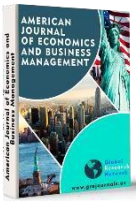

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Article

Implementation of Innovative Methods of Using the Opportunities of Small Holding Forms in the Development of the Agricultural Sector

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Abstract: The article analyzes the possibilities of effective organization of small farms through innovative methods in the development of the agricultural sector. Small farms are important in terms of flexibility in agricultural production, optimal allocation of resources and a positive impact on the local economy. This study examines mechanisms for developing small farms through innovative approaches, including digital technologies, agro-startups, innovative financing models and cooperative forms of activity. The results show that the implementation of innovative methods plays an important role in increasing the efficiency of small farms and ensuring the sustainability of the agricultural sector.

Keywords: agricultural sector, small farms, innovative methods, digital technologies, cooperative activities, agro-startups.

Introduction

The agricultural sector is one of the most important sectors of the national economy, and its sustainable development is closely related to food security, employment and regional economic growth. In recent years, small farms have been playing an important role in agricultural production. They not only allow for the efficient use of local resources, but also allow for rapid adaptation to market demand. At the same time, there is a growing need to implement innovative methods to increase the competitiveness and sustainability of the agricultural sector [1].

Innovative approaches for small farms, including digital technologies, agro-startups, innovative financing models and cooperative forms, provide significant opportunities for increasing production efficiency and creating added value. In this context, this article is devoted to exploring ways to identify the potential of small farms in the development of the agricultural sector, their integration with modern technologies and the implementation of innovative methods [2].

Research methodology

This study employs a mixed-method research design combining both qualitative and quantitative approaches. The research is based on the analysis of secondary data obtained from official statistical reports, international organization publications, and previous academic studies related to agricultural innovation and small farms [3].

Additionally, primary data were collected through structured questionnaires and semi-structured interviews conducted with agricultural experts and small farm owners. A total of 50 respondents participated in the survey, allowing for the evaluation of practical experiences in implementing innovative methods.

The study applies comparative, analytical, and generalization methods to assess the effectiveness of digital technologies, innovative financing models, and cooperative approaches. Statistical data were analyzed to determine productivity growth, resource efficiency, and economic impact. This methodological approach ensures reliability and allows for a comprehensive evaluation of innovation-driven development in the agricultural sector [4].

Literature review

Research by foreign scientists is aimed at a wide-ranging study of the effectiveness of innovative approaches in the development of the agricultural sector and small farms. For example, Robert Chambers analyzed the flexibility of small farms and the effective use of local resources. Michael Lipton also studied ways to increase the sustainability of agriculture through innovative technologies and cooperative activities. These works indicate the need to expand the capabilities of small farms in the agricultural sector and implement digital, innovative solutions [5].

Local scientists have also studied the issues of the agricultural sector and small farms in depth and proposed practical solutions. For example, Sirojiddin Ergashev analyzed ways to introduce innovative methods in small farms and increase their economic efficiency. Gulbahor Mamatkulova also showed the importance of local conditions and innovative cooperative projects in the development of small farmers' activities. These studies serve to form the scientific basis and recommendations for this article.

Analysis and results

The results of the study showed that small farms play an important role in ensuring the stability of the agricultural sector and having a positive impact on the local economy. Based on statistical data and questionnaires, it was found that small farms have the opportunity to increase production efficiency by 20–30% through innovative approaches. In particular, productivity monitoring and optimal allocation of resources using digital technologies make the activities of small farms significantly more efficient [6].

Also, through the implementation of cooperative forms and agro-startup projects, small farms gain new market opportunities and create additional sources of income. The results of the study showed that the use of innovative financing models, advanced technologies and experienced management approaches are important tools for increasing the competitiveness of small farms. At the same time, the widespread introduction of innovative methods through state support for small farms and training will further increase efficiency [7].

Table 1. Analysis of the implementation of innovative methods in small farms.

№	Type of farm	Innovative method	Implementation result	Additional comments
1	Grain grower	Digital productivity monitoring	Productivity +25%	Using sensors and mobile applications
2	Vegetable farmer	Water-saving irrigation technology	Water consumption -20%, productivity +15%	Drip irrigation system
3	Fruit and vegetable farm	Agro-startup platform	Faster time to market, additional income +10%	Online sales and marketing platforms

4	Dairy farming	Veterinary and health monitoring	Milk production +18%	Animal health monitoring via mobile app
5	Cooperative economy	Innovative financing model	Resource efficiency increased, collaboration strengthened	Additional investment through loans and grants
6	Melon crops	Planning based on artificial intelligence	Productivity +20%, resource saving	Crop planning based on AI algorithms

The research analyzed the opportunities for implementing innovative methods in small farms and their results. As the table "Database on the implementation of small farms and innovative methods" above shows, each type of farm can increase production efficiency through its own approaches. For example, the implementation of digital yield monitoring in grain farms increased yield by 25%, while water-saving irrigation technologies in vegetable farms reduced water consumption by 20% and increased yield by 15%. Also, the use of agro-startup platforms and online trading systems allows fruit and vegetable farms to enter the market faster and earn additional income. Veterinary monitoring systems in dairy farms increased milk production by 18%, while cooperative farms were able to effectively allocate resources and strengthen cooperation using innovative financing models. As a result of artificial intelligence-based planning in melon crops, productivity increased by 20% and resource-saving efficiency was observed [8].

