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Abstract

This paper considers the efficiency of information and consulting provision for agricultural production, which is one of the priorities in the implementation of the state agrarian policy. The main directions of evaluation of the information and consulting service 'Kazagromarketing' consist in identifying the degree of impact of information and consulting services on the functioning of agricultural producers and their economic performance. The present paper identifies two main definitions of economic efficiency of the information and consulting service affecting the agricultural production system.

Based on the identified areas, there was determined the economic efficiency of information and consulting provision for agricultural production for the application of innovative technologies in the field of crop production, in particular. The evaluation of the economic effect of the use of an innovative technology is possible through the evaluation of impact of information and consulting provision on the operation of agricultural producers and their

economic performance. Therefore, one of the measures to determine the economic effect of the application of an innovative technology was a training session combining the presentation of a theoretical material and its practical assimilation. For this purpose, the price and income from the organization and holding of the training session were calculated. An income from one potential participant amounted to 25,100 tenge in the first year.

For comparison, an analysis of the efficiency of participation of three experimental households for the application of innovative technologies of the cultivation of agricultural crops was given. The calculations proved the economic feasibility of the implementation of this measure. For all the households the participation in this event was effective. For all the participants a payback period was 3-4 months, and the internal rate of return (IRR) was 26-30%.

Keywords: economic efficiency, information and consulting services, agricultural production, agricultural producers.

JEL Classifications codes: Q, Q1.

Introduction

One of the priorities in the state agrarian policy of the Republic of Kazakhstan is to promote the development of efficient agricultural production capable to meet the needs of the population and enterprises. Therefore, one of the most effective measures of state regulation to promote the development of agricultural production is its information and consulting provision (improvement of agricultural production with available resources) and the improvement of its competitiveness.

Information and consulting activities in agricultural production enable to create the most favorable conditions for the functioning of agriculture in general. Therefore, the impact on agricultural production, and consequently, the development of rural areas is provided through its main customers - agricultural producers, who use information and consulting services. And, as a consequence, the efficiency of agricultural production appears as one of the major economic categories, which determines the degree of impact of the industry on economic growth.

In modern conditions, theoretical aspects of the economic category of efficiency are being developed in different directions, which are reflected in scientific works of leading scholars and economists. Depending on the level of an economic entity, it is possible to use a variety of efficiency criteria. There is a generally accepted definition of an efficiency criterion – the maximization of production results while minimizing costs. Thus, the coexistence of different approaches to efficiency criteria, designed to quantitatively reflect various aspects of the economic processes of a particular business entity, is possible.

The purpose of this study is to assess the economic efficiency of information and consulting provision in agricultural production, particularly in the field of crop production in Pavlodar region of the Republic of Kazakhstan.

To accomplish this goal, the following tasks have been set:

- To identify the main factors for the creation of a criteria system of the efficiency of information and consulting services that have an impact on agricultural production;
- To identify the approaches to the determination of the economic efficiency of information and consulting services;
- To assess the economic efficiency of agricultural production, particularly in the field of crop production.

The novelty of this research is to reveal the scientifically grounded recommendations for the evaluation of the economic efficiency of information and consulting provision in agricultural production of Pavlodar region of the Republic of Kazakhstan.

1. Evaluation of Economic Efficiency of Information and Consulting Provision for Agricultural Production

One of the key issues is to determine the efficiency criteria for the agricultural information and consulting service (Konstantinov 2000). To determine the efficiency criteria, it is recommended to use the following order recognized by many scientists:

- by the results of the activity analysis of the information and consulting service in other developed countries, where they have made a significant contribution to the development of the agricultural sector, such as the US, Australia and the Netherlands, there are determined the factors that ensure their successful functioning;

- in the presence of these factors, the information and consulting service of the country's agricultural sector is effective, and in the absence of at least some of them it may not be recognized as such;
- the identified factors are taken as the efficiency criteria for the information and consulting service (Muratova 2003).

According to the analysis of the Cooperative introduction service in the United States, the Introduction service in the Netherlands and other services, the main factors that have the greatest influence on the efficiency of information and consulting provision for agricultural production are identified (Konstantinov 2000, Meghalaya on November 8-10, 2006).

