Possible development of the organic production in a moutain area of the Florence province in Tuscany

Possible development of organic production in a mountain area of the Florence province in Tuscany

Veronica Alampi Sottini and Caterina Contini
Department of Agricultural and Land Economics, University of Florence, Florence, Italy
Andrea Martini
Dipartimento di Scienze Zootecniche, University of Florence, Florence, Italy, and
Silvio Menghini
Department of Agricultural and Land Economics, University of Florence, Florence, Italy

Keywords *Agriculture, Organic food, Production planning, Development*

Abstract *The organic production technique is a significant innovation for both process and product aspects of the agricultural sector. In less favoured areas, organic production contributes to develop the potential revitalisation of the production sector and also supports the application of endogenous development models, thus favouring sustainable development both on socio-economic and ecological bases. The paper focuses on a case study about the possible growth of organic production in a mountain area of the Florence province, in Tuscany. The organic and non-organic agricultural activities of the area are illustrated, with regards to the whole territorial organisation and the need to maintain agricultural activities for territorial defence. The potential development of the organic product supply is described as a result of a direct survey on the major distribution channels. The main reasons for the delayed expansion of the organic production are outlined in a direct survey on the farms of the area.*

Introduction

The concept of development as pure economic growth has led for years to an absolute indifference towards the environmental sustainability of productive processes. As a matter of fact, in the Common Agricultural Policy (CAP) input productivity maximisation targets were considered the essential aims to achieve. This point of view has brought agriculture towards an increasing specialisation in which the productive processes have become less and less sustainable and localised in the most fertile territories. All this brought extremely negative consequences in terms of loss of specific social and ecological values[1] and in terms of environment, which led to a general deterioration for some areas and complete neglect for others.

This trend, which has been more intensive in the less favoured areas such as the mountains, has been hindered in the last few years thanks to a new CAP, based on rural development and on a new general culture, much more sensitive towards environmental values and alimentary health.

British Food Journal,
Vol. 104 No. 8, 2002, pp. 654-669.

DOI 10.1108/00070700210435407

Rural development proposes a new role for agriculture: agriculture is no longer seen just as an economic activity, but also as the most important player in the management of rural territory, of its social, cultural and natural resources. Moreover, rural development encourages a higher sustainability of agricultural activities, promoting at the same time organic production.

For a long time organic production was considered an existential choice in opposition to the consumer society's excesses and with the productive logic of income maximisation. Thus, at the beginning the development of organic agriculture was characterised by high philosophic content, as for instance in the case of biodynamic agriculture by Rudolf Steiner and in the case of the no-doing Fukoka agriculture[2].

In the 1980s, organic products gained widespread interest, becoming one of the most convincing answers to the increasing demand for quality food from a society more and more conscious as regards environment and quality. The consumer's approval for organic productions, which are able to guarantee healthy alimentation, determined also an improvement in farmers' professionalism and, in the opinion of some authors (Dahlberg, 1988), it reduced the initial meaning of organic production as an "alternative agriculture"[3]. This cyclic and holistic approach of the farm (Vazzana, 1994) forces the organic farmer to produce without causing "serious and violent distortions in the substances' cycles and in the vital energies" (Milenkovic, 1990): thus, the need for an in-depth knowledge of the natural processes, in order to be able to behave without interfering with or replacing them.

The holistic approach of organic production aims to a less intensive agriculture and a high quality of food, suggesting strategies of "no price competition", able to increase the competitiveness of many less favoured areas by converting local constraints into specific characteristics of typical production and reducing the environmental impact of the productive process.

The study case of this paper considers a cattle farm located in a less favoured rural area, in a municipality of the Appennino Mountains, in the northern area of the province of Florence. The case study concerns the conversion from traditional into organic cattle husbandry. The economic analysis, done with the net present value (NPV) and the internal rate of return (IRR), emphasizes the differences among four distinct alternatives of farm organisation and commercialisation. The technical differences between traditional and organic farming point out the externalities produced by organic farming, which is able both to turn the local limits into typical elements and to take back a "new old" relationship between cattle production and land, increasing the utilisation of this second element.

This situation represents a positive adaptation to new realities in terms of consumer demand and preferences (Miele, 1998) and in terms of new challenges, in particular after the BSE case.

