Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 13, Issue 3, 2013
PRINT ISSN 2284-7995, E-ISSN 2285-3952

WASTE MANAGEMENT GENERATED FROM AGRICULTURE IN CĂLĂRAŞI COUNTY

Cecilia NEAGU

University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania, Faculty of Management, Economical Engineering in Agriculture and Rural Development – Călăraşi Branch, 1 Nicolae Titulescu, Călăraşi, Romania, Phone/Fax: +40242332077,
E-mail: cecilianeagu2005@yahoo.com

Corresponding author: cecilianeagu2005@yahoo.com

Abstract

The agriculture practiced in Calarasi county has negative effects on soil and water sources. The significant quantities of chemical fertilizers and fito-sanitary products, mono crops practicing, vegetal layer reducing (pasture) and poor organic waste management derived from agriculture vegetal remains and animal manure) lead to soil and ground water pollution. Due to the geographical position of the county, it is needed to monitor constantly the agricultural sector that can flow into the Danube high quantities of nitrites and nitrates. Călăraşi county has a high potential of biomass, enough to obtain natural fertilizers and biogas.

Key words: *biogas, bio waste, chemical fertilizers, compost, phyito-sanitary products*

INTRODUCTION

The sustainable development and integrated waste management methods assume a stable ratio between the natural habitat and people in the respective area.
The main objective of this paper is to present options for the sustainable management of organic waste from agriculture to maintain a balance between the natural environment, its resources and man. Farmers and the others living in the rural areas should be aware of the negative impact of incorrect waste management, which subsequently reflects upon them and future generations.
Călăraşi county is well known for agricultural profile, mostly cereals. The agricultural waste management is needed to maintain soil fertility through the application of methods for recovery of the resulted biomass - namely through methods such as composting and methanisation, which will have an impact on human health and on environment protection .
Soil pollution leads to affect its fertility, disturbing all its physicochemical, biological and biochemical functions [5].
The concept of sustainable development involves the application of biowaste recycling methods to replace conventional farming.
Soil conservation in its lively form is the only guarantee of the future of every nation and of the planet as a whole [2].

MATERIALS AND METHODS

As any economic activity, agriculture also generates waste but they have a special character, requiring attention. Farmers carry out their current activities to ensure a considerable profit, but it must be combined with monitoring the entire production chain from the farm, including proper management of manure and vegetal residues [3].
The main sources of data in the paper are provided by the Environmental Protection Agency and the Department of Agriculture in Calarasi, units that monitor waste management unit and agricultural activity in the county.
The base of agriculture in Calarasi county is represented by agricultural land, that has about 425.000 hectares. The percent of person in the rural area that develops activities in agriculture in the county is of 70%. Călăraşi is

situated in the top of the counties in Romania from the point of view of the production of wheat, barley and sun flower.
The practice of monoculture and the application of large amounts of chemical fertilizers to enhance production in this area have led to the degradation of the environment, particularly soil and groundwater.
The actual pollution of soil and groundwater can be reached when harmful substances that reach the soil exceed that soil capacity to degrade these substances [1].
The four main sources of water pollution by nitrates are nitrates from manure and household waste mineralization, those from the fermentation without a guide or mismanaged waste and waste water from livestock, nitrates from fertilizers and those coming from mineralization of humus [4].

RESULTS AND DISCUSSIONS

As regards the distribution of agricultural lands in the county, the highest surface is occupied by arable land - 96,64 %, due to the geographical area of plain.
On types of use, during the last three years, the distribution and evolution of agricultural lands is as follows:

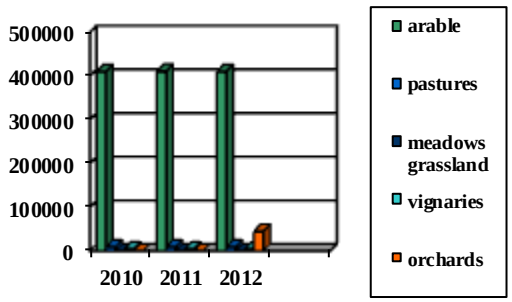

Fig. 1. Situation of agricultural land on categories of use in Calarasi county in the period 2010-2012 (in hectares)

The evolution of agricultural land distribution shows that areas in the last three years are relatively constant in all categories, except in 2012 the grassland area reached zero that contributes to the degradation of the soil quality (it is needed to keep in the plain are a surface to help the soil remineralization after intense use in conventional agriculture). From the figure we can see that large amounts of vegetable waste from agricultural activities are produced.
The total cultivated surface, in 2012, was of 410,7 thousand hectares, the surfaces cultivated being very close to the previous year, 2011 – 409,7 thousand hectares [9].

