FACTORS OF TECHNICAL PROGRESS IN CROP PRODUCTION

FACTORI DE PROGRES TEHNIC ÎN PRODUCȚIA VEGETALĂ

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Abstract: *Positive results of agriculture in economically developed countries, were obtained through the implementation of intensive technical-economical production systems, where technical and organization progress have a significant role. Technical progress manifests its role in economic growth through the way of using of the resources, through the results of using them.*

Key words: *technical progress, soil management, crop production*

INTRODUCTION

Like all economic activities, agriculture has as final goal satisfaction of human needs. Needs which it proposes to meet are essential, through their importance and through their permanence. For satisfaction of human needs for food, agricutural activity in general, and the crop one especially, will require operating ways, which involve an important intervention of natural factors and biological phenomena[1].

MATERIALS AND METHODS

I realized a documentary study of specialty literature, using the followinfg specific methods:

- comparative analysis;

[1] Alles G., Boyer R. - La grande transformation de l′agriculture INRA, Economica Publishing, Paris, 1955

- critical analysis;
- content analysis, summarizing and presenting their views.

1. MAIN FACTORS OF TECHNICAL PROGRESS IN CROP PRODUCTION

L.Lucas, considers the event of any **technical progress factors** in agricultural production through:

- improving the current culture systems (adaptation of varieties);
- completely new methods (plant treatments, plant nutrition, new varieties, etc.)
- news that may open the way of new areas to the existing techniques[2].

Louis Lucas believes that technical progress can occur under certain influence of internal factors, such endogenous, for example irrigation, treatment plant, on the one hand and under the influence of exogenous factors, foreign, such as products market, the factors which condition the valorification of natural agricultural resources, which determine the progress of agriculture in the end.

Sylvie Bonny believes that the crop production, factors of **technical progress** will occur through the following on the future of agriculture[3]:

- improving soil quality and a proper management of it;
- agrometeorology and irrigation;
- crop protection: chemical treatments and biological fight;
- mechanization and robotics in agriculture;
- mineral fertilizers;
- construction and materials;
- genetic improvement;
- applications of biotechnology in crop production;
- informatics techniques applied in agriculture;

[2] Lucas L. -"Resurces naturelles d′origin agricole et developpement scientifique et tehnique dans "La gestion ressourcea naturelles d′origine agricole" Libraires Tehniques, Paris, 1983, pp.45-54;

[3] Bonny Sylvie - L′evolutiom tehnologique en cours en agriculture et ses consequences, INRA GRIGNON, 1991, pp.5-97 ºI "Le changement tehnique en cours et a venir en agriculture, Etudes Economiques nr.12, INRA, 1993, pp.-34-38;

- the future of agriculture.

Sociological factors have a significant influence on the introduction of technical progress in natural resources exploitation: the existence and quality of schools in rural areas, rural public services, communication, health, demographic policies etc.

The technical progress in agriculture, is subject to intensive culture systems, specialized production systems, to a management system organized to produce maximum yield per unit area and time.

Economic environment, climate and political will, social pressure, tradition and customs, achievements in science, the complex ratio between them affect technical achievements, explaining successes and failures.

2. MAIN MANIFESTATION AREAS OF TECHNICAL PROGRESS IN CROP PRODUCTION; TECHNICAL NOVELTIES OF BIOTECHNOLOGY AND IT APPLIED INTO THE CROP PRODUCTION

Biotechnologies are defined as "application of science principles and engineering principles to the treatment of materials by biological agents to produce goods and services"[4].

Technical achievements of this sector in agriculture or in various fields, which through their products favor agriculture are: improving species through genetically engineering, waste degradation and waste pollution, improve seed quality through enzyme engineering.

From a technical standpoint, biotechnology has three main characteristics, with importance on economic plan:

- speed, acceleration into the processes of obtaining plants (resistant to diseases, adverse conditions, etc.), of obtaining hybrids of homozygous lines, in obtaining vegetative cultures in vitro in fact a reduction in time and costs required to achieve new varieties, hybrids, etc.;
- possibility of progressive substitution chemical action techniques, through biological techniques;

[4] x x x - Biotehnologie, agriculture et alimentation, OCDE, Paris, 1992

- a more natural adaptation of the resources to the needs of the plant, which permits to limit waste and improving efficiency in the utilization of those resources[5].