Organic farming in this specific area means efficient support for the diversification of economic and social activities, being able to sustain private initiatives in less favoured rural areas.

Organic farming promotes economic and environmental sustainability in the global framework of rural development, preserving natural resources, biodiversity and cultural identity of many rural areas lacking other opportunities.

General characteristics of the area

The administrative area of the municipality of Firenzuola is about 27,000km^2. About 30 per cent of the territory is over 800 meters above sea level and only 3 per cent is less than 400m above sea level. Land use analysis highlights a low human presence: more than 64 per cent of the territory is covered with forest and natural vegetation; about 2 per cent is urban area; and just 2 per cent is used for annual crop productions. However, about a quarter of the territory is covered with permanent pastures (Figure 1) and more than 72 per cent of the municipality is part of the local cultivation system.

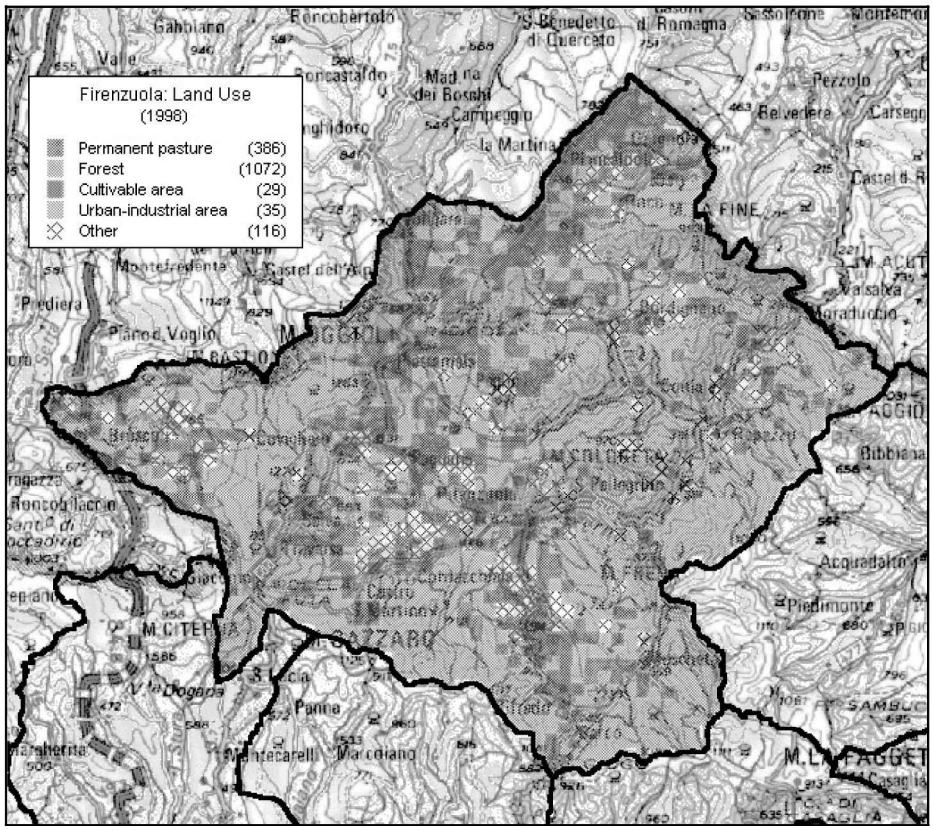

Figure 1.
Land uses in the municipality of Firenzuola

The low human presence is a social and productive characteristic of the area. The local agronomic and climatic aspects are a constraint for a new, more dynamic and competitive agriculture and in many cases the extensive system is the only possible solution and not a free choice.
Cattle husbandry is often one of the most interesting activities in the local agriculture and it represents the only opportunity to support a human productive presence. Organic farming regarding cattle production is an important way to re-establish a positive relationship between a productive activity and its territory, and it is able to produce important externalities in respect of the local natural resources and of the countryside.

Organic regulations and cattle organic husbandry situation in Italy
Organic animal husbandry follows the directions of the European Union, in particular Reg. CEE n. 1804/99 on animal production and Reg. CEE n. 2092/91 on organic agriculture production.

As regards Italy, on 4 August 2000, in accordance with the DM n. 91436, the Minister of Agricultural and Forest Policies enacted the methodology for the realization of the Reg. CEE 1804/99 on organic animal husbandry production. This procedure has been subsequently modified with DM of 29/3/2001.

