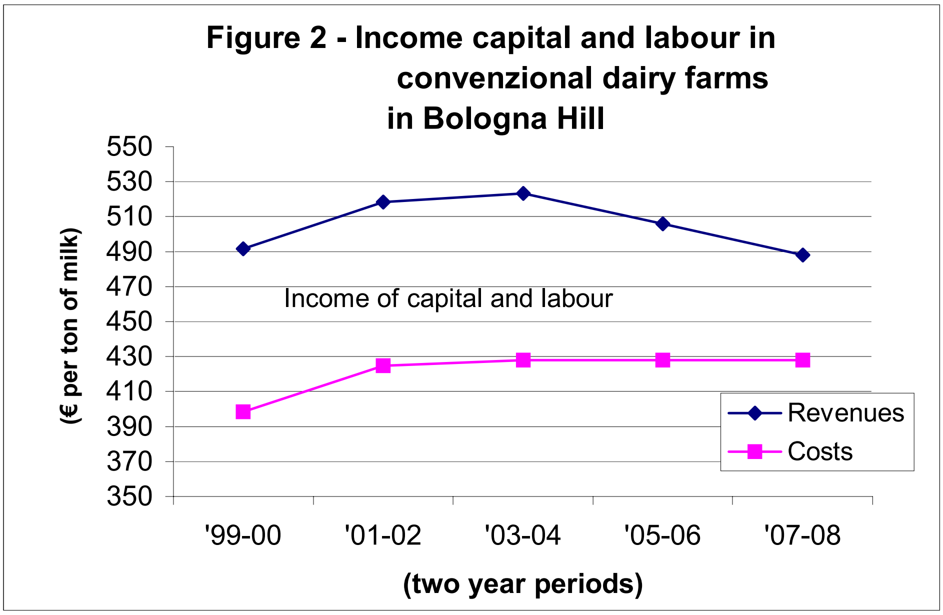
According to the forecast analysis, the capital and labour for farms in the Bolognese hill country which produce organic milk (Figure 1) will have a progressively increased income up to 200 € per ton in the 2007-08 two-year period.

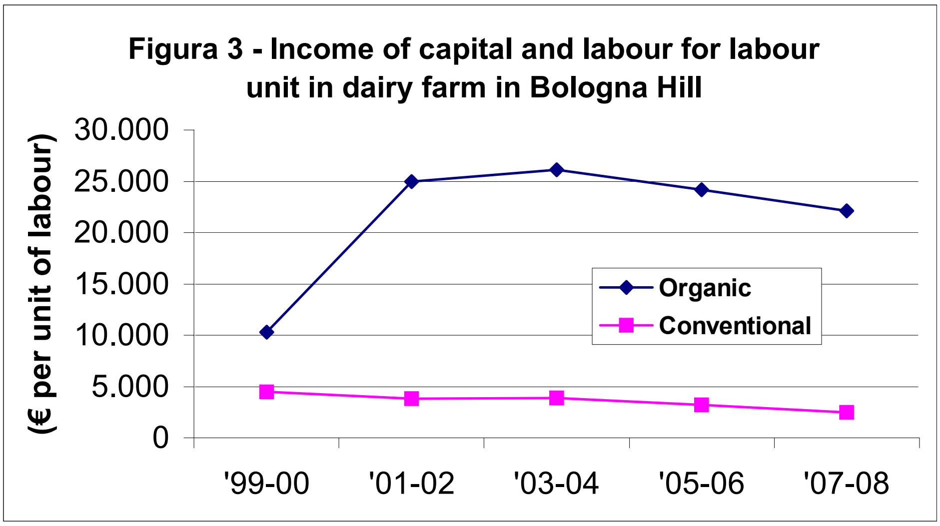
Conventional milk dairy farms on the other hand were severely penalised due to the application of the reform which calls for a heavy price reduction causing a severe drop in already extremely low incomes. Income forecast for the 2007-2008 two year period indicate a decrease to 60 € per ton (-37%) (Figure 2)

Overall capital and labour income per unit of labour in dairy farm using organic production techniques for the two year period 2003 –2004 reached a level of 26.150 € which progressively reduced is going to be 22.140 € for the two year period 2007-2008 (Figure 3).

In those farms that carried out reconstruction and necessary updates production capacity increased 45% (to three times that of conventional dairy farms) albeit with enormous financial investment. Conventional dairy farm income per worker is 2.444 € and there have been no current actions but a containment of production capacities within milk quota limits.







Conclusions

Organic dairy farms take full advantage of the territory in which they are located. They must meet technical standards, make notable commitments as per the directives in the Agenda 2000 and need to meet the requirements of Reg. Ce 1804/99. The authors suggest that livestock farms for milk production in marginal hillside and mountain areas should be safeguarded and promoted whether they use conventional or organic production methods. It is also suggested that marginal activities like organic and conventional dairy cattle farms in the hill country should be given subsidies to apply modern technology to reach the maximum quotas allowed by article 16 Chapter IV of the directive Reg. Ce 1255/99 integrated by Italian national and regional requirements as set out in article 18 cited above.

The inability of the dairy farms to meet the norms regarding free range animal housing (required by decree before stipulated time) means that these small farms run the risk of closing. The authors, therefore, suggest that the current government re-enact the waiver to permit Italian farms to conform to the relative housing norms by 2010.

Replacing obsolete rearing structure is important :
- to increasing production capacity;
- to bringing it into balance with the land available; and
- to allow efficient labour mechanisation and rationalisation.

Progressive price increases in organic milk are a correct recognition of production method quality that requires increasingly higher costs and personal sacrifice on the part of the farmer in order to achieve a satisfactory income. This result has been made possible by membership in dairy processing co-operatives, insuring a higher production technique professional level, product diversification and a more efficient product organisation to respond to market needs. The Consorzio Cooperativo GRANLATTE, under another name assumed the responsibility of marketing organic milk in 1995 (Ansaloni - Sarti 1996). GRANLATTE began by purchasing

7,000 kilos of organic milk from five dairy farms every day. Today GRANLATTE purchases 33,000 kilos of organic milk from 11 dairy farms on a daily basis. In addition, the organic dairy product line begun with fresh milk and yoghurt has been expanded to include fresh cheeses like *stracchino* and *mozzarella*.

The demand for organic milk and other organic products is a real demand. The hope for the future is that this demand will be helped by further EU subsidies to assist dairy farms in meeting technical standards that this type of production requires. It would also be good to have a further increase in organic milk prices to insure an adequate income to the dairy farmer so that the current situation may not only continue but improve and grow.

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Production costs and profitability of organic Parmigiano-Reggiano cheese and organic industrial milk in northern Italy

A. Menghi and K. de Roest
Centro Ricerche Produzioni Animali S.p.A., Corso Garibaldi 42, 42100 Reggio Emilia, Italy

Introduction

In the framework of the project, "Monitoring livestock production in Emilia-Romagna Region", the Research Centre on Animal Production carrie out, in 2002, a specific survey among organic milk producers. The aim was to calculate milk production costs for both organic milk for Parmigiano Reggiano cheese, and milk for industrial use. Furthermore, the profitability of both types of production has been calculated.

The methodology used was based on the model of the European Dairy Farmers (www.dairyfarmer.net), who annually calculate milk production costs in 14 EU Countries. The data was collected by means of questionnaires.

The farm samples regarding industrial milk production included farms located on the hills and mountains of the Emilia-Romagna Region, outside the Parmigiano Reggiano PDO (Protected Designation of Origin) area. The farms in the sample of Parmigiano cheese producers were located both on the plains and in the hills. Given the strong heterogeneity of the farms located in the hills (size, breeds, buildings etc.), it was possible to sample in this category only the farms on the plain. In the latter case, the sample consists of all types of farms operating in this area. The results of the analysis have been compared to similar samples of conventional farms involved in the project for several years.

Industrial milk

The sample included small farms, with an average of 44 Italian Friesian cows (Table 1). The average production of milk per head was 5.6 tons per lactation. The production is comparable to conventional farms located in the same area. Fat and protein content can be considered good, reaching 3.8% and 3.4% respectively. Average lifespan of the cows was 4.6 years after first calving.

All arable land of the farms was cultivated to produce animal feed. Alfalfa was the main forage crop cultivated in rotation with cereals and protein crops (usually horse bean). The production per hectare of the main crops were: 5.3 tons of alfalfa hay, 4.6 tons of winter wheat, 4.3 tons of barley and 2.6 tons of horse beans. Because of the limited acreage of the farms, these yields are unable to satisfy the feeding needs of the herd. Organic concentrates and flour are bought in to complete the feed ration. The amount of concentrates used in organic farms was similar to that used in conventional farms. The main difference was that in organic farms, the proportion of flour in the feed ration (corn flour in particular) is bigger than in conventional farms, where concentrates represent the bigger proportion.

Table 1: Technical characteristics of the sample in 2001

Technical parameters	Industrial milk	
	Mountain CONV	**Mountain ORG.**
Farms (N)	**13**	**8**
Average dairy cows (n.)	41	44
Milk production (kg/year)	5,560	5,650
Utilized arable area (ha)	28	45
Forage area (ha)	24	27
Working units (n.)	2.42	2.58
Cow per working units (n.)	16.9	17
Cow per ha of forage area (n.)	1.6	1.6
Calf mortality 1st month (%)	4.0	6.8
Concentrates per cow per year (kg) (*)	1,866	1,874
Fat content/kg milk (%)	4.0	3.8
Protein content/kg milk (%)	3.3	3.4

(*) Including concentrates for replacement heifers.
Source: own elaboration

The common strategy of all farms in the sample was to use their own feed production as much as possible and to rely on external inputs as little as possible. This strategy was particularly evident in the case of concentrated feed because of the high price of the concentrates. Family farm labour was mainly employed for forage production. Contract labour was scarcely used. There was a large machinery park to do the work in the farm. Crop fertilizers were mainly manure from the livestock and small amounts of other minerals were added.

Another interesting characteristic of some of the farms was the rearing of male calves for organic beef production. This strategy increased the value of the calf meat. When calves were sold at a few days of age, they were sold at the same rate as the conventional calves, as there is no market for organic calves. The situation was different when the calves reached about 300 kg of weight, when they could be sold as organic beef. During 2001 (a crisis beef period), the price of young bulls was about 2.5 Euro per kg of live weight. However, cull cows, even if they are certified as organic, they are not always sold as organic.

Excluding public support for organic production, the production cost per liter of milk in 2001 was 68.15 euro per 100 kg of milk. The cost is about 20% higher than for conventional milk (Table 2). Feeding costs were about 20% higher than conventional production, but the composition of this cost is different in different samples. In the case of organic farms, the high costs of concentrates push the farmers to produce as much as possible. Basic self-produced forage is integrated with concentrates and flour. Producing organic feed on the farm using low input methods requires high input of labor and the number of machinery has to be adequate to perform all technical interventions on the land and crops. It means that, to the costs of purchasing feed, labour input, machinery depreciation, interests on capital and other variable costs linked to fuel consumption, energy, mechanics etc. should be added. In conventional production, the use of chemical inputs makes it possible to reduce labor input and all related costs. Organic certification accounts for about 1% of total production costs. This has a negative impact on profit for these farms. The milk price is on average 43-44 euro/100 kg of milk (about 41 euro for conventional milk). The good revenue from meat production at about 8 euro per 100 kg of milk and the EU subsidy for organic production leads to a total revenue of 56.5 euro per 100 kg of milk production. This sum does not cover the total production cost previously calculated.

In Italy, it is quite common that dairy farms located on the mountains hardly remunerate sufficiently their own labour and invested capital. This is true also for organic dairy farms. To reach the same modest remuneration of labour and capital (if EU subsidies will continue to be available) milk prices should be at least 13% higher than conventional milk and 21% higher, if subsidies were not available.

Table 2: Industrial milk production costs

Cost items	***Industrial milk***			
	Mountain Conv		**Mountain ORG.**	
	€/100 kg	%	**€/100 kg**	%
Purchased feed	9.87	16.6	12.0	15.7
Vet, medicine, insemination	0.63	1.1	1.3	1.7
Variable costs (water, electricity, fuel)	1.21	2.0	3.6	4.7
Other general dairy inputs	3.12	5.2	4.18	5.5
Certification	0.00	0.0	0.67	0.9
Depreciation	6.97	11.7	13.5	17.7
Labour	29.63	49.7	32.5	42.6
Interests	8.19	13.7	8.6	11.3
Total costs	**59.62**	**100.0**	**76.35**	**100.0**
Meat revenues	3.18	5.3	8.2	10.7
Net costs	**56.44**	**94.7**	**68.15**	**89.3**
Subsidies			4.5	5.9

Milk for organic Parmigiano-Reggiano cheese production

The sample of dairy farms producing milk for Parmigiano Reggiano cheese accounted for only 5 farms; they represent all farms involved in this type of production on the plain (Table 1). All farms had converted to organic production several years earlier. The limited number of farms of this sample does not allow us to define them as the typical farm for organic Parmigiano Reggiano production, and even the large size of these farms (258 heads and 310 Ha on average) describe a particular situation. They are, in fact, big farms, employing a large number of workers (8.4 on average). As in the case of liquid milk cows, productivity is very similar between organic and conventional. Fat and protein content is slightly higher in organic milk but in line with conventional milk. The average age of the cows is 5.9 years.

The use of concentrates was lower on organic than on conventional farms (2,094 kg against 2,335 kg per year per cow). Quality of forage was one of the most important factors in milk production and it was even more important in organic dairies. The fact that concentrates are limited to a maximum of 40% of the ration in organic milk production requires a very high quality of forages in order to obtain good productivity per cow.

Table 3: Technical characteristics of the sample in 2001

Technical parameters	**Parmigiano-Reggiano**	
	Plain Conv. (> 75 heads)	**Plain ORG.**
Farms (n.)	**20**	**5**
Average dairy cows (n.)	104	258
Milk production (kg/year)	7,550	7,770
Utilized arable area (ha)	52	310
Forage area (ha)	44	153
Working units (n.)	3.3	8.4
Cows per working units (n.)	30.9	30.7
Cows per ha of forage area (n.)	2.8	1.7
Calf mortality 1° month (%)	7.1	6.1
Concentrates per cow per year (kg) (*)	2,335	2,094
Fat content/kg milk (%)	3.5	3.6
Protein content/kg milk (%)	3.2	3.4

(*) Including concentrates for replacement heifers.

The strategy of the farms was to produce as much feed as possible on the farm in order to reduce purchased inputs. Not taking into account the EU subsidies to organic farming, the milk production cost in farms producing Parmigiano Reggiano cheese was 47.2 euro per 100 kg of milk. This cost is about 10% higher than the sample including conventional farms. The relatively small difference is due to the fact that the product specifications make the organic and the conventional system quite close to each other (see the feeding rules for example). Purchased feed on organic farms was lower than on the conventional farms. This is due to the self-production of forage in the large acreage of these farms. In some cases, organic soy was cultivated in order to supply protein to the animals. All cost items, pertaining to forage production (e.g. machinery and labour). were higher in organic farms than in conventional herds (Table 4).

Profitability of the farms, was very different from the organic farms producing liquid milk. On the farms, milk was processed within the farm and ripened and sold directly as final product to individual consumers or to retailers. In both cases, the added value of the production is kept on the farm. To give an idea of the difference, in 2001 conventional Parmigiano-Reggiano was sold, on average, at 9 euro per kg while the organic Parmigiano-Reggiano cheese was sold at about 11.5 euro per kg of cheese. Subtracting from the organic cheese price the processing and ripening costs, we obtain 62 euro per 100 kg of milk (47.05 euro for conventional milk). This means that the production cost previously calculated at 47.2 euro was largely covered by the milk price. To this value, we should also add the EU subsidies for organic farming, but the lack of information does not permit this final calculation.

Table 4: Parmigiano Reggiano milk production costs

Cost items	**Parmigiano-Reggiano**			
	Plain Conv.		**Plain ORG.**	
	€/100 kg	**%**	**€/100 kg**	**%**
Purchased feed	15.67	34.9	13.1	26.9
Vet, medicine, insemination	1.78	4.0	1.0	2.1
Variable costs (water, electricity, fuel)	2.88	6.4	2.4	4.9
Other general dairy inputs	2.96	6.6	1.4	2.9
Certification			0.4	0.8
Depreciation	3.70	8.3	6.5	13.3
Labour	11.48	25.6	16.8	34.5
Interests	6.39	14.2	7.1	14.6
Total costs	**44.86**	**100.0**	**48.7**	**100.0**
Meat revenues	2.05	4.6	1.5	3.1
Net costs	**42.81**	**95.4**	**47.2**	**96.9**
Subsidies			n.a.*	

*The figure was available only from one farm

Conclusions

The technical performance comparison between the organic farms and the conventional farms shows that organic farms can have similar performances to conventional farms. To meet this target, the farm strategy needs to be drawn in a particular way, based on good availability of labour, land and capital. In this way, it is possible to solve one of the most problematic aspect of organic animal production: feed management. Self-production of animal feed gives the farmer the opportunity to limit the purchase of organic forages and concentrates that are, at the moment, very expensive. Those farmers who have a limited availability of labour, land and capital, can hardly manage their farms in a profitable way. For this reason, many organic farms with dairy production prefer to cultivate and sell organic crop products and keep the livestock production under the conventional system.

This empirical survey shows that profitable organic dairy production is possible only in a limited number of farms. In the case of organic milk producers located on the hills and mountains, the traditional way of farming was close to the organic system. Their strategy was to certify the product as organic in order to add value to the product without large investments. For some of them, the approval of the Regulation 1804/99 represented a challenge. The low profitability of these farms has forced many of them to cease farming alltogether or return to conventional farming. The profitability of these farms is linked to the milk price. Their small size and the price setting at national or regional level does not take in account the higher production costs of farms working in marginal areas. For these and for other reasons (social and environment, for example), the decreasing trend in number of dairy farms on hills and mountains is likely to continue.

The situation of the farms producing organic Parmigiano-Reggiano is completely different. They are not marginal farms and have a clear strategy linked to the market. Conversion of these farms to organic production was linked to the possibility to diversify their product, also gaining a market power towards big retailer chains. They could add value to a product that they could sell directly to their customers, avoiding the intermediary system and wholesalers. Cheese can be stored for several months, while liquid milk can only be sold to the industry immediately after production
.
When comparing the result of this empirical survey to other similar surveys carried out in other EU countries, one common problem is the high price of organic concentrates. They can reach a price 60-70% per cent higher than the conventional product. Higher labour input and machinery is also common in other organic dairy farms in Europe (de Roest, K., Menghi, A., 2003). The success of organic dairy farms is also dependent on the technical know-how of the farmer: conversion of a farm to organic production requires a new equilibrium among the different farm inputs. The high variability among the farms included in the survey shows that many farms in Italy are still far from reaching this equilibrium.

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Poster Presentation: Socio-encomical effects of organic crops and animals rearing diffusion in Tuscany (Central Italy)

A. Pardini and F. Longhi
Department of Agronomy and LaND Management, University of Florence, piazzale delle Cascine, 18, 50144 Firenze.

Introduction

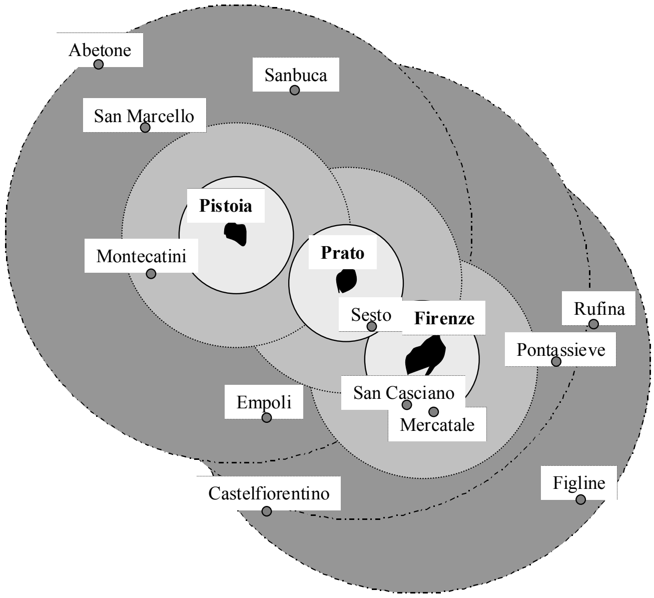
Recent adulterations of products in food industry have increased consumer interest in foods that are produced in more natural systems (i.e. on organic, biodynamic, integrated farms). The new interest is focused mainly on organic crops and livestock products that, in Central Italy, have already reached most of the market places.

Further diffusion of organic foods can have positive influences on social and economical conditions of farmers that operate in marginal areas. Organic farming and typical, regional products have also been recognized to increase chances to maintain people in rural areas (Tallarico *et al*., 2002) and, in turn, to have a beneficial effect on land care (Pardini, 2002). Availability of local (typical) foods, especially if organic, have also a positive influence on the number of customer-days in Tuscan agri-tourism farms (Pardini et al., 2002). Unfortunately high prices and reduced diffusion in market places limit availability of organic products. This paper describes some important parameters related to organic foods available in Tuscan market places in order to favor their further diffusion.

Materials and methods

Prices and availability of vegetal crops and livestock products and by-products in wide areas of the Provinces of Firenze, Prato and Pistoia were investigated (Figure 1). A total of 65 supermarket chains and other shops were also investigated in 15 Municipalities in the area.

Figure 1: Geographical position of the Municipalities investigated. Circles show areas of 20, 40 and 80 km diameters from town centers.



The following investigations were carried out:

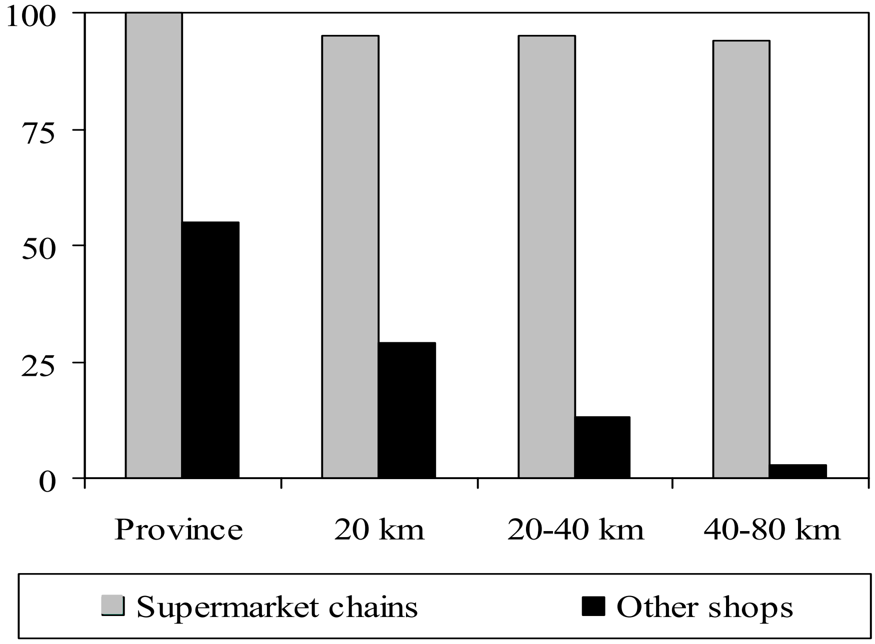
1. Availability of organic foods (at least 5 different foodstuffs);
2. Prices of organic and conventional foods (on 10 fruit types, 11 vegetables, 4 pulses, 7 meat parts and salami, milk); and
3. Reasons for lack of organic foods in marketing chain (interviews to managers and owners of the shops).

Results and discussion

Availability of organic foods (Figure 2)

Organic foods were available in all (100%) supermarkets in urban areas. In two towns (Firenze and Prato), there were also shops that sold only organic foods. The percentage of supermarkets that sold organic foods remained very high (always above 95%) also at longer distance from towns. However, the amount of organic food available was reduced further away from town centres, where no specialized shops were located. The percentage of family run shops that sold organic products was small at any distance from the town centre and their number reduced consistently with increasing distance from towns.

Figure 2: Percentage of supermarkets chains (grey) and other shops (black) where at least 5 organic foods were available, inside the town area and by 20, 40, 80 km from town center.

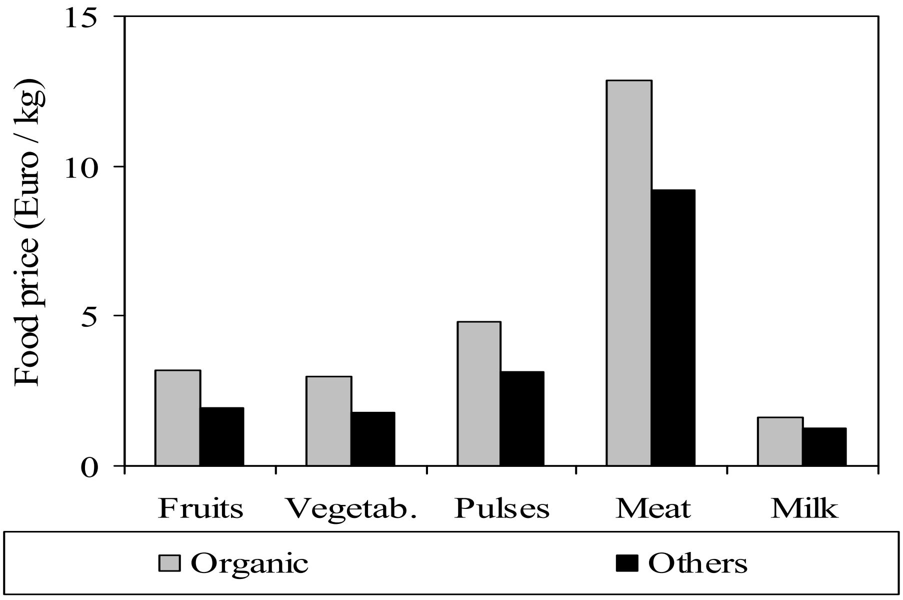


Food prices (Figure 3)

The average prices (mean of 10 fruit types of the 65 shops) calculated for organic fruits was 66.7 % higher than the price of same, conventional fruits. Organic vegetables were 66.6 % more expensive than conventional ones. Pulses were 52.3 % more expensive than the same foods from conventional agriculture. Organic meat was 39.8 % more expensive. However, it must be noted that, normally, this food can be bought in organic farms only in pre-packed mixtures that comprise several different animal parts and consequently does not allow any choice. Milk price was 31.5 % higher when organic. The lack of choice is a detrimental parameter additional to higher prices of organic meat.

Organic products resulted cheaper in supermarket chains than the same foods available in family run shops, and even cheaper in specialized shops than in the other types of shops (not visible in the figure).

Figure 3: Comparison of organic and conventional food prices (average of category products and 65 shops).



Reasons for shops not to carry organic food

The interviews pointed out that family-run shops that are placed far from town centers have little interest in selling organic foods because:

1) People who live in rural areas often crop most of their food in private orchards where they grow some poultry (this answer was given by 78.3 % of the respondents). Local people trust more the quality of self grown plants and animals because they have control, even if most people have adopted conventional farming systems that make use of several chemicals.
2) The number of inhabitants and population density is smaller than in towns, consequently the demand for special foods is limited (69.0 % of the respondents gave also this answer). There are exceptions where there is seasonal presence of foreign tourists. However people have normally short holidays during which they are not very concerned with the quality of food.
3) People who live in mountains and marginal rural areas are normally aged and they have got less comprehension of the quality differences of organic and conventional foods (this reason was given by 43.7 % of the respondents). For the same reason there is also less attention to fraudulent practices in food industry.
4) Shops that are near marginal rural areas might offer only few organic foods. This leads to a situation where clients loose interest in quality and special foods and simply and simply buy what is available (this answer was given by 37% of the respondents).

Conclusions

Organic foods were present in almost all supermarket chains and many other shops. However, further diffusion in mountain and other marginal areas appeared difficult. Limitations are related to high prices of organic food. However, the concerns on price interact also with education, this is understood comparing prices of most organic foods with that of chip-bags, a lower quality food than organic that is sold in large quantities nonetheless of the high cost (up to 9.39 Euro per kg), if people effort to buy this food at this price their preferences can be guided to prefer organic foods that guarantee higher quality at cheaper prices. Other limitations to organic foods diffusion are related to population density, social structure (age) and education.

Prices of organic foods can be further reduced with scientific and technological development. However, consumer education on the quality of food by national and local authorities, research and extension institutions and by professional and customers organizations appears important. Promotional actions on quality of organic food as well as on better quality and taste of local genotypes of plants and animals also appear needed.

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Field Visit: Organic farms in Mugello region in Italy - background to workshop farm visits

A. Martini, P. Migliorini, G. Lorenzini, S. Rosi Bellière and Contini, C.

Mugello area

Mugello is a hilly/mountainous region located in the North-Eastern sector of Tuscany, in the province of Florence. In this region livestock farming is so diffuse that the area is the most important point of reference for the Dairy Centre of Florence, Pistoia and Livorno and the Meat Centre of the Agricultural Co-operative of Firenzuola.

The extensive character of the agriculture and the traditional high quality of the production system, have created a widespread interest in producers and consumers in agricultural production in general and that of livestock in particular. There is a particular interest in the environmental impact of livestock production in the area.

Cooperativa Emilio Sereni

The farm is a dairy production tenancy co-operative (whose members are salaried). The co-operative has operated as a certified organic farm since its conversion, which took place between 1992 and 1995. Its entire production is bought by the Dairy Centre of Florence, Pistoia and Livorno.

The farm employs 13 full-time agricultural workers. The President is Giuseppe Pietracito, who is also the President of Breeders Association of the Florence and Prato Provinces.

