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Assessing the impact of rural policy on biodiversity: High Nature Value Farming in Italy

Trisorio A.[1], Borlizzi A.[1]

1 INEA, National Institute of Agricultural Economics, National Rural Network, Rome, Italy

trisorio@inea.it

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Trisorio A. , Borlizzi A.

Abstract

Farming practices and the conservation value of farmland are intimately interconnected. The recent policy debate has shed light on the need to address farming activities towards a more sustainable path, and has advocated for a reallocation of payments towards farming systems that provide public goods. This paper aims to explore likely HNV farms policy needs through the use of HNV farming system indicators.

Keywords: High Nature Value, monitoring and evaluation, biodiversity indicator, farming systems.

JEL classification: Q18, Q57.

1. INTRODUCTION

The concept of High Nature Value (HNV) farming was introduced during the early nineties (Baldock *et al.*, 1993; Beaufoy *et al.*, 1994) in order to emphasize the positive role of agriculture towards biodiversity. Then it evolved in the framework of both the integration of environmental concerns into the Common Agricultural Policy (CAP), and the adoption of the European model of multifunctional agriculture (Paracchini *et al*, 2006; Pointereau *et al*, 2007; Paracchini *et al*, 2008; Beaufoy *et al*, 2008; European Evaluation Network for Rural Development, 2010). Within this framework, HNV farmland and the associated farming systems have increased their policy relevance. Their protection and enhancement became one of the strategic priorities in the implementation of the European Rural Development Policy (European Council, 2006). Subsequently, in order to monitor and evaluate the results and impacts of Rural Development Programmes on biodiversity, HNV farmland indicators have been included into the EU Common Monitoring and Evaluation Framework (CMEF). HNV farming is now widely recognized as a provider of a wide range of public goods, thus justifying policy measures aiming at its preservation (Commission of the European Communities, 2006; Cooper *et al*., 2009, IAASTD, 2010).

Farming practices and the conservation value of farmland are intimately interconnected. Understanding the drivers of farmers decisions is therefore of the utmost importance in order to implement appropriate policy schemes. Technological evolution, economic and social drivers, and past CAP have often driven farmers' choices towards more intensive agricultural activities. The biodiversity decline observed during the last decades in the European territory is partly due to intensification of agriculture in more fertile areas and to gradual abandonment of low-intensity farming in marginal lands, which led to environmental and landscape degradation. Processes of agricultural intensification and specialization, indeed, move farms away from a

sustainable use of natural resources, which is a necessary condition for the conservation of HNV areas. Nonetheless, economic viability is a necessary condition for farms to work: the abandonment of low-intensity agricultural activities strictly derives from the vulnerable economy of the associated farming systems, as the characteristics that make these areas valuable for biodiversity, are mainly the same that weaken/threaten the economic viability of farms.

The recent policy debate has shed light on the need to address farming activities towards a more sustainable path, though maintaining its primary function of food production, and has advocated for a reallocation of payments towards farming systems providing public goods, in order to re-orientate CAP towards society's expectations (European Environment Agency, 2009; European parliament, 2010; BirdLife International *et al.*, 2009; Beaufoy *et al*, 2010; European Commission, 2010). HNV farming is therefore very likely to assume a central role in post 2013 CAP.

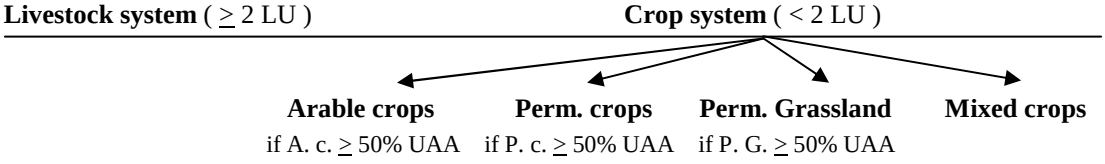
The aim of this paper is twofold: 1) to identify HNV farming through the definition of appropriate indicators, based on both land cover and farming system approaches; and 2) to explore likely HNV farms' policy needs through the use of HNV farming indicators. In particular, we concentrate the analysis on HNV farming system indicators that provide insights into the management needs of HNV farmlands, thus allowing for a better targeting of policy measures.

2. DATA AND METHODOLOGY

The identification of HNV farming systems in Italy has followed two steps: 1) the definition of a typology of farming systems; 2) the selection of HNV farming systems.

Step 1. The typology of farming systems , built upon individual farm data from FSS[1] dataset, was based on two dimension: land use and the size of livestock. We, first, separated livestock systems from crop systems according to the size of livestock, - with a threshold of two Livestock Unit (LU). Then, within the crop system we identified four systems according the land use dimension: specifically, the relative area of arable crops, permanent crops and permanent grassland (fig. 1).

