

STAFFING FOR INNOVATION AND INVESTMENT DEVELOPMENT OF AGRO-INDUSTRIAL COMPLEX

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A modern level of preparation of specialists is the basic condition of possibility for innovative development and economy growth of agro-industrial complex. Exceptionally new connections between a production, science and education are in high demand. The system of regional higher agrarian universities must perform as a generator of innovative scientific ideas and as a realization of innovative-investment projects for development. The analysis of agrarian science potential is conducted and priority industries of investments for peopleware are set. By means of expert method the system of estimation of personnel in agrarian field has been worked out and shaped that takes into account two constituents – intellectual and labour. Each employee except professional qualities must have a capacity for the innovative thinking. The new approaches to the personnel selection will allow activating innovative activities of enterprises.

Keywords: agricultural education, highly-skilled specialists, human capacity, innovation and investment projects, innovative development.

JEL Codes: I25, M12.

1. Introduction

Innovative and investment development of every industry is based not only on technical and technological resources, but also first of all, on a creative interpretation, mastering and implementation of scientific and technical ideas, own innovative developments.

In Ukraine the legal framework which regulates innovative activities comprises the Law of Ukraine "On Innovative Activities", the Law of Ukraine "On Priority Lines of Innovative Activities in Ukraine", the Law of Ukraine "On government control of activity in the field of transfer of technologies", the Law of Ukraine "On scientific and scientific and technical activities" and others. Permanent amendments to basic laws (the last took place on December 28, 2014) affirm consistent state interest in providing up to date changes to agrarian sector on innovative basis.

The level of intellectual potential of any country is the most important precondition of economic growth of the state and the basis of its competitiveness at the world market.

At present, there are strong ties between the research and market influence which causes the effect of acceleration of innovation process and rapid ageing of equipment and final product. In contrast to rapid high tech development in the developed countries of the world and principally new forms of cooperation of science and production spheres, the Ukrainian production appeared to be captured by morally outdated technologies (Kulaiets, 2011). As a result our country fell behind the civilized countries of the West in many spheres of scientific and technical development and it is necessary to create the innovation and personnel potential for providing the development of technologies, equipment and creation of new products. The creation of information and intellectual base of development is of primary importance of every country.

The innovations at every enterprise require new personnel changes. The demand in new modern type of staff having the qualities of innovative nature and able to activate the enterprise environment appears.

The aim of the article is to analyze staffing in the field of agrarian science and to develop the system of estimation of staff in agrarian field that would take into account two constituents of activity – intellectual (forming of scientific potential, aspiration for self-realization, ability to implement innovative and investment projects, level of education) and labour (it is determined by record of service, level of education, ability to execute different types of work).

Research works of O. Yu. Yermakov (2010) deal with the formation and efficiency of human resources. The role of education in the process of forming the staffing is investigated by Y. F. Zinovyev (2008). He mentions that education is a main tool of realization of every economic opportunity at any enterprise. S. A. Volodin (2007) forecasts qualitative and quantitative changes of scientific personnel in agrarian market. S. Vyzhva (2012) points out the necessity of investment into the preparation of highly-qualified scientists. In the works of H. D. Baubekova (2014) devoted to innovative development of the country the main interest lies upon innovative management.

Thus, the important prospect of accelerated innovative development of agro-industrial complex (AIC) is a formation of the most effective system of innovative policy in personnel administration in present conditions of agricultural production.

In the process of complex analysis of staffing of innovative and investment development it is necessary to make a synchronous analysis of the scope of activities and to research dynamics of their changes. The definition of the integrated estimation indicator of specialists taking into consideration stochastic factors is of decisive importance for the estimation of possibilities to achieve certain results of activity of enterprises. In addition, it allows defining the contribution of every employee to innovative development and his place among other employees, to carry out optimization of number of employees.

Determining the general evaluation of professional capability for innovations for the estimation of staffing of enterprises was held by means of mathematical formalization. Applying the method of experts (experts were represented by 47 directors of enterprises in Mykolaiv region with a number of employees starting from 30, and their experience of working at that position was not less than 10 years) weight factors

were defined according to the performance results of those enterprises for the last 5 years.

