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INFORMATION TECHNOLOGIES IN GRAIN MARKET INFRASTRUCTURE OPERATIONS

Abstract. The directions of development of innovative process, one of the key factors of development of agriculture - introduction of tools of digitalization applied in Kazakhstan are considered. It is noted that initially digitalization was actively introduced in animal husbandry due to the fact that the main share of animals was concentrated in a private farmstead, which had significant risks in the organization of veterinary safety, complexity in carrying out complex veterinary measures. The use of information systems AgroStrea, which allows to collect a large amount of data of different variations of technologies, varieties, crops, is presented to determine the best performance. An important task facing the state is the implementation of international requirements and norms of the EAEU to ensure the control of food safety of products delivered to Kazakhstan from third countries and exported from the country to other States. This will allow to realize the domestic export potential of branches and spheres of agriculture, which will change the volume of production, will contribute to a significant increase in the technological development of agriculture in Kazakhstan. The activity of "AgroStream" LLP, which is the developer of the methodology of transformation and implementation of information systems, is considered. It is noted that the use of the new module of IP "AgroStream – "AgroMap" mobile application will allow to organize the effective work of agronomists. Informatization of production, operation, management and services in agriculture with the introduction of digital technologies is aimed at transforming the model of agricultural turnover, stimulating the development of industrial parks and electronic trade in agricultural products.

Key words: agriculture, digitalization, technologies, systems, efficiency, production, products, innovations, implementation, organization.

Introduction. In modern conditions, the innovation process is a single and continuous flow of turning specific technical or technological ideas based on scientific developments into modern technologies or individual components of technological solutions and bringing them to use directly in production in order to obtain qualitatively new products. The company regulates the course of the innovation process in General and in individual sectors by developing and implementing an appropriate innovation policy, the purpose of which is, first of all, to bring scientific and technical developments to their practical use.

The most active direction of development of innovative process in modern conditions is the organization of introduction of scientific achievements in production [1].

The practice of implementing innovations in agriculture, as a rule, indicates a difference in the levels of technical and technological development of economic entities that are participants in the innovation process

According to experts, 25% of the world economy by 2020 will move to the introduction of digitalization technologies [2]. that is Why, in order to reduce costs, increase productivity and optimize the working process, one of the key factors in the development of agriculture is the introduction of digitalization tools, which are also actively used in the Republic of Kazakhstan.

Research methodology. In the next five years, the country plans to create 20 digital farms and 4 thousand farms using separate digital technologies.

Currently, the processes of maintaining the register of permits in the field of issuing certificates in animal husbandry and crop production, the organization of monitoring the passage of goods in import and

export operations are more digitized. Data exchange with the Russian veterinary monitoring system on the issued export permits has been implemented quite effectively. Fully automated monitoring processes and the operation of the turnover of grain receipts. The process of automating the issuance of subsidies in agriculture is being completed.

It should be noted that initially more actively digitalization was introduced in the field of animal husbandry due to the fact that before the market reforms the main share of animals was concentrated in a private farmstead, which represented certain risks in the organization of veterinary safety and greater complexity in carrying out complex veterinary measures.

Research results. The results of the analysis conducted in the country of the current state of introduction of precision agriculture with the division into "advanced" and "digital" farms showed that there are 114 advanced and 10 digital farms in the country. By 2022, the goal is to bring the value of the indicator to 2 thousand advanced farms throughout the country [3].

A digital farm is a farm that can operate through the application of new tools and technologies, with almost no human intervention. The main objective of digitalization is to simplify the activities of farmers from the beginning of activity to the sale of products.

Due to new technologies, training and professional development of agricultural sector workers will be carried out, for which in 2020 it is planned to launch an online training program with the involvement of private IT companies. Students will be given the opportunity to choose their courses and teachers remotely, which will significantly reduce the time and transport costs of farmers [4]. Rural producers will be taught the basics of entrepreneurship, farming, agronomy, seed production, animal husbandry. In 2019, a pilot project was implemented to launch online lending for spring field work, in 2021 this process will be fully automated.