The farm's total surface (being rented) is 352 hectares, while the utilized agricultural area is156 ha. A total of 280 heads of the Italian Holstein cows produce on average 3500 dm^3 of milk daily. The average milk quality measures are: 3.55% fat, 3.13% protein and 200,000 somatic cells per milliliter. The livestock are managed in a loose, open housing system. The dimensions of the stable are 100 meters in length and 20 meters in width, with an external paddock (3,800 square meters), part of which is in packed earth and part is concrete. The walking areas within the stable and to and from paddocks are concrete. In total, the area used for livestock constitute 1,666 square meters of covered surface with a fence, external to the stable, for the livestock, that totals 3,800 square meters (1,428 square meters in cement and 2,436 square meters in packed earth of paddock).

The following improvements have been made to improve the animal welfare:

1. boxes for the nursecows and the calves,
2. cow brush for the dairy cows
3. fans in the stable, supplied with climatized humidifiers.

4. pasture for the dairy cows: 2,5 hectares of pasture on irrigated land,
5. pasture with wood shelter for the heifers and dried off cows: 2.5 hectares of land for grazing on irrigated land, and
6. stable flooring in hexagonal cement blocks that offer good grip to the animals.

(*source: C. Contini, et al., 2003 presented at SAFO 1st workshop*).

Agricultural Cooperative of Firenzuola (CAF)

The Agricultural Co-operative of Firenzuola (CAF) is a joint-stock co-operative, founded in 1972 by a group of producers from the Municipality of Firenzuola (in the Province of Florence). The aim of the Cooperative is to slaughter and market the products of the Cooperative's members, who are mainly cattle, pig, sheep and goat producers. After a difficult beginning, the Cooperative has grown over the years and is now a stable feature of Mugello meat production. Five different direct sale points have been opened since the founding of the co-operative.

Currently, the CAF deals with some 130 small farms throughout the area of Mugello and high Mugello. These farms are family farms, that rarely employ outside labour. The principal aim of the farms that are members of the co-operative is to add value to the mountain-grown meat in order to enable production in areas where there is little possibility to practice intensive agriculture. Fifteen of the member farms are organic that use closed cycle breeding, i.e. produce their own calves and fatten them on the farm. The stock (most of them Limousine, Charolais, Chianina and Romagnola breeds) are kept from spring to autumn in mountain pastures. The calves are weaned at 6 to 8 months of age and are slaughtered at 18 to 20 months of age.

Almost all of the organic farms make use of derogations in terms of buildings and the use of the pastures, and virtually always keep the calves in boxes for the entire period of fattening. The animals are mostly fed with organic products grown by the farm itself, such as grain and hay. Few farms use silage, and almost no one is in derogation for the utilisation of 10% of conventional foods.

With its own technicians, the CAF carries out inspections that are added to those of the certification bodies (ICEA, CCPB, IMC, etc.). The aim is to increase the organic livestock farms of Mugello to produce almost exclusively organic meat in an area particularly favourable to extensive and high-quality productions.

In 1997, the CAF took over the management of the Public Slaughterhouse of Borgo S. Lorenzo in order to meet its own slaughtering needs, and also those of the other breeders penalised by the closing of other communal installations. Since October 2000, the CAF manages a new slaughterhouse (Meat Centre), created by the Consortium of Communities in Mountain Areas. It consists of a modern slaughterhouse for cattle, sheep and pigs, a plant for cutting and preparing meat products, with the community recognition EC 2417 M (macellazione/slaughtering) S (sezionamento/cutting) P (prodotti preparati/prepared products), and a local retail outlet. The new structure of nearly 2000 square meters is approved for the slaughter and production of organic meat (Body of Control CCPB) and IGP (PGI) for the white beef of the Central Apennines.

Azienda Valdastra (http://www.valdastra.it/)

The farm of Valdastra, owned by Doctor Adriano Borgioli, is in the municipality of Borgo San Lorenzo, in Mugello, a few kilometers from Florence. In the 15th century, the villa of Valdastra (‘vallis ad astra’ as it was called in the place names of the time), the edifices and surrounding lands were owned by Bernardetto de’ Medici, a cousin of Lorenzo the Magnificent. The Medici family, native of Mugello, had many properties in the area, and, a short distance from Valdastra, there still exist buildings and various other testimonies of their presence.

In the 17th century, Valdastra passed to the Padri Serviti of Santissima Annunziata, dependents of the Convent of Montesenario. Confiscated by the State in 1867, the villa and the farm were bought by Cavalier Evaristo Piani and by the Noblewoman Marianna Gandini, who adapted it as their residence. The villa of Valdastra holds decorations of remarkable worth of the Liberty period, and is part of a “liberty walk” that includes palaces, churches, private and public residences in Mugello.

The actual farm is divided into two parts: a level part made up of fertile irrigated fields along the Sieve river where grain, fodder and vegetables (potatoes, cabbage, beans) are cultivated, and a hilly part, used for pasture for the raising the cattle. The wood thicket and high brush constitute an excellent habitat for both settled and migrating wild game that also make the Valdastra an interesting faunal and hunting farm.

Today the farm, that practises organic agriculture since 1988 (Body of Control AIAB/ICEA), has nearly 300 hectares, cultivated with seed crops and pasture (UAA), and 200 hectares of woods. Cattle production (organic since 2001) was initiated by Adriano Borgioli in 1964 with some 20 heads of Brown Swiss cattle. In 1986, the nearly 100 heads of Brown Swiss were exchanged with a breed exclusively used for meat: the Limousine. 100 steers of the highest genealogy were acquired by the expert cattle selectors from the French Central Massif, as well as bulls chosen from the French Genetic Center of Lanaud with the aim of improving the genetic patrimony and qualifying the breeding at a national level, privileging the pedigree line. The Etendard and Glaieuil bulls were well known and highly appreciated by the Italian breeders. In the last few years Danish bulls were also acquired.

With the purpose of increasing the quality and welfare of the stock, the management of the livestock farm has evolved over the years, with a special regard to a better use of the buildings and the farm’s own fodder production. The farm is managed with open housing and the animals have access to the pasture. The herd is constituted by 320 heads, managed in groups of about 30 heads, divided by gender and age. There are also 120 cows, and each animal is electronically identified with an endo-ruminal microchip. The farm’s own production of fodder and grain is more than sufficient for the diet of the herd. Calving takes place in the spring and in the autumn. The annual production averages about 110 calves; about 10 % of the females are retained for breeding. About 40% are sold for reproduction, while the rest are fattened and slaughtered as organic calves by the Agricultural Co-operative of Firenzuola, of which Valdastra is a member since 1977.

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Part C:
A framework for organic livestock production: standards, attitudes and expectations

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Why do humans keep animals? Does the answer help to define the standards for organic animal husbandry?

G. Rahmann
Institute of Organic Farming of the German Federal Agricultural Research Centre (OEL-FAL), Trenthorst 32, D-23847 Westerau

Introduction

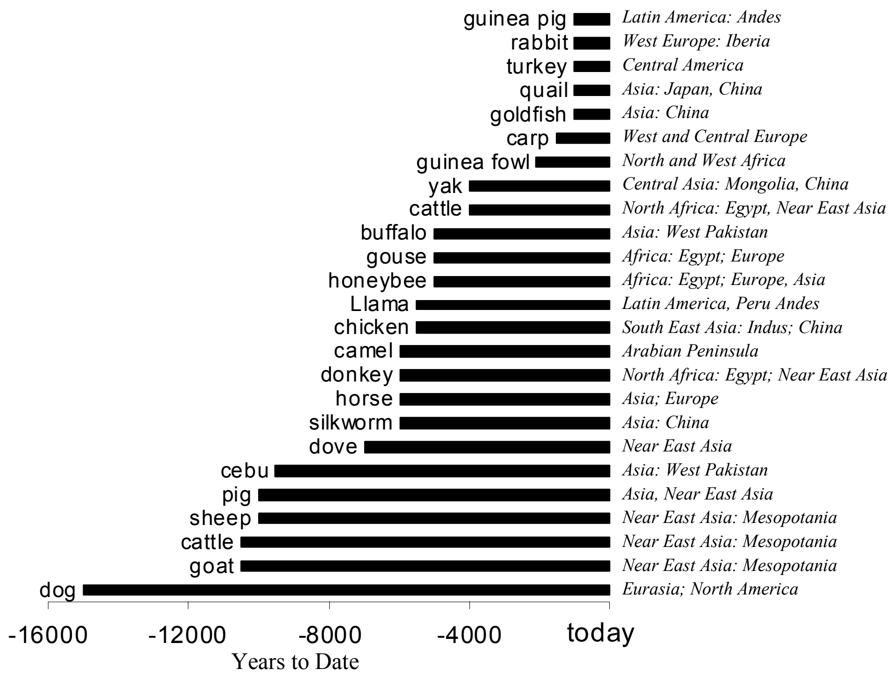
Domestic livestock, such as farm animals and pets, are part of the cultural heritage of mankind. Animals have been used for food, services, non-food or religious purposes or just as a hobby for thousands of years. Man-made breeding has created livestock that are adapted for different purposes and functions. Today, thousand of breeds exist: adapted to the various conditions in human households.

The discussion of animal welfare and the definition of standards for livestock keeping have to consider the different functions, ethical values and perceptions of people involved (Badura, 1999). The differences of culture, as well as private and common wealth between individuals, regions and countries, can be a reason for different standards for animal keeping. This discussion can become easier with an understanding of the functions of animals from a historical and ethical perspective. This can help to answer the question of how the animals should be kept.

History of livestock keeping

Worldwide, there are about 100 different animal species kept by humans for multi-purpose use (Groenefeld and Glodek, 2000). Most of the 40 different mammalian species (e.g. cattle, yaks, banteng, mithan, buffalos, sheep, goats, horses donkeys, pigs, reindeer, camels, cats, dogs, buffalos, rabbits, guinea pigs, llamas, elephants, rats, mice), 24 different bird species (e.g., chicken, geese, ducks, turkeys, doves, guinea fowl, ostriches), 18 different fish species (e.g., carp, trout, salmon) and several insect species (e.g., earthworms, bees, silkworms) are kept on farms and have been domesticated at different stages of history (Fig. 1).

Figure 1: Domestication periods and regions of important livestock species (Source: designed by Rahmann)



Livestock utilisation and keeping has always been an important aspect of human activity. There are only a few cultures that do not use the services and products of animals. In the history of mankind, there were several stages in the building of human-livestock-relations (Tab. 1):

- Hunting (pre-domestication: 15 000 years ago): Humans hunted and collected wild animals for food and non-food purposes. This was their only influence on the wild animal population. A nomadic lifestyle was required to search for prey for self sufficiency.
- Wild game keeping (domestication by chance: 15 000 – 10 000 years ago): With increasing human density (1 to 2 people/km^2), game became scarce and hunting more difficult. People started to settle and improved hunting and crop production. Domestication of wild animals began. Dogs were the first animals kept by humans. Puppies of wild dogs were probably reared. They could be trained for hunting and protection. Young, wild animals, caught alive, were reared and slaughtered for meat (e.g., goats, sheep). Subsistence livestock keeping was dependent on local availability (man ↔ animal co-evolution, Luke 1989). Planned breeding, feeding and treatment was not practiced, and reproduction was still dependent on wild animals. The needs of self sufficiency determined the numbers of animals kept by humans.
- Animal husbandry (10 000 years ago until the 18th century): With planned breeding and feeding, animal keeping became independent from wild game resources. This period can be considered as the beginning of livestock keeping. The farmers could produce their own breeding stock. Suitable species were those that supplied the needs of the animal holder, were

easy to tame, were fertile under captivity and could be easily fed and controlled even during difficult seasons (e.g. winter period or harsh conditions). After many generations, domestic animals became adapted and, therefore, different from their relatives living in the wild. The increase in productivity and the selling of products – surpluses which could not be used for home consumption - began. Self sufficiency was still very important, but not necessary for everyone. Food could be sold and purchased (urbanisation). Fewer people needed to keep animals: livestock keeping was no longer just for subsistence, but became a market-oriented agricultural business.

- <u>Animal production (the last two centuries):</u> In the last two centuries, animal husbandry has shifted towards animal production. Improved feeding, health care, stable keeping conditions and breeding developed high yielding livestock. Distances and environmental conditions were no longer a limiting factor. Household equipment, artificial insemination, fodder production on crop land and veterinary drugs helped to increase productivity and reduce the impact of unfavourable environmental conditions for livestock. Cheap and fast transportation possibilities supported the trade and exchange of live animals and animal products all over the world. Today, every species can be kept in every country, every livestock product is available everywhere. The industrial form of animal keeping can only be practiced by a small number of farmers. Most people have lost any ties they may have had to livestock keeping. Pets, without any self sufficiency function, have become more and more important, especially in developed countries. Over-production, changed ethical values and animal cruelty, problems in animal health and negative environmental impacts are the results, and the social, economic and ecological sustainability can no longer be taken for granted.
- <u>Animal husbandry of the future (from today until tomorrow):</u> Developed societies are not clear in their approach to the development of livestock keeping. There are serious conflicts of different ethical values, perceptions and expectations between farmers, consumers and the society. Recently, three paths of development of livestock keeping in developed countries can be observed:
  - Type I: low to medium external input – low to medium output systems: back to nature (landscape management, organic farming, hobby farming).
  - Type II: medium external input – high output systems: development of the classical animal production systems (improved high yielding varieties/breeds, integrated production).
  - Type III: high external input – high output systems: technological advances (e.g., GM or cloned livestock, zero-emission stables, artificial food production).

Table 1: Three philosophical phases of man – animal relations in the Western world (Source: Badura, 1999)

Period	Human – Animal Relations	Philosopher
Antique	The differences between humans and animals are graduated (spirituality of animals and equality to humans on different levels)	Aristoteles, Plutarch, etc.
Middle Ages and Pre-Industrial	„Animals are like machines“, they have no soul and therefore no rights (e.g., vivisection was possible) (radically Anthropocentric, Christian theology)	Descartes, T.v. Aquin, Spinoza, etc.
1800s to Present	Animals and humans have the same history (evolutionary theory), animals have rights („The Five Freedoms of Animal Welfare“) (Socio-biology, „man and other animals“)	Darwin, Kant, Griffin, etc.

Results of man-made breeding

Today, most farm animals are domesticated breeds. Domestication means that the animals are adapted to the farm conditions due to a selection carried out by humans. These animals show differences in phenotype, physiology, productivity and behaviour when compared to relatives living in the wild (Fig. 2). Thousands of different breeds have been created for specific purposes and functions within the framework of environmental and socio-economic conditions (Rahmann, 1996). Only small populations are found of many breeds in specific regions (rare breeds), some are found worldwide (e.g., Holstein Friesian dairy cattle). The selection has created breeds adapted to the conditions and purposes of the farms. Worldwide, 863 sheep breeds, 783 cattle breeds, 313 goat breeds, 357 horse breeds, 263 pig breeds, 78 donkey breeds and 62 buffalo breeds are known. About 39% of these breeds are of European origin, but 26% of them are at risk of extinction (Loftus and Scherf, 1993) (Tab. 2). Endangered breeds are often no longer able to meet the demands of humans, and fewer and fewer people breed or keep them. Extinction means the loss of agricultural biodiversity. This is serious problem because it will never be known if these breeds could have been important in the future. For example, for organic farming purposes, breeds that are adapted to the local conditions are needed (Rahmann, 2002).

Table 2: Development of farm livestock in the world over the past 40 years (in millions of animals) (Source: FAO, 2003)

Species	Year	EU 15	Europe	North America	Latin America	Africa	Asia	World
Cattle	1962	87		144	147	124		957
	1982	97		178	246	177		1,241
	2002	81	141	161	311	237	475	1,267
Sheep	1962	89		39	117	133		997
	1982	82		21	103	185		1,129
	2002	105	141	16	74	240	407	1,034
Goats	1962	12		15	19	94		364
	1982	10		14	19	143		480
	2002	12	18	14	23	217	470	743
Pigs	1962	73		80	38	6		423
	1982	114		92	52	10		770
	2002	124	196	97	56	21	566	941
Chickens	1962	669		956	251	282		4,041
	1982	915		1,463	774	608		7,760
	2002	1,005	1,815	2,842	1,808	1,307	7,963	15,854
Turkeys	1962	8,7		40	2	1		113
	1982	54		66	5	2		207
	2002	98	112	100	16	8	13	251
Horses	1962	5		9	12	3		60
	1982	2		14	13	4		59
	2002	2	7	14	16	3	16	56

Figure 2: Thousand of years of breeding have changed the phenotype, behaviour and physiology of animals, for example of wild boars in comparison with domestic pigs (Fotos: Marek, Rahmann)

Many of the recent high yielding breeds (e.g., pig and fowl) are dependent on the farmers' care. They would not survive in the wild. Due to health problems, fodder needs and the loss of self-protective ability, most escaped farm livestock die after a while in the wild. Severe survival problems occur, particularly in winter. On the other hand, feral animals can be found in many countries around the world, sometimes for centuries. They can create problems like wild goats in Scotland; sheep, goats, dogs, camels and rabbits in Australia; cats in Germany; honey bees in Latin America and feral horses in the United States. They can transmit diseases to the indigenous livestock, damage the natural vegetation or crops on farmland, destroy infrastructure and even kill or injure animals and humans.

The functions of livestock on organic farms

In the course of history, the functions of different livestock species have changed. The answer to the question "Why do humans keep these animals?", seems easy, particularly in agriculture, but following the initial reaction, many more reasons emerge (Clauss *et al.*, 1999; Capell, 1998; Tab. 3).

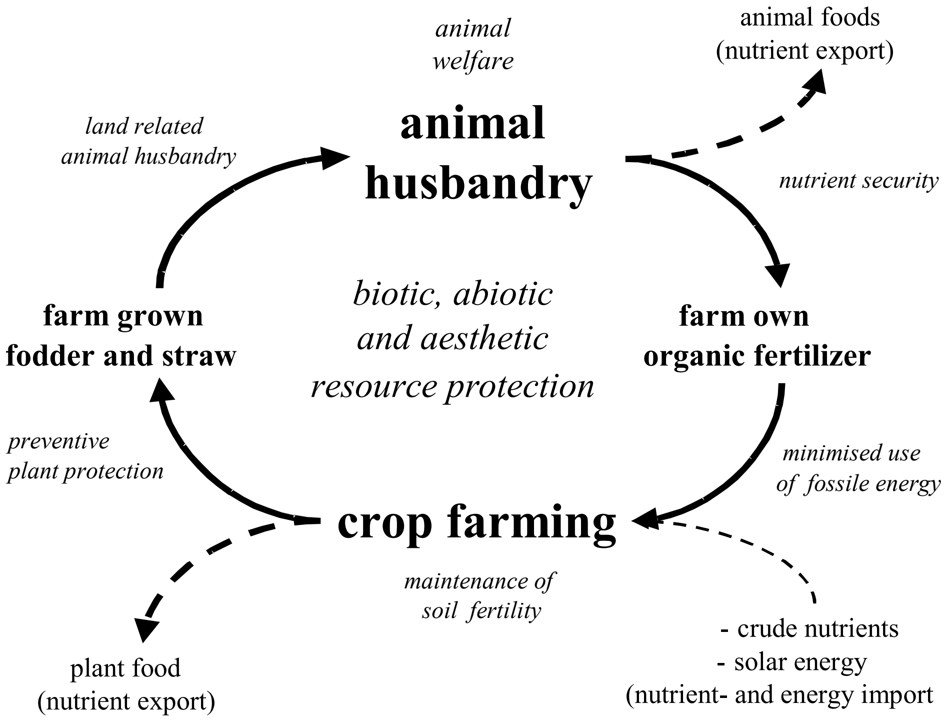
Table 3: Products and functions of farm livestock (**Source: compiled by Clauss, 1999 and Capell, 1998**)

Food products	meat, milk, eggs, honey, blood
Non-food products	feathers, wool, skin, hair, bones, silk, medicine, biogas, wax, propolis
Off-farm services	transport, therapy, recreation, landscape maintenance, hunting, protection, sport, status, research, religion
On-farm functions	manure production, utilisation of by-products from crop farming and processing, pollination, pest control (e.g., insects, rodents, snails), herding, marketing, attraction of guests, biodynamic preparation processing (e.g. horns)

In the last century, farm animals have changed from multi-purpose to single purpose animals. The majority of modern farm livestock is high yielding and specialized for only one product, even on organic farms in the Western world (Rahmann, 2003). This development has only been possible through a mutual development of the farm environment and the animal. Improved breeds were in need of better feedstuff, protection, health care and housing conditions and vice versa. The functions of livestock changed not only in a historical context, but even in terms of different socio-economic and environmental framework conditions.

The cost of the improved keeping conditions could only be paid for by higher animal productivity. This feedback system resulted in the modern animal production conditions of cost intensive and high yielding animal production. However, there seems to be a limit to this up-streaming. In the past decades, Western society – which is dominated by non-farmers and citizens - has substantially changed the framework conditions for farming. Animal welfare, environmental protection and landscape management play an important role in farm practices. The multi-functionality of stock has become more important; not in production sense but in soft functions, like on-farm impact, tourism, on-farm attractions, “edu-tainment”, landscape management, renewable energy production and/or hobby and recreation (Rahmann, 1998; Rahmann and Tawfik, 2000; Rahmann, 1997). This has also had an influence on the animal husbandry conditions. For example, organic farming has re-integrated livestock in the whole farm organism with respect to the on-farm functions. The traditional concept of farming system development focuses on the mutual relations of physical farming elements: soil, plant and animal (Fig. 3).

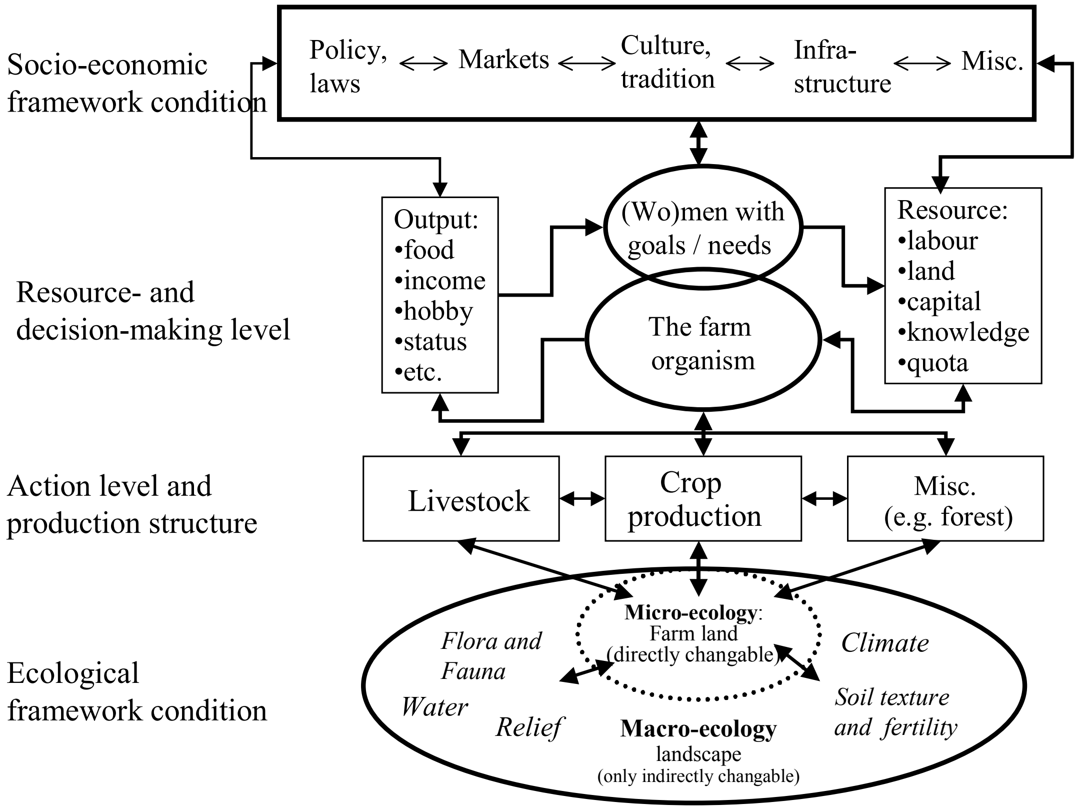
Figure 3: Animal husbandry at the production level of an organic farming system (Source: Rahmann, 2003)



A holistic approach needed for organic farming system development

The farm-focused development concept for animal husbandry, as described in Figure 3, does not include some important aspects that influence the farming system substantially: the farmer himself and his family with their resources, goals and needs, as well as the socio-economic and the ecological framework conditions (Fig. 4). For example, dairy cattle kept in wealthy, humid Germany is different from dairy cattle kept in a poor, tropical country like Bangladesh. The inter-cultural and supra-regional definition and development of standards and regulations has to respect local socio-economic and ecological conditions. Livestock keeping standards for different framework conditions can only be at a minimum level of consensus. Locally adapted interpretation of these standards has to be made (see 2092/91/EEC and 1804/99/EC). With an interdisciplinary approach, like the Farming System Research and Development concept (FSR+D), holistic problems of improvement and development of farming with different framework conditions can be better understood and, therefore, better solved (Rahmann, 1993; Rahmann, 1998; Fischer *et al.*, 1999).

Figure 4: The holistic approach of Farming System Research and Development (FSR+D) (Source: Rahmann, 2000)



The ethical impact of standards definition in animal husbandry

Standards for animal husbandry and welfare mainly have an anthropocentric perspective (e.g., Kant, 1925; Krebs, 1993) and background. Product and process quality, compassion and morals are concepts of Western human society. It is difficult for some cultures to understand the animal welfare movements in Europe because they have other morals (Tab. 4). Even for farmers in Europe, many "urban" values for animal welfare are difficult to accept and fulfil. The discussion of the prohibition of battery keeping in cages or the prohibition of tying up cows in organic farming in Germany in the past years has shown the different ethical values in a society. The patho-centric morality (e.g., Schopenhauer, 1977) is the most relevant factor for animal welfare standards. Our compassion for suffering animals exists only for livestock, which can express pain or react to cruelty. We do not experience compassion for mosquitos or snails, and therefore have no moral obligation or animal welfare concept for these creatures (Badura, 1999).

Table 4: The different moral philosophical concepts of man – animal relations (source: Badura, 1999)

- Anthropo-centric: Moral relevance: how animals are treated has an impact on humans (e.g., product and process quality) (Kant, Christian religions).
- Bio-centric and physio-centric: Moral relevance: dignity and respect for every animal and plant (bio-centric) or even every thing (physio-centric). There can be no advantage for humans. (Intrinsic value, ecological ethics, deep ecology, religions) (Schweitzer, animalism, jainism, hinduism, American indigenous religions).
- Patho-centric: Moral relevance: compassion; if an organism can feel, it can also suffer. (Schopenhauer, Krebs, Regan, Utilitarism).

The socio-economic framework conditions have to consider the ethical values of the societies that are not always in the historical context of the Western world (ethnocentric perspective). For example, in a Muslim society, pork is not eaten, and, in a Hindu society, beef is not consumed. Western cultures do not like to eat guinea pigs, dogs or insects, like the people in the Andean regions of Ecuador, in Korea or in Zimbabwe. In the Masai culture, the horns of cattle are more important than the milk yield for the status of the owner. In biodynamic farming, horns have an important role in the processing of biodynamic preparations. Even the land property rights influence the standards of animal husbandry. Private, communal, state or even free property rights on land use have a direct impact of animal husbandry, health care, nutrition, housing and breeding.

On the other hand, the environmental framework conditions determine the animal husbandry standards. In tropical, semi-arid, humid or arctic climates, the standards are adapted to the circumstances. There is no straw available in arctic areas, and zero-grazing in sub-tropical areas is accompanied with vector transmitted or soil-born diseases (e.g., East Coast Fever, tryponomiasis, anaplasmosis, anthrax, botulism). In Europe, the endo- and ecto-parasites or infections like foot rot limit the outdoor keeping of animals (apart from climate limitations in summer and winter seasons).

Conclusion

In organic farming, the on-farm functions of manure production, by-product utilisation and attraction for visitors are relevant for the animal husbandry structure. The multi-functionality of livestock includes the anthropocentric ethical values of the society. Consumers expect high animal welfare standards because of their compassion for creatures in human control, environmentally sound production to secure the biotic and abiotic resources (water, soil and air) and high product quality at low prices. To meet these expectations simultaneously is not possible.

The holistic view of the multi-functionality of livestock on farms does allow us to determine standards for organic animal husbandry under several circumstances. These must respect the socio-economic and ecological framework conditions as well as the physical situation of the farm and the goals, needs and resources of the farmer. This has mostly been forgotten in the past. The EU has for six years discussed the regulation 1804/99/EC because of different perspectives and attitudes on "good organic animal husbandry practices". The common standards of organic animal husbandry are a compromise. They have to be interpreted and developed under the local conditions of the regions in the EU.

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Guidance and advice on animal health and welfare in organic production systems – do attitudes matter?

H. Hovi
Veterinary Epidemiology and Economics Research Unit, The University of Reading, UK

Introduction

While both organic and conventional farmers have a long tradition of exchanging medicines and know-how (and most certainly diseases!), the veterinary profession is the main source of information and advice on animal health issues to the majority of farmers. While the veterinary profession has remained the "official" and relatively uncritical guardian of animal welfare throughout the - sometimes extreme - intensification of livestock production, it has also often been the first professional group to criticize organic farming/farmers for poor welfare. It has been suggested that this is due to the "health-centred" view of welfare that veterinarians tend to hold, i.e. an animal has good welfare as long as it is not diseased or ill, irrespective of how much its freedom or access to natural behaviour is restricted. This view is likely to clash with the organic principles that appear to put more emphasis on freedom or access to natural behaviour than on disease. Inevitably, this raises the question: how do vets and organic farmers find common ground? And if they do not, how does the veterinary attitude affect his advisory role on organic farms?