Figure 1. Types of farming systems



Source: own elaboration on FSS data.

[1] FSS collects comprehensive information not only on crops and animal species, but also on some farming practices and farmland features, allowing us to have an insight into the intensity of land use. We referred to 2005 data, because the 2007 FSS does not contain information on some of the agricultural practices and farmland features collected in 2005, such as those related with the unfarmed features.

Step 2. The selection of HNV farming systems was based on a combination of two dimensions: intensity of farming and biodiversity, each of them characterized by a set of parameters/indicators. Specifically, the intensity of farming dimension was described by indicators such as absence of irrigation; minimum or no-tillage; crop rotation; green manure; grass covering, and livestock density[2] (only for livestock farms); the biodiversity dimension was described by indicators such as presence of olive groves, of rice fields and of unfarmed features - hedgerows, small areas of woodland, etc. Our data on unfarmed features, however, do not include the presence of stonewalls; therefore, the extent of HNV farming systems in Regions with a high proportion of stonewalls might be underestimated. Finally, low-intensity livestock systems have been divided in two systems, based on the prevalence of permanent grassland or of arable/permanent crops. In the latter case, we identified a *HNV mixed low-intensity livestock and crop system*.

An economic and structural specification of HNV farms has also been undertaken, based on Italian FADN dataset[3]. The analysis was carried out on three-year (2003, 2004 and 2005) average values, allowing for more robust estimates. The classification procedure is different from the classification made on FSS dataset, as it is derived by Andersen *et al.*'s (2003) work. The parameters used to classify HNV farming systems are mainly related with the intensity of farming (input cost[4], stocking density, presence of irrigation) and the presence of extensive land uses such as permanent grassland, fallow and pastures. Other stratifying structural and economic variables[5] have also been introduced in order to characterise the two groups of farms (HNV vs. non-HNV) from an economic perspective, which includes the role of subsidies.

3. RESULTS

High Nature Value farmland in Italy extends over about 3.2 million ha (table 1), equal to 11% of the Italian territory and 25% of the national UAA, and involves about 15% of the Italian farms, mainly located in uplands. The two most representative HNV farming systems are "Permanent grassland" and "Low-Intensity livestock systems", which in total accounts for about 45% of total HNV farms and 71% of UAA. A brief description of the identified HNV farming systems is provided below and displayed in table 1.

Permanent grassland systems make up the 40% of the total HNV farmland (fig. 3). About 100 000 farms are involved, mainly located in mountainous areas. This type of system do not include livestock farms, although the respective farmland is often used for grazing by animals of

[2] As to livestock density, three intensity thresholds has been fixed in order to take into account the different suitability of land, based on literature and expert judgements, and namely: 0.5 LU per hectare of forage area in mountainous areas; 0.75 LU in hilly areas; and 1 LU in plain areas.

[3] FADN includes farms over-4 Economic Size Unit (ESU), i.e. farms getting an over 4,800 Euros (1 ESU = 1,200 Euros) Standard Gross Margin, regarded in Italy as "commercial" farms.

[4] It includes the costs of fertilisers, pesticides and concentrate feedstuff .

[5] The variables are: Utilised Agricultural Area (UAA), Net Value Added (NVA), Annual Working Unit (AWU) , Net Value Added per ha, Net Value Added per AWU, Net Farm Income (NFI), Total Assets (TA), Return on Investment (NFI / TA), Family AWU (< 45 years old), Farmer age.

external livestock farms: almost two-thirds of this type of area are managed under common property regimes by a small number of public bodies characterised by very large size[6].

Table 1: HNV Farming systems in Italy

	UAA (ha)	Share of HNVF	No. of Farms	Share of total no.	Avg. UAA (ha)	Mountains (% UAA)	Common lands (% UAA)
Permanent grassland	1 293 313	40%	99 464	39%	13	78%	71%
Low-intensity livestock	969 447	30%	15 766	6%	61	42%	5%
Low-intensity arable crops	483 135	15%	25 289	10%	19	10%	0.1%
Low-intensity permanent crops	268 667	8%	108 406	42%	2	15%	4%
Mixed livestock-crops	160 562	5%	4 005	2%	40	19%	0.6%
Low-intensity mixed crops	18 730	1%	3 649	1%	5	11%	-
Total	3 195 045	25%	256 591	15%	12	48%	31%

Source: our elaborations on 2005 FSS data.

Low-intensity livestock systems account for 6% of total HNV farms (fig. 4) and 30% of HNV farmland, for a total of about 1 million ha of UAA, mainly located in hilly areas. Cattle raising is prevalent in the Alpine range, whereas in Central and Southern Italy sheep and goats are more common. Common lands represent only 5% of the area, but are characterized by very large average size. Organic farming is undertaken by about 7% of the farms, and is mainly related with permanent grassland and cereals, and sheep and goat raising. "Vertical" transhumance is still undertaken in many Regions, with cattle/flocks shepherded uphill during the summer, whilst long-distance transhumance along traditional *"tratturi"* (cattle-tracks) has now disappeared.

