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THE ISSUE OF METHODOLOGICAL ASPECTS OF ASSESSMENT OF LAND RESOURCES

Abstract. Basis of formation of effectively functioning agricultural production is improvement of the land relations and formation of system of land use, "adequate market economy". Society hasthe great need in transition to essentially new type of economic growth - to the intensive growth of resource-saving type, based on careful use of natural resources, on achievement of ecological equilibrium. In life of society the earth has special, outstanding value. It is the most important condition of existence of mankind, irreplaceable means of satisfaction of the most different requirements: economic, social, esthetic, etc. However, speaking about use of the earth, usually mean its functioning in the sphere of production. Rational use of land resources has the great importance in rural economics and the countries, all over the world. In the spheres of production activity of the person the role of the earth isn't identical. In the industry, transport and cities constructions wereused the base, spatial operational basis for the production placement. More particularly important the earth becomes in mining industry, where it serves as a raw materials source. The process of production and receiving results of production don't depend on the quality of the soil, relief and many other properties, inherent in the earth.

Keywords: earth, land turn, market earth, authorized capital, land plots, alienation of lands, land registry, land use, market economy, ecological equilibrium.

The land capability evaluation characterizes and appraises land development units from a general point of view without taking into consideration the kind of its use. This classification is useful as some soils can be suitable for specific crops and unsuitable for another's; therefore precision of land utilization types is necessary. It cloud be expressed not only in terms of types of crop productions, but also how these specific crops are produced. Land suitability refers to the ability of a portion of land to tolerate the production of crops in a sustainable way. Its evaluation provides information on the constraints and opportunities for the use of the land and therefore guides decisions on optimal utilizations of resources, whose knowledge is an essential prerequisite for land use planning and development. Moreover, such a kind of analysis allows identifying the main limiting factors for the agricultural production and enables decision makers such as land users, land use planners, and agricultural support services to develop a crop management able to overcome such constraints, increasing the productivity. Land could be categorized into spatially distributed agriculture potential zones based on the soil properties, terrain characteristics and analyzing present land use.

Production could be met through systematic survey of the soils, evaluating their potentials for a wide range of land use options and formulating land use plans which were economically viable, socially acceptable and environmentally sound.

To reduce the human influence on natural resources and to identify an appropriate land use, it is essential to carry out scientific land evaluations. Such kind of analysis allows identifying the main limiting factors for the agricultural production and enables decision makers to develop crop managements able to increase the land productivity. Objectives of this study were to develop a GIS based approach for land use suitability assessment which will assist land managers and land use planners to identify areas with physical constraints for a range of nominated land uses. Georeferenced soil survey data and field work observations have been integrated in a GIS based land use suitability assessment for agricultural planning in the different foreign countries, including India. Also, GIS has been used to match the suitability for main crops based on the requirements of the crops and the quality and characteristics of land. Different

land quality parameters, viz. soil texture, depth, erosion, slope, flooding and coarse fragments under various land units were evaluated for the crops. Subsequently all of them were integrated using a sequence of logical operations to generate land suitability and capability maps. Suitability and capability maps for each land use were developed to illustrate these suitability degrees and display the spatial representation of soils suitable for agriculture. It was also found that better land use options could be implemented in different land units as the conventional land evaluation methods suffer from limitation of spatial analysis for the suitability of various crops.

Lands are utilized for multiple purposes. They are mainly used for agriculture, pastures and forestry. Depending on the nature and properties of soils, they are suitable for one or other uses. Based on the capability or limitations, the lands are grouped into eight classes. Among them, the first four classes of lands are used for agriculture or cultivation of crops. These four classes are differentiated based on the extent of soil slope, erosion, depth, structure, soil reaction and drainage. The classes from V to VIII are not capable of supporting cultivation of crops. They are for growing grasses, forestry and supporting wild life. The last four classes are delineated based on problems like stream flow, flooding, ponding, rocky nature, short growing season, snow cover etc.[1, P.3].

Land evaluation is the process of estimating the potential of land for alternative kinds of use. Its basic features are the comparison of the requirements of land use with the resources offered by the land. Land evaluation involves the collection and interpretation of very large amounts of data. Also, land evaluation predictions will be changed with the changes in technology and economic factors. Thus, data concerned with land evaluation must be stored in a way that re-evaluation can readily be made when any or all of these factors change significantly, as techniques improve, and more data become available.In this connection, the approach for land evaluation in the studied area is carried out through two steps; diagnose and rate land limitations and applying the system in view of type, number and degree of limitations.