- (1) Openness and accessibility of the knowledge system. Any agricultural producer can ask for help in the information and consulting service (the ICS).
- (2) Objectivity of information and consultation. The ICS provides agricultural producers with the objective information on the basis of scientific research and practical experience.
- (3) The direct exchange of information between the ICS experts and agricultural producers is much more important than its distribution.
- (4) Adaptation to the changing needs of the agricultural business. The ICS can quickly adapt to the changing information needs of agricultural producers, as it ensures their close interaction (feedback).
- (5) Agricultural producers, their cooperatives, associations and other organizations have the opportunity to control the system of agricultural knowledge.
- (6) The scientific component is focused on the needs of practice, the need for the implementation of the new knowledge and advanced technologies.
- (7) Educational specialized institutions on a permanent basis support the educational level of knowledge consumers, allowing them to perceive new things.
- (8) The ICSs are closely interacted or created on the basis of experimental stations, universities, research institutes and experimental households, which allows to adapt the scientific development to the field, and enables agricultural producers to have the opportunity to become acquainted with them in the process of implementation and to assess their effectiveness.
- (9) Differences in professional requirements for researchers, teachers and the introduction service employees.
- (10) The introduction service employees have a frequent direct contact with agricultural producers in their households.
- (11) Informal communication between specialists of research, educational and promotional structures are as important as formal.
- (12) The effect is achieved when all small regions and areas of the country have structural subdivisions in the provision of agricultural knowledge (educational specialized institutions, experimental stations and services, information and consulting centers and others) (Konstantinov 2000; Public spending in developing countries; trends, determination, and impact, 2004; Rosenstein-Rodan).

In our opinion, these factors may be complemented by the training and demonstration of innovative technologies directly in households to determine the correct use of the received skills and abilities.

All these factors have been identified in well-functioning systems of agricultural knowledge that made a significant contribution to the development of agricultural production in their countries, such as the United States, the Netherlands, Australia and Israel. In those countries, where the introduction service and the system of agricultural knowledge are underdeveloped, these factors are absent. These factors may serve as the basis for creating a system of efficiency criteria for the information and consulting service that has an impact on the development of agricultural production (Stein 1988, Van Den Ban 1998).

To assess the economic efficiency of the impact of the ICS functioning on the development of agricultural production, it is difficult to use this approach in connection with a number of its characteristics: firstly, not all work of the ICS employees increases the cost of the final product; secondly, not all the costs of information and consulting services can be carved out of the production costs and, thirdly, the activity of information and consulting services often leads to cost savings, the reduction in losses, etc. (Muratova 2003, Veselovsky, Zyatkov and Blyumin 2002).

There are different approaches to the evaluation of the economic efficiency of information and consulting provision affecting agricultural production:

- by the volume of information and consulting activities;
- by the economic results of the direct consumers of information and consulting services;

- by the evaluation of efficiency of the service activity by service consumers (Veselovsky, Zyatkov and Blyumin 2002).

A specificity of the information and consulting activity consists in the fact that not always the result can be seen quickly and reflected financially. In turn, the described techniques have drawbacks: they are difficult in practical application, and cannot cover all aspects of the information and consulting impact on agricultural production (Rural Infrastructure and Agricultural Development 2006).

The economic efficiency of the ICS activity is formed by agricultural producers in the form of the difference between the financial result of the implementation of service offerings, and the results that have been (could be) in the case of basic actions, other than additional costs associated with the service offerings (Kozlov 2000).

Therefore, there is one of the most important reasons for the implementation of recommendations of the ICS consultants by agricultural producers – the expected positive economic effect. Based on the purpose of the information and consulting service, an orientation in the efficiency evaluation should be conducted from the perspective of agricultural producers.

Each user of the efficiency evaluation has his or her priorities and views on its goals and objectives, methods of implementation, as well as the use of the results. In evaluating the efficiency, an important aspect is to agree on the goals and objectives of the assessment. For example, in the reimbursement of expenses through the provision of paid services the main efficiency criterion of the ICS functioning, the real indicator of the high quality of services and their orientation on agricultural issues will be the fact of the conclusion or renewal of the contract for the provision of paid services (Infrastructure for Agriculture and Rural Development 2004, Stukach, Pomogayev and Petukhovskiy 2003).

