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Integration of environmental problems into economic analyses of state policy of the Republic of Kazakhstan

Nowadays, regulation of water resources consumption is one of the most important task of economic policy in Kazakhstan. Special attention in this problem is paid to the effective use of water in agriculture because this sector is the biggest consumer of water in the country. From the standpoint of the New Public Management methodology the authors examine the implementation of project management tools in regulating environmental policy in Kazakhstan. The focus is done on management of water resources. Within the framework of project management authors tried to measure sustainable regional development. Environmental problems in sphere of water resources management are reflected in the calculation of some indicators for measuring sustainable development of a country. In particular, the authors study the issues of Sustainable Society Index. Based on the analysis and research of the problem areas in ecological management of Kazakhstan, the study attempts to solve theoretical and practical problems of increasing the effectiveness of public management of the region's environmental development.

Keywords: ecologic policy, sustainability, development, regional development, state program, project management, management tools, effectiveness, public management, green economy.

Last years Kazakhstan pays more attention to green economy development. In 2006 in Kazakhstan Presidential Decree No 216 the Concept of Transition of the Republic of Kazakhstan to Sustainable Development for the Period 2007–2024 was adopted [1]. The general goal of the Concept is «to achieve an economic, social, environmental and political balance of the development of the Republic of Kazakhstan as a base for improvement of quality of life and provision for the competitiveness of the country in the long-term period» [2].

For ensuring sustainable development, we should achieve certain level of development that is normally measured by different indicators. One of the most important of them, in our opinion, is water resources (their availability; quality of water; sufficient to drink; renewable water resources).

Nowadays one of the biggest consumers of water resources in a world is agriculture. Agriculture is one of the main sectors of economy and development of rural areas, and, definitely, it is one of the most important goal of economic policy of any state. The Republic of Kazakhstan pays a lot of attention to agricultural sphere too. According to Kazakhstan Agency of Statistics in 2016 in rural area lived 41.5 % from total country population [3]. Effective state regulation of Kazakhstan agriculture important for food security on national and regional level, taking into account that Kazakhstan is one of the leading producers of wheat in CIS countries.

In this case, effective water use in Kazakhstan agriculture is one of the most important aspects not only from economic, but also from environment and social perspectives.

In 2014 Government of Kazakhstan adopted Plan of measures on implementation of state program of water resources management. National Plan on Integrated Water Resources Management and Increasing of Water Efficiency of the Republic of Kazakhstan is one of the most important documents for water management improvement and define priority directions for favourable legal conditions and water resources instruments development. There are several acute problems for effective water use in Kazakhstan: increasing water deficit, pollution of surface and groundwater, huge abnormal amounts of water loss, providing of clean drinking water for population, problems of interstate water allocation and threat of water resources depletion due to climate change [4].

All above problems need competent and efficient state measures for their solving.

Kazakhstan agriculture is the biggest consumer of water among other sectors and depends from irrigation very much. At present, agriculture consumes about 75 % of water resources. Lack of advanced water saving technologies and not sufficient conditions of irrigation system are some of the main problems of effective water use.

Aim of State Program of Water Resources Management of Kazakhstan is water security of the Republic of Kazakhstan providing by improving the efficiency of water resources management. Tasks of the program are:

- 1) guaranteed providing of water resources for the population, the environment and economic sectors through the implementation of water conservation and increase of the volume of available water resources;
- 2) improving of the efficiency of water resource management;
- 3) preservation of water ecologic systems.

Terms of the program are from 2014 to 2020.

Overuse of irrigation wastes water, but also results in very low yields from its crops, a situation that Kazakhstan already experiences. Overuse of water reduces per hectare annual yields directly because the plants are stressed by so much water. It also reduces arable land because of the salinization of soil cause by the overuse of water combined with ineffective drainage. Overuse of water for agriculture also pollutes the water in rivers and other water bodies, including aquifers, by increasing salinity. Additional pollution is caused by insufficient treatment of municipal waste water prior to disposal, unmanaged industrial waste dumping and unregulated solid waste disposal. The above shows that the problem in Kazakhstan is not a resources problem but a management problem. It is well accepted that the management of the water resources of Kazakhstan is at a very low point. A decade of budget and staffing cuts has had a dramatic effect on the ability of the authorities manage water at all. This is immediately apparent simply by looking at the low number of people involved in water management and in the extremely low budgets the water management organizations are allocated by central government.

