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METHODS AND TECHNIQUES REGARDING THE GENERAL TECHNICAL-ECONOMIC IMPROVEMENT OF THE PLANTS

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Abstract

The capacity of continuous modernisation of our agriculture, in order to obtain some high vegetal and animal productions is reflected first of all by the effects of applying some productions technologies that are as adequate as possible to the natural and technical-economic conditions in the units. In order to improve in general the production technologies of the vegetal crops it is needed to identify the crops that are to be practiced, the surfaces (differentiated on categories of fertility) that it would be good to be allocated to different cultures, the technological chains needed to obtain the various products depending on the limits imposed by the resources that exist in order to obtain a maximum profit. In this regard, the technical-economic background of the production technology and the corresponding linking to the component elements, increase the effect of their action. The present paper proposes to establish the general methods and techniques specific to the modern technologies in the plants crops.

Key words**:** *critical path method, crops, graph, indicators, technologies*

INTRODUCTION

At the global level, given the vastness of products, the production conditions, the used systems, the technological levels and the new resources that revolutionize the technological system, the modern science and technology are very important resources for increasing the productive potential of the agriculture. The rapid level of technology change and development of new technologies has led to the development of the engineering aspects of technology that seek to develop science-based technologies that are most effective and should be applied in practice in a creative manner.

Thus there is an ongoing development, selection and adoption of techniques and technologies to new objective conditions existing at each stage of development, so that the effort made by those woeking in agriculture to be optimal .Sequential optimization in process technologies agricultural production ranging from basic research to practical application, to ensure economic efficiency of the proposed technology is a long way. Basic research is performed in relatively small dimensions, however its cost is relatively high. To reach economic performance, of course, a number of items which enables basic even experimental research must be reduced, because in practice you can enter only those technologies that have improved efficiency compared to the previous one. Without this relationship, basically a new technology can be applied in practice. Another aspect to be taken into account in sequential optimization of production technologies is the perishable nature of technology, the appearance of new resources that go. To meet increased competition and to keep up with productivity, agricultural units must shape differentcombinations of production factors and to build up capital so as to adapt to the needs and modernization and characteristics of agricultural process. Technological optimization at global level tend to have as priorities the use of production factors that have beneficial effects on reducing costs and does not breach environmental rules. In the general process of development of production technology basically several stages are passed their trend and rhythm are different and when a saturation stag is reached and from this stage to decline. Today a technology

obsolescence is witnessed particularly wear due to continuous change of the qualitative and quantitative resources and new discoveries or technological structural combinations in fact the need to change their structure. Science and technology, when considered as resources for optimization of technologies have practically unlimited character. Impetuous development of science and technology knowledge and widens as the rate at which this process takes place, it accelerates certainly and prefigures a new form future.

MATERIALS AND METHODS

A method commonly used in general optimization is the method of variants. This method consists in producing many types of technologies applied to the concrete conditions of the agricultural units.

Case study was carried out collecting information from specialised literature and information processing.

RESULTS AND DISCUSSIONS

The sequential optimizing of the production technologies must be completed by a global optimization model of all technological links. For this aim selecting from the set of variants, technically acceptable, the alternative of combining production technology ensures maximum efficiency of available resources in enterprise and market expectations.

Up to a certain point, the best technology would be assembled by putting together all the variants considered sub-optimal. This method is not the best because from the mechanical assembly of technological optimal sequences, it does not necessarily result a optimal technology. Under these conditions, the overall optimization of technologies aiming at bringing those technological elements with interaction leads to maximum economic effect in the concrete conditions of each agricultural unit.Based on the analysis of each subsystem is done in compiling several technological options that will keep possible solutions from sequential optimization.By achieving overall optimization of vegetable crops production technologies should be identified crops to be applied, surfaces (differentiated by type of fertility) would be appropriate to allocate different cultures, effective technologies by which it is obtained different products depending on the limits of existing resources in order to achieve the main objective of business: profit and that the maximum revenue.

By a judicious technical-economic substantiation production technology and appropriate combination of constituents can be increased effect of their combined action.

Hence the necessity of combining the technology of those elements whose interaction can lead to maximum economic effects in concrete terms ag units widely deployed in the overall optimization is the method variants. This method consists in producing many types of technologies applied to the concrete conditions of agricultural units.

