

Development of the Sciences and Scientific Developments in Agrarian Sector of the Uzbekistan

**BabadjanovAbdirashidMusaevich, AhmedovAzamatKamilovich,
TabayevAzamatZaripboyevich**

ABSTRACT---*The necessity of modernization and re-equipment of production process in the agricultural sector was validated, which is important sector in the economy of the Republic of Uzbekistan. The paper covers issues on expansion of research works in the agricultural sector, implementation of results of research work into the production process, intensification of innovative activities. Also, the possibility of non-budgetary financing of scientific-research process in the agrarian sector was considered. The mechanism of financing was proposed for solving the problem of lack of financial resources and introduction of complete scientific product.*

Author supports the argument that sustainable development of agricultural production is only possible through development of scientifically intense production based on scientific products and author's view is given on the main directions of science that need to be supported as a foundation of further development of scientifically intense agricultural production.

Keywords: *agricultural sector, innovation, scientific research, scientifically intense production, research product, gross output of agriculture,*

I. INTRODUCTION

To the large extent, current development of agrarian production is based on the results of scientific researches. However, development of innovative activities in agricultural sector is becoming increasingly important.

Innovative development of an economy requires proactive role of government in setting market environment and macroeconomic regulation. This also implies active involvement of government in resource allocation, attraction of extensive foreign investments for upgrading technologies, making investments into main assets for development of new sectors and modernization of currently operating production basis, enhancement of export extension of finished products.

Many countries and transnational companies are succeeding in increasing their competitive advantages, mainly, through development and introduction to the markets of scientifically intense (high-technology) products. In order to constantly recover import costs, it is important to produce and export high technology products. Meanwhile,

in the agrarian sector, scientifically-intensive industries result in competitiveness of the economy.

Scientifically-intensive industries are creating the basis for application of new technologies and state-of-the-art equipments in conventional industries as well as serving as a prerequisite for establishing technological advanced society and high quality standards of living. In addition, high technology industries have a new form of production organization, management and marketing. Undoubtedly, scientifically-intensive industries have a large impact on the level of development of economy, its sectoral structure and are the most profitable area for attracting investments.

Development of scientifically-intensive production is considered in many research works of scientists as a factor of sustainable development of economy, whereas high-technology scientifically intense industries play major role in advanced development of the country in modern conditions, enabling it to become one of the global intellectual leaders, which is very important in the conditions of accelerated globalization process of world economy.

The problems of functioning and development of scientifically intense industries are widely covered in research works of many scientists. However, despite large amount of scientific works on this topic, there is no unified or common approach to determination of scientifically intense production. Presently, statistical approach to determination of scientifically intense production is dominating one in the science.

Particularly, professor K.A. Bagrinovsky's formulating definition and stating the role of scientifically intense industries in the development of economy made the following conclusions: «...modern evaluation of the role of science is based on the premise that only science can serve as a long-term basis for growth of economy and maintaining high level of employment of the population. At the same time the essential part of the mechanism of scientific-technological development are scientifically intense industries. Presently, such industries are identified by the level of index on scientific intensity of production, which is calculated as a ratio of expenses on researches and developments to the volume of commodity output at enterprises of given industry » .

Similar statement is made by Zuev S.Y., specifically the

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BabadjanovAbdirashidMusaevich, Doctor of Philosophy in Economics, Associate Professor of the Department of Accounting and Audit. Tashkent institute of irrigation and agricultural mechanization engineers.

AhmedovAzamatKamilovich, Doctor of Philosophy in Economics, Chair of the Department of Accounting and Audit. Tashkent institute of irrigation and agricultural mechanization engineers.

TabayevAzamatZaripboyevich, Associate Professor of the Department of Accounting and Audit. Tashkent institute of irrigation and agricultural mechanization engineers

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most widely used index during identification of scientifically intense industries is a ratio of scientific intensity, which is estimated as a ratio of the amount of expenditures on scientific-research and experimental-design works to the basic index of the result of performance by the enterprises of the industry. Specifically, presuming the following indicators as a basic index:

- cost of gross, commodity, shipped, net output;
- production price;
- cost estimates of main factors of production .

In the research works of Bendikov M.A. and Frolov I.E. there were given theoretical validation of classification, according to which "...the scientifically intense industries are considered to be markets of industrial products of fifth and more advanced categories of technological structure... the core of the sixth category is made of nanotechnologies and modern materials, genetic engineering, fine chemistry of aerospace engineering production, etc."

