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ҚАЗАҚ ҰЛТТЫҚ АГРАРЛЫҚ УНИВЕРСИТЕТИ

# Х А Б А Р Л А Р Ы

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НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК  
РЕСПУБЛИКИ КАЗАХСТАН

КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ  
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## NEWS

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OF THE REPUBLIC OF KAZAKHSTAN

KAZAKH NATIONAL  
AGRARIAN UNIVERSITY

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## **ESTIMATION OF THE EFFICIENT LAND USE IN THE LIMITS OF LAND PLOTS OF ACTING AGRI BUSINESSES**

**Abstract.** This article examines the methodology of determining the efficiency of agricultural land use in terms of a multistructural economy, taking into account structural and resource indicators. The necessity of improving the system of land relations of peasant (private) farms with the purpose of optimizing their perspective activity is considered. The need to achieve optimal sizes of land plots in the process of increasing the profitability of agribusiness is justified. Studies have shown that the methodology of assessing the economic efficiency of land use should be simple in application to any business entity. One of the important moments is that all value indicators used in any methodology of assessing the economic efficiency of land use should be considered in terms of inflation and risk. It is necessary to make adjustments to prices as well, because the value of sold products is calculated taking into account purchase prices to determine the total income of the enterprise.

**Key words:** agribusinesses, efficiency, gross agricultural output, rational use of farmland, optimal land use.

**Introduction.** In conditions of agricultural production development, the issues of regulation of land relations are of special importance, where the formation of land plots of optimal size in various forms of business plays the most important role [1].

Currently the solution of the tasks of effective land use requires the organization of accounting and assessment of soil fertility on soil bonitet in the frames of land use. It is known that even in the case of one land plot, the economic land fertility differs from the main group of soils in terms of low bonitet score, which affects the production results [2].

As a rule by actual gross output or its value per 1 ha or 100 ha of land one can judge on the level of farmland use.

Analysis of the land use structure of agribusinesses for the period from 1995 to 2016 in Kazakhstan showed that the share of peasant farms (96.3%) is prevailing in their total number, while the number of agricultural enterprises in 2016 is only 6.9 thous. [3].

The average sizes of land use are also differentiated. The LLPs and agricultural enterprises have the largest land areas. At present, the tendency of reduction of the number of agricultural production cooperatives is observed despite more democratic form of management.

**Results and discussion.** Efficiency of agricultural land use is also different and varies according to the periods and categories of farms due to the increasing level of inflation and prices for agricultural products (table 1).

The main reasons for the disintegration of production co-operatives into LLPs and peasant farms and, accordingly, the size of land use are as follows: incompliance with democratic management principles, exclusion of land holders from management, non-transparency of profit distribution, small amounts of dividends, preferential taxation of peasant farms, which are the main factor of their mass organization.

Table 1 – Tendencies of changes in the number, sizes of various forms of businesses and efficient use of agricultural lands in the Republic of Kazakhstan for 1995-2016

Farm category	1995	2000	2010	2015	2016
Number of agribusinesses					
Agri enterprises	5787	5345	5702	6906	12310
Peasant farms	30785	95460	193435	216567	219759
Average sizes of agribusinesses, ha					
Agri enterprises	15602	10680	5780	5701	3312
Peasant farms	412	260	233	270	273
Gross output production per 100 ha of agricultural plots, mln. Tenge					
Agri enterprises	100,4	249,7	495,5	212,3	312,1
Peasant farms	136,5	461,8	612,8	177,1	273,4

The most efficient production and land use has been achieved in large-scale agribusinesses, where high-performance machinery is used, crop rotations are being observed, and there is greater accessibility to loans, subsidies, and leasing.

On the basis of the land of production cooperatives, the process of organization of LLPs and PF is taking place, which average size of land use over the past 2 years has stabilized, while there are peasant farms with small land plots in the southern region (table 2).

