

FAMILY FARM ECONOMIC BEHAVIOUR AND SOIL DEGRADATION IN A MEDITERRANEAN CONTEXT: THE AGRICULTURAL BASIN CASE (*)

GIOVANNI QUARANTA (**)

The degradation of fragile drylands threatens the livelihoods of over 900 million people in some 100 countries.

The process affects some 25% of the Earth's land area and seems to be occurring at an accelerated rate globally, according to United Nations Environment Programme. Causes include overgrazing, overcropping, poor irrigation practices and deforestation, combined with climate variation."

EARTH SUMMIT, Convention on desertification, Rio de Janeiro, Brazil, 3-14 June 1992. (The Problem, page II).

Traditionally, in the development of soil degradation and desertification particular importance is attributed to the climate conditions and than to soils and vegetation.

Especially in the Mediterranean context, however socio-economic factors may have also played a role in mitigating or exacerbating the role of natural factors. At the last century eve the economic development of the area where this study have been conducted, as well as other Mediterranean areas, was such that the land was predominantly covered by forests and the traditional agricultural system, based on crop rotation of cereals, legumes and pastures. This was favourable to preserve soil fertility and prevent any

ABSTRACT

In the Mediterranean countries private farmers, who also are the owners, manage the largest portion of the land. As is well known their behaviour strongly influence the healthy of the soils and the rural environmental in general. In fact in the Mediterranean context family manages the most of the farms, which behaviour depends not only on the farm characteristics but also on features of the family.

This study, by using the data collected by a representative family-farm sample in the Agri Basin (Southern Italy), where a large part of territory is profoundly affected by soil degradation, attempts to build an economic model of farm behaviour under these physical and agronomic conditions. In order to achieve this aim, first, it is necessary to find and select the main variables and the relationship among them that historically have influenced the family-farms land use decisions, then asses the family-farm reaction to policy instruments. The proposed model can also evaluate the real economic links among the farming activity, land and family living on it.

RÉSUMÉ

Dans les pays Méditerranéens, les agriculteurs privés qui sont aussi propriétaires, gèrent la plus grande partie des terres. Il est bien connu que leur comportement influe fortement sur l'état des sols et sur l'environnement rural en général. Il est assez bien connu aussi que les initiatives des agriculteurs dépendent de plusieurs variables. Dans le contexte Méditerranéen, c'est la famille qui gère la plupart des exploitations agricoles et son comportement dépend tant des caractéristiques de l'exploitation agricole que de la famille.

Cette étude, en utilisant les données collectées par un échantillon représentatif de famille paysanne dans le bassin de la rivière Agri (Italie du Sud), où une grande partie du territoire est profondément affectée par la dégradation du sol, essaie de construire un modèle économique de comportement de l'exploitation agricole dans ces conditions physiques et agronomiques. Pour atteindre cet objectif, il est d'abord nécessaire d'identifier et sélectionner les principales variables et les relations entre elles qui ont toujours influencé les décisions de la famille paysanne et, donc, évaluer la réaction de la famille paysanne face aux instruments de politique. Le modèle proposé permet aussi une évaluation des véritables liaisons entre les activités agricole, la terre et la famille paysanne.

kind of soil degradation. From that period, due to many factors, especially related to economic policies, the farmers have found economically convenient to deforest and produce commercial crops without the agronomic practices that have been usefully utilised for century. This is the clear sign that for that, at least for that type of environment, the soil degradation strongly relay on the factors that influence the decisions on the land use, made by the ones who control the land resources. In the entire Mediterranean basin the prevailing form of land tenure is private, that means that are the farmers, and in particular the rural families, which take the decision on the use of the own land.

FAMILY AND FARMS IN AGRICULTURAL BASIN

The area where the study has been conducted is the hydrographic basin of the Agri river, named Val d'Agri, located in Basilicata, a

small region of Southern Italy. It has been selected in the most concerned part of the region, with regard to soil degradation, and it is also peculiar because it is developed along with different climate conditions. In fact, the Basin is divided into three homogenous areas, known as Upper, Middle and Lower Val d'Agri, according to their physical and environmental profile. Also the evolution of human settlements characteristics and land use confirms the division of the area in three homogeneous sub-areas. At the beginning of the last century the entire area was protected by forests and by traditional agricultural system based on crop rotation and pastures. From that period, on the one hand an increas-

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(**)Department of Agricultural Economics and Land Management (DITEC), University of Basilicata, Italy.

ing population density led to deforestation, on the other hand an intensive development of commercial crops, like durum wheat, took place (BOVE, 1992).

In Upper Val d'Agri, the large amount of water available has favoured irrigation agriculture represented by dairy farming and recently by horticulture and fruit growing. In the Middle Val d'Agri, since the almost absence of transportation infrastructures, the population had little or no commercial contacts with the external world. Agricultural activity was extremely rigid and only recently it has been possible to diversify agricultural crops. The survival of many communities it has been really a problem due to the fragility of the soils (Levi, 1963). The presence of alluvial soils and irrigation water is the main reason of the good performance of the agricultural sector in Lower Val d'Agri, where salinisation problems may occur if the extraction of the water will not be controlled.

