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Agriculture and Agricultural Science Procedia 7 (2015) 198 – 202

Agriculture and Agricultural Science

**Procedia**

Farm Machinery and Processes Management in Sustainable Agriculture, 7th International Scientific Symposium

## Agricultural equipment in Greece: Farm machinery management in the era of economic crisis

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### Abstract

The mechanization of the Greek agriculture began in the early 60s as a way to overcome the lack of labor force, due to the rural exodus. The approval from the farmers was encouraged by the financial support provided via national and European programs. Nowadays, thanks to this support, the index of mechanization of the Greek agriculture exceeds country's needs. However, there is inefficient use of farm machinery, due to the lack of the necessary complementary parts or overwhelming power of the tractors. The aim of this paper is to examine the management of farm machinery in Greece, during the economic crisis, a period of volatility in the markets and need for reduced production costs. It is shown that farmers got used to a mentality of fast-track farm management and farm machinery selection which can no longer be continued.

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Peer-review under responsibility of the Centre wallon de Recherches agronomiques (CRA-W)

*Keywords:* Farm machinery management; agricultural equipment; economic crisis; agribusiness approach.

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### 1. Introduction

The development of the Greek agriculture and its passage from traditional to modern production systems began in the 60s, the same period when its mechanization took place. The perspectives for growth in Greece's exports due to the country's association to the Common Market (1962), and a system of advantageous bank offers, subsidized in a large part by the state, encouraging farmers to buy on credit, triggered this modernization process. After the massive rural exodus of the 50s and the early 60s, farm mechanization was a way to overcome the lack of labor force, while

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through the created automations farm productivity was improved.

The mechanization procedure succeeded: a drop in production costs (thanks to the decreased labor cost), increase in agricultural income (automation etc.), preservation of farmers' income through the acceleration of farm activities (harvesting), and it was observed that both the farmer and his family was relieved from the tiring works in the field, the warehouse or the barn. All these factors encouraged farmers to expand their farms.

Mechanization has been combined, especially from the beginning of the 70s, with an increasing use of irrigation, fertilizers, pesticides and improved seeds (HYVs). This production system was vastly applied in the flat and fertile regions of central and northern Greece. On the other hand, the southern regions, with less favorite or mountain areas and the islands have specialized more in labor intensive cultivations.

However, the initial euphoria of all European farmers, which was caused by the abolition of barriers to international market access and thus providing them with increased expectations for export opportunities, during 60s and 70s, contributed to the increase of intensification, concentration and specialization of cultivations, which reach their limits in the begging of the 80's, due to market saturation. The farming income decreased, while at the same time it became depended on the fluctuations of a more and more limited number of markets. Many hundreds of thousands of farmers have disappeared because of competition and others become pluriactive, cultivating crops which are less labor-demanding. All these problems have put the utility of the "productivist farming system", characterized by a continuous modernization and industrialization of agriculture, into question (Ilbery et al, 1997).

Although, after Greece's integration to the EEC in 1981, the level of mechanization continued to rise, mostly by exploiting funds from European programs, Greek agriculture is obliged to adjust to a new era of "post-productivist transition". Its objectives have been progressively reoriented: from maximizing the production of food towards reducing food output, providing environmental goods and producing within the context of an increasingly competitive international market (Bowler & Ilbery, 1997). During the 90s, the austerity and adjustment policy that were imposed in the process of the EMU of the EU aggravated the situation and had a severe impact in the countryside, forcing to elimination thousands of small and inefficient farmers.

From 2008, the burst of the economic crisis, and onwards, Greece undergone the imposition of the austerity measures, a decreased demand even for agricultural products, the cancel of the subsidized oil and a very high taxation for the farmers. Taking all these into consideration, the present state constitutes a crucial point for the future of the Greek agriculture.

The aim of this paper is to analyze the way Greek farmers adjust into the new conditions of "post-productivist transition" and the economic crisis, taking into account the evolvement of a major input of their production system, the farm machinery. We firstly approach the evolution of farm machinery in Greece in general, and then we present a part from the results of a research which is based on the level of mechanization of the prefecture of Achaia in Peloponnese during the period of the economic crisis.

## 2. Farm machinery management in Greece

In the mid-60s people working in the primary sector accounted about the 35% of the labor force of the country, in 1991 this percentage dropped to 22% and the 2001 census shows even further decrease (16.1%). The population census in 2011 and the data of Hellenic Statistical Authority (HSA) in 2013, present a continued decline at the percentage of people working in the primary sector in relation to the total labor force, 10.2% and 9.9% correspondingly.

The number of farm holdings decreased from 950,000 in 1983, the first period of Greece accession to EEC, to 817,059 in 2000. The data of the Farm Structure Survey (2009) estimate that there are 723,007 farm holdings, 716,823 of them with utilized agricultural land (UAL), and a later survey (2013) estimates them to be 703,535, accounted for 3,381,500 hectares (ha). The average of UAL per farm is estimated to be 4, 8 ha.