Table 2 – Grouping of land use sizes of small peasant farms by composition of farmland and arable land in the regions of the southern Kazakhstan

Region, area	Number of PF with ag.plots, thous. ha	Up to 50 ha		Number of PF with arable lands, thous.	Up to 50 ha	
		thous.	share %		thous.	share %
Republic of Kazakhstan	148,9	94,4	63,4	119,7	97,2	81,2
Southern region	108,5	88,4	81,5	98,1	90,7	95,5
Almaty region	41,3	31,3	75,8	35,3	32,2	91,2
Zhambyl region	16,3	12,0	73,6	14,6	12,4	84,9
Kyzylorda region	2,3	0,6	26,1	0,9	0,5	55,6
South Kazakhstan	48,6	44,5	91,6	47,3	45,6	96,4

*Note.* Calculations were performed on the basis of data from the Committee on Statistics of the RK. Col. "Agriculture, Forestry and Fisheries in the Republic of Kazakhstan" for 2016.

Monitoring data of the Statistics Committee of RK as of 1.01.2016 show that 93.7% of peasant and private farms have land area of up to 500 ha. To the greatest extent, small-scale peasant farms became widespread in the southern region, where the share in the total number of plots of 50 ha is 90.1%, while in the northern region only 8.1%, central - 3.9%, western - 11, 3%. Most of them have narrow specialization, many of them are natural and semi-natural farms [4].

Small-scale type of production does not allow to manage agricultural production on an intensive basis, to ensure full use of material, labor and other resources, to comply with environmental requirements. Small and even medium private and peasant farms due to the lack of financial resources don't have the opportunity to introduce new technologies in the development of their production.

Small-scale agricultural production is not attractive for outside investors. Like investors, loan and bank organizations don't make investments to small-scale farms, which is one of the main reasons for the reduction of production volumes and failures in timely logistical support. The main condition for the investors is the possibility to have complete influence on product output, using modern production means and technologies. And this can be achieved only if the business has sufficient scale and size. As a result, the main source of financing is a significant public support of the entrepreneurs who have small share of own funds.

At present, the issue of organizing effective land use aimed at the rational use of land which aims at the development of crop rotations, a new moisture-resource-saving technology, and the use of more productive machinery is very relevant.

One of the main directions in solving the problem of peasant farms with small land plots is the development of cooperation, unification into single crop rotation areas. The study of cooperative processes in agricultural sector has shown that three main directions can be distinguished here.

The first direction is co-operation of agricultural entities by production: the cultivation of labor-intensive crops (fruit and vegetable specialization), fattening and raising livestock, etc. This is a production cooperation where the shareholders and labor team are the same people.

The second direction is cooperation (unification) in the sphere of material and technical services. This form of cooperation can be spread due to the lack of financial and material resources and underdevelopment of the service sector. The first and the second direction can have a mixed character, since the purpose of these co-operations is the production of agricultural products, and it is extremely difficult to differentiate them as a pure type.

The third direction is establishing of cooperatives on processing and selling products based on joint funds and material and technical resources by peasant farms and personal subsidiary farms.

We see the solution of this problem not only in view of enlarging the land areas, but also providing public support, especially to small peasant farms, since they play an important role in production of gross agricultural - they produce 25% of the value of the gross agricultural output of the republic.

The economic efficiency of a particular form of management depends on increasing labor productivity, strengthening saving regime, increasing production intensification, using internal reserves and possibilities of agricultural production, and, especially, rational use of land.

With regard to land use, rationality assumes the expediency of productive and non-productive use of land by applying both intensive and extensive factors that ensure a constant increase of soil fertility. But the use of intensive factors should not lead to the decrease in land fertility and their withdrawal from agricultural production.