Similar questions could be asked of organic inspectors. While their official role is not to assess welfare outcomes on the farms, it can be argued that they have an implicit role in assuring that animal welfare is not jeopardized. Is it possible that their judgment could be clouded by the focus of welfare inputs described in the organic standards; i.e. if an inspector believes that a particular input produces good welfare, e.g. access to outdoors, is he/she likely to ignore a poor welfare outcome resulting from such access?

This paper will explore the questions posed above in the light of three examples: the differences in veterinary and inspector attitudes towards organic standards in regard to welfare inputs, veterinarian's role in mastitis control on UK organic dairy farms and organic inspector approaches to welfare assessment on organic livestock farms in Scotland.

Veterinary and inspector perceptions of organic standards and their impact on animal welfare

A questionnaire survey of UK cattle veterinarians (157 returns, 12% return rate) and organic inspectors specialized in livestock enterprises (31 responses, 67% return rate) asked the respondents to indicate their opinion on the potential welfare impact of 20 organic standards (UKROFS, 2000), deemed to be relevant to cattle welfare (Hovi and Kossaibati, 2002). Similar questionnaires covered sheep, pig and poultry production.

There were significant differences in the perception of the respondents (Table 1). By and large, a larger proportion of the inspectors than vets tended to perceive the standards as having a positive impact on animal welfare. The differences were particularly significant in areas where the standards limit the use of conventional veterinary medicinal products. Similar results were obtained from the questionnaires covering other species of livestock from different groups of respondents.

Table 1: Veterinary and inspector perception of the positive welfare impact of selected organic standards on cattle production (* = significant difference – $p<0.05$; ** = significant difference – $p<0.001$).

Standard	% of respondents perceived +ve impact Vets	Inspectors
Breeds or strains of animals must be selected to avoid specific diseases or health problems.	76.5	86.7
Where livestock are obtained from other units, special attention must be paid to animal health measures.	64.9	82.8
Maximum number of animals allowed on a holding: Dairy cows (500 kg) – 2/ha	74.5*	93.1*
Records must contain information on details of any animals lost and reasons; disease prevention and treatment and veterinary care: date of treatment, diagnosis, type of treatment product, method of treatment .	53.2*	76.7*
Calves have to be fed on natural milk for a minimum period of three months.]	65.6**	93.3**
Feeding of herbivores is to be based on maximum use of pasturage … At least 60% of the dry matter in daily rations is to consist of forage.	71.7*	90.0*
Disease prevention shall be based on appropriate breeds or strains of animals.	66.9	83.3
Disease prevention shall be based on the application of animal husbandry practices appropriate to the requirements of each species, encouraging strong resistance to disease and the prevention of infections	71.1**	96.7**
Disease prevention shall be based on the use of high quality feed, together with regular exercise and access to pasturage, having the effect of encouraging the natural immunological defences of the animal	70.9	86.7
"Positive health and welfare" must be provided by a plan drawn up by the farmer, preferably working together in partnership with a veterinary surgeon and agreed between them during and after conversion…	90.2	80.0
The use of chemically-synthesised allopathic veterinary medicinal products or antibiotics for preventive treatments is prohibited.	3.9**	40.0**
The use of substances to promote growth or production and the use of hormones or similar substances to control reproduction or for other purposes is prohibited.	13.5**	80.0**
Animal treatment products involving the use of organophosphates are not permitted.	19.2**	65.5**
With the exception of vaccination, treatments for parasites and compulsory eradication schemes, where an animal … receives more than three courses of treatment with chemically-synthesised allopathic veterinary medicinal products or antibiotics within one year … the livestock, or produce derived from them, may not be sold as organic.	1.3**	35.5**
Keeping livestock tethered is forbidden.	72.7	76.7
At least 50% of the total floor area must be solid, that is, not of slatted or of grid construction.	81.6	86.7
Dry bedding must be provided in the resting area. The litter must comprise of straw or other natural material.	79.1*	96.7*
The housing of calves in individual boxes is forbidden after the age of one week.	57.2	70.0
The outdoor stocking density of livestock kept on pasturage, other grassland, heath land, wetland, heather, and other natural or semi-natural habitats, must be low enough to prevent poaching of the soil and over-grazing of vegetation.	83.3	83.3
… forms of artificial or assisted reproduction (for example embryo transfers) are prohibited [excluding artificial insemination].	40.5	56.7

It could be argued that the differences reported above could lead to two situations that can be detrimental to the provision of sound animal welfare advice on organic farms:

1) The less positive perception of the standards among the veterinary profession may lead to a situation where veterinarians have a negative attitude to the system and loose contact with farmers who are dedicated to farming organically; and
2) The positive perception of some of the standards by inspectors may lead to situations where assumptions of good welfare are made on the basis of the implementation of standards; e.g. good animal welfare is assumed because low level of conventional veterinary medicinal inputs is confirmed during inspection.

The following two examples of veterinary involvement in organic dairy farms and inspector practices in Scotland will explore these arguments further.

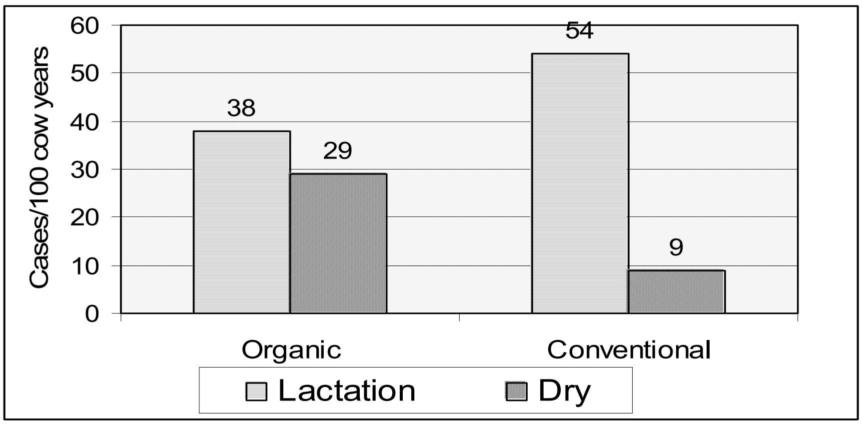
Veterinary role in mastitis control on UK dairy farms: a case study of well-established organic farms

A two-year study of well established organic dairy farms was carried out to investigate mastitis management and mastitis patterns on organic dairy farms in the UK. Sixteen well-established organic farms were included in the study. Some of the main findings of the study can be summarized as follows (Hovi and Roderick, 2000):

- Implementation of many well-recognized (i.e. reduction of infection pressure) and standard-defined (e.g. breeding for resistance) mastitis control measures relatively poor;
- Understanding and awareness of mastitis situation poor;
- Homeopathy the most common alternative therapy used;
- Both bulk milk and cow milk somatic cell counts higher than in milk recorded herd at national scale;
- Milk withdrawal often very short after alternative therapies (i.e. mastitic milk was included in the bulk milk);
- Risk for clinical mastitis lower during the lactation period but higher during the dry period than on matched conventional farms (Figure 1).

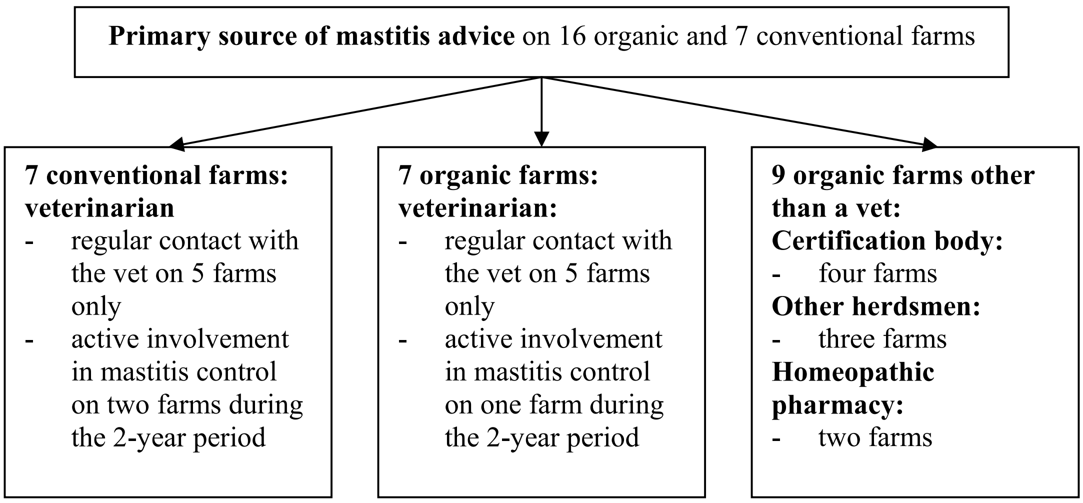
When the approaches to mastitis on the study farms were investigated, it became evident that, while veterinarians were considered as the primary source of advice on mastitis on all conventional farms and on many of the organic farms, the organic farms were more likely to have other primary advisory sources than the veterinarian (Figure2).

Figure 1: Lactation and dry period risk rates in 13 organic and seven conventional dairy herds in over a two year period (1998-1999).



When the veterinarians in the 12 practices involved with the study farms were interviewed about their relationship with the organic clients, majority of them (11/12) expressed negative or sceptical views of organic farming and organic standards, equating organic farming with alternative therapies and failing to see a role for themselves. When the farmers and the herdsmen who received their primary advice from another source than a veterinarian were asked what this advice consisted of, it was found out that all alternative sources (see Figure 2) of advice promoted homeopathy. Other herdsmen were often mentioned as a source of information on other alternative therapies than homeopathy. The certification bodies were reported to give advice on natural resistance, reduction of stress, optimization of yields and breeding. It appeared, however, that this advice was very general and did not promote specific issues, e.g. in relation to natural resistance, promotion of teat duct patency by preventing teat end damage or by preventing cows access to bedding immediately after milking were not mentioned.

Figure 2: Primary sources of advice on mastitis and mastitis control on 16 organic and seven conventional dairy farms in the UK.



It could be argued that many of the results of the study, particularly those suggesting that there is poor mastitis awareness and understanding on the farms and that well-recognized mastitis control techniques are not implemented, are a result of the poor veterinary involvement and, consequently, the poor or biased advice given by other primary sources of mastitis information. Similarly, the mastitis patterns observed on the farms could be, at least partly, attributed to the advisory situation. For instance, high bulk milk SCC levels were, at least on some farms, a direct results of too early inclusion of mastitic milk into the tank. Similarly; high levels of dry period mastitis went "unnoticed" on some farms, as the farmer, in the absence of advice and reference point, assumed that such high incidence of dry period was common; etc. – While lack of veterinary advice could be seen as the primary cause of these problems, it is useful to recognize that the observed lack of veterinary involvement in mastitis control, particularly on the organic farms, was likely to arise from the negative attitudes the veterinarians had in regard to organic farming.

Animal welfare assessment by organic inspectors

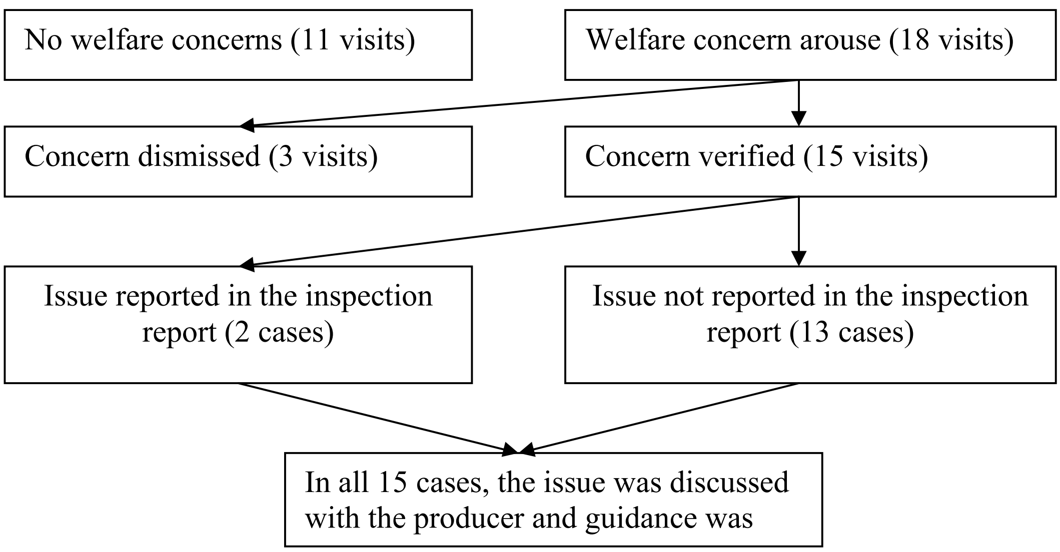
Four organic inspectors, who primarily inspected livestock farms for one single certification body, were asked to fill in a detailed questionnaire following inspections visits to four different farms over an eight-month period (covering both summer and winter seasons). The questionnaire covered issues relating to welfare assessment and its outcome on each farm (Hovi *et al.*, 2003).

The inspectors indicated in their responses that they considered welfare assessment to be one of the main parts of the inspection process on livestock farms and used a wide range of welfare assessment parameters, including assessment of stockmanship by observation and interviews. The welfare parameters used were both input and outcome-related, but there was no formalization of the assessment. In terms of assessing health on the farm, treatment records appeared to be the main point of reference, but again very little formal assessment took place; e.g. no summary analysis of records was made or available on the farm or in the health plan.

In spite of the lack in formal assessment protocols, many welfare concerns arouse during the visits (Figure 3). Very few of the concerns were, however, reported back to the certification body, and in most cases, the inspector discusses the matter with the farmer/herdsman, giving guidance and/or advice.

When two of the inspectors were interviewed afterwards about the reasons for not reporting back their welfare concerns, they indicated that the lack of formality in the inspection process was the main problem. They appeared convinced that their judgment had been correct, but felt that they would not have adequate evidence if challenged, as much of the judgment was based on tacit knowledge rather than formalized assessment.

Figure 3: Action pathway on welfare concerns during 29 inspection visits on organic livestock farms.



Conclusions

The above examples go some way towards answering the questions posed at the beginning of this paper. Firstly, do veterinarians have attitudes/views that affect the relationship between the profession and organic livestock farmers, and does this have an impact on animal welfare? It appears that veterinarians view the organic standard restrictions, particularly on conventional medicine use, as something that causes them welfare concerns. As a result they tend to be critical and weary of organic farming and have less involvement in disease control on organic farms. In the case of mastitis control, it is probably unwise to assume that all mastitis problems on organic farms arise from the absence of veterinary advice, but there certainly appears to be areas where more regular veterinary involvement would be helpful.

Secondly, do inspectors' attitudes influence the way they view animal welfare on organic farms or carry out welfare assessment during visits? Inspectors certainly perceived organic standards in significantly more positive light than veterinarians, particularly in connection with the standards that restrict the use veterinary medicines. However, this positive view of welfare inputs incorporated in the standards did not seem to be translated into low priority for welfare assessment during the inspections visits. Lack of formal welfare assessment protocols, on the other hand, appeared to prevent inspectors from including welfare concerns in the inspection reports.

In conclusion, the cautious view veterinarians appear to have of organic farming, seems to be reflected in, or indeed may be a reflection of, their perception of the impact of organic standards on animal welfare. It appears prudent to think that this perception prevents full co-operation and positive veterinary involvement on organic livestock farms. If this is the case, there is a need to make sure that the veterinary profession does get involved, both in the development of organic standards and in helping organic farmers maintain good welfare on their farms. Also, it appears necessary to engage the veterinary profession in a discussion of the nature of welfare: health may turn out to be a too limited a view of welfare in the future – even in conventional livestock production.

The results from a limited studies described above do not suggest that organic inspectors put limited emphasis on welfare assessment during inspections. The fact that inspectors lack confidence in their welfare assessment and, consequently, do not raise welfare concerns in a way that would allow follow-up, however, is a concern and needs to be addressed by the certification bodies, preferably by introduction of more formal welfare assessment systems.

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Comsumer perceptions and production realities

C.E. Milne
SAC, Animal Health Economics Group

Introduction

The UK Food Standards Agency and the House of Commons Agriculture Committee have both raised questions about the validity of some of the claims for organic food (such as whether organic food is better for you or more animal welfare friendly) (House of Commons, 2001; Krebs, 2003). Similar concerns regarding the health and welfare of organic livestock are being expressed by people closely involved in organic farming, including veterinarians (Lund and Algers, 2003). These commentators challenge organic producers, researchers and professional advisors to review carefully the production realities of organic farming and attributes that are used to promote its produce to consumers.

Animal health and welfare concerns, when expressed generally, relate to specific diseases: diseases where management actions will not achieve acceptable levels of control, and where there is a high dependency on the use of veterinary medicines, such as external (ecto) parasites of sheep and liver fluke (*Fasciola hepatica*). In these cases, there is a degree of incompatibility with the general principles of organic livestock production, which concentrate on 'naturalness' of the production system, and where the aim is to prevent disease by management actions specifically:

- appropriate breeds and strains of animals
- application of [appropriate] animal husbandry practices
- the use of high quality feeds, .. regular exercise and access to pasturage, [to] encourage the natural immunological defence of the animal
- ensuring appropriate [stocking] density. (DEFRA, 2003)

To demonstrate the dilemmas that can arise, two of the external parasites that affect sheep in the UK have been selected as examples: these are sheep scab and blowfly strike.

Sheep scab mite (*Psoroptes communis ovis*)

Scab infestations, initiate an allergic dermatitis that causes severe irritation and distress to affected sheep. This can lead to inappetance, which along with secondary infections, can cause mortality (Bates, 1999; Henderson, 1990). As an obligate parasite, scab mites can only be transmitted directly from sheep to sheep or via recently (within the previous 16 -17 days) contaminated fixtures, fittings or materials. These include fence-posts, haulage vehicles, shearing equipment and human clothing. High standards of biosecurity (including double fencing) can prevent infestations at least theoretically. However, this can be very expensive and there is one particular Achilles heel - replacement stock. The introduction of purchased ewes may be less commonplace in organic than conventional systems but rams often need to be purchased to prevent inbreeding. On the live animal in the early stages of an infestation, when mite numbers are small, it can be impossible to diagnose scab by physical examination. The scab mite is only 1 mm in length and clinical signs (skin damage) may not develop for 10 days or even months after the initial infestation (Bates, 1999). On an animal with even 2 cm of fleece it is the proverbial searching for a needle in a haystack.

Without considering any of the other potential transmission routes, here is an immediate dilemma for the organic sheep farmer. It is not possible to eliminate scab infestations by any management action and application of a veterinary medicine is essential - indeed a legal requirement in the UK, when outbreaks occur. Therefore, on purchase of a replacement sheep, should the organic farmer routinely use veterinary medicines to eliminate any scab infestation that might be present, or should it be released un-medicated into the flock[28]?

Routine use of veterinary medicines is permitted where there is a known risk - but with scab the risk is unknown and historically has been low due to statutory controls. Failure to exclude scab from a flock will result in a loss of animal health and welfare. This is implicit since clinical signs are a preliminary to diagnosis and treatment. Furthermore, the veterinary medicines used to eliminate infestations can be excreted in dung and kill invertebrates in the wider environment (Strong and Wall, 1994; Taylor, 1999). Compliance with the principle of not using veterinary medicines routinely carries a risk that animal health, welfare and environmental care is compromised. Alternatively applying veterinary medicines to all replacement sheep on arrival where the probability of infestation is low compromises the principle that allopathic veterinary medicines will not be used prophylactically.

Blowfly (*Lucilia sericata*)

Blowflies are non-obligate parasites and only the developmental stages from egg to mature larvae (maggot) are completed on host sheep (it is also non-host specific). The term 'strike' is used to denote the presence of feeding larvae on a host. This only occurs during the summer period and can cause serious animal welfare problems, as the larvae feed on the flesh of live sheep and heavy infestations can be fatal (Tellam and Bowles, 1997). Prevalence of strike is influenced by climatic conditions, with warm damp weather favouring outbreaks. An estimated 80% of flocks in the UK suffer from strike attacks. Unlike scab it is a very common disease, it is not contagious and only a proportion of a flock will be affected - without application of preventative veterinary medicines between 3% and 40% of sheep can be affected (French et al., 1992; Morris, 1997). Two main factors influence the probability of an attack; the susceptibility of the sheep and the prevalence of blowflies in the environment (Fenton et al., 1998). The main predisposing factor is the level of moisture in the fleece (Morris, 1997). Blowfly are particularly attracted to areas of decomposing matter, e.g. areas of soiled fleece or where there are bacterial infections such as footrot, wool rot or mycotic dermatitis (Radostits et al., 1997; Urquhart et al., 1996). Farmers can implement management actions to reduce the susceptibility of their sheep to attack such as effective worm control. However, climatic conditions that result in damp fleeces are out with their control, and attacks are still likely to occur.

[28] A quarantine period could and many would say should be observed. This may not be sufficient to ensure all scab infested sheep are diagnosed prior to introduction to flock animals for two reasons: the lag phase before development of clinical signs can be long and replacement stock are normally traded in the summer/autumn for production reasons. Practicable quarantine periods may therefore be too short to ensure diagnosis.

The dilemma again is whether to routinely use allopathic veterinary medicines as a preventative measure or to wait and eliminate infestations from affected animals (by which time, animal health and welfare will have been compromised). Many organic farmers will choose, in light of the high probability of attack to apply preventative veterinary medicines - the same action as will be taken by many conventional farmers. For this disease organic practices would then be the same as those operated on many conventional farms.

In these two disease examples it can be seen that there are decision problems for organic farmers seeking to sustain[29] the health and welfare of their sheep and as noted by others (Hovi *et al*., 2003), there are conflicts that need to be resolved. The problems could from this point be discussed purely on an animal health basis, but doing so would lead away from our starting point – the divergence between production realities and consumer perceptions.

Attributes of organic foods and consumer perceptions

Intrinsic and extrinsic[30] attributes are combined in many food products but extrinsic or 'credence qualities', are invisible to the consumer and characteristics particularly of 'quality' products (Grunert, 2002), such as organic foods. Looking at promotional information, a small number of broad extrinsic attributes are most commonly used to describe organic produce such as 'environmentally and animal welfare friendly', 'high quality' and, in recent years, 'free of genetically modified products'.

Two examples[31] of promotional information that consumers might access demonstrate this:

> *"Organic farming delivers the highest quality, best-tasting food, produced without artificial chemicals or genetic modification, and with respect for animal welfare and the environment, while helping to maintain the landscape and rural communities"*
> HRH the Prince of Wales, Soil Association patron quoted on the Soil Association web site (Soil Association, 2003).

And

> *'Top reasons to buy organic*
> - *Fewer artificial chemicals*
> - *There are no GM ingredients*
> - *Animals are well cared for*:
>
>   *All organically reared animals are free-range, which means they are able to roam outside for most of their lives. This lifestyle encourages a natural rate of growth, because the animals are not routinely fed growth-promoting drugs, such as antibiotics. In fact, many ailments of organic livestock are successfully treated by alternative medicines like homeopathic remedies. For example, the character and responses of some cows are analysed and their treatment is chosen accordingly.'*
>
> (Tesco, 2002)

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[29] Sustain is taken to mean 'continue' or 'keep alive'

[30] Intrinsic attributes are ones 'that cannot be changed or manipulated experimentally without at the same time modifying the physical characteristics of the product itself. Extrinsic attributes are those 'that are related to the product, but do not form part of the physical product'. See (Olson and Jacoby, 1972) cited by (Alonso et al., 2002)

[31] Note: These examples demonstrate fairly typical information that consumers may access and are not intended to single out any particular body.

In these examples it can be seen that there are some inconsistencies: are artificial chemicals not used or are they just used less often? The statement that all organic livestock are free-range might also be open to some questions by those more knowledgeable about farming systems. Describing the organic process by a small number of attributes thus can be seen to be difficult.

The perception that consumers have of organic food attributes, unsurprisingly, is similar to that found in promotional information as shown in table 1 and these same attributes are also important factor in consumer purchasing behaviour as demonstrated in Table 2.

Table 1: Perception of 'organic food' (Source: MORI – Soil Association, 1999)

Attribute	**% respondents**
No chemicals/additives/pesticides	59
Natural	47
Healthy	41
Good for the environment	35

Table 2: Reasons for purchasing organic foodstuffs (Source MORI – Soil Association, 1999)

Reason	**% respondents**
It's healthy	53
Better tasting	43
Environmentally friendly	28
Animal welfare friendly	24

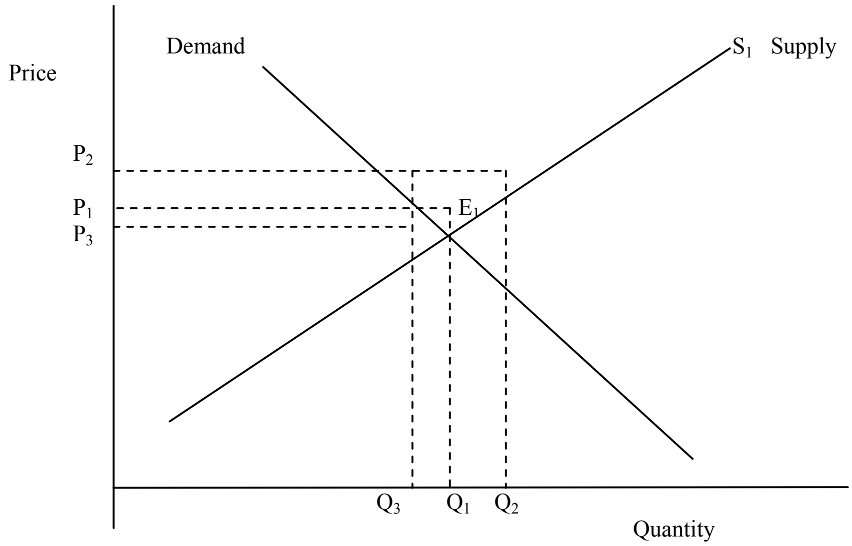
Other consumer studies concur that health and food safety is the most important reason for purchase of organic foods, and that the welfare of farmed animals causes concern to consumers (Harper and Makatouni, 2002; Mintel, 2001). It would seem then that promotional information has successfully communicated its message to consumers – but it confirms the presence of some divergences that remain between consumer perceptions and production realities, such as that chemicals/additives/pesticides are not used in organic systems.

This divergence - or information asymmetry, is a factor that compounds uncertainty about the future price premiums for organic foods. For consumers could, in light of new information on production realities, become disillusioned with 'organic' resulting in a fall in demand. Alternatively, aspects of production (such as the eradication of scab from the UK organic sheep flock) could be changed to match consumer expectations, potentially increasing production costs and reducing the number of farmers willing to supply organic produce. These effects can be demonstrated more clearly by considering the supply and demand relationship and market evidence.

The Supply and demand relationship and organic foods

Whether you are an economist or not, the relationship between supply and demand is an economic concept that you will recognise. As the price of a good increases, supply will increase and demand will ultimately fall. This is illustrated in Figure 1, where a convergence to an equilibrium price is shown (E_1). At a price of P_2, suppliers are willing to supply Q_2, but this will not be accepted by consumers who, for that price level, will only be willing to buy Q_3. Eventually, through an iterative process, the equilibrium price (P_1) and quantity (Q_1) would be established. (But this can only be achieved in a perfect market.)

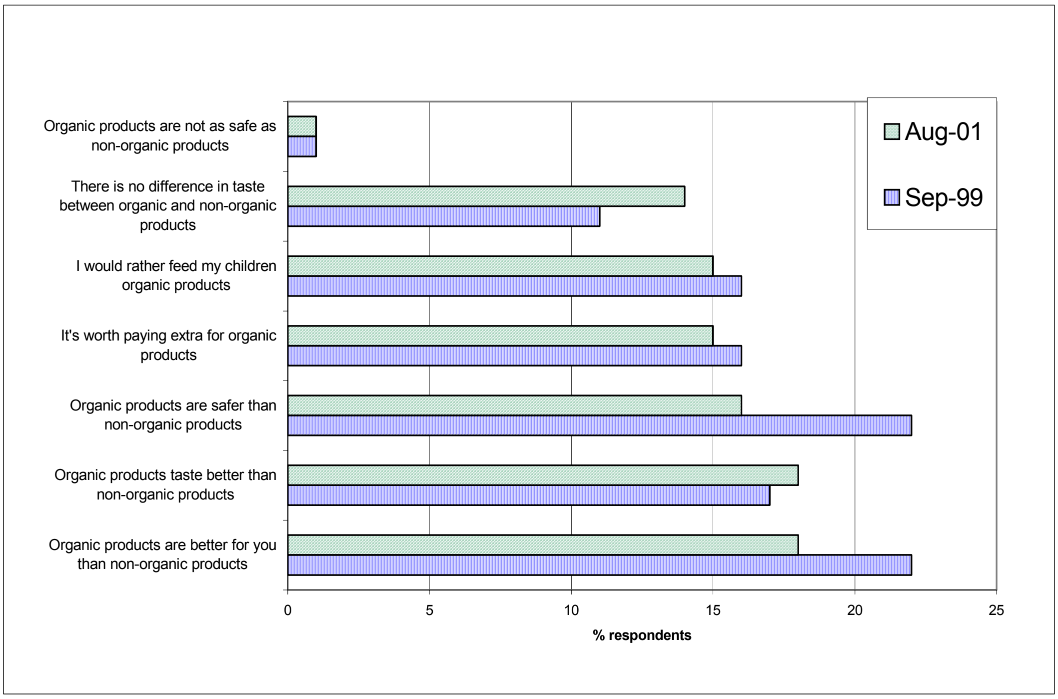
Figure 1: Supply and demand



Applying this, firstly in relation to the supply curve, food chains including that for organic produce have historically been supply led. This has changed for much of the conventional food sector (Kinsey, 1999) and is changing for the organic sector. The reasons for this include saturation of the market and product lifecycle effects (Ziggers and Trienekens, 1999). Downward price pressures and a need for increasing product differentiation are therefore to be expected for organic foodstuffs. For some organic goods, such as milk in the UK, there is evidence that the market has become saturated and, recently, this has resulted in the complete erosion of a price premium for organic milk for some producers (Farmers Weekly, 2003).

