

THE QUALITY ASSURANCE SYSTEM OF EDUCATION AS A FACTOR OF AGRICULTURE SUSTAINABLE DEVELOPMENT

V. Smelik¹, A. Dobrinov², I. Belinskaia³, A. Perekopskii⁴

Saint-Petersburg State Agrarian University^{1,2,4}

Peterburgskoeshosse, 2

Saint-Petersburg-Pushkin, Russia

Federal State Budget Scientific Institution Institute

for Engineering and Environmental Problems in Agricultural Production³

Filtrovskoeshosse, 3, Tjarlevo, Russia

e-mail^{1,2,3,4}: smelik_va@mail.ru, a.v.dobrinov@yandex.ru, belinska@yandex.ru,
aperekopskii@mail.ru

Abstract

The main objective of creating conditions for sustainable development of rural areas is the formation of professional staff capable of developing and implementing effective management decisions. The development of agriculture requires a rational approach to the use of all types of productive resources, taking into account environmental aspects, achieving the fullest possible employment of the rural population. To solve these problems it is necessary to attract highly qualified specialists. They should have the complex of theoretical and practical skills, knowledge and abilities. Agricultural producers must be confident in the high level of graduates of higher educational establishments of agrarian profile coming to work for them. To ensure a balance between the demands of employers for graduates and state standards allows the system of public accreditation of educational agricultural programs. The aim of the study is to determine the development of common requirements for the training of specialists of higher education engaged in agriculture. For it 95 employers, who are leaders of different levels in the agro-industrial complex, were interviewed in 10 regions of Russia and Belarus by survey and interviewing methods. Production standards benchmarks for the evaluation of the education quality is implemented in the framework of mathematical models based on statistical data. The agribusiness entities have given database for modeling through the peer review, the results of mathematical calculations underlying the determination of professional

competences of future specialists. The results of the research are the basis of the national Agency for Accreditation of Agricultural Programs activities, created with the participation of the authors.

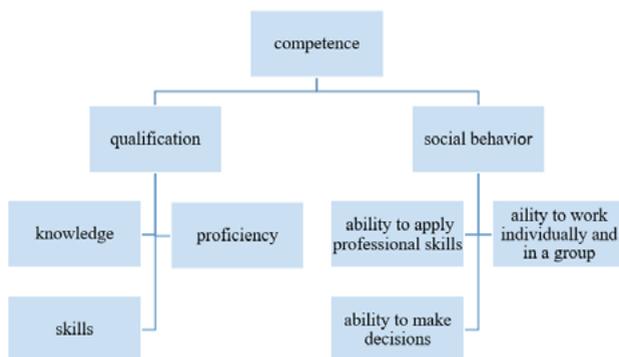
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JEL classification: *A20, Q01*

1 Introduction

Stable socio – economic development of rural areas, increasing the volume of agricultural production and its efficiency, achieving full employment of the rural population, rational use of land-all these tasks are to increase the sustainability of rural development. The creation of socio-economic conditions for the sustainable development of rural areas is impossible without the availability of qualified specialists in the field of agriculture. The graduate must demonstrate special competencies related to the uniqueness of the tasks of agriculture, objects and types of innovative engineering activities in the field of agricultural specialization (research, production and technological, organizational and managerial, design, etc.) in agricultural enterprises and organizations for servicing agricultural production, and the readiness to follow its corporate culture. Competence is the amount of qualifications, which are defined by asset of knowledge, skills and proficiency (Figure 1).

Figure 1 **The scheme of professional competences (Golokhvastov et al., 2015a)**



The graduate must have experience in the use of universal methods of engineering analysis, intellectual technologies and methods of computer analysis in solving complex and special engineering problems of the agrarian profile to form the competences at the appropriate level.

Efficiency of work of the graduate in agricultural production is determined by compliance of requirements imposed by employers to abilities, competences and skills; successful execution of job responsibilities; psychological compliance of a post and adaptation in new collective; personal characteristics. Selection of applicants for the position is based on the following factors: theoretical and practical knowledge, professional and personal qualities, health status, availability of additional professional skills (knowledge of information technology, foreign languages, modern management methods, etc.). (Petrovavlovskiy, M., Smelik, V., & Nefedova, O., 2016).