Finger millet is a promising and well adopted crop for the area. It is highly drought tolerant crop and can be grown throughout the year in India where the temperature is above 15 °C with rainfall ranging from 400 to1000 mm or even more. It can be cultivated in all types of soils ranging from poor to highly fertile soils, though it performs well in fertile and well drained loamy red and lateritic soils. Even alluvial and black soils are suitable if drainage is not a problem. It is highly salt tolerant and can be grown even in strongly alkaline soils [2].

It is the traditional and number one oilseed crop of India as well as the world. It is predominantly a crop of tropical and sub-tropical climates. It comes up well in tracts receiving 625-1250 mm of fairly well distributed rainfall. Alternate spells of dry and wet weather are ideal for this crop. Loose/friable soils facilitate good pod development. Therefore sandy and loamy soils with fairly rich in organic matter are very well suited for this crop. Waterlogging, alkalinity and soils poor in lime greatly affect the pod filling.Rice is a major food staple and a mainstay for the rural population and their food security. It is mainly cultivated by small farmers in holdings of less than 1 hectare. Rice is also a wage commodity for workers in the cash crop or non-agricultural sectors.

Land suitability assessment for agriculture is very important for agriculture development and future planning. Based on that, a land suitability assessment for agriculture purpose has been conducted in order to help decision makers and agriculture development planners. The results showed the suitability of the district for deferent crops in the study area. A suitability map for each land use was developed to illustrate the various degrees of suitability and their spatial representation in the area.

The most important limiting factors in the area are soil texture, gravel, lime, gypsum. In recent years, these attributes have had influence on the land suitability and resulted in changing their moderately suitable class to marginally suitable class. Slope, an important element of landform, plays an important role wherever mechanization is concerned. In order to avoid soil erosion and other problems derived from the use of machinery, only land with slopes below 8° should be used. Fortunately, most of the study area was found suitable with respect to topography; only 10.06% had the steepest slope category and was therefore unsuitable for full-mechanized cultivation [3, P.19].

Each plant species requires definite soil and site conditions for its optimum growth. Although some plants may be found to grow under different soils and extreme agro-ecological conditions, yet not all plants can grow on the same soil and under the same environment. The conspicuous absence of Pinus species in inter-tropical and of eucalyptus in the temperate (cold) regions are examples. Since the availability of both water and plant success and/or failure of any plant species, in a particular area, is

largely determined by these factors. The deep rooted forest or orchard plantations respond differently to soil depth and soil texture.

Mountain societies in Kazakhstan and other Central Asian countries have transitioned from a centrally planned, Soviet mode of land use and management to a de jure and de facto, more decentralized, market-oriented system with new drivers of land degradation and greater socioeconomic, political, and environmental uncertainties. While new opportunities and challenges for sustainable land management (SLM) emerged as a result of the transition, there continues to be a lack of relevant, up-to-date, empirical, rigorously investigated, and adequately documented scientific knowledge particular to these Central Asian mountain societies. The capacity of local research institutions was undermined following the withdrawal of Soviet support, and the emphasis of international research in the past 2 decades has largely been limited to donor project requirements. Further, there are numerous barriers hindering interactions between research and action in policy and implementation domains [4, P.31].

Hard copies of local academic literature are kept in university libraries, public libraries, and the libraries of the respective Academy of Sciences. There is no comprehensive electronic archiving system and therefore no means of conducting thorough keyword searches. We therefore manually reviewed the hardcopy tables of contents of all available issues of relevant journals for the period from 1991 to 2018. As our aim was to identify the articles that were most likely to have undergone an objective peer review, we chose to focus on academic articles in multidisciplinary journals.

Analysis of the publications involved attributing the main content of each document to one type of knowledge based on the categorization of system knowledge, target knowledge, and transformation knowledge and assessing the research type (i.e. disciplinary, multidisciplinary, or trans disciplinary research). Further, the organizational affiliation of authors was analyzed to understand the degree to which collaboration was occurring between authors affiliated with local and international organizations as well as between authors from different types of organization (including academic and nonacademic organizations).