In connection with the above approaches to determining the economic efficiency of the information and consulting service that has an impact on agricultural production (increasing the efficiency of its functioning), we propose the following two main areas:

- (1) Impact of information and consulting services on the functioning of agricultural producers and their economic performance.
- (2) Opportunities for employees of the information and consulting service to achieve their goals and objectives.

Target setting and evaluation tasks are largely determined by a number of persons or organizations that will be the users of its results. In our case, there can be distinguished three groups of users interested in the results of the efficiency evaluation of the ICS activity:

Group 1 – the government (Ministry of Agriculture of the Republic of Kazakhstan, National Managing Holding 'KazAgro', regional departments of agriculture);

Group 2 – Joint Stock Company 'Kazagromarketing' (regional and district branches);

Group 3 – agricultural producers of various organizational and legal forms.

The main indicators characterizing the socio-economic efficiency can be very different from the position of an interested group of people and organizations.

In this paper, in particular, of particular interest is the determination of the impact of information and consulting activities on agricultural production. For example, to obtain the annual effect of the advisory work, the efficiency is determined by each individual object of consultation. To do this, it is necessary to compare the indicators prior to consultation (implementation) and after consultation (implementation), and as a result, we get the overall effect in the household as a whole. This effect is achieved by the joint efforts of the ICS experts, managers and household employees. The effect of the consulting activity can be immediate or delayed (can be obtained at the expense of additional revenues or through savings) (Public spending in developing countries; trends, determination, and impact, 2004, International Journal of Social Science Tomorrow 2012).

For example, to calculate the efficiency of the introduction of a new technology in the field of crop production, scientists in this field have suggested the following formula:

$$E t. c. p. = (Y. n. t. - Y. b. t.) * P$$

where:

E t. c. p. - The efficiency of introduction of a technology in crop production, tenge;

Y. n. t. – The crop yield by the new (proposed) technology, dt / ha;

Y. b. t. - The crop yield by the basic technology, dt / ha;

P - the price of 1 dt of production.

As a result of the calculation of the new technology introduction by the proposed formula, the effect of the consulting activity will be immediate and, therefore, all the interested parties will have the expected effect. Thus, the received expected effect is the result of determination of the impact of information and consulting services on the functioning of agricultural producers. In a similar manner, it is possible to calculate the efficiency of the introduction of a new technology in the field of livestock (Savenko, Demishkevich, Sandu and Gubanova 2010).

The second direction of determination of the ICS economic efficiency and service employees' achieving of goals is possible on the basis of the monitoring of their activities. Monitoring of the ICS activity consists in conducting systematic arrangements to gather information in the following areas:

- The volume of needs for information and consulting services;
- The existing possibilities of information and consulting services provided directly by the ICS;
- The volume of the actually provided information and rendered (planned to provide) services;
- The study of public opinion on the provision of information and consulting services (demand volume, availability, quality of service, etc.). (Van Den Ban 1998, Van Den Ban and Koshelev 1998).

For the implementation of the proposed measures, it is necessary on a regular basis to take into account the organization of information, consultations and activities, as well as sociological surveys of the opinion of real and potential customers of the ICS, *i.e.* the establishment of a feedback. It can be concluded that the efficiency of information and consulting provision for agricultural production is one of the priorities in the implementation of the state agrarian policy. The main directions of evaluation of the ICS activity consist in identifying the degree of impact of information and consulting services on the functioning of agricultural producers and their economic performance. The advantage of the proposed approaches is the possibility to identify the factors of the actual impact of information and consulting provision on the performance of agricultural producers.

2. Materials and methods

In order to examine the need for new agricultural knowledge, technologies, and information of various categories of the ICS potential customers, as well as to identify their attitude towards the service itself and its efficiency, we developed and tested a questionnaire. To collect the necessary information, agricultural producers of Pavlodar region of the Republic of Kazakhstan were interviewed and surveyed. The interviews were conducted with managers and specialists of agricultural enterprises. A priority method of identifying their needs was questioning. A questionnaire survey covered 1,037 respondents of 9 districts of Pavlodar region.