2 Data and Methods

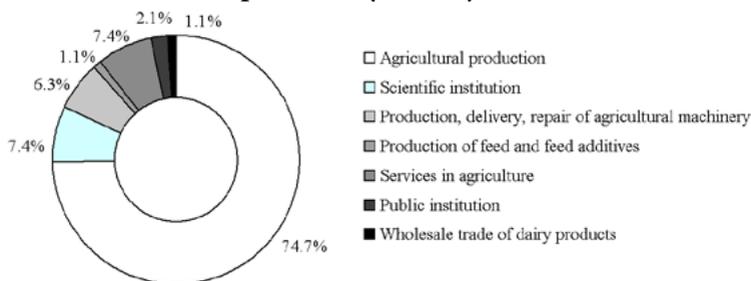
Training of a highly qualified specialist takes place through synthesis of requirements of employers, educational structures and public administration bodies to the level of professional competences (Vasilevskaya, E., Maximovich, V., 2014, Zayceva, 2015). An effective tool for solving this problem is the public accreditation of professional educational programs (PA PEP), which is recognition of the quality and level of training of graduates who have mastered the educational program in a particular organization. This organization carries out educational activity which meets requirements of professional standards and labor market to specialists of the corresponding profile.

The purpose of public accreditation is to give an independent objective assessment of the quality of training of graduates on the accredited educational program on the basis of indicators that are not taken into account in the state accreditation. These indicators are based on the analysis of the demand for graduates by the labor market, compliance of their qualifications with the requirements of employers, professional standards, as well as identifying the best practices and significant achievements of the educational institution.

Guided by the requirements of the Federal State Education Standards in the training of future professionals, universities determine a set of core competencies (professional and general cultural). A graduate should have its competencies as a result of the successful study of educational programs in the field of agricultural machinery and agricultural technologies. However, without taking into account the opinion of employers, it is impossible to form an accurate list of competencies.

In the framework of the International TEMPUS project "Development of public accreditation of agricultural programs in Russian" (PACAgro) a survey was conducted of **95 employers** of graduates of agricultural universities in **10 regions of Russia and one from Belarus** in different fields of activity, see Figure 2 (Golokhvastov et al., 2015a). The research methods are survey and interviewing.

Figure 2 Distribution of respondents by area of job (Golokhvastov et al., 2015b)



In assessing the practical skills of graduates of agricultural Universities were given **419 answers**; most often were assessed the qualifications of a mechanical engineer and agronomist (agronomy) – 13.6%, the zooengineer - 12.4% and a veterinarian is 12.2%.

The survey revealed that some qualifications do not exist the following theoretical and practical knowledge and skills:

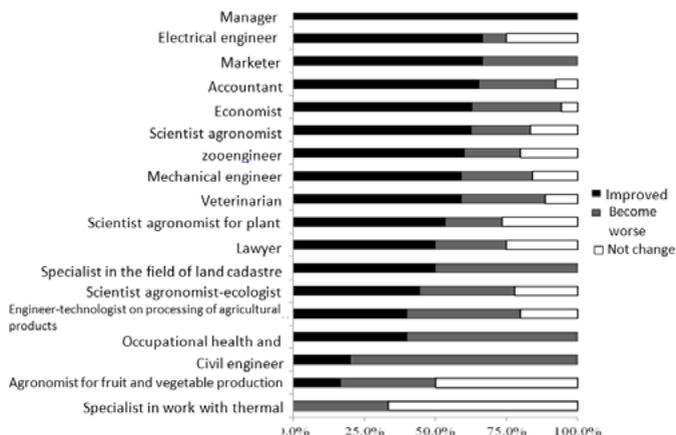
- "agronomy", "scientist agronomist" - lack of practical experience in modern agricultural enterprises, poor knowledge of a foreign language;
- "zooengineer", "veterinarian" - graduates are not prepared to work with large animals, there is no knowledge of a foreign language, theoretical knowledge of the main disciplines are at a low level;
- "agroengineering", "mechanical engineer" - insufficient knowledge of production equipment operation;
- "economics", "management", "economist", "accountant" - General theoretical knowledge-at a low level, not enough practical experience of exchange with other agricultural enterprises (Smelik, V., Ovchinnikova, E., 2016).