With regard to system links, the majority of all the publications reviewed focus on the impact of changes in land management decisions and practices on ecosystem properties and regimes. There is comparatively little research available on the influence of global factors on social systems and in particular on regional and local land use decisions and practices. This is despite the fact that Kazakhstan became dramatically more integrated into global structures and processes and affected by globalization trends after the collapse of the Soviet Union. There is a similarly small amount of research on global factors affecting ecological systems. Publications attributed to this link focus mainly on climate change and do not consider other drivers (e.g. biochemical, biophysical). But even the impact of climate change on ecosystem structure and properties has been investigated insufficiently, even though the Central Asian region is “particularly vulnerable to climate change” [5, P.17].

Moreover, little is known about the interactions within ecological systems. Only a few international academic publications and no local academic publications examine this link. One reason for this may be that knowledge about interactions within ecological systems requires long-term monitoring, the capacity for which was greatly reduced after the collapse of the Soviet Union. There is a comparatively large amount of research on the link between ecosystem services and human wellbeing; however, there is very little research on theoretical and methodological foundations for ecosystem service valuation. There are also few publications that look into how people respond to changes in ecosystem service provision. Specifically, little has been published on how people at various scales respond to changes in water discharge, an issue that is commonly known to be associated with social-political conflict.

While it may appear that local academic literature, which is focused on agricultural technology and often includes specific recommendations for improved land use practices, aims to help identify or achieve a desired future condition (target and transformation knowledge), the publications concerned create mainly system knowledge because the means to achieve the desired condition are developed without involvement of the intended beneficiaries. As is detailed below, the recommendations given in local academic literature have subsequently been ineffective at facilitating change. It was also found that less than 14% of all publications and none in local academic literature included participatory knowledge generation associated with trans disciplinary research. The lack of stakeholder engagement in local academic research is likely due to the absence of a tradition of trans disciplinary or other participatory research in the region. The lack of stakeholder engagement in international academic research may be due

to short timeframes and language barriers, as well as an emphasis on academic as opposed to applied outputs. As a result, potential end users are not involved in research processes and are subsequently less likely to make use of research outputs, even if they do include practical recommendations [6, P.58].

In addition, many of the technologies recommended in local academic literature were developed on experimental plots at research stations and cannot be transferred easily to farmers' fields or scaled up for implementation across larger areas. This is due to several factors: land users do not have the knowledge or skills to use the newly developed technologies; there are no extension services that can effectively train farmers to implement new technologies, and some technologies are not affordable for farmers from a financial or human resource perspective. Even if research findings are well developed and appropriate, they are not disseminated to land users, practitioners, and decision makers.

The discussion above points to many examples where there is no connection between research and application. Our analysis, however, also found many cases where institutional reforms recommended in the literature have taken place both in Kazakhstan. These reforms highlight that rates of change, especially within social systems, are still high even 2 decades after independence. In such circumstances, stakeholders often have to make decisions quickly and without recourse to a sufficient amount of valid and reliable research or other information. While we recommend improved means of generating and making accessible useful research and other knowledge for informed decision-making, we also acknowledge that many decisions will continue to be made under dynamic and uncertain conditions. Learning how to make decisions under such conditions is just as important as generating and making accessible information to reduce uncertainty [7, P.66].

No matter how advanced science and technology becomes, human beings consistently rely on natural resources for survival and living. Expansive urbanization associated with rapid industrialization places enormous pressure on the Earth's resources, and humans' requirements for resources have surpassed the planet's regeneration capacity since the 1970-s [7, P.67]. Unfortunately, the high ecological pressure in urban areas and almost fully loaded land carrying capacity are even more troublesome as cities continue to experience population expansion, consumption growth, resource overuse, waste and emission accumulation, et al [6, P.64]. Thus, it is essential to determine land carrying capacity (LCC) to ensure the safety of ecosystems and their sustainable development, or at least to slow down the degradation of natural capital.