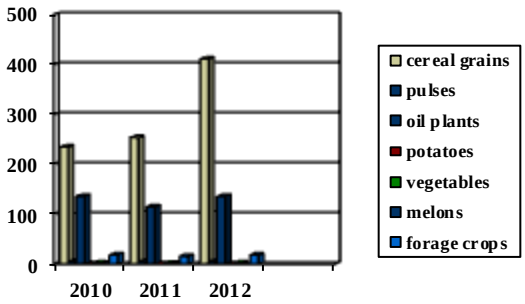

Fig.2. Surface cultivated with main crops in Calarasi county in the period 2010 – 2012 (in thousand hectares)

The most significant share of cereal grains culture is held by wheat and rye, followed by maize, and barley crops.
The areas planted with major crops recorded slight variations due to the weather conditions precipitations uniformly distributed, but they are generating the second production following processes after harvest: corn cobs, straw, stalks.
The intensive farming of cereals mainly has a negative impact on the soil, decreasing the reserves of nutrients. The solution could be growing grain vegetables as they have a positive effect on agricultural land, helping to restore the background of natural chemicals (it fixes nitrogen in the soil) [7].
According to the data provided by Calarasi County Agricultural Department [8], the dynamics of livestock in the same period was the following:

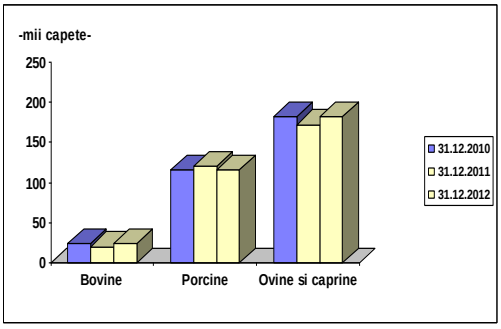

Fig.3. Evolution of livestock in Calarasi county in the period 2010 – 2012 (thousand heads)

The figure above highlights the fact that in 2012 the number of cattle registered a small decrease, the other livestock presented registered a significant increase especially sheep and poultry. The quantities of manure generated require the application of technologies to meet the environmental requirements imposed by the current legislation.
The livestock sector is an important sector of the economy, particularly that of poultry placing the county on the first place in the sheep and poultry held.
The data in this graph show insignificant fluctuations made during the three years analyzed, but the fact that they are owned by the private sector it means a greater need to manage correctly not only the livestock but also the manure that results following their exploitation.
One of the worst effects of excessive use of chemical fertilizers is produced by the phenomenon of washing of nutrients and water from the soil by irrigation or rainfall and their infiltration into groundwater, contributing to increased rates of eutrophication of water [6].

Table 1. Evolution of use of chemical fertilizers in Calarasi conty in the period 2010 – 2012

Year	Fertilizers used (tons of active substance)			
	Nitrogen	Phosphor	Potassium	Total
2010	14210	6002	912	21124
2011	14210	6170	1116	21496
2012	14210	6002	912	21124

The quanity of chemical fertilizers used in the three years analysed [10] is relatively constant, variations being very small. From the quantities used, we can understand why Călăraşi is among the polluted area with nitrates derived from the agricultural activity.
For the plants protection, the fito-sanitary products used in the last years are mentioned in Table 1.
From Fig.4, one can see that the fito-sanitary products are present in quite high quantities, this being a consequence of using fertilizers that attract different pests. The year 2012 totalize the highest quantity, comparatively to the previous years.

