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## TECHNOLOGICAL ACTIONS FOR PROMOTING A DURABLE AGRICULTURE

Mariana Bran<sup>1</sup>, Marcela Ștefan<sup>2</sup>

**Abstract:** Sustainable agriculture means viable economical technologies, on a long period. Within this context, it attends to maintain and improve the physic environment, the resistance at external pressures, to gratify the population demand for food, to ensure for agricultural producers economic and social welfare.

In the crop production, combining rationally and scientific the species, we can contribute to the improvement of those deteriorate areas by various factors.

The real agriculture development involves a cautious administration of resources and environment.

**Key words:** sustainable agriculture, viable technology, resources' administration

### Effects of technology - “pro” durable agriculture

*Technology* ensures the proportion between the obtained crop and its regeneration, and the waste emission must be in balance with the natural assimilation ability of the system (land + crop), which leads to a high bio-productivity and to the effective use of the invested money.

Technology has a social, cultural and psychological part, based on understanding, on knowledge and on receptivity from the ones who apply its methods. For example, land crumbling has created serious structural imbalances in agriculture and a social crisis, as well.

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Any technology must improve the consumption-accomplishment relation, in order to eventually obtain a higher and a better production, against the slowest possible unit cost. The mechanizing, the chemical nature and the selected seeds have the tendency to increase production with relatively slight changes in the total consumptions and they even allow for making savings. The use of hybrid corn seeds, for example, raises production and the cultivator's income, in comparison to sowing non-hybrid seeds. *One must keep in mind that a new technology or technique is an important stimulus for the economic growth rate.*

Agricultural plant technique, by its physical efforts, contains polluting and self-polluting elements under various shapes (mineral fertilizers, plant-pharmaceutical substances, herbicides, growth regulators, soil water), but other industrial, urban, rural and radioactive sources (noxious substances) are involved in it as well, which may deteriorate the agricultural environment: the industrial impurities, oil and pesticides may destroy the useful fauna in the ground; the industrial smoke gathers on leaves and slow down the photosynthesis process, even burning plants.

Not all technologies lead to beneficial results for the environment, even the intensive ones sometimes deteriorating the ecologic balance, the cultural values and the rural landscape. One ascertained that, in areas where the agricultural activity has disappeared, the natural environment suffered, and the natural diversity diminished.

### **Technology/technologic flow**

Technology is seen on the agricultural land via the technologic flow, which represents the totality of methods and works in their natural order and succession, starting from the preparation of the land for sowing and until products are cropped and vegetal remnants is removed.

The agricultural technologic flow, with its bio-technical components, constitutes the base for defining a concrete, smart and effective agrarian policy. Thus, specialists and researchers think that agriculture is not only theory and economy, but an alive, productive activity, expressing itself by sundry technologies and techniques, which are meant to reduce pollution on the products obtained in an ecosystem.

By a rational agricultural management, it is possible to preserve, to protect and to improve the environment, and for this, economists, ecologists and technologists must work together for proposing durable constructive solutions – economic, naturist, alternative and adapted technological solution, which may be applied function of the agricultural structures.

Against the aggressive technique, eco-technique tries, based on the ecologic principles, to protect the integrity of the ground and of plants and to decrease, as much as possible, wastes and residues; it is a superior level of the current technique which may realize clean, non-polluted products, based on the following main actions:

- To respect the ecologic balance;
- To use the scientific system for fertilizing using organic-mineral fertilizers, with established norms and technical-economic criteria.
- To fight against diseases and pests, gradually reducing the use of pesticides.
- To cultivate the productive varieties and hybrids, with different raping, genetically resistant to diseases and to pests.

Agriculture pollutes the environment to a more or less extent, and its durable development must include this postulate, as well.

*Agriculture must provide clean and healthy products to consumers, against low prices.*

### **Fertilization, a technological chain**

The passage from the conventional agriculture to the ecologic one is made gradually, so that the economic structures do not feel the effects of the decrease in productivity and producers gain trust in the ecologic systems. The certification of such economic units is made as soon as part of them complies with the ecologic standards, provided, however, that the two systems (the conventional one and the ecologic one) be separated both in the documentations and in the productive activity (Sin. Gh and collab. 2003).

The ecologic technology of a crop, unlike the conventional one, must comply with the specific requirements and principles must surpass certain chains, and the production is smaller. In such circumstances, unit costs are higher and the selling price is higher, too (10-30% - Sin. Gh and collab. 2003).

The effects of ecologic technologies are many, of long term and they can be seen in time (i.e. treating the seed and the material for planting with biological substances is made only in the purpose of fighting against pathogen agents lying in such materials, to increase the number and the activity of microorganisms in the grounds and to improve the ground's nutritive ability).

Fertilization is an agricultural - husbandry method and work performed in order to scientifically complete the deficit of nutritive elements which can be assimilated by the use of fertilizers, thus ensuring the maintenance of fertility at a normal level and obtaining a higher crop, of superior quality. The fund of nutritive elements in

the ground depends on a series of factors, undergoing under changes, due both to losses by washing and by transforming into insoluble forms, and to its being consumed by plants. According to some authors, in order to obtain durability in time in the development of vegetal productions, it is absolutely necessary that the ground have agricultural-chemical stability, especially as regards the humus, organic nitrogen, mobile phosphorus and mobile potassium contents.

If there is a period supervision of the balance of nutritive substances which may be assimilated, as they form under ground and the necessity of plants, from a qualitative and quantitative point of view, one can see that this is often negative. The balancing of this ratio may be carried out only by using fertilizers, applied at a certain period of time and for each culture.