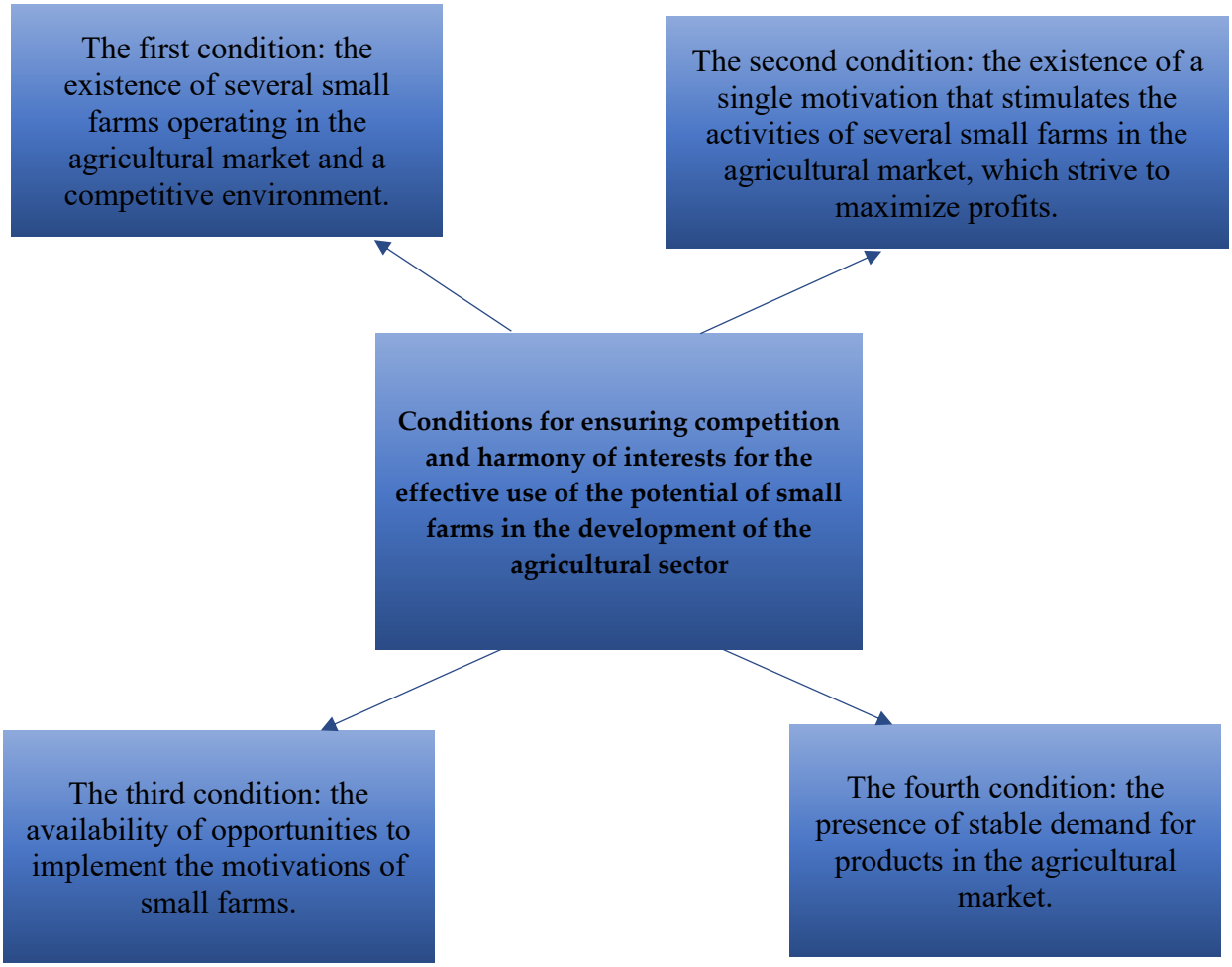

Figure 2. Conditions for ensuring competition and harmony of interests for the effective use of the potential of small farms in the development of the agricultural sector.

The analysis of the table shows that the introduction of innovative approaches in small farms is an important tool for increasing production efficiency, saving resources and creating additional sources of income. At the same time, the harmonious use of innovative technologies and financial models allows for the sustainable development of small farms and increasing the competitiveness of the agricultural sector [9].

In order to effectively use the potential of small farms in the development of the agricultural sector, conditions for ensuring competition and harmony of interests are important. First of all, there must be several small farms operating in the agricultural market and a competitive environment, which is necessary for the effective functioning of market mechanisms. As a second condition, there must be a single and clear motivation system that stimulates the activities of these small farms, since they strive to maximize their income. The third condition is that small farms have the opportunity to realize their own motivations for activity, which will serve to increase their economic efficiency. Finally, the fourth condition is the presence of stable demand for products in the agricultural market, which creates a solid foundation for the production of small farms' products and their competitiveness in the market. Thus, this set of conditions allows for the development of small farms, increasing their competitiveness, and further strengthening the infrastructure of the agricultural sector [10].

