

RISK IN PERFORMANCE AGRICULTURAL PRACTICE

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Abstract

The environment, with all physical and chemical components, was permanently exploited by the biodiversity. The ecology experts consider that its value is invaluable. But, under anthropic activity, the biological communities suffer modifications, which, under current conditions are differently understood. In this respect, at global level the issue environment – economy occurs, due to complex and multidimensional features (technological, economical, political and ecological) by nature and involvements. The agricultural science and practice, by meteorological variations, intensity and field exploitation type, have demonstrated the exposure of yield to the risk. The research refers to some technological risks. It is important to understand the role and the implications of using chemicals as part of agricultural practice. All vegetal species are differently affected by the diseases and pests and as well as by weeds. The damages could affect the yields, even fully. The modern and efficacy measures to prevent and control all kinds of pests are chemical treatments. Used rationally, they create the healthy of crops with no pollution to the environment. The key question for an efficient technology are what, how and when are used the pesticides. This aspect is under research into field crop exploitations.

Keywords: technology, risk, agricultural product, environment

JEL Classification: O3, Q12

Introduction

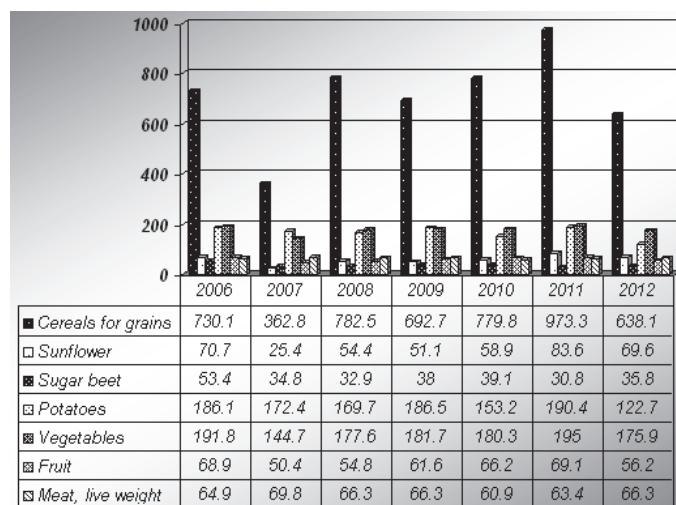
The agricultural practice is achieved based on specific technologies, financially sustained. A technological system is an entity consists of many elements (material, human and/or informational ones) joined as certain structure, into a specific environment (ambient); it is characterized by some on-going technological processes (germination, emergence, growth, development) with agricultural product as final destination (grains/seeds, vegetative mass, fruits).

The high-level yields, economical or ecological ones are consequence of the fact that the producer could have access to general, technical, economical and management knowledges. Under these circumstances, one can act to raise the perception degree of phenomena and to better utilize the tools (economical-financial and environment ones) contained by the policies promoted versus agriculture. So, the „enclosed” agriculture is replaced by elements of knowledges regarding the agricultural science; by the obtained products, the exploitations are also connected to national and international fluxes.

Materials and methods

Field vegetal yield (cereals, industrial crops, forage crops, legumes, fruit trees and vineyards) is achieved annually, on about 60,82% of total Romania's area, with 0.68 agricultural area/capita or 0.44 arable land/capita.

The national statistical data from figure 1 represents the yield/capita during 2006 – 2012; add to these, 260.47 l milk and 307 eggs.



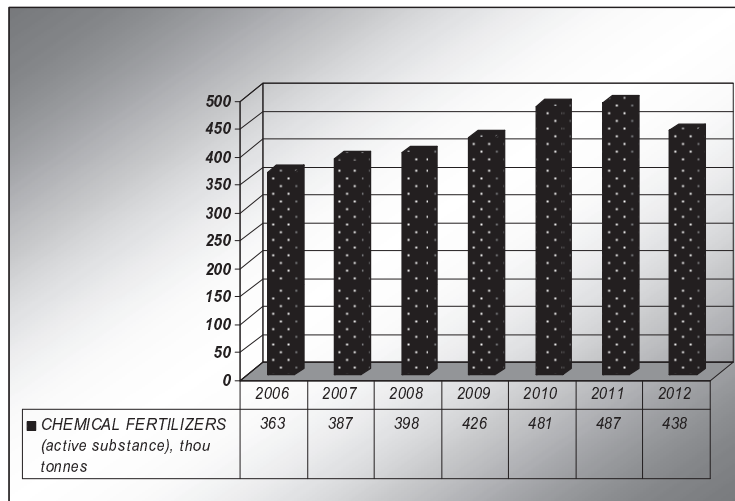
Source: Statistical Yearbook of Romania, 2013 - 2014