2. Findings of Investigation

The main problem of the article is to develop specific proposals for the formation of human capacity able to implement the innovation model of economic development of Ukraine and its integration into European community.

The aim of functioning of any economic system is to organize efficiently production process, to ensure its stability, sustainability and competitiveness. A rapid impact of science and technologies on development of economic processes stipulates for the necessity of structural innovation changes. The study of changes in personnel must be implemented in two directions:

- the analysis of staffing in terms of labor potential;
- the analysis of staffing as specialists with high intellectual potential.

The analysis of personnel in terms of labour potential allows assessing employees on age, on sex, on education and qualification. To benchmark efficiency of the use of labour resources on an enterprise such indicators as – efficiency of labour, level of the use of human resources, coefficient of the use of working hours, coefficient of the use of labour supply, coefficient of labour activity of employees, labour supply of the production.

We shall focus more on the second direction of forming of human capacity. For this purpose it is necessary to analyze innovation environment in agrarian sector in terms of staff.

An undeniable world leader in the development and implementation of scientific achievements is China.

In China, there are five times more registered patents than in Russia, which holds the second place in the world. Besides, such countries as India and the USA also possess a powerful innovation potential. The Chinese scientists let only Americans to be number one in research.

The changes in the number of scientific workers in Ukraine (there were 313079 persons in 1990, 89534 in 2010, 77853 in 2013) have negative consequences both for the country economy as a whole and the regions economy (In Mykolaiv region there were 2238 specialists engaged in research in 2000, 1479 in 2006, and only 1239 in 2010 and 809 in 2013) (source: material of Main Department of statistics in Ukraine, 2013-2014). A 4–5-fold decrease in the number of researchers does not have any analogy in the world, where their number is growing.

At present, being caused by reduction of research personnel one third of total workforce of the country is engaged in agriculture while in the West – about 3 per cent (Khvesyk, 2011). It is clear that such amount of workers is needed due to a very low productivity of agrarian work and low productive efficiency. T. Oliynyk proves that the level of personnel qualification in agricultural production, especially at agrarian enterprises, is enormously important for increasing the production efficiency (Oliynyk, 2008). Thus, the primary task of the country is training specialists for the implementation of technical and technological innovations in AIC, and also for im-

plementation of new effective organizational structures capable of solving the problems of extended representation.

The potential of agrarian science is concentrated at 71 research institutions, 5645 scientists work in the system of agrarian science. 41 per cent of them are engaged in plant growing, crop farming, soil science; 15 per cent are engaged in land improvement, 6 percent – in biotechnologies in plant growing and animal husbandry, 7 per cent – in farm mechanization and electrification, 9 per cent – in economics and land affairs, 6 per cent – in veterinary medicine, 11 per cent – in animal husbandry, 5 per cent – in the problems of information technologies (according to the National Research Centre of Agrarian Economics Institute).

In our opinion, considering crisis situation in a livestock sector, critical level of the technical equipping, these directions of scientific research require more attention. Really, Ukraine does not produce the sufficient amount of meat today that is why consumption of meat products is almost in two times less than normative standards. A production of livestock sector is concentrated in the private farms. At agricultural enterprises less than a fifth of general volume of meat products is produced.

Gradually the density of volume of executed scientific and technical works in the structure of GDP is being shortened: in 1996 – 1.36%, in 2000 – 1.16%, in 2010 – 0.90%, in 2013 – 0.81% (source: material of Main Department of statistics in Ukraine, 2013–2014).

Reduction of the budgetary financing, insufficient level of the financial provision of enterprises' internal funds, inability of their management and core employees to understand prospects of scientifically based changes, have led to the fact that 90% of agrarian enterprises do not use innovative products.