In these days, due to recent scandals such as BSE and foot-and-mouth disease, organic animal husbandry has gained a widespread interest among consumers. Unfortunately, official data on organic animal husbandry in Italy are lacking, but it is possible to get out an idea thanks to the national data collected by Italian Association of Bovine Breeders (AIAB). Until now this organization has certified about one-third of the total organic farms existing in the territory. Thus, it is possible to make a good assessment of the Italian situation at the end of 2000 (Table I).

A picture of the current situation of organic animal husbandry in Tuscany is given in Table II, edited by ARSIA (Regional Agency for the Development and the Innovation in Agriculture in the Tuscany Region), which refers to 31/12/2000.

At the end of the year 2000, the total number of organic husbandry farms in Tuscany was 123, of which only 38 were breeding cattle, being just three or four organic dairy farms. ARSIA notified that 30 other organic cattle farms, which breed bovine species, are waiting for the Certification of Accreditation from the certifying bodies and that many breeders have forwarded the request of certification of their production in the first months of the year 2001.

The process of conversion of traditional to organic husbandry can be synthesized in the following elements: conversion of field crop production; conversion of breeding methods; and ideological conversion of the breeder. The first two aspects represent the technical factors of the problem, while the third represents the breeder's need to take on himself an holistic vision of the reality, which will enable him to optimise the technical phases of conversion.

Table I.
Animals bred with the organic method in Italy, certified by AIAB, and evaluation of the Italian situation

Region	Dairy cattle		Beef cattle		Sheep		Pigs		Poultry		Other species	
	N. farm	Head	N. farm	Head	N. farm	Head	N. farm	Head	N. farm	Head	N. farm	Head
Abruzzo					12	3,340						
Basilicata					1	2,000						
Calabria	1	15	4	80	1	600	1	50	1	200	11	Bee
Campania	1	300[a]									9	Bee
Emilia	21	1,172	3	130	3	646			2	1,700		
Lazio	3	600	3	150	8	400	1	50	1	1,000		
Liguria	3		7		8							
Lombardia	7	1,626	2	134			1	470	2	2,500	2	Bee
Piemonte	1	40			4	989			1	2,869	5	Bee
Puglia	2	80	3	100	1	300						
Sardegna					6	3,865			1	860		
Sicilia												
Toscana	2	30	18	500	19	3,300	11	500	2	310	1	Ostrich
Trentino	18	700									3	Bee
Umbria			3	240	2				4	33,600		
Veneto	31	140	4	150	5	350	3	200	4	9,000		
Total AIAB	90	4,703	47	1,484	70	15,790	17	1,270	18	52,039	31	
Total in Italy (estimated)	270	14,109	141	4,452	210	47,370	51	3,810	54	156,117	93	

Note: [a] Dairy buffalos

Source: AIAB (2001)

Province	Organic husbandry farms	Organic husbandry farms with bovines
Arezzo	19	5
Firenze	25	10
Grosseto	24	11
Livorno	5	2
Lucca	13	1
Massa	1	1
Pisa	14	4
Prato	1	0
Pistoia	4	0
Siena	17	4
Total	123	38

Source: ARSIA (2001)

Table II. Tuscan husbandry farms which follow organic methodology at 31/12/2000

It is a general opinion that the conversion of traditional animal husbandry to organic can be simple in some cases, as for an extensive system of cattle breeding, and difficult in others, as for the fattening.

In order to achieve optimised organic production specific for the Italian environment, it is necessary to progress with scientific experimentation in order to consider all the elements and the needs of this new type of breeding. Numerous technical problems have to be solved, as for the parameters and limits fixed at a political level. In fact, at the moment, the regulations are based on convenience and transition norms, since the definitive version of organic production has not been defined yet, and the results of the research are still missing.

In the following paragraphs some fundamental aspects of organic beef cattle husbandry in Italy are given: they essentially refer to the respect of animals, environment and human beings.