There are several ways to calculate land carrying capacity LCC, but changing land-use patterns caused by advancing modern lifestyles have complicated the calculation procedure. Due to expansive urbanization, main industries, human population, and wealth are concentrated in city centers, and a majority of human populations occupies a small amount of land area, the locals tend to lose sight of the space and significance for non-commercial agricultural production and ecological protection [7, P.68]. Thus, the concept of agricultural sustainability was integrated into LCC. And it was suggested to improve LCC from feedback of measuring the condition of agricultural sustainability (e.g., the maximum level of sustainable exploitation of human resources) [7, P.69]. Noticing the correlation of land, population, and agriculture with environmental degradation, selected villages in our country to investigate the relationship of combating desertification and agricultural sustainability, aiming to evaluate the land conversion policy's influence on the supply-demand balance in rural communities [8, P.153]. Agro-ecological zoning methodology originated in the 1970-s and was applied as a system to evaluate land for rain-fed and irrigated agriculture, forestry, and grazing. This methodology has been developed by the United Nation's food and agriculture organization (FAO) to assist with land resource assessments for better management and monitoring of these resources. In particular, based on the land productivity potential, such systems are commonly used in developing countries in order to assure food security [8, P.154].

Ecological footprint analysis is known as an effective tool for measuring the sustainable use of natural resources and a land's ability to support human beings [1, P.5]. On the basis of different ecosystem service functions and production characteristics, land is divided into six categories [5, P.20]. Population consumption and waste emissions by corresponding land areas can be normalized so that different land types can be compared with each other. In general, EFA calculations contain two variables, including ecological footprint and bio capacity, which represent the demand and supply, respectively. This method can be used to determine the balance of ecological deficits and ecological surpluses in a time series to estimate LCC, based on which further analysis is made to examine if a city is moving toward or away from sustainability [6]. Along with pioneering studies, researchers and organizations (e.g., the World Wild

Fund for Nature) have revealed wide applications of EFA and periodically publish ecological footprint reports to determine ecological footprints' impacts on different economic zones associated with various governmental and non-governmental agencies.

In this regard there is a question: how to estimate today objectively the cost of the land plots? What factors does the earth price depend on? How to organize estimated activity of land resources?

In the modern conditions of development of national economy one of the global reasons of the organization of estimated activity is the cost of the earth in macroeconomic aspect, and also regulation of the economy in the different states. Assessment of the earth depends on itsparticular importance, management of the state and municipal ownership. The arising practice of estimated activity is economically expedient and important tool in market conditions of development of economy, which allows solving many essential problems.

It has been widely accepted that there is a close relationship between the land use type and water quality. There have been some researches on this relationship from the perspective of the spatial configuration of land use in recent years. The results indicated that there was significant negative correlation between forest land and grassland and the water pollution, and the built-up area had negative impacts on the water quality, while the influence of the cultivated land on the water quality was very complex. Besides, the impacts of the landscape diversity on the indicators of water quality within the watershed were also analyzed, the result of which indicated there was a significant negative relationship between them. The results can provide important scientific reference for the local land use optimization and water pollution control and guidance for the formulation of policies to coordinate the exploitation and protection of the water resource.

The land use within the watershed has great impacts on the water quality of rivers. The water quality of rivers may degrade due to the changes in the land cover patterns within the watershed as human activities increase. Changes in the land cover and land management practices have been regarded as the key influencing factors behind the alteration of the hydrological system, which lead to the change in runoff as well as the water quality.There have been three waves of the research that tried to reveal the effects of the land use and land cover change on the quality of surface water. The researchers have started to study the linkage between land cover and the river water quality in order to investigate the effects of morphological features of watersheds on the turbidity, dissolved oxygen and temperature of the river water since the early 1960-s. The second wave of researches on this topic emerged in the 1970-s, focusing on the analysis at the watershed scale. The third waves of these studies have started to take advantage of the remote sensing, and multivariate analysis to explore the influence of the land cover on the suspended sediment, nutrients and ecological integrity of the stream.