According to the National Agricultural Census data available, reported in **figures 1** and **2**, the land use evolution has followed an economic pattern of development. In fact, where the socio-economic indicators show risk of degradation also does the land use. For example, the percentage share of the arable land is much higher in the Middle basin having a demographic degradation too.

The division of the Agri basin in three homogenous sub-areas, is also confirmed by a socio-economic and demographic characteristics.

According to the last Population Census (1991) the number of resident units in the Agri basin were 99.702, almost 1/6 of the Basilicata region, with a density of 48 inhabitants per km². In the last forty years the population of the valley as a whole was almost constant, but the dynamics of the three areas have been very different. In fact, as shown in the **figure 2**, residents have decreased in the middle valley bringing the population to 32 per Km², while they have increased in the lower valley up to 72 per Km². Even though these values remain much less than the Italian value (190 per Km²), but in line with the

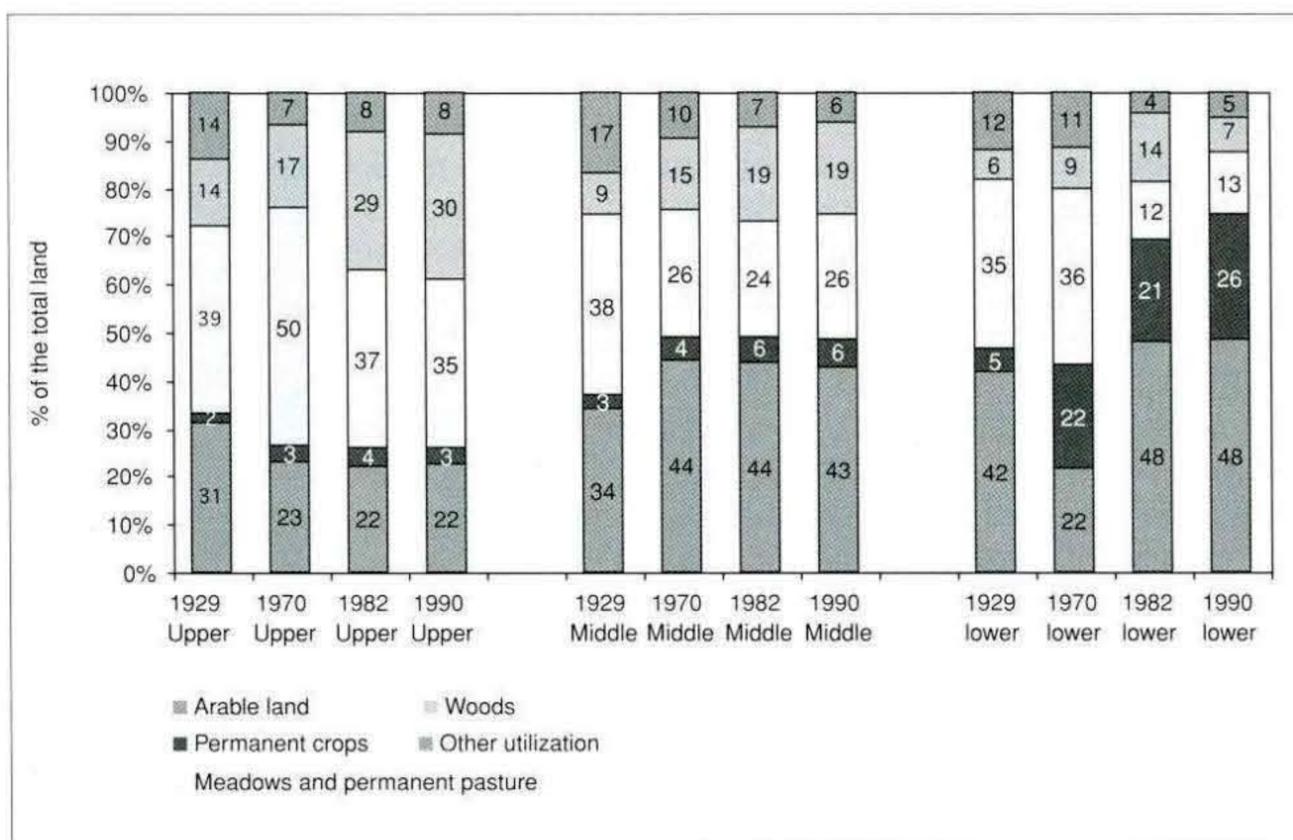


Figure 1 - Land use change for the last seventy years in the three areas of the Agri Basin.