Since the process of obtaining land at auctions and auctions was not automated and there was practically no open map of land plots, until July 1, 2019, the provision of land only in electronic form was carried out in some regions in a pilot mode, while by the end of 2019 it is planned to create an open map of land plots, and from 2021 to launch the process completely.

As an example of effective management decisions, consider JSC "Atameken-agro", which began its activities in 2003 and by 2014 began to search for solutions to digitalize the company's activities.

In 2016, "AgroStream" LLP offered its services for the implementation of the planning module of technological maps for "Atameken-agro". This was due to the fact that there was an urgent need for rural producers in effective technologies for carrying out plan-fact analysis, control of theft and exclusion of losses. Therefore, the planning module was transformed into a full-scale information system "AgroStream" – the only domestic company offering a comprehensive product. "AgroStream" combines the experience of advanced foreign developments, but at the same time is maximally adapted for the Kazakh consumer. Simplicity of the interface, intuitiveness of reporting, informativeness and complexity are the main competitive advantages of the proposed product.

The results of the implementation were expressed in a significant reduction in theft and loss, in strengthening control over the implementation of specified technologies. This, in turn, led to an increase in crop yields. But the main goal in the development and implementation of IP "Agrostream" in the activities of JSC "Atameken-agro" was not so much to reduce losses and reduce the impact of the human factor, as to collect the necessary amount of data. On the basis of management information, it became possible to gradually move to precision farming and get the opportunity to determine the most effective technologies, select more marginal varieties, understand which crops give the best return in our climatic conditions. All this will make it possible in the future to take a differentiated approach to planning for each field.

The use of AgroStream information systems allows to collect a large amount of data of different variations of technologies, varieties, crops, etc. in order to determine the best performance. However, the most difficult in the implementation process was the training of personnel. The main problem was not even in training, but in instilling an understanding of the need for innovation, in the psychological acceptance of the idea as such. It was necessary not only to install the program, but also to change the thinking of the staff.

At the same time, thanks to constant training, user support and operational technical support, it was possible to achieve mutual understanding with the personnel of agricultural producers involved in the implementation process. The corporate policy of JSC "Atameken-agro" helped to achieve this result, as all

important issues in the company are taken collectively by the team. This not only raises the spirit of the staff, but also contributes to the maximum effectiveness of the strategy and everyone's involvement in the common cause. The staff of "Atameken-agro" is ahead of other domestic agricultural enterprises in the understanding and awareness of the development strategy and digitalization of activities. The official partner of AgroStream is TerraPoint, specializing in automation technologies in agriculture.

LLP "AgroStream" is not just a developer of the system, but also a professional consultant, he developed a methodology for the transformation of the consciousness of users and the introduction of information systems, up to the audit of all business processes. Only such an approach can give the expected results for the transition to precision agriculture.

Active work on introduction and use of the new module of IP "AgroStream" – "AgroMap" – the mobile application which is directed on the effective organization of work of the agronomist is continued. Negotiations are underway to integrate with artificial intelligence, where the user, by clicking on any point of the field map, will be able to determine the likelihood of diseases and pests, to receive unique recommendations for the implementation of preventive actions.

An urgent task facing the state at the present time is the implementation of international requirements and norms of the EAEU to ensure the control of food safety of products entering the Republic of Kazakhstan from third countries, as well as exported from the country to other EAEU States. The fulfillment of the requirements will allow to realize the national export potential in the field of agriculture, which will change not only the volume of production, but also will contribute to the increase of technological development of the country's agriculture.

The experience of such States as the USA, Canada and Australia shows that the informatization of production, operation, management and services in the introduction of digital technologies in this sphere is aimed at transforming the model of agricultural turnover, stimulating the development of industrial parks and electronic trade in agricultural products, accelerating the demonstration and dissemination of digital technological achievements in agriculture, but also, ultimately, contributes to the stable economic development of rural areas, taking into account their specific characteristics [5].