Figure 1. The main agricultural products made in Romanian agriculture, kg / capita

Based on these achievements, the Romanian consumer has fully covered the needs of food, so, Romania has no pressing food issue.

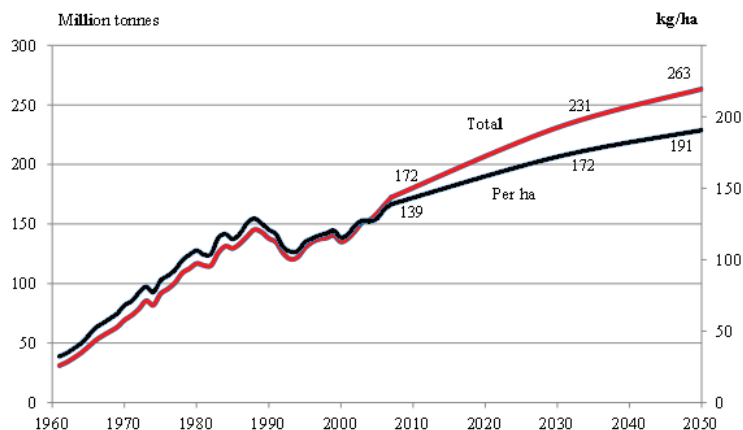
The economical analysts have predicted that during next time (starting with 2015 till 2050) the Romanian agricultural yield could be doubled, which means that we could sustain the consumption abroad too. The calculation was based on the agricultural area of the country and performance technology approaches (Enache Calcedonia, 2011). These are consumers of inputs, such as: fertilizers (chemical and manure), seeds and valuable biological planting material, pesticides, irrigation water.

Yield factors. Comparing the chemical consumption per Romanian agricultural area (fig. 2) with world one (fig. 3), one can ascertain that the average/ha in Romania in 2010 was of about 33 active ingredient; this represents a diminution of 100 kg active ingredient/ha versus world average.



Source: NIS, 2012

Figure 2. The amount of fertilizer used in making production plant in Romania



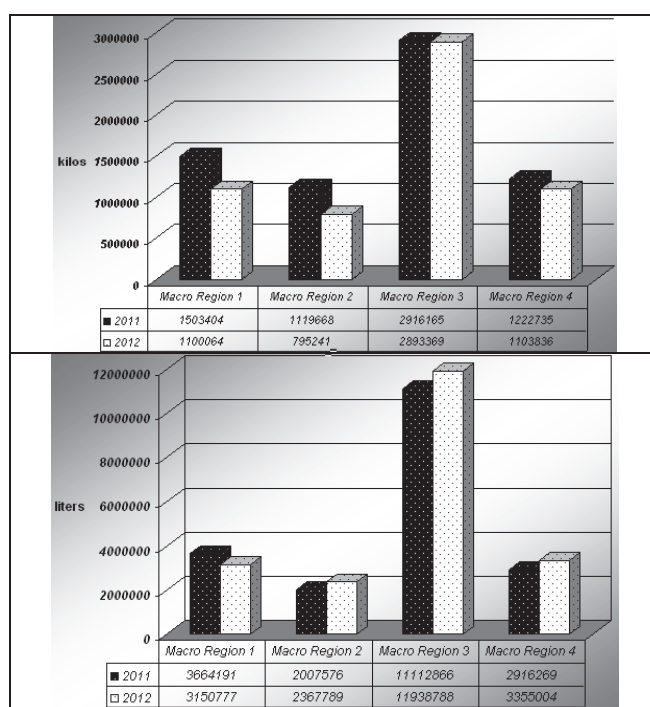
Source: Alexandratos N. and Bruinsma J., 2012

