

THE EEC REGULATION 2080/92 ABOUT FOREST MEASURES IN AGRICULTURE: THE CASE OF POPLAR PLANTATIONS IN GREECE

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ABSTRACT

The Common Agricultural Policy reform that took place in Europe in 1992 and the relevant decisions it entailed created the preconditions for a considerable amount of agricultural land to be withdrawn from food production in order to be used for the production of wood. In recent decades, agricultural productive activities have been gradually losing their predominant role within the developmental process in rural areas. This study concerns the analysis of the personal and social characteristics of investors/cultivators of poplar plantations and the factors affecting the size of poplar plantations according to the EEC Regulation 2080/92. The research was carried out through questionnaires administered within the Prefecture of Pella. Farmers constitute the majority of investors/cultivators. Large areas of land being privately owned, the size of the irrigated land, participation in European programs and other European regulations are the main factors that affect the establishment of poplar plantations.

Keywords: CAP, EEC/2080/92, forest development, poplar plantations.

1 INTRODUCTION

A basic objective of agriculture during the post-war period was to improve agricultural performance and ensure sufficiency in food through an intensification of production systems. The accession of Greece to the European Economic Community (EEC) in 1981 and the application of the Common Agricultural Policy (CAP) resulted in an inflow of significant funding, strengthened the income of producers, motivated a further intensification of production practices and a pronounced agricultural exploitation of the countryside, but also led to the phenomena of territorial and social inequality [1, 2].

In recent years, the CAP reform, the General Agreement on Tariffs and Trade (GATT), the decisions of the World Trade Organization (WTO), the turn towards non-protected national markets and the enlargement of the European Union (EU), have created a new situation for the agricultural sector and rural areas in general [3]. Although agriculture used to be at the core of rural growth and supported the development of the countryside, it now seems to be losing its special weight and has adopted a defensive attitude towards increasing competition from the gradual liberalization of the market and the destabilization of the global markets for agricultural products and types of food due to excessive supply. Furthermore, the agricultural sector that once employed a majority of the active population now tends to involve a limited number of rural activities, even in zones with a low population density [4, 5].

In fact, within the policies of the EU, the countryside is promoted as a place devoted to the conservation, protection and enhancement of the natural environment, cultural values and the quality of life, and which requires special care and public supervision in order to achieve environmental and territorial balance [1, 6].

A variety of measures linked to agri-environmental issues, early retirement schemes, afforestation, as well as regulations related to organic farming and livestock, have contributed to the conversion, diversification and transformation of the existing production system on a farm level and nowadays

highlight the multi-functional role of agriculture and the countryside as a whole [7, 8]. The multi-functional role of the countryside also extends beyond the role of agriculture and includes other activities (production of non-food products, leisure, environmental protection, etc.) that create a complex set of occasionally contradictory characteristics. More precisely, rural areas in Europe represent not only environmental values and concerns but also significant cultural characteristics related to history and civilization [9, 10].

During the last few years, large expanses of land in Europe have been withdrawn from agriculture and food production to be used for purposes unrelated to food and nutrition, such as development of infrastructure, communications, industries, leisure activities and forestry. In the case of the EEC, the CAP reform in 1992 with the institution of Regulation 2080/92 greatly accelerated the set-aside of agricultural land from food production and its use for the establishment of forests and forest plantations. The multi-functional role of forests (environmental, social, economic, developmental and cultural) nowadays constitutes a multi-faceted issue that is gaining importance, with relatively unknown possibilities for the broader public, but with an important contribution towards the protection of the environment and the integrated development of the countryside. This has meant that the significant role of forests is gradually being enhanced, as well as their multiple benefits for the local productive and social system, and for environmental balance [4, 5, 11, 12].

Regulation EEC/2080/92 institutes a scheme for forestry measures in agriculture that is primarily aimed at controlling agricultural production, encouraging development of forestry activities on farms and improving the income of persons employed in farming. The aid scheme comprises aid for afforestation costs, a premium to cover maintenance of afforested areas, a premium to cover losses of income resulting from afforestation of agricultural land, and investment aid for the improvement of woodlands belonging to farmers [13].