The experience of the leading countries, whose economies are characterized by a developed agricultural sector, shows that at one time each of them passed a kind of "technological revolution". For example, classical extensive agriculture is now being replaced by precise (precision), geoinformation technologies are more widely used, multi-operational energy-saving agricultural units are being introduced, high-yielding plant varieties are being selected and highly productive animal breeds are being bred. According to the research Agency RolandBerger, every year only in Asia, about 20% of the potential growth is provided by the use of innovative technologies in the field of agriculture.

In Australia, for example, introduced a system of identification and traceability of farm animals and products, which includes a complete package of software modules with the ability to accurately track animals throughout their lives and identify all the animals and objects with which they were in contact during their life cycle, which allows you to quickly and effectively respond to the emergence of various diseases at the time of their occurrence. This reduces the cost of the combined costs associated with disease spread, industry support, and market closure.

In the Russian Federation, within the framework of the State program "development of the fishery complex", work is being carried out on the development and implementation of the software and technical complex "Electronic fishing journal". The electronic journal allows recording and transmission of information on the implementation of fishing activities in electronic form, as well as provides remote access to information on the results of fishing.

For the development of agriculture is necessary to provide automated monitoring of the treated soil, to assist in the digitization of agriculture (including agriculture, livestock, fishing, cultivation, mechanization), to create a platform safety control of agricultural products covering all administrative departments at all levels to improve the information system of rapid response [7].

In order to further develop the agricultural sector it is planned:

- automation of the process of subsidizing agriculture, which would contribute to increasing the transparency and efficiency of subsidies, operational control over the development of allocated funds;
- the development of automation of registration, pledge, issuance of agricultural machinery and issuance of driver's licenses will allow to promptly provide public services in the field of technical

inspection for the population, to conduct centralized monitoring and control over the technical condition of agricultural machinery and compliance with legislation in the field of technical control and road safety;

- automation of traceability of livestock products, ensuring proper equipment, animal identification, tracking, including a system response to disease, will enable the industry to respond quickly and effectively to a variety of diseases as they occur;

- automation of traceability of crop products will track the entire life cycle of products, including the processes of production, storage, transportation, sale, destruction or disposal;

- automation of monitoring of the turnover of fish and fish products will make it possible to reduce the volume of poaching and illegal trafficking of fish products, to ensure the safety of fish resources, collection and timely processing of information on the activities of fishing and fish processing organizations and enterprises engaged in the purchase and sale of fish and fish products, its wholesale and retail sales.

Industrialized and economically stable States have developed agriculture, realizing that the degree of development of agricultural production largely depends on the level of welfare of the country. Wide application of digital technologies in the agriculture of the Republic of Kazakhstan will increase productivity, increase the contribution of agriculture to GDP, stimulate the export potential of domestic agricultural products to world markets.

The effectiveness of process management in a modern logistics system should be considered in close relationship with an integrated approach to processes and resources. In this regard, an important role should be given not only to the information and resource aspects of commodity system management, but also to the adaptation of management to changing business processes. The rational functioning of logistics systems ensures the smooth functioning of flow processes, which are the basis for the formation and development of the modern system of the world economy [7]. The key consumers of this system are individual organizations and enterprises, as well as States that flexibly and optimally use logistics processes and, as a result, gain competitive advantages at the micro-, meso- and macro levels, including foreign economic activity.

Determining the combination of different types of freight transport in individual countries depends on their location, level of development, natural and other conditions. In the transport infrastructure of most States, as a rule, all major modes of transport are involved: rail, road, air, water, pipeline. For the implementation of production and economic relations and ensuring the movement of goods through the territory of Kazakhstan, including the implementation of foreign trade obligations, mainly rail and road transport are involved, which are preferred in accordance with the estimated time and cost of transportation over a given distance, as well as the characteristics of the transported goods. When planning transportation to the destination, the exact route is developed and the possibility of tracking the movement of the cargo is provided.

Kazakhstan carries out grain transportation, mainly by rail. The volume of traffic in 2018 amounted to 283 million tons, of which 30% is accounted for exports.

The main transportation by rail in the Northern regions of Kazakhstan is carried out by JSC "Astyk TRANS", which has 15 representatives in the regions. On its basis, it is a single information portal to support IT processes, which allowed to automate the application process and ensure clear control over their execution. At the request of shippers it is also possible to provide information about the location of cars at any stage of their movement [6].