Basilicata region (65 per Km²). The most important factor determining this pattern is the migration phenomena, which has interested the Agri basin during the last decades. Both intra-basin, from the Middle and Upper basin to the Lower, and extra-regional movements have contributed to create the present situation quite different from the one found after the second World War. As a consequence of this, many municipalities have reduced their population by half of what it was forty years ago (many in the middle basin), and some others doubled their residents (many in the Lower basin). Another consequence of these population movements, is the demographic fragility and impoverishment, that is very se-

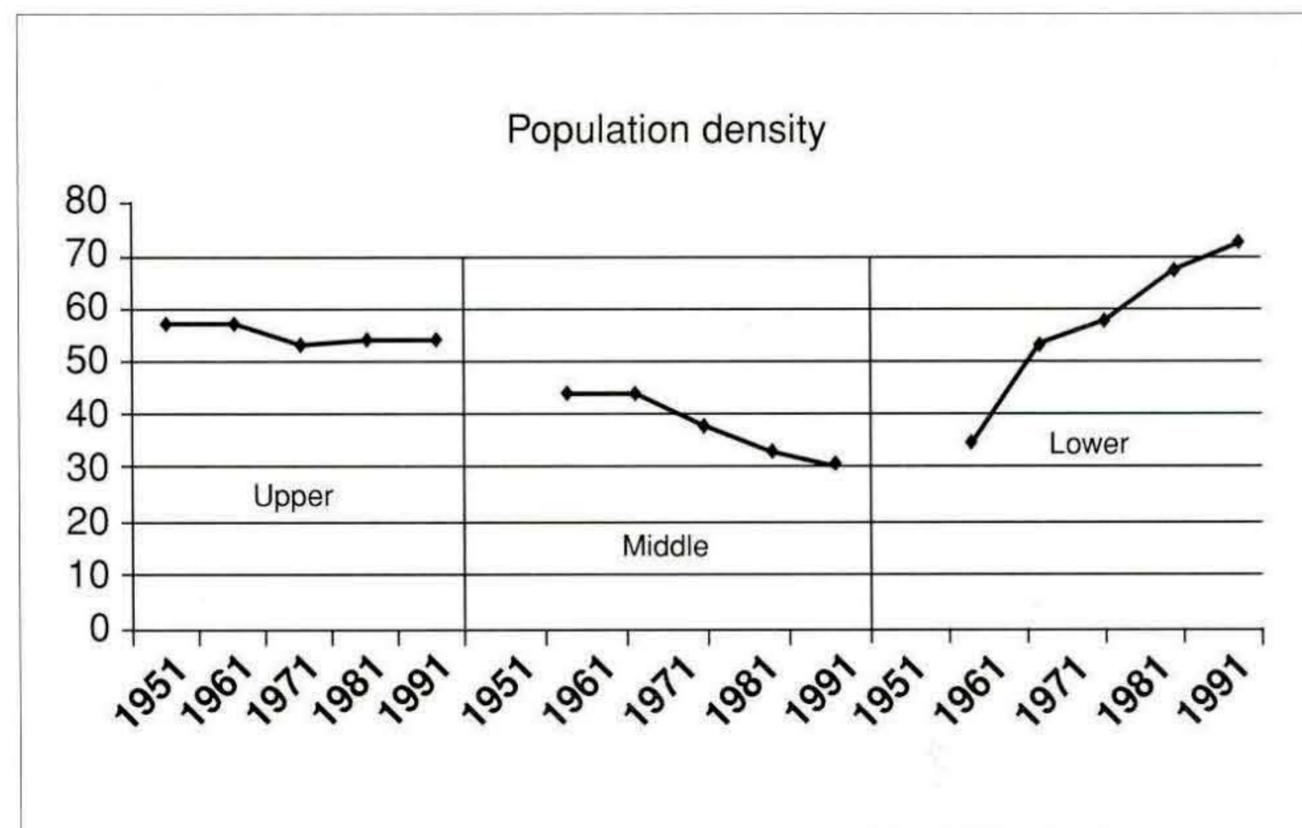


Figure 2 - Evolution of population density (inhabitants per sq. kms) in the Agri Basin from 1951 and 1991.

rious for a large part of the basin. Taking as an example the elderly index, calculated as the ratio between the resident population over 65 years old and the population under 6 years old, we can find many villages made up only by old pensioned people. In fact, this index assumes different values in the three sub-areas, passing from an extreme of more than 1.100, to 93.

The unemployment rate for the entire valley was 30% in the 1991, almost three times more than the national figure. Almost one third of the working population living the Agri basin is occupied in the agricultural sector, as well as another third in the industrial sector. Therefore, as reported in **figure 3**, the agricultural sector of the Agri valley still represents one of the main sectors of the economy in terms of percentage of labour force employed.

The last General Agricultural Census (1990) identifies 15,520 farms, which were almost as much as in 1982. These farms conduct 73,300 hectares of agricultural land, with an average size of 11 hectares. The distribution of land by size classes illustrates a typical poor agricultural structure: in fact the 64.2% of the farmers run farms having an average size around 2.5 hectares.