The number of animals bred on a farm has to be balanced both to the farm size, since gathering together too many animals leads inevitably to sanitary problems, and to its production capability, with respect to environment and to the comfort of the animals. Animal productions and their defecations have to be integrated in the crop cultivations of the farm, with the purpose of not producing pollution but of improving soil fertility. The limit given by Reg. CEE 1804/99 of two adult bovines per ha (that is 170kg N/ha/year) can be criticized if applied to some Italian situations, because it considers the defecations, but it does not consider the farm sustainability. Two adult bovines per ha can be too many for a farm in an area characterised by arid and unproductive soils or too little in plain areas with very fertile soil.

Animal feeding is essential for organic production. The main aim is to feed animals with healthy and safe aliments, and not with dangerous ones such as GMO, or tankages. The regulations fix the traditional aliment quantity allowed, in order to feed the animals with the greatest possible quantity of organic

products, preferably coming directly from the farm itself. Protein aliments represent a big problem for the Italian situation, because the national territory lacks permanent pastures, which assure high and good forage production for the entire year. Soybean sold in Italy comes almost entirely from the USA, thus it is almost surely GMO. The only possible solution for the Italian case is to produce leguminous feeding crops, such as protein pea or pigeon bean, in order to cope with the protein needs of the animal ration.

However, organic animal feeding supply has largely increased in these last months, thanks both to the conversion of many farms into organic cattle feeding production and to the development of the animal feeding industries.

The question regarding the origin of the animals for replacement is serious at the moment, because of the BSE epidemics. As happened in organic agriculture for seeds and plants, in organic husbandry it is permissible to use animals coming from traditional breeding, because this is still an adjustment period for many Italian farms.

Unfortunately, this method does not give any guarantees on the health of the animals as regards BSE, since the checking procedures for the disease are not enough. Moreover, a great part of the cattle bred in Italy come from abroad, thus adding further uncertainty on the animals' real health. Greater safety could be achieved using bovines borne in Italy, but the calves' supply does not cope with the needs of the market.

Regulations forbid an intensive system of breeding and permanent housing, and give directions on how and in which conditions animals need to be managed.

The animals' areas, characterized by good ventilation and natural illumination, have to be wide enough to allow both free movement and easy access to food and water. As regards cattle, the area per head provided for by the Regulation CEE 1804/99 is not much different from the one already used in traditional Italian husbandry, even in the case of an intensive system. In general, no significant changes are necessary to modify the traditional closed housing: just a few openings, to allow animals to have free movement and free access to the external pastures, are enough to adequate the breeding to the organic method.

Regulation CEE 1804/99, completed and modified by DM 4/8/00, considers the necessity of grazing for the cattle bred. This is probably the most difficult problem to solve for the Italian situation and in particular for Tuscany, where for a long period of the year pastures are not available for cattle grazing.

In non-organic husbandry, because of the uncertainty of Italian pastures, calves six to seven months old are fattened in stables for 10/12 months, until slaughter. At the beginning, the European Regulations and the Italian Regional Laws on organic production allowed this kind of intensive system of breeding, but now Reg. CEE 1804/99 fixes a maximum fattening period in stable of no longer than three months. Thus, there is a need to adjust the terms and times of the current husbandry system to the organic requirements.

Objectives

Our study aims to assess the economic convenience to convert traditional production into organic production and to study the relevance of the productive process verticalization. This analysis was done by comparing alternative hypotheses of cattle husbandry management and commercialisation.

The study case is located in Firenzuola, an area in which cattle husbandry represents a vital part of agriculture because of the typical mountain character of the territory. Traditionally, the aim of cattle husbandry was the breeding of suckling calves, sold at the age of seven months to other breeders for the final fattening. This kind of husbandry was conducted with an extensive system, allowing the grazing of the animals during summer time. The study farm was organised on this basis until May 2000 and, in our economic analysis, this situation represents *HA*.

Recently, cattle husbandry has been characterised by a growing interest from the farmers of the area, thus many of them decided to invest in this economic activity on two different levels:

(1) changing the final product, i.e. breeding cattle for 20 months and selling young bulls and heifers, instead of suckling calves;

(2) changing the breeding system in order to obtain organic production, instead of non-organic.

HB refers to a farm in which the final aim is the selling of non-organic cattle 20 months old. At present, this is the most common case in the area, since few farms have decided to adopt organic production. Moreover, the lack of conventional commercialisation channels in the area led the breeders to create a cooperative which makes itself responsible for processing and retail business of the product. Thus, the above mentioned hypothesis considers the selling of cattle through the cooperative.