Through this aid scheme, the terms of intervention defined by Regulation 1609/89 are radically modified as financial incentives, and support for the afforestation of agricultural lands and their subsequent conservation are significantly increased. Moreover, Regulation 2080/92 marked a major change in the forest strategy of the EEC, as it is ascertained that forest use of agricultural lands is an important outlet both at the level of the individual farm and at the level of the member states. Furthermore, there is a potential of using these areas to generate products in which the EEC is deficient [14, 15].

In Greece, the implementation of Regulation EEC/2080/92 from 1994 to 2002 resulted in the establishment of 35,836 hectares (ha) of forest plantations. Poplar (*Populus sp.*) plantations, with 4,582 ha, cover an important percentage of the above-mentioned area, namely 12.8% [16].

Poplar is a forest species widely known by the Forest Service and local farmers. Since the beginning of the 1930s, the Forest Service established the first poplar plantations on riverbanks and embankments mainly for protection purposes. Later on, poplar cultivation was also extended to other suitable areas, private and public, where they acquired a purely economic character. The import of particularly productive poplar clones from Italy provided a significant impetus for the development of poplar cultivation [17].

Prior to the implementation of Regulation EEC/2080/92, i.e. in the early 1990s, it was calculated that the total area dedicated to private poplar cultivation amounted to 7,500–8,000 ha, with an annual wood production of 350,000–400,000 cubic meters (m^3), which represented 15%–20% of the total domestic wood production [18]. During the last 20 years, many programs for the genetic improvement of poplar clones have been implemented, aiming at species with an increased production [19–22].

Poplar plantations provide raw material for several large Greek wood industries, which do not only cover the domestic market but also undertake significant exports. The insufficient amounts of poplar wood on a national level have forced industries to import from neighboring countries resulting in

an increase in production costs and creating a state of dependency. Poplar cultivation constitutes a profitable and lucrative forest-related activity that could play a major role for the rural economy of Greece. Its financial significance is due to the following characteristics of poplar: it has a very rapid growth rate, exhibits great adaptability to the soil and climate and is a lucrative alternative type of cultivation for agricultural land, since it guarantees a satisfactory income for farmers that more than exceeds the income from numerous annual agricultural crops. Finally, its wood is suitable for a broad range of end products [19–24].

The purpose of the present research is to investigate the personal and social characteristics of the poplar investors/cultivators and the factors that affect the size of poplar plantations according to the EEC Regulation 2080/92.

2 RESEARCH AREA AND METHODOLOGY

The Prefecture of Pella, which is located in northern Greece and borders eastwards with the Prefecture of Thessaloniki and northwards with FYROM, was selected as a case study.

The relatively high percentage of lowlands (40%–65%) that border the Prefecture of Pella is reflected in the land use. Thus, agricultural cultivation constitutes 37.5% of the total area of the prefecture, approximately 94,000 ha; grazing lands 29.8% and forests 23.5%. The most significant agricultural crops from the point of view of volume are wheat, corn, cotton and peaches [15].

Irrigated crops cover around 74% of the total in the Prefecture of Pella and they consist mainly of corn, cotton and peaches, whilst wheat makes up the largest portion of non-irrigated crops. In recent years, overproduction and low prices have resulted in a large portion of the peach-growing regions being converted under the terms of a program of reforms for the peach-growing community [15].

The specific prefecture was selected because it represents the policy of the EU for the set-aside of agricultural lands from food production and also the EU strategy for the increase of forestlands. Furthermore, an additional reason for its selection is the wide acceptance of the implementation of Regulation EEC/2080/92 during the period 1994–2001, when 3.4% of agricultural lands were planted and also a high percentage (40%) of lands used for the cultivation of fruits and vegetables were withdrawn. Agricultural lands that were afforested amounted to 3,200 ha in all altitude zones and the main forest species selected were black locust (*Robinia pseudoacacia* L) and poplar (*Populus sp.*) [15, 25–27].

