# ISSN 2181-9408



Scientific and technical journal

# Sustainable Agriculture

# №2(18).2023







#### **Chief Editor**

Salohiddinov Abdulkhakim Vice-rector for international cooperation Professor at "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" National Research University, Doctor of technical sciences

#### **Scientific Editor**

Yunusov Iskandar

PhD, "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers"

National Research University

Editor

Hodjaev Saidakram

Associate professor at "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" National Research University, Doctor of technical sciences

Candidate of technical sciences

#### EDITORIAL TEAM:

**S.Umurzakov**, PhD, Deputy Prime-Minister for Investments and Foreign Economic Affairs - Minister of Investments and Foreign Trade of the Republic of Uzbekistan; **SH.Khamraev**, PhD, minister, Ministry of the Water Resources of the Republic of Uzbekistan; **H.Ishanov**, PhD, chief specialist, Cabinet Ministers of the Republic of Uzbekistan; **Dr.Prof.B.Mirzayev**, Rector of "TIIAME" NRU; **Dr.Prof. A.Pulatov**, Vice-rector for research and innovations, "TIIAME" NRU; **Dr.Prof. A.Pulatov**, PhD, associate professor, "TIIAME" NRU; **B.Pulatov**, PhD, "TIIAME" NRU; **G.Bekmirzaev**, PhD, "TIIAME"NRU; **M.Amonov**, PhD, associate professor, "TIIAME" NRU; **Sh.Khasanov**, PhD, associate professor, "TIIAME" NRU; **D.Prof. N.Khushmatov**, Chief Scientific Secretary of the Agricultural and Food Supply Production Center; **Sh.Murodov**, PhD, "TIIAME" NRU; **Dr.Prof. O.Tursunov**, "TIIAME" NRU; **M.Juliev**, PhD, "TIIAME" NRU; **Dr.Prof. A.Karimov**, "TIIAME" NRU.

#### **EDITORIAL COUNCIL:**

Dr.Prof.N.Vatin, Peter the Great St. Petersburg Polytechnic University, (Russia); Dr.Prof.Y.Ivanov, Russian State Agrarian University - Moscow Timiryazev Agricultural Academy, executive director of Engineering and Land Reclamation named after A.N. Kostyakov, (Russia); Dr.Prof.D.Kozlov, Moscow State University of Civil Engineering - Head of the Department Hydraulics and Hydraulic Engineering Construction of the Institute of Hydraulic Engineering and Hydropower Engineering, (Russia); D.Ziganshina, PhD, Scientific Information Center of Interstate Commission for Water Coordination in Central Asia; J.Lubos, associate professor at "Department of Water Recourses and Environmental Engineering" of Slovak University of Agriculture in Nitra, (Slovak); Acad.Dr.Prof.P.Kovalenko, National Academy of Agricultural Sciences of Ukraine, Advisor to the Director of the Research Institute of Melioration and Water Resources, (Ukraine); Prof.N.Xanov, Head of the Department of Hydraulic Structures RSAU – MAA named after K.A.Timiryazev, (Russia); Krishna Chandra Prasad Sah, PhD, M.E., B.E. (Civil Engineering), M.A. (Sociology) Irrigation and Water Resources Specialist. Director: Chandra Engineering Consultants, Mills Area, (Janakpur, Nepal); Dr.Prof.A.Ainabekov, Department Mechanics and mechanical engineering, South Kazakhstan State University named after M.Auezov, (Kazakhstan); Acad.Dr.Prof.T.Espolov, National academy of sciences of Kazakhstan, Vice-President of NAS RK, (Kazakhstan); I.Abdullaev, PhD, the Regional Environmental Center for Central Asia, Executive Director; Sh.Rakhmatullaev, PhD, Water Management Specialist at World Bank Group; A.Hamidov, PhD, Leibniz Centre for Agricultural Landscape Research ZALF, (Germany); A.Hamidov, PhD, Leibniz Centre for Agricultural Landscape Research ZALF, (Germany). A.Gafurov, PhD, Research scientist at the department of hydrology, GFZ Potsdam (Germany). Dr,Prof. Martin Petrick, Justus-Liebig-Universität Gießen JLU Institute of Agricultural Policy and Market Research; Eldiiar Duulatov, PhD, Research Fellow, Institute of Geology, National Academy of Sciences, Kyrgyzstan; Gisela Domej, University of Milan-Bikokka Professor of Earth and Environmental Sciences, Italy; Moldamuratov Jangazy Nurjanovich, PhD, Taraz Regional University named after M.Kh. Dulati, Head of the Department of "Materials Production and Construction", Associate Professor, Kazakhstan; Muminov Abulkosim Omankulovich, Candidate of Geographical Sciences, Senior Lecturer, Department of Meteorology and Climatology, Faculty of Physics, National University of Tajikistan. Tajikistan; Mirzoxonova Sitora Oltiboevna, Candidate of Technical Sciences, Senior Lecturer, Department of Meteorology and Climatology, Faculty of Physics. National University of Tajikistan: Tajikistan; Ismail Mondial, Professor of Foreign Doctoral Faculty, University of Calcutta, India; Isanova Gulnura Tolegenovna, PhD, Associate Professor of Soil Ecology, Research Institute of Soil Science and Agrochemistry named after UUUspanov, Leading Researcher, Kazakhstan; Komissarov Mixail, PhD, Ufa Institute of Biology, Senior Research Fellow, Soil Science Laboratory, Russia; Ayad M. Fadxil Al-Quraishi, PhD, Tishk International University, Faculty of Engineering, Professor of Civil Engineering, Iraq; Undrakh-Od Baatar, Head of the Central Asian Soil Science Society, Professor, Mongolia; N.Djanibekov, Dr, External Environment for Agriculture and Policy Analysis (Agricultural Policy), Leibniz Institute of Agricultural Development in Transition Economies (IAMO) Theodor-Lieser-Str. 2 06120 Halle (Saale) Germany; A.Karimov, Dr, Head of the ICBA Regional representative office for Central Asia and South Caucasus.;