At the present stage, in the conditions of intensive farming, new peculiar problems arise in land use including the decrease of humus concentration in soil which is the basis of its fertility is of a particularly concern. The experience of world land cultivation also confirms that one of the indicators of the evaluation of land cultivation system is the level of humus concentration in soil. Soils with high humus concentration have more favorable water-physical and other properties. They are less susceptible to side effects of pesticides, and mineral fertilizers are more effectively used on such soils. In connection with this, the level of humus concentration in soil is one of the most important indicators of the rational land use, reproduction of soil fertility.

The formation of farms according to the area depends on the nature of the land plots, i.e. their structure (size of arable land, hayfields, pastures); specifics of particular sectors; zonal conditions. Rational land use excludes monocrops, because the seasonal character of agricultural production determines the need for full employment of labor forces during the year. To regulate these processes, a rational combination of crop production and livestock production sectors is necessary. Foreign and domestic experience shows the rational combination of crop production and livestock production sectors in the ratio of 60:40 and 50:50.

Another criterion for establishing optimal land use sizes for the farms is the output of agricultural products per 100 ha of farmland (arable land); net profit per 100 ha of farmland (arable land); level of own commodity production; the level of application of innovative technologies, the process of diversification, the maintenance of an optimal livestock population; cost of fixed production assets; number of permanent employees, availability of own working capital and high level of creditworthiness, level of profitability [5].

This issue is closely related to land turnover, especially in view of small farms that are unable to use crop rotation and high-performance machinery. The cancellation of sublease caused significant damage in the formation of optimal parameters of land use. Therefore, the main mechanism governing the parameters of enterprises is the organization of simple partnerships and the development of horizontal cooperation.

The effective agriculture directly depends on the ongoing activities on land reclamation. In this regard, the State policy on maintaining the quality of irrigated lands should be developed and implemented in comprehensive and close interaction with other agricultural activities.

Let's consider the state of land use by different categories in the Enbekshikazakh district of Almaty region (table 3).

Table 3 – Availability of land and its distribution by categories in Enbekshikazakh district of Almaty region for 2016

Name of categories of land, landowners and land users (possession and temporary use)	Total area (ha)	including:						
		Arable lands (ha)		Perennial plantations (ha)			Hay fields (ha)	Pastures (ha)
		total (ha)	of them irrigated	total (ha)	Of them:			
					Orchards (ha)	vineyards (ha)		
Agricultural lands	394351	85487	77527	9164	5338	3716	15118	278197
Land of citizens for farming	315803	63130	57781	5170	4194	976	13057	233988
Average size of 1 PF	23,1	4,6	5,3	0,4	0,3	0,07	0,9	17,1
Lands of economic partnerships and joint-stock companies	58359	17298	15310	2563	34	2529	1556	31594
Average size of 1 LLP and JSC	367,0	108,8	166,4	16,1	0,2	15,9	9,8	198,7
Land of agricultural cooperatives	17285	4181	3565	368	167	201	505	12181
Average size of 1 cooperative	480,1	116,1	169,8	10,2	4,6	5,6	14,0	338,4
<i>Note.</i> Compiled by the authors according to the data of the Land Relations Department of Enbekshikazakh district, for 2016.								

In the structure of agricultural land use, the largest share belongs to peasant farms - 80.1%, LLP and JSC - 14.8%, and PC - 4.4%. The average size per one PF -23.1 ha, which indicates the small land area, and the average size per cooperative - 480.1 ha which is higher than one LLP and JSC. Land users (PF, LLP, PC) in the district are highly specialized, and there is no rational combination of sectors.

Specialization is represented by a diversified structure. In the structure of the sown area, specific weight is as follows: 40.2% - cereals, 15.4% - oilseeds, and 5.4% - perennial plants. In addition, a large share in production have fruits and berries. Of the total production volume of fruits and berries, 5.3% are stone fruit and pome fruits.

The main criterion characterizing the marginal (minimal) size of peasant farms is its annual turnover - gross production of goods (gross income) in monetary terms, which determines the level of competitiveness. The level of intensity and efficiency of land use is determined by the index of gross (sold) production per 100 ha of farmland (table 4).

