

# ECONOMIC AND TECHNICAL PROBLEMS OF THE INNOVATION IN GREENHOUSE FLOWER PRODUCTION IN BULGARIA

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The raised standard of living and higher aesthetical requirements of people, the high returns of invested money as well as the energy crisis require accelerated flower-growing development. Floriculture is one of the branches of agriculture.

Greenhouse flower production as a sub-branch of its own economic importance differentiated in the middle 60's. From 0.006 ha greenhouse area in 1950, the first greenhouses for flowers in the village of Gorna Bania in the labour cooperative farm, it increases to 173 ha in 1991.

The place of greenhouse flower production in the system of domestic economy is determined by its share 0.005% in the total share of the cultivated land of the agricultural organizations and enterprises.

Its production amounts to 0.43% of the gross agricultural output.

The fixed assets value in this specific sub-branch is 0.58% of the fixed assets value in agriculture. The workers employed in this subbranch are 0.29% of all agricultural workers.

The export of horticultural cultivars accounts for 0.03% of the country gross export. The share of the greenhouse flower production in the creation of the national income of the country is 0.08%.

The rates and proportions in the change of the basic economic indices characterize the unfavourable trends in the development of greenhouse flower production over the past decade.

A rather complex combination of reasons predetermined the development of these processes, such as :

The achievements of the scientific-and-technical progress are rather slow and ineffective in gaining access. The fixed assets have become out of date both technically and biologically;

The supply of resources is inadequate, and no solution is provided to the problem of producing own high-quality planting material;

## Abstract

The problem of technological innovation is of crucial importance since in some of the greenhouses primitive and low-productive technologies are still used. Our investigations show that in horticultural production, technologies are used for 10-12 years, while some of the elements are constantly developed and more quickly innovated - every 2 or 3 years. This dynamics in the field of biotechnology studies is 3-5 years. The mentioned differences in the dynamics of the processes of innovation show that in order not to lag behind we should constantly work for a new technological development.

## Résumé

Le problème de l'innovation technologique est important lorsque dans certaines serres on utilise encore des technologies non productives et primitives. D'après l'analyse qui suit on remarque que pour la production horticole on utilise une technologie pendant 10-12 ans, en développant certains éléments seulement tous les 2-3 ans. Dans le domaine des biotechnologies l'intervalle devient de 3-5 ans. On peut donc conclure qu'il faut travailler toujours pour développer des nouvelles technologies, afin de ne pas rester en arrière.

The quality of flowers and the diversity of assortment are inadequate and give in to world level of quality;

The qualification of workers is inadequate in solving the problems of the quality of produce and in implementing vanguard technologies;

The personal interest of labour collectives have dropped due to the drop of rentability of production.

In order to overcome the unfavourable trends in the development of flower production the problem of resources should be provided for the implementation of vanguard technologies, along with the use of new flower species and varieties to improve both assortment and quality. Greenhouses are to be basically repaired and modernized, and supplied with virus-free planting material.

In the conditions of insufficient material and labour resources, the creation and implantation of the achievements of science and technology is the only factor for the intensive dynamics of technical progress when the cycle of technical innovation is considerably curtailed the limitation of capital investments increases considerably. Production efficiency is the economic criterion for their allocation. This problem is extremely important for greenhouse flower production where the development of the fixed assets is necessary. The implantation of the innovations can be realized only by reconstruction and modernization but additional capital investments will raise the cost of the already constantly being made more and more expensive fixed assets, that form a

considerable part of their elements by import.

The analysis of the fixed assets shows that for the period 1970 - 1991 they have been constantly increasing at a high rate : 14,35%. Their paramount role is determined by their big absolute volume per 0,1 ha. For 1965 the average cost of a 0,1 ha of greenhouse is 20 950 levas, in 1970 and after that the average cost is already over 30 000 levas, in 1988 it is about 60 000 levas and in 1990 0,1 ha of greenhouse cost 100 000 - 130 000 levas. For the society the funds advanced to carry out the process of production matter greatly especially considering the fact that it is deprived of these funds that are returned back in small amounts.

The big absolute growth of the fixed assets is a precondition for the increase of the level of intensification in greenhouse production of flowers. On a quality level the conditions in the greenhouses are considerably backward. In the structure of the assets a certain disproportion is marked that influences negatively the level of intensification.

The applying of more complex equipments for cultivation is not accompanied by the corresponding supplying of the assets - machinery and equipment for mechanization and automatization of the main production processes.

The disproportion between the elements of the fixed assets causes irregularity in the different sections of the production processes.

The orientating of capital investments predominantly to set up equipments for

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modern cultivation without supplying them with the technology for production process mechanization and automatization increases the capital use per unit of output and reduces the efficiency of the production process.

The upsetting of the complexity of the fixed

assets is one of the factors that mostly retain the increase in labour productivity in greenhouse production of flowers.

The efficiency of greenhouse production of flowers could be expressed by the profitability norm. For the studied out period of 21 years it has decreased over 4 times (**table 1**).