There are many consequences of a fragmented, sectoral driven, poorly funded, poorly governed water resources management system. A few to highlight in Kazakhstan are:

- The environmental disaster that is the Aral Sea which is an environmental and social disaster, but with the addition of the huge costs associated with attempts to stop or slow the damage and reduce the impact of the problem. Foreign aid support to alleviate the problem amounts to about \$40 million over the 10 years to 2002, with significant additional funds from the Government of Kazakhstan on such projects as the dam separating the North Aral Sea from the rest.

- The concern over Lake Balkash and the potential for a disaster similar to that of the Aral Sea has not led yet to any concrete action to improve the situation, either in terms of stopping the pollution from the copper mining activities and agriculture or to manage Kapshagai Reservoir in an environmentally safe way.

- Continuing of desertification of agricultural lands associated with overuse of water for irrigation, and the consequent drainage problems.

- Poor and deteriorating water quality in most water bodies in Kazakhstan.

- Apparent localized water shortages where the actual total resource is sufficient.

- Irrigation demands that are several times higher than in other regions of the world with similar crops and climates.

- The estimated cost of lost crop production, mainly through poor irrigation efficiency, is \$1.7 billion annually across Central Asia with about \$200 million annually in Kazakhstan. This does not take into account lost land and other damaged ecosystems.

- Vast amounts of money have been spent on large infrastructure which would be unnecessary if managing water demands were given the right attention, and there are further plans to build additional structures.

In short, it is evident that the existing approach to water resources management in Kazakhstan is not working. An integrated approach, in which the river basin is managed holistically, with the participation of water user stakeholders and ensuring environmental sustainability, would resolve many of the above problems.

Like surface water, groundwater also needs to be protected. Much of the groundwater in Kazakhstan is polluted, either by salts from poor irrigation and drainage management, or by organic and chemical contamination due to the dumping of untreated or insufficiently treated municipal wastewater. The pollution problem is exacerbated by unmanaged solid waste disposal.

Very low efficiency of water use, especially in irrigation, is one of the biggest problems in Kazakhstan today. It has consequences for wasting water, for a start, but also [5]:

- damage to the Syr Darya delta wetlands because of overuse of water;
- reduced yields from irrigated agriculture;
- massive costs due to reduced crop yields and unnecessary investments;
- significant problems of drainage water disposal;
- damage to water quality in the rivers and groundwater;
- increasing losses of cultivable land from salinity;
- an important relationship with transboundary issues.

Most of the waste in volumetric terms is in irrigation and most of the environmental damage is also due to poor irrigation practice. Overuse of water causes low crop yields, irreparable damage to agricultural land, saline groundwater which is no longer usable, environmental degradation of the rivers and other water bodies downstream as well as health problems among the local population.

Apart from wasting a valuable resource, the inefficient use of water results in an equally inefficient use of public money, furthers the poverty of farmers, damages the environment and causes loss of soil fertility, land degradation and the reduction of available land for agriculture [6].

Water resources of Kazakhstan are limited compared to many other countries. There is a regional shortage in some river basins, with the result of that there are losses in the fishing industry and agriculture, degradation of lakes, rivers, wetlands.

The main volume of water resources provides surface water in an average of 101 km³ per year. Kazakhstan is similar with Israel and Portugal by the index of depending on the inflow of transboundary rivers from neighbouring countries. This greatly increases the importance of regulating cross-border flows to address existing and potential water problems of the country.

High water losses in agriculture explain by the low efficiency of irrigation systems. Return of water from the unsatisfactory level of operation and their technical condition is less than 1 % of the total intake.

The use of water-saving technology supply and drain the water (drip, sprinkler, discrete) in agriculture is less than 7 % of used irrigated lands or 95.8 thousands hectares.

Due to water pollution water quality is unsatisfactory. In 2012, only 13 out of 88 reservoirs in terms of pollution were classified as «clean». In addition, evidence suggests that over time the level of water pollution is increasing (from 2006 water pollution index rose for 8 large bodies of water) [7].