- Aksu district - 117 respondents;
- Zhelezin district - 119 respondents;
- Ertis district - 117 respondents;
- Kashyr district - 140 respondents;
- Lebyazhye district - 92 respondents;
- Pavlodar district - 128 respondents;
- Uspen district - 125 respondents;
- Sharbakty district - 98 respondents;
- Ekibastuz district - 101 respondents.

The selection of the respondents was carried out by random sampling from the target group, particularly from the managers of agricultural enterprises, peasant farms and private farms. The survey involved the managers and owners of all types of households: large agricultural enterprises – 45, peasant farms - 647, public households - 310 and the employees of agricultural departments - 35.

The age category of the respondents is as follows:

- Up to 29 years - 37 people;
- From 30 to 39 years - 511 people;
- From 40 to 49 years - 425 people;
- Over 50 years - 64 people.

The main share of the respondents is represented by the owners and employees of peasant (farming) households. With regard to age, a significant share is taken by the agricultural producers aged between 30 and 49. With regard to gender, 845 of the respondents are men and 192 - women. The educational level of agricultural producers of all categories of households involved in the survey is presented in Table 1.

Table 1. The educational level of the respondents

| District | Higher education | Secondary vocational education | Secondary education |
|-----------|------------------|--------------------------------|---------------------|
| Aksu | 21 | 73 | 23 |
| Zhelezin | 34 | 68 | 17 |
| Ertis | 15 | 69 | 33 |
| Kashyr | 28 | 74 | 38 |
| Lebyazhye | 19 | 38 | 35 |
| Pavlodar | 37 | 61 | 30 |
| Uspen | 25 | 58 | 42 |
| Sharbakty | 16 | 49 | 33 |
| Ekibastuz | 22 | 58 | 21 |

As can be seen from Table 1, the respondents with a secondary vocational level hold a leading position.

A sociological survey was conducted within a year from April 2014 to May 2015. As mentioned above, the selection of the respondents was carried out by random sampling from the target group. Within two to three weeks, a survey was conducted directly in each district. Further personal data were processed manually.

During the survey, there was identified the need for the timely and accurate information – in 88%, and 12% of the respondents did not require it. 84% of the respondents had the need for consulting services in business management and 16% did not need them. Survey data indicate that the greatest demand was recorded for information and consulting services related to the public support for the agricultural sector (ACS) and maintenance of crop production (mentioned by more than 40% of all the respondents). The questions of livestock and accounting occupy the second position (38% and 37%) and the questions related to business planning – the third (27%).

In the course of the study, most of the respondents expressed their views on receiving the consultations in several directions at the same time, depending on the scope of their activities. In percentage correlation, the categories of the basic consumers of services provided by the JSC 'Kazagromarketing' have an average of the following ratios: agricultural producers - 78.0%, public authorities of the agricultural sector - 22.0%.

The services provided by 'Kazagromarketing' are relevant and in demand in the market. The main consumers are agricultural producers of all categories of households. Depending on the category of households, the needs of agricultural producers differ (Table 2).

Table 2. The need of ACS subjects by segment

| Segment of ACS subjects | Needs of ACS subjects |
|---|--|
| Small households (private households, individual entrepreneurs) | <ul style="list-style-type: none"> ▪ Consultations on various aspects of the agricultural market (loans, materials and equipment, state support, etc.); ▪ Prices for agricultural products and materials and equipment; ▪ Development of a business plan; |
| Middle households (farming enterprises) | <ul style="list-style-type: none"> ▪ Development of a business plan and feasibility study; ▪ Expansion of production capacity; ▪ Improvement of the quality of products; ▪ Organization of specialized training courses; |
| Large households (Business partnerships, joint-stock companies, production co-operatives) | <ul style="list-style-type: none"> ▪ Definition of promising areas of business development and increasing its effectiveness; ▪ Conducting marketing researches of both domestic and foreign markets; ▪ Obtaining relevant information on the agri-food market trends. |

Note: compiled by the authors on the basis of questionnaire details

The degree of satisfaction with the efficiency of activity of the regional branch of the JSC 'Kazagromarketing' is as follows: 'good' - 59%, 'satisfactory' - 29%, and 12% of the surveyed are not satisfied with its activity. The majority of the respondents (76%) expressed the view that consulting services should have a practical character and mentioned about the use of the method of consultation in demonstration fields (households). When asked: 'What is the role of the state in providing consulting services', 62% of the respondents noted the importance of the role of the state on the basis of information and consulting provision in agricultural production (Infrastructure for Agriculture and Rural Development, 2004; Simanaviciene, Amirova, 2016).