Secondly, in relation to the demand curve, products containing premium attributes (such as organic foodstuffs) should be able to attain a price premium since they provide additional attributes that are not present in the majority of goods. A decrease in the price of organic goods implies that either the associated attributes are no longer attractive to consumers or that consumers are unable to distinguish them from alternative goods. Looking at actual trends in UK consumer attitudes to purchasing organic food (Mintel, 2001) a decline in the attractiveness of promoted organic attributes is indicated as shown in Figure 2. For example, in 2001 fewer felt that organic food is better for you than conventionally produced foods than 1999 and there was a decline in the numbers who thought it worth paying a price premium for organic products. It could be argued that these results are not representative of the' organic purchaser' and that there is a hard core of loyal organic consumers whose attitudes are unlikely to have changed. However in the UK, only 7% of organic consumers are 'committed' organic buyers with the majority of consumers being 'dabblers' (Soil Association, 2001). Moreover, Mintel (2001) found evidence that numbers of active organic buyers had peaked.

Figure 2: Consumer attitudes to purchasing food (Source: Mintel, 2001)



On the point of whether organic foods are perceived to offer premium attributes over conventionally produced alternatives, Harper (2002) found that consumers confuse 'free-range' with 'organic'. The presence of inconsistent promotional information (as illustrated for artificial chemicals in the two quotations given) will also hamper consumers developing clearly defined associations. It must be noted that the broad attributes currently used to differentiate organic produce are increasingly present in conventional foodstuffs. (New regulation, such as European Directives on Groundwater and Nitrates, and recognition of the growing importance of product differentiation within the conventional food chain is driving these latter developments.)

There is evidence then that the downward price pressure being experienced in the organic food sector is likely to be arising from factors affecting both the supply and demand curves. The effect on supply of the current provision of subsidies to farmers converting to organic production in the UK must be noted. Many of the ‘premium’ attributes associated with organic production provide social rather than private benefits. For example, the environmental benefits are not gained exclusively by the consumer of the organic goods but by all members of society. This provides a valid case for governmental subsidisation – society pays collectively through taxes for the benefits society receives. Furthermore in the presence of market failure (where the market provides insufficient incentive for farmers to convert to organic production) governments may also seek to intervene through measures such as subsidies. However, provision of subsidy only during the organic conversion period, as happens in the UK, will encourage farmers to move into organic production even when the market is becoming saturated, particularly if insufficient market forecasting information is available to producers (or there is a failure in its communication). The likely outcome is not only a flow of farmers into organic production, but also out of organic production in due course.

Returning to demand, the issues raised about the validity and ability of promoted attributes of organic foods provide both an opportunity and a threat. The threat is clear, that disillusionment of consumers could lead to a fall in demand and price that could ultimately make organic production of affected goods financially unsustainable. The opportunity is to link both a reappraisal of how animal health is sustained in organic systems and how organic foodstuffs are promoted.

For some animal health problems, it may need to be accepted that the simultaneous attainment of all the principles of organic production currently may not be possible. For some diseases, where control is highly dependent upon allopathic veterinary medicines, there are opportunities such as the eradication of sheep scab from the national organic flock. This would be an achievable goal since scab mites are obligate parasites. All stock entering organic conversion could be treated to eliminate scab at the outset and good bio-security would thereafter enable this status to be maintained. Although this course of action would initially incur additional production costs, it may be the optimal decision when viewed in the long term. Undertaking an economic analysis of the disease for the organic sector would provide the required supporting information to make such a decision, as has been demonstrated by several existing studies on the economics of animal disease (Milne and Dalton, 1988; Stott *et al*., 2003; van Schaik *et al*., 2002). Moreover, by reducing future disease costs organic livestock systems would be better able to compete with conventional farming even if there were to be some erosion of price premia in the marketplace. It might be questioned why such an approach has not already been adopted as it is in line with the specific management actions stated in the organic regulations. The barriers to greater co-operation and co-ordination of disease control within organic livestock farming need to be explored and overcome where benefits can be obtained from such action.

Conclusions

A wide variety of literature is available that both on its own and in combination highlights that achieving animal health and welfare standards above that of conventional farming systems is difficult with some diseases in organic systems. They also demonstrate that there is a conflict between some of the organic principles when dealing with diseases which cannot be effectively controlled without allopathic veterinary medicines. This is a common theme in a number of recent articles on the health and welfare of organic livestock. Economic theory demonstrates the relationship between price and the supply and demand for organic foods. Aspects of demand have been researched and provide an insight into consumer perceptions of organic foodstuffs and their purchasing behaviour. This shows that there are some divergences between consumer perceptions and production realities and that downward price pressures on organic foods are likely to increase. There are opportunities in animal disease control, such as eradication programmes, which have not been adopted by the organic sector. These could provide benefits to animal health, welfare, marketing and farm profitability, but require concerted action.

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Organic standards: by whom and for whom?

W. Lockeretz[1] and V. Lund[2]
[1] Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy, Tufts University; [2] Dept. of Animal Environment and Health, Swedish University of Agricultural Sciences

Introduction

The rapid growth of the organic market greatly complicates the already difficult task of setting appropriate organic standards because it brings into the process new interest groups with differing perspectives on organic farming. In particular, a much greater role is now played by food wholesalers and retailers, and more attention is being given to the (presumed) expectations and wishes of a broad segment of current and potential consumers of organic foods (Giovannucci, 2003). This raises a challenging question: Who should define what organic farming is? Organic farmers? The food industry? Organic consumers? Governments?

The question is especially significant for organic livestock standards, which are much less fully developed than for crop production and which, along with the many environmental and health-related considerations that go into crop standards, also involve difficult ethical issues relating to animal welfare and the human-animal relationship.

The prevailing answer seems to be ‘the consumer’. The doctrine of ‘consumer sovereignty’ and the dictum that organic standards must be based on the market’s expectations have been asserted in many quarters:

- A US organic certifier noted that ‘our primary concern is understanding and meeting consumer expectations’ (Ritchie, 2000, 3).
- Under the UK’s organic Action Plan, the government ‘will seek to ensure that the EU organic standards continue to develop in line with consumers’ expectations, reflecting the desire to have high standards in place’ (DEFRA, 2002, 4).
- A US environmental and consumer advocacy group, noting that the US Department of Agriculture regarded its organic standards as ‘a marketing standard based on consumer expectations’, said that the USDA’s National Organic Standards Board ‘must account for the market place expectation of consumers’ (Mendelson III, 2002a, 2). It suggested many changes on USDA’s draft standards on the basis of ‘consumer expectations’; those having to do with livestock dealt with outdoor access, pasture for ruminants, and feeds (Mendelson III, 2002b).
- An organic consultant in the UK, discussing possible changes in standards, expressed the opinion that ‘there is an urgent need for research here to find out what consumers expect from organic food, especially those new organic consumer who have entered the market over the last eighteen months’ (Wright, 2001, 2).
- A US Congressman, Dennis Kucinich, a strong supporter of organic farming, said that ‘consumer expectations and preferences have driven the organic market to where it is today… Strict organic standards that … promote consumer preferences will help the market grow even more’ (quoted in Swientek, 2000, 2).

We take a different view. We believe that the main voice in setting organic standards should be that of organic farmers, not consumers or the market. We base our view on the philosophy of organic farming and on our reading of its history, which goes back long before the organic sector approached mass market status, as it is beginning to do in many European countries.

Historical perspective on organic markets and standards
In the early days of organic farming – until the past quarter-century or so – the process of defining it was much simpler because the organic sector itself was much simpler. The early organic movement was producer-driven, and the concept was mainly developed by farmers and their allies. Among its major goals was the production of more wholesome and nutritious foods, which is certainly a consumer-oriented goal. But consumers were not a significant independent part of the early organic movement in a formal way. There were few organic consumers, and they constituted a narrow segment of the consuming public, a select group that shared the values and principles of the early organic farmers.

Nor was the marketing sector a significant independent force, because the organic market was not highly developed. Many early organic farmers in the US sold their products through conventional outlets because no organic channels existed (Wernick and Lockeretz, 1977); they farmed organically anyway because they preferred it as a production system, independent of marketing possibilities. For meat, the term ‘organic’ was not even allowed on the label in the US until 1999 (USDA, 1999), and in Europe too, organic livestock initially were sold through conventional channels (Schmid, 2000a).

When organic products were sold as such, it was mainly through small, specialised enterprises that shared the values of their suppliers and customers. Often the markets were highly localised, further integrating farmers, sellers and customers into what might be called the ‘organic community’. At first there were no standards, just a shared understanding of what ‘organic’ meant, at least in its basic principles if not in every detail. Nor was there certification; rather, the system was based – justifiably or not – on personal trust. When standards and certification were introduced, it was by organisations that primarily were farmer-oriented, such as Bioland in Germany, which introduced its organic label in 1981 (Bioland, n.d.).

All that has changed, of course. Organic farmers are much more numerous now, raising the possibility that new entrants, who may be motivated more by economic considerations than a commitment to fundamental organic principles, will seek to loosen the standards. Especially with the globalisation of the organic food market, the number of intermediaries between producer and consumer has increased, with processors, distributors, traders and retailers of organic foods exercising greater economic power (Giovannucci, 2003). The expanded organic market has involved a new kind of organic consumer, one who we can assume has less knowledge of and commitment to the full range of organic principles, as well as less direct knowledge and experience regarding farming in general, as is true for society as a whole. Finally, the fact that organic standards are now legally binding (both nationally and internationally) has required that they become much more detailed and elaborate.

The effect has been to give a much greater voice to the marketing sector, to consumers (perhaps more correctly, to those who purport to speak in the name of consumers), and government agencies. This may have diminished the role of organic farmers, especially of the kind who were more likely to take up organic farming in the early days, i.e., smaller farmers more involved with direct or local marketing. For example, the Organic Foods Production Act of 1990 (which mandated the establishment of National Organic Standards in the US), although generally welcomed by the organic sector, was strongly opposed by a vocal minority of organic farmers who said ‘Don’t let them take “organic” away from us.’

The greater attention being given to expanding the market is often taken as a welcome sign that the organic sector has matured. However, not everyone is cheered by that development. For example, Woodward and Meier-Ploeger (1999) see it as undermining the distinctive quality characteristics of organic foods; Giovannucci (2003, 197) believes that ‘reaching a broader audience may mean adapting to more industrial forms of agriculture, some of which may be inherently contradictory to organic principles’.

Organic principles and organic standards

In discussing what organic farming is, it is important to distinguish between standards and principles. The principles describe goals, while the standards describe the practical process of how to reach those goals. The basic principles do not change (at least not casually), but the standards change constantly, since they must deal more directly with a changing reality. As economic conditions, available technology, and scientific understanding change, standards must adapt while remaining true to the spirit of organic farming. The standards are a compromise between ideals and the harsh realities that organic farmers have to face: new problems with pests and diseases, such as the appearance of resistant sheep parasites, which has forced organic farmers to accept deworming methods that are unacceptable according to the spirit of organic farming; shortages of organic feeds because of the apparently increasing frequency of severe weather; increasing production costs; and changing market demands and consumer opinions. Because standards must compromise, they do not always fully reflect what organic farming would be like in an ideal world.

The basic principles stated by IFOAM today were elaborated by the early organic farming movement. However, organic farming is not just any mishmash of ideas that early organic farmers happened to like. Rather, it is underpinned by an extensive value system that can be related to ethical theories (Lund, 2002; Verhoog *et al.*, in press). Thus, it is valid to talk about an underlying ‘organic philosophy’. This is not to say that all organic farmers personally hold these values, since there are other reasons for farming organically, for example because it is good business (Lund *et al.*, in press). What it does imply, however, is that the organic principles should not easily be changed just because some new organic farmers do not agree with basic organic ideas or because some consumer groups have other expectations.

The variability of livestock standards

In contrast to organic principles, standards are much more variable and sensitive to the influence of different constituencies. This can be seen in the changes made by USDA in response to public comments on the first and second drafts of the US national standards (AMS, 2000a,b). It also can be seen by comparing several major sets of standards: those of the EU (European Communities, 1999), the USDA, and IFOAM (its worldwide Basic Standards [IFOAM, 2002]). However, the latter comparison, no doubt, reflects not only the influence of different groups, but also adaptation to production and marketing conditions in the region where each standard respectively applies. Also, relevant are the different roles these standards are intended to serve: the EU’s are minimum standards that must be met, but some national-level variation is allowed in their application; the USDA's constitute a complete set of uniform standards to be applied 'as is'; IFOAM's are not intended to be enforced directly, but rather are minimum requirements that certifiers must meet in developing their own standards.

Among the major differences in livestock standards are the following:

- *Organic feed requirement*
  USDA originally proposed allowing up to 20% of the ration to be non-organic, but in response to public comment eliminated this allowance except during strictly limited emergencies (AMS, 2000a, 13546). EU and IFOAM both allow up to 10% non-organic feed for herbivores, and respectively 20% and 15% for other species.
- *Feed self-sufficiency*
  In keeping with the basic organic principle of favouring on-farm resources, IFOAM requires at least 50% of the feed to be grown on the farm or in co-operation with farms in the region; USDA says nothing about this; EU says only that feed should 'preferably' come from the farm.
- *Antibiotics*
  USDA's original proposal allowed antibiotics to be administered to sick animals (but in the case of slaughter stock only when very young), but in response to public comment it later prohibited any animal that received any antibiotic from being sold as 'organic'. However, it also required that a sick animal be treated by whatever method was appropriate, e.g., antibiotics, even if this resulted in loss of its organic status (AMS 2000b, 80645). In contrast, EU and IFOAM permit limited therapeutic use of antibiotics on animals sold as organic.
- *Withholding times after drug use*
  EU and IFOAM provide for extended withholding times following the use of permitted drugs. USDA originally rejected this requirement 'because an extended withholding time does not further the goals of a system of organic farming and handling' (AMS, 1997, 65881). However, in response to public comment USDA later imposed an extended (90 day) withholding time for milk after the use of certain drugs, such as Ivermectin. The explanation that accompanied the change is relevant here: 'No food safety arguments are used or implied to support the use of extended withdrawal periods. Rather, we determined that extended withdrawal periods are *more compatible with consumer expectations of organically raised animals*… [A]n extended withdrawal period would indicate that such use was neither routine nor normal.' (AMS, 2000a, 13549 [emphasis added]). Keatinge *et al.* (2000) made a similar point regarding the EU standards.
- *Mutilations*
  All three standards require that mutilations be done in a way that minimises pain and suffering. In staying with a proposed rule that evoked a great deal of public comment on both sides, USDA imposes no other restrictions, and in fact 'require[s] that producers perform physical alterations as needed to promote animal welfare' (AMS 2000b, 80572). IFOAM has a limited list of allowed mutilations; EU permits more kinds, but only with the approval of the certifier, not systematically.

- *Transportation*
  USDA says nothing about transportation, although it is an important aspect of animal welfare; EU and IFOAM both call for limiting stress and both prohibit tranquillisers and electric prods.

Besides these examples, there are many more differences, some substantial, in areas such as: minimum slaughter age; length of time an animal must be raised organically; stocking and housing densities; feed ingredients and medicines; access to outdoors and pasture; and confinement and tethering (Schmid, 2000b; 2002; Riddle and Coody, 2002; Padel *et al.*, in press).

Why do livestock standards vary so much?
The organic principles represent visions, and as such they may be ’fuzzy’. Also, in the early stages of organic farming, most of the actors involved shared a common value framework, and there was no great need to elaborate the principles further, since there was a general and shared understanding of how to apply them to agricultural practice. As already mentioned, at first there were not even any standards. The need to put more ‘flesh on the bones’ grew as more people with more diverse interests got involved in organic farming, and the work to develop the principles further has now begun (e.g., Alrøe *et al.* 2000; DARCOF, 2000; Lund and Röcklinsberg, 2001; Verhoog *et al.*, 2003). More work along these lines is needed, not the least to support the work on setting standards.

Standards, on the other hand, must be very concrete. Setting organic livestock standards is a subtle matter that must serve diverse and possibly conflicting goals, from environmental and ethological to ethical and economic (Padel *et al.*, in press). The scientific basis for setting livestock standards is incomplete, at best. Nor is it simply a matter of science; science can provide a factual basis for decisions, but how the principles should be interpreted and applied is always value-based (Verhoog *et al.*, in press).

For example, when a new production technique becomes available, we need to decide whether to permit it in organic farming. Such a decision must not be based on the simple question ‘Is it good or bad?’ Rather, the decision must be based on organic principles, and also depends on how these are interpreted. It is not easy to strike an appropriate balance between innovation and tradition in organic farming.

The case of artificial insemination (AI) illustrates this point. One of the most important and influential pioneers of organic farming, Albert Howard (1947, 81), strongly condemned AI as ‘a monstrous innovation … [that] is bound to end in sterility and disaster‘. Yet today it is accepted under all the standards just discussed. This illustrates the need to compromise between ideals and realities when setting standards. If AI is prohibited, this would (under a strict interpretation) prohibit organic dairy farmers from using any bulls of conventional origin. Organic animals would quickly fall behind their conventional counterparts in their genetic production potential. Also, organic farmers would have to abandon a powerful tool for breeding healthier animals with better longevity; because most of the relevant traits have low inheritance, evaluating them genetically requires a large number of offspring, which is possible only with AI.

Standards-writers also have the delicate job of deciding on the conflicts among different interests, for example between the well-being of the animals and that of their caretakers, as in the possible threat a horned cow presents to human welfare (and that of its herdmates) when it is allowed to keep its horns. And like it or not, the farm's economy matters, not just to the farmer, but also to the animals. If an animal welfare requirement makes organic production so expensive that a farm cannot survive economically, there would be fewer animals on organic farms. Would the animals then be better off?

There also may be conflicts with powerful interests outside the organic sphere. Organic livestock production must comply with all other laws and regulations, such as on food safety. For example, the organic principle of feeding an animal a diet appropriate to the species would call for some animal protein in the diet of poultry, which are not vegetarians by nature. Yet feeding of animal protein (except milk and some fish products) is prohibited in the EU because of a precautionary attitude resulting from the BSE crisis.

Another important source of variation in standards, one that differs between IFOAM on one hand and EU and USDA on the other, is the role of government. Governments generally have no interest in interpreting organic principles as such; their concern with standards stems primarily from trade and consumer considerations, including food safety (although the organic movement influenced the writing of the EU regulations). IFOAM, in contrast, as the umbrella organisation of the organic movement, is deeply concerned with the principles of organic farming and how these are to be expressed through the standards. Furthermore, the EU standards are the result of political negotiations, where not only organic principles but also regional and political concerns of various kinds entered, some of which did not even have to do with agriculture at all.

Who can best decide?

For all these reasons, sound organic standard-setting requires judgement, knowledge, and experience. Standards are about how to embody ideals into reality, and organic farmers and those who work closely with them (e.g., farm advisors) are best equipped to carry out this challenging task. They not only have historical 'ownership' of the concept; they also have a special knowledge of the realities of farming. The nature of the principles, calling for co-operation and working in harmony with nature, gives them special authority, because they have a broad and profound understanding of what this entails in an agricultural context. Further underlining the importance of farmers is that the organic standards are about a process – how the animal was raised – and not about the resulting product.

In contrast, consumers as a whole – not just those who already are heavily committed to buying organic foods and are knowledgeable about them – are less likely to understand organic principles in their full complexity, or to have the knowledge of farming necessary to deal wisely with the trade-offs required in setting standards. Yet it is these consumers who represent the future growth of the organic market and are the ones whose perceptions (real, presumed, or manipulated) will have the greatest weight in market-driven revisions of the standards: 'Further increases in sales [will] depend more on less committed consumers with different perceptions, attitudes and requirements. While early adopters of organic products may have been driven by ethical and environmental concerns, as the market has broadened the mass market may be less motivated by such factors and more driven by economic factors such as price' (Hallam, 2003, 185).

This might be seen as implying that giving a greater role to marketing considerations would dilute organic standards for the sake of economic benefits (cheaper food). However, the effect could also go in the opposite direction. Consumers sometimes have an oversimplified, all-or-nothing understanding of organic livestock production, e.g., 'no antibiotics'. Such a belief, if incorporated into the European standards, could impose an economic burden (as well as create additional welfare problems). Similarly, thanks in part to idyllic representations of organic farms in marketing efforts, consumers may have an unrealistically rosy image of an organic farm, with a few each of cattle (with horns) on a lush pasture, chickens scratching around in a clean, dry, safe yard, cute pigs rooting in the dirt, etc. No doubt many would be shocked on learning how big and specialised some organic farms are, or on learning how the dairy cows came to have no horns. Presumably, on learning the reality – which will happen eventually – they would want to toughen the standards so that all organic farms would have to fit the idealised image.

A special problem in this context is the entrance of governments on the scene, because standards that have become legally binding are very difficult to influence and change. Historically the organic movement, including IFOAM, 'owns' the standards, but making them into law to a considerable extent has eliminated that ownership. As much as possible of the ownership should be given back to the organic farmers, although this probably will not be easy since it now involves legislation.

Is self-regulation sufficient?

In saying that farmers should still drive the standard-setting processes, aren't we inviting abuse by ceding control to a group that is directly affected economically by those standards? Isn't self-regulation susceptible to becoming, in effect, non-regulation?

The pitfalls of what may seem like self-regulation must be dealt with on three levels. We believe that they all can be avoided by:

- *Ensuring that 'organic' principles really are that.*
  A lively debate is underway to ensure this. The principles must be discussed and elaborated in an open, democratic process, allowing all concerned to speak out. This is where consumers' opinions come in. It is important to have explicit principles down on paper. This will provide a yardstick against which to compare current or proposed standards. Of course, bringing values into the open risks causing deep splits in the movement, with people who thought they liked organic farming finding that what they liked really was something defined very differently.

- *Ensuring that organic standards stick to organic principles.*
  We are not suggesting that the standards should be absolutely anything that organic farmers say they should be; rather, we are suggesting that they **not** be absolutely anything the market says they should be. Standard-setting would still be an open process, and proposed changes would still have to be justified in light of the basic principles of organic farming,

not simply expediency or economic advantage. Farmers' voices would presumptively be given the greatest weight, but should it be necessary, others can protect against flagrant distortions of the organic concept. Moreover, the history of farmer-developed standards has shown that at least in the past, organic farmers have been highly committed to organic principles and are eager to protect and uphold them. However, as discussed earlier, whether this will still be true for newly entering farmers remains a question. Another possible problem is that tougher standards than organic farmers might want can be an incentive for developing improved methods that come closer to the organic ideals; farmers need to recognise that their long-term interests are served by such standards, even if they make things more difficult at first.

A further safeguard can be offered by IFOAM, as the most broadly representative and respected worldwide voice of all those concerned with organic farming. IFOAM's Basic Standards carry considerable authority (even if only unofficially), and IFOAM accreditation oversees how certifying organisations deal with standard-setting, a role that can increase as more certifiers see the value of becoming IFOAM-accredited.

- *Ensuring that organic farmers truly farm organically.*
  Of the three levels, this is the one that is regulatory in the strict sense, and where the potential problems with self-regulation are real. However, we are not suggesting that it be returned to individual farmers for private self-regulation, as in the early days. An effective regulatory mechanism is needed to guarantee that a product labelled 'organic' in fact was produced according to the standards it claims to meet, and that these standards were adopted by a legitimate process that can reasonably be said to reflect the term 'organic'. The task of guaranteeing the validity of the label currently falls, and should continue to fall, to accredited, third-party certifiers who protect the consumer's legitimate interest in nonfraudulent labels, backed up by the possibility of legal action in case of violation.

For a farmer-oriented approach to make sense, it will require consumers – who in fact do have the ultimate say in whether organic farming thrives – to be knowledgeable about it and to support farmers' good faith efforts to embody its principles in workable standards. It will do no one any good to propagate images of a mythical organic paradise or to paper over the difficulties of running an organic farm that both fulfils all the ideals and survives economically. This in turn requires the organic sector to inform consumers about both the ideals and the realities of organic farming, and to do so honestly and fairly. Only that way will consumers accept farmer-oriented standards as legitimate rather than self-serving.

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Impact of socio-demographic factors on consumption patterns and buying motives with respect to organic dairy products in Switerland

J. Sanders and T. Richter
Research Institute of Organic Agriculture, Ackerstrasse, 5070 Frick, Switzerland

Introduction

In the 1990s, the Swiss organic dairy market experienced an enormous expansion with annual growth rates of 10–15%. In 2001, approximately 191,000 tonnes of organic milk were produced. This corresponds to 4.9% of the overall milk production in Switzerland (Hamm and Gronefeld, 2003). This market expansion was clearly driven by a growing demand, which in turn was closely connected to the marketing activities of the major retailers (Richter and Sanders, 2001). Today, however, the situation has changed. While in the past, the demand for organic milk was typically higher than supply, there is currently an oversupply with approximately 7 million kg of organically produced milk that cannot be sold as organic milk (Bio Suisse, 2003). A similar development is likely for the next years. Since the number of organic buyers will not increase anymore only by the fact that organic food is available in the shelves of retailers, it is necessary to develop more target group and product group specific marketing strategies in Switzerland based on an in-depth understanding of organic consumer attitudes and consumption patterns. Through this strategy, it might be possible to achieve a further growth of the currently saturated market.

The aim of this paper is to present and compare consumption data and survey results from three different sources, in order to give a comprehensive overview of the socio-demographic profiles of organic consumers and, in particular, of consumption patterns and buying motives with respect to organic dairy products. Based on these data, recommendations for improved marketing measures for organic dairy products are derived.

Data sources

- *Household budget survey from the Swiss Federal Statistical Office*: In 2000, the Swiss Federal Statistical Office (SFSO) conducted a nationwide survey on income and consumption, in which some 3,642 private households, selected at random from the Swiss population, participated. The extensive sample provides a realistic picture of Switzerland's section of the population and regions, as well as representative information about income and consumption. The household budget survey also included questions about food consumption of households. Participants had to keep a detailed diary about their food expenditures, including a record of whether the purchased product is organically produced or not.

- *Swiss "IHA Households Panel Plus"*: The Swiss "Households Panel Plus" provides all relevant information on consumption, market development, brands sales, retail trade and competition. Since household panels are characterised by a certain inaccuracy the "Household Panel Plus" combines panel data from the SFSO with data from retailers. Retail trade data are collected by sales records via EAN codes. For the analysis of organic consumption patterns, data from the year 2002 are used.

- *In-depth consumer survey*: Finally, data were used from a qualitative consumer survey, carried out within the EU-funded research project "Organic Marketing Initiatives and Rural Development". In total, 105 semi-structured interviews were conducted in Switzerland using laddering approach in order to identify motives and their structural links for buying organic food. The sample consisted of approximately 60% regular buyers and 40% occasional or non-buyers of organic food. The data were coded, aggregated and presented in hierarchical structured value maps.

Socio-demographic characteristics of organic consumers

The household budget survey of the SFSO gives an overview of the socio-demographic profiles of organic consumers. The data, compiled in Table 1, shows the impact of income, age and household size on consumption of organic food.

Table1: Impact of socio-demographic factors on consumption of organic food.,

	Share of consumers that buy organic products at least once per year (%)	Average share in expenditures for organic products in relation to total food expenditures per houshold (%)	Average share in the overall expenditures for organic products in Switzerland (%)
Income classes			
< 2000 CHF	68,0	8,9	1,2
2000 - 2999 CHF	54,3	3,8	2,2
3000 - 3999 CHF	62,1	3,6	3,4
4000 - 4999 CHF	63,2	3,6	4,3
5000 - 5999 CHF	71,2	5,0	7,1
6000 - 6999 CHF	70,9	4,5	9,7
7000 - 7999 CHF	72,8	4,8	11,3
8000 - 8999 CHF	73,0	4,5	9,3
9000 - 9999 CHF	71,8	5,3	10,8
> 10000 CHF	82,2	4,8	40,8
Age Classes			
15 - 29 Yr.	66,9	4,5	5,6
30 - 39 Yr.	74,2	5,3	28,0
40 - 49 Yr.	76,8	4,9	29,6
50 - 59 Yr.	73,2	4,5	19,9
> 59 Yr.	69,5	3,9	16,9
Size of housholds			
1 Person	64,7	6,5	16,9
2 Persons	75,5	4,4	31,1
3 Persons	75,0	4,7	17,0
4 Persons	75,7	4,0	21,0
5 Persons	75,8	5,2	10,7
> 5 Persons	77,9	4,9	3,3

Source: FiBL, HBS 2000

The higher the income, the higher is the share of consumers that buy at least once per year an organic product. Accordingly, 82% of consumers with an income of more than 10,000 Swiss francs (CHF) are regular or occasional buyers of organic food. This consumer group has the highest share (41%) of the total organic food expenditure in Switzerland. It is very interesting that households with an income below 2,000 CHF have the highest share in expenditures for organic products per household, but only 68% of these households buy at least once per year an organic product. This means that this group consists of two contrary sub-groups: one sub-group has very high expenditure for organic food, whereas another sub-group spend probably no money at all for organic food. These results suggest that the amount of expenditure per household is not clearly related to income but rather to the general attitudes towards organic farming and organic food.

