

Abstract

of the doctoral thesis titled *Integrated cultivation system and production efficiency*

Changes which take place in the market surrounding of farmers and increase of consumers' awareness gain momentum with each year which forces producers to search for methods that raise their production efficiency and the farming system. One of the most important factors that raise production efficiency and thus the production potential of farms is implementation of processes which first of all aim at modernization of farms. Effective modernization of farms depends on many factors the aim of which is indication of the pace and the nature of this process. Efficiency of the effective agricultural production process is presently defined with the level of limiting threats to the natural environment which result from various types of technologies and agricultural production means. The integrated agricultural cultivation in comparison to the traditional production in commodity farms is carried out with the assumption that such farms strive to maximize the crop size and minimize expenditures which result from limitation of chemical and mineral production means use, and to base a crop protection technology on mechanical treatment (Sawa, 2008). Rational mechanization of production processes is an essential element of efficiently functioning integrated farms (Alvarez, Arias, 2004). Mechanization of performance parameters in agriculture is a factor that preconditions implementation of intensive production systems. Furthermore, mechanized processes induce managers of particular farms to simplify production organization and its specialization which influences the entire process of farming (Stielow, 2003). Application of various cultivation technologies in the discussed production systems is related, inter alia, with a various level of use and exploitation of the machinery park. The fertilization process plays a significant role in the integrated production where at the reduction of the amount of fertilizers, their application on a relevant surface is predominant. Efficiency of the entire technological process of fertilization depends, inter alia, on the use of farming machines, work inputs and applied fertilizers. The integrated cultivation system is understood as a system that includes the newest achievements of science and agricultural technology.

The research covered in total four producer groups. Within the integrated production system there were the Vegetable and Fruit Producers Cooperative "Sielec" which was oriented at production of carrot and the Horticultural Trade Cooperative Łososina oriented at production of apples. While, among traditional producers covered by the research there was Carrot Producer "Dzida Produkt" Sp. z o.o. and Owoc Łącki Fruit and Vegetable Producers Group of Nowy Sącz.

When selecting farms grouped in producer groups, facilities oriented at the production of carrot and apples were purposefully selected. According to available statistical data, production of apples in the integrated system prevails. In case of vegetables, production of carrot is predominant.

Through comparative analysis, production effects of the researched facilities were determined and expressed with the index of standard gross margin and the economic size acc. to the achieved ESU index was assigned. By emphasis of the fertilization system significance in the integrated cultivation system, analysis of fertilization efficiency in particular farms was carried out. Such indices as: nutrients collection index, productivity coefficient, agronomic efficiency index and recovery efficiency were applied. Moreover, the quantity equipment with a machinery park, energy saturation and technical infrastructure index were calculated. The paper presents calculation of the level of compensation of the incurred direct expenditures in the form of the obtained direct payments.

Farms and collected source data covered by the paper allowed execution of the assumed objective and scope of the paper. A working hypothesis was assumed according to which „*Efficiency of agricultural production in the integrated production system is comparable to efficiency of production in traditional farms*“. By analysis of results it was positively verified. Thus, it is concluded that in the Polish production conditions, the integrated production system may be competitive to the traditional production. This relates to the analysed apple and carrot oriented production. Thus, the problematic question in the paper "*Whether the integrated production in the Polish farming conditions may be competitive to the traditional production?*" was answered. The answer is: yes, the integrated production may be competitive to the traditional one which is proved by similar values of such indices as the gross final production (kPLN·ha⁻¹AL), which in case of the horticultural integrated production was 46.01 in the comparable traditional system 47.04 (k PLN·ha⁻¹AL). In the carrot production a difference in the value within the analysed production category was only 2.87, the integrated system was slightly less favourable. Production is inseparably related to inputs which within the analysed production systems were contrary to the relation which occurred in case of the gross final production. The integrated vegetable production had almost twofold lower value of direct expenditures (by 2.21 k PLN·ha⁻¹AL) Referred to the horticultural production, the difference in the value of direct expenditures index was more favourable for the traditional production only by 0.9 (k PLN·ha⁻¹AL). Thus, one may suppose that by slight optimization within rationalization of the incurred inputs, this difference may be reduced.

A coping stone of the statement on the competitiveness of the integrated production is the value of the obtained standard gross margin which results from the difference of the above mentioned indexes. Within the analysed grouping variables, the calculated differences for this index were very low of the order of hundredths of k PLN·ha⁻¹AL. Confirmation of the insignificance of determined differences was obtained by statistical analysis.

Whether the applied technical measures and the fertilization system affect the effectiveness of farming in these farms? An answer to this question may be found by comparison of the productivity value of the machinery park in the production system. It was proved that the discussed index was a strongly determining factor in case of carrot producers. However, it is due to a great specificity of the traditional producer group accepted for the research which by a high level of owned mechanization production means, could be an example for a statistical European farm. A difference of the value of the discussed index was as much as 11.25 of conversion units. In case of horticultural farms, this difference was only 0.21 conversion units. Answering the second part of the question concerning efficiency of the fertilization system, the author's own research entails fertilization effectiveness indices which include production and environmental aspects of the assumed fertilization strategy. The obtained results indicate a great variability of the value of all fertilization effectiveness indices in particular farms.

To conclude in relation to the assumed test facilities, it should be also emphasised that propagating the idea of formalized activities forms on the territory of the whole country is significant from the point of view of widely understood development of the Polish agriculture. By stimulation of the grass-roots initiative, verification of team work abilities, of particular attitudes, eliminating mutual prejudices, suiting to objectives which are socially the most advantageous, takes place. What is the most important, compliance to the determined technological and technical principles which they form, are the basis for safety food production according to the assumptions of the integrated production. It is crucial that farmers understand that not only widely understood production intensification may be fundamental in striving for the increase of production effectiveness but also rational technology pursuant to the environmental safety. These are features of the integrated agricultural production.

In the moment of growing competitiveness of agricultural production and the increasing social awareness with regard to safe food, one should undertake initiatives in each field of operation, including a scientific one, in order to popularise safe and effective production systems. Such system is the integrated production system.