The most profitable cultivar is the gerbera followed by the freesia, roses and the production of transplants.

The flowers cultivated in pots are at the greatest loss. As a result of the strongly decreased yield, inefficient production and the reduced quality of the production, the export of flower cultivars strongly decreased.

The greatest amounts of production are exported in the months April, May, November, the biggest and the prices - the highest.

At the moment flowers are exported predominantly for the Russian, Hungary, Czechoslovakia, Kuwait.

Of the analysis of the main economic indexes trends and interrelations is marked the declining economic efficiency of greenhouse production of flowers.

The reasons for these unfavourable trends are revealed on the basis of the analysis of the main linkages and interrelations between the intensification level index and the economic efficiency index of the greenhouse production of flowers.

**Table 1** *Level of intensification and efficiency of greenhouse flower production in Bulgaria (levas per 0.1 ha).*

Year	Total production	Net production	Net income	Fixed assets	Production costs	Profitability norm. %
1970	19.253	9.351	6.884	31.590	12.369	55.7
1975	15.007	6.581	3.996	41.231	11.011	36.3
1980	14.013	3.721	730	54.485	13.283	5.5
1985	12.777	4.141	-191	55.728	12.968	-1.5
1988	14.414	5.453	1.694	59.137	12.720	13.3
1991	15.235	6.134	2.127	61.356	13.108	16.2

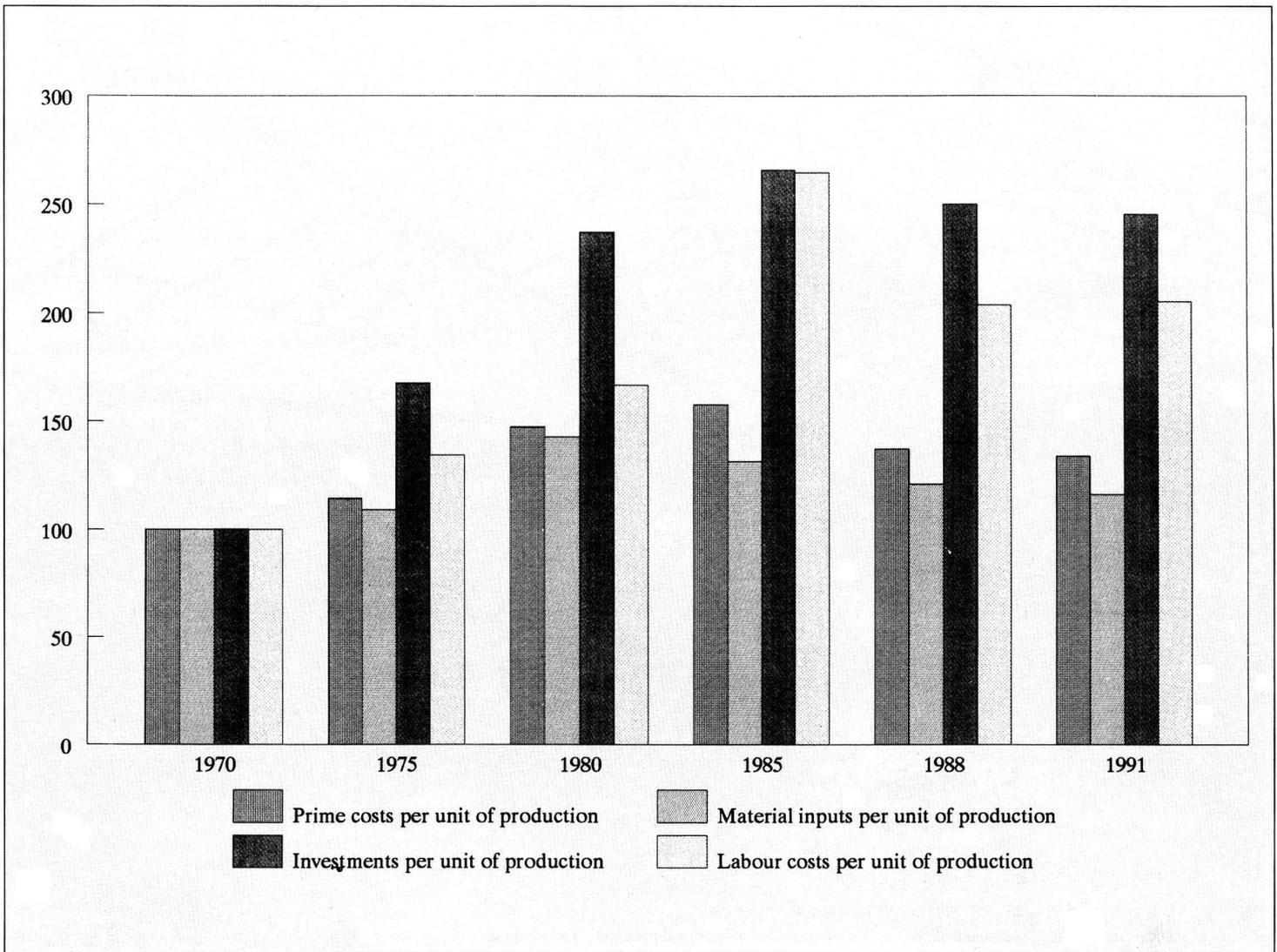


Figure 1 - Efficiency of greenhouse production of cut flowers in Bulgaria.