Table 1. Greek agricultural equipment in use.

Year	Agricultural Tractors	Harvester-threshers (combines)	Irrigation spray systems	Wheat sewing machines	Milking machines
1965	31,519	3,763	12,836	5,780	4,050
1970	61,945	4,151	49,042	12,662	4,300
1975	93,424	5,234	83,476	19,277	4,600

Year	Agricultural Tractors	Harvester-threshers (combines)	Irrigation spray systems	Wheat sewing machines	Milking machines
1980	140,305	6,109	114,576	30,815	5,200
1985	183,410	6,566	136,211	39,970	6,180
1990	215,755	6,247	184,820	45,306	12,366
1995	236,197	6,100			14,155
2000	253,785				13,865
2005	259,766				13,289
2010	257,385				

Source: HSA (Statistical Yearbook) and FAOSTAT Database

Table 1 shows that after 2000 the number of tractors remains stable, with only some few fluctuations. The small drop in 2010 can be easily explained due to the economic crisis. However, the records from the National Bank of Greece present that during the last 5 years there has been a rise in the prices for the products belonging in the category of “Farm machinery and equipment”. With base year 2005, between 2010 and 2011, 2011 and 2012, 2012 and 2013 there is a rise of 0.6%, 1.2% and 1.0% correspondingly.

From 1970, various forms of mechanization have been applied and expanded rapidly. K. Vergopoulos (1978) and other authors argue that there has been an over-mechanization and there are indeed cases where farm machinery (tractors, etc.) is used as prestige or status symbols. There is also, on the average, a low degree of its utilization. The inefficient utilization of a large portion of the Greek agricultural equipment is due to, on the one hand, practical reasons relevant to the special characteristics of the land and the structure of the farms, and on the other hand the perception of the farmers in relation to the management of their farms and their input.

The vast majority of farmers, affected by serious structural weaknesses and productivity problems, do not strive for a macroscopic approach of farm management. These problems involve the small size of holdings, the multi-fragmentation of farms, the low level of farmers’ education and training, the irrational use of modern technology and the high production cost as well as the underdeveloped marketing of agricultural products, and the state of the cooperative movement and of the bureaucratic public administration.

After Greek accession to the EEC, income increase and the improvement of standard of living was the result of extraneous interventions in relation to the conventional Greek agricultural farming system and many of its advantages remained unexploited by the great majority of producers. This seems to confirm what Harrison and Kennedy had noted in 1977: “Supporting domestic production at artificially high prices may detract from the competitive advantage of the nation by inhibiting the development and adoption of new technologies”.

Furthermore, the cutback in private investments, irrational management of EU funds and ineffective structural policy appear to have played a decisive role in the fall in the competitiveness of Greek agriculture (Demoussis 2003; Petropoulos 2007). A substantial part of the increased income is directed towards consumption and urban real estate, disregarding investments which would improve the infrastructure of their farms. Between 1980 and 2007 the gross fixed capital investments in agriculture were reduced from 7, 8% to 4%.

Beyond all forecasts, the accession of Greece to the EU did not set in motion the integration of its agricultural structures, but rather it seems to have reinforced the heterogeneities and inequalities at many levels. The vast majority of farmers pursue a survivalist model of farming depending on various combinations of land, labor and capital (Daskalopoulou & Petrou 2002). Furthermore, individual or family pluriactivity of the agricultural household tends to be the norm.

A vastly accepted index of the mechanization of a farm, a region or a country is the number of medium power tractors (for Greece is 4,5 kW/ha) which correspond to 100 ha of UAL. The Farm Structure Survey (2009) estimates the UAL to 3,477,900 ha and the number of tractors to 257,385 units, which means that mechanization index is 7.4 tractors per 100 ha of UAL. Furthermore, if we add to the calculation the uniaxial tractors (132,624 units), our index rise to 11.2. Taking into consideration that in south-eastern European countries the number of (axle) tractors (per 100 ha of arable land) is in range from 1.5 (Bulgaria) to 25.0 (Croatia) and the installed power engine of the tractors (per 1 ha) is from 0.3 to 5.4 kW/ha, we see that Greece is at a relevant high level of mechanization.

### 3. Farm machinery during the economic crisis

The following results are part of the preliminary processing of a research for farm machinery in Achaia, landed in the northern-west of Peloponnese. The research took place during the winter of 2015. The prefecture is divided into 5 sub prefectures and encapsulates the three typical zones of the Mediterranean landscape, lowland, hilly and mountainous. The UAL is estimated at 53,275.4 ha and there have been recorded 4,309 tractors. The mechanization index is 8 tractors per 100 ha, which is assumed to be satisfactory. Although, the power of tractors is big, the fieldwork showed small rate of utilization. This was, mainly, due to the lack of the necessary complementary parts (mechanical seeder, mechanical fertilizer spread, etc.) in order to have complete farm mechanization.