Of the greatest importance is the search for or expansion of channels of production distribution. At the same time, the respondents' readiness to pay for the provided service (information, consultation, training) was 62%. Provision of information and consulting services on a reimbursable basis, in turn, stimulates not only consultants, but also agricultural producers themselves to approach the matter responsibly. In modern conditions, the ICSs use different methods of consultation, which further helps agricultural producers form their own opinions about the existing problems and make their own managerial decisions (Simanaviciene and Amirova 2016).

The training course with the application of demonstration activities by the staff of the ICS of 'Kazagromarketing' was conducted in three pilot households, which are leaders in the production of crops. For comparison, an analysis of the efficiency of participation of all three pilot households of different areas of Pavlodar region was conducted (Kashyr, Uspen and Sharbakty).

3. Results

According to the results of the sociological survey, it was found out that agricultural producers of Pavlodar region of the Republic of Kazakhstan prefer learning with practical orientation directly on demonstration fields (household). Education of the experts and owners of households should be carried out in the form of a short-term training in specific conditions (advanced households) because not all agricultural producers can participate in long-term trainings with a separation from their primary activity (Simanaviciene and Amirova 2016).

Therefore, it is proposed to conduct a training session for agricultural producers of the region, particularly for the manufacturers of priority crops (cereals), combining the presentation of a theoretical material and its practical assimilation. The training was organized by the ICS of the Pavlodar branch of the JSC 'Kazagromarketing'. It also involved the employees of Pavlodar Research Institute of Agriculture and leading specialists of higher educational institutions in the region as field consultants. As a result of this collaboration, all the parties concerned should get the benefit.

On the basis of this study it was found out that crop production is greatly influenced by the volume of funding for phytosanitary measures. Therefore, to determine the efficiency in crop production it was offered to use an innovative technology 'Method of crop cultivation by the example of spring wheat and the basics of phytosanitary measures' which could increase the crop yield.

The target market for the implementation of the proposed service is the agricultural enterprises of different ownership of Pavlodar region in the field of crop production, namely the households with grain farming.

The goal of the training session with the use of demonstration activities was to promote visually the innovative technology, to test new agrotechnical measures and new varieties, aimed at improving the quality of products and increasing the efficiency of agriculture, and to carry out phytosanitary measures in the households.

The attendance of agricultural producers (participants of the training) at demonstration fields (advanced households), their acquaintance with the latest technologies in practice, as well as with the results of their application, in most cases, simplifies and accelerates the dissemination of knowledge and innovation in other agricultural units (Development Strategy of the JSC 'Kazagromarketing' for 2011-2020, 2013).

To conduct the training it is necessary to determine an approximate estimate of the cost for one participant (Table 3).

Table 3. An estimate of costs for holding a teaching training

| Cost items | Unit of measurement | Quantity | Price, tenge | 10 people Cost, tenge |
|-----------------------------------|---------------------|----------|--------------|--------------------------|
| Ground rent | hour | 36 | 1,200 | 43,200 |
| Costs for meals | day | 6 | 500 | 30,000 |
| Handout | people | 10 | 200 | 2,000 |
| Fee (for the training specialist) | hour | 24 | 2,000 | 48,000 |
| Fee (for the assistant) | hour | 12 | 1,000 | 12,000 |
| Total, 10 people | | | | 135,200 |
| Total, 1 person | | | | 13,520 |

Basic costs account for the trainer's fee and ground rent. The costs associated with renting of a demonstration ground assume an additional training (demonstration) room, with an area of 18 square meters in the form of a block-module of a container type, which will be based in the pilot household.

Table 4 shows the calculation of the price and revenue from the organization and holding of the training. The amount of funding for the training session for 1 year is calculated as follows (Formula 1):

$$V = Ct * Q \quad (1)$$

where:

Ct – costs for holding of the training (10 people);

Q – the number of trainings held.

$$V = 135,200 * 12 = 1,622,400 \text{ tenge}$$

For subsequent periods, it is calculated in a similar manner, but with regard to inflation, which is an average of 8% per year in Kazakhstan.