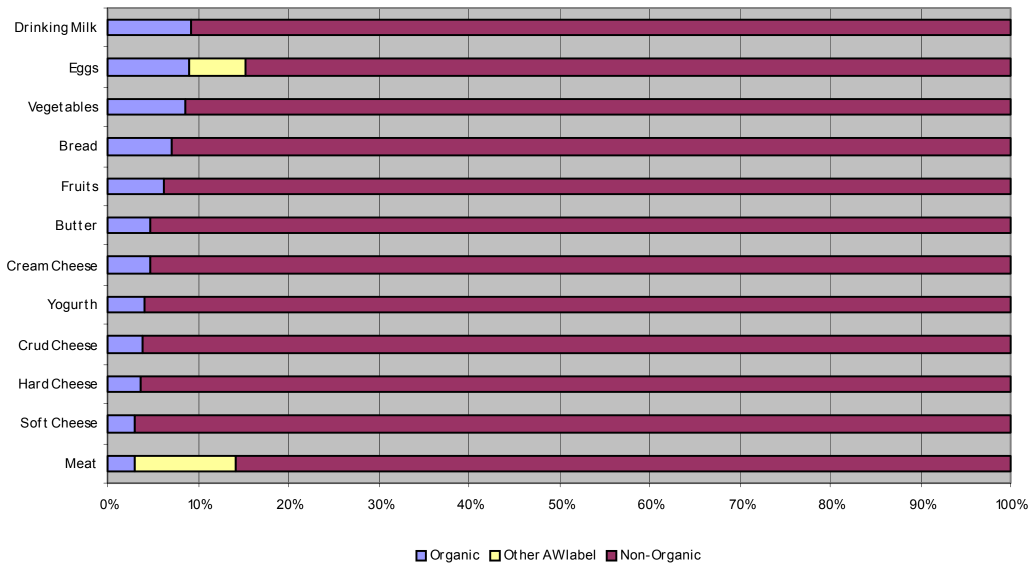
Regarding the age, the data does not show a clear result. The highest expenditure and the highest share of buyers are related to consumers of the age group 30-49 years. The highest share of non-buyers of organic food is related to the age group 15-29 years and above 60 years of age. Approximately 1/3 of this group does not buy at all organic products, and only 10% may be classified as regular consumers.

There is a clear tendency for large households to have a higher preference for organic food than for single households. There are only 65% of single households that buy organic produce at least once per year. Although the share of regular and occasional buyers of this group is relatively low, their expenditure for organic food per household is the highest. In contrast to this, there are much more regular or occasional buyers in households with more than 5 persons. In total, 78% of this group buy at least once per year an organic product. However, this group has only a share of 3.3% in the overall expenditure for organic food. Households with two persons have the major share in the overall expenditure for organic food.

Consumption patterns

According to IHA Households Panel Plus in Switzerland, approximately 9% of all consumed drinking milk is organically produced. This means that liquid milk is the most important organic fresh produce with the highest share by volume in comparison to all other organic fresh produce. Other dairy produce, such as different types of cheese, have a share of approximately 4%.

Figure 1: Share of organic consumed fresh produces by volume in 2002



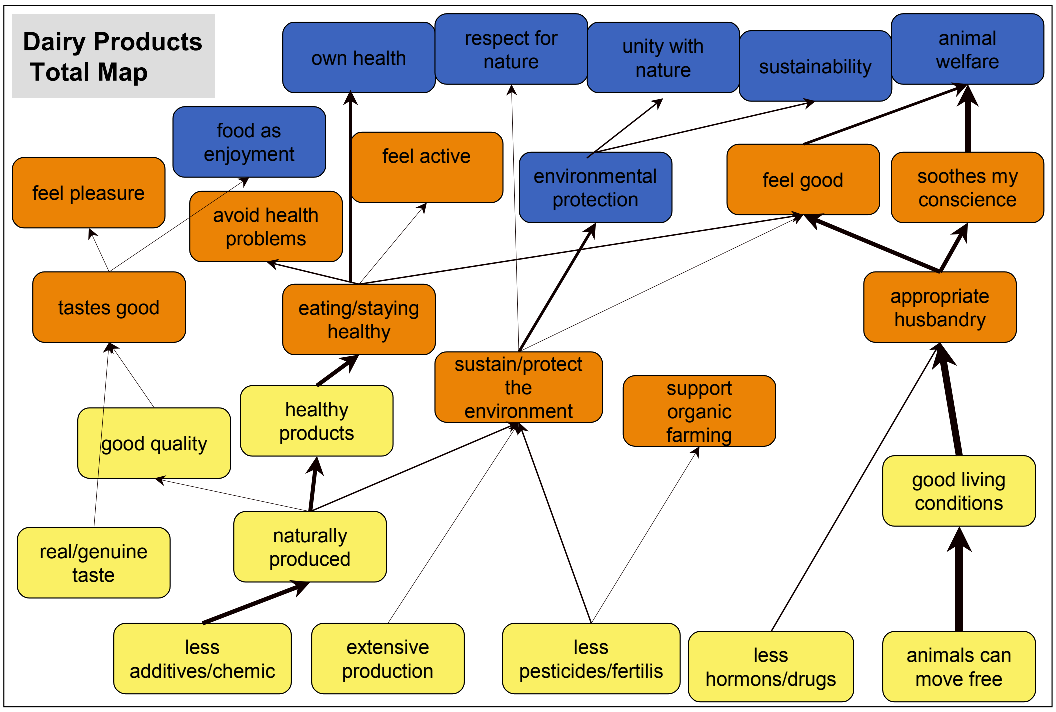
Source: IHA-GfK Switzerland

Buying motives

In general, organic food is purchased because it is considered to be healthier (food safety and food quality) and more tasteful than conventional food, as well as because organic farming is regarded to be better for the environment and to keep animals in a more appropriate way (e.g. Poschacher, 1997; Wendt *et.al*., 1999; Lockie *et.al*., 2002). Results of in-depth interviews with Swiss organic consumers indicate that attitudes, buying motives and value concepts are product specific and vary according to consumer groups. Many regular organic consumers tend to buy only certain products in organic quality as they have a differentiated perspective on the benefits of organic production systems.

The interview results with respect to the buying motives of organic dairy produce are presented in a hierarchical structured value maps. The maps illustrate the motives and their structural links to each other, beginning with product attributes (light grey), expected functional and psychological consequences of these attributes (medium grey) and underlying values (dark grey). The arrows between each aspect indicate a cognitive link between them. The thickness of each arrow depicts the frequency of the identified links.

Figure 2: Motives and their structural links that are behind the decision to buy organic dairy produces



Source: OMIaRD consumer survey in 2002

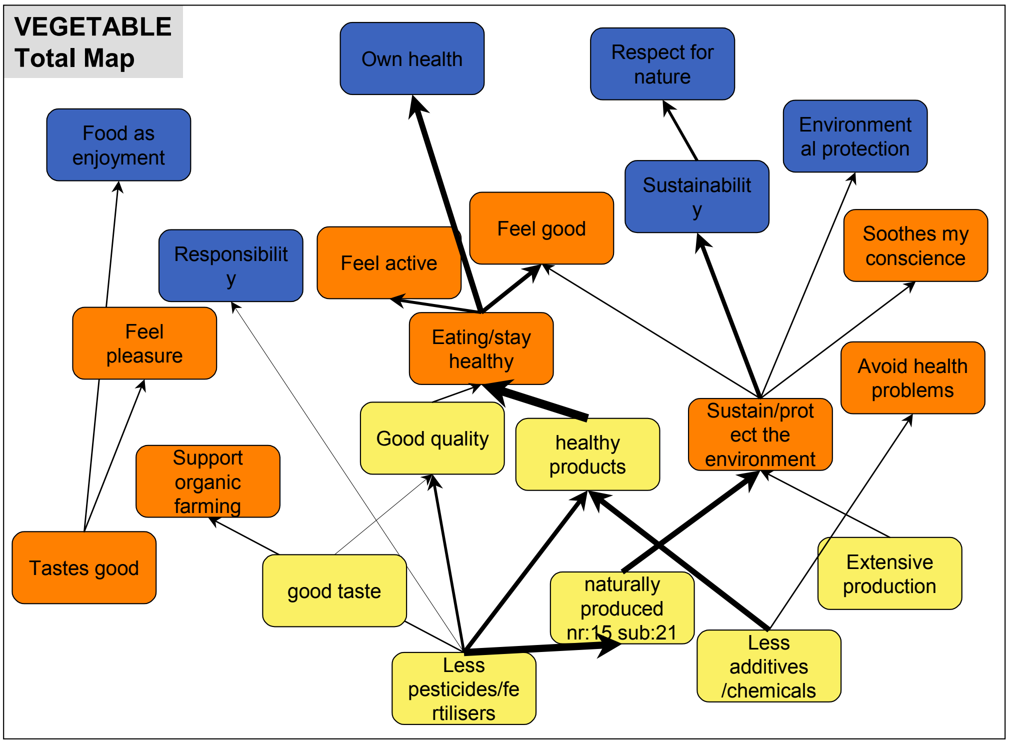
The map above shows that the prime motive of the interviewed consumers for buying organic dairy produce is animal welfare and, to a lower extent, also personal health. The two most distinct structural links of motives are:

- *animals can move free >> good living conditions >> appropriate husbandry >> soothes my conscience >> animal welfare*
- *less additives >> naturally produced >> healthy products >> staying healthy*

Further motives are related to environmental protection (*less pesticides and fertilizer*), and positive characteristics of taste (*genuine taste*) and enjoyment of organic food, respectively. If the value map of organic dairy produce is compared with value maps of other product groups (e.g. vegetables, Figure 3), it becomes clear that buying motives and cognitive structures are rather product specific and less related to organic farming in general.

Figure 3: Motives and their structural links that are behind the decision to buy organic vegetables

Source: OMIaRD consumer survey in 2002



A further analysis of the data shows that also income level and children have a clear impact on buying motives and the cognitive structure of the buying decisions. High-income households buy organic dairy food mainly for altruistic and hedonistic reasons (environmental protection, food quality, taste, enjoyment, animal welfare). Furthermore, these households are characterised by their wide range of motives. In contrast to this, medium/lower-income households have fewer reasons to buy organic dairy products. Besides animal welfare, consumers of this household group buy primarily organic food for health reasons.

While most consumer studies report that families with children buy organic food because they want to look after the health of their children, this result cannot be confirmed by the Swiss data. The responsibility for the family plays only a minor role for households with children. The most important reasons for this group to buy organic products are *environmental protection* and *animal welfare.* In general, households with children have a wider range of motives to buy organic dairy produce than households without children. For the latter one, *animal welfare* and *personal health* are the two most relevant motives to buy organic dairy produce.

Conclusions

Data from the Household Budget Survey indicates that the consumption of organic food varies depending on income and household size. In Switzerland, there are two main consumer groups that are relevant for marketing strategies:

- First, households with a high income, consisting of couples with no children or with one or two children and where the adult members of these households are between 30 and 49 years old.
- Second, single households of young people with current low income.

Regarding the buying motives for organic dairy food, animal welfare seems to be in general the most important motive. However, the motives for buying organic dairy food vary for individual consumer groups. For high-income households/households with children, animal welfare and environmental protection are the most relevant motives, whereas medium/low-income households/households without children prefer organic dairy food because of animal welfare. Households without children buy organic dairy food also for health reasons.

Marketing strategies for organic dairy products should take into account these details and should become more product-group and target-group specific. Instead of using general positive attributes of organic farming, marketing for organic dairy milk should rather stress the animal welfare and health advantages. Further, marketing strategies should consider socio-economic aspects and consumption patterns of specific target-groups. For example, families with children might be better targeted by offers of large quantities of milk. By developing specific marketing strategies, it is expected that the Swiss organic dairy market may achieve high growth rates again, which would be a basis for a further expansion of organic farming in Switzerland.

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Working Group Report:

Attitudes of consumers to animal product quality and safety: identification of problems and development of recommendations

Compiled by J. Sanders and G. Arsenos

Based on the presentations held earlier, participants discussed the discrepancy between consumers perception on organic farming and the real organic farming practices, with regards to health and safety, environmental protection and animal welfare. Furthermore, it was discussed, whether consumer communication (education?) or organic production regulation should be modified, in order to reduce the existing discrepancy.

Problems/issues:

- Participants clearly recognized that, in most cases, it is very difficult to define and prove positive human health effects by organic animal products. Instead of telling consumers that organic products are healthy, consumer communication should be focused on food safety, which is much easier to define and to guarantee.
- Consumers generally perceive organic production as more environmentally friendly than conventional agriculture. However, in particular in marginal farming areas, the difference between organic and conventional farming can be small, with respect to environmental impact. As a result, it is difficult to explain to the consumers the existing differences or to justify organic premiums, particularly when organic production is criticised in terms of its environmental benefits. It is probably better to address the issues by identifying solutions through research rather than by rewriting standards. Furthermore, consumer education should highlight the major differences but not reproduce myths.
- The working group also believed that, very often, consumers have an unrealistic image of organic livestock systems in mind. Again, consumer education should highlight the major differences but not reproduce myths.
- In some European countries, there is still a lack of independent, comprehensive, easily understandable consumer information. Commercial advertisement by retailers may confuse consumers or lead to unrealistic expectations. Instead of telling consumers something, consumers should be informed about “organic facts” and told about clear differences between organic and conventional animal products and production processes.

Recommendations:

1. Consumers education must be improved. Independent information and dissemination of facts is needed. Governments and certification organisations could have a significant role. An integrated approach should be chosen for consumer education (e.g. organic action plan for consumer education).

2. More scientific research is needed: to provide more scientific evidence in regard to food quality and safety and environmental impact.
3. Consumer education should be accompanied by market research in order to understand better the consumer perceptions, needs and expectations. “Knowing the customer” would result in more successful marketing of organic food products. The focus of consumer education should be on the process rather than the product.
4. In order to take consumer expectations into account, processing standards of organic food should be developed.

Working Group Report:

Attitudes of veterinary and advisory staff to organic livestock production: identification of problems and recommendations

Compiled by K. Ellis and M. Hovi

This report is a summary of the discussion during the working group session where debate centred mainly around inspector and advisory, and specifically around veterinary, attitudes to animal health and welfare on organic farms. Delegates present were from a wide range of EU countries including Denmark, Finland, France, Holland, Latvia and UK, and although there were many different farming regions represented, many problems being faced were similar.

Problems identified:

Inspection

- Organic inspectors may not have a livestock background, thus they may be unfamiliar with specific and potential problem areas;
- IN the absence of welfare assessment protocols, individual inspectors may have different interpretations of the standards, and assessment of on-farm situations may be subjective and variable; and
- Inspection is often limited to measuring inputs into the system (potentially encouraged by the positive view inspectors have of the standards).

Advisory services

- There are many types of advisory service available to farmers, i.e. privately paid services such as SAC, or linked to feed companies and also the farm's own veterinary service.
- The advice given by different parties may vary in quality, depending on the primary interest of the advisor. Those working 100% in organic farming may be more interested and familiar with alternative approaches to problems.
- There may also be some scepticism from farmers receiving information from advisors working in conventional production, particularly in some more intensive sectors, such as pigs and poultry.

Veterinarians

- It was felt that veterinarians tend to have a lack of knowledge on organic farming in general and can be sceptical of organic farming as a system;
- However, it was suggested that veterinarians are increasingly becoming aware of preventive medicine and herd health, as a result of farm assurance schemes in conventional systems, but they have little knowledge of alternative management practices or therapies.
- It was felt that health planning on organic farms is often vague and aspirational and may be even more so when the veterinarian is not involved. However, it was admitted that

compulsory veterinary involvement with individual farm herd health plans may not guarantee an improvement in animal welfare.

Animal welfare assessment

- The emphasis on welfare assessment has been on the inputs, and this has lead to claims of higher welfare standards in organic systems, based on the standard requirements rather than actual welfare outcomes.
- Organic farming must be aware of the increasing number of animal health schemes operating in the conventional sector (which may or may not deliver better animal health and welfare), and be able to differentiate itself from these.
- Organic (and conventional) farming needs an objective system of measurement to evaluate animal welfare from the perspective of the animals themselves. This system must be objective, repeatable, and above all practical at the farm inspection level.
- Claims of better animal welfare on organic farms look increasingly tenuous without evidence based on the health, welfare and productivity of livestock on organic farms.
- Animal welfare assessment is particularly difficult in extensive systems, for example beef and sheep production in hill areas, where contact with livestock is infrequent and recording systems are less developed than in the dairy sector.
- Determining what actually constitutes good welfare, as opposed to recording disease levels, appears difficult in spite of many attempts to identify the 'special' nature of animal welfare in organic farming. Additionally, the significance of certain factors needs to be determined, i.e. what is a significantly acceptable cell count, or number of lame cows etc.
- There is a reluctance by farmers to take part in yet more paperwork without an obvious incentive to do so.

Recommendations

Animal welfare assessment

- The following issue should be openly discussed: Should organic farming be promoted on the basis of better animal husbandry input requirements, rather than actually claiming better animal welfare outputs, at least until an objective assessment system is up and running?
- A system of monitoring animal health is being piloted in Finland looking at a number of key areas and tied to the animal health plan for the farm. This system also includes a financial incentive for good performance. The results of this work need to be disseminated and developed.
- Existing work done in the UK has looked at herd health in farm groups with reference to benchmarking farms and providing feedback to farmers on their performance, which seemed to have been well received by the farmers as they got good feedback of information. The results of this work need to be disseminated.
- Current work in the UK is looking at using animal based welfare parameters as part of organic inspection protocols, based on initial, qualitative risk assessment categorisation of each farm on the basis of previous performance and written health plans. This work needs to be discussed and disseminated.
- The above existing work should be presented and discussed in a future SAFO workshop.

- Reference baseline data on animal health and disease status on organic farms (and nationally on all farms) is required.

Veterinarians

- While a need for veterinary training and education on organic farming was recognised, also potential scope for veterinary involvement within organic certification bodies to advise on herd health plans and preventive health measures was recommended.

Inspectors

- There needs to be uniform training to a baseline standard of assessment of organic farms, including an assessment of animal welfare.

Advisers

- There is a need to encourage dedicated organic advisory services for farmers.

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Part D:
Poster presentations

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Current socio-economic trends of organic plant and animal produce in Western Australia

C. Faiello, A. Pardini[2] and L.C. Litjens.[3]
[1] The Graduate School of Management - The University of Western Australia, 35 Stirling Highway Crawley, Western Australia ; 2 Department of Agronomy and Land Management, University of Florence, Piazzale delle Cascine, 18, 50144 Firenze.; [3] Department of Arts – The University of Western Australia, 35 Stirling Highway Crawley, Western Australia 6009, PoBox 3364 Broadway, Nedlands Western Australia

Introduction

In recent years the trend for both the production and consumption of organic produce in Australia has increased considerably. This trend has been driven by a heightened awareness of health and environmental issues which has moved the concept of "organic" towards the mainstream. Organic farming has a beneficial effect on land-care and the conservation of the natural ecosystem, as it refrains from using chemicals and favours the sustainment of biodiversity (Hopkins and Hrabe, 2001; Pardini, 2002).

Whilst Australia remains behind Europe and the U.S.A. in terms of the volume produced, the effects of market changes in these two countries has had a positive influence on the Australian organic industry. Due to the larger population, organic produce is more widely available in the eastern states of Australia than in Western Australia where availability is still limited. However, the number of farms converting to organic throughout Australia is steadily increasing. For example, in the past 2 years the percentage of organic growers has increased by approximately 10% (Organic food & farming report, Australia 2003). Nevertheless, current prices for organic produce remain high when compared with conventionally grown products. A further increase in demand is therefore essential for the expansion in production and subsequently, a decrease in price for the consumer.

Materials and methods

The purpose of this research has been to highlight the availability and pricing of organic produce in the localities around Perth, Western Australia. Approximately 80% of the existing organic businesses in Perth participated in this survey. These businesses are located within a 15 km radius of the city. A number of shops were excluded from this study due to the uncertain origin of their organic produce.

Direct interviews were conducted with the managers and owners of the selected businesses. The produce available on the shelves was predominantly certified with BFA (Biological Farms of Australia) or NASAA (National Association for Sustainable Agriculture in Australia), the two largest organic associations in Australia. A final comparison in price was then made between conventionally and organically grown produce.

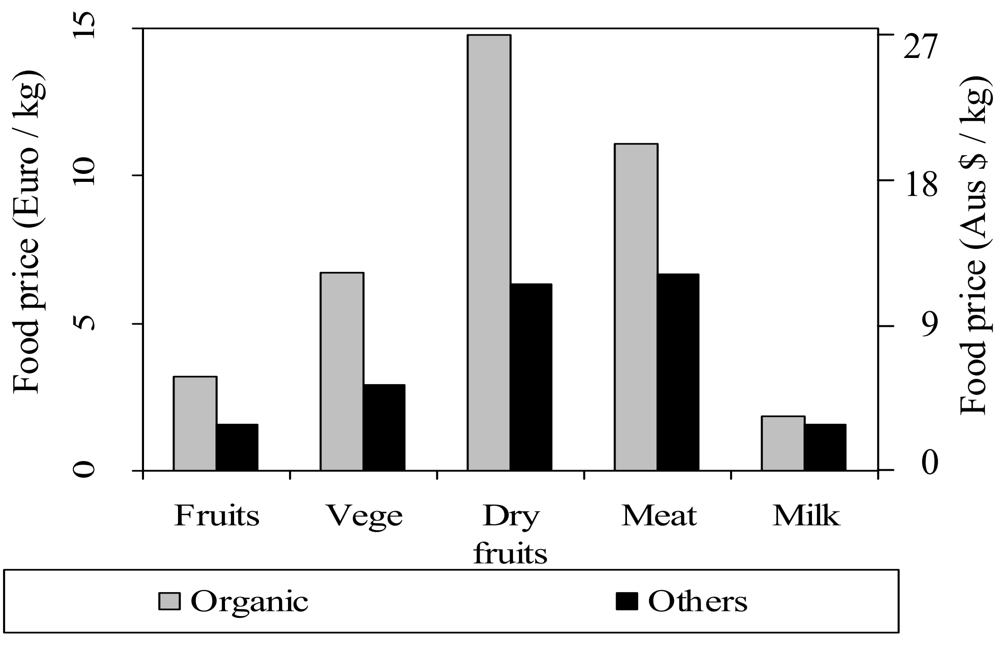
The controls undertaken were:

1. The prices of both organic and conventional foods: of 6 fruit categories comprised of 9 different varieties; 13 vegetable categories comprised of 17 varieties; 6 categories of dried fruits; 4 species of animals with 20 different cuts of meat; and cow's milk);
2. Reasons for the limited availability of organic produce.

Results and discussion

The findings of this survey reveal the average cost of the products researched (Figure 1). Analysis of the data collected shows that on average, the price of organic goods is in excess of 100% when compared to conventional goods, with the exception of meat and milk which is considerably lower. Specifically, organic fruit is 108% more expensive than fruit grown with conventional methods; vegetables are128% more; dried fruits cost 138% more; while organic meat is 66 % more expansive, and milk 17%.

Figure 1: Comparison of organic and conventional food prices (average for categories). Prices are referred to in Euro and Australian $ (1 AUS $ = 0,563 Euro).



The reasons for both the limited availability and higher prices for West Australian organic food when compared to the same produce grown conventionally, are as follows:

- Higher production costs (particularly the first few years after conversion);
- Limited number of organic producers and retailers;

- Inexperienced organic farmers, therefore limited produce;
- Insufficient demand;
- Increased cost for those products transported from the eastern states of Australia and/or imported from overseas (e.g. USA, Europe).

Despite the higher prices for organic food, the quality of fruit and vegetable produce varies, as many farmers are still inexperienced. On the other hand, the quality of organically produced meat is consistently superior. This is confirmed by a dramatic increase in exported organic beef in the past two years (Organic food & farming report, Australia 2003).

Conclusions

An increased supply of organic produce would have a positive impact on both the social and economic spheres within Australia and particularly Western Australia. Firstly, food produced by utilising organic methods would lead to increased nutritional value. Secondly, an overall increase in the supply of organic food would result in a decrease in price. Thirdly, it would expand the export market overseas. Furthermore, of great importance would be the preservation of the environment as a whole. Finally, Western Australia with its abundance of agricultural land and its diverse climate would benefit greatly from this emerging organic industry.

While organic production in Australia is currently limited, the figure of 10% growth in the primary sector is very encouraging. The trend in Western Australia towards higher prices (as shown in this paper) only serves to reinforce the dire need for further education of both the consumer and organic producers. It is conclusive that education is paramount for the growth and success of the organic industry in Australia, which can only be achieved with the intervention and assistance of both Government and the private sector.

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Organic farming in the Slovak Republic

O. Ondrašovičová[1], M. Vargová[1], O. Ondrašovič[1], J. Kottferová[1] and J. Juršík[2]
[1]University of Veterinary Medicine, Komenského 73, 041 81 Košice, [2]State Veterinary Institute, Botanická 15, 842 52 Bratislava, the Slovak Republic

Introduction

Ecological agriculture in Slovakia is defined as a type of agricultural, characterised by economic exploiting and preservation of natural resources, maximisation of recycling of nutrients and energy, minimal use of substances and preparations that may pollute the environment and by natural livestock farming, based on natural needs and welfare requirements of animals, with regulated use of veterinary drugs. This definition indicates that it is an extensive agricultural production that requires considerable effort of farmers and institutions involved and, above all, a sufficient body of information about all difficulties that this system may bring and about the ways in which to prevent the most serious problems that these requirements may bring in everyday practice. It is also important to provide sufficient information about ecological farming and its products to potential consumers and domestic food processors.

Conversion of conventional farms to ecological ones, establishment and running of new farms and the related activities require considerable support from the government in different fields, including planning, legislation and support.

Development of organic agriculture in Slovakia

The development of organic agriculture in Slovakia is 15 to 20 years behind some other European countries. Organic farming in Slovakia was initiated in 1991 by the Ministry of Agriculture and Nutrition of the Slovak Republic, following the experience and development trend in West European countries. The rules of organic farming adopted in the Slovak Republic were based on the rules formulated by the IFOAM, and a Certification Commission was established to work in the legislative and regulatory area. Farms/production units (37 in 1991) that complied with the defined rules and conditions were granted subsidies for a three-year transition period at 10,000 Slovak Crowns (Sk) per hectare (1st year – 4,000 Sk per hectare, 2nd year – 3,500 Sk and 3rd year – 2,500 Sk). These producers were allowed to label their products as bioproducts only in 1994, after the completion of the conversion period. However, when they placed their produce on the market there was a little interest in these organic products. For this reason, they decided to export their products to the West European markets.

In 1995, the government of the Slovak Republic adopted a programme "The conception of ecological agriculture in Slovakia". This fundamental document defined the plan for the organic agriculture in Slovakia by 2010 and proposed a set of measures to implement this plan .In 1998, there was a crucial change in the enforcement of the law concerning organic agriculture when the Act 224/1998 on Ecological Agriculture and Biofood Production was adopted. It entered into force the first of October, 1998. The system of subsidies was changed in 1999. In accordance with the Act 415/2002, the Ministry of Agriculture and the Inspection Institute have been designated as the bodies to control organic agricultural production and the production of biofoods. Inspections on farms are performed regularly according to the Act No. 415/2002 of the Code. The Ministry of Agriculture of the Slovak Republic is the executive body responsible for the development of organic agricultural production and production of biofoods, co-ordination of international collaboration in this field, inspection of organic agricultural production and production of biofoods, and other activities according to the Act. Inspection Institute (Central Agricultural Control and Testing Institute) – fulfils all the tasks specified by the Act, concerning inspection, evidence, and issuing certificates. The Inspection Office performs inspection of the subjects oriented on ecological production of food by the inspectors of ecological agriculture.

Agricultural land area and the number of farms involved in organic agriculture

According to information supplied by the Ministry of Agriculture, 84 ecological farms were registered in the Slovak Republic (SR)on the first of January 2003. They farmed 49,998.99 hectares of agricultural land, which represents approximately 2.13 % of the total agricultural land. Out of that 16,993.75 hectares are arable soil and 32,780.82 hectares permanent grassland. The number of farms and the farmed area was almost the same as in 1998 (82 farms, 50,615 ha) but lower than in the 1999–2000 period.

Currently, there are 29 organic livestock farms in the SR, with the following number of animals: cattle – 7,808; pigs - 0; poultry – 4,776 (layers). Organic farms produce about 42 types of bioproducts and biofoods including cereals (common wheat, spelt wheat, rye, barley, oats, buckwheat), legumes (peas, horse bean), root crops (potatoes, beat, maize), oil crops (flax, sunflower, oil rape), forage crops, energetic forage, herbs and spices, cosmetics, fruit, cattle, sheep and poultry, milk products, and others. The majority of products of plant origin are exported to EU countries and Switzerland as raw, unprocessed products.

Organic animal husbandry in Slovakia

Livestock husbandry on organic farms is aimed at satisfying the stocks' physiological, ethological and ethical requirements, according to special provisions, particularly with regard to:

- appropriate size of the herd;
- natural movement of animals in the fresh air and their simultaneous protection against bad weather;
- housing of animals with good access of fresh air and daylight and sufficient and area for resting provided with bedding.

The following is not allowed:

- keeping cattle in housing systems with year-round tethering;
- keeping animals in cages with limited area for movement;
- confinement of animals in closed houses without access to run or pasture; and
- using parallel ways of keeping for animals of the same species and productive orientation which belong to the same herd and are housed in the same animal house.

Veterinary care in organic livestock production

Veterinary care is oriented particularly on therapeutic interventions, using natural treatment processes, if they correspond to the indication. In case of using conventional therapy, procedures leading to rapid improvement of health, prevention of spreading of infections and saving animal life should be applied. Evidence is kept of all therapeutic interventions, and animal products obtained during the treatment and the withdrawal period. The withdrawal period for products from treated animals is doubled.

It is prohibited:

- to administer drugs and general prophylactic preparations to healthy animals;
- to use hormonal synchronisation of oestrus;
- to use embryo transfer;
- to use interventions with embryo;
- to use hormonal preparations to stimulate the oestrus and ovulation; and
- to use genetic-engineering methods in animal reproduction and breeding.