The role of **computer technique**s in agriculture is very few presented in the specialty literature. It is sure that IT can improve the decision-maker action automatically (by the control systems, eg automatic control of microclimate in a greenhouse), or the farmer uses the informatic management systems.

Another important area where technical changes can be implemented is the **soil** management, which takes into account the maintenance of productive quality of it and also the preservation, protection of it.

New techniques are implemented to give the soil the means to resist to the degradation factors, to rebuild the structural characteristics. It is primarily about the cultural techniques designed to prevent soil erosion, to prevent degradation of the structure, of biological qualities. Second techniques allow to completely analyze the soil.

Third, biological techniques allow to optimize the potential, improving soil nutrient conditions.

Fourth, computer techniques help farmers to reach make complex works of space arrangement, works of pedological mapping, economic data necessary for better management of soil potential.

Irrigation technology represents the link which condition production of some agricultural areas. Improving irrigation techniques, new irrigation techniques, computer applications in this field, the cultivation of varieties that effectively leverages the effect of irrigation water are some of the technical measures that lead to more efficient management of irrigation water. New techniques allow irrigation to be turned on correlated with vegetation cover temperature, or the water conditions in the plant. Certainly hopes are linked in this area with the bioprogramming of irrigation, greenhouses entitling the achievements of this statement.

Fertilization of crops and actual techniques are considering the practice of rational fertilization: mineral and organic fertilization techniques in conjunction with the projected harvest, the climatic potential of the

[5] Bonny Sylvie - L'evolution tehnologique en cours en agriculture et ses consequences, INRA, 1991, pp.7-11;

parcel, with materials and utility equipment, the culture system practiced (eg irrigatied or non-irrigated), with particular crop destionation, etc. intended. A high productivity in crop production can not be obtained only through valuable biological material irrigation and fertilizers.

Crop rotation, without involving significant costs, is classic a way but always present, to eliminate the spread of diseases, pests, weeds, is a way of growing crops, and agricultural yields[6].

Agricultural soil parcelation is a soil organization in a number of pieces of equal size, where successive rotations of cultures are done in space and time, culture on which are applied a specific and unitary culture technique.

Computer techniques applied to agriculture, optimize structure of the cultures, taking into account: phyto crop requirements, market requirements, the rational use of parcels through an appropriate proportion between the cultivated plants, the concetration of cultures on soils whit optimal favorability for them.

Mechanization of agriculture, was the domain which determined the first "revolutions" in agriculture.

Presently, mechanization of agriculture in economically developed countries, find itself under cumputrization mark. For example there are farm machinery which control the entire system of plant cultivation, as greenhouse crops, irrigation systems are triggering and are providing water for the plant without human intervention, but only by bioprogrammation.

Protection of cultures ensures consistency of good production quality and quantity. Losses due to harmful agents, diseases and weeds, are considered to be 6-80% of the culture or culture can be entirely compromised.

Integrated control in culture protection does not exclude chemical fight, but integrates it in a complex mix: culture rotation, use of resistant varieties, determining the tolerance, use of chemicals in quantities which provide maximum efficiency at the right moment and biological methods.

[6] Dincã C. - Asolamentele agriculturii moderne, Ceres Publising, Bucureşti, 1985, pp. 3-45;

RESULTS AND DISCUSSIONS. CONCLUSIONS

This brief overview of the specialty literature allowed us to put the most important factors in light of technical progress in crop production.

In our opinion the most important **technical progress** factors of the vegetal sector are:

- **biological material** (improved varieties and hybrids);
- rational **fertilization** of crops;
- **irrigation**;
- improvement of agricultural production technologies in crop rotation;
- agricultural **mechanization** (technical and complex machines, better adapted to the culture) and applied robotics;
- **crop protection** against unfavorable factors, diseases and pests;
- **improvement of soil quality**;
- **biotechnology**;
- **techniques of computer science** applied to agriculture.

Each of these factors or each of these areas that constitute the expression field of technical progress can be applied in complex production technologies.

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