The present research was carried out with the help of a structured questionnaire and using personal interviews. The realization of an empirical study in the field of social science has to pass through different phases or stages of progress. One of these is the collection of data and, more precisely, the collection of individual and social data through the use of a questionnaire [28]. The structured questionnaire used in this paper mainly included closed-ended questions or questions with pre-constructed answers. The various questions were related to the interviewees' individual characteristics, the structure of their farm and their attitude towards forest plantations.

From the data provided by the Forest Services of Aridea and Edessa, it is observed that 565 farmers were incorporated in the Regulation. However, only 461 questionnaires were distributed door to door. It was impossible to contact the remaining individuals, possibly due to the fact that their place of work was other than their place of residence. In addition to this, some people did not agree to respond. From the 461 questionnaires collected, 23 were considered unsuitable for various reasons (unclear answers, refusal to respond to some questions, etc.).

Considering that the valid questionnaires (438) represented 77.5% of the beneficiaries concerned, we are in a position to claim that the analysis below will provide valid and representative results on the characteristics of the population. The sample covered all types of geographical regions (mountainous, semi-mountainous and plain), and all the range of settlements found in the Prefecture of

Pella (from small, isolated villages to large cities and the prefecture's capital). Out of a total of 438 investors/cultivators, 199 persons (45.4%) were involved in the cultivation of poplars.

Bearing in mind the objective nature of the research, we investigated the relations between:

1. the total size of the land owned by the poplar investors/cultivators and the size of land allocated to poplar plantations,
2. the size of their irrigated land and the size of the land allocated to poplar plantations,
3. the extent of the participation of the investors/poplar cultivators in European regulations and projects (in addition to 2080/92) and the size of their poplar plantations,
4. another parameter that was examined regarded any differences that could be noted between the various altitude zones (plain, semi-mountainous and mountainous) and the size of the poplar plantations. Furthermore, any potential relation between the investors' gender and the size of the poplar plantations was also investigated. The data processing was completed using the SPSS v.10.0 computer program. Methods of descriptive statistics were used for studying the individual and social characteristics of the investors/poplar cultivators. The non-parametric coefficient of Spearman and the non-parametric tests (Kolmogorov–Smirnov, Mann–Whitney, Kruskal–Wallis) were used to investigate the research hypotheses [29, 30].

3 RESULTS

The total area that was planted with poplar amounted to 173.6 ha, out of which 62.7 ha were planted in the mountainous zone, 8.6 ha in the semi-mountainous zone and 102.3 ha in the plain zone [15].

The majority of the cultivators were men, 145 in all (72.9%), as opposed to 54 women (27.1%). The average age of the individuals was 48.8 years, 68.3% of them being under 55 years of age. On average, 0.86 male and 0.72 female offspring corresponded to each individual in the sample, while the average number of members per family were 3.45 individuals.

Out of all the respondents, 135 (67.9%) declared that farming was their main occupation, 36 (18.1%) were freelance professionals (merchants, technicians), 14 were civil servants (7%), 9 were private employees (4.5%) and 5 were professional scientists working on a freelance basis (2.5%) (Table 1).

The parents of the respondents were primarily farmers (93%). Twenty-four respondents had not completed primary school (12.1% of the sample), 93 had received primary education (46.7%), 37 had completed secondary school (18.6%), 7 were technical school graduates (3.5%), 23 were high school graduates (11.6%), 4 were graduates of technological higher education institutes (2.1%) and 11 were university graduates (3.5%) (Table 2) [15].

It is important to note that almost half the individuals were primary school graduates. The composition of the sample as far as conventional education is concerned is almost identical to the picture presented by the total number of farmers in Greece. The low level of conventional education and the general lack of technical training adapted to the modern needs of the agricultural sector could be restored through professional training programs provided by the state (mainly through the Centers for Agricultural Training) and other authorities [15].