Currently, the management of JSC "Astyk TRANS" is 5 200 owned and leased grain cars. In addition, for grain transportation, it is possible to attract a cargo fleet of the Russian shareholder of the company CJSC Rusagrotrans. At the same time, priority is given to intra-Republican socially significant transportation of grain from Akmola, Kostanay, North Kazakhstan region to all regions of the country in order to ensure the stability of enterprises of grain processing and food industry, poultry and livestock.

The share of the company in the transportation of domestic grain cargoes reaches 90%, export transportation, including the countries of Central Asia, is provided by it by 50%. To increase the volume of cargo transportation and expansion of regular customers in the conditions of fierce competition of owners of rolling stock, the organization effectively uses the tools of logistics marketing. For example, at the beginning of the summer season, the company reduced the fee for the use of grain wagons for the organization of export transportation by 15%. In addition, when carrying out intra-Republican transportation, the cost of grain wagons has been unchanged for the last three years.

Other instruments aimed at tariff optimization are also used in the framework of the main activity. In particular, in 2018, an agreement was reached between JSC "Uzbekontemiryullari" and JSC "NC "KTZ" to create effective tariff conditions for the promotion of export goods through the territories of the two countries. The established agreements also apply to the transportation of grain, flour and other grain products. Also, in the conditions of the need to ensure the increase in the transportation of grain cargoes and flour products from Kazakhstan, lowering coefficients were introduced in the context of the following sections: Keles-Khojadavlet-50%; Keles-Galaba-20%. Thus, the conditions for Kazakh and Uzbek producers were actually leveled.

Despite the need to introduce an unpopular measure—an increased fee for the use of inventory cars, due to the expediency of equalizing tariff rates for this fleet in relation to their own, this made it possible for domestic carriers to compete with the owners of transport cars from other countries to generate funds and attract investment to upgrade the fleet.

After the devaluation of the tenge, the tariff for the use of cars of the inventory fleet of foreign railway administrations increased by 2 times, amounting to 3.7 million Swiss francs (1.3 billion tenge) for covered cars and grain carriers. To compensate for part of the cost of transporting grain in the railway tariff was laid 19 percent subsidy, which was carried out by the railway.

The work carried out had a positive impact on the volumes of grain and flour transportation in 2018, the value of which exceeded the indicators of the previous period by almost 1.5 times. Export operations also increased: to Iran by three times, to Uzbekistan-by 1.63 times, respectively, Afghanistan and China by 53 and 23%. In addition, in Uzbekistan, the values of flour shipment indicators grew steadily, which increased by more than 47% compared to last year.

This was largely facilitated by the introduction of a comprehensive automated system "Contractual and commercial work" (ACS DKR) in the territory of Kazakhstan. This System provides the possibility of a single entry of data on shipments in electronic form for subsequent reuse in order to track transit cargo. Currently, in the "on-line" mode, it is possible to implement the function of using a standardized reference database, with the help of which the client gets access to the tools for carrying out calculations on transport transportation on the single corporate portal of JSC "NC "KTZ".

Modern technology makes it possible not only to use rolling stock more efficiently, improve the infrastructure of railway stations, but also has a positive impact on improving the competitiveness of domestic rail transport.

At the same time, both shippers and consignees, using this system, gain confidence in the economic feasibility of organizing and performing rail transportation, the effectiveness of decisions taken in terms of ensuring the possibility of using an electronic digital signature, the development of the functional activities of transport forwarders, including tracking the arrival of cargo at the destination station. ACS DKR predicts the expansion of the list of services, including the provision of opportunities for complex works at the destination station and payment via the Internet of the full cycle of logistics costs for transportation.

It should be noted that joint activities within the framework of development of cooperation and integration of the DKR ACS used in KTZ and the current system of transport control of the Russian Railways network are designated as a promising direction. The advantage of ACS DKR is the possibility of centralization and consolidation of databases, the introduction of electronic digital signature. The work carried out jointly with the Russian operator for the introduction of electronic digital signatures, in the future can become the key to the digitalization of traffic control systems in railway transport.