DATA

The study is based on data gathered by a specific questionnaire given by interview to a random sample of family farms operating on the Agri Basin. The questionnaire was constructed taking into account the 1991 General Agricultural Census. Family farms that had less than two hectares were cut out, since it was not possible for them to live only on its income, bringing the number of farms from 15,520 to 8,991. However, these farms play a not less important role in environmental sense, but, since they are country residential more than real farms and because they manage very few hectares of land, they have not been considered in this study. It was not possible to have a detailed list of all the family farms in the area, therefore in order to have a random sample we chose to sample them in two phases. Firstly, two-thirds of the questionnaires were filled out by individual family farms going randomly by the farms of the Agri basin, and then verified with the relative figures of the entire population in order to reproduce the totality of its variance. The second phase looked only at the family farms that satisfied the criteria of improving the statistical representativeness of the sample.

The sample is made up of 154 family farms, 30% of which fall in the



Upper Valley, 40% in the Middle Valley and the remaining 30% in the Lower Valley. The surface area surveyed was about 3,293 hectares, 484 hectares is forest and 2,809 farm land. The mean surface area for each farm is about 19 hectares, and 60% is used for sowing (mainly cereals) and the rest is pasture and arboreal cultivation (olive groves, orchards etc.). Olive groves are mostly

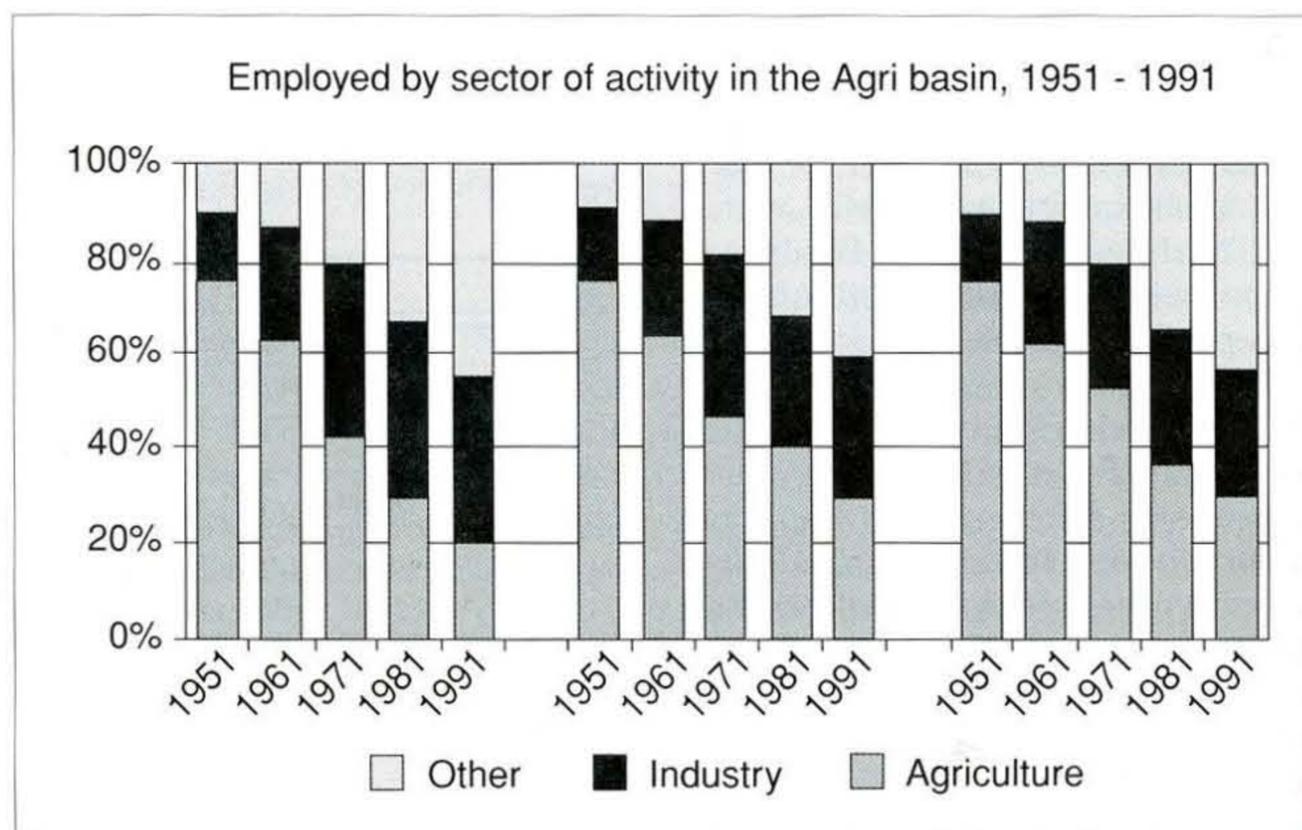


Figure 3 - Evolution of worker distribution by sector of employment in the Agri Basin.

found in the Middle Valley while orchards are found in the Lower and Upper Valley.