Beginning from the year 2000, the farm started the conversion process of its production, which will be completed before the end of the year 2006. The conversion process involves both the adjustment into organic regulations and the achievement of a different final product (young bulls and heifers 20 months old, instead of suckling calves). The verticalization process will be further developed thanks to the functioning of the processing and packaging planting, managed by the cooperative of which our farmer is a member.

The economic convenience of organic production, including the effects of the verticalization process, are evaluated considering the farm entirely adjusted to the organic regulations and at full capacity, selling the product through the cooperative (HC_2).

The importance of the cooperative has been highlighted introducing HC_1, in which the organic product is not sold through the cooperative but to commercial enterprises.

Methods

During our visits in the study farm, with the collaboration of the breeder, a direct survey was conducted in order to acquire information regarding the following aspects for *HB* and *HC* vs *HA*:

(1) Farm asset and management (cultivation system, climate, slope, etc.).

(2) Management of cattle husbandry:

- production system;
- cattle stock;
- livestock feeding – samples and their analysis.

(3) Extra costs of investment and management.

Data on the major distribution channels of the area were collected through direct surveys with the farmers and the distributors themselves.

Processing of data led to the determination of:

- Cattle gross output for the different production typologies: *HA*, selling non-organic suckling calves seven months old; *HB*, selling non-organic cattle 20 months old; HC_1, selling organic cattle 20 months old not through the cooperative, but to commercial enterprises; HC_2, selling organic cattle 20 months old through the cooperative.
- Total extra costs for *HB*, HC_1, and HC_2 with regard to *HA*.

In particular, livestock feeding costs were determined formulating the diet (Table III) for Charolaise young bulls and heifers (INRA, 1988) with an average liveweight of about 860g/day[4], as follows: opportunity cost was used to assess the value per kilo of emmer waste, which represents a by-product of the seed sold for human consumption; production cost was used to assess the value per kilo of hay and pastures, while market value was used for bought-in feedstuffs. Opportunity cost was also used to assess the labour costs.

Table III.
Feeding ration during winter (loose housing) and summer time (grazing), considering an average liveweight of about 860g/day

	Loose housing		Grazing	
	kg per head	%	kg per head	%
Cattle weighting between 250 and 375kg				
Emmer by-product	1	13.3	1	5.1
Bought-in feedstuffs	2	26.7	1.4	7.1
Hay	4.5	60		
Pasture			17.2	87.8
Cattle weighting over 375kg				
Emmer by-product	1	10	0.5	2
Bought-in feedstuffs	3	30	2.5	10
Hay	6	60		
Pasture			22	88

Reconstruction costs for the stables (per m^2) were assessed using the costs of the constructions built in the present year by the farmer. The total covered area was calculated in accordance with the organic regulation (Reg. CEE n. 1804/99). Market value was used to determine the cost of the fence, whose length was estimated taking into account the above mentioned regulation. In the hypothesis of non-organic cattle production (young bulls and heifers 20 months old), the construction cost of the stable (per m^2) was considered half that of the organic case (CRPA, 2001), because of the lower standards required by non-organic buildings.

Results

The study case

Our study case refers to a self-management farm which counts three full-time workers: a single wage-earner and two family members (i.e. the owner and his son). The total extension of the farm is 280ha, of which 107.5ha are cultivable area, subdivided into herbaceous crops (35 ha) and permanent pasture (72.5ha) (Figure 2). This represents a typical cultivation system for the local farms.

The study case concerns a livestock farm, which breeds Charolaise bovines. The entire cultivable area of the farm is used for animal feeding, except for about 4ha which are cultivated with emmer (intended for human consumption) in rotation with forage crops.

In May 2000, the farm embarked on a structural change on a double level: on one hand, it modified the production target, selling young bulls and heifers instead of suckling calves; on the other hand, it gave its support to organic production (getting the official certification).