#### Designer: Dilmurod Akbarov.

2

Note: Only the authors of the article are responsible for the content and materials of the article. The editorial board does not respond to the content of the article!

Founder: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers Our address: 39, Kari-Niyaziy str., Tashkent 100000 Uzbekistan, www. sa.tiiame.uz

The journal "Sustainable Agriculture" is registered in the Press Agency of Uzbekistan on the 12<sup>th</sup> of February in 2018 (license № 0957).

In 2019, the journal is included in the list of recommended scientific publications by the Higher Attestation Commission of the Republic of Uzbekistan.

3

## ARCHITECTURE. LANDSCAPE ARCHITECTURE

O.Rozikulova, N.Teshaev Determination of air temperature in agricultural land based on remote sensing and GIS data in the case of Jizzakh region
A.Jumanov, Sh.Daminova Monitoring of soil erosion in the Yakkabog river basin and its impact on agricultural areas7
T.Shavazov, A.Ashurov, J.Yoqubov Analysis of the melting of glaciers in the territory of the republic of Tajikistan based on remote sensing technologies
A.Jumanov Global consequences of land use
M.Rajapboev, N.Teshaev, J.Yoqubov <b>Programming of geodetic observations for sediments of engineering structures18</b>
M.Rajapboev, N.Teshaev Determination of the refractive index of air when measuring lines with light sensors in geodetic networks
POWER ENGINEERING, ELECTRICAL ENGINEERING, AUTOMATICS. COMPUTING TECHNOLOGY.
P.I.Kalandarov, A.N.Khayitov Stages of automation of grain processing24
D.Kuchkarova, B.Ismatov, Sh.Suyunov Algoritms for using geometric modelling methods in creating project drawings of hydrotechnical constructions27
M.Ismailov, E.Ozodov Development mathematic model of automatic control system of water purification process
D.Abdullaeva Method of automatic irrigation and control of the root system of growing hydroponic green forage
A.Sh.Arifjanov., A.A.Abdugʻaniyev., A.M.Nigʻmatov., R.F.Yunusov Intelligent system for monitoring the irrigation process based on the Internet
A.Nig'matov, D.Yulchiev Automatic monitoring and control of groundwater level
A.Nig'matov, D.Yulchiev <b>Automatic monitoring and control of groundwater level42</b> ENVIRONMENTAL PROTECTION. WATER MANAGEMENT, HYDROLOGY
Automatic monitoring and control of groundwater level42
Automatic monitoring and control of groundwater level
Automatic monitoring and control of groundwater level
Automatic monitoring and control of groundwater level
Automatic monitoring and control of groundwater level