A large percentage (84.9%) of the individuals in the sample had not attended professional training courses with an agricultural focus, yet 61.8% watched TV and radio programs with an agricultural content, since these are the communication media available in almost every home. More than half the sample (51.8%) read articles on agriculture in newspapers and magazines.

The size of the cultivated area is considered as one of the basic structural characteristics of a farm. On average, 3.1 ha correspond to each farm, of which 2.85 ha is irrigated land and 0.25 ha non-irrigated. The increased amount of irrigation on lowland areas gives farmers the opportunity to choose from a fairly wide range of crops (e.g. peaches, corn, poplars and so on). The corresponding

Table 1: Distribution of poplar cultivators according to profession.

Profession	Number of cultivators	%
Farmers	135	67.9
Freelance professionals (merchants, technicians)	36	18.1
Freelance professionals (scientists)	5	2.5
Private employees	9	4.5
Civil servants	14	7.0
Total	199	100.0

Table 2: Distribution of poplar cultivators according to educational level.

Educational level	Number of cultivators	%
Did not complete primary school	24	12.1
Primary school	93	46.7
Secondary school	37	18.6
Technical school	7	3.5
High school	23	11.6
Technological higher education institute	4	2.0
University	11	5.5
Total	199	100.0

average for the Prefecture of Pella is 3.2 ha, while it is 3.9 ha for the whole country. A percentage of 38.2% of the individuals in the sample own less than 3.2 ha. Moreover, an average of 7.6 plots corresponds to each farm as opposed to the national average of 6 plots. The area that is in fallow land is particularly limited (0.01 ha/farm).

On average, basic cultivation on each farm includes: poplar 0.86 ha, peach 0.81 ha, wheat 0.53 ha and corn 0.46 ha. About 22.1% purchased the agricultural land before the establishment of the poplar plantations, while 20.6% rented agricultural land before the establishment of the poplar plantations. The average rent for irrigated land amounts to 351 euros/ha, and for non-irrigated land 182 euros/ha. About one-fourth of the respondents (26.6%) stated that during the last five years the value of irrigated land has decreased, 46.7% that it has remained stable and 26.6% that it has increased. The selling price of irrigated land is on average around 8,494 euros/ha, and of non-irrigated land 6,020 euros/ha.

Most of the poplar investors/cultivators (70.4%) also grow peach trees and the cultivation of wheat follows close behind (61.8%). Additionally, 48.2% cultivate corn and 24.1% tobacco. As regards agricultural cultivation, it is obvious from the results of our research that there is a predominance of extensive cultivation (wheat), as well as industrial plants (tobacco) and fruit-bearing trees (peach trees) [15].

A significant proportion of the respondents (41.7%) are not at all satisfied with the selling price of their agricultural products, 56.3% are fairly satisfied and 2% very satisfied. One-third of the respondents (34.7%) face numerous problems in selling their agricultural products, 55.8% face some problems and 9.5% none at all.

In order to examine the knowledge of basic EU policies for the improvement and reform of agriculture, Regulation 2328/91 and the project related to the restructuring of agriculture were selected. The results show that the majority of poplar investors/cultivators (57.3%) are not aware of the existence and function of basic development policies and EU projects, while only 19.6% have actually participated in any such project. The rapid and dramatic policy changes that have been taking place at the European (the changes to the CAP) and international levels (GATT/WTO) have begun to limit the protection and the support of agricultural products.

Of the people who established poplar plantations, only a small percentage (24.1%) had formerly participated in reforestation work. The relatively small amount of work demanded by poplar plantations (limited spraying and trimming) led 47.2% to choose poplar rather than other types of cultivation. Moreover, poplar is a very well-known forest species, as poplar plantations have been established in Central Macedonia since the beginning of the 1960s. Another important reason that made cultivators choose poplar plantations was the size of the provided subsidy (18.6%), given both for the establishment of the plantation and for its maintenance [15].