The major changes in the management of the farm were due to cattle fattening, which led to the increase in the total number of animals. Table IV

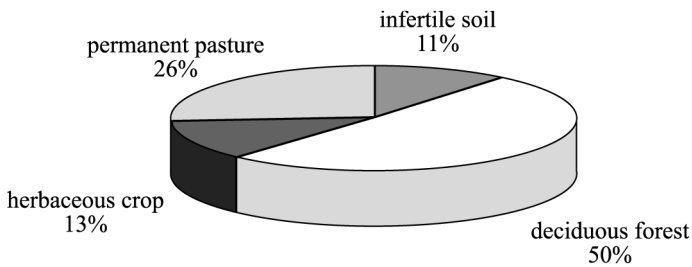

Figure 2.
Distribution of the total farm area

Description	Cattle stock until May 2000 N. of head	Catle stock at full capacity N. of head
Bulls	2	2
Cows	55	55
Suckling pigs	20	20
Young bulls and heifers	0	33

Table IV.
Variation of cattle stock

compares cattle stock before and after the above change occurred. In order to satisfy the minimum animal area required, the breeder built a loose housing stable of 120m^2. Thus, at the present time, the farm counts two loose housing stables, where cattle recover during winter time, for a total roofed area of 364m^2.

The introduction of organic production has been a natural evolution for this farm, since the previous cattle husbandry was carried out with an extensive system. However, the farm needs to complete the adjustment process before May 2006, in order to conform to the organic regulations, as stated in the Italian Ministerial Decree of 29/04/01.

These adjustments will concern the construction of a new loose house (which has to have at least 200m^2 of covered area) and of additional fences, in order to let the animals reach the pasture freely.

Economic analysis

The choice to turn into cattle fattening requires high initial investments, above all regarding the construction of loose housing. Table V shows the costs that the farmer has to face for the different hypothesis of change. In the case of non-organic production, the investment is much lower (€24,790) for two main reasons: the less covered area required per head (the existing 364m^2 can be considered enough to recover the animals) and the minor construction costs per m^2. In organic production the investments regard not only the loose housing (€132,213), but also the fencing of the pasture (€19,984), for a total cost of €152,097.

Table VI points out the cattle gross output for each case considered, the extra costs that the different hypotheses of change have to face and the net income variation in comparison with the selling of suckling calves seven months old.

The variable extra costs that weight on cattle fattening derive from labour and livestock feeding. For non-organic production, additional labour requirements refer to stable cleaning and animal caring, while for organic production they refer also to the keeping of organic registers and documents.

Even though organic animal feeding is in general more expensive (between 30 per cent and 40 per cent) than non-organic, in the study case the costs result

Type of investment	*HA*	*HB*	*HC*
Stable (120m^2)		24,790	49,580
Stable (200m^2)			82,633
Fencing			19,884
Feeding mangers			1,963
Total		24,790	154,059

Note: Values are given in euros

Table V.
Investment costs for the different hypotheses

	Non-organic suckling calves seven months old *HA*	Non-organic cattle 20 months old sold through the cooperative *HB*	Organic cattle 20 months old, sold to commercial enterprises HC_1	Organic cattle 20 months old, sold through the cooperative HC_2
Price of carcasses (€/kg)[a]		2.77	2.77	3.74
Cattle gross output	27,695	45,633	45,633	61,739
Livestock feeding		10,413	10,078	10,078
Labour		744	1,116	1,116
Certification		0	456	564
Capital asset costs (housing and fences)				
Reinstatement		306	1,880	1,880
Maintenance costs		248	1,521	1,521
Insurance (housing)		124	661	661
Interest		496	3,042	3,042
Circulating capital costs				
Deadstock reinstatement		0	15	15
Deadstock maintenance		0	20	20
Deadstock interest		0	118	118
Livestock insurance		1,023	1,023	1,023
Livestock interest		2,045	2,045	2,045
Cooperative association costs		258	0	258
Total extra costs (*HX* vs *HA*)		15,657	21,974	22,340
Net income variation (*HX* vs *HA*)		2,281	–4,036	11,704
Net income variation per head (*HX* vs *HA*)		69	–122	355

Notes:
[a] In *HB* and HC_2, price considers the cooperative most probable distribution of earnings (0.52€/kg)
Values are given in euros

Table VI. Comparison of the different hypotheses regarding cattle gross output, extra costs, variation of net income and variation of net income per head, with respect to the former husbandry system

higher for the non-organic hypothesis. This happens because the farm counts enough pastures and forage cultivations to be self-sufficient and because pasture is cheaper than stable feeding.

Distribution of extra costs (investments and management costs) for *HB* and *HC* with respect to *HA* are shown in Figure 3. It is evident that *HB* requires investments only in the first year, while for *HC* the structural transformation last for five years.