I.Yunusov Conceptual directions for the development of fisheries58
A.Suvanov Regional development of beekeeping62
N.Usarova Strategies for enhancing the marketing system in Uzbekistan's agriculture sector65
A.Suvanov, B.Sultanov <b>The importance of a beeкeeping to our food supply</b> 68
U. Khabibullaeva Foreign experiences in sphere of citrus production70
O'.Islomov, M.Inoyatova, N.Abdurazakova Economic efficiency of land use
M.Ismailov, O.Ismailov, S.Mirzakhalilov Remote monitoring of athlete's blood pressure during training or competition based on artificial intelligence algorithms
D. Abduvakhobova Study of Babur period in Pakistan (short historiographical analysis)
Sh.A.Mirzaev, Sh.S. Gaziev Features of the islamic financial system and its importance in mitigating the acute political conflict of capitalism81
I.Kamoliddinov Strategic directions for increasing the efficiency of business activity in economic development86
S.S. Khodjaev, M.A.Malikova, K.S.Gerts Elements of "digital technology" in test-based knowledge assessment at higher education institutions of Uzbekistan
U.Nulloev, G.Eshchanova Improvement of students oral speech through increasing the interest to the overseas culture91

## **ECONOMIC EFFICIENCY OF LAND USE**

U.Islomov - Associate professor, M.Inoyatova - PhD student, N.Abdurazakova - Associate professor "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" National Research University

Abstract

The earth is the source of the wealth of society, the natural basis for the creation of the material wealth of mankind and the provision of raw materials for production. In the process of production of material goods, the land participates as a base and a mean of production. Central Asia presently undergo distinct political, economic and social transformations due to the collapse of socialism. However, the level of associated reforms varies substantially across the region and, most probably, the countries will follow different post-socialist developmental paths.

Keywords: Land, market economy, land quality, effective use of land resources, irrigated land, dry land, land allocated to industry, transport, and service sectors.

#### 

ntroduction. In the years of independence, the effectiveness of rational and efficient use of land has developed in our republic, the development of the market economy has opened the way for people to use land effectively. This situation strengthened the role of land as an important object of socio-economic relations in the society. Decree of the President of the Republic of Uzbekistan No. PF-6061 of September 7, 2020 (On measures to fundamentally improve the system of land accounting and state Cadastres) and No. PQ-4819 of September 7, 2020 (Organizing the activities of the Cadastre Agency under the State Tax Committee of the Republic of Uzbekistan According to the Decision (Uzdavergeodezkadastr) on the basis of the state committee, the Cadastre Agency under the State Tax Committee of the Republic of Uzbekistan was established. [1;2]

The new laws, adopted in the mid-1990s, formally established democratic states with market economies. They have provided for the distribution of powers among the executive, legislative and judicial branches of the government. In reality, the balance of real political power has been skewed in favor of the executive branches controlled by the heads of states. The latter almost unilaterally make key political and economic decisions in most countries (EP, 2005). However, the centralization of political power varies significantly across the region.

Table 1	The different levels of centralization of political power in the region
---------	---

	The levels of centralization						
Country	Extremely high	Very high	High	Moderate*			
Georgia				$\checkmark$			
Kyrgyzstan Armenia			$\checkmark$	$\checkmark$			
Kazakhstan			$\checkmark$				
Tajikistan			$\checkmark$				
Azerbaijan		$\checkmark$					
Uzbekistan		$\checkmark$					
Turkmenistan	$\checkmark$						

Note: \*Recent political events in Kyrgyzstan are taken into account Source: EP, 2005

Today, land use in our republic has a multi-functional and multi-purpose features. Multipurpose use of land is reflected in the unified land reserves. According to that, the land fund is divided into 8 categories. Depending on the purpose of further defining land use, each category of land itself is classified accordingly. In this, they receive a certain content depending on their target nature. In turn, with the development of society, the requirements for the multi-purpose nature of land use become more complex, the forms and character of land use change, this situation determines its dialectical nature, characterizes it as a constantly developing process. The main aspects of land use are the following: social, economic, recreational and ecological.

There is productive and non-productive social,

recreational, nature conservation consumption of land as a resource in society. This, in turn, determines the respective differences in land use methods. Productive uses Economic and ecological efficiency is associated with nonproductive-mainly social-recreational and ecological uses. The first includes agricultural and industrial-production methods of land use, and the second includes methods of using land as an operational base without economic efficiency. Depending on the aspects and methods of land use, it becomes the main means of production in the society, the breadth of the operational base, and the quality of goods. [3]

The agricultural method is related to the use of the soil layer of the land to grow agricultural crops. Here land comes as the main means of production. In turn, it can be divided into methods of land use by the types of technologies of planting working crops, perennial tree plantations, and using pasture land without working, irrigated farming and dry farming.