The analysis of enterprises innovative activity of all industries testifies of its substantial fluctuations. In 2000 18% of enterprises carried on innovative activity, in 2006 – 11.2%, in 2013 – 16.8%. It is clear that the market of commodities and services requires the new approach to enterprises functioning that is why, investigating the tendencies of innovative activity of Ukrainian enterprises on the future period; we shall estimate their stable (http://www.multitrans.ru/c/m.exe?a=110&t=888_2_1&sc=0growth). In addition, in 2015, more than 10% of such enterprises will already appear. Creation of the environment friendly to scientific, technical and innovative activities needs development and implementation of (http://www.multitrans.ru/c/m.exe?a=110&t=995664_2_1&sc=291) corresponding activities both on state and regional levels. First of all, it determines the increase in need for specialists who are capable to make and (http://www.multitrans.ru/c/m.exe?t=6050724_2_1) promote innovations, who are able to implement innovative management at the enterprise.

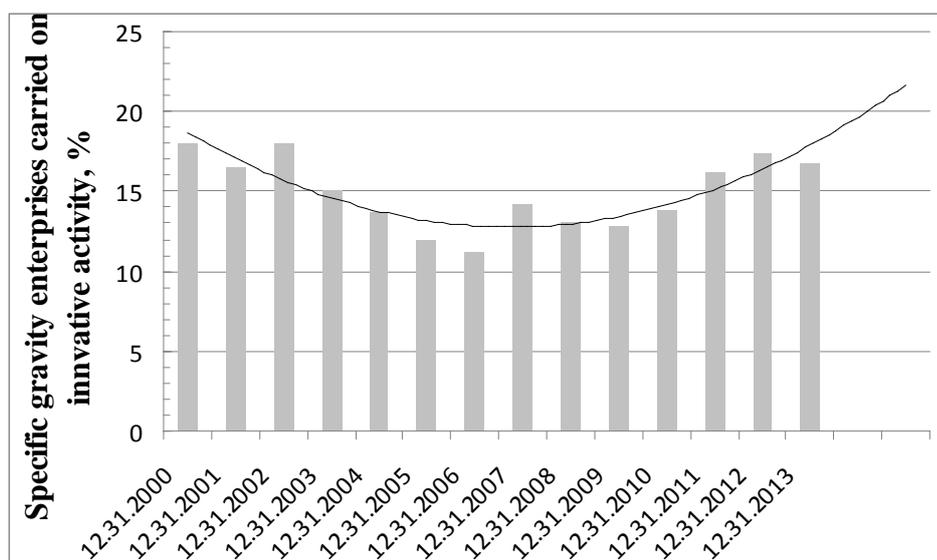


Fig. Innovative activity of enterprises

The fact of substantial increase of number of highly-skilled specialists in the last few years is important. They implemented their own scientific developments in production or they built theoretical fundamentals for new researches and on this basis defended their theses for obtaining candidate or doctoral degree.

Table 1. The number of specialists with scientific degrees in economy, Ukraine

| Years | Number of Doctors of Economics, Ukraine, persons | Number of Candidates of Sc. in Economics, Ukraine, persons |
|-------|--|--|
| 1995 | 9759 | 57610 |
| 2000 | 10339 | 58741 |
| 2001 | 10603 | 60647 |
| 2002 | 11008 | 62673 |
| 2003 | 11259 | 64372 |
| 2004 | 11573 | 65839 |
| 2005 | 12014 | 68291 |
| 2006 | 12488 | 71893 |
| 2007 | 12845 | 74191 |
| 2008 | 13423 | 77763 |
| 2009 | 13866 | 81169 |
| 2010 | 14418 | 84000 |
| 2011 | 14895 | 84979 |
| 2012 | 15592 | 88057 |
| 2013 | 16450 | 90113 |

As shown in the table 1, the greatest increase rates in the number of specialists of the highest degree were in 2008 for Doctors of Sciences (104.5%), and in 2006 for Candidates of Sciences (105.3%). Thus, scientific potential of labour-market and market of educational services is increasing gradually.