In the conclusion we would like to note that Landscape pattern change is mainly caused by the change in land cover and land use change. The landscape ecologists and other researchers have developed numerous metrics to investigate the effects of the landscape pattern on the ecological processes. The potential impact of the unsustainable use of land resources is increasing. Each parcel of land has a stationary geographic location, while its utilization is optional. The re-adjustment and optimization of land use patterns ought to be encouraged. Spatial reconstruction refers to the combination of various land elements, which can promote the rational and efficient allocation of land resources through a four-layer action framework: the development of unused land, urban renewal, ecological reconstruction, and spatial displacement. The feasibility and validity of these methods are illustrated by practical cases in different provinces in Kazakhstan. Land is an essential resource for humans and our means of production for existence and development. The efficient use of the Earth's finite land is becoming a matter of life or death for humankind. Land use is a complex process with a time orientation and spatial characteristics. Land use problems are identified in both spatial and time dimensions as some land conversions are found to occur at the "wrong" time and locations. People can consciously interfere and guide the evolution of the spatial structure of land use to comply with the requirements of social and economic development. The concept of spatial reconstruction is derived from the field of urban planning and is characterized by a homogeneous urban space transforming into a heterogeneous multiple-use urban space.

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ЖЕР РЕСУРСТАРЫН БАҒАЛАУДЫҢ ӘДІСНАМАЛЫҚ АСПЕКТІЛЕРІ МӘСЕЛЕСІНЕ

Аннотация. Адамзат тарихында жер қоғамның дамуында зор, теңдесіз рөлге ие болды және әліол қызметін атқарып келеді.Жер табиғат пен табиғи ресурс ретінде бүкіл адамзаттың және жалпы қоғамның кәсіпкерлік белсенділігінің бүкіл жүйесінде бірегей ұстанымға ие, бұл оның қайталанбайтын сипаты мен көп функциялы мақсатына байланысты. Жер қатынастары объектісі жер учаскесі болып табылады, оның шекарасы белгіленген және белгіленген тәртіппен расталған жер бетінің бөлігі.Ауыл шаруашылығында жер – әмбебап өндіріс құралы.Бір жағынан, ол еңбек құралы ретінде жұмыс істейді, екінші жағынан - бұл еңбектің пәні.Жердегі заттанған еңбек – бұл қоғамның байлығы, оның қажеттіліктерін қанағаттандыру ғана емес, сонымен қатар оның тәуелсіздігін қамтамасыз етеді. Реформаларды жүргізу барысында Қазақстан Республикасы құрылымдық трансформациямен, нарықтық экономикалық жүйені қалыптастыру мен жұмыс істеу механизмін дамытуға байланысты стандартты және стандартты емес экономикалық мәселелерді шешу қажеттілігіне тап болды.Сонымен бірге, ұзақ мерзімді экономикалық өсуді қамтамасыз ету үшін ұлттық экономикалық жүйенің мәні мен қағидаттарын, республиканың экономикасы дамуының заңдары мен үрдістерін өтпелі кезең жағдайында білу өте маңызды.

Түйін сөздер:жер айналымы, жерді иеленушілер, жер пайдаланушылар, жер нарығы, жерді жалдау, жер учаскесі, жерді бағалау, жердің құнарлылығы, жерді аймақтарға бөлу, жер сапасы.

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К ВОПРОСУ О МЕТОДОЛОГИЧЕСКИХ АСПЕКТАХ ОЦЕНКИ ЗЕМЕЛЬНЫХ РЕСУРСОВ

Аннотация. Основой формирования эффективно функционирующего сельскохозяйственного производства является совершенствование земельных отношений и становление системы землепользования, «адекватной рыночной экономике». Общество остро нуждается в переходе к принципиально новому типу экономического роста - интенсивному росту ресурсосберегающего типа, основанному на бережном использовании природных ресурсов, на достижении экологического равновесия. Особое, выдающееся значение в жизни общества имеет земля. Она является важнейшим условием существования человечества, незаменимым средством удовлетворения самых разных его потребностей - экономических, социально-бытовых, эстетических и т.д. Однако, говоря об использовании земли, обычно имеют в виду её функционирование в сфере производства. Рациональное использование земельных ресурсов имеет большое значение в экономике сельского хозяйства и страны в целом. В сферах производственной деятельности человека роль земли не одинакова. В промышленности, транспорте и градоустройстве она используется как фундамент, как пространственный операционный базис для размещения производства. Более важное значение земля приобретает в добывающей промышленности, где она служит в качестве источника сырья. Здесь процесс производства и получения продукции не зависит от качества почвы, рельефа и многих других свойств, присущих земле.

Ключевые слова: земля, земельныйоборот, рыночный землеоборот, уставной капитал, земельные участки, отчуждение земель, земельный кадастр, землепользование, рыночная экономика, экологическое равновесие.

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