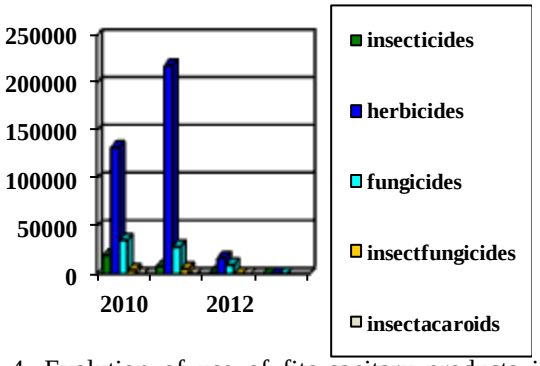

Fig. 4. Evolution of use of fito-sanitary products in agriculture in Calarasi county in 2010-2012 (tons of active substance)

CONCLUSIONS

In conclusion, the conventional agriculture is only an economic business in the rural areas that does not pay due attention to the environment, under the pretext that the population needs increasing amounts of food, which leads to a number of problems: compaction, erosion and pollution of soil and underground water contamination and eutrophication due to nitrates and phosphates; human health effects due to pesticide residues and additives in animal nutrition, landscape degradation
The vegetable and animal husbandry sector in the county have negative effects on soil and water sources, which are subject to deterioration and pollution.
The large quantities of fertilizers and plant protection products are used in conventional agriculture, degradate the natural resources and the main factor of production, soil, too heavily exploited.
The livestock sector produces manure with a high content of nutrients that can be converted into organic fertilizers. They are a source of groundwater pollution by nitrates, due to improper storage, due to ignorance or poor information.
Due to its geographical position which includes two important elements: Bărăganului Plain with fertile soil suitable for agriculture and the Danube Valley, it is necessary to

constantly monitor the agricultural sector, which can discharge large amounts of nitrates and nitrites in the Danube.

The eutrophication process is a serious negative consequences due to poor management of agricultural waste and poor representation of organic agriculture in the county.

Organic waste management in agriculture is not just about compliance with environmental standards, it encompasses benefits for those who practice agriculture, allowing them to diversify their activities and increase their profits. Through proper use of biomass, they can develop a strong market for organic products by composting technology and organic farm practicing.

Another benefit brought by crop residues and livestock manure is the renewable energy, biogas with its dual use electricity and heat, that allows the removal of the "label" given to agriculture of intensive energy consumer.

Calarasi county has a significant potential of agricultural biomass, due to the large area of farmland.

The application of alternative composting and methanisation represents the reduction/ elimination of pollution from agricultural activities, if farmers will understand the new direction of agriculture and of the rural area represented by durability.

The advantages of biogas are that it is a renewable energy source that replaces successfully the sources depleting that have been overused.

In Calarasi county, the sustainable development of agriculture and the entire rural area must be applied, considering the agricultural area and the share of agriculture in GDP, the viable solutions being the ecologic agriculture to minimize soil degradation.

A solution to the problems identified is the construction of storage platforms and agricultural waste landfills. It is necessary passing to sustainable agriculture, building a compost market for the development of organic products that are sought in the European Union.

The correct use of agricultural land involves the cultivation of leguminous plants that fix nitrogen in the soil and increase the meadow, because under the natural vegetation, the soil fertility regenerates continuously, reaching a steady state of nutrients.

Also, the vegetal sector must be correlated with the livestock for the best use of its potential the county has. If the two sectors support mutually, the possibility to achieve increased profit is considerable (meat has a higher value compared to vegetal production).

European funds accessing both in agriculture and environmental protection provides financial support for those who want to practice organic farming and conserve environmental resources.

REFERENCES

[1] Berca M., 2006, Planning of environment and natural resources management, Ceres Press House, Bucharest, p.284

[2] Berca M., 2008, Problems of soil ecology, Ceres Press House, Bucharest, p. 18

[3] Barloy, J.,2008, Pollution des sols et des eaux par les engrais et les effluebts d'elevage. Course. University of Agricultural Sciences Banat – Timişoara, p.33

[4] Code of best agricultural practices, vol I, Bucuresti, 2003, 55.

[5] Penescu, A., Băbeanu, Narcisa, Marin, D. I., 2001, Ecology and environment protection, Sylvi Press House, Bucharest, p.206.

[6] Ghinea, L., 2002, Biology of microbiology of soil - course, Agroprint Press House, Timişoara, p.107;

[7] Neagu, Cecilia, Doctoral Thesis, 2006, p.57

[8] Annual Report on environment state in Călăraşi county in 2010, elaborated by APM Călăraşi; http://www.apm.ro

[9] Annual Report on environment state in Călăraşi county in 2011, elaborated by APM Călăraşi; http://www.apm.ro

[10] Annual Report on environment state in Călăraşi county in 2012, elaborated by APM Călăraşi;http://www.apm.ro