Conclusion. The considered system of management of the organization of contractual and commercial work confirmed expediency of its use. As the main positive results shippers call convenience and efficiency in the application of the system. The transition to electronic technology has allowed to reduce the number of procedures for coordination and reduce unproductive costs, increasing the efficiency of management activities by improving the quality of the railway sector to serve the recipients and senders of goods.

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АСТЫҚ НАРЫҒЫНЫҢ ИНФРАҚҰРЫЛЫМДЫҚ ОПЕРАЦИЯЛАРЫНДАҒЫ АҚПАРАТТЫҚ ТЕХНОЛОГИЯЛАР

Аннотация. Инновациялық үдерісті дамыту бағыттары, ауыл шаруашылығын дамытудың негізгі факторларының бірі – Қазақстанда қолданылатын цифрландыру құралдарын енгізу қарастырылған. Малдардың негізгі үлесі жеке аулаларға шоғырландырылғандықтан, мал шаруашылығында алғаш рет цифрландыру белсенді енгізілгені атап өтілді, бұл ветеринарлық қауіпсіздікті ұйымдастыруда елеулі тәуекелге ие болды, кешенді ветеринарлық іс-шараларды өткізуде қиындықтар болды. Ең жақсы нәтижелілікті анықтау мақсатында технологиялардың, сұрыптардың, дақылдардың әр түрлі нұсқаларының үлкен көлемін жинауға мүмкіндік беретін AgroStrea ақпараттық жүйелерін пайдалану ұсынылған. Мемлекет алдында тұрған маңызды міндет Қазақстанға үшінші елдерден жеткізілетін және елден басқа мемлекеттерге шығарылатын өнімдердің азық-түлік қауіпсіздігін бақылауды қамтамасыз ету үшін ЕАЭО халықаралық талаптары мен нормаларын орындау болып табылады. Бұл ауыл шаруашылығы салалары мен бөлімдерінің отандық экспорттық әлеуетін іске асыруға мүмкіндік береді, өндіріс көлемін өзгертуге мүмкіндік береді, Қазақстанның ауыл шаруашылығын технологиялық дамытудың едәуір ұлғаюына ықпал етеді. «AgroStream» ЖШС-нің ақпараттық жүйелерді трансформациялау және енгізу әдіснамасын әзірлеушісі болып табылатын қызметі қаралған. «AgroStream»-«AgroMap»-мобильдік қосымшаларының АЖ жаңа модулін пайдалану агрономдардың тиімді жұмысын ұйымдастыруға мүмкіндік беретіні атап өтілген. Сандық технологияларды енгізу кезінде ауыл шаруашылығында өндірісті, қызмет көрсетуді, басқаруды және өндірісті ақпараттандыру ауыл шаруашылығы өнімдері айналымының моделін өзгертуге, өнеркәсіп парктерін және ауыл шаруашылығы өнімдерінің электрондық саудасын дамытуды ынталандыруға бағытталған. Қазіргі жағдайда классикалық экстенсивті егіншілік дәлірек ығыстырылатыны, геоақпараттық технологиялар кеңінен пайдаланылатыны, энергия үнемдейтін ауыл шаруашылығы агрегаттары енгізілгені, өсімдіктердің жоғары өнімді сорттарын селекциялау және жануарлардың жоғары өнімді тұқымдарын шығару жүргізілетіні атап өтілген. Roland Berger зерттеу агенттігінің деректері бойынша, жыл сайын Азия елдерінде әлеуетті өсімнің шамамен 20%-ы ауыл шаруашылығы саласында инновациялық технологияларды қолдану есебінен қамтамасыз етіледі. Австралияда ауылшаруашылық жануарлары мен өнімдерін сәйкестендіруге және бақылауға арналған қолданбалы жүйеге жануарлардың өмірін нақты бақылауға және барлық жануарлар мен заттарды сәйкестендіруге мүмкіндік беретін бағдарламалық модульдер жиынтығы кіреді. өмірлік циклі кезінде олармен байланыста болған, олардың өмірлік циклі ішінде байланыста болады, және бұл әртүрлі аурулардың пайда болуы кезінде жедел және тиімді әрекет етуге мүмкіндік береді. Бұл аурулардың таралуына, индустрияны қолдауға және нарықтағы операцияларды жабуға байланысты жиынтық шығындардың құнын төмендетеді. Қазақстан Республикасының ауыл шаруашылығында цифрлық технологияларды кеңінен қолдану еңбек өнімділігін арттыруға, елдің ЖІӨ-дегі ауыл шаруашылығы саласының үлесін арттыруға, отандық ауыл шаруашылығы өнімдерінің экспорттық әлеуетін әлемдік нарықтарға ынталандыруға ықпал ететін болады.