Land degradation processes interest about 36 of the 154 farms, strongly in disorder and cultivated with olive trees, pasture and sowing crops jeopardising the soil's stability. Forty percent of the farms are able to irrigate their lands, mostly located in upper and lower Valleys, giving them the possibility to cultivate both cereals and horticulture. Animal breeding is carried out in 94 farms of which 72 medium-large farms grow sheep and goats. The remaining farms breed cattle.

About one half of the families live on the farm while the remaining number live less than 7 km away all averaging about 3 family members. The active population is equal to 347 units most of all falling into the 30-55 year old range. The head family member is usually male about 50 and having an Elementary school education. About 86% of them carry out their full working time on the farm compared with the 17 units that are active in other working sectors as commercial shops and public offices. One third of them have declared that they are not working at their full potential and confirm the bad state of the art of this sector, with many potential workers.

Quality criteria were then used in order to define sample representivity. This is illustrated in the **figures 4 and 5**, comparing data percentages on land use and family farm distribution per size of the sample with respect to the entire number of family farms showing a high representivity of the chosen sample.

FAMILY-FARMS BEHAVIOUR AND SOIL DEGRADATION

The analysis of the gathered data and the discussion of them with local opinion leader shed light on the family farms behaviours. In particular the following relationship have been found and utilised in building the proposed model.

- Young farmers make investments in the farms to preserve soil fertility;
- Young farmers have a multicrop farms;
- Rich farmers are by far more sensible to soils conser-

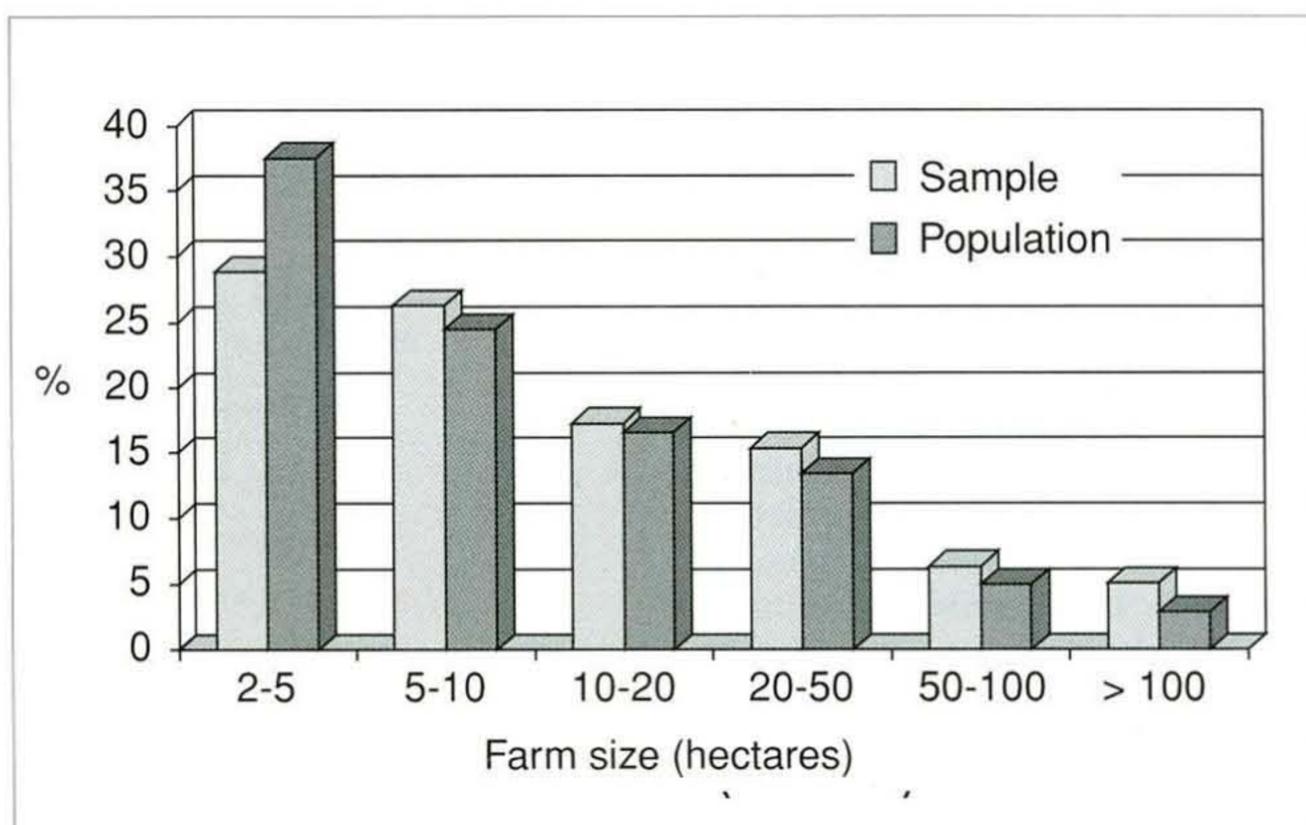


Figure 4 - Relationship between sample and population in terms of farms dimension.