Between the fertilization as agricultural-technical method and the plants' nutrition regime, there must be a full balance. The theoretic fundament of the fertilization of agricultural lands constitutes the start point in establishing the rational nutrition regime for each species and soil. The necessity to permanently know the needs of plants for nutritive elements and the times to use fertilizers imposes the supervision of nutrition and of controlled fertilization, by monitoring, controlling and researching the tillable land and the plants. Such control is carried out by making classic analyses and a foliage diagnose, which is maybe the most indicated means of emphasizing the nutrition needs of a culture at a given time. Supervision is necessary to see what the critical period of plant nutrition is, when the lack of nutritive elements negatively affects the plants' growth and cropping. Based on the collected data, the agricultural-chemical mapping of the sowed ground is made, and the quantities of fertilizers are established, to be put into the ground.

Moreover, it is difficult to say at a given time what are all the effects of fertilizers. First of all the expenses are integrally absorbed by the culture they are used for, but there is also a remnant effect they have. Moreover, fertilizers cause a series of additional expenses, for cropping, transportation and storage of the exceeding quantity of the crop.

The effectiveness varies function of the variety of fertilizer, of the active substance and of the applied dosage.

In this context, certain ecologic protection rules have been established:

- To forbid the use of chemical fertilizers and improving substances for the soil (chemical fertilizers and pesticides) when growing agricultural and horticultural plants and to use non-toxic substances;
- To preserve and to improve the soil fertility;
- To use organic fertilizers, as basis for soil fertilization, and the cultural practices must preserve or increase the humus contents and the biological activity;

- The soil fertility may be improved by: adding organic material obtained from biological agriculture; cultivating vegetables; culture rotation; introducing a vegetable in the crop rotation.

The cultural techniques must be designed so as to reduce, as much as possible, the aggressive pressures on the ground.

### Case study

The trend towards obtaining ecologic corn does not mean to give up practicing culture in conventional technologic systems, but this is only a complementary solution to the former (Table 1 Comparison within an agricultural company).

Table 1 Comparison between the productions and economic results of corn growing methods

Serial No.	Ratio	Conventional			Ecologic		
		kg/ha	lei <sup>1</sup> /kg	lei/ha	kg/ha	lei/kg	lei/ha
1	Average production	5000	-	-	3000	-	-
2	Material expenses, out of which:	-	-	895	-	-	2800
2.1	Seed	20	6.5	130	20	10	200
2.2	Chemical fertilizers	-	-	250	-	-	-
A	Nitrogen	200	0.5	100	-	-	-
B	Phosphorus	100	0.5	50	-	-	-
C	Potassium	200	0.5	100	-	-	-
2.3	Organic fertilizers	-	-	-	40000	0.05	2000
2.4	I+I herbicides	-	-	15	-	-	-
2.5	Mechanical works	-	-	500	-	-	600
3	Labor expenses	-	-	250	-	-	350
4	Leasing	-	-	350	-	-	350
5	Total expenses	-	-	1495	-	-	3500
6	Production cost	-	0.299	-	-	1.1666	-
7	Selling price	-	0.35	-	-	1.5	-
8	Total incomes	-	-	1750	-	-	4500
9	Profit	-	0.051	255	-	0.3334	1000
10	Profit rate, %			17.0			28.5

<sup>1</sup> 1 E = 3,35 lei (1.10.2007)

By comparing results, one can see, first of all, a significant production difference per area unit (conventional/ecologic ratio = 1.66); the production cost is around 4 times higher than the ecologic option. Moreover, the producer's gain is the bigger than the land (soil) preserves its fertility level, allowing it to use in the years to come a rational crop rotation.

*We are for the corn culture obtained in ecologic conditions, by using non-polluting technologies, which preserve the product's biological features.*

### **Conclusions**

1. The ecologic technology of a crop, unlike the conventional one, must comply with the specific requirements and principles must surpass certain chains, and the production is smaller.
2. We are convinced that, as humankind gathers experience, it will be able to get on to the actual eco-agriculture, having eco-technique and bio-technique as basis.
3. The producer's gain is the bigger than the land (soil) preserves its fertility level, allowing it to use in the years to come a rational crop rotation.
4. Agriculture must provide clean and healthy products to consumers, against low prices.
5. By a rational agricultural management, it is possible to preserve, to protect and to improve the environment, and for this, economists, ecologists and technologists must work together for proposing durable constructive solutions - economic, naturist, alternative and adapted technological solution, which may be applied function of the agricultural structures.

### **Bibliography**

1. Mariana Bran, 2005—"Vegetal exploitation eco-technique" Printech Publishing House, Bucharest, pp 251-276
2. Mănescu B. and Marcela Ștefan, 2005—"Agricultural ecosystems engineering", ASE Publishing House, 99 15-22, 191-232
3. \*\*\* Ecologic agriculture legislative guide, 2004
4. \*\*\* "Farm" Collection

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**ТЕХНОЛОШКЕ АКЦИЈЕ ЗА ПРОМОЦИЈУ  
ОДРЖИВЕ ПОЉОПРИВРЕДЕ**

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**Абстракт**

Одржива пољопривреда подразумева економску способност развоја технологије, у дужем периоду. У том контексту, она се брине за поправку и побољшање физичког окружења, отпорност према спољним притисцима, задовољење потреба становништва у исхрани, обезбеђењу економске и социјалне добробити пољопривредних произвођача.

У производњи усева, комбиновањем рационалног и научног, можемо допринети побољшању оних средина код којих су идентификована погоршања путем различитих фактора.

Развој пољопривреде у правом смислу укључује обзривост у администрању изворима и животном средином.

**Кључне речи:** одржива пољопривреда, способност развоја технологије, администрање изворима

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