Overhead costs are calculated according to the equation (2):

$$Co = Qh_{tr} * Cf \quad (2)$$

where:

Qh_{tr} – the number of hours of the training;

Cf - fixed costs.

$$Co = 36 * 12,46 = 448,59 \text{ thousand tenge}$$

The total cost of the training (service) is given by the equation (3):

$$S_{tot} = V + Co \quad (3)$$

where:

V – the volume of funding for holding of the training;

Co – overhead costs.

$$S_{tot} = 1622,4 + 448,59 = 2071,0 \text{ thousand tenge}$$

The price and revenue from the organization and holding of the training are calculated according to the equation (4):

$$P = S_{tot} * P_{tr} \quad (4)$$

where:

S_{tot} – the total cost of the training;

P_{tr} – an income from holding of the training.

$P = 2071,0 * 1,3 = 2692,3$ thousand tenge

The calculation of price inclusive of VAT, which is 12% in the Republic of Kazakhstan, is made as follows (equation 5):

$$P_{vat} = P * 12\% \quad (5)$$

where:

P - the revenue from the organization and holding of the training;

$P_{vat} = 2692,3 * 12\% = 3015,4$ thousand tenge.

The revenue derived from one participant of the training is calculated according to the equation (6):

$$Rev = P_{vat} / \text{number of participants} / \text{number of trainings} \quad (6)$$

$Rev = 3015,4 / 10 / 12 = 25,1$ thousand tenge

The number of the trainings held is projected to constitute 12.

As a result of the organization and holding of the training, the revenue from one potential participant in the first year will be 25,100 tenge.

Table 4. Calculation of the price and revenue from the organization and holding of the training, thousand tenge

| Expense items | Years | | | | |
|--------------------------------------|---------|---------|---------|---------|---------|
| | 1 | 2 | 3 | 4 | 5 |
| Teaching training | 1,622.4 | 1,752.2 | 1,892.4 | 2,043.8 | 2,207.3 |
| Overhead costs | 448.59 | 484.5 | 523.2 | 565.1 | 610.3 |
| Total cost | 2,071.0 | 2,236.7 | 2,415.6 | 2,608.8 | 2,817.5 |
| Sale price w/o VAT | 2,692.3 | 2,907.7 | 3,140.3 | 3,391.4 | 3,662.7 |
| Price of goods sold inclusive of VAT | 3,015.4 | 3,256.6 | 3,517.1 | 3,798.4 | 4,102.2 |
| Revenue received from 1 participant | 25.1 | 27.1 | 29.3 | 31.6 | 34.2 |

Note: Compiled by the authors.

The use of intensive technologies in the field of cultivation of agricultural crops for the improvement of agricultural efficiency would solve a number of strategically important issues for agricultural grain crops, which in dry conditions are quite difficult to solve using traditional agricultural technologies.

As mentioned above, the evaluation of economic efficiency of the proposed (new) technology is possible through the evaluation of impact of information and consulting provision on the operation of agricultural producers and their economic performance. To determine this efficiency, we will consider the comparative characteristics of the composition of wheat and yield by the traditional (prior to implementation) and proposed (after implementation) method of cultivation (Table 5) (Makin 2000).

Table 5. Comparative characteristics of the composition of wheat and crop yield by the proposed method of cultivation

| Cultivation method | Wheat technical parameters | | | | The increase of grain from 1 ha by the proposed method | | Crop yield, dt/ha | | |
|--------------------|----------------------------|-----|-------------|-----|--|------|-------------------------|----------------------|---------------------------------------|
| | Gluten*, % | | Protein*, % | | dt | % | Leader South Kazakhstan | Leader Jambyl Region | Average in the Republic of Kazakhstan |
| | min | max | min | max | | | | | |
| Proposed method | 29 | 32 | 29 | 32 | 2,5 | 19,1 | 23,58 | 22,03 | 18,82 |
| Traditional method | 23 | 26 | 23 | 26 | - | - | 19,8** | 18,5** | 15,8** |

Note: Compiled by the authors based on data from the Information Agency 'Kazakh-Zerno'.