The survey on the commercialisation channels underlined many difficulties for non-organic production to be placed on the market. On the contrary, the increasing demand for organic products does not determine this kind of problem for organic cattle, but Table VI reveals that extra costs due to the organic process are not covered by an adequate price, when the bovines are not sold directly on the final market. In this sense the cooperative plays an important role, reducing the price taker's position of the farmers by processing, packaging and selling the product directly to the consumers[5].

Table VI points out also the important role of the verticalization process: the cooperative allows the farmer to get a better price/kg, because it carries out by itself processing, packaging and retail business. This verticalization process represents an important reality because it allows the members of the cooperative to get a higher value added, which is reallocated among the members through the distribution of earnings at the end of the year.

Moreover, it must be said that thanks to the cooperative the whole production (both organic and non-organic) can be allocated on the market, without unsold stocks, which would represent not only an income loss but also an extra cost for the farmer.

Analysing the investments in terms of NPV and IRR, a period of 30 years was considered. The results are shown in Table VII.

The convenience assessment in terms of NPV[6], calculated with a discount rate (r) of 4 per cent, is positive for non-organic and organic cattle 20 months old, both sold through the cooperative. On the other hand, it is negative for organic cattle 20 months old, sold to commercial enterprises. For this last case, the price of carcass for which NPV is equal to zero (€3.55) should be about

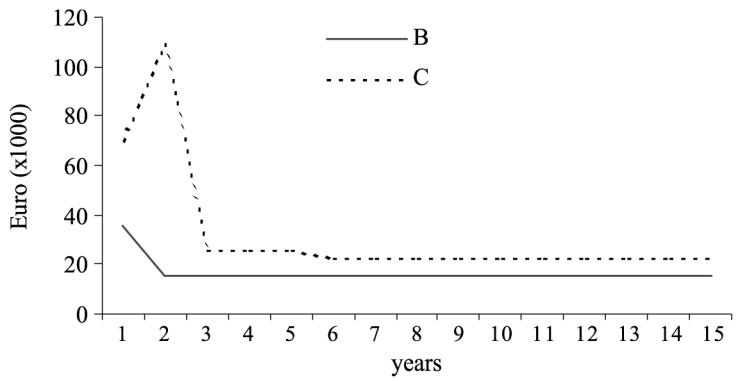

Figure 3.
Extra costs (investments and management costs) for *HB* and *HC*, with respect to *HA*

Table VII.
Convenience analysis referred to a period of 30 years, excluding organic production contribution

	HB	HC_1	HC_2
NPV (r = 0.04)	5,198	–220,280	57,719
IRR (%)	5.3		7.7
Price of carcass (€/kg) for which NPV = 0		3.55	

one-third higher than the price at which it is sold at the moment to commercial enterprises (€2.77).

Discounted back extra costs and income for the different hypothesis, with respect to *HA*, are compared in Figure 4.

Examining the economic convenience of the different alternatives in terms of IRR, the result points out that both *HB* and HC_2 are positive, being IRR 5.3 per cent and 7.7 per cent respectively[7]. However, it must be said that the convenience of *HB* is subordinated to the commercialisation of the final product which is guaranteed by the cooperative. Also in the case of organic production (*HC*), because of the relevance of the investments required, cattle husbandry is convenient only when the verticalization process considers processing, packaging and retail business (HC_2).

Discussions

Our study case proves the economic convenience of organic conversion, pointing out the importance of verticalization, which is much more evident as the process is emphasized. This is the case of the cooperative that carries out processing, packaging and retail business.

In fact, at the moment, despite an increase in demand for organic products, good commercialisation channels for cattle are still lacking in the study area, thus converting to organic production does not seem to be worthwhile. However, this result should be subordinated to further considerations, because the analysis does not take into account public contributions, whose presence can change the convenience judgement and represent an incentive for the farmers to turn into an organic production system. CAP regulations and the rural development plan of the Tuscany region for the period 2000/2006 consider public contributions for both structural changes (new buildings) and organic production management. The former contributions cover 45 per cent of the costs sustained by the farmer for new organic buildings, the latter are determined in accordance with the area cultivated with forages and pastures and with the number of animals bred in the farm, up to 15,400 per year for our study case.