In this method the following steps:

- establishing alternative technologies.
- calculating, for each variant, the economic indicators specify.
- comparison of alternative technologies based on indicators calculated.
- choose the most convenient technology.

In this method, analyze the production technology involves several modalities and criteria of approach:

a)physical criteria. Involves analyzing economic indicators, expressed in physical units, indicators serve expert in assessing the influence of one or more physical inputs on results. Physical criterion is a criterion partial analysis of the results

b)criterion value (economic). It is necessary to deepen the consequences of each choice, showing how much can be produced that are valuable results and economic efficiency.

Such indicators are: total production value (PTV), additional production value (PSV), average production value (PMV), the marginal production (PMgV), total costs (TC), additional expenses incurred by factor considered variable (CV) total additional profit and labor productivity.

c) energy criterion. It considers the premise that any material or product has built into it a certain amount of power and energy consumption required to obtain. Studies in this field have led to energy analysis methodology and a set of indicators:

- total or additional energy obtained

-energy consumption, total or additional under different forms

-net energy obtained

Energetic efficiency is reflected by:

Specific-energy consumption (Cs) which is determined as follows:

$$Cs(\%) = \frac{energyconsumption}{energyfrom} \times 100$$

- Bioconversion ratio (Rc):

$$Rc = \frac{100}{Cs}$$

expressing the energy unit is converted by the technology per unit of energy consumed

The method has the advantage that the results are not influenced by changes in prices, although it may be supplemented by determining costs for each type of energy and environmental cost of energy unit of various factors and their share in total expenditure.

d) Ecologic criteria. It becomes mandatory and may be reflected in substance use of chemicals: herbicides, fungicides, content in nitrates, etc..

Disadvantages of method variants that limit the number of factors that can be optimized simultaneously (one or two) and analysis discontinuity factors used for the proposed levels.

In the process of optimizing the overall production technologies in agriculture, a more modern method used is based on critical method . This method, which has gained wide spread use in planning and tracking complex work in ensuring production rhythm with maximum efficiency and use of resources based on business optimization methods using decision theory using graphs.

Its advantage is the ability to choose from many possible combinations of technological routes best in terms of costs and employmentin the era's best quality parameters and limits with the use of scarce resources.

Critical path analysis is a tool commonly used in programming and follow-scale works, which allows short and medium term planning, operational planning to execution and regular updating of these projects taking account of factors: time, cost, resources and manpower .

Graph MDC method allows complex parts division action at a level to link their logic and technology that make it possible to establish interacting between components (activities).

All planning methods using graphs are based on a model representing the conventional signs are shown by some independent work that must be done to achieve this goal. Graph can be represented as focused or detailed form, but in any case it is exhibited, it must present an idea of the ways in which you can reach your goal and what are the expenses. On the occasion of the graph drawing, unclear thing appear, as well as illogical measures of in the organisation context of planned action. Using the graph, the whole complex of works can be included also at the same time, it becomes accessible to study in detail the different parts.

In addition to present the foreseen works in reaching the goal, the graph contains a series of assessments (time, cost, resources, degree of technicality of elements) for each paper. These values can be exact or approximate with a known degree of discretion. Graph, together with the findings noted on it, serves as a basis for further analysis of possible changes and to check its performance. The main parameters that are examined in this analysis, are time and cost. These two factors usually are in direct dependence with each other, the shorter the time spent for execution of works, the higher the expenses necessary for their performance will be and vice versa.

Graphical analysis allows to choose the optimal plan in terms of ensuring the execution of all works required and minimum cost. Method by stringing activities and the time required to achieve them in a certain time sequence in a graph, highlighting all of the work flow and process critical path.

When drawing the graph all the work has to be taken into account , without the execution of which is impossible to achieve the ultimate goal. It is not mandatory to start directly with developing a detailed graph. In the first step only overall links are established of various complex works, thus obtaining a network that reflects the order, and the inter-dependencies between key stages. This network presents the overall organization of the works, highlighting different nodes and allowing focus on the main points of the program.

The economic calculations based on these networks present a great approximation and therefore s introduced a new phase - detailing network was introduced. On this occasion it is obtained a more accurate assessment of the time required for carrying out more complex activities within the overall network. After detailing ,some complex work with many interacting networks can be regarded as independent. Using the mathematical planning and management system based on graphite, it is determined the time required to execute all respective works. The results of assessment for solving problems of complex works are noted on the original network and are used for the timing of work specified in the graph. Planning and management based graph allows early assessment of the effects of deviations from the original program and it allows the prevention of works interruption.