Animals kept on organic farms may be vaccinated only with the agreement of the certification body and only in such situations when other anti-epizootiological measures are ineffective.

Some important health risks associated with organic livestock husbandry

The health risks associated with organic livestock husbandry depend on a number of factors, including animal species, size of the heard, pasture quality, climate and others (Juršík and Čuboň, 1999, Juršík *et al*., 2001). The most frequent diseases observed in organic stock are the following:

- non-infectious diseases associated with deficit of some elements; and

- conditions arising from certain biofactors or their complexes or from shortcomings in technology of feeding, grazing and housing.

The problems most frequently encountered in cattle include dysfunction of proventricula, grass tetany and muscle dystrophy and parasitic (invasive) diseases, sometimes termed pasture parasitoses, caused by protozoa (eimerioses), cryptosporidia, sarcocysts, helminths (*Fasciola hepatica, Dictyocaulus viviparus, Taeniarhynchus saginatus*, strongylidoses) and ticks (*Ixodes ricinus*).

Development of organic agriculture should support the following (Leibl, 2003):

- relationship between organic agriculture and the environment and animal welfare,
- consumer confidence in bioproducts and advertising,
- processing and marketing, and
- research, education and consulting.

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Organic farming in Latvia

E. Selegovska and L. Degola
Latvia University of Agriculture, Department of Animal Science

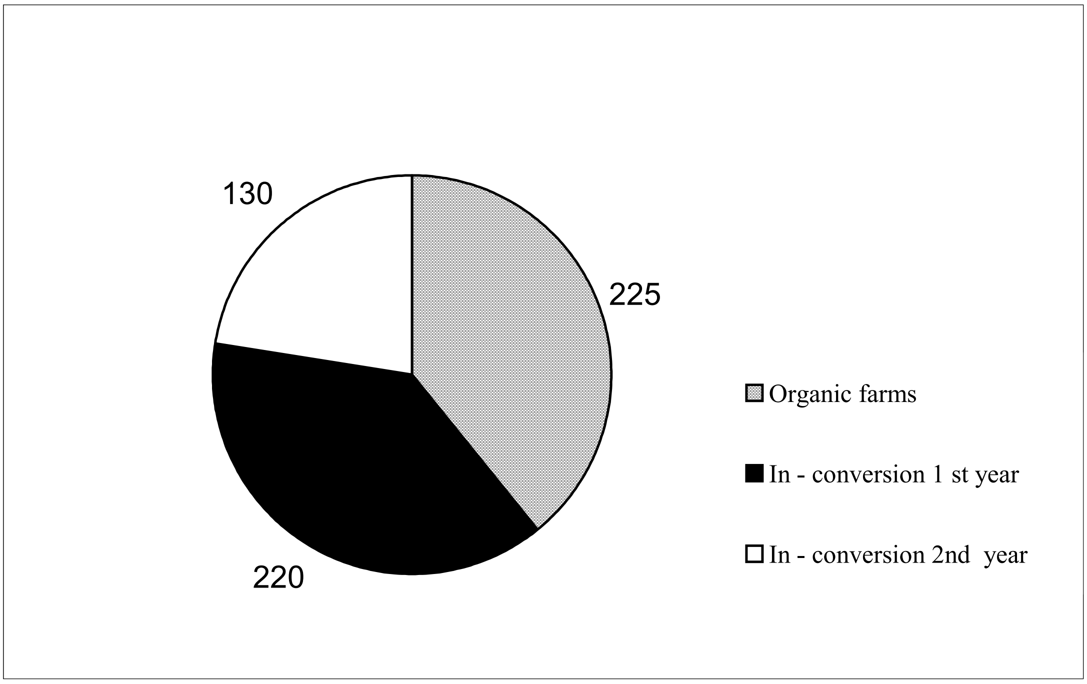
Introduction

Agricultural land occupies 39% of the total area of Latvia (2.5 million ha) and is mainly owned by the private sector. In terms of economy, small scale farms are characteristic for the agriculture of Latvia: on average, one rural farm has 12.4 hectares of agricultural land. About 40% population are engaged in agriculture. There are about 95,000 private farms in Latvia in total (64.8% small farms with 2-10 ha; 0,2% big farms with 100 ha and more).

Organic farming – current situation

Lately organic farming has started to develop. There are some 575 certified organic and in-conversion farms, with the total area of 24,000 ha, but many others do not use fertilizers, pesticides and herbicides due to lack of funds. Hence, the potential for organic conversion is great.

Figure 1: Organic and in-conversion farms in Latvia



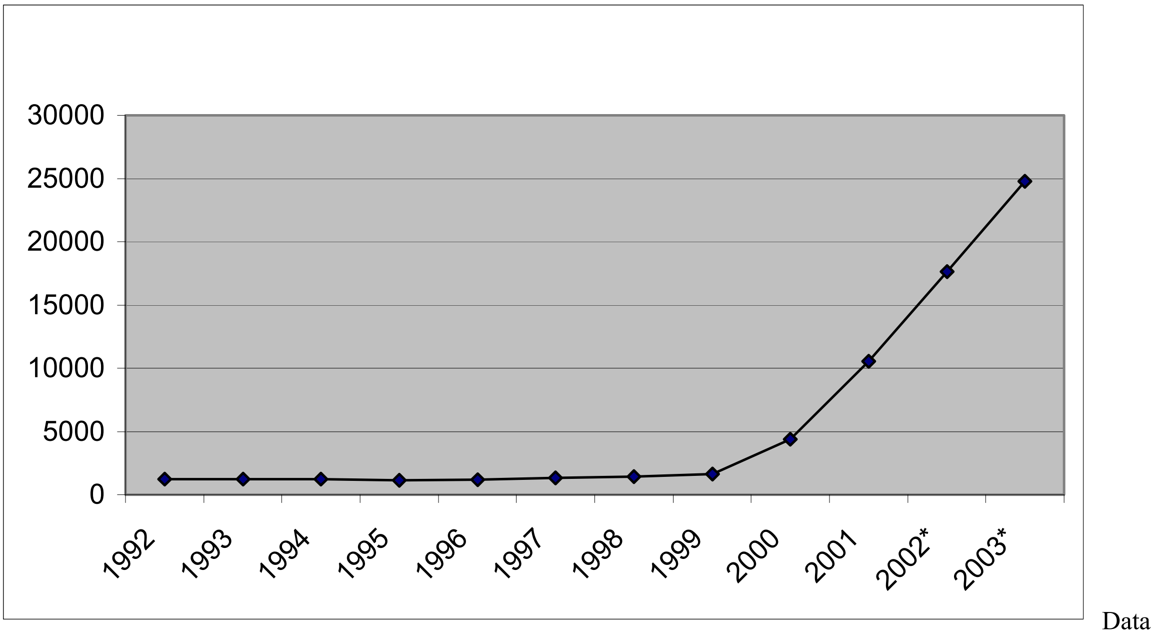
Data source: “EQ” on 01.08.2003

Organic farming is developing alongside with the conventional agricultural production, allowing to diversify the employment of rural population and to earn extra income. Beginning of organic movement in Latvia was in 1989. The second period stared in 1995 when Association of Organizations of Organic Farming was founded. Association defined the national standards to organic production and established control institutions. Since 2001, certification and control system of organic production in Latvia complies with the EU. Certification of organic farms is carried out by the public body Environment Quality. Its operations comply with the Regulation 514 "On Circulation of Organic Agriculture Products and Procedure of Certification".

Future growth potential

A very significant condition for further development of the organic farming in Latvia is the fast conversion to organic farming, taking place over the last three years.

Figure 2: Certified organic and in-conversion land area in Latvia



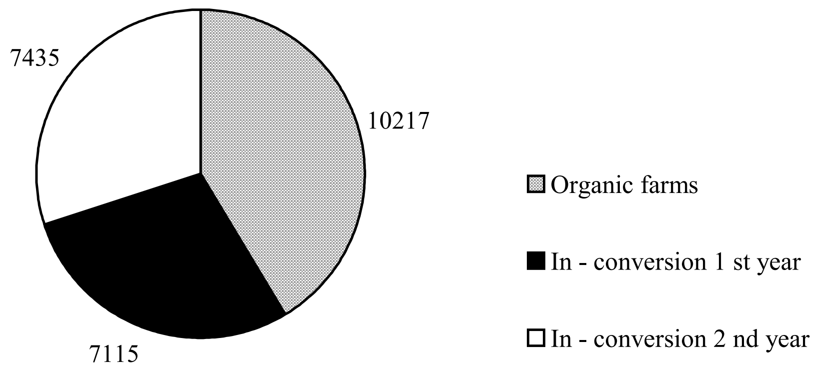
source: IFOAM, Ministry of Agriculture Republic of Latvia

** Data of "Environment Quality" on 1.08.2003.*

In 2002 there were 355 organic farms, or farms converting their production to organic farming, but in 2003 conversion was started by more than 200 farms. Certified land and land in-conversion make up approximately 17,000 ha of agricultural land in 2002 and 24,000 ha in 2003, as compared to 160,000 ha in 1999.

Currently land area under organic and in-conversion management of total agricultural area in Latvia is only 1,0%, but the potential of land to be used for organic farming, could be 21% of agricultural land.

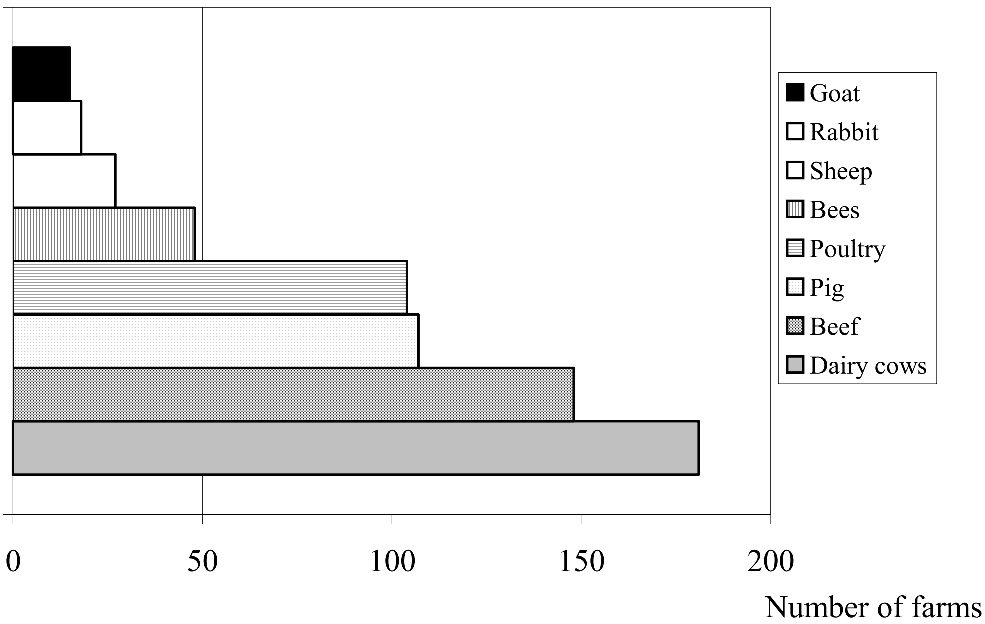
Figure 3: Certified organic and in-conversion land area of Latvia on 2003 (ha).



Data source: "EQ" on 01.08.03.

The major sectors of organic farming where the production of organic products is developed are cereal growing, horticulture and dairy farming.

Figure 4: Livestock production on orgnaic farms in Latvia.



Data source: "EQ" on 01.08.03.

The rapid growth of organic farming in Latvia has been fostered by the adoption of the amendments to the Law on Agriculture in 2001, where the concept "organic farming" was defined and direct payments to organic farms were assigned.

Marketing

The quantity of organic produce in the market in Latvia is currently in a stage of slow growth, because:

1) demand and number of consumers have grown, but;
2) prices of organic products are rather high;
3) entering into market of organic products is still complicated, marketing channels are not organized; and
4) majority of consumers do not recognize organic products.

The produce of organic farming has been sold at the same price or a little bit higher than the conventional farming produce. At the moment, organic farming in Latvia is orientated towards local market. Only few enterprises export their products, and these are not livestock products.

Table 1: Prices of organic animal products (Latvia, 2003)

Products	Price (EUR)
Cow milk, L	0,70
Goat milk, L	1,30
Butter, kg	4,80
Sour cream, kg	3,50
Cottage cheese, kg	3,80
Eggs, 10	1,70
Sausage, kg	7,00

Products	Price (EUR)
Beef, kg	3,50-12,00
Veal, kg	5,00-6,00
Pork, kg	3,00
Chicken, kg	5,00
Turkey, kg	6,00
Pheasant, kg	18,00
Goose, kg	6,00

Consumer is the main agent in the development of organic agriculture, but a survey found lack of information about organic products in Latvia and that consumers appear to have little interest for organic products [is there a reference for this please?]. Association of Latvia Organic Agriculture Organizations established a label for organic products, which is being promoted in the food market.

State support for organic farming

Latvia government grants subsidies to farmers, researchers and advisory services. The main interest is in farm subsidies. Subsidies are given in different production systems and for different aims. The Ministry of Agriculture has increased interest in organic farming since 1998, and there are some possibilities to receive subsidies for organic farmers since 1999. About 520,000 EUR are budgeted for organic farmers in 2003. This money will be given to farmers, who are certificate in organic farming or in 2nd year in-conversion period, issued by public organization "EQ".

State subsidies for development of organic farming slightly stimulate the sales of organic products, and it is suggested that the economic and financial conditions for the organic farming in Latvia are much better than for the whole farming system.

Table 2: State support to organic farming

Subsidies, EUR	**Restrictions**
35,-/per beef cattle	**If there are more than 5 cattle in farm**
60,-/per milk cow	**If there are more than 5 cows in farm**
24,-/per pig	**If there are more than 10 pigs in farm**
21,-/per sheep or goat	**If there are more than 20 animals**
5,-/per poultry	**If there are more than 100 poultry**
60,-/per ha of cereals	**Min. 3 ha**
130,-/per ha of potatoes	**Min. 1 ha**
165,-/per ha of orchard	**Min. 1 ha**

Organic farming in Latvia is restricted by following obstacles:

- Lack of necessary techniques and equipment;
- Lack of financial resources;
- Deficit of organic auxiliary and raw materials;
- Farms are mainly located far from significant outlet centres;
- Difficult to organize stable supply of organic products to wholesale or retail;
- Fragmentation of farms makes difficult to co-operate in farming, processing and distribution of products;
- Intensive competition with producers of conventional farming;
- Lack of qualified labour force.

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Organic agriculture in Poland – legal and market aspects

J. Zastawny, H. Jankowska-Huflejt and B. Wróbel
Institute for Land Reclamation and Grassland Farming, Department of Meadows and Pastures, Falenty near Warsaw, Poland

Social and economic determinants of Polish agriculture

Agrarian politics of the last 10 years have caused a recession in Polish agriculture. Excessive imports of subsidised agricultural products from the European Union have resulted in poor profitability of domestic agriculture, in a declined demand for home-grown products and, consequently, in a decrease of farmers' income.

High unemployment and poverty in the rest of the society have decreased the demand for food and worsened the overall situation of farmers and the food processing industry. The share of agricultural products of total exports decreased from 14.1% in 1990 to 10.3% in 1999. The decline of the parity of agricultural incomes in the last decade is remarkable: from 92% in 1990 to 57% in 1994 and 38% in 1999. Due to economic reasons, young people from rural areas have a restricted access to education – only 4% of students come from farming families, who constitute 38% of the whole of population. The area of barren and fallow lands has increased to reach 1.7 million ha in 2000. The lands are usually weed-infested and become overgrown by trees and shrubs. The consumption of mineral fertilisers has drastically declined. In the fiscal year 1991/1992, it amounted only 62.1 kg ha^{-1} NPK and in 2000 it was 85.8 kg ha^{-1} (nitrogen fertilisation of grasslands does not exceed 30-40 kg ha^{-1}) and has a very unfavourable N:P:K ratio (Table 1).

Table 1: Consumption of mineral fertilisers in kg·ha^{-1} of croplands in Poland (Rocznik, 2001).

Years	Consumption of mineral fertilisers				
	NPK total	N	P_2O_5	K_2O	CaO
1990	163.9	68.9	40.7	54.3	182.4
1997	88.3	49.0	17.3	21.1	139.0
2000	85.8	48.4	16.7	20.7	95.1
2000 : 1990 (=100%), %	52.4	70.2	41.0	38.1	52.1

Now, the challenge is to adjust Polish agriculture to the competition on European markets after the accession of Poland to the European Union. Failing to do so will mean further deepening of the crisis and unemployment in the country.

Organic farming as a solution to Polish agricultural crisis

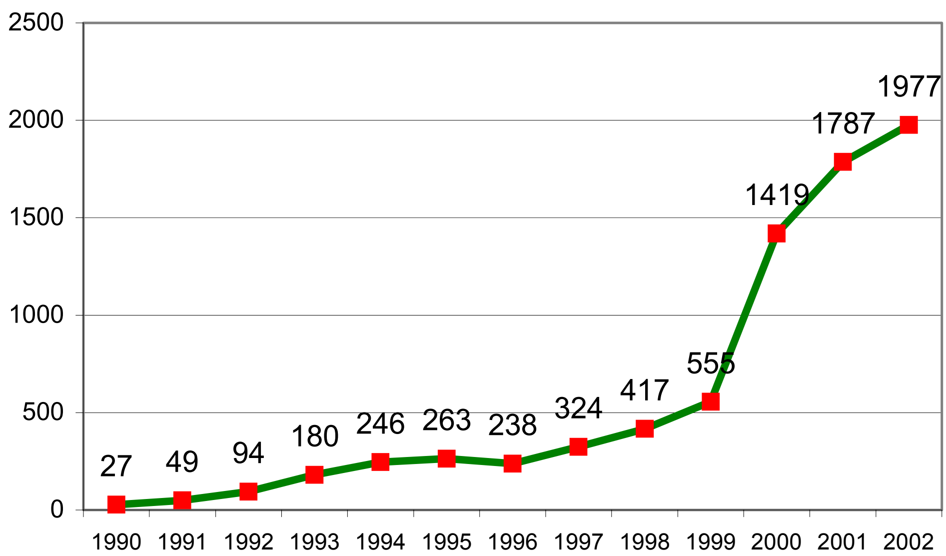
One of the means to restore the place of Polish agriculture in the national economy is the development of organic farms and the improvement of grassland management. The former may improve economic situation of farmers and decrease the unemployment. There are favourable natural and social conditions to develop organic farms in Poland, and organic products are sold at lower prices than those in the EU countries. Therefore, these products may have competitive advantage on the EU market.

Propagation of the idea of organic agriculture began in Poland at the break of the 1970s an 1980s. The development of organic farming is far less advanced in Poland than in some EU countries, though it has accelerated recently. Many training courses have been organised for farmers interested in organic methods of agricultural production. In consequence, some farmers have decided to convert their farms to organic production. But until the end of 1997, there was no state support for such a production, although as early as in 1990 the first 27 farms obtained appropriate certificates. The certificates were issued by “Ekoland” – the Association of Ecological Food Producers according to their own criteria.

Since 1993, the certificates for organic farms have been also granted by the Polish Society for Ecological Agriculture. In 1996, a certification body, named Agro Bio Test, was established and similar activity was undertaken in 1998 by Bioekspert.

However, the number of organic farms decreased between 1995 and 1997. They occupied 0.03% of the total cropland area in Poland. Recently, the situation has improved, particularly after the state budget began subsiding ecological crops and the costs of controlling ecological farms in the year 1999 (Fig. 1).

Figure 1: The number of controlled organic farms in Poland in years 1990-2002



In spite of a lack of legal regulations, the production carried out with organic methods has been subsided from the state budget since 1998. According to a decree of the Minister of Agriculture and Food Industry, financial support for the control of organic farms was directed to Agro Bio Test and the Polish Society for Ecological Agriculture. Later, the extension of support through direct subsidies to organic crops and control costs was planned in “Middle-Range Strategy for the Development of Agriculture and Rural Areas” - a document adopted by the Government on April 21st 1998.

Legal foundations of organic farming in Poland

In 1998, the Ministry of Agriculture and Food Industry, supported by the Team for Ecological Agriculture, initiated works on the project of an act on organic agriculture and on detailed regulations to this act. Resultant was the Act on Organic Agriculture of 16th March 2001 (Dz. U. 2nd May 2001, No. 38 poz. 452).

The act adjusted domestic regulations to those of the European Union i.e. to the Decree of the EC Council No. 2092/91 of June 24th 1991 on organic agriculture and its products and to the Decree of the Council No. 1804/99 of June 19th 1999, which supplemented the latter with the regulations on animal production.

Organic agriculture was defined indirectly through describing agricultural production with organic methods. The regulations involved agricultural production and food processing with organic methods, the system of controlling certificates for production and processing and the market for and labelling of organic products. According to the act, organic agriculture differs from other methods of management by using:

- crop rotation and other natural methods of maintaining and increasing biological soil activity,
- organic fertilisers, plant protection measures and fodder obtained in a way different from the industrial chemical synthesis,
- seeds and seedlings obtained from plants, which were cultivated for at least one generation (in the case of perennials – for at least two vegetative seasons) under conditions of ecological production, and
- election of species and breeds naturally resistant to diseases, particularly using local populations and breeds.

Fulfilment of the defined conditions puts some restrictions on producers as to the purchase of seeds and farm animals, which, according to the act, should come from ecological crops and farms. With the increasing number of farms and increasing demand for organic products, this might be a significant obstacle to the development of organic agriculture in Poland due to the lack of seed plantations and limited supply of farm animals that would meet the requirements of organic production.

The need for controlling environmental status, not required by the EU regulations, may arise some doubts. According to the act, an organic farm ought to be situated in the area, where concentrations of harmful substances do not exceed permissible levels. This requirement is associated with high costs and, moreover, it may be used to raise the unsubstantiated claims that soils in Poland are polluted and that their usefulness for food production should be verified, farm by farm, when organic conversion is planned.

The act adopted principles of supporting producers in the period of transformation and management of organic farms, which differ from those in the EU countries. In the latter, organic agriculture is subsided within the agricultural and environmental programmes (the decree No. 1257/1999) and results from unquestionable and positive effect of this type of agriculture on the environment.

In regard to permanent grasslands, the act on organic agriculture is focused generally on recommendations that grasslands should be managed in agreement with the principle of rational development of agricultural production by using natural means of production and should secure permanent soil fertility and healthy plants and animals. But in 2003, the Ministry of Agriculture and Rural Development began a widespread action promoting organic agriculture including fodder production on grasslands using organic methods within the PHARE project (PL01.04.04. – Komp.7). The authors of this presentation participate in the ministerial programme and are responsible for the preparation of training materials (instructions) for advisors and farmers. These materials will be used during the training courses foreseen in the programme.

The control of organic farms

The system of controlling and certification introduced by the act on organic agriculture is a state/private system that involves:

- the Minister of Agriculture and Rural Development as an institution licensing private certification units to carry the control and to edit certificates.
- Particular licenses are issued by:
    - the minister appropriate for agriculture – within the scope of agricultural production and acquisition of wild plants or their parts,
    - the minister appropriate for agricultural market – within the scope of processing ecological products,
    - the Inspectorate of Market Quality of Food Products, which is a supervising institution over the agriculture certifying units,
    - institutions licensed to certify organic agriculture.

In accordance with the act, in 2002, the Minister of Agriculture and Rural Development licensed four institutions to carry the control, issue and withdraw certificates:

- Polish Centre for Research and Certification (PCBC),
- AGRO BIO TEST Ltd.,
- BIOEKSPERT, and
- The Institution for Certification of Organic Production Ltd. (PNG).

The farms are inspected at least once a year by the institution that issues certificates. According to the act, the producer, who aims at carrying an organic farm applies to the certifying institution in writing and delivers:

- a statement that production will be carried out with organic methods,
- information on the type and amount of products that are to be produced with organic methods,
- description of the farm with the location of grounds, buildings and production means,
- an extract from the grounds record pertaining to the farm,
- a certificate stating that permissible concentrations of harmful substances have not been exceeded in the farm grounds (issued by the local Inspectorate for Environmental Protection in the case of air and water pollution and by the chemical-agricultural station in the case of soil pollution by heavy metals),
- description of actions that should necessarily be undertaken during transformation of the farm to organic production.

Conversion of farms lasts two years but the period may be shortened to one year for grasslands upon the agreement of the certifying institution and on the condition that plant protection chemicals and forbidden fertilisers have been not applied in the last three years.

Annotation on food labelling in the Polish act differs from that in the decree of EU No. 2092/91. The latter requires that organic products be labelled with the name of producer or his trade mark together with the code of certifying institution. The number of certificate is not required, however, in contrast to Polish regulations. A scheme of labelling the products of organic agriculture according to the act should contain:

- a notation "the product of organic agriculture",
- producer's name,
- the number of certificate,
- the name of certifying institution, and
- identity number of certifying institution.

Legal regulations determine also the principles of distribution of organic products and hold the distributors responsible for separation of raw materials and products of organic agriculture and for transporting them in closed containers labelled with information on producer and certifying institution.

Legal acts that regulate production, processing, certification, control and market of products of organic agriculture in Poland largely agree with the respective acts of the EU countries. This should allow for the dynamic turnover of these products between Poland and the EU countries, particularly in view of the prospect development of organic agriculture stimulated by the subsidies.

Organic farms in numbers in Poland

Certifying bodies controlled 1,977 farms in 2002 (by 10.6% more than in 2001) and 18 food processing companies (Figures 2 and 3).

Figure 2: Ecological farms in particular voivodships in Poland in 2001.

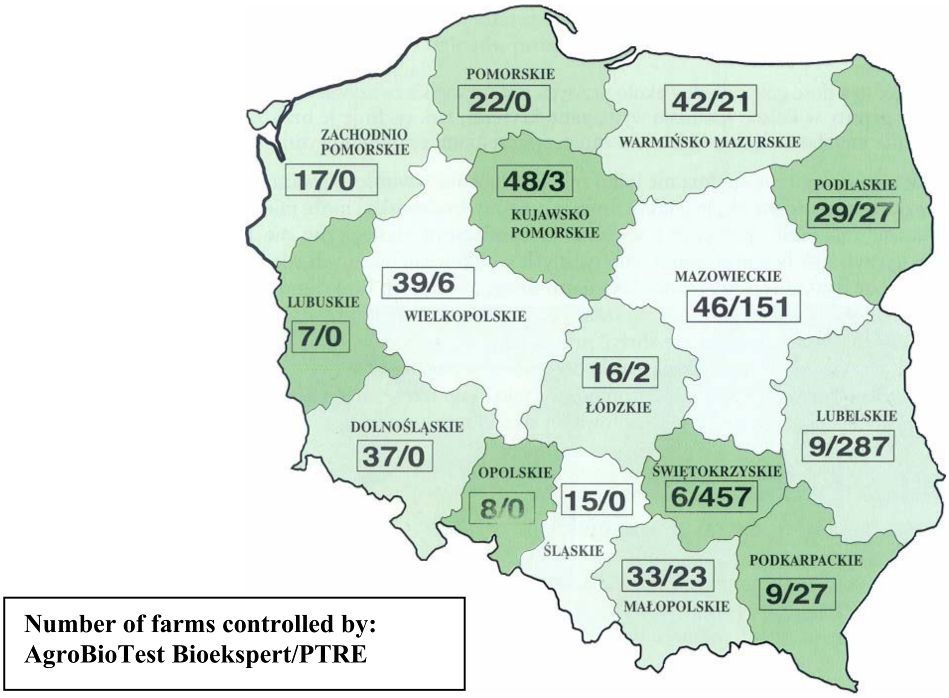
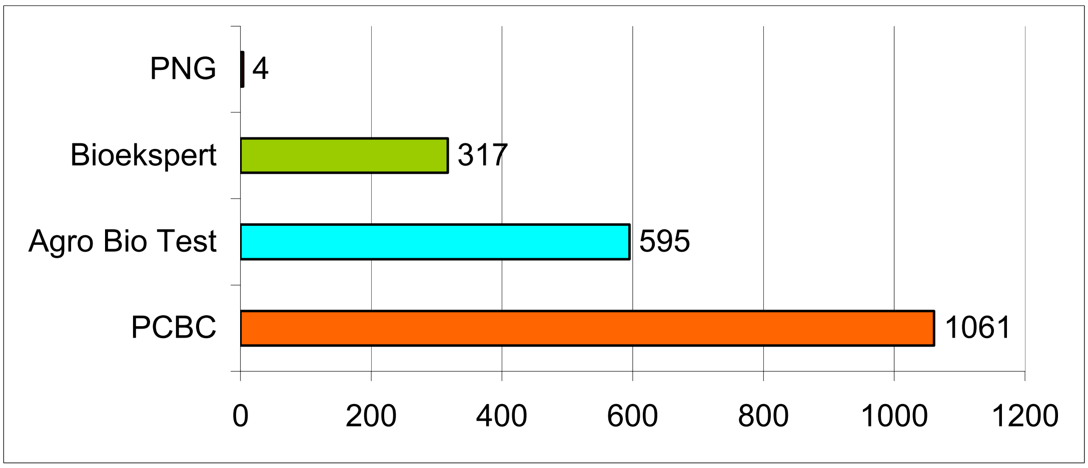


Figure 3: The number of certified farms by certification organisation in Poland in 2002.



Total area of the farms certified in 2002 was 53,515.4 ha, which means a 19.2% increase as compared with the year 2001 (Table 2). The area of croplands in the analysed year was 43,828.2 ha. 882 farms (of a combined area of 24,412.5 ha) out of 1,977 certified obtained the certificate of agreement. It means that these farms used ecological methods of production. There were 505 farms (13,522.2 ha) in the second year of conversion and 590 farms (15,580.7 ha) in the first year.