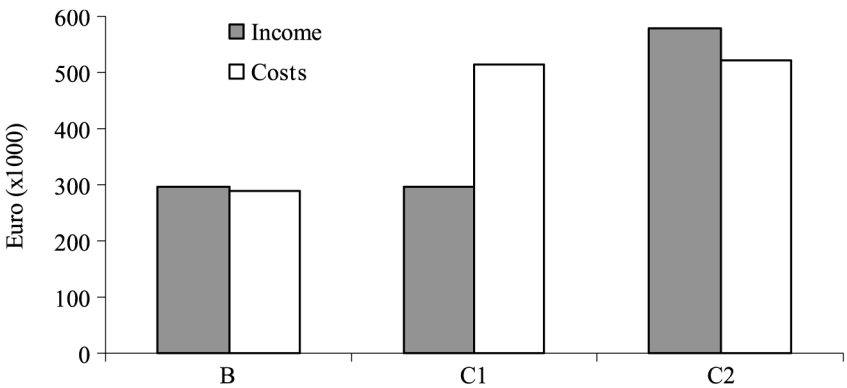

Figure 4.
Discounted back extra costs and income for the different hypotheses, with respect to *HA*

In the area, the convenience to convert into organic production is further emphasized by the fact that the extensive system for cattle husbandry is the natural vocation of the territory. Thus, the adoption of the organic regulations and practices does not determine many significant changes as could happen in other areas.

Moreover, thanks to the union of organic production and the verticalization process, it is possible to obtain at local level a higher value added. This allows the inhabitants of the area to count on a higher income, which remains in the territory and can be further invested for the development of the area itself. Thus, agriculture can be a fundamental element of development also in a reality in which local agronomic and climatic aspects are a constraint for a new, more dynamic and competitive agriculture.

In particular, our study case underlines the strengths of organic cattle husbandry, able to turn local limits into typical elements through the achievement of a quality product in respect of the local natural resources and of the countryside.

Organic cattle husbandry is not only capable of encouraging the re-establishment of the relationship between a productive activity and its natural resources, but, with the positive exploitation of local specificity, it is also able to produce important externalities, such as the defence of the territory from degradation and depopulation. For all these reasons organic cattle husbandry can represent the starting point for an integrated development, contributing as a decisive factor to the revitalisation of the productive sector and supporting the application of endogenous development models.

Notes

1. Loss of culture and rural tradition and reduction in biodiversity.
2. So called because the fundamental principles of the method are given as negations of the usual techniques applied in agriculture.
3. Considering its most rigorous meaning, organic agriculture represents a production method that identifies the farm as an ecological system, in which the specific productive processes are not distinct realities, but are integral parts of the same living organism.
4. This is the average live weight of the animals bred in the farm; if it is compared with the liveweight of non-organic husbandry it turns out to be low, but since the animals are reared in an extensive system, this value can be considered satisfactory.
5. The organic production accentuates the price taker position of the farmers, because it is addressed to market niches which are characterized by strong oligopolistic features.
6. Where:

$$NPV = I_0 - C_0 = \sum_{n=0}^{30} (i_n - c_n) \frac{1}{q^n - 1}.$$

7. The assessment, for *HB* and HC_2, was done by comparing their IRR with an alternative rate (r_a = 4.8 per cent), where r_a is the rate applied to Long Term Treasury Bonds. The transformation is convenient when IRR $\geq r_a$.

References

AIAB (2001), internal report.

ARSIA (2001), internal report.

CRPA (2001), *Bollettino CRPA notizie*, p. 1.

Dahlberg, K.A. (1988) (Ed.), *New Direction for Agriculture and Agricultural Research: Neglected Dimensions and Emerging Alternatives*, Rowman and Allenheld, Totowa, NY.

INRA (1988), *Tables de l'alimentation des bovins ovins and caprins*, INRA, Paris.

Milenkovic, L. (1990), *Origine e sviluppo dell'agricoltura biologica in Europa*, CLESAV, Milano.

Vazzana, C. (1994), "Agricoltura biologica e il mantenimento della biodiversità", Proceedings of the Congress Norme per l'Agricoltura Biologica, 9 June, Grosseto, Italy.

Miele, M. (1998), "I prodotti biologici toscani e i mercati del Nord Europa", *Quaderni ISAD*, p. 5.