Due to the calculation process and the used algorithm, the critical path is just the simple arithmetic optimization variant that chooses one variant from several ones, the shortest one. The phases taken to optimize using critical path are:

a) development of all graphical operations

b) calculating the start and end times of activities

c) control of works and updating the graph

The following example is a model of design, calculation and update the graph for scheduling activities within an agricultural seasons.

For the critical path method, it is needed to analyse in detail the operational plan of campaign work, monthly or every ten days, taking into account each activity to be performed, determining their sequence. You also need to establish activities that can be performed simultaneously.

Given the specific conditions of the unit at the beginning of the campaign, different work activities are set up in chronological order, taking into account their interdependence, as well the estimated duration of each activity.

Table 1.List of activities for the harvesting campaign of straw cereals

Activity symbol	**Activity name**	**U.M.**	**Duration days**
O1	Organisation of wheat harvest area	Ha	2
O2	Mechanical harvest of barley	Ha/t	7
O3	Load, unload, grain barley	T	8
O4	Barley transported to storehouses	T	8
O5	Works to reduce moisture of barley grains	T	5
O6	Pack of barley straws	Ha/t	8
O7	Load, unload barley straws pack	T	6
O8	Transported barley straws barley	T	6
O9	Soils works after barley for double crop	Ha	4
G1	Organization of whet harvesting area	Ha	5
Activity symbol	Activity name	U.M.	Duration in days
G2	Mechanic harvesting of wheat	Ha/t	15
Activity symbol	Activity Name	U.M.	Duration in days
G3	Wheat loading, unloading	T	12
G4	Transport of grain wheat to storehouses	T	12
G5	Packing of wheat straws	T	10
G6	Loading, unloading of wheat straws packs	T	10
G7	Transport of wheat straws	T	10
G8	Packs of straws wheat	T	10
G9	Previous cleaning of wheat destined to seeds	T	4
G10	Conditioned seed wheat	T	5
G11	Ploughted, harrowing after wheat	Ha	7
P1	Preparation of germinating layer for sowing double culture of wheat	Ha	4
P2	Sowed wheat green mass double culture	Ha	2

The durations of activities in agriculture are determined by the biological limitations and the weather, which require a minimum or maximum for a given activity. The following table (Table 1) lists activities for grain harvesting campaign of grains Each task is assigned a symbol index, necessary activities barley crop received a symbol, the symbol G

for wheat crop and fodder maize in culture Double symbol P.

CONCLUSIONS

In agriculture, the occurrence of unexpected events, often causes deviations from
Initially established work programs, as required, in most cases, a compression of activities between optimal terms from biologic point of view and from the point of view of time state.
To compress programs usually he following are used:
1)Speed up critical activities by redistributing existing resources; as a result of performing work during the critical path is reduced, and the other is increased in some extent
2) The allocation of additional resources through cooperation purchased from other units
3) Detection of activities enabling total or partial overlap
4) Application of finer decomposition in some parts of works for further analysis of the terms and technology
Critical path method finds its practical use in design and implementation of a marketing program of an agricultural unit, as the design, development and use marketing program is a complex process which aims structuring and scheduling all activities necessary for carrying out the proposed strategies.
The list of activities includes: symbol activity, its contents, indicating directly preceding activity, duration of each activity and responsible unit for its achievement. These activities should be sorted, grouped in order to perform them logically and chronologically.
The advantages of applying the critical path method are numerous, especially in terms of the following aspects:
1) it allows an overview on the development work and leads to saving time required for analysis work, which on classical methods, it would require the research of numerous charts and other specific records.
2) It is a perfect analyzer that highlights all jobs without reserves of time to direct the attention and to allow a quick decision on the measures to be made for the purposes of the work.
3) It highlights the delays and advancing, allowing easy adaptation to the new situation of the graph, while the graph calendar must be recovery entirely in such a situation
4) It requires factors liable to analyze in detail the technical documentation, technical processes and organizational issues related to the execution of the works.
5) It constutuie the starting basis of the work for the optimization of deadlines and costs and it imposes setting a suitable information system.
6) It leads to the most efficient scheduling of works during the time, correlated with resources.
7) It allows to analyze in various aspects (technical, organizational and economic especially) of several variants, of which, the safest option is chosen

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