Table 2: The structure of ecological farms and their area in ha in Polish voivodeships (province)

Voivodeship (province)	The number of certified farms	Area of ecological farms (ha)	Croplands in these farms (ha)	The number of farms in the second year of transformation	Area of farms in the second year of transformation (ha)	Croplands in these farms (ha)	The number of farms in the first year of transformation	Area of farms in the first year of transformation (ha)	Croplands in these farms (ha)
Dolnośląskie	37	2.259.4	2.044.8	16	1.330.52	1.181.6	29	1.014.6	945.8
Kujawsko-pomorskie	45	723.68	644.16	11	257.59	240.58	7	271.40	255.8
Lubelskie	162	2.046.3	1.787.0	63	925.85	818.73	28	299.92	259.5
Lubuskie	17	1.305.1	1.250.2	2	39.49	38.97	3	85.95	85.56
Łódzkie	19	389.56	355.07	4	25.36	24.70	11	151.7	124.4
Małopolskie	86	1.634.5	1.404.1	65	1.776.02	1538	115	1.701.25	1.418.5
Mazowieckie	123	1.630.1	1.389.5	58	983.92	744.41	51	963.35	691.9
Opolskie	7	63.83	59.38	5	37.22	33.99	4	113.91	109.8
Podkarpackie	48	3.649.1	2.710.5	88	1.747.6	1.509.5	95	1702.2	1.361.9
Podlaskie	30	854.30	749.73	21	338.62	295.88	52	1.060.07	966.4
Pomorskie	23	1.408.3	1.249.6	9	591.34	509	7	242.47	193.4
Śląskie	12	53.58	41.41	2	10.67	7.83	22	205.92	176.8
Świętokrzyskie	180	1.520.1	1.381.5	111	1.083.21	914.15	97	1312.2	917.3
Warmińsko-mazurskie	49	3.722.2	3.035.5	24	1.415.75	1.139.2	31	2.634.64	2141.8
Wielkopolskie	28	1.312.4	1.123.5	7	212.32	187.04	4	130.86	129.3
Zachodnio-pomorskie	16	1.839.4	1.635.1	19	2.746.68	2.307.2	34	3.690.20	1.696.9
Total	**882**	**24.412.5**	**20.861.5**	**505**	**13.522.2**	**11.490.9**	**590**	**15.580.7**	**11475.**

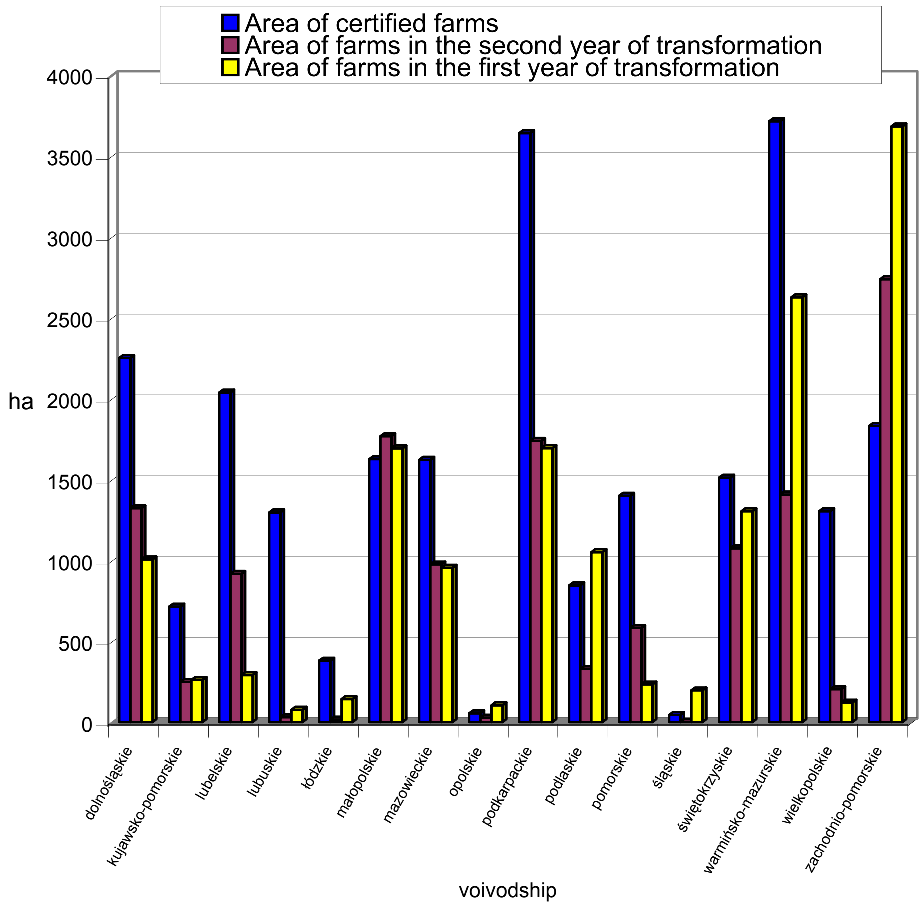
Areas of ecological crops and those during conversion in particular voivodeships are shown in Figure 4. Basic crops like arable crops, vegetables, orchards, berry plantations and grasslands covered 40,720.7 ha in the year 2002 (Table 3).

Table 3: Basic crops (in ha) in certified farms and in those during transformation

Item	Arable crops	Grasslands	Orchards	Berry plantations	Vegetable crops	*Total* **ha**
Certified farms	10 371.4	7 988.6	349.8	533.7	473.3	**19 716.9**
Farms in the second year of transformation	5 326.0	4 973.7	105.6	156.7	107.7	**10 669.7**
Farms in the first year of transformation	4 506.2	5 321.3	166.9	181.8	157.9	**10 334.0**
Total ha	**20 203.6**	**18 283.6**	**622.3**	**872.2**	**738.9**	**40 720.6**

Most certified farms were situated in świętokrzyskie (388), lubelskie (253), mazowieckie (232) and podkarpackie (231) voivodeships (province). Certified farms covered the largest area in zachodnio-pomorskie (8,276.35 ha), warmińsko-mazurskie (7,772.68 ha), podkarpackie (7,098.98 ha) and małopolskie (5,111.82 ha) voivodeships. Mentioned areas constituted 52.8% of those in the remaining voivodeships.

Figure 4: Area of organic crops in year 2002 (ha) in Poland



Land use on organic farms

The largest areas were covered by arable crops (20,203.6 ha) and grasslands (18,283.6 ha), the smallest – by orchards (622.3 ha). Percentage share of certified crops is presented in Figure 5 and that of certified and in-conversion crops Figure 6.

Fig. 5. Percentage share of particular certified ecological crops

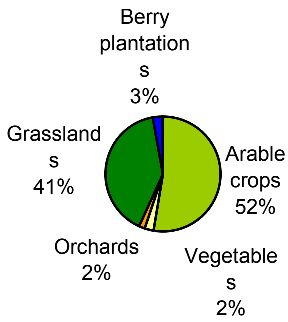
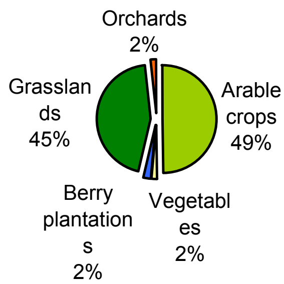


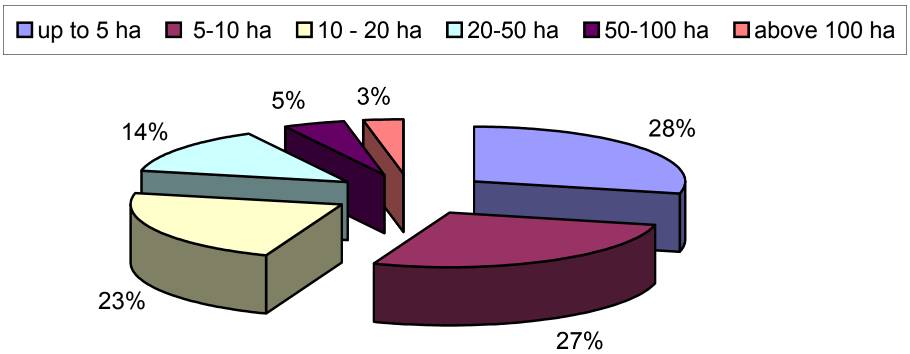
Fig. 6. Percentage share of particular certified and transformed crops



The size of farms

Most numerous (1,550) were small farms (up to 5 ha, from 5 to 10 and from 10 to 20 ha), which comprised 78% of the total number. The farms larger than 50 ha constituted 7.7% of the total number. The structure of farms is presented in Figure 7.

Figure 7: Structure of organic farms in Poland in 2002



Subsidies

Subsidies have been paid to organic farmers in Poland since 1999. 1,910 farms were subsided in 2001 (supported crops and the costs of control). Subsided crops covered an area of 30,353.1 ha in the year 2002, i.e. by 62.9% more than in 2001 (Figures 8 and 9). The size of aid for organic farms and for farms converting to organic farming is shown in Table 5.

Figure 8: Subsided organic crops (in ha) in 2001 and 2002 in Poland.

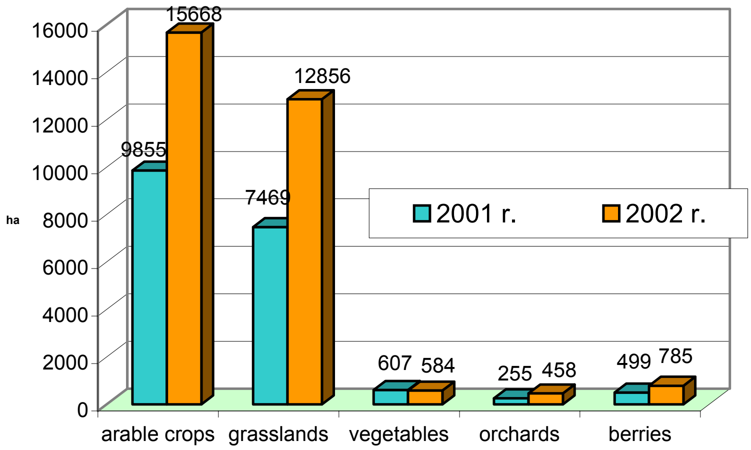


Figure 9: Percentage share of the subsidies to particular organic crops in Poland.

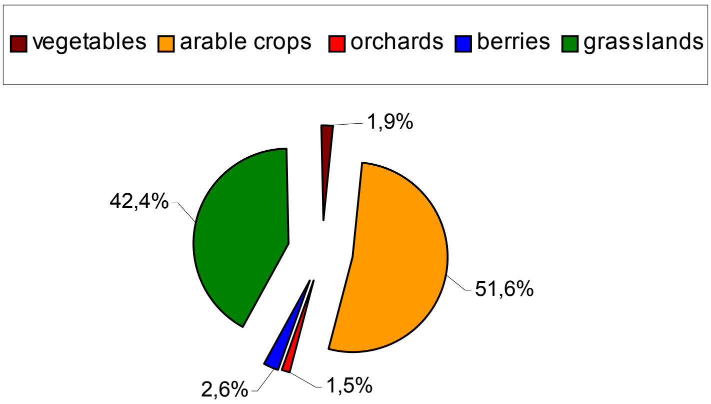


Table 5: Aid for organic farms and for farms converting to organic farming (according to Annex No. 17 of the Decree of May 22nd 2002)

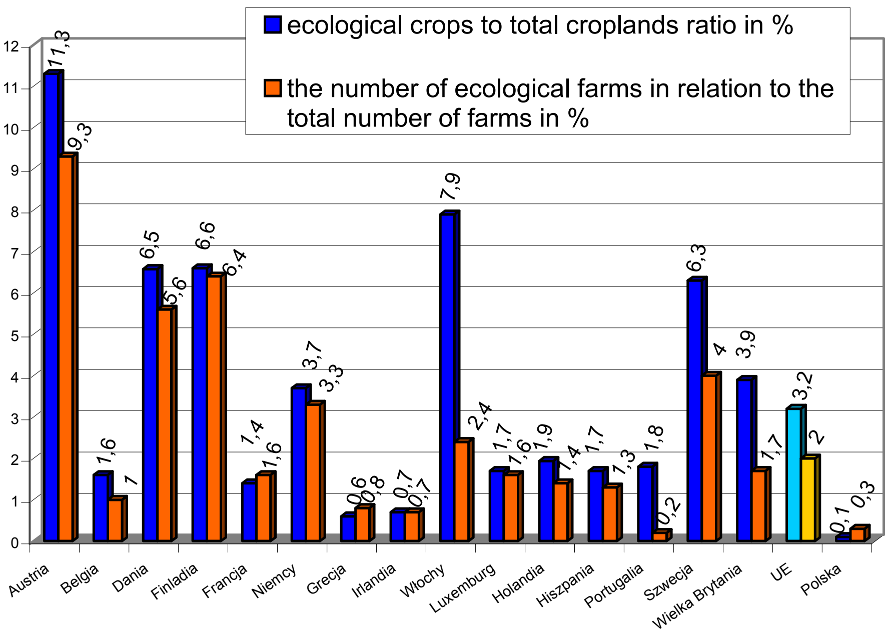
Crop	SUBVENTION FOR 1 HA IN EURO	
	In conversion	Organic farms
Vegetables	125	100
Arable land	50	37
Orchards	137	112
Berries	137	125
Meadows and pastures	20	12

subsidy for the farms of a surface:
up to 50 ha – 100% of the sum for 1 ha,
over 50 ha to 100 ha – 50% of the sum for 1 ha,
over 100 ha: no subsidy.

Poland's contribution to organic agriculture in the EU

Ecological croplands covered 43,828 ha in Poland in 2001, which made 0.26% of the total cropland area in the country and the number of ecological farms (1,977) equalled 0.1% of the total number of farms. Ecological croplands in Poland covered an area equal to 1% of the respective croplands area in the EU countries (Figure 10).

Figure 10: Organic agriculture in the EU and Poland



Summary

Agriculture in Poland differs between regions in the natural and economic conditions and in the type of infrastructure. This will markedly affect the dynamics of economic processes in particular regions, including the development of organic agriculture in Poland. Low consumption of mineral fertilisers and plant protection chemicals, hence a more extensive character of agricultural production as compared with that in many other EU countries should favour this development.

An increasing interest in organic food is noteworthy. This phenomenon will intensify in the future, as consumers are more inclined to buy healthy food of highest quality, devoid of conserving agents and pollutants.

To achieve a higher share in the food market, one has to guarantee the consumers that the food they buy meets their expectations. It is thus necessary to create certification system based upon the act on organic agriculture to adjust domestic legislation to that in the EU countries. Only then Polish products of organic agriculture could be sold in both domestic and European market.

It should be pointed out that after Polish accession to the European Union, a large part of farmers will be forced to leave conventional agriculture. Greater labour consumption in organic agriculture, together with the increasing demand for organic products, may create more available workplaces.

In conclusion, the Polish legislation on organic agriculture has regulated main problems pertaining to organic production, food processing with organic methods, labelling and distribution of organic products and, first of all, the system of controlling. Further development of organic agriculture in Poland will depend on common advisory and training services, on the activity of research institutes and on financial support from the state budget directed to production and control.

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The economy of organic livestock production enterprises in Andalusia, Spain – two case studies

R.G. Trujillo[1], J. Fernández[2], T. Haba[2] and P. Blázquez[2]
[1] Research an Education Center on Organic Agriculture and Rural Development of Granada
C / Pablo Iglesias s/n. 18320 Santa Fe, Granada, Spain.
[2] Producer

Introduction

Organic livestock production in Andalucía is not a well-developed sector. The main exploitations are cattle, sheep and goat systems, primarily dedicated to meat production. These are extensive systems, based on grazing and browsing of grass and bushes, or integrated in different crops, like the case of sheep in olive groves or hens in citrus orchards.

The present work is based on two case studies from the county of Cordoba.

Case 1. Integrated organic sheep and pig production in an agroforestry system in Cordoba

The enterprise is located in a region with an extensive surface of agroforestry, named dehesa. The dehesa is constituted of oaks (*Quercus ilex*) in densities between 40-50 trees/ha, whit grasses covering the floor. In the system, two main livestock combinations are found: pig-sheep and pig-cattle, both dedicated to meat production. The principal animal breeds are Iberian autochtonous pigs crossbred with Duroc Jersey pigs, Merino sheep and various cattle breeds and crosses. The main feed for rumiants is are grass with tree prunings and hay produced in the dehesa, while acorns from the oaks are reserved for pigs.

The case study system is an exploitation of 38.7 ha with Iberian pigs and Merino sheep. A total of ten sows produce some 108 piglets per year. Between 25 and 40 of them are left on the property to fatte, depending on acorn production. The rest of piglets are sold after weaning. The 125 Merino sheep are crossed with male Fleischaft and Landchaf, in order to improve meat characteristics of lambs. Sheep produce on average 1.5 lambs per year. These are weaned at the age of 2.5 to 3 months and at 22 kg of liveweight. The mean livestock density on the property is between 0.66 – 0.57 CU/ha, a little lower than on conventional adjacent farms.

The farmer does not deworm animals, neither apply vaccine, nevertheless problems, such as brucellosis, enterotoxemia or parasitism are not present on the farm, despite of being usual problems on the conventional farms of the region.

Some data of the production and sale prices are presented in Table 1.

Table 1: Animal sales and prices on the first case study farm

	Animals sold	Live weight (kg)	Price for sale (€/animal)
Piglets	65-80[1]	19	34.7
Lambs	164	22	59.7
Pigs	40-25	155	307.8

[1]Depending of the year, i.e. normal or low oak acorn production.

The economic performance of the exploitation in shown in Table 2. At the present time, this exploitation is not receiving premium price for its products because they are sold in the conventional market, due to difficulties in establishing marketing channels for its organic products.

Table 2: Economic performance of the firs case study farm (values in €)

	Organic system	
	Normal year[1]	Defective year
		Costs
Feeding and fuel	6,708	5,865
Salary and social security	8,864	8,864
Veterinarians	301	301
Investments and maintenance	1,611	1,611
Others[2]	747	747
Subtotal costs	18,231	17,388
Income		
Production	24,317.65	20,221.15
Grant	9,497.49	9,497.49
Subtotal income	33,815.14	29,718.65
Profit	15,646.97	12,393.40
Profit/ha	67.27	53.28
Family Income	21,657.10	18,403.52

[1]Year with a low acorn production, that only affect pigs
[2]Other costs includes organic certification and taxes

In the case of the lambs sold as organic and according to the prices in organic market at the cities near the enterprise, the benefit for that would be increased to 468 and 384 €/ha, for good and bad year of acorn production, respectively.

Cost of carcass lamb production was 4.18 €/kg, sale price of lamb carcass at enterprise level (without premium price) was 5.45 €/kg and the possible price with premium price would be 7.09 €/kg if the lamb was sold as organic to a wholesaler company.

Case 2. Lamb production in olive grove at Cordoba county.

This enterprise is located at the north of the county of Cordoba. In this region, there are extensive areas planted with organic olive groves and meadows. Currently, there are 12,225 ha of organic olive groves and 3,404 ha of organic meadows (CAAE, 2002).

In a survey carried aout in the area, it was found that 86.9% of the organic olive grove enterprises had some type of livestock for weed control, while in convetional olive groves, livestock was used only in 30.8% of them (Alonso, 2003).

The study case is an enterprise that consists of two units. One of them is a 58 ha olive grove and the other a 38 ha of meadow farm (dehesa). The olive grove has a density of 129 trees/ha. The olive unit is divided in four areas that allow the management of olive groves and livestock. The livestock unit is a flock of 200 Merino sheep and 7 horses. Sheep arrive at the olive grove by the middle of December and remain there until the end of March. If the year is rainy enough, they can remain until May, returning again to the meadow where they feed with natural grasses, acorns and hay.

The four parcels of the olive grove unit are of similar size and they are managed in the following way:

- Parcel 1: Prune olive trees (every four years).
- Parcel 2: Apply organic matter from compost made with oil by-products and manure from sheep and horses.
- Parcel 3: Sow vetch (Vicia sativa) as green manure and feed for sheep.
- Parcel 4: Clear branches of olive trees to avoid fungi.

Sheep always enter in parcel 1 where they eat grasses and olive grove prunings, remaing in this parcel for some 60 days. Later on, they enter in parcel 4, grazing grass and olive leaves from foliage. In this parcel, they stay for some 45 days and, finally, in April they move into parcel 3 to graze vetch, sown in October. Sheep do not enter in parcel 2, because after the pruning, olive regrows are tender and sheep can damage these new branches. This parcel is grazed by horses that remain in the olive grove all the year around.

Sheep mate naturally and in groups of 40 in order to maintain lambs supply for the market during the whole year. Sheep are supplemented to stimulate gestation with 0.5 kg/day of organic concentrates 15 days before mating. Sheep fertility is at about 1.5 lambs per sheep per year. Lambs are weaned at two months of age with about 22-23 kg live weight. In this period, each lamb eats about 20-25 kg of organic concentrates.

The stock has not been vaccinated or dosed with anthelmintics for seven years. They do not have problems with brucellosis, tuberculosis, lamb diarrheas or enterotoxemia, which are common in conventional enterprises in the area. Problems with pneumonia in sheep have been solved by delaying shearing until mid May. External parasites have disappeared since tail docking of sheep was discontinued. If external parasites are detected on any individual animal, it is separated for two or three days and treated with home-made soap. Lamb mortality is around 5-10%, mainly due to premature birth and lack of milk in the dams.

Lamb production is 6,480 kg live weight per year (68.2 kg/ha). In addition, three foals are produced every year. Oil production is approximately 20,000 kg per year. A detailed description of the enterprise can be found in Garcia Trujillo (2002b).

In this case, oil and lamb production receive premiun prices. The producer sells carcass lambs in vacuum packs directly to organic stores.

The economic balance (Table 3) shows an important benefit for this exploitation, where animal production contributes with 27.7% of total profit. Profit/cost rate is high, with valuesof 2.34 €, 1.49 € and 2.02 € of profit per spent euro in the olive grove system, sheep system and total system, respectively.

In a recent study carried out in this region comparing organic and conventional olive grove production (Alonso, 2003), a profit/cost rate of 0.84 € in the organic system and 0.28 € in the conventional one was reported. The difference between our study case and this one is due to a higher oil production per ha and a 24% lower production cost, mainly due to the synergy produced by the sheep inclusion (a very well integrated system) and to the direct lamb marketing.

Table 3: Economical balance of an integrated sheep-olive grove production system (values in €)

	Olive grove subsytem	Sheep Subsystem	Total system
Costs			
Feeding		4,490.10	4,490.10
Veterinarians		300.00	300.0
Salary and social security	22,735.23	3,851.69	26,586.92
Investments	2,251.1	1,891.80	4,192.90
Others	2,383.35	5,891.23	8,224.08
Subtotal	27,369.68	16,484.22	43,794.00
Incomes			
Production	56,002.50	31,350.00	87,352.50
Grant	35,370.45	9,620.00	44,990.45
Subtotal	91,372.75	40,970.00	132,342.95
Profit	64,003.27	24,545.18	88,548.46
Profit/ha			
General	1,103.50	258.37	932.09
Olive grove subsystem2			1,188.77
Dehesa subsystem			170.52
Family income3			94,875.50

1 In the sheep subsystem it is included the payment to organic certification and the slaughtering, packaging and distribution lamb cost.
2 We considered that 33% opf animal production was carried out in the olive grove subsystem.
3 We considered family salary and profit.

In this system, lamb carcass production cost is 5.24 €/kg, lamb carcass packed in vacuum sale price to retailers is 10.70 €/kg and final sale price to public is 14.23 €/kg.

Discussion

In both studies of organic lamb production, lamb mortality was low and, in general, around 5%, although some years it can rise up to 10%, despite of the fact that the main lamb health problems in the area are not present in the two enterprises. In a present work in conventional sheep and meat goat exploitations in Granada county, we have found high levels of diarrhoea and white muscle disease in lambs and kids. Lamb mortality is 19.40% (±0.09) and mediactions, vaccines and veterinary cost are 4.39% (±3.28) of total cost (between 0.6-11%), while in the analyzed organic enterprises, cost related to illness was 0.6%. These data suggest that there are animal health advantages of organic systems, either by death rate reduction and in minor medication costs.

Lamb production allows comparisons between cases 1 and 2 and with conventional lamb production. Cost of production is smaller in the organic system. Generally, the organic farms spend less on concentrates than conventional ones, although conditions are not completely comparable (Table 4).

Table 4: Lamb production cost and sale prices in diffrent points of market chain (€/kg carcass)

	Production cost	Producer's sale price	Public sale price
Case 1	5.24	10.711	14.23
Case 2	4.18	5.452	8.54
Conventional4	6.69	5.143	8.54

1 Organic. Sold to retailer in carcarss packed in vacuum.
2 Organic. Lambs sold alive to middleman at the farm at conventional price.
3 Conventional. Sold alive to middleman at the farm.
4 Study of 8 cattle breedeers rearing sheep and meat goats in Granada county.

It should be noted that, in Case 2, if the producer sold alive lambs as organic to a processor company, he/she could sell the production at 7.46 €/kg of carcass to maintain public sale price at 14.23 €/kg. Conventional sucking lamb type with a carcass weight of 7-9 kg is sold at 15.24 €/kg in final market. This price is higher than organic. On the other hand, conventional lamb producers sell lambs below the production cost, or for very low profit based on production grants. Many of these conventional enterprises only cover a low wage for the owner.

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Organic livestock production and marketing of organic animal products in Austria

S. Wlcek[1], M. Eder[2] and W. Zollitsch[1]
University of Natural Resources and Applied Life Sciences Vienna, [1] Institute of Livestock Sciences, [2] Institute of Agricultural Economics, Gregor Mendel-Str. 33, A-1180 Vienna.

Introduction

In Austria, about 298,000 ha of agricultural area (without alpine pastures) was cultivated organically in 2002, which is about 11% of total agricultural acreage. Two thirds of this area is permanent grassland, and is situated in the mountainous regions of Austria. During the last few years, organic permanent grassland area have remained constant, while the area of organic arable land has been growing. This development reflects the fact that arable farms are more profitable than grassland farms due to high demand for cash crops, while marketing of organic milk and beef is reaching its limits.

Organic livestock in Austria

In 2001, 12.8% of all Austrian dairy farms were organic and kept 14.6 % of all dairy cows. About a quarter of all suckler cows and sheep (24.2 % and 25.4 %), respectively, were on organic farms. Compared to conventional farms, the size of organic dairy herds, suckler cow herds and sheep flocks was larger, while pig herds and chicken flocks were smaller (Table 1). During the last few years, organic dairy stock has decreased, while sheep and pig stock has remained constant and chicken stock increased markedly. There is an obvious trend from dairy to suckler cows, probably because of the difficult market situation for organic milk and milk products (in 2000, the degree of self-sufficiency in organic milk was 112 %; Hamm *et al.* 2002).

Table 1: Organic livestock compared to total Austrian livestock 2001 (Source: BMLFUW 2002)

	organic farms	**stock**	**all farms**	**stock**	**% organic farms**	**stock**
Dairy cows	9,558	87,036	74,410	597,981	12.8	14.6
Suckler cows	9,173	62,455	54,274	257,734	16.9	24.2
Cattle	14,313	319,346	94,284	2.118,454	15.2	15.1
Sheep	2,796	81,454	17,755	320,467	15.7	25.4
Goats	3,162	17,244	12,799	59,452	24.7	29.0
Pigs	6,364	33,250	75,347	3.440,405	8.4	1.0
Chickens	8,227	387,348	84,447	11.905,111	9.7	3.3

Marketing and consumption of organic animal products

About 14% of total milk production (470,000 tons) and 18.3 % of sheep and goat meat (1,500 tons), respectively, come from organic farms, while EU average is only 1.5% and 0.8%, respectively. The Austrian market could not cope with these large amounts, therefore, not more than 50, 46 and 33% of milk, beef and sheep/goat meat, respectively, could be sold as "organic". By contrast, 80, 89 and 89% of organic pork, poultry and eggs, respectively could be sold as organic (Hamm *et al.* 2002).

In Austria, a very important marketing channel for organic products is public canteens. About 80 public canteens (hospitals, schools, the army) are using organic products to provide for 15,000 customers per day. It is demanded by a resolution of the Lower Austrian provincial government that at least 25% of all commodities (volume based) have to be organic. Main products are milk and dairy products, bread, beef and seasonal fruits and vegetables (Kaiblinger 2003, Raffeiner 2003). Kicker (2003) estimates the share of organic beef marketed to public canteens to be 27% of the overall beef put on the market.

Performance and health of organic livestock

Schwarzenbacher (2001) compared 261 organic and 2245 conventional Simmental dairy herds in Lower Austria and found lower milk yields in organic dairy farms (-423 kg), but organic cows with a higher longevity (+0,33 y) than conventional ones (Table 2). Milk protein content was roughly 0.1 % lower in organic than in convetional dairy cows (Schwarzenbacher 2001, Zollitsch et al. 2003), probably due to the smaller amounts of concentrates fed to organic cows. Concerning animal health, organic farmers see improvements rather than a deterioration after conversion, with leg disorders being an exception (Figure 1). Omelko and Schneeberger (2003) evaluated 94 and 388 organic and conventional pig farms, respectively, by questionnaires. They found that only 51% and 85% of organic farms keeping growing pigs and sows, respectively, record the performance of their pigs (Table 3).