Low-intensity arable crops systems represent 15% of the Italian HNV farmland and are mainly located in Northern plains (rice fields) and on hilly areas of Central and Southern regions (cereals and forage crops). Organic farming represents about the 27% of the UAA, with cereals (particularly wheat) as the main organic crop, while landscape elements (hedgerows, tree rows, etc.) are quite important features of this system. Almost half the farms, finally, are managed by farmers over 60.

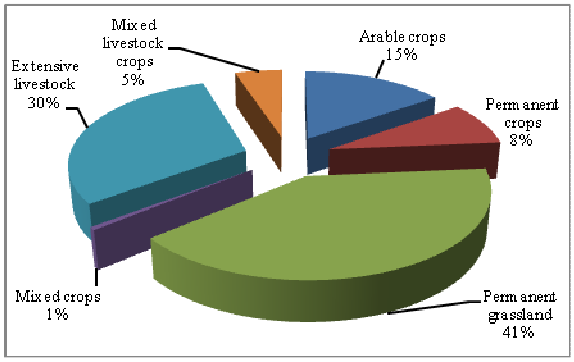
Low-intensity permanent crops systems account for 8% of total HNV farmland and 42% of HNV farms, which are characterised by very small average size (about 2.5 ha). They are mostly located in hilly areas of Southern and Central regions, the most representative crops being olive trees and vineyards. Organic crops account for 17% of the total UAA, whereas more than half farms are managed by farmers over 60. Landscape elements, finally, represent an intrinsic element of this system.

[6] The current lack of adequate data on the utilization of common lands did not allow us to consider the "Permanent grassland" and "Low-Intensity livestock" systems as a unique one. The 2010 Italian Agricultural Census will provide information on this aspect.

Mixed low-intensity livestock and crop systems represent 5% of total HNV farmland and 2% of HNV farms, mainly located in hilly areas of Central and Southern Regions. The share of organic farming is quite large (23% of the farms and 35% of the area). Sheep and goats rearing, and cereals and forage crops are the main activities.

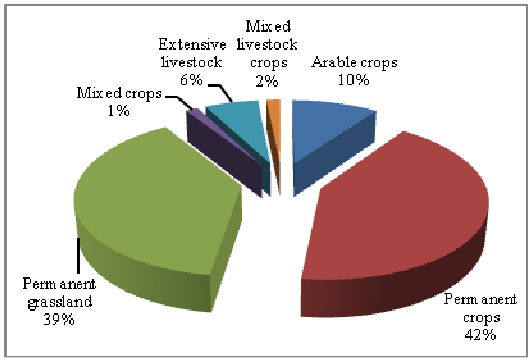
Low-intensity mixed crops systems, finally, account for 1% of both HNV farms and farmland, and are almost evenly distributed in the different geographical areas. Forage crops, cereals, vineyards and olive groves are the most cultivated crops, while landscape elements represent a main feature of this system. Organic farming is undertaken by 9% of the farms and on 13% of the surface area. Almost 50% of farms are managed by farmers over 60.

Figure 3. HNV farmland by farming systems



Source: our elaboration on FSS 2005.

Figure 4. HNV farms by farming systems



Source: own elaborations on FSS 2005.

Seventy percent of HNV farms are characterised by an economic dimension lower than four Economic-Size Unit (ESU), managing about 12% of the total HNV farmland. The mere use of FADN data would therefore underestimate the total extent of HNV farming systems by such entity.

Finally, more than half the HNV farms and more than one fourth of HNV farmland are managed by farmers over sixty, and are therefore at risk of abandonment in the next years in absence of generational turn-over.

4. HNV VS. NON HNV: ECONOMIC ISSUES

The FADN dataset allows us to analyze the economic aspects of HNV farming systems and the role of CAP subsidies, as shown in Trisorio *et al.*, (2008). The average size of HNV farms is larger than non-HNV ones only in terms of farming area (28 ha vs. 13 ha[7]), whereas the economic size and the number of worker units are definitely larger in non-HNV farms (table 2). Nevertheless, structural weaknesses limit the economic performance of HNV holdings. An HVN farm gets on average a net value added of 16 000 Euros, while a non-HNV reaches 29.000

[7] These figures are different from those obtained by using FSS data because in the FADN dataset are only included farms characterised by an economic dimension greater than 4 ESU.

Euros. The difference is particularly evident in holdings in the plains and in the Northern regions.