The subsidies endorsed by decision no. 322/15-07-1998 of the Ministry of Agriculture, which have been thrice revised since the year of application of the Regulation 2080/92 in Greece (1993), state the following [15]:

1. As regards afforestation expenses:
 - up to 680,000 drachmas (drs) per ha for eucalyptus plantations,
 - up to 1,000,000 drs per ha for conifer plantations,
 - up to 1,200,000 drs per ha for broadleaved or mixed plantations that include at least 75% broadleaved plantations.
2. As regards conservation expenses:
 - up to 80,000 drs per ha and the same amount annually for the first two years and an extra 50,000 drs per ha per year for the following three years if conifers are planted,
 - up to 150,000 drs per ha and the same amount annually for the first two years,
 - up to 100,000 drs per ha and the same amount annually for the next three years for broadleaved or mixed plantations that include at least 75% broadleaved plantations.
3. As regards the premium provided to counterbalance the loss of agricultural income:
 - up to 160,000 drs annually per ha, if the afforestation is undertaken by the holder, owner or tenant of a farm or by a group of farm holders, who cultivated the land before its afforestation, on condition that it can be adequately proved that 25% or more of their income originates from agricultural activities practiced on their farm,
 - up to 50,000 drs annually per ha, if the afforestation is carried out by any other stakeholder.

The maximum duration of the premium is fixed at 20 years and is calculated from the date of the initial afforestation.

Poplar cultivation, with financial subsidies from the EU, is a profitable and prosperous investment even for investors who are not farmers by profession. More specifically, in the financial analysis that was performed, it was found that the annual equivalent value when financial subsidies were given to farmers according to Regulation EEC/2080/92 amounted to 600 euros/ha, as opposed to 294 euros/ha for other types of cultivation [23].

After the establishment of the poplar plantations, no important changes took place regarding the size of the agricultural area cultivated. Of the individuals concerned, only 8% rented and 4% purchased additional land. The main agricultural crops cultivated during the previous year on land where poplar plantations were established were wheat and corn, two traditional cultivations in the area. The initial

Table 3: Distribution of poplar cultivators according to the source of influence.

	Number of cultivators	%
Nursery owners	5	2.5
Rural cooperative	6	3.0
State foresters	9	4.5
Family	80	40.2
Fellow villagers	62	31.2
Freelance professionals foresters	37	18.6
Total	199	100.0

sources of information for the establishment of poplar plantations were co-villagers (56.3%) and freelance professional foresters (18.1%) [15].

The family environment (40.2%) and fellow villagers (31.2%) proved highly persuasive (Table 3).

A very high percentage (78.4%) of the interviewees' fellow villagers agree to the establishment of the plantations, as do their family (96.5%). Only a low percentage (5.5%) considers the establishment of poplar plantations as a very risky practice. Also, the percentage of people who do not feel apprehension toward the forest legislation is particularly high (72.9%). Traditionally in Greece, there has been a degree of suspicion in relation to Forest Services and particularly towards forest legislation. Nevertheless, the establishment of poplar plantations in agricultural areas from the 1960s and 1970s has greatly assuaged the fears concerning the ownership of the produced wood [15].

Most of the individuals (63.3%) believe that no change has been made to their family's workload and very few (7.5%) consider that it has actually increased. Poplar cultivation has no specific demands relating to agricultural machinery, since the machines that exist on any farm can be used. The main problems associated with poplar cultivation are plant protection (48.7%) and irrigation (39.2%). A significant proportion (47.7%) considers that their family income has been affected. It seems that establishing a poplar plantation is more profitable than cultivating wheat and corn. A high percentage (73.9%) shows an increased interest in training on issues related to poplar cultivation [15].

With the accession of Greece into the EEC and the implementation of the CAP, a large part of the income from agriculture is based on community subsidies. Farmers and people living in rural areas have become accustomed to European subsidies and this has meant that they are only willing to become involved in activities, particularly of the primary sector, which are linked to the provision of financial incentives. Furthermore, a significant percentage (74.4%) has not changed their attitude regarding the establishment of such plantations [15].