Fluctuations in the quantity of water consumption are influenced by water availability, as well as the total per capita volumes of renewable fresh water resources available in the RK is higher compared to agricultural and industrial countries such as India and China, but lower than in the countries such as Russia, Brazil and Canada. Currently, 38.6 km³ of the total renewable water resources per year (estimated to be 100.5 km³) are required to maintain environmental flows, to conserve river and lake ecosystems. Annually about 29 km³ of water are lost due to factors such as the lack of necessary infrastructure, processes of evaporation and infiltration within canals and rivers, and the need to ensure compulsory minimum levels of inflow to border states such as China and Russia. In addition, 12.8 km³ of water resources are not guaranteed, due to the natural variability of river runoff levels e.g. lower volumes are available in low water years. Thus, the amounts of available, sustainable and reliable water resources in the RK currently make up 23.2 km³ per year [8].

About 90 % of the territory of the Republic of Kazakhstan relates to arid zone with low humidity and limited water resources. Water availability is 20th. m³/km² and is one of the lowest in Eurasia. Low water availability is limiting factor for natural and land resources development.

Transfer of water resources from remote regions is the matter of future, because of that water issues should be resolved through water saving. This requires programs for water saving technologies, reduction water expenses per production unit, progressive norm introduction. During recent years water availability even became lower because of water deficit and water quality worsening.

Irtys river has highest flow in Kazakhstan but its balance is also tense, besides it is polluted by industrial wastes. While solving Irtys river issues it is necessary to take into account importance of three-sided long-term agreement including water pollution prevention, river flow quality maintenance and diversion volume.

Balkhash lake basin is now in unfavourable conditions due to diversion increase from Ily river and water pollution. Relations with Chinese on this river are still unregulated. Intensive water and land resources use lead to environment degradation and lake itself shrinking. Main direction of problem solution is water saving and flow quality restoration, releases from industry and agriculture stoppage. Water balance maintenance will depend on agreements with Chinese.

Economic reforms in Central Asia have own peculiarities. For example, in Kazakhstan agricultural enterprises are fully privatized, power plants are transferred in long-term lease, preparation is done for distributive network privatization and water resources management is executed at lower administrative level. These factors influence on regional collaboration and should be analysed to determine strategic directions [9].

Water withdrawals increased regularly until the mid-1980s. Over the past two decades withdrawals have slightly decreased in the agricultural sector mainly because of the adoption of water conservation methods, and in industry as a result of the sector's decline since independence.

Water from the Syr Darya, Ili, Chu, Talas and Irtysh rivers is mainly used for irrigation. The most intensive use is in Kyzylorda, South Kazakhstan and Almaty provinces, where 90 percent of overall irrigation water is used.

The aim of the national water-use strategy is to first protect water and implement efficient water-saving technologies in all spheres of water management. This can decrease the volume of water consumed as well as the amount of sewage discharged. National water conservation plans should be systematic for all aspects of water use, thus creating a basis for transition to integrated management of water resources. The main objective of a regional water strategy and policy is the implementation of agreed national activities for preservation of the resource potential of the river system and its ecological security [10].

Distribution of the surface water resources on the territory of the Republic of Kazakhstan is uneven with significant multi-year and annual dynamics. Kazakhstan accounts for about 85.000 rivers, 90 % of them have the length of over 100 km, there are over 48.000 lakes, 21 of them have the surface area of more than 100 km². Moreover, in the country there are around 4.000 water reservoirs and ponds.

Kazakhstan possesses considerable resources of ground water, however their highly uneven distribution over the territory of the country and varying water quality do not allow fully use of them. As a result, out of the total forecasted and explored resources of the ground water only 16.04 km³ are considered available [11].

In Kazakhstan, agriculture accounts for 11 % of the GDP and 14 % of the employment. About 90 % of the farmlands are now in private hands. Subsidies on agricultural inputs, procurement monopolies, and price controls have been removed. The drying up of Aral Sea and the consequent environmental damages are a significant set of problems for Kazakhstan. More than normal winter discharges from the Toktogul reservoir cause flooding on account of frozen waterways and diversion of water to Arnasay depressions. The government is pursuing options to improve waterways and ensure flows in the river to the delta area to mitigate the Aral Sea problem. It is also active in discussions with upstream riparian states to improve the water sharing agreements [12].

Regulation of water resources consumption is one of the most important tasks of economic policy in Kazakhstan. Special attention in this problem is paid to the effective use of water in agriculture because this sector is the biggest consumer of water in the country.