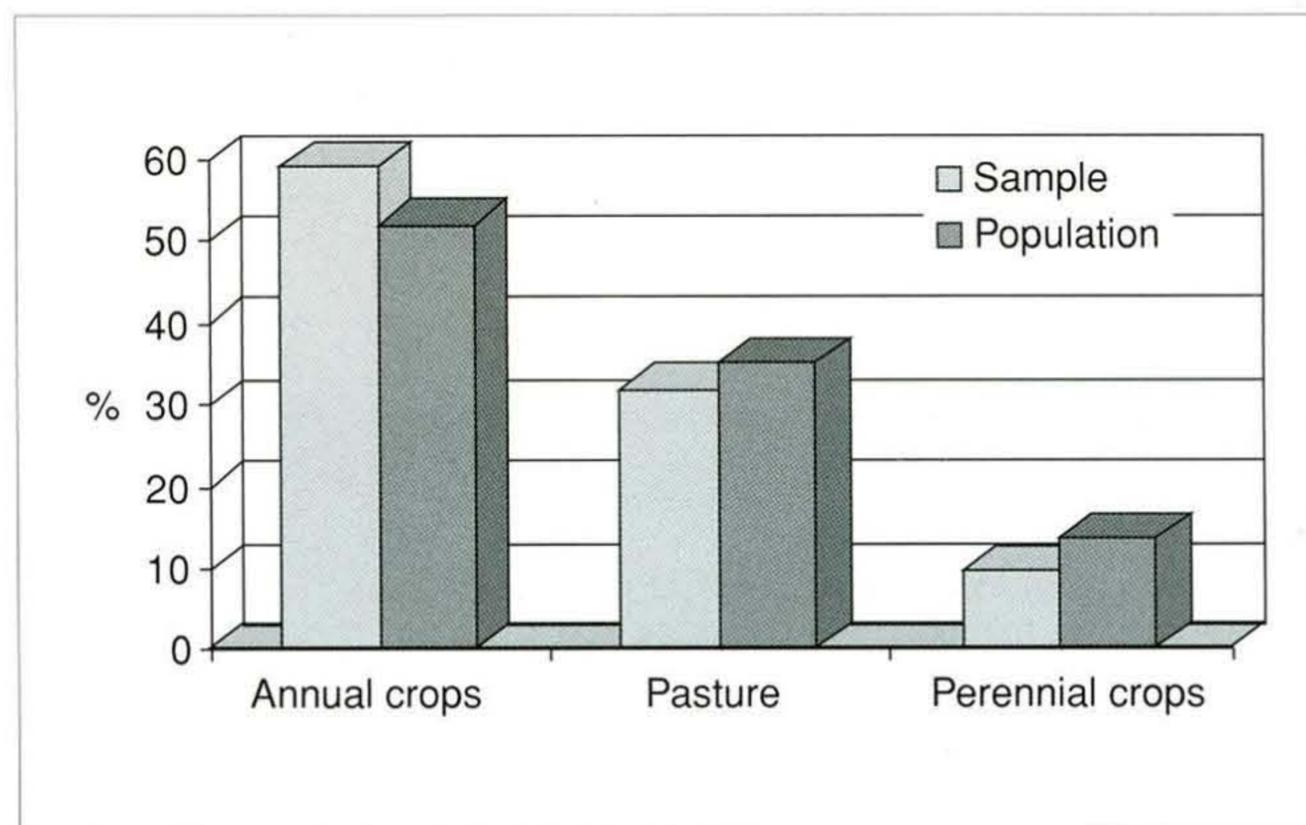


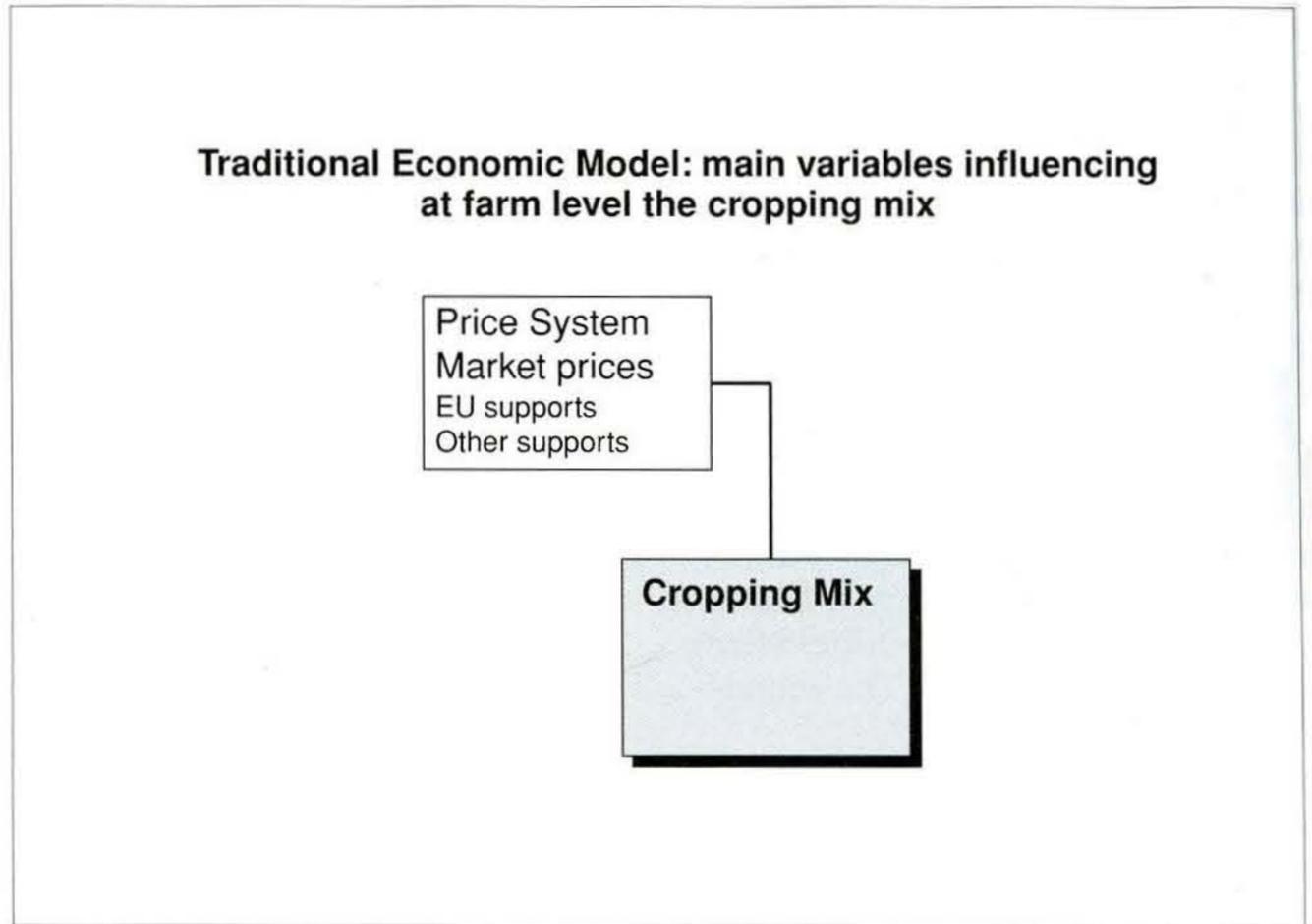
Figure 5 - Relationship between sample and population in terms of land use.

vation;

- Rich farmers manage large farms or also work in other sectors;
- Farmers are very much favourable to Agricultural Price Policies, but much less about Environmental Policies;
- Little adoption of the EU Reg. 2078/92 incentives (agriculture compatible with the environment);
- Little adoption of the EU Reg. 2080/92 incentives (re-forestation of agricultural land)
- Cereals -that cover about 50% of the agricultural land- are only possible because of EU supports;
- Extensive breeding activity -which plays an important role in soil conservation- is decreasing -and is mainly carried out by older families;