Therefore, in the economy of Ukraine innovative development takes place in two opposite vectors. In one direction, there is the total reduction of number of scientists, decrease of the budgetary financing for scientific development. In another direc-

tion, there is a tendency to growth of innovative activity of the enterprises and increase in number of experts with scientific degrees. Such situation is caused, first of all, by a difficult financial condition of state sector of economy of Ukraine; the budget has no funds for investments into innovative development of the country. But a number of heads of big enterprises understand that competitive advantages of goods and services provide innovations.

Innovative and investment development has a special value in agro-industrial complex; its output provides viability of people.

From 1998 enterprises and organizations of Ukraine finance the advanced and scientific and technical studies far more than other sources together. Every manager of enterprise understands that the competitive edges of commodities and services provide innovations. The best economic effect for enterprises is reached in case if all stages of innovative process are covered – from realization of fundamental research to implementation of innovative product. And peopleware has a great significance in this case. Every employee must meet such requirements as general professional, personal qualities, capacity for innovations, specific requirements of a certain enterprise. We suggest using the coefficient of professional capability for innovations for the estimation of staffing of enterprises.

$$K = \sigma_1 O \left(1 + \frac{W}{4} + \frac{A}{18}\right) + \sigma_2 \frac{Pc \cdot PR}{C} + \sigma_3 V_1 V_2,$$

when: σ_i – weighting factors, $\sum_{i=1}^3 \sigma_i = 1$; O – a level of education ($O=0.15$, for respondents with incomplete secondary education, $O=0.6$, for respondents with complete secondary education, $O=0.75$, for respondents with a bachelor's degree, $O=1$, for respondents with a master's degree); W – record of service ex professo; A – age of an employee; Pc – probability of commercial success of an employee's proposal; PR – gross revenue from implementation of innovative idea; C – expected charges for development or research afterwards; V_1 – employee's capability to execute tasks from other professional spheres; V_2 – knowledge of modern information technologies but (V_1 and V_2 take on a value from 1 to 3).

The given coefficient (formula) shows the general assessment of employee in the first block, in the second block it determines the innovative capabilities of employee, that is a cost estimation of his offers is for the enterprise, in the third block specifies specialist's capability to execute additional tasks. The first block is obtained based on the formula from Y. F. Zynovyev (2008). Weighting factors, usually, are received by expert method for every enterprise separately. In general case it is possible to consider: $\sigma_1 = 0.3$; $\sigma_2 = 0.6$; $\sigma_3 = 0.1$.

A modern informative economy requires from a man not simply mastering of standard professional knowledge, but also ability to make decision, ability to study with creativity, and also taking and production of scientific and technical ideas.

Innovation and investment development has a special value in an agro-industrial complex the production of which provides viability of the humanity.

Agriculture always was conservative; it is related to seasonality of production, high dependence on natural conditions. To assess the implementation of innovations into agrarian production at least one year is required. In general, agriculture of Ukraine considerably falls behind other countries on productivity of plants and animals, energy intensity of production.

We will focus on the dynamics of change of education level of agricultural employees in Ukraine. Only an appropriate level of education allows getting and using information which forms intellectual potential of agro-industrial complex.

Almost 90% of managerial staff of agricultural enterprises have higher education. In farming, where 33.8% of crop production and 84.5% of livestock sector products are produced, the situation with education is difficult as of the end of 2013. Less than 8% of household heads (table 2) have higher education.

Table 2. Educational attainment of households heads in 2013, %

| | Male | Female |
|--|------|--------|
| Heads of households , who have | | |
| Complete higher education | 7.3 | 5.3 |
| Basic higher education | 0.0 | 0.8 |
| Incomplete higher education (no diploma awarded) | 10.0 | 13.1 |
| Complete secondary education | 50.1 | 48.2 |
| Basic secondary education | 21.3 | 24.3 |
| Primary education | 11.3 | 8.2 |
| Heads of households who do not have, Primary education | 0.0 | 0.1 |
| Illiterate heads of households | 0.0 | 0.0 |

Having analyzed the changes of educational level of households heads it is possible to assert that for the last seven years, that the amount of those with complete higher education is constantly growing, and as for the other levels of education there is no clear dynamics. The fact, that in 2013 as compared to 2011 the percentage of heads of households with primary education rose sharply (male by 8.1%, and female by 2.3%) causes anxiety.