Table 2. Registered tractors in the prefecture of Achaia during the last five years.

	2010	2011	2012	2013	2014
New	47	28	22	36	43
Used	88	80	52	6	76
Total	135	108	74	98	119

Source: Ministry of Agriculture, Direction of Patras.

As far as new tractors are concerned, for the last three years before the recorded period there were registered: 93 in 2007, 55 in 2008, and 52 in 2009. There have been a great drop in tractors' market from 2009 and then, due to the economic crisis. It is observed that only after 2012, the market has started to adjust, presenting a relevant rise for used and cheaper tractors.

Two programs contributed mostly in the mechanization of the farms during the last years, encouraging farm machinery purchase, European Union Young Farmers Program (Aggelopoulos et al, 2015) and Program for Young Farmers to buy land with subsidized interest (see Table 3).

Table 3. Young Farmers of Achaia in Programs.

Year	Young Farmers Program	Program for Young Farmers to buy land
2000	102	
2001/2	226	
2003	131	
2004		26
2004/5	172	
2005		52
2006	79	27
2007		23
2008		36
2009	248	41
2010		20
2011		26
2014	394	
2015		4

Source: Ministry of Agriculture, Direction of Patras.

### 4. Conclusion

Although rural exodus in the 60s facilitate the modernization of production systems and the approval of mechanization as a mean to improve both the productivity and the quality of agricultural activity, the crisis and the

industrial decline since the mid-70s have forced Greek authorities into a support policy for the maintenance of rural population in the countryside, which led farmers to get used to a supported modernization. The CAP has also promoted a similar policy until the mid-80s. The growth of the Greek agriculture was forged, which led, apart from few exceptions, farmers to have passive attitude towards every change of their operational environment.

During the last 25 years, Greek agriculture while being fully integrated in the European agricultural system is called to survive in a very competitive and volatile environment, without thus far being able to compete, except for some very big farming corporations. The farm management and the management of farm inputs should be made in a different way in order to succeed a competitive production cost with high product quality. The current economic crisis could constitute a chance for setting a stricter and an effective productive system, in order to contribute not only in alleviating short-term impacts of the economic crisis, but also to help in the mid and long term growth of the farms.

Through observing the mechanization index we conclude that the real problem of the Greek agricultural production system, is not the lack of agriculture equipment, but the inefficiency of the whole productive procedure. Due to bad management, the application of farm machinery is unsuccessful.

The main setback of the Greek agriculture is the false mentality of Greek farmers and their lack of responsibility and professionalism towards their agribusiness approach.

## References

- Aggelopoulos, S., Pavlouidi, A., Chioteris, S., Papageorgiou, A., 2015. The progress of agricultural entrepreneurship for young farmers: Evaluation of investment plans, 8<sup>th</sup> Annual Conference of the Euromed Academy of Business “Innovation, Entrepreneurship and Sustainable Value Chain in a Dynamic Environment”, 16-18 September, University of Verona, Italy.
- Bowler, I., Ulbery, B., 1997. The regional consequences for agriculture of changes to the Common Agricultural Policy. In: Laurent, C., Bowler, I. (Eds), CAP and the Regions. Building a Multidisciplinary Framework for the analysis of the EU Agricultural Space. INRA, Paris, pp.228.
- Dascalopoulou, I., Petrou, A., 2002. Utilizing a farm typology to identify potential adopters of alternative farming activities in Greek agriculture. *Journal of Rural Studies* 18, 95-103.
- Demoussis, M., 2003. Transformations of the CAP and the need for reorganizing agricultural policy in Greece. In: Kassimis, C., Stathakis G., (Eds), The reform of the CAP and rural development in Southern Europe. Ashgate Pub Ltd, Aldershot, pp. 191.
- Harrison R., Kennedy, P., 1997. A neoclassical economic and strategic management approach to evaluating global agribusiness competitiveness. *Competitiveness Review* 7, 14-25.
- Ulbery, B., Chiotti, Q., Rickand, T., 1997. Introduction. In: Laurent, C., Bowler, I. (Eds), CAP and the Regions. Building a Multidisciplinary Framework for the analysis of the EU Agricultural Space. INRA, Paris, pp.228.
- Petropoulos, D., 2007. European Union's enlargement and the agricultural sector in Greece. *Review of Economic Sciences* 11, 123-140. [In Greek]
- Vergopoulos, K., 1978. Capitalism and Peasant Productivity. *The Journal of Peasant Studies* 5 (4), 446-465.