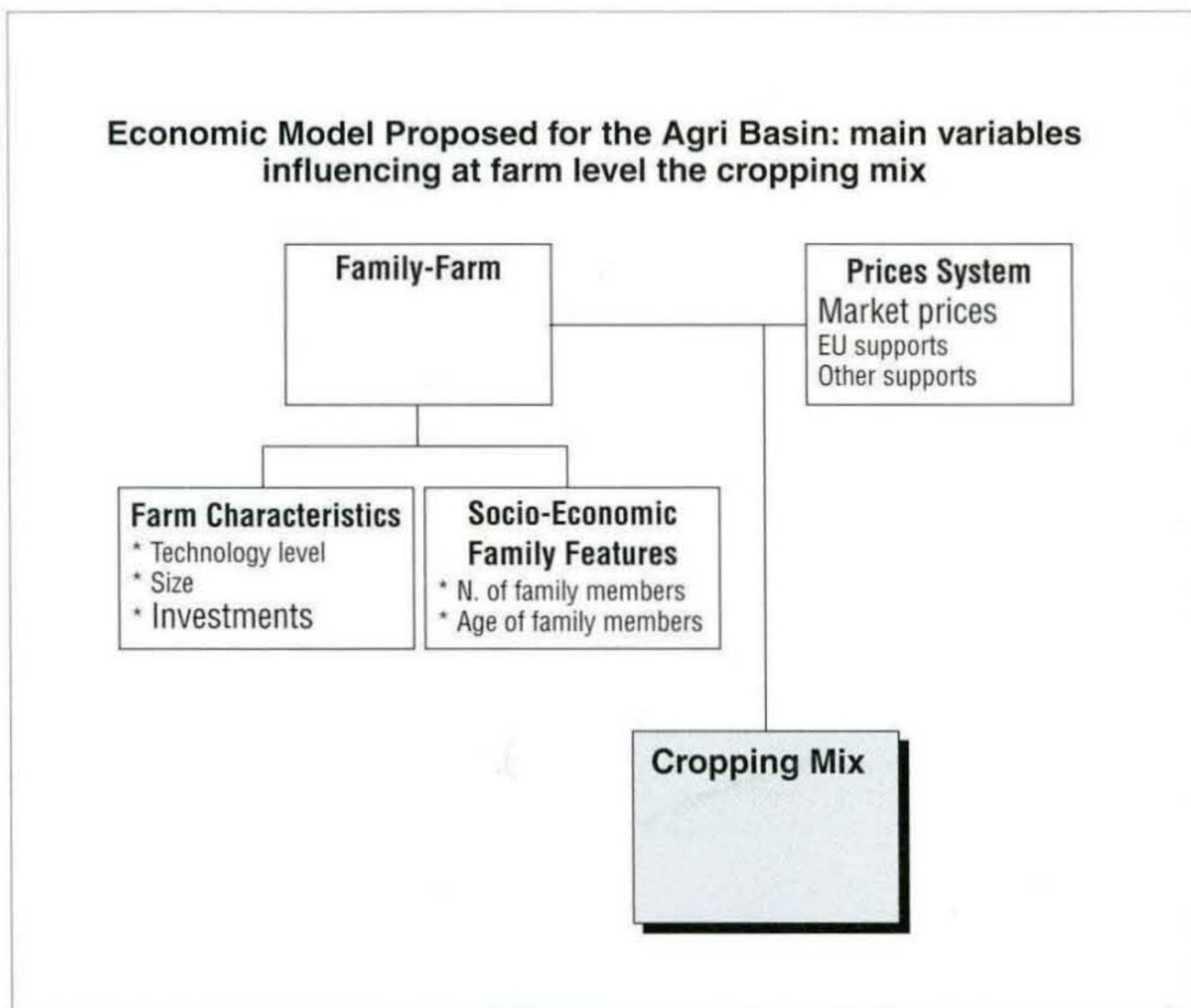
- Only the families that live on the farm are really interested in soil conservation practices, and usually they are young families.

All these findings have to be included in whichever model intended to interpret the behaviour of the farms operating in such environments. The traditional models utilised by the Agricultural Economists and by Economist of Natural Resources both for positive and normative analysis can be summarised as the following scheme. Here the cropping mix decision is only related to price system (**scheme 1**), in a very simple way i.e.: an abstract entrepreneur before use the land to produce any kind of crops looks which is the most economically convenient at a given or expected price, without other considerations.



Scheme 1





Scheme 2

Therefore in these very simplistic types of models the policymakers could influence the use of land simply modifying the ratio among the crop prices by a specific agricultural policy instruments (incentives, premium, quotas, etc.).

CONCLUSION

A deep analysis of the gathered data together with the tools to interpret the behaviour of the farms deciding on how to utilise the land, in particular when environmental factors play an important role, shows big limit of the traditional methods. In fact, to manage the farms in Val d'Agri, and in most of the Mediterranean context, is not a "virtual entrepreneur" but a family farms which try to optimise the use of all the resources available (land and family labour, especially). This means that there are many variables influencing the decision on the crop mix of the farm, namely the opportunity to find job outside the farm for the family members, their age and educational level, etc. So for example, the same farm managed by two different family will use the land in different ways. One, more educated family, have found job outside the farm, will use the land more extensively, adopting environmental friendly practices; the other, with less economic opportunity outside the farm, will use the land in a very intensive way in order to have a minimum family income. Therefore, in this example can be concluded that a key variable is not the price of the output of the farm, but the opportunity to find a job

outside the agricultural sector, i.e. a rural development policy is necessary, and not an agricultural policy. In other words, using the proposed model (**scheme 2**) became clear that a price policy alone would probably not be sufficient to solve a multi-facets problem, which needs many complex social, economic and technical aspects to be considered. Thus, the re-allocation of economic support to more sustainable farming systems should be viewed as part of an integrated policy, together with other incentives and measures, including training and extension services, land use planning, conservation and rural development strategies.

This need a sound combination of administrative regulations and controls, economic incentives, eco-technical interventions, preventive measures, information and education, altogether being part of a consistent regional policy. ●

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