All the mentioned above environmental problems in sphere water resources management are reflected in the calculation of indicators for measuring sustainable development of a country.

So, for this reason the Sustainable Society Index has been developed in 2006 by the Sustainable Society Foundation. It allows determining the overall level of the country's sustainability. This index reflects many aspects, which are presented in Figure.

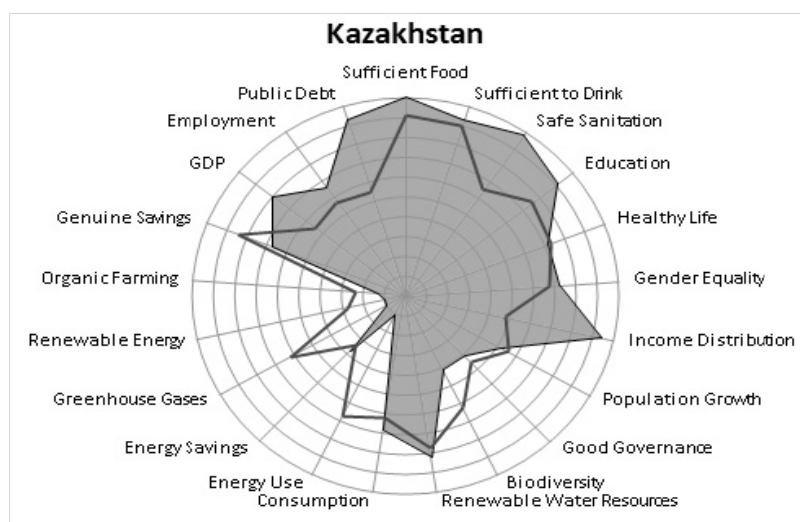


Figure. Sustainable society index in Kazakhstan, 2016

Note. Data is taken from <http://www.ssindex.com/>.

Based on Figure, we highlighted the strengths and weaknesses of the stability of Kazakhstani society. Among the strengths we can allocate a sufficient level of nutrition (Sufficient food), drinking (Sufficient drink), safe sanitation (Safe sanitation) which are named as so-called basic needs. A sufficient level of them is achieved due to high productivity of land (in relation to cereals) and availability of water resources. However, the problem of the effectiveness of the use of agricultural lands and pastures remains unsolved.

Weaknesses are dominated in the ecological and social spheres. This is reflected in the meaning of the following indicators: «Good governance», «Renewable energy», «Organic farming» and «Clean air». The air pollution is caused by the lack of sufficient control from the public authorities over the activities of industrial enterprises. Most enterprises have imperfect technology, morally and physically worn out basic production assets, which contributes to increasing of the number of harmful emissions and discharges into the environment.

Summarizing all the above, we made a SWOT-analysis of the socio-ecological and environmental sphere of the Republic of Kazakhstan, which allows us to identify the strengths and weaknesses, as well as the opportunities and threats that face the country.

Table

SWOT-analysis of social, economic and ecological spheres of Kazakhstan at the modern stage of development

Strengths	Weaknesses
Provision of food; Access to water; Education; Renewable water resources.	Ecological situation (quality of air, water, land resources); Biodiversity; Energy intensity of production; Commodity orientation; Renewable energy sources; Public health; State debt; Public administration.
Opportunities	Threats
Rational development of irrigated agriculture; Departure from the commodity orientation and the development of clusters; Rational use of resources and development of renewable energy sources; Development of human capital.	Deterioration of the ecological situation (land degradation and impoverishment of landscapes, desertification, reduction of soil fertility, reduction of livestock production and crop production, water shortage, air and water pollution, etc.); Deterioration of public health; Increase in public debt; Increase of natural resources used for production and consumption by the population; Reducing the number of animals and plants.

Note. Table is composed by the authors.

Thus, for the transition to green economy and the implementation of the principles of sustainable development, it is necessary to improve the state policy in the field of sustainable development and environmental protection.

Environmental policy of the Republic of Kazakhstan is based on the ecosystem approach, taking into account the territorial division of powers and responsibilities between the participants in the process of public administration. The object of management is the state of the environment in the Republic of Kazakhstan. Man, society, state as a whole are the subject of control over the environment.