Figure 3. World fertilizer consumption (NPK): past and projected

To understand the importance of fertilizers, it is obvious to know the need of consumption to achieve the agricultural product. For example, to achieve 1000 kg wheat grains, the crop has a consumption of active ingredients (NPK) of about 57 – 83 kg. But, 1 ha could yield over 8 tons, which means a higher NPK consumption. The calculation is not made strictly mathematical, but takes into consideration the local conditions, sown cultivar, generally speaking the factors which influence the technology (including of risk).

Other chemicals are the pesticides, for which, we underline a diminution in solid pesticide commercialization in 2012 and an increasing of liquid ones commercialization (fig. 4). Per total, in 2012, more such products were sold.

The pesticides are frequently known by benefic effect regarding the weed control (herbicides), diseases control (fungicides) and pests (insecticides). They are also known as harmful for human and environment health, by their toxicity. Their using or not is optional. But, knowing the damages provoked by weeds, diseases and pests on crops (in maize for grains, yield losses are of 12.4% due to pests attack, 9.4% due to diseases and 13% due to weeds; the same plants could be affected by an attack or by the three ones, so, we cannot estimate the total losses), one can highlights the consequence of pesticide utilization under risk conditions too.



Source: NIS, 2012

Figure 4. The sale of pesticides (solid and liquid) in Romania

Risk factors are joined with the yield factors, but they could be classified independently – climatic, biological and anthropic risks. Due to the fact that affect the yield, partially or totally, there are necessary to exist prevention and control measures, even improvement of the current technologies or new ones realization.

The risk biological factors are the weeds, diseases and pests. The concept born at the end of the XXth century – Integrated Plant Protection Management (IPPM) – has in view the maintenance of risk below EDT.

For example, in order to achieve an IPPM against risk biological factors, certain activities could be taken into consideration:

- *establishment of EDT (economic damage threshold)* for problem – weeds in different crops. The EDTs are based on: evolution of weed populations under influence of various agro-technical measures on soil seed reserve and weed emergence prognosis; critical period of weed occurrence; influence of weed on yields;

- *establishment of EDT for diseases specific to cultivated species* under influence of agro-technical measures on attack degree and yields. The EDT is established based on research results (e.g.: genetic resistance of varieties and hybrids under certain pedoclimatic conditions; variety behavior under specific stress factors;

- *establishment of EDT for pests*. The realization of IPPM against pests are based on bio-ecological peculiarities of the pests; correlations between climatic conditions and pest rearing; crop rotation influence on pest rearing; influence of technology choose to fight with pest attack, yield quality and quantity; using natural predators and testing of chemicals un-pollutant for the environment.

Anthropic factors of risk. By spreading crops, the humans affected the environment, leading to: soil erosion, soil compaction and degradation of soil structure, acidification, clay content and macro- and micro-elements diminution, soil, water and air industrial pollution, reduction of biodiversity. As follows, it is urgent to prevent and control these aspects, but, the recovering of “failures” is long-term process.

Many and diversified documentation sources, as well as surveys method utilized to farmers have allowed the identification of the current level of technological development and impact of the reality on performances registered by the vegetal exploitations.

Results and discussions

Nothing is more clear than the uncertainty prevailing over the consequences of any decision and economical activity (Cioc, P., 2001).

The uncertainty occurs when one action of the stakeholder, at least, leads to many possible consequences. Thus, the consequence is that the stakeholder does not control perfectly its environment. For example, the output of a stakeholder could not be possible – starting from a given input collection – than under favorable meteorological conditions.

During an exploitation organization, he must know the yield factors useful to obtain given yields. The scheme no1 presents the factors that influence the agricultural yield.