Thus, taking into account an essential contribution of agrarian households into the volume of agriculture gross output it is necessary to direct efforts to improve the education level of heads of the relevant farms (households).

The main centres of agrarian education in Ukraine are higher agrarian educational establishments. There are twenty universities of this kind in Ukraine. Among them there are ten national universities. Mykolaiv National Agrarian University holds the second position in the rating by the integrated index among all agrarian universities (first rank belongs to National University of Life and Environmental Sciences of Ukraine, Kyiv, with 37 thousand students).

The national university in Ukraine is a structure, which is characterized by the unifying, integrative, innovative, cultural functions in the humanitarian, natural-scientific and technical areas.

Five years successively Mykolaiv National Agrarian University is recognized as "The Leader of Modern Education" for innovative activities in modernization of Ukraine's education. At the XXIII Agricultural Exhibition "Agro 2011" University was awarded with four gold medals in the categories: "For a significant contribution into realization of innovative modernization of national education system", "For a significant contribution into the national-patriotic education of youth", "For a significant contribution into the scientific production and introduction of scientific production developments", "For the development and introduction of the investment and innovative technologies in the process of the specialists training as provided by modern requirements". In 2012 at the III International Exhibition "Modern Educational Establishments–2012" Mykolaiv National Agrarian University received the highest award in the field of education – the Grand Prix "The Leader of the Higher Education in Ukraine".

At this university the main area of scientists' research is improvement of agricultural production technology. The main directions include designing crop rotations for the small agrarian enterprises considering general soil and ecological principles of their organization; studying and implementation of sorts and hybrids of seed crops of intensive type; use of the integrated system of plants protection from diseases, vermin and weeds; cattle breeding, creating of reliable food supply, use of intensive technologies in livestock production, use of growth-promoting factors and stimulants for improvement of physiological state of animals. A lot of attention is paid to the problems of technical modernization and use of machinery and equipment. The work on constructing of equipment complex for energetic self-sufficiency of small enterprises and on the use of agricultural production processing waste is continued. The problems of reforming of social and economic relations in agrarian industrial complex are analyzed in the studies of economists. The university works under the slogan "Science–Education–Innovations–Implementation".

The innovation investment projects, which are designed by scientists of the university, are aimed at the implementation of their own scientific developments, and besides they have created an up-to-date sites for the professional practice of students. We would like to illustrate it with several examples.

Plant-growing: orchard laying, construction of greenhouse sector, organic farming certification.

Animal husbandry: construction of the educational scientific and production complex for pig-breeding; construction of cattle livestock complex; fishponds stocking, creating of a plant for milk processing, creating of a plant for meat processing. The important role in projects is given to the energy saving which provides for construction of biogas cogeneration plant for producing biogas and electricity. Common projects include the creation of a regional scientific agro-technical park, the laboratory of GMO determination and Trade House of Mykolaiv National Agrarian University. For each individual project and portfolio business plans are developed, where rea-

sonable efficiency and payback of projects are grounded. Nowadays they are under consideration of Ministry of Agrarian Policy and Food in order to be implemented.

Modern production and scientific potential development form new requirements for specialists training. During last three years Mykolaiv National Agrarian University has started specialists training in eight new specialties. Among them the special place is taken by specialty 8.03060102 "Management of Innovative Activity". The best students with a creative independent way of thinking and a high level of knowledge have chosen this specialty. As a result of training this graduates have gained knowledge and information regarding specifics of national innovation systems in foreign countries, they are able to understand essence, needs and priorities of the state innovation policy and are capable of developing innovative activity strategies of enterprises, are able to select and implement mechanism of knowledge diffusion and transfer of technologies.