Using Spearman's correlation coefficient r_s , the issue examined was whether there is a correlation between the size of privately owned land and the size of the poplar plantations. It was ascertained that there is a weak positive correlation between the private land of investors/cultivators and the size of the land planted with poplar (Spearman's correlation coefficient $r_s = 0.386$, level of significance $p < 0.001$). This means that as the size of the land owned by the investor/cultivator increases, so does the size of the land planted with poplar. Although poplar is a fast-growing forest species, poplar cultivators view it as a long-term investment when compared to annual agricultural cultivations. That explains why the investors/cultivators plant more poplar trees as the size of their land increases. The farm size is positively related to the adoption of new cultivation, like poplar. Moreover, farm size is also a very significant factor governing the production choices and strategies of its manager, which subsequently affects his work and income, both on a personal and family level.

The poplar investors/cultivators who own land exceeding 3.2 ha plant more poplar than the ones who own land equal to or less than 3.2 ha. More specifically, on an average, the former planted 1.1 ha of poplar, whereas the latter planted 0.73 ha (Mann–Whitney $U = 2930.5$, level of significance $p < 0.001$) (Table 4).

Poplar plantations seem to be viewed by investors/cultivators as a long-term investment. They cover fertile, irrigated plain areas and compete with intensive agricultural cultivations for the land available. Therefore, the investor/cultivator plants more poplar when his level of ownership increases.

Using Spearman's correlation coefficient r_s , the next point examined was whether there is a relation between the size of the irrigated land and the size of the poplar plantations. It was established that there is a weak/moderate positive correlation between the size of the irrigated land and the size of the land planted with poplar (Spearman's correlation coefficient $r_s = 0.358$, level of significance $p < 0.001$). Poplar is a fast-growing species that grows better on deep alluvial soils, with average clay texture, rich in nutrients and constantly supplied with moving underground water. Moreover, poplar being a very widespread species all over Greece, most people are aware of the demands and care related to its cultivation. So, the cultivators establish poplar plantations in more areas when the extent of their irrigated land increases.

The factor pertaining to the cultivators' participation in European programs has affected the poplar planted lands. It is a well-known fact that during the last 20 years, a major share of the investments made by Greek farms has been partially financed from national sources and from the EU structural funds. This funding is provided through various regulations (e.g. 797/85, 2328/91, 950/97). In particular, the participation of cultivators in restructuring programs has had the greatest effect. More specifically, those who participated in Regulation EEC/2328/91 planted on average 1.15 ha, while cultivators who participated in the program of restructuring planted on average 1.17 ha (Table 5).

The factor 'altitude zone' (plain, semi-mountainous or mountainous) affects the size of the land planted with poplar. That is, altitude levels differ in relation to the size of the poplar plantations. More land was covered with poplar plantations in mountainous zones than in semi-mountainous ones.

Table 4: Distribution of planted land in relation to privately owned land.

Private land	Mean (ha)	N (number of cultivators)	SD
≤ 3.2 ha	0.73	123	4.6
> 3.2 ha	1.11	76	8.5
Total	0.87	199	6.6

Mann–Whitney $U = 2930.5$, $p < 0.001$.

Table 5: Distribution of planted land in relation to participation in European programs.

Participation	Mean (ha)	N (number of cultivators)	SD
2328/91	1.15	8	10.0
Restructuring programs	1.17	31	9.8
None	0.8	160	5.4
Total	0.87	199	6.6

$\chi^2 = 10.417$, $df = 2$, $p < 0.01$.

More precisely, an average of 0.98 ha were planted with poplar in the former, as opposed to 0.57 ha in the latter (Mann–Whitney $U = 243$, significance level $p < 0.01$) (Table 6).

Altitude zones differ as far as the planted land is concerned. A larger area with poplar plantations was established in the plain zone (an average of 0.85 ha) compared to 0.57 ha in the semi-mountainous area (Mann–Whitney $U = 576.5$, significance level $p < 0.05$). Poplar is a fast-growing forest species with a short rotation; it thrives in plain irrigated areas and competes with other agricultural cultivations [15].