However, we think that this classification fails to fully shed light on the essence of problems and it is much sophisticated. We suggest that scientifically intense products should be classified not only by belonging of production technology to complex scientific disciplines, but also by content of elements of scientific developments and based on existing peculiarities of the industry.

If to consider the difference and peculiarities of industrial and agricultural production, then in the agricultural sector level and scope of scientific intensity of the product should be much lower than in the industrial sector.

Let's assume that scientifically intense products of industrial production in the agrarian and industrial countries mainly serve for re-equipment of basic funds of agricultural production.

According to Frolov I.E. "Scientifically intense industries of industrial production, by concentrating significant amount of newly created cost (value) on final sections of technological chains, per se, ensure basis for accelerated economic growth in modern conditions. Thus, borders of scientifically intense industrial reproduction are determined by the borders of expanded reproduction of those sectors from which the costs (values) are being reallocated".

Thus, from the statement of author it can be seen that during identification of criteria of scientific intensity of production by using single approach system, it is necessary to pay attention to newly created cost (value) taking into account specifics of industries, from which commodities are supplied.

For this reason we agree with the proposal of authors that criterion for determining scientifically intense production can be final product, which mainly serves as the basis for development of production industries.

It is important to notice the difference between the concept of scientifically intense products and scientific product itself. In the literature on economics these terms are used both as synonyms as well as separate terms. In the former case, according to the number of specialists "scientific products can be represented by concepts, theoretical constructions, models, symbolic systems, graphic images and other information that contains new knowledge and ensures its equal interpretation and learning by specialists. By the final product of science are understood

products of innovation, to be more specific actual effect from their use".

Also, the considered concepts are also differentiated. According to Anchishkina A.I. the scientific products are represented by scientific knowledge only: "Fundamental scientific knowledge is considered to be an 'intermediate' scientific product, which contributes to creation of its final product – applied scientific knowledge".

As it is known, the averaged cycle of scientific development of agricultural technology of fundamental value takes approximately 4 years, while average cycle for new theoretic and practical product based on development of applied sciences takes at least 3 years. This period also includes initial phase – search for ideas and customers, technical development with identification of area of application and development of alternative options. Based on innovation, the applied technologies, which are necessary for creation of new scientifically intense productions, span whole cycle from fundamental researches till innovative adoption of final complete results of applied researches.

In the market economy conditions, newly developed scientific and technical programs on creation of scientific products should take into account peculiarities of life cycle, specific types of final products, and based on marketing research. This will enable timeliness and necessity of promotion of innovative agricultural solutions as a basis for formation of scientifically intense agricultural production.

Meanwhile, as practice shows, there are some particularities in financing of scientifically intense programs, including:

governmental budget should assume major part of risk related to development and use by agricultural enterprises of scientifically intense agricultural technologies, economic mechanisms and crop varieties;

– as practice shows, none of the countries has a capacity to carry out full-scale researches on all scientific directions due to the fact that development of new knowledge requires large amount of investments on equipment and training of specialists. This fact reveals the necessity of identification, validation and support of priority directions.

Development of scientifically intense directions of agricultural production and innovative research works requires, in addition to governmental funding, attraction of equal financing from other sources such as participants of private sector, e.g. manufacturers and other entities like financing institutions. In this regard it would be useful to cite Zuev S.Y: "...essential role in ensuring functioning and development of scientifically intense industries belongs to commercial crediting, which connects economic players and which as a basis for delayed payment for supplied goods, as well as 'crediting' by customers".

Oftentimes, development of new directions (branches) of scientifically intense agricultural production depend on the level of maturity of basic agricultural technologies. Scientifically intense agricultural production, being based on innovative ideas and being cyclically developed, goes through different phases of maturity and at the last phases

becoming part of basic technologies.

When deciding upon the course of development of agricultural production on the basis of innovative ideas the following dilemma may occur: What is more practically feasible: to purchase licenses for already developed agricultural technologies or development of domestic alternative?

As practice shows, even developed countries oftentimes purchase technology from outside, and this puts them into advantageous position by saving time and expenditures. However, when buying new agricultural technologies it is important to conduct elaborate technical and economic expertise to eliminate nonviable solutions, which will result in savings of funds up to 40% at later stages of development and adoption into production process. Also, it is equally important to evaluate possibility of using purchased technologies for creation of new competitive products in a short timeframe. If delay in adaptation of technologies occurs, effect of their purchase will decrease in accordance with changes in life cycle of technology itself.

