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FARM TYPOLOGY IN COPSA MICA REGION

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Abstract

In Copsa Mica it was found, unfortunately, very well expressed some of the main weak points of the Romanian agriculture: the excessive fragmentation of property and land abandonment. Even if the pollution in recent years affected agricultural area, the farmers work the land properly, even if small areas. This is due to the specialists from villages, well trained and interested (some of them developed activities such as mechanical works, input distribution). A large surface of the agricultural land is uncultivated. This situation is because of losses caused by wild boars and some social issues.

INTRODUCTION

According to Luca [1], Romania has a population employed in agriculture twice in comparison with Poland, ten times higher than the share of agricultural population of Germany, Belgium etc. The average area per farm is a little higher than in Malta, but lowers than in Cyprus. For those that are agree with large and very large farms, the study reminds them that in Europe, farms have on average: 7 ha in Italy, 24 ha in Netherlands, 49 ha in Germany and France.

Heavy metal accumulation in soils and vegetal products is of concern in agricultural production due to the adverse effects on food quality (safety and marketability), crop growth (due to phytotoxicity) [2]. The uptake of metals from soil depends on different factors such as their soluble content in it, soil pH, plant species, fertilizers and soil type [3]. Phosphate fertilizer application is a significant contributor of trace element, especially for Cd accumulation in cropland soils [4]. Generally plants are characterized by translocation of larger quantities of metals to their leaves than to their fruits or seeds [5].

Cadmium is one of the most well-known environmental intoxicants to humans and is characterized by high mobility in biological systems. Its presence in nature and entrance to human's food chain, causes serious damage in kidneys, lungs, bones and also anaemia and sometime hypertension [6].

Lead as a well-known toxic heavy metal that accumulates in the human body through food chain and endangers human health. Foods such as fruit, vegetables, meats, grains, seafood, soft drinks and wine may contain significant amounts of lead. As far as it known till today, lead has no essential function for plants, animals

and microorganisms. It inhibits the thiolic groups of some enzymatic systems, especially those that potentate haemoglobin synthesis [7].

During our survey, it was found that the contents of heavy metals in some places in the studied area are above the permissible limits. For example, in a farm from Axente Sever village, it was found lead levels of 1.5 ppm lead and 0.72 ppm cadmium in maize [8]. According to Commission Regulation (EC) No 1881/2006, the permissible limits for grains are 0.2 ppm for lead and 0.1 ppm for cadmium

Similar studies regarding cadmium and lead concentrations found in agricultural products were developed worldwide [9-12].

MATERIAL AND METHODS

For this study, we chose five localities in the Copa Mica region: Copa Mica city, Tarnava, Valea Viilor, Axente Sever, Micasasa and Seica Mica. In this area we unfortunately found very well expressed some of the main weak points of Romanian agriculture: the excessive fragmentation of property and land abandonment.

We have analyzed 835 farms in the five mentioned localities, using data from APIA, Departments of Agriculture and Rural Development Office and also from agricultural agents that work at corresponding city halls.

RESULTS AND DISCUSSION

In Copsa Mica there are 62 farmers. Of these, only 10 (16%) have farms larger than of 4.5 ha. Arable land in Copsa Mica is 140.42 ha.

From 10 farms considered, eight of them have the whole area as arable, the other two with 81% and 95% area in arable. It is noted that the total area of farms varies between 4.51 ha and 15.07 ha and the average area of the parcels is very small (between 0.55 and 2.04 hectares). This is due to the large number of parcels (between 3 and 16)/exploitation.

In Copsa Mica it was found the smallest surface planted with winter wheat in the region, of only 3 ha, although this year the yield was 26.7 q/ha, greater even than the natural potential of the area, which is only 21 q/ha. The explanation is a technical one: there is no harvesting combines. Therefore maize it is planted frequently (379 ha), because the yield is harvested manually. Average yield of maize was 30 q/ha. There were 70 ha of alfalfa, with a yield of 34 t/ha. Potato yield on the 20 ha was quite low (12 t/ha), potato being a crop which did not encounter good growing conditions this year (excess rains).