Түйін сөздер: ауыл шаруашылығы, цифрландыру, технологиялар, жүйелер, нәтижелілік, өндіріс, өнім, инновациялар, енгізу, ұйымдастыру.

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ИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ В ИНФРАСТРУКТУРНЫХ ОПЕРАЦИЯХ ЗЕРНОВОГО РЫНКА

Аннотация. Рассмотрены направления развития инновационного процесса, один из ключевых факторов развития сельского хозяйства – внедрение инструментов цифровизации, применяемые в Казахстане. Отмечено, что первоначально цифровизация активно внедрялась в животноводстве в связи с тем, что основная доля животных была сконцентрирована в частном подворье, что имело значительные риски в организации ветеринарной безопасности, сложность в проведении комплексных ветеринарных мероприятий. Представлено использование информационных систем AgroStrea, позволяющего собрать большой объем данных различных вариаций технологий, сортов, культур с целью определения наилучшей результатив-

ности. Важной задачей, стоящей перед государством является исполнение международных требований и норм ЕАЭС для обеспечения контроля пищевой безопасности продукции, доставляемой в Казахстан из третьих стран, и вывозимой из страны в другие государства. Это позволит реализовать отечественный экспортный потенциал отраслей и сфер сферы сельского хозяйства, что позволит изменить и объем производства, будет способствовать значительному увеличению технологического развития сельского хозяйства Казахстана. Рассмотрена деятельность ТОО «AgroStream», являющееся разработчиком методологии трансформации и внедрения информационных систем. Отмечено, что использование нового модуля ИС «AgroStream» – «AgroMap» - мобильного приложения, позволит организовать эффективную работу агрономов. Информатизация производства, функционирования, управления и услуг в сельском хозяйстве при внедрении цифровых технологий нацелена на трансформацию модели оборота сельскохозяйственной продукции, стимулирование развития промышленных парков и электронной торговли сельскохозяйственной продукцией. Отмечено, что классическое экстенсивное земледелие в современных условиях вытесняется точным, более широко используются геоинформационные технологии, внедряются энергосберегающие сельскохозяйственные агрегаты, производится селекция высокоурожайных сортов растений и выведение высокопродуктивных пород животных. По данным исследовательского агентства RolandBerger, ежегодно в странах Азии порядка 20% потенциального роста обеспечивается за счет применения инновационных технологий в сфере сельского хозяйства. Применяемая система идентификации и прослеживаемости сельскохозяйственных животных и продукции в Австралии включает пакет модулей программного обеспечения с возможностью точного прослеживания животных на протяжении их жизни и определения всех животных и объектов, с которыми они были в контакте в течение их жизненного цикла, что позволяет достаточно оперативно и эффективно реагировать на появление различных заболеваний уже в момент их возникновения. Это снижает стоимость совокупных затрат, связанных с распространением заболеваний, поддержкой индустрии и закрытия операций на рынке. Широкое применение цифровых технологий в сельском хозяйстве Республики Казахстан будет способствовать увеличению производительности труда, росту вклада сельскохозяйственной отрасли в ВВП страны, стимулированию экспортного потенциала отечественной сельскохозяйственной продукции на мировые рынки.

Ключевые слова: сельское хозяйство, цифровизация, технологии, системы, результативность, производство, продукция, инновации, внедрение, организация.

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