The industrial-production method envisages adaptation of land plots in terms of width in order to place industrial, transport, service sectors and trade objects in the period of their existence and to keep them stationary. In this place, land will exist as a primary condition of production, as a means of production. Industrial and transport facilities are often considered regime generators, whose normal operation mode requires the creation of a region.

Discussion and methods

In the conditions where the land market exists, it is important to distinguish the commercial method of its use. The sale of land plots is related to the economic benefit of the participants of the action, as well as the duty for the state registration of the rights to the land plots. The evaluation of lands with different target nature is related to the nature of their target use and the types of efficiency obtained. One or another method of land evaluation is chosen depending on the purpose of land use and types of efficiency. We will consider the types of land use efficiency in terms of different purposes. [6;7;9]

Land use in agriculture and forestry is related to harvesting and timber from agricultural crops, that is, economic efficiency and appropriate income from land use. At the same time, the annual use of the soil reduces its productivity, and its work is associated with changes in its mechanical order, water-weather mode, that is, it leads to the deterioration of the ecological condition. Land use in agriculture and forestry is related to economic efficiency as well as ecological efficiency, both types of efficiency can be positive or negative. The availability of economic efficiency of land use allows the use of the income method in the assessment of land of this purpose. Currently observed differences in political-economic systems and levels of reforms across the region may provide insights into the potential consequences of certain macro-level development options and their impacts upon forest management. Namely, the degree of political freedom and the strength of a civil society, as well as the level of economic diversification appear to be positively correlated with the quality of forest management. Therefore, these two major factors could be used in determining future development options in terms of their impact upon forests (see Figure 1).

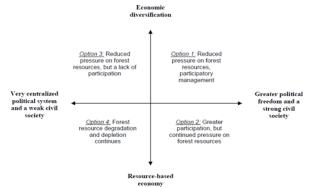


Figure 1. Possible future macro-level development options affecting the forestry sector.

As it can be seen, Option 1 appears to be most desirable in terms of sustainable and participatory forest management. In contrast, the diametrically opposite Option 4 is basically the continuation of the present situation (i.e. business as usual). The remaining two options are apparently better than the fourth option, although they fail to fully promote sustainable forest management. For instance, despite reduced pressure on forests (Option 3), the lack of public participation may result in the failure to meet public expectations regarding forest management.

It should be mentioned, however, that Options 3 and 4 seem less likely to occur. For instance, democratic societies tend to favour economic diversification and reduce the pressure upon natural resources (including wood and non-wood forest products). In contrast, highly centralized political systems with limited transparency usually result in excessive natural resource exploitation aimed at increased currency revenues. Such systems are not sustainable in the long term. Nevertheless, for the purpose of comparison, it is worth to include these options as possible alternatives. Finally, more detailed evaluation of the future development options/scenarios and their impact upon forests is a subject for further research in its own right.

Dekhans (smallholders or peasant farmers) received a subsidiary plot of about 0.13ha, and although each household was entitled to private land, in provinces where population density was high, this was not possible (Kandiyoti, 2003). Of our four sites, Andijan is the most densely populated followed by Samarkand (Bektemirov and Rahimov, 2001) where families used these plots to grow subsistence crops and produce goods for barter as a way to mitigate the costs of unemployment, late payment, meagre wages, and diminished social protection by the state. An FAO report (2019) indicated that in labour law, women who work in dekhan farms do not receive any kind of protection (such as sick pay, maternity leave or childcare leave). The small-holder economy and the state-led export economy were dependent on one another (Kandiyoti, 1996; Kandiyoti, 2002, 2003) even as land distributed to Dekhans is inheritable and bequeathable and was not affected by subsequent land reform measures (Djanibekov et al., 2012).

Industrial lands are less active in the production process than agricultural lands. Although land exists as a means of production in this place, it is not as primary as agriculture. Nevertheless, even in such a case, there is an economic efficiency of land use, the calculation of the relative income corresponding to the means of production-land here is a rather complicated and little-studied problem. This makes it difficult to assess productive land in a revenue manner.

The above rules regarding the efficiency of the use of industrial land are also valid for the land of trade facilities and service sector facilities. There is also a new economic efficiency here, but the problem of calculating the relative income of the means of production per land is not fixed here either, and as a result, it is difficult to apply the income method to land valuation.