Regression and correlation analysis have been made between the growth of the fixed assets and the rest of the economic indices.

A linkage of correlation between them has been established with the exception of the index net income.

The absence of correlation dependence between the fixed assets and net income could be explained with the fact that the system is oversupplied with fixed assets.

Since the coefficient of elasticity of labour productivity growth from the growth of capital per unit of labour is very low, i.e. in the investigated period labour productivity growth is not marked, a conclusion is drawn that the system of greenhouse production of flowers is oversupplied with outworn and old fashioned technology.

The low productive functioning of this technology causes the decline in the economic efficiency of the greenhouse production of flowers. (table 2).

Figure 1 illustrates the change of efficien-

cy index of production of cut flowers.

The problem of technological innovation is of crucial importance since in some of the greenhouses primitive and low productive technologies are used still. Our investiga-

tions show that in horticultural production, technologies are used for 10 - 12 years, while some of the elements are constantly developed and more quickly innovated - every 2 or 3 years.

Factors	Areas
Fixed Assets	0.99
Total Production	0.99
Production Costs	0.99
Material Inputs	0.97
Labour Inputs	0.97
Net Production	0.93
Net Income	—

This dynamics in the field of agricultural biotechnology studies is 3 - 5 years.

The mentioned differences in the dynamics of the processes of innovation show that in order not to lag behind we should constantly work for a new technological development.

The working out and applying of new, modern technologies is an indivisible part and basic condition for the intensive development of greenhouse production of flowers.

When applying the hydroponic technology the existing equipment is not changed and liquidated for new one.

About 10 000 levas per 0,1 ha are necessary to install new equipment : feeding system; water tank for the feeding solution; pumps; pipes to supply solution and to drain it away; heating system for the substrate e.t.c. The difference in the amount of the capital investments necessary to apply the technology in the variants with imported and Bulgarian materials and equipment is 24,5%.

The coefficient of comparative economic efficiency when applying the hydroponic technology with stone lining compared to the soil growing is equal to  $Egk = 0,46$

while that applying the technology with growing on perlite compared to the soil growing is equal to  $Egk = 0,54$ .

This show the high efficiency of hydroponic technologies in the case of the both applied in Bulgaria variants.

Of considerable importance for the obtaining of high yields in hydroponic growing of flower cultivars is the healthy condition of the planting material without viruses is the cultivation "in vitro" of meristem tissue from stem tips.

This technology is the most intensive but at the same time the most expensive of all the methods of vegetative propagation.

In this technology form one plant for 1 year could be obtained from 500 to 100 000 guaranteed healthy plants.

This is possible but from economic view point we should estimate whether this is correct and profitable.

Because this huge production depends on the rationality set up laboratory capacities, well equipped laboratories, on the supplying with materials and preparations, on the qualification of the staff and most of all on the rational organization of the work. It is necessary to observe strict technologic discipline, rational use of the materials and

preparations, fullloading of the equipments, reducing of the expenditures for the production of planting material without viruses in order the production should be profitable and the produce with high quality.

Only the labour expenditures are within the frames of 50 - 65% of the direct costs. The share of the material costs is 10 - 20%, while that of the depreciation costs - from 15 to 25%. There are possibilities to reduce the costs, but the greatest cost reduction is possible with an optimum technology of micropropagation or with changing the stage of the rooting from sterile into non-sterile conditions.

An indivisible part of the new perspective technologies are the new high-yield, illness-resisting and insect-resisting varieties of flower cultivars.

Many varieties of Bulgarian greenhouse carnations have been created with high decorative qualities and increased resistance to fungus. The change in the varieties of the flower cultivars is done mainly through introduction of flower varieties from abroad, the only exception being the carnation and roses.

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«L'agricoltura osservata come combinazione di elementi tecnologici, scientifici, politici e sociali» diventa una realtà profondamente vitale, oggetto di un giustificato ed opportuno desiderio di indagine. Lo studio storico è del resto indispensabile per possedere un'autentica cultura agraria poiché rende consapevoli delle vicende attraverso le quali ha preso forma il patrimonio di cognizioni scientifiche e metodologiche sperimentali che abbiamo ereditato. È questa l'intelligente intuizione di Antonio Saltini concretizzata in un'opera di ricostruzione storica degli eventi significativi che hanno caratterizzato il processo di sviluppo teorico e pratico dell'agricoltura dalle sue origini ai tempi moderni. L'analisi, condotta con acuto spirito d'osservazione e descritta con linguaggio brillante, affascina per la vastità dei suoi interessi e la lucidità critica con cui interpreta i fatti e integra le osservazioni di altri scrittori.