As far as gender is concerned, there is a difference between the two sexes (male and female) concerning the extent of land planted. Men established poplar plantations with larger areas, on average 0.94 ha, as opposed to 0.70 ha established by women (Table 7).

An overwhelming majority of farms in Greece are run by men. Only in certain cases, and mainly when their husband's primary occupation is unrelated to farming, do women take on the role of a farm manager. The Greek rural society, especially in the past, did not even acknowledge the work that women did in their family farm. Despite the changes to the legal framework and the improvement of women's position in society in recent years, the family's hierarchical structure and the formal distribution of roles, at least, do not seem to have changed in Greece. As pointed out by other researches, the data concerning the gender of the farm manager still corroborates a typical ideological–social distinction of the roles undertaken by the members of a household. The participation of women and their role as workers on the farm are still determined to a great extent by the role of the men on the farm, and also by factors such as the size and type of the farm, and the size of the family. On small farms in particular, as opposed to large farms, it is more socially acceptable for women to take on the roles 'assigned to men,' due to the common involvement of the farm managers in a variety of occupations [30].

4 DISCUSSION

The results of the research have characteristically indicated the factors that affect the establishment of poplar plantations on farms, within the framework of Regulation EEC /2080/92, and their conversion into agro-forested areas.

Table 6: Distribution of planted land according to altitude zone.

Altitude zone	Mean (ha)	N (number of cultivators)	SD
Semi-mountainous	0.57	15	4.2
Mountainous	0.98	64	7.5
Plain	0.85	120	6.2
Total	0.87	199	6.6

$$\chi^2 = 10.898, \text{ df} = 2, p < 0.01.$$

Table 7: Distribution of planted land according to gender.

Sex	Mean (ha)	N (number of cultivators)	SD
Male	0.94	145	7.0
Female	0.70	54	5.0
Total	0.87	199	6.6

$$\text{Mann–Whitney } U = 2914.5, p < 0.01.$$

The last two decades have witnessed a reduction in the availability of new crops, the possibilities for their expansion and the margin for reduction of production costs. This has made imperative the need to find a new way of restructuring agricultural production. What is essentially required is to extend the production of new, dynamic products of high added value that will contribute to a reduction of the negative trade balance in agricultural goods (from farming, livestock and forestry) all over the country. The unfavorable effects of this negative trade balance are of paramount significance for the Greek economy, not only as regards the outflow of foreign currency, but also from other aspects related to employment and income (in primary production and manufacturing), the exploitation of natural resources, self-sufficiency and external economies [3].

The CAP reforms, the institution of measures for the afforestation of agricultural land (Reg. EEC/2080/92) and the provision of more enticing financial incentives in relation to the former institutional framework (Reg. EEC/1609/89) have given farmers the possibility to restructure their means of production (land, capital, labor, entrepreneurial capacity) within the framework of the farm and not beyond it [7].

With the CAP reform in 1992 and the structural funds earlier on (1988), the strategy of rural development has been adopted and generalized, constituting the central axis of the developmental policy of the EU for rural regions: diversification of economic activities, decoupling of financial subsidies from the volume of production, agro-environmental measures and improvement of infrastructure in agricultural areas. Furthermore, the role of natural forests and forest plantations for the integrated development of rural areas has been gradually promoted [5].

In Greece, the most frequent type of farm is the one involved in plant and animal production. The mixed type of farm attempts to combine the sectors of plant and animal production with the aim of achieving a mutual exploitation of both.

In recent years, following the implementation of Regulation 2080/92 in Greece, forest tree plantations have been established on agricultural land for wood production purposes. This has meant that the productive activities on these farms now comprise one more sector, the one related to forests. The selection of various species for forest plantations on farms has been based on natural and economic factors. We therefore come across poplar plantations on lowlands and irrigated areas, black locust and walnut plantations in diverse environments, and pine and fir plantations in mountainous areas predominantly, along with chestnut plantations. As a result, Greece seems to be following the example of the other EU countries, with the gradual formulation of a new, mixed type of farm, where agricultural land and forests intermingle [15].