During purchase of new technologies, there is always a risk of purchasing outdated technology. This is possibly widespread phenomenon due to the fact that manufacturer of technologies can be simultaneously pursuing interest in maintaining competitiveness of its own scientifically intense product at the global market. In this case, it will become necessary to establish domestic scientific institutions and develop of scientifically intense technologies. At the same time, it is also important to assess competitiveness of internal (domestic) potential such as availability of domestic scientific organizations and condition of material and technical equipment of their facilities, and availability of qualified scientific staff, levels of financing of science and other factors.

ANALYTICAL RESULTS & DISCUSSIONS

Development of agricultural sciences to the large extent is dependent on the agrarian sector being of priority for the state. As it can be seen from results of analyses, the share of agriculture in the structure of Gross Domestic Product of Uzbekistan rapidly decreases in the last 10 years. This is a good prerequisite for development of scientifically intense agricultural production with priority on development of provision of services and processing of agricultural products.

For example, the share of agricultural sector in GDP of the country in 2009 was 18 percent, by the 2018 it decreased to 5.1 percent. There is large progress in development of manufacturing industries, service industries, also government supports attraction of foreign investments and creates favorable conditions for their attraction.

The government of the country takes special care of development of applied agricultural sciences, support to authorship rights of selectionist scientists, design institutes, which has direct financial motivation in increasing the scope of use of their own scientifically intense products in the country in order to maintain their material basis. Because of this, productivity of main agricultural crops – cotton and grain – has an upwards-moving trend in the recent years in the country.

Scientific-agrarian innovations on development of cotton- and grain-growing in the country are mainly focused on increase of productivity and higher quality of the products meeting standards of international markets.

However, nowadays in addition to ensuring food security of the country, the development of agricultural production should be made in environmentally-friendly manner. This, first of all implies finding tradeoff options between cotton and fodder crops and crop rotation in the conditions of existence of private farmers. Due to crops, which are grown in the crop rotation with cotton, should aim not only at gaining fodders or food supplies, but also facilitate fertility and improvement of ecologic conditions, phyto-sanitary condition of soil, and serve as crops positively balancing negative effects of growing cotton.

Uzbekistan is one of the leading countries in terms of production of cotton fiber and second large exporter of cotton in the world. Also, due to development of applied sciences, the grain self-sufficiency was achieved in short period of time with the population of over 33.5 millions of people (as of early 2019).

Analyses also reveal the fact that results, achieved in production of cotton and grain and accounting for almost half of the value of gross output of agricultural sector, are directly correlated with development of agrarian sciences.

Nowadays, it is undoubtedly evident that support to development of agricultural production is only possible through development of scientifically intense production based on scientific products. In this regard, the government and agricultural science gives priority on the following main perspective directions of science, which require support as a basis for further development of scientifically intense agricultural production:

- at the state level, to design program on development of scientifically intense branches of agricultural sector;
- for development of scientifically intense agricultural production to identify priority directions, which will be financed directly and through development of other adjacent structures;
- to finance scientific-research works in the area of agrarian fundamental and applied science on adaptation of agriculture to global changes of the climate;
- it is important to identify main directions of negative effect of climate change and raising awareness about them among decision making and managerial structures of agricultural sector, as well as training of farmers and general public;
- to identify priority directions of adaptation of agricultural sector to climatic risks on the basis of in-depth analysis climate change in our region, which will enhance agricultural adaptation mobility of Uzbekistan to global climatic risks;
- to assist in development of modern technologies and conditions on creation of best local selection variety of crops and breeds of domestic animals with the use of best genetic components of national fund.

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Development of scientifically intense branches should primarily be accompanied by development of entrepreneurship in scientific-technical and productions areas. Providing incentives for development of scientifically intense industries of economy and motivation of all players in scientific-production activity can serve as a strong foundation for further development of agricultural production.

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FORM

Full name

BabadjanovAbdirashidMusaevich

Academic degree Candidate fordoctoral degree in
Economics

Education Higher / University Diploma

Country of nationality Republic of Uzbekistan

Name of present employer Tashkent institute of irrigation and agricultural mechanization engineers

Address 39. Cori Niezii Str., MirzoUlugbek district,
Tashkent city, 100001, Uzbekistan

Position Associate Professor of the department of
Accounting and audit

Tel.: (+99871) 237-19-22, (office)

(+99871) 258-08-45, (home)

(+99890) 920-24-65, (mobile)

Fax: (+99871)237-22-38,

E-mail ABDURASHID65.65@mail.ru