The gross output of agriculture increased by 9.1% per year.

For example, LLP "Fresh Fruit Kazakhstan" has a land area of 60 ha. Agricultural land - 60 ha, including perennial plantations - 40 ha. Irrigated - 40 ha, of which stone fruits- 10 ha, pome - 30 ha. The annual profit, total - 803 thousand Tenge.

Table 4 – Comparative indicators of the efficient use of farmland in Enbekshikazakh district for 2015- 2016, mln Tenge

Index	2015	2016	2016 to 2015., %
Gross agricultural production, million tenge	72414,7	79209,4	109%
Area of agricultural land, thousand hectares	785787	785798	100%
Area of arable land, thousand hectares	164993	170096	103%
per 100 hectares of farmland, million tenge	921,6	1008,0	109%
per 100 hectares of arable land	413	465,7	113%
<i>Note.</i> Compiled by the authors according to the data of the Land Relations Department of Enbekshikazakh district for 2015-2016.			



LLP JSC "Issyk Wine Plant" -agricultural land is 350 ha, including perennial plantations - 280 ha, of which 280 ha are irrigated. The annual profit, total - 1079 thous. tenge.

By group of peasant farms of Enbekshikazakh district the indicators are as follows: PF "Rafikov" - the area from 11 to 20 h, PF "Aldazharova" from 41 to 50 ha were accepted, the "Shimgambaev" farm - from 51 to 100 ha, "Aidarbaev" farm over 100 ha.

Analysis of the financial situation of the PF of Enbekshikazakh district shows that the medium-sized farms (from 31 to 40 ha) have the most high profit which is 5286 thous. Tenge and large (over 40 ha) - 5931 thous. tenge.

In a number of certain territories, as a result of heavy soil exploitation, due to the severe anthropogenic impact in recent years, there is the depletion of soils, a sharp drop in soil fertility, which is irrational, since fertility can be restored very slowly.

Processes and phenomena that reduce soil fertility, destroying land resources of the country can be divided into 4 groups:

- natural processes, the adverse effect of which on soil surface cannot be prevented. These are earthquakes, mudflows, floods, etc.;

- natural processes that a person can prevent to some extent or reduce the negative impact on soil. For example, soil wind and water erosion, salinization of soils due to the lack of engineering structures associated with functioning of drainage system, flushing and erosion of soils on slopes due to improper tillage of crop rotation fields;

- natural processes, the intensive manifestation of which is due to unreasonable human economic activity. This is the degradation of land due to the high pressure of livestock, desertification of the territory, due to deforestation, intensive flushing and erosion of soil surface runoff of temporary water flows, salinization of soil associated with excessive irrigation;

- phenomena entirely related to human economic activity.

Information and advisory services and scientific provision, training and upgrading courses of farmers are very important for the further development of peasant farms. In order to meet the needs of peasant farms, cooperatives and other agricultural producers in information and advisory services, it is necessary to establish a single information and advisory service, including sectoral and regional centers with a network of district consultants, as well as relevant units in the government bodies of the agro-industrial complex. The information and advisory service should assist in mastering the achievements of science and technology, advanced production technologies, in marketing, economics of cooperation, social and legal protection [6].

Agricultural research institutions will expand studies on economic, legal, technological and social problems of farming and development of agricultural cooperation, they should develop optimal models of peasant farms and cooperatives of different production specialization, taking into account the natural and economic zones. It is important to expand training and professional development of farmers and cooperative workers, including loan and insurance cooperatives.

**Conclusions.** The assessment of the efficient land use in small peasant farms of fruit and vegetable specialization using the index method has made it possible to identify groups that can withstand a sufficient level of competitiveness in case of the use of innovative technologies in irrigated lands and increase of government support measures.

The index of the efficient land use, labor productivity, technical equipment in all groups, recommended peasant farms is approximate or equal to 1. Thus, these peasant farms can withstand competition if public support measures will be increased and, first of all, subsidies for drip irrigation, mineral fertilizers, plant protection, as well as providing preferential loans for leasing of machinery and equipment [7].