Table 2: Structural and economic profile of HNV and non-HNV farms

	HNV	non-HNV	Total
Utilised Agricultural Area (UAA)	28.1	13.2	15.0
Net Value Added (NVA)	15 966	28 629	27 029
Annual Working Unit (AWU)	1.0	1.4	1.4
Net Value Added per ha	568	2 177	1 797
Net Value Added per AWU	15 299	20 388	19 893
Net Farm Income (NFI)	11 775	21 014	19 846
Total Assets (TA)	301 193	352 918	346 380
Return on Investment (NFI / TA)	3.9	6.0	5.7
Family AWU (< 45 years old)	0.2	0.3	0.3
Farmer age	57.3	56.6	56.6

Source: own elaborations on FADN, Italy 2003-2005.

The larger economic size and the possibility of allocating the production factors in a more effective way determine a remarkable difference in terms of labour and capital productivity. The labour productivity of non-HNV farms is on average 33% higher than HNV ones on a national level. Also the return on investments is definitely higher in non-HNV farms than in HNV ones.

The total amount of subsidies received by HNV farms is slightly greater than the amount received by non-HNV farms (table 3), even though the amount of subsidies per hectare is higher in non-HNV farms. Moreover, subsidies represent more than 40% of HNV farms' Net Value Added (NVA), and only 20% of non-HNV farms' NVA. Hence, HNV farms are more dependent on subsidies than non-HNV ones.

Also the source of the subsidies is different between HNV and non-HNV farms: the latter rely more on direct payments, whereas HNV farms received a more significant part of the payments through the Agri-Environmental Schemes and the Less Favoured Area Allowance. The relatively higher share of HNV farms in mountain and other marginal areas can explain this difference.

Table 3: Farm subsidies of HNV and non-HNV farms

	HNV	non-HNV	Total
Subsidies	6 823	5 673	5 818
Subsidies on net VA (%)	42.7	19.8	21.5
Distribution of subsidies (%):			
- Direct Payments	74.3	87.7	85.7
- Agri-Environmental Schemes	13.2	5.2	6.4
- Less Favoured Areas Payments	5.5	1.2	1.9
- Other RD measures	4.5	4.4	4.5
- Other subsidies	2.5	1.4	1.6
Subsidies per hectare	243	431	387
Subsidies per AWU	6 537	4 040	4 282
Net Value Added per AWU (without subsidies)	8 761	16 348	15 611

Source: own elaborations on FADN, Italy 2003-2005.

Our analysis confirms the results obtained by Osterburg *et al.* (2008) about the essential contribution of the subsidies to the economic viability of the HNV farms. The subsidies per Annual Worker Unit are greater in HNV farms compared to non-HNV farms, where the amount of subsidies reaches higher levels in terms of area units. Comparing the net-of-subsidies labour productivity (net value added minus subsidies per AWU) the dramatic difference between the two types comes out very clearly: the "net" labour productivity of the HNV farms (coming from the market) is half than the productivity of non-HNV farms.

5. FINAL CONSIDERATIONS

The analysis of HNV farming systems indicators allows us to point out the main features, weaknesses, and strengths of HNV farming systems in Italy, and provides us with useful information about the needs of policy interventions. HNV farming systems are mainly extensive, often traditional, farming systems with a high proportion of unfarmed features and semi-natural vegetation. Most of them are semi-natural grazing systems located in uplands, a large part of which represented by common lands, characterized by low economic viability and high levels of subsidies for Annual Worker Units. These systems are at risk of abandonment in marginal areas, and at risk of intensification in more productive areas. Nevertheless, HNV farming systems are widely acknowledged as provider of a range of environmental and social public goods (Cooper *et al.*, 2009).

The main features of HNV farming systems discussed above suggest the need of both economic support measures to prevent abandonment and payments to prevent intensification or land conversion. This should be realized through a proper and well targeted support scheme (BirdLife International *et al.*, 2009; Beaufoy *et al*, 2010), even drawing from the available tools properly reshaped and tailored on HNV farming. On the other side, a wider public intervention

such as investments in public services and technology, drawing on other funding, might contribute to the medium-long term economic viability of HNV farms.

Agri-environmental measures could be tailored to address the needs of specific type of farming or areas, and targeted for obtaining specific environmental objective and favouring specific farming practices, such as extensive grazing, traditional crops systems, and the maintenance of the "unfarmed features (hedgerows, stonewalls, buffer strips, ponds, small areas of woodland and ecological corridors). Measures favouring generational turn-over, especially in mountain areas, would indirectly help tackling the abandonment of HNV farms, as well as more targeted and effective use of investment aid and a wider use of advisory systems on biodiversity and nature conservation issues. Moreover, the reduction of administrative burden on farms and the establishment of new market opportunities for HNV products could be also very good ways to foster HNV farming in the future.

However, in order to efficiently support HNV farming within a targeted support scheme further improvements are needed in the implementation of adequate data systems on biodiversity and farming practices, and in the development of an EU consistent methodological framework.

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