This effect is achieved by the joint efforts of the ICS specialists, field consultants and agricultural producers. In our case, the following formula was proposed to calculate the effect of introduction of the new (proposed) technology in the field of crop production:

$$E t. c. p. = (Y. n. t. - Y. b. t.) * P$$

Based on the proposed formula and a comparative characteristic of the composition of wheat and crop yield by the new (proposed) technology, an additional cash revenue from the wheat cultivation amounted to 75.4 US dollars per 1 hectare (ha) of the wheat area of Class 3 with 23-24% of gluten and 81.48 US dollars per 1 ha of the wheat area of Class 3 with 27-30 % of gluten (Table 6).

Table 6. Additional cash revenue from wheat cultivation by the proposed technology (from 1 ha with regard to average prices), in US dollars per 1 dt

| Cultivation method | Average crop yield, dt/ha | Average price in US dollars per 1 dt, inclusive of VAT 0 % (ex elevator) for 16.08.2015* | | Cash revenue from 1 ha with regard to average prices for 1 dt, in US dollars (average yield from 1 ha * avg. price for 1 dt) | | Additional cash revenue from 1 ha, in US dollars | |
|--------------------|---------------------------|--|--------|--|--------|--|--------|
| | | wheat of Class 3, with gluten | | wheat of Class 3, with gluten | | wheat of Class 3, with gluten | |
| | | 23-24% | 27-30% | 23-24% | 27-30% | 23-24% | 27-30% |
| Proposed method | 18,82 | 25 | 27 | 470,45 | 508,08 | 75,44 | 81,48 |
| Traditional method | 15,8* | 25 | 27 | 395 | 426,6 | - | - |

Note: Compiled by the authors based on data from the Information Agency 'Kazakh-Zerno'.

Taking into account the additional cash revenue from 1 ha, it is possible to ascertain the possibility of additional profit through the use of a unique method of wheat cultivation.

4. Discussion

In the course of the study it was found out that for the further promotion of the proposed technology among agricultural producers there is a need to intensify the information and consulting activity of the JSC 'Kazagromarketing', which in various ways may timely inform about holding of training sessions (Shelomentseva and Amirova 2013).

Thus, when implementing the proposed technology the effect of the consulting activity will be immediate and, therefore, all the interested parties will have the expected effect:

- (1) JSC 'Kazagromarketing' - cost recovery;
- (2) agricultural producers – increase in productivity, thus improvement of their functioning;
- (3) research institutes, higher education institutions - income, recognition of the proposed technology and its relevance.

Thus, this technology needs to be recognized for its subsequent implementation. The teaching training with the implementation of demonstration activities is one of the most successful ways of introduction of the proposed technology and its further dissemination among agricultural producers.

For comparison, we will analyze the efficiency of participation of three pilot households. Economic indicators are estimated with the help of discounting. According to expert estimates, a discount rate is assumed at 15% (Table 7) (Makin 2000).

A discounted payback period is calculated by the equation (7):

$$DPP = \sum_{i=1}^n \frac{CF_t}{(1+r)^t} \geq I_0 \quad (7)$$

The discounted payback period for the three households was 0.29, 0.32 and 0.43. Net present value (NPV) is calculated as the difference of the present value of cash flows with regard to the discount rate and investment (equation 8):

$$NPV = \sum_{i=1}^n \frac{NCF_i}{(1+r)^t} \quad (8)$$

The internal rate of return is a ratio of the reduced cash flow of the beginning of the period at the end of the period and is calculated according to the formula 9:

$$IRR = \sum_{i=0}^n \frac{CF_i}{(1+IRR)^t} - \sum_{i=0}^n \frac{I_t}{(1+IRR)^t} = 0 \quad (9)$$

Table 7. Profitability ratios for all participants

| Profitability ratio | Participants of the project | | |
|---|-----------------------------|-------------------------|--------------------------|
| | Peasant farm 'Shcherbak' | Peasant farm 'Zhanabet' | Peasant farm 'Bes Again' |
| Necessary investments, thousand tenge | 1,378.7 | 1,378.7 | 1,378.7 |
| Discounted payback period, Years | 0.29 | 0.32 | 0.43 |
| Net present value (NPV), thousand tinge | 89,120.70 | 85,329.06 | 86,742.99 |
| Internal rate of return (IRR), % | 30% | 26% | 28% |

Note: Compiled by the authors.