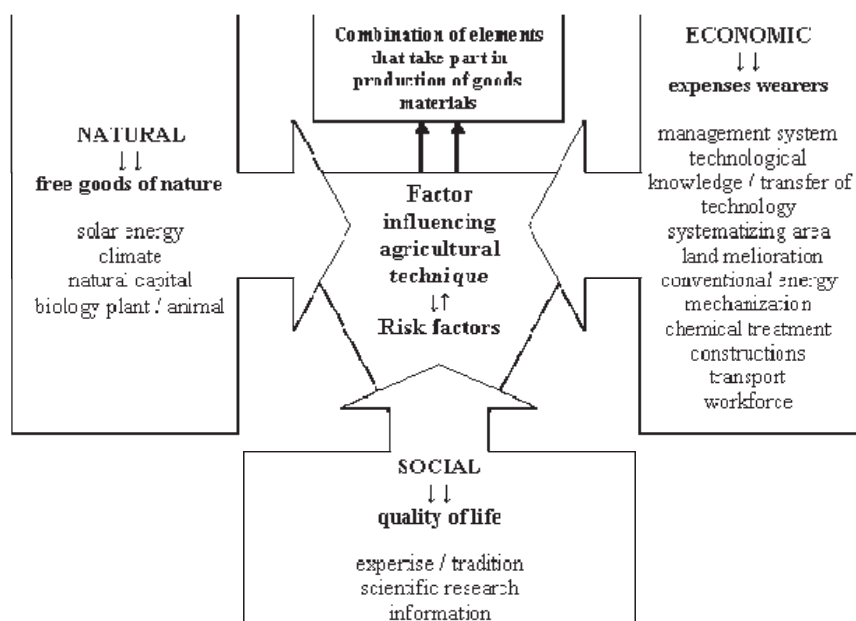
Among *natural factors*, one can highlight: soil fertility class used into production process; rainfall regime of the given region and how they could intervene if the regime is deficitary; annual average temperatures and the varieties/cultivars/hybrids adequate for this regime.

Natural factors are no cost carriers that transfer on the achieved products.

Into action, the natural factors encourage or not the yielding processes and efficiency of economical factor utilization.

Economical factors are various and cost carriers: materials necessary to yielding process on categories and quantities; seeds, herbicides, insecticides, fungicides, fertilizers suppliers; irrigation water, if necessary (Voicu R., Iuliana Dobre, 2003).

The economical factors have dynamic character (Vasile Emilia and al., 2009), it manifests through suffered transformations, partially or totally, during yielding processes.



Source: processed by the author

Scheme no 1 – Factors of influence and risk in agricultural technique

Human factor represents the conscious factor of whole activity into farm and also, the element to put into action yielding means, with ability to apply the high-level technologies.

The human factor releases values which exceeds its own cost.

The sustainable vegetal yield involves the implementation of crop systems on an given area, choosing species and crop rotation, soil fertilization, integrated pest management (IPM) (diseases, pests, weeds), sowing, crop management (irrigation, supplementary pollination), harvesting, transport, storage and yield commercialization.

Unlike other yielding processes, the final agricultural product depends by many risk factors (pedoclimatic, variety), which could act during any vegetation stage.

The benefit and losses of farmers are affected by uncontrollable factors, including climatic ones, market fluctuations, diseases and pest infestation and legislation. On these considerations, the prompt and efficient application of cultural

practices is required, having as aim the losses mitigation. The cultural practices, respectively the utilized technologies, improve efficiency, diminish cost and increase efficiency.

Regarding the species and variety, if they are chosen according to area requirements, the yield will be satisfactory and market satisfied.

The tested farmers, managers of exploitation between 13 and 2122 ha, have positively argued utilization of both chemicals and pesticides. Their percentage into yielding expenditure ranged between 9 and 19%, higher expenses are registered to fertilizers. Among pesticides, all farmers affirmed that they made higher investments in herbicides, the risk of diseases and pests being cancelled by using seeds treated with insecto-fungicides.

Conclusions

Natural factors and probability of their occurrence as favorable manifestation allow better utilization of economical factors.

The vulnerability is fundamental component part into risk assessment.

The risks of chemical residues existence into agricultural product is the object of the risk management.

The future agriculture, intensive, performance one, imposes to producer to be high-level agronomist, expert in environment preservation and financial analyst, but expert in marketing and informatics too.

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