Many cost types are determined comprehensively for the whole farm (fuel and lubricants, depreciation and current repair of machinery, etc.), and are transferred in respective shares for each crop.

In this regard, priority tasks include conservation of productive agricultural lands, optimization of arable land and sown areas by quantitative and qualitative characteristics of land.

The solution of these tasks is related to the improvement of technologies of maintaining and increasing bioproductivity of agricultural lands, the development of technologies of rational land management, land use and land protection, establishing the effective organizational and legal mechanisms of agricultural land management, and the development of public monitoring of agricultural lands.

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### **ЖҰМЫС ІСТЕП ТҰРҒАН АГРОҚҰРЫЛЫМДАРДЫҢ ЖЕР ПАЙДАЛАНУ АУМАҒЫНДА ЖЕРДІ ПАЙДАЛАНУ ТИІМДІЛІГІН БАҒАЛАУ**

**Аннотация.** Мақалада құрылымдық және ресурстық көрсеткіштерді есепке ала отырып, көп секторлы экономикада ауыл шаруашылық жерлерін тиімді пайдаланудың анықтау әдістемесі қарастырылды. Шаруа қожалықтарының болашақтағы жұмысын оңтайландыру мақсатында жер қатынастары жүйесін жетілдіру қажеттілігі қарастырылады. Аграрлық бизнестің өнімдік тиімділігін арттыру үдерісінде жер учаскелерінің оңтайлы мөлшеріне жету қажеттілігі негізделген. Зерттеулер көрсеткендей, жерді пайдаланудың экономикалық тиімділігін бағалау әдістемесі кез келген кәсіпкерлік субъектісіне пайдалануда өте қарапайым болуы керек. Сондай-ақ, жерді тиімді пайдаланудың кез келген әдістерінде экономикалық бағалаудың барлық құндық көрсеткіштерінің бірден бір маңызды кезеңі болып, олардың тәуекелділігі және инфляциясы арқылы қарастырылуы тиіс. Бағаларына өзгеріс енгізу қажет, өйткені сатылған өнімнің бағасы кәсіпорынның жалпы кірісін анықтау үшін сатып алынған баға есебімен есептеледі.

**Түйін сөздер:** агроқұрылымдар, тиімділігі, ауыл шаруашылығының жалпы өнімі, ауыл шаруашылығы мақсатындағы жерді ұтымды пайдалану, жерді оңтайлы пайдалану.

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### **ОЦЕНКА ЭФФЕКТИВНОСТИ ИСПОЛЬЗОВАНИЯ ЗЕМЕЛЬ В ГРАНИЦАХ ЗЕМЛЕПОЛЬЗОВАНИЙ ДЕЙСТВУЮЩИХ АГРОФОРМИРОВАНИЙ**

**Аннотация.** В статье рассмотрена методика определения эффективности использования земель сельскохозяйственного назначения в условиях многоукладной экономики с учетом структурных и ресурсных показателей. Рассмотрена необходимость совершенствования системы земельных отношений крестьянских

(фермерских) хозяйств в целях оптимизации их деятельности на перспективу. Обоснована необходимость достижения оптимальных размеров земельных площадей в процессе роста доходности аграрного бизнеса. Исследования показали, что методика оценки экономической эффективности использования земли должна быть достаточно проста в применении к любым хозяйствующим субъектом. Также одним из важных моментов является то, что все стоимостные показатели, используемые в любых методиках оценки экономической эффективности использования земли, должны рассматриваться с учетом инфляции и риска. Необходимо вносить коррективы в цены, т.к. стоимость реализованной продукции рассчитывается с учетом закупочных цен для определения общего дохода предприятия.

**Ключевые слова:** агроформирования, эффективность, валовая продукция сельского хозяйства, рациональное использование сельхозугодий, оптимальное землепользование.

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