Depending on the form of ownership, several models of public administration in the field of environmental protection can be presented: state monopoly on environmental protection (100 percent of state participation in environmental protection), competitive business environment (enterprises competing for efficient use of resources and acquiring rights to emission of harmful substances into the environment) and a mixed management model, which is a combination of the first two models. Accordingly, the chosen model forms the relationship between the central and territorial authorities.

In Kazakhstan, there is a mixed model of public administration in the field of sustainable development and environmental protection, which is represented by a wide range of subjects of governance.

In our opinion, there should be a single government body responsible for regulating the use of natural resources, coordinating the activities of departments, enterprises, organizations and institutions for improving the environment and improving its quality, granting it the appropriate rights and powers, which should lead to exclusion of duplication with other subjects of sustainable development management in Kazakhstan. Nevertheless, this authority should not be either the Ministry of Energy of the Republic of Kazakhstan, or the Ministry of Agriculture, the sphere of supervised issues of which is already sufficiently large. The main task of the Ministry of Agriculture of the Republic of Kazakhstan, in our opinion, is to contribute to ensuring the country's food security, and the Ministry of Energy of the Republic of Kazakhstan in the development of energy.

The current environmental management system played a positive role in the formation of the general government system, when the methods of direct administration had no alternative. As the economy stabilizes, the discrepancy between the current principles of its management and dynamically changing macroeconomic conditions towards the liberal market becomes more and more noticeable.

The next stage in the development of a market economy requires a more perfect management model, including the management of natural resources. This stage is often referred to «innovative», «diversified», «sustainable», «green economy». In addition, although not all these names are synonymous, they have a common basis, known in economics as the «open access economy» or «open economy».

Kazakhstan has already been recognized as a country with a market economy. Moreover, in a great number of parameters — both managerial and socio-economic-environmental our current economic model is still far from the parameters corresponding to the requirements of models with the above-mentioned names.

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Экологиялық мәселелерді Қазақстан Республикасының мемлекеттік саясатының экономикалық талдауына интеграциялау

Бүгінгі таңда су ресурстарын тұтынуды реттеу мәселелері Қазақстанның экономикалық саясатында маңызды орын алады. Ауыл шаруашылығында суды тұтынуға ерекше көңіл бөлінеді, себебі бұл сектор елдегі су ресурстарының ең ірі тұтынушысы болып табылады. Жаңа мемлекеттік басқару әдіснамасы тұрғысынан авторлар Қазақстандағы экологиялық саясатты реттеуде жобаларды басқару құралдарын қолдануды қарастырады. Су ресурстарын басқаруға баса назар аударылды. Жобаны басқару тұжырымдамасы шеңберінде авторлар тұрақты аймақтық дамуды қарастыруға тырысты. Су ресурстары саласындағы экологиялық проблемалар елдің тұрақты даму көрсеткіштерін есептеуде қолданылады. Атап айтқанда, авторлар қоғамның тұрақты даму индексін қарастырды. Зерттеу барысында аймақтағы мемлекеттік су ресурстарын басқару тиімділігін жоғарылатудың теориялық және практикалық мәселелерін шешу бағыттары қарастырылған.

Кілт сөздер: су ресурстары, экологиялық саясат, тұрақтылық, даму, аймақтық дамуы, мемлекеттік бағдарлама, жобалық басқару, басқару құралдары, тиімділігі, мемлекеттік менеджмент, жасыл экономика.

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Интеграция экологических проблем в экономический анализ государственной политики Республики Казахстан

На сегодняшний день вопросы регулирования потребления водных ресурсов занимают важное место в экономической политике Казахстана. Особое внимание уделено потреблению воды в сфере сельского хозяйства, так как данный сектор является самым большим потребителем водных ресурсов в стране. С позиции методологии нового государственного управления авторами исследовано применение инструментов проектного управления в регулировании экологической политики в Казахстане. Акцент в работе сделан на управление водными ресурсами. В рамках концепции проектного менеджмента авторы сделали попытку измерить устойчивое региональное развитие. Экологические проблемы в сфере водных ресурсов применяются при расчёте индикаторов устойчивого развития страны. В частности, авторы рассмотрели индекс устойчивого развития общества. В исследовании предпринята попытка решить теоретические и практические проблемы повышения эффективности государственного управления водными ресурсами региона.

Ключевые слова: экологическая политика, устойчивость, развитие, региональное развитие, государственная программа, проектное управление, инструменты управления, эффективность, государственный менеджмент, «зеленая» экономика.

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