The calculations prove the economic feasibility of the implementation of this event. For all the households, the participation in such an event on the use of innovative technology is effective. For all the participants, the payback period was 3-4 months, the internal rate of return amounted to 26 – 30%.

The JSC 'Kazagromarketing' on the basis of paid consulting services will receive an additional profit of 21,740,950 thousand tenge by 2024, and the level of profitability for this activity in the long term will be 52.7% (Table 8).

Table 8. Efficiency of the JSC 'Kazagromarketing' activity in the long term

| Indicator | 2015 | 2025 | Coefficient of indicator variation |
|--|--------|-----------|------------------------------------|
| Revenues from sales of services rendered, thousand tenge | 703.52 | 39,862.18 | 56.7 |
| Cost of services rendered, thousand tenge | 635.71 | 18,121.23 | 28.5 |
| Profit (loss), thousand tenge | 67.81 | 21,740.95 | 320.6 |
| Profitability level, % | 9.1 | 52.7 | +43.6 |

Note: Compiled by the authors.

Conclusions

As a result of the research, the following conclusions can be made.

Firstly, the main factors for creating a system of criteria for the efficiency of information and consulting services that have an impact on the development of agricultural production were identified.

Secondly, two main areas of the definition of economic efficiency of the information and consulting service that has an impact on agricultural production (an increase in the efficiency of their work) were identified.

Thirdly, the evaluation of economic efficiency in the field of crop production on the use of an innovative technology was made by conducting a training session with the use of demonstration activities.

Fourth, an analysis of the efficiency of participation of three pilot households for the application of an innovative technology and activity of the JSC 'Kazagromarketing' in the long term was given.

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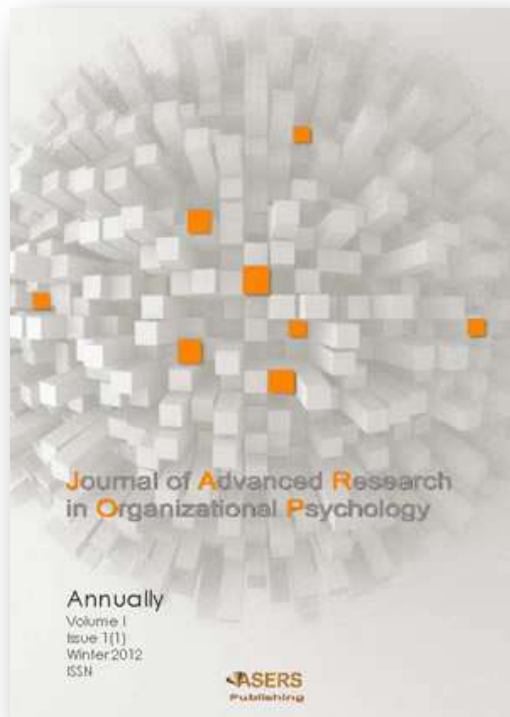
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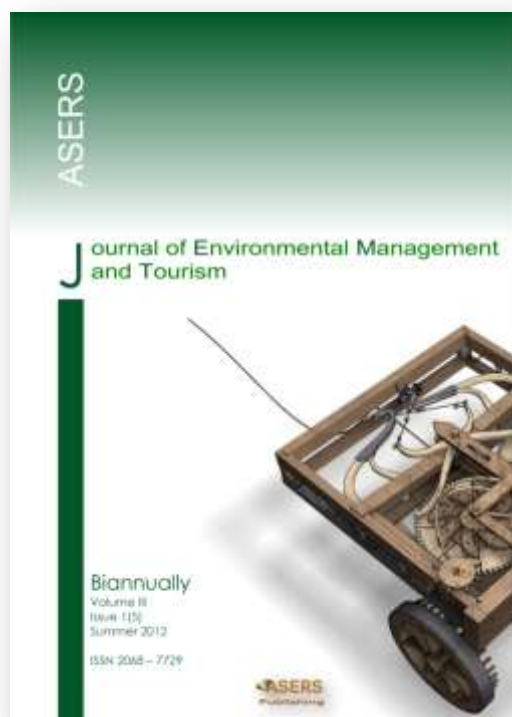
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