In Axente Sever village there are 217 farmers. Only 9 of them (4%) have surfaces in arable area of more than 8 hectares. Total arable area is 554.46 ha. From the total surface of such exploitations, arable area represents from 19% up to 100%.

It is noted that in this locality there is an excessive fragmentation of the arable area. Although the size of farms is considerably higher (between 70.91 and 10.12 ha), the number of parcels/farm (between 2 and 17), makes the average area of a field in rotation to range from 1.13 ha up to 7.07 ha.

Regarding the field crops, in Axente Sever the widest range of species are grown, though, except maize, which is cultivated on 300 ha, the areas are relatively small: 25 ha for wheat, 10 ha for barley, 5 ha for spring barley, 40 ha for potato and between 30 and 50 ha for fodder plant (annual, perennial and alfalfa).

The cereal crops have achieved the biggest yields for the localities that were studied: 50 q/ha for maize, 32 q/ha for wheat, 30 q/ha for barley. For spring barley the yield was lower, only 13 q/ha. Also a relatively low yield was obtained for potato (12 t/ha). Regarding the fodder plants, the best results were obtained in alfalfa (20 t/ha). Meadows yield were lower, between 8-12 t/ha.

It is important to mention as an example, the case of a veterinarian from this village. He has 7.5 ha and would like to expand the property. This is quite difficult because there is more land and is not worked around. Under these conditions the damages caused by the wild boars and thefts are high. For the four cows that he has, he has cultivated in 2010, 2 ha with maize (37 q/ha), 1 ha with wheat (32 q/ha), 1 ha with oats (15 q/ha), 0.5 ha with potato (20 t/ha).

He uses herbicides to control weeds in maize plots that are furthest from the village and for the remaining surfaces he uses manual hoeing. He uses hybrid seed and fertilizes with manure from the four cows. He uses plant protection products for the potato crop. Potato harvesting is made manually, but there were years when it was used harvesting machines.

In the village Micasasa there are 286 farmers. The vast majority of them (97%) have arable areas smaller than 11 hectares. In this locality it was detected the smallest area of arable land (78.76 ha).

If we analyze the 10 largest exploitation in Micasasa, it is noted that:

- arable area occupies a variable percentage between 0% and 100%;
- in most cases, the land that is not arable is abandoned; in the larger farms, non arable land is used as pasture;
- the largest areas are properties of livestock farmers (shepherds);
- in the 10 largest farms in Micasasa, the area surface varies between 11.74 and 103.86 ha;
- although there are small farms, the number of plots is high, between 1 and 28; it is important to be mentioned the case of a farmer that has merged 40 hectares in a single plot;
- in Micasasa, the average area per plot varies from 0.66 ha (18.66 ha on a farm) up to 40 ha (a “happy situation”, one plot).

Although in Micasasa it is cultivated the smallest arable surface (78.76 ha), yields were quite good this year. In winter cereals (wheat and barley), the yields were 32.5 and 30 q/ha. The spring varieties of the same species, the yields were half (15.1 q/ha for wheat and 3 q/ha for barley). The yields were 30 q/ha in maize and 30 t/ha (green weight) in alfalfa. However, potato production has been compromised on the 100 hectares, due to excess of rains. Many farmers have not recovered even the quantity that was planted. Potato yield this year was 1.5 t/ha.

An agronomist, employee of the city hall, gave a 5 ha farm: 500-1000 square meters cultivated with potato, barley on 0.5 ha, wheat on 1 ha, maize on 1 ha. He obtained pretty good yields: 65 q/ha for barley, 40 q/ha for maize, 15 t/ha for potato. Almost 90% of total number of farmers use certified seed. Maize is fertilized with 60-70 kg nitrogen/ha.

In the potato crop, plant protection products are used and in maize, herbicides are applied usually.