The economic efficiency of land use, the market value of minerals in the domestic or foreign market, and the costs of their production and land recultivation, in turn, depend on the depth of minerals, as well as their relative size. If the value of minerals is an active factor in the efficiency of land use, the cost of their development is a passive factor. In this case, it is also required to determine the relative amount of income corresponding to land as a means of production. This allows us to use the income method in the assessment of land of this purpose. [5;6;7]

The use of transportation land is also related to obtaining economic benefits. For productive purposes, as in all cases of land use, it is a problematic issue to make a profit on land as a means of production. The determination of this indicator allows the use of the income method in the assessment of the target land in question. In terms of market relations, the land market is a specific field of land use, where land plays the role of a commodity. There will be economic efficiency in the implementation of market actions, income from the sale of a plot of land, but the peculiarity of land valuation in this case is that the land market can be primary and secondary. In the first case, only normative methods of assessment can be used, because there is no economic benefit from the sale of land in the creation of the primary market. Here, too, the problem of determining the standard value of the land arises, the amount of income from its future sale is not known and has no justification from the market point of view, and it is practically impossible to apply the income method of assessment. In the second case, the secondary market land and land plot value assessment is determined based on sales of other land plots that took place in the recent period. Therefore, even in this case, the income method of land valuation cannot be used, other similar methods are necessary.

The use of land in the social sphere is related to the use of land under the construction of private houses, preschools, schools, colleges and institutes, polyclinics and hospitals, libraries and other objects of social importance.However, the lack of study of the assessment of the social efficiency of land use makes it difficult to conduct a social assessment of land. If some social objects have a commercial character, for example, paid polyclinics, diagnostic centers, private kindergartens, etc., in such cases there will be economic efficiency as well as social efficiency of land use. [5;6;7]

Conclusion.

Nature conservation reserves, private parks, national parks, national parks and recreation areas-bathing areas, ship stations, forests, mountain slopes, tourist bases, etc.

### ECONOMY. ECONOMIC SCIENCE. OTHER BRANCHES OF THE ECONOMY

are related to the use of land for recreational purposes. Because of this, it is very difficult to evaluate these lands. If it has the character of using objects of recreational importance, in such cases, the use of these lands will have economic benefits as well as recreational benefits. It should be noted that economic, recreational and social efficiency is always accompanied by ecological efficiency in other words, the use of land in any area of society's activity provides at least two types of benefits, one of which is always ecological efficiency. This situation is explained by the fact that the land used by the society as a land resource for various purposes is considered to be the main element of the natural complex at the same time, and its use by the society is reflected in the state of the environment. In particular, the use of land in agriculture is related to the reduction of land productivity and a number of its characteristics, as well as the restoration of soil fertility, the improvement of land melioration conditions. The negative ecological efficiency in the use of nonagricultural land is associated with the destruction of the upper layer of the earth during the construction of various objects, creation of quarries, etc. Melioration of degraded land will have a positive ecological effect. Each type of efficiency has its own natural indicators, and in order to calculate the aggregated efficiency of all organizations, it is necessary to bring them to a single indicator, that is, to make them look like a value. The ability to calculate the combined efficiency of land plots for multi-purpose use allows to evaluate all land plots in an income manner.

#### **References:**

1. Decree of the President of the Republic of Uzbekistan № PR-6061 of September 7, 2020 (On measures to fundamentally improve the system of land accounting and state cadastre management).

2. The regulation "On the procedure for determining the boundaries of administrative-territorial units" approved by the decision of the Cabinet of Ministers of the Republic of Uzbekistan  $N_{2}$  299 dated April 23, 2018.

3. "Regulation on the procedure for correspondence of land resources".

4. "Land Code" of the Republic of Uzbekistan. T: Uzbekistan, 1998.

5. Law of the Republic of Uzbekistan. "On the state land cadastre. T.: Uzbekistan, 1998.

6. Chertovitsky Å.S., Bozorov A.K., Ikhlosov I.I. Fundamentals of land and real estate valuation "Fundamentals of land and real estate valuation". Tashkent, TIMI, 2008

7. Geodetic work in the registration of land plots. http://dx.doi.org/10.26739/2181-9696-2019-4-6

 Allanazarov, O., Khikmatullaev, S., Islamov, U. Maintaining the state cadaster of the territories on the basis of remote sensing materials. E3S Web of Conferences, 2023, 371, 01014. https://www.scopus.com/record/display.
National report 2023.