As a result of the survey, a certain discrepancy between the requirements of employers and the level of preparedness of graduates was revealed. Thus, the average score of the level of formation of professional competencies varies depending on the profession from 4.2 to 4.5 on a five-point scale, almost 30% of employers surveyed note the poor knowledge of graduates of advanced technologies and management practices in agriculture. 57% of respondents believe that the level of theoretical and practical training of graduates has improved over the past 10 years, 27% - has not changed and 15.4% - decreased. Distribution by profession is shown in Figure 3.

The results of the surveys show that agricultural workers are poorly prepared to meet the challenges that contribute to improving the sustainability of rural areas.

The survey was conducted by expert groups, which included representatives of public organizations, employers, universities (teachers students, administrative staff). The received statistical base allows to reveal the most significant competences in the separate directions of preparation and serves as a basis for formation to adequate requirements of the market of educational programs.

Figure 3 Chart of the training by profession level(Golokhvastov et al., 2015b)



Public accreditation has advantages for both employers and future graduates.

The benefits of PA PEP for graduates:

- confirmation of the high (in some cases international) level of the quality of the program implementation through the introduction of accredited agricultural programs in the register;
- possibility to obtain a certificate for compliance with the qualification requirements and to apply for inclusion in the register of national or international level professional specialists (Smelik, V., & Ovchinnikova, E., 2016).

The benefits of PA PEP for employers:

- obtaining information about universities and educational programs that have successfully passed an independent evaluation for compliance with national and international requirements in terms of quality assurance of education;
- possibility of forming a competence model of the educational program graduate in accordance with agricultural business needs;
- decrease of financial costs for training and retraining;
- participation in the preparation of the state order for the specialists training with the necessary qualifications for agriculture.

3 Results and Discussion

Public Accreditation as part of the education quality assurance system allows for a more detailed approach to the development of educational programs. First of all, it is necessary to form a list of competencies, the receipt of which will meet both the requirements of public authorities and the needs of agro-industrial enterprises (Golokhvastov et al., 2015b; Perekopskii et al., 2016). Implementation of professional and public accreditation procedures allows planning the development of skills and abilities necessary for specialists of the agro-industrial complex to solve the problems of increasing the stability of rural areas. The process of training specialists takes four (six) years, the list of formed competencies should be constantly subjected to iterative shifts with the help of expert evaluation methods and principles of extrapolation of data.

The mathematical expression of this process is the construction of an additive model for each direction of training and each year of training. It allows you to build quality trends used in the creation of educational training programs.

$$\sum_{i=1}^n \sum_{j=1}^m X_i Y_j \quad (1),$$

where

$$\sum_{i=1}^n X_i -$$

- the sum generated educational program competencies,

$$\sum_{j=1}^m Y_j -$$

- the sum of the weight of each competence in the educational program, determined on a scale of ten. Weight accounting is necessary to determine the proportion of subjects in the educational program, forming a specific competence.

The results of mathematical calculations are the basis for planning the activities of the National Agency for Professional Accreditation of Educational Programs, created within the TEMPUS project with the participation of the authors.

4 Conclusion

The regularity of the choice of certain competencies is possible only after a graduate of the University can take a direct part in the production process for a particular employer.

Then it will be possible to identify the level of competencies formation needed to improve the stability of rural areas. These competencies include the ability:

- to independently find organizational and managerial solutions aimed at improving the socio-economic efficiency of agriculture, and willingness to bear responsibility for them;
- to develop and implement new technical, economic and technological solutions;
- to optimize technical processes through the use of modern information technologies and mathematical models.

Total 95 employers from 10 regions of Russia and Belarus were interviewed as part of the study. Based on the results of the surveys, mathematical dependencies were developed, aimed at the formation of new approaches to the development of educational programs in agriculture. The results of the research are the basis for the organization of the National Agency for Accreditation of Educational Programs of Agricultural Profile activities.

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