In Tarnava village, from 136 farmers just 10 of them (7%) have exploitations with areas larger than 5 ha.

The surface of the 10 largest farm in Tarnava varies from 5.7 ha up to 100.1 ha, while the average size of one plot varies from 1 to 4.5 ha. Number of parcels ranges from 5 to 25 (the case of exploitation of 100.1 ha).

60% of the area is desolated, being under weed growing process, a forestation and erosion. Grown on small areas (15 ha), the highest yield was obtained in winter wheat (3.5 t/ha). High yield were obtained also for spring barley (2.5 t/ha). However, green weight production of alfalfa was quite small (15 t/ha). For potato the yield was 16 t/ha.

Most farmers do not have their own equipment. For that reason, mechanical operation are hired. Maize cobs are harvested largely by a two rows harvester. For wheat and maize are used crop plant protection products.

In the Valea Viilor village, from the 177 farmers, only 10 (6%) have farms larger than 7 ha. Farm area varies from 8.1 up to 49.17 ha and the plot surface, from 0.62 ha up to 4.91 ha. Number of plots/exploitation is between 4 and 16.

Although lower than other localities, the most important surface is used to grow maize (180 ha). The yield was 30 q/ha. In the Valea Viilor, the smallest area is cultivated with winter wheat (8 ha). The yield in spring wheat is somewhat lower than for winter wheat, only of 15.1 q/ha. The same is the case of the spring barley. The potato yield was quite good (20 t/ha), because the crop is fertilized with manure and complex fertilizers. Also, the plant protection products are used.

In general the seed for sowing it is purchased, but is not always certified. In wheat and maize are used herbicides, but for the control of weeds in maize crops, also horse-drill hoe is used. The maize is harvested using combines.

In the Seica Mica village, there are 130 farmers. Among them, the largest 10 (8%), have over 15 ha each.

The 10 largest exploitations from the village are between 15.43 and 78.11 ha. The average area of a plot varies between 0.81 ha and 22.5 ha, because the number of plots/exploitation varies from two to 21 plots.

Also, in Seica Mica the largest area is planted with maize (350 ha) and production is quite good (35 q/ha) in comparison with the potential of the area. Maize it is cultivated especially for use in households to grow 1-2 pigs. Maize is a crop that is strongly affected by wild boars, situation that was met in all localities in the area. For some of the plots cultivated with maize are used herbicides, and other are manual weeding.

On the 45 ha cultivated with winter wheat the yield was 21 q/ha. In alfalfa the yield was higher than in other localities (35 t/ha), but in the case of natural grassland the yields were, as expected, smaller (12 t/ha). Potato production has been affected by rain, being only of 14 t/ha. For potato crop are used plant protection products.

In Seica Mica part of agricultural operations are carried out mechanically, and some of them with the help of animals (working with horse hoes) and also, manually. Wheat is fertilized with ammonium nitrate and manure. In this area the farmers use quality seeds that are provided by authorized distributors.

CONCLUSIONS

1. Maize is the most cultivated crop and will be probably the culture that will be the subject of an expert system for crop plants grown on contaminated land. This is because hybrid seeds are used, different methods of weed control, organic and mineral fertilizers.
2. Even if the pollution in recent years affected agricultural area, the farmers work the land properly, even if small areas. This is due to the agronomists from villages, well trained and interested (some of them developed activities such as mechanical works and input distribution of seeds for sowing and pesticides).
3. A large part of the land is uncultivated. The main obstacles for expansion of cultivated land are losses caused by wild boars and social issues.
4. The most important farm in the region has 250 ha (in Copsa Mica and Tarnava region). In 2010, the yield was 6 t/ha in maize, 3.5 t/ha for cereals, 20 t/ha for sugar beet (affected by excessive rain). There are applied 1-2 treatments with pesticides and the fertilization is performed with manure, and chemical fertilizers (about 80 kg N/ha). The farmer conducted experimental plots. Almost 60 maize hybrids were tested.

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