Table 2: Comparison of herd performance of organic as compared to conventional Simmental cows (Source: Schwarzenbacher 2001)

Trait	Conventional	Organic	Difference
Herd size (cows)	15.7	15.0	-0.7
Milk yield (kg)	6,209	5,786	-423***
Fat content (%)	4.22	4.11	-0.11***
Protein content (%)	3.45	3.34	-0.11***
Cows age (years)	5.05	5.41	+0.37***
Longevity (lacations)	2.89	3.19	+0.30***
Lifetime production (kg)	15,699	16,233	+534***

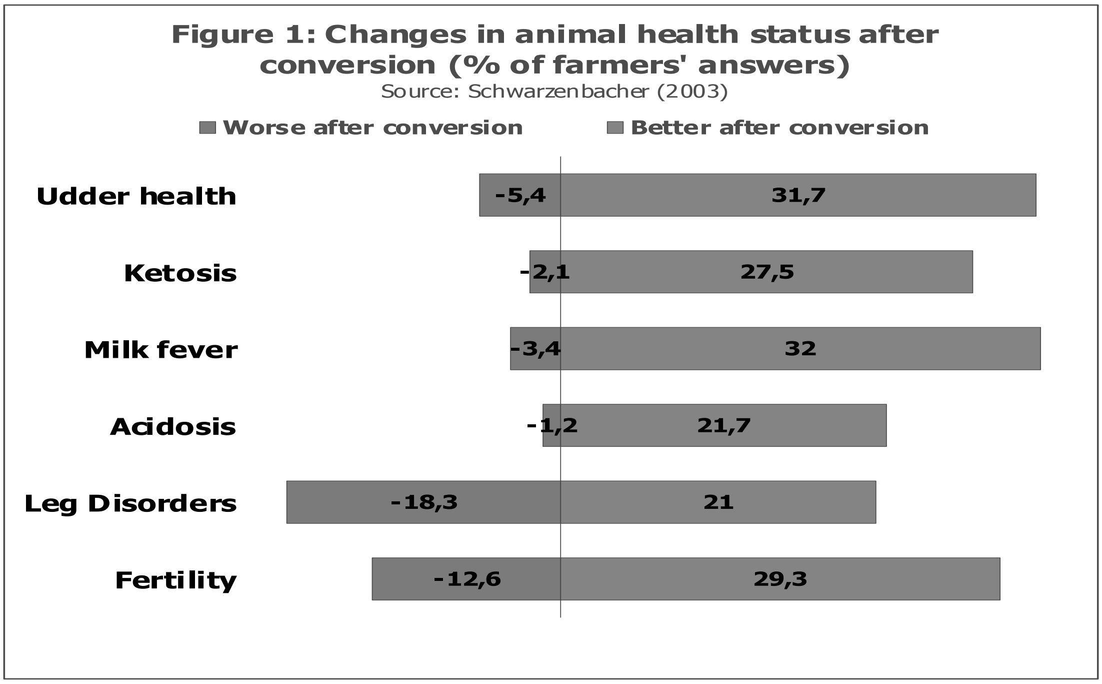
***...P<0.001

Table 3: Comparison of herd performance of organic as compared to conventional pigs (Source: Omelko and Schneeberger 2003)

Trait	Conventional[a]	Organic[a]
Piglets per sow and year	21.0	18.6
Litters per sow and year	2.16	2.05
Suckling period (days)	29.8	--[b]
Fattening period (days)	119	129
Lean meat (%)	58.7	56.9
Feed efficiency	2.9	3.2

a...no statistical comparison has been made; b...no data available, minimum requirement of 40 days according to EU-Regulation 1804/99 (Council of the European Union 1999)

Figure 1: Farmer perception concerning animal health status after conversion to organic production on Austrian dairy farms (Schwarzenbacher, 2003).



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Rearing healthy meat sheep at a reasonable cost: the Redon-Orcival project in France

M. Benoit, G. Laignel and J. Cabaret
INRA, Laboratoire d'économie de l'élevage, 63122 Saint Genès Champanelle, France
INRA, Bioagresseurs Santé Environnement, 37380 Nouzilly, France.

Introduction

The French ovine population has been continuously decreasing at a rate of 1% since 1981 and 85% of the ewes are located on farms in difficult environmental conditions (altitude, climate and soil). The average income of a lamb producing farm was 8,600€ in 1999, this being the lowest farm income in the high altitude zones (>600 m) (Benoit and Laignel, 2002). Organic farming, offering higher income, is potentially an alternative for breeders in these disadvantaged zones.

Organic lamb production in France has grown to 3.5 times the level recorded five years ago. Since 2000, the farmers have had to follow the specifications of the European Union, complemented by the French regulations. The main constraints are: the concentrate proportions limited to 30-40% of the daily ration, fattening of lambs on pastures, limitation of treatments and the ban on hormonal treatments for heat synchronising. Depending on the type of farm, each of these limitations may play an important role. In the mountain zones, each one may be a real difficulty, but the main problems appeared to be 1) lambing outside the natural lambing season, e.g. from January to April (without hormonal treatment and with the necessity to consume large amounts of concentrates) and 2) the management of helminth infections on pastures (Cabaret, 2003; Cabaret J., Mage C., Bouilhol, 2002).

Most of the information available on organic farming is available from private farms, which limits the range of investigations. Two experimental farms at INRA Theix were available for conversion and they provided a unique opportunity to perform either systemic (Redon, 800 m above sea level) or analytic experiments (Orcival, 1100 m).

Materials and methods

The study sites characterisics

The sheep belong to the Limousine breed. They have the same genetic background as they were bred in Redon, and the progeny in excess .was progressively introduced in Orcival. All sheep were reared extensively during the 10 years preceding the organic conversion. The stocking rate is 0.75 livestock unit/ha while the potential in local conventional systems is 1.2. A brief description of the two sites is given in Table 1.

Table 1: A description of INRA Redon and Orcival sites.

Redon =site 1
All organic / homeopatic practice (100 ewe/flock)
Flock R1 : one lambing every year
Flock R2 : three lambings every 2 years
Parasites : digestive tract strongyles + protostrongylids
Orcival = site 2
Smaller flocks, 50 ewes/flock, one lambing every year in may for O1 and O2, December for O3)
Flock O1 : reared as organic, firstly homeopathic and phytotherapic, then individual classical synthetic treatments
Flock O2 : conventional low input, not organic, synthetic group treatment
Flock O3 : "traditional" with cattle mixed grazing, not organic
Parasites: digestive tract strongyles + small liver fluke

Flock records

The prolificity, mortality of ewes and lambs, weight of lambs, prices at which they were sold, were recorded. The gross margin per ewe was calculated. Faecal samples were taken monthly in order to assess the parasitological status of the ewes and lambs by an indirect method based on the numeration of nematode eggs per gram of faeces (EPG). Coccidiosis in lambs was studied on several occasions (species and oocysts counts in lamb faeces). A general linear model (GLM) statistical procedure was used for comparisons of EPG. Necropsies were also performed to identify the helminth species at the end of each grazing season on at least 3 animals of each flock.

Results

Organic versus low input conventional (O1 vs O2)

The reproduction performances were similar, but much fewer pathogenic problems were recorded in the organic flock. For example, lamb deaths were recorded in the conventional system after turning out in 2002. These were probably linked to coccidiosis The GLM estimated EPG (strongyles) were nearly identical during three at 38 and 34 eggs per gram of faeces.

Three lambings versus two lambings every two years (R1 vs R2)

The results were similar in both groups as shown in Table 2.

Table 2: Production and mortality rates and economic returns in two flocks reared organically

Year	2000	2001	2002
Prolificity (no of lamb born for 100 lambings)	158/156*	160/153	166/153
Mortality(lamb) % of dead lambs after lambing and before being sold	12/15	14/26	13/12
Mortality (ewe) % females that died for 100 females over one year of age	7/9	7/7	3/3
Gross margin € /female over one year of age	63/34	60/57	76/78

*one lambing/year vs 3 lambings per 2 years.

The GLM estimated EPG were 80 eggs (1 lambing each year) and 161 eggs (3 lambings in two years).

General evolution of the flocks (O3 versus others)

The O3 (traditional with cattle mixed grazing) flock was not fully evaluated for zootechnical and economic parameters, as it was in very different situation (mixed grazing with cattle, no lambs on pasture). The strongyle nematode species composition did evoluate during the four years of study in all the flocks except O3. The number of species was reduced in all the flocks except O3. The following evolutions were recorded in the R1, R2, O1 and O2 flocks during the four year study:

- *Teladorsagia* : no change;
- *Haemonchus* : rare, no change;
- *Cooperia curticei* : strong decrease;
- *Trichostrongylus axei* : strong decrease; and
- *Trichostrongylus colubriformis* : decrease.

The intensity of infection was reduced in all groups except O3 .

Discussion

The conversion from conventional to organic was achieved without great difficulties, as shown by flock performances, economic returns and internal parasites records. This might be due to the fact that these flocks were not reared intensively before conversion. Gross margins in 2002 were similar to those recorded in the organic private farms (76€) of the region (Benoit and Laignel, 2002).

All the flocks that were technically managed differently before conversion became highly similar in their performances. The changes were important both in Orcival (no more mixed grazing with cattle in O2 and O3, ewes and lambs grazed together, production of heavier lambs) and in Redon (reduction of the number of helminthic treatments, intensification of reproduction effort). The information and guidance given to the shepherds and workers were homogeneous. This support was a new feature, as the staff had received limited guidance to run the flock before conversion. This is indicative of a strong human factor that may influence the technical results and, hence, economic returns. This proposal is also corroborated by the improving results from one year to another in the same flock, as if learning to manage better was the main factor for flock production improvement. The study undertaken included a large array of specialists (from soil/pasture to meat quality) and there is a need to gather all information for constructing a more holistic evaluation of the flock production systems.

Acknowledgements
We thank the staff of both experimental farms for their efficient help. Financial help of CIAB (INRA Committe for Organic Agriculture) and FEOGA is acknowledged.

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Part E:
Report from the working group on standard development

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1st Report of the Working Group on Standard Development

M. Walkenhorst and A. Sundrum

Introduction

The initial meeting of the working group on standard development took place at the 1st SAFO-Workshop, September 2003, in Florence. In accordance with the main topic of the Workshop, the discussion was primarily focused on the relationship between socio-economic aspects of the standards and the issue of animal health and food safety in organic farming.

In order to compile information about the current situation in the different European countries and to get to know the main constraints in the transformation of the standards, a questionnaire survey will be carried out in the near future. The questionnaire will be developed before the 2nd SAFO Workshop in March 2004. The members of the Working Group are responsible for sending out the questionnaire to various representatives in the different countries, including stakeholder groups and specialists in organic livestock farming. Main emphasis will be put on the question of how far and in which way the current EU standards are expected to influence animal health and food safety in different regions and in different farming conditions. Opinions on which direction the regulations should be developed will also be sought. The results of the survey and the conclusions by the Working Group will be presented and discussed at the 2nd and 3rd SAFO Workshops.

The following report cover the additional issues discussed in the 1st Working Group meeting in Florence.

What is the outcome of "standards"?

Organic standards describe the minimum of what is expected in relation to the transformation of the code of practice and, therefore, define a production process and a minimum of 'process quality'. The level of standards is always a compromise between the interests of different groups of stakeholders and, as a consequence, a compromise between principles and reality. There is, or should be, a development within the standards to adapt the rules to changing conditions and expectations. On the other hand, there is a risk that an adaptation process may weaken the overall goals and principles.

Standards provide an opportunity to control and certify the transformation of the standards into practice. They do not guarantee a specific, intrinsic quality of organic livestock products. On the other hand, consumers expect that organic products are of a higher product quality than conventional products, as a result of the production process. The confidence of the consumers in organic products and their willingness to pay premium prices will depend on the future developments, i.e. whether the gap between the expectations and the provided quality can be reduced.

Who are the stakeholders?

Farmers

In organic livestock farming, a lot of different stakeholder groups are involved. First of all, there are the farmers. Pioneering organic farmers tried to put the main principles of organic agriculture into practice and developed the organic concept in opposition to the mainstream agriculture.

Consumers, market place

As the production is driven by consumer demand and depends on the willingness of consumer to pay premium prices, consumers are important stakeholders, by and large, represented by the market for organic products. In addition, food wholesalers and retailers play an important role, as they are paying increasing attention to the presumed expectations and wishes of a broad segment of current and potential consumers of organic foods. Several studies and surveys show that there is a discrepancy between consumer expectations and the level of production quality that can be provided by standards. These findings imply a risk of confidence loss in organic produce among.

Society

A third group, with an interest in organic livestock production, is the society itself, by and large, represented by policy makers and governments. Their expectations are likely to be that the organic livestock farming provides better animal welfare and that agro-ecosystems are more sustainable than the conventional systems.

Animals, farms

Additionally, it has to be discussed whether farm animals themselves could be seen as a stakeholder group, accepting that livestock are sentinel beings. Also, an agro-ecosystem, like a farm, can be seen as a stakeholder, as each ecosystem requires specific resources (nutrients, labour, investment etc.) in order to function within a holistic approach as a sustainable ‘farm organism’.

What are the resources?

Two of the stakeholder groups that deal directly with resources: farmers and the public (including policy makers, governments and the consumers). On the farmer side, the main resources are labour (as a human resource), soil, climate, structure of landscape (and others as a natural resource), home-grown feedstuffs, production capacity of the animals, etc.. The public has to pay for the deliveries direct by way of surpluses on prices for organic livestock products, or indirect by subsidies. Here the resources are the willingness to pay premium prices and the economic capability to do so. It will be of high relevance for the future development of organic livestock farming whether the resources of the two groups can be brought into a balance.

To what degree do standards influence animal health and food safety?

The EEC Regulations on organic livestock production have, among others, the objective to provide good conditions for a high status in animal health and welfare by stipulating adequate space allowances in the indoor and outdoor areas and by providing litter in the lying area. On the other hand, feeding, as one of the most important factors of health, is not well-defined in the standards under species specific physiological aspects. Furthermore, the measures, which should be carried out in a case of disease, are not very specific or formulated in great detail. Therefore, it is justifiable to assume that the standards do not guarantee a high level of animal health and welfare. Currently, reliable data are missing to support or reject this hypothesis, as existing, published data offers evidence both in support and favour of it, being sometimes even contradictory.

In the standards preceding the current EEC Regulation on organic livestock production, direct controls of animal health were not part of the regulation. The question arises, whether the on-farm control of preventive measures or a direct measurement of animal health status on farms would be a suitable tool to improve the situation and would ensure a high animal health and welfare status in organic livestock farming.

How far do the standards have an influence on food safety?

In the current EEC Regulation, the requirements to use 100% organic feedstuffs (derogation until August 2005) and to implement a prolonged withdrawal period following the use of with chemically synthesised veterinary medicinal products are the most relevant regulations of the standards in relation to food safety. It is assumed that these requirements reduce chemical residues in organic livestock products. However, even the prolonged withdrawal period cannot guarantee absolute absence of chemical residues. On the other hand, food safety is not only characterised by the absence of residuals but is related to many hazardous risks for human health (e.g. zoonoses) that are not covered by the standards.

What are the socio-economic impacts?

Aiming at a high level of animal health and food safety inevitably increases the financial pressure on farmers. It is reasonable to assume that farmers, under such pressure, tend to work to a minimum of the requirements of the standards in order to maintain reasonable economic margins for their production. During the last decades, farmers have increasingly lost their influence on the market prices. This has happened alongside with a loss of independence in organising the farm according to the requirements of a more sustainable production system. Two relevant questions arise:
Which actions, in relation to product and process quality, are affordable to organic farmers and of interest for specific consumer groups?
To what extend are the consumers willing to pay premium prices in order to compensate for the higher cost of producing organic food?

What are special problems between current standards and reality of (organic) livestock production in different regions of Europe?

The availability of breeds and strains that are adapted to the local conditions and show a high vitality and resistance to disease is limited (especially in the case of poultry, as these species are almost entirely in the hand of a few international, conventional breeding organisations with little interest in organic livestock production).

In some regions, pasture for ruminants is not traditional, in other regions no grain is grown and getting straw for bedding is extreme expensive, or in the case of Iceland, virtually impossible.

Fish farming and other less traditional livestock production systems are regional features of organic agriculture. Detailed standards in these species are still missing.

What could be the solutions to these problems?

All stakeholders should participate in the development of standards. The needs and resources of each stakeholder group have to be discussed. The basis for such a discussion is information and education. We need to determine what type of information and education would be helpful to develop such a discussion process.

There is a large diversity in natural resources in Europe. As a result, the EEC Regulation can only set a baseline. One of the main questions is, whether an adaptation of the standards to the regional situations could be a way of improving the standard setting.

The questionnaire survey and the following work of the Working Group is expected to reflect regional and stakeholder specific diversity and to provide answers to animal health and food safety questions like:

What are the specific problems in relation to the current standards and the production reality of organic livestock systems in the different regions of Europe?

What could the steps be to solve these problems?

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List of delegates

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Prof. Francesco Ansaloni
Università di Camerino, Via Fidanza,15
Matelica 62024, Italy
Tel: +39 0737 404008, Fax: +39 0737 404010
Email: francesco.ansaloni@unicam.it

Dr Georgios Arsenos
Aristotle University of Thessaloniki Greece, University Campus,
Thessaloniki 54124, Greece
Fax: 30231999892
Email: arsenosg@vet.auth.gr

Anu Asikainen
University of Helsinki, Mikkeli Institute for Rural Research and Training,
Mikkeli Institute for Rural Research and
Training,Lönnrotinkatu 3-5
Mikkeli FIN-50100, Finland
Tel: +358 15 202 3356
Email: anu.asikainen@helsinki.fi

Dr Ton Baars
Louis Bolk Institute, Hoofdstraat,24
Driebergen 3972LA, Netherlands
Tel: 00.31.343.523878, Fax: 00.31.343.515611
Email: t.baars@louisbolk.nl

Dr. Georgios Banos
Aristotle University of Thessaloniki, Faculty of Veterinary Medicince, ,
Thessaloniki , Greece
Email: banos@vet.auth.gr

Dr. Sara Barbieri
University of Milan, Instituto de Zootecnica ,Faculty of Veterinary
Italy
Email: Sara.Barbieri@unimi.it

Philippe Baret
Université catholique de Louvain,
Belgium
Email: opfergelt@adre.ucl.ac.be

Mrs. Judit Benda
kétezeregy kiadó/ kétezeregy publishers, Bajcsy Zs. ,55.
Piliscsaba H - 1078, Hungary
Tel: 00 36 06 26 374586
Email: benda.judit@ketezeregy.hu

Tina Benninger
University of Kassel, Department of Agriculture , Bornaische Str.,90
Leipzig 4277, Germany
Tel: 0341 3039973
Email: tinabenninger@gmx.de

Dottoressa Novella Benvenuti
Dipartimento Produzioni Animali, Viale delle Piagge,2
Pisa 56124, Italy
Tel: 503139426, Fax: 503139433
Email: novella@vet unipi.it

Dr Davide Biagini
Departement of Animal Science - University of Turin, via L. da Vinci,44
Grugliasco 10095, Italy
Email: davide.biagini@unito.it

Davide Bortolozzo
Istituto Nazionale di Economia Agraria, ,
Legnaro PD 35020, Italy
Email: davide.bortolozzo@unipd.it

Dr Jacques Cabaret
INRA (Institut National de la recherche agronomique),
Nouzilly 37380, France
Tel: 33 2 47 427768, Fax: 33 2 47427774
Email: cabaret@tours.inra.fr

Dr Giovanni CALARESU
Centro di referenza nazionale per la zootecnia biologica
c/o Ist. Zooprofilattico della Sardegna, Via Duca degli Abruzzi,8
Sassari 7100, Italy
Tel: +39 079 2892268, Fax: +39 079 272189
Email: gianni.calaresu@izs-sardegna.it

John Claxton
Scientific officer European Commission,
Email: John.Claxton@cec.eu.int

Dr Claus Deblitz
Federal Agricultural Research Centre (FAL), Bundesallee,50
Braunschweig 38116, Germany
Email: claus.deblitz@fal.de

Lilija Degola
Latvia University of Agriculture, Faculty of Agriculture,
Dept. of Animal Science,Liela Street 2
Jelgava LV-3001, Latvia
Email: lild@sc.llu.lv

Mr Passmore Dongi
Bindura University of Science, Atherstone, Nil
Bindura 263, Zimbabwe
Email: pdongi@yahoo.co.uk

Kristiina Dredge
University of Helsinki, Faculty of Veterinary Medicine,
Finland
Email: kristiina.dredge@helsinki.fi

Prof., dr.hab. Andrzej Drozdz
National Research Institute of Animal Production,
Dept. of Sheep and Goat Breeding,
Balice 32-083, Poland
Email: Adrozdz@izoo.krakow.pl

Michael Eder
University of natural Resources and Applied Life Sciences,
Institute of Agricultural Economics, Peter Jordan Str. 82
Vienna A-1190, Austri
Email: Michael.Eder@boku.ac.at

Kathryn Ellis
University of Liverpool, c/o Dept. Human Anatom and Cell Biology,
Ashton Stret Medical Building
Liverpool L69 3GE, United Kingdom
Tel: 0151 794 74 25
Email: K.Ellis@liverpool.ac.uk

Valentina Ferrante
University of Milan, Instituto de Zootecnica,
Italy
Email: valentina.ferrante@unimi.it

Cervelin Franco
Centrale del Latte di Firenze Pistoia Livorno Spa,
Firenze, Italy
Email: mukki@mukki.it

Dr Jacopo Goracci
Dipartimento Produzioni Animali, V.le delle Piagge, 2
Pisa 56124, Italy
Tel: 328/8395548, Fax: 050/3139433
Email: jacopogoracci@hotmail.com

Douglas Gray
SAC Veterinary Services, Mill of Craibstone, Bucksburn
Aberdeen AB21 9TB, United Kingdom
Email: D.Gray@ab.sac.ac.uk

Professor Ulrich Hamm
Universität Kassel, Faculty of Ecological Agricultural Sciences, Steinstrasse 19
Witzenhausen D-37213, Germany
Email: zzz@email.dk

Merike Henno
Estonian Agricultural University,
Institute of Animal Science, Dairy Laboratory, Kreutzwaldi 1
Tartu 51014, Estonia
Email: henno@eau.ee

Britt I.F. Henriksen
Norwegian Centre for Ecological Agriculture,
Norge
Email: Britt.i.f.henriksen@norsok.no

Malla Hovi
VEERU, The University of Reacing,
United Kingdom
Email: m.hovi@reading.ac.uk

Dr. Halina Jankowska-Huflejt
Institution for Land Reclamation and Grassland Farming at Falenty,
Raszyn 05-090, Poland
Email: H.Jankowska@imuz.edu.pl

Agronomist Simon Jonsson
SUAS- Swedish University of Agricultural Sciences, Patrons Allé ,10
ÖJEBYN 943 31, Sweden
Tel: +46 911 66100, Fax: +46 911 66101
Email: Simon.Jonsson@njv.slu.se

Researcher Paul Kledal
Danish Research Institute of Food Economics, Rolighedsvej, 25
Frederiksberg 1958, Denmark
Tel: +45 35 28 68 75, Fax: +45 35 28 68 02
Email: paul@foi.dk

Dr. Antoni Kuzniar
(Partner no. 10), ILRG Institute for Land Reclamation and Grassland Farming, MRC - Krakow
Krakow, Poland
Email: imuzkrak@kki.pl

Ragnar Leming
Institute of Animal Science, Estonian Agricultural University,
Estonia
Email: r.leming@eau.ee

Professor Willie Lockeretz
Friedman School of Nutrition, Tufts University, 150 Harrison Ave, Rm 124
Boston MA 2446, United States of America
Tel: 1 617 636 3792, Fax: 1 617 636 3727
Email: willie.lockeretz@tufts.edu

Dr. Vonne Lund
Swedish University of Agricultural Sciences, c/o GENO,
Hamar N-2322, Norway
Tel: +47 62 52 06 26
Email: vonne.lund@hmh.slu.se

Mr. Alberto Menghi
CRPA S.p.A (Research Centre on Animal Production), Corso Garibaldi, 42
Reggio Emilia, Italy
Email: a.menghi@crpa.it

Ms Catherine Milne
SAC, Craibstone Estate, Bucksburn,
Aberdeen AB21 9YA, United Kingdom
Email: c.milne@ab.sac.ac.uk

Assoc. Prof. Ing. Olga Ondrasovicová
University of Veterinary Medicine in Kosice,
Slovakia
Email: ondrasovicova@uvm.sk

Susanne Padel
IRS,
United Kingdom
Email: sxp@aber.ac.uk

Professor Andrea Pardini
University, Piazzale Cascine, 18
Firenze 50100, Italy
Tel: ++39-055-3288.248
Email: andrea.pardini@unifi.it

Gesche Petersen
Institute of Organic Farming - Agricultural Research Centre (FAL), Trenthorst, 32
Westerau 23487, Germany
Email: oel@fal.de

PD Dr. Gerold Rahmann
Institute of Organic Farming - Agricultural Research Centre (FAL), Trenthorst, 32
Westerau 23847, Germany
Email: oel@fal.de

Researcher Riikka Rinne
University of Helsinki, Mikkeli Institute for Rural Research and Training,
Lönnrotinkatu, 03-May
Mikkeli 50100, Finland
Tel: +358 15 202 3318
Email: riikka.p.rinne@helsinki.fi

Dr Stephen Roderick
Organic Studies Centre, Duchy College, Rosewarne,
Cornwall TR14 0AB, United Kingdom
Tel: 0044 1209 722113, Fax: 0044 1209 722156
Email: s.roderick@cornwall.ac.uk

Alojz Rogelj
Institute for Sustainable Development, Metelkova, 6
Ljubljana 1000, Slovenia
Tel: 38614397465, Fax: 38614397105
Email: info@itr.si

D. Carmelo Garcia Romero
Junta de Comuniddes de Castilla La Mancha Pintor Matias Moreno 4,
Toledo 45002, Espana
Fax: 925266897
Email: carmelog@jccm.es

Federica Saltalamacchia
Istituto Sperimentale per la Zootecnia, Via Salaria, 31
Monterotondo (Roma) 16, Italy
Email: fed_sal@libero.it

Juern Sanders
FiBL - Research Institute of Organic Farming, ACKERSTRASSE,
FRICK 5070, Switzerland
Email: juern.sanders@fibl.ch

M. Pierre SANS
ECOLE NATIONALE VETERINAIRE DE TOULOUSE / INRA UREQUA, Chemin des Capelle, 23
TOULOUSE Cedex 3 31 076, France
Tel: +33 5 61 19 39 77, Fax: + 33 5 61 19 39 77
Email: p.sans@envt.fr

Danio Sarti
CNR - IBIMET Sez. Bologna,
Italy
Email: d.sarti@ibimet.cnr.it

Dott. ssa Sc. agrarie Angela Scossa
Istituto Sperimentale per la Zootecnia, via Salaria, 31
Monterotondo 16, Italy
Email: carmela.tripaldi@isz.it

Elita Selegovska
Latvia University of Agriculture, Faculty of Agriculture,
Latvia
Email: elitasel@cs.llu,lv

ing Gidi Smolders
Research Institute for Animal Husbandry, Runderweg, 6
Lelystad 8219 PK, Netherlands
Tel: 0031 320-293439, Fax: 0031 320-241584
Email: gidi.smolders@wur.nl

Pierre Stassart
Fondation Universitaire Luxembourgeoise, Av Longwy 185,
Arlon B-6700, Belgium
Email: Stassart@ful.ac.be

Dr Alistair William Stott
SAC, Craibstone Estate,
Aberdeen AB21 9YA, United Kingdom
Tel: 01224 711218, Fax:
Email: a.stott@ab.sac.ac.uk

Prof. Dr. Albert Sundrum
University of Kasse, Faculty of Ecological Agriculture, Nordbahnhofstrasse 1 A
Wizenhausen D-37213, Germany
Tel: 05542 98 17 10, Fax: 05542 98 15 81
Email: sundrum@wiz.uni-kassel.de

Dr. Györgyi Takacs
Szent István University, Faculty of Veterinary Science, Dept. of Food Hygiene, István
Budapest H-1078, Hungary
Tel: 00 36 1 3211355, Fax: 00 36 1 4784155
Email: gytakacs@chello.hu

Professor Stig Milan Thamsborg
The Royal Veterinary and Agricultural University,
Department of Veterinary Microbiology, Dyrlægevej 100
Frederiksberg C DK-1870, Denmark
Tel: +45 35 28 37 78
Email: smt@kvl.dk

Roberto García Trujillo
Universidad de Córdoba, Instituto de Sociología y Estudios Campesionos,
Spain
Email: ragarciat@yahoo.es

Mette Vaarst
Danish Research Centre for Agricultural Sciences, Dept. of Animal Health and Welfare,
Tjele DK-8830, Denmark
Tel: +45 89 99 13 44
Email: Mette.Vaarst@agrsci.dk

Daniela Vairo
Polytechnic University of Marche, Via Brecce Bianche,
Ancona, Italy
Email: daniela@agrecon.unian.it

med.vet. Michael Walkenhorst
Forschungsinstitut für biologischen Landbau, Ackerstrasse,
Frick 5070, Switzerland
Tel: 0041 62 865 72 86, Fax: 0041 / (0) 62 865 72 73
Email: michael.walkenhorst@fibl.ch

Dr. Barbara Wróbel
Institute for Land Reclamation and Grassland Farming at Falenty,
Raszyn 05-090, Poland
Email: B.Wrobel@imuz.edu.pl

David Younie
SAC,
United Kingdom
Email: D.Younie@ab.sac.ac.uk

Prof. Jan Zastawny
Institute for Land Reclamation and Grassland Farming (IMUZ),
Poland
Email: J.Zastawny@imuz.edu.pl

Werner Zollitsch
University of Natural Resources and Applied Life Sciences Vienne, Dept. of Livestock Sciences,
Austria
Email: zoll@boku.ac.at