In the area under research, poplar plantations have been primarily established on lowlands and irrigated areas and cover 27% of the average farm. Irrigation is one of the main parameters, which permit farms to increase their yield and differentiate their crops. The significant expanses covered by poplar plantations are expected to make a considerable contribution to the level of wood production, given the fact that Greece has a deficient supply of wood and its products.

The level of wood production from Greek natural forests is not sufficient to cover the needs of the Greek market for wood and its products. This is not only owing to the lack of adequate areas covered by natural forests, but mainly to their low level of productivity resulting from poor management for a long period of time after the liberation from the Turks and the frequently unfavorable climatic and soil conditions that limit production. Furthermore, Greek natural forests require long-term forest management and greater funding in order to be upgraded. Afforestation efforts have not managed to achieve a great increase in the area covered by forests. This is due to the fact that afforestation is performed on a small scale, mainly because of limited funding and the inability to locate suitable areas, due to the conflict with stockbreeding. If properly cultivated in soil that is suitable for their growth, poplars, and chiefly Euro-American hybrids, have the potential of significantly increasing

the wood products in Greece, due to their high wood producing capacity and high percentage of industrial wood they can produce in a relatively short period.

The basic structural characteristics of Greek agriculture have not showed any promising improvement, 20 or more years after accession into the EEC. The average size of farms is very small and the number of plots per farm still remains fairly large. However, despite the above-mentioned structural weaknesses of Greek agriculture, poplar plantations do cover a substantial part of the lowlands and irrigated areas on the average farm and constitute an alternative proposal for the use of agricultural land.

5 CONCLUDING REMARKS AND RECOMMENDATIONS

The CAP reform of 1992 paved the way for the acceleration of programs related to the afforestation of agricultural lands. Poplar is a fast-growing forest species that has been used in Greece for soil protection since the beginning of the 1930s and, for productive reasons, mainly from the 1960s onwards.

Research shows that the large majority of poplar investors/cultivators are males, with farming stated as their main occupation and with a low level of conventional education. Poplar is the predominant species compared to other cultivation (agricultural and forest) that is established on the average farm. The large size of privately owned land seems to affect the size of the area planted with poplar, as investors/cultivators with a large ownership establish more land area to poplar plantations. The size of the irrigated land also affects the land area of the plantation. Investors/cultivators with large expanses of irrigated land establish larger poplar plantations. The participation of investors/cultivators in other European programs has been a positive influence, as these respondents seem to establish more poplar plantations compared to those who had not participated in any.

The altitude zone also seems to affect the size of the area planted with poplar. In fact, larger areas were established with poplar plantations on the lowlands as compared to mountainous zones.

Regulation 2080/92 has benefited the expansion of poplar cultivation in certain regions of Greece. Nevertheless, the implementation of a national policy for the development of poplar cultivation and an increase in wood production is required in Greece, since there is a shortage of such products.

Measures to be taken in order to establish more poplar plantations, particularly in the plain zone include:

1. higher financial support provided for the establishment of poplar plantations on agricultural land that produces surplus products,
2. information to farmers concerning the possibility of producing valuable wood from other forest species as well, mainly broadleaves (e.g. *Acer sp* and *Fraxinus sp*),
3. discouragement of poplar plantation establishment in semi-mountainous and mountainous areas by providing very reduced financial incentives,
4. further funding by the state for research carried out in universities, institutes and other authorities concerning the genetic improvement of poplar.

In conclusion, the main points on which the efforts for a rational development of poplar cultivation in Greece should focus involve long-term planning for sustainable production of poplar wood, the implementation of a national policy that will encourage poplar cultivation beyond any community subsidies and the provision of information to farmers concerning the cultivation techniques and economic yield of poplar.

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