Today the area of innovative activity requires specialists who, on the one hand, possess knowledge of modern mechanisms for development of economy, management and business planning and, on the other hand, who are able to show good results in scientific and innovative activities, and who are aware of mechanism of their interaction. Therefore, preparation of highly skilled academic and teaching staff at the university is one of strategic priorities of forming scientific and innovation potential of Ukraine (Vyzhva, 2012).

China's experience as integrator of knowledge and innovation is important. The majority of foreign students studying abroad come from China. The level of state support and knowledge accumulation in that country is very high.

An important aspect in development of Ukrainian agrarian education is the state support. Let us carry out its analysis for the last three years (Table 3).

Table 3. Expenditure of state budget allocated for support of agriculture in Ukraine

| The name in accordance with department and program classification of expenditures | Funds expended, thousands of UAH | | |
|---|----------------------------------|---------|---------|
| | years | | |
| | 2012 | 2013 | 2014 |
| Training, retraining and advanced training of staffing, advanced training of specialists of agrarian industry complex | 35095.8 | 39735.0 | 21875.0 |

Taking into consideration that in 2015 the expenditures stipulated by the State budget of Ukraine as for the separate budgetary programs of Ministry of Agrarian Policy and Food of Ukraine are to be cut short, thus the situation will not become better with state support for human resources training.

Principal barrier to implement innovations is low level of investment support. Deficit of funds gives no possibility to replace out of date equipment and machinery for new technologies. The investment in agriculture basic capital, in hunting and forestry amounted to 16145.9 mln. UAH in 2013 which corresponds to 6.5% of total volume of investments.

Growth of investment attractiveness of agro-industrial complex will promote innovative development and as consequence it requires the rise of intellectual potential, preparation of highly-skilled managers and training of qualified specialists.

3. Conclusions

1. The analysis of agrarian science potential in Ukraine according to sectors was held. We consider that biotechnology in livestock sector, engineering in agrarian production require qualitative and quantitative intensive research.

2. The factor of professional capability was offered for assessing staffing at agrarian enterprises. It promotes innovative activity of enterprises and households.

3. Heads of agrarian enterprises, heads of households, tenant farmers require constant control over their standard of education. Food safety of country and export potential depends mainly on them.

4. Today the functions of agrarian universities are being transformed. They serve as dynamic basis for strategic changes in agro-industrial complex. Modern higher education institution is a combination of traditional university, potential of information technologies and mobility of knowledge and skills. Its principal task is to provide labor market with highly qualified specialists, capable of taking independent decisions, forecasting their consequences and having responsibility for them.

The problem of permanent in-house training of specialists at universities and at leading innovation-oriented enterprises and the problem of retraining of specialists deserve special attention.

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DARBUOTOJŲ ATRANKA SIEKIANT INOVACIJŲ IR INVESTICIJŲ PLĖTROS AGROPROMONINIAME KOMPLEKSE

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Santrauka

Pagrindinė inovacijų plėtros ir ekonominio augimo agropromoniniame sektoriuje sąlyga – modernaus lygio specialistų ruošimas. Išryškėja naujos būtinios sąsajos tarp gamybos, mokslo ir išsilavinimo. Regioninė aukštųjų agrarinių universitetų sistema turi tapti inovatyvių mokslinių idėjų generatoriumi, realizuoti inovatyvius investicijų plėtros projektus. Straipsnyje atlikta žemės ūkio mokslų potencialo analizė, nustatant industrijas, kurioms aktualus darbuotojų rangos poreikis. Taikant ekspertinį metodą, sudaryta žemės ūkio srities darbuotojų vertinimo sistema, apimanti dvi dedamąsias – intelektinę ir darbo. Nustatyta, kad kiekvienam darbuotojui (išskyrus profesinės kvalifikacijos darbuotojus) yra būtinas inovatyvus mąstymas. Naujas požiūris į darbuotojų atranką leis aktyvuoti inovatyvias veiklas įmonėse.

Raktiniai žodžiai: žemės ūkio edukacija, aukštos kvalifikacijos specialistai, žmonių pajėgumas, inovacijos ir investiciniai projektai, inovacijų plėtra.

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