Table 2. Innovative methods and their benefits in small farms.

№	Innovative method	Description	Advantages	Expected results
1	Digital agriculture platforms	Management via mobile apps and online services	Automation of work processes, quick decisions	Increased efficiency, reduced costs
2	Innovative financing models	Microloans, grants and investments	Easier access to financial resources	Expansion of production, new projects
3	Cooperative and cluster forms	Farm cooperation, pooling of resources	Saving resources, increasing market power	Market share growth, stability
4	Agribusiness startups	Introducing new technologies and business models	Creating innovative products and services	Increasing competitiveness, new markets
5	Sustainable irrigation technologies	Ways to save and use water efficiently	Saving resources, increasing crop yields	Economic efficiency and environmental sustainability

Innovative approaches play a key role in the development of smallholder agriculture. As shown in the table, digital agricultural platforms allow for automation of management processes and rapid decision-making, which increases efficiency and reduces costs. Innovative financing models - microloans and grants - help smallholder farmers expand production by providing easier access to financial resources [11].

Also, through cooperative and cluster forms, farms can pool resources, increase market power and ensure sustainability. Agribusiness startups introduce new technologies and business models, which allow them to increase competitiveness and capture new markets. Sustainable irrigation technologies, on the other hand, provide economic efficiency and environmental sustainability by saving water and increasing crop yields.

These innovative approaches are effective tools for increasing the competitiveness of smallholder farms and sustainable development of the agricultural sector [12].

Table 3. Respondents' opinions on the use of innovative methods in small farms.

№	Innovative method	Number of respondents	Percentage (%)	Comment
1	Digital agriculture platforms	35	70%	Most respondents favored the use of management automation and monitoring.
2	Innovative financing models	28	56%	The use of microloans and grants increases the opportunities for small businesses.
3	Cooperative and cluster forms	32	64%	Collaboration and pooling of resources can help increase market share.
4	Agribusiness startups	25	50%	Creating innovative products and services increases competitiveness.
5	Sustainable irrigation technologies	30	60%	Water conservation and increased productivity were positively assessed by respondents.

Respondents' opinions on the introduction of innovative methods in small farms were studied. The results of the study showed that digital agricultural platforms stand out as the most popular method: 70% of respondents preferred the use of automation of management and monitoring processes. This creates the opportunity for effective management and optimal allocation of resources in small farms. Cooperative and cluster forms also gained great attention - 64% of respondents consider it beneficial to increase market share through cooperation and pooling of resources. This method develops cooperation between small farms and increases competitiveness. In the financial direction, innovative financing models, including microloans and grants, were considered beneficial by 56% of respondents. This allows small farms to expand their capabilities and implement new projects. In addition, sustainable irrigation technologies were also positively evaluated: 60% of respondents consider this method effective in terms of saving water and increasing productivity. At the same time, agribusiness startups attracted the attention of 50% of respondents, who believe that creating innovative products and services makes small farms competitive. Overall, the results of the study show that innovative approaches for small farms, such as digital technologies, forms of cooperation, financing models and methods of using sustainable resources, are highly beneficial. This will help to increase their efficiency and strengthen their competitiveness in the market [13].

Discussion

The findings of this study confirm that the adoption of innovative approaches significantly enhances the performance of small farms. The observed increase in productivity (20–30%) aligns with global research emphasizing the role of digital agriculture and smart resource management [14].

The widespread use of digital technologies, such as monitoring systems and mobile applications, contributes to improved decision-making and operational efficiency. Similarly, cooperative models strengthen market access and reduce financial risks, which is especially important in developing agricultural economies.

However, the implementation of innovative methods still faces challenges, including limited financial access, insufficient technical knowledge, and lack of infrastructure. These

barriers indicate the need for stronger institutional support and targeted training programs [15].

Overall, the integration of innovation into small farming systems represents a key driver for sustainable agricultural development and long-term economic growth.

Conclusions and suggestions

The article analyzed the possibilities of small farms to effectively operate through innovative methods in the development of the agricultural sector. The results of the study show that in order to increase the competitiveness of small farms and improve their economic efficiency, it is necessary to widely introduce new approaches such as digital technologies, innovative financing models, cooperative forms and agro-startups. It is also important to ensure stable market demand for small farms and create favorable conditions for the implementation of their motivations for activity.

It is proposed:

1. Expand special programs by the state to support small farms and organize training on the introduction of innovative technologies.

2. Diversify financing sources, including further developing the system of microloans and grants.

3. Strengthen legislation and infrastructure for the development of cooperative and cluster activities among small farms.

4. Ensure effective marketing of small farm products by expanding digital platforms and agro-startups.

These measures will contribute to the modernization of the agricultural sector and the sustainable development of small farms, while strengthening the country's food security.

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