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ECONOMIC AND INSTITUTIONAL ANALYSIS OF THE FEASIBILITY OF PAYMENTS FOR ECOSYSTEM SERVICES IN UKRAINE

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INTRODUCTION

Recently, innovative financing mechanisms have been recognized as essentials for addressing some of the identified failures in environmental management, in particular, Payments for Ecosystem Services (PES). In a situation of high environmental concerns and limited financial resources, PES can generate additional alternative resources, allocate funds to environmentally friendly management practices and sustainable production patterns, create incentives for investments, and increase the involvement of the private sector in environmental protection.

The second meeting of the Working Group on Integrated Water Resources Management, held in Geneva in

June 2006, examined the concept of payment for ecosystem services in terms of integrated water resources management, and proposed to the United Nations Economic Commission for Europe a Draft Code of Conduct on Payments for Ecosystem Services in Integrated Water Resources Management.

“Ecosystem services” literary mean the benefits that people get from nature. According to the Millennium Ecosystem Assessment (2000), all benefits from nature are classified into 4 groups of ecosystem services. These include:

- Provisioning services, being the capacity of ecosystems to provide food, water supply, wood;

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- Regulating services, being the capacity of ecosystems to regulate the climate, floods, diseases, wastes and quality of water;
- Cultural services - recreational, aesthetic and spiritual needs;
- Supporting services, such as soil formation, photosynthesis and nutrients cycle.

The term “investments into ecosystem services” is used in the current analysis to describe the financial and technical investments into restoration, preservation, protection of ecosystems, which are important for the provision of ecosystem services.

The report was developed within the project “Promoting Payments for Ecosystem Services and Related

Sustained Financing Schemes in the Danube Basin”, which is implemented by WWF with the financial support of UNEP through GEF. The report covers:

- Analysis of water policy in Ukraine - implementation of integrated water management in Ukraine and the Ukrainian Danube Basin;
- Structure and dynamics of water consumption, including irrigation;
- Financial mechanisms related to water protection and consumption;
- Measures necessary for the introduction and improvement of economic mechanisms and implementation of PES;
- Examples of potential PES schemes.

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WATER POLICY IN UKRAINE

Ukraine belongs to European countries with poor local water resources, which are distributed very unevenly. The water use efficiency is extremely low, and the water intensity of GDP (water consumed per unit of gross domestic product) is high enough ¹.

The reform of the water management system in Ukraine remains a major subject for discussion by authorities and scientists. The practical implementation of river basin management based on integrity, interrelationship and consistency with economic development, has been under discussion for a long time.

The issues of basin management autonomy related to the priorities of carrying out water management and protection business; attracting investments for the implementation of promising innovative projects; commercialization of public areas of water management remain pending. Principles of interaction between basin management administration and relevant subsections of the Ministry of Environment of Ukraine and other agencies also remain vague, which again creates the same regulatory vacuum for development

of appropriate water management projects, which can dramatically alter the functional orientation of the water use in general and in its different sectors.

The norms of the environmental law, adopted by the Law of Ukraine “On Environmental Protection” ² are the basis of the legal relations in the field of water resources management and protection. The Water Code of Ukraine³, approved by the Resolution of the Verkhovna Rada of Ukraine on June 6, 1995, № 214/95-VR is the basic document regulating the legal relations in the field of water use. According to its provisions, the tasks of water legislation of Ukraine are to regulate legal relationships in order to ensure the conservation, science-based and rational water use for the needs of the society and the economy, water resources recharge, protection of water from pollution, contamination and depletion, prevention of harmful effects of water and mitigation of their consequences, improving the status of water bodies and protection of the water use rights of enterprises, institutions, organizations and individuals ⁴. Ukraine has ratified several international conventions,

¹ Which is also explained by underestimation of GDP of Ukraine because of high rate of shadow economy – up to 40-60% (see <http://ekonomist.kiev.ua/economics/tenevaya-ekonomika-ukrainy.html>)

² <http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=1264-12>

³ <http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=213%2F95-%E2%F0>

⁴ Ibid

in particular, the Convention on Transboundary Watercourses, and declared intention to follow the implementation of the Water Framework Directive 2000/60/EC of the European Union under the Action Plan “Ukraine - EU” approved by the Cabinet of Ministers of Ukraine № 117 – p of 4/22/05 and number 36 - p of 2/12/05.

Depending on the type of economic agents participating in the water use process, the volume of operation and the environmental impacts on water resources, two major groups of water use can be identified: general water use by the general public on common base which is not related to generating any profit and special water use by businesses and individuals.

The management of the general water use on common base is limited to the establishment of sanitary inspection rules, which aim at consumers’ safety,

and rules that prevent environment deterioration as a result of negligent treatment, pollution or contamination of water bodies. It is implemented by the local authorities which agree their management decisions with the governmental agencies for environmental protection, water resources monitoring, sanitary and epidemiologic security.

Water legislation ensures the implementation of a wide range of measures for water protection from pollution, depletion, prevention of the harmful effects of water and elimination of the consequences of disasters.

Special water use is a fence of water from water objects with application of constructions or technical devices, use of water for dump of polluting substances in water objects, including a fence of water and dump of polluting substances with turnaround waters



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Fishing is an important mainstay for local communities.

with application of channels ⁵ .

As to the department structure of water management in Ukraine there are:

- Legislative and representative bodies, local government bodies: performing normative, fiscal, and partly analytical and informational functions (the Verkhovna Rada of Ukraine, the Verkhovna Rada of the Autonomous Republic of Crimea, Kyiv and Sevastopol City Councils, regional councils, rural, village, town and district (in the cities) councils);
- Executive agencies: the Cabinet of Ministers, the Council of Ministers of the Autonomous Republic of Crimea and public administration at regional and local levels (institutional, normative, fiscal functions);
- Specially authorized bodies for the management, conservation and reproduction of water resources (integrated management, implementation of the unified scientific-technical policy, coordination of activities

of ministries, departments, enterprises, institutions and organizations of this area): Ministry of Regional Development, Construction and Communal Living of Ukraine - production and operating of environmental, investment, analytical and information functions; the Ministry of Environment and Natural Resources of Ukraine – executing environmental, analytical and information, investment functions; the State Agency for Water Resources of Ukraine – production and operating of environmental, analytical and information, investment functions (Fig. 1) ⁶ .

The State Agency for Water Resources of Ukraine ⁷ is the central specially authorized body of the executive power in the area of water use and protection, and reproduction of water resources. The main tasks of the Agency are: developing and implementing the state policy for water resources development and land reclamation; surface water resources management, use and reproduction; operating the complex public water facilities, off-farm irrigation and drainage systems.

⁵ Charges for special water use is imposed with the aim of encouraging rational water use and protection, and reproduction of water resources according to the Act of the Cabinet of Ministers of Ukraine №836 of 18.05.99 “On norms of charges for special water use and charges for water use for the needs of the hydropower engineering and the water transport”.

⁶ Tarasova M.L. Organizational and economic mechanism of water resources management in Ukraine – doctoral thesis speciality 08.00.03 – Economy and national economy management, Doneck- 2011-255 pp.

⁷ Clause on State Agency of water resources of Ukraine, approved by the decree of the President of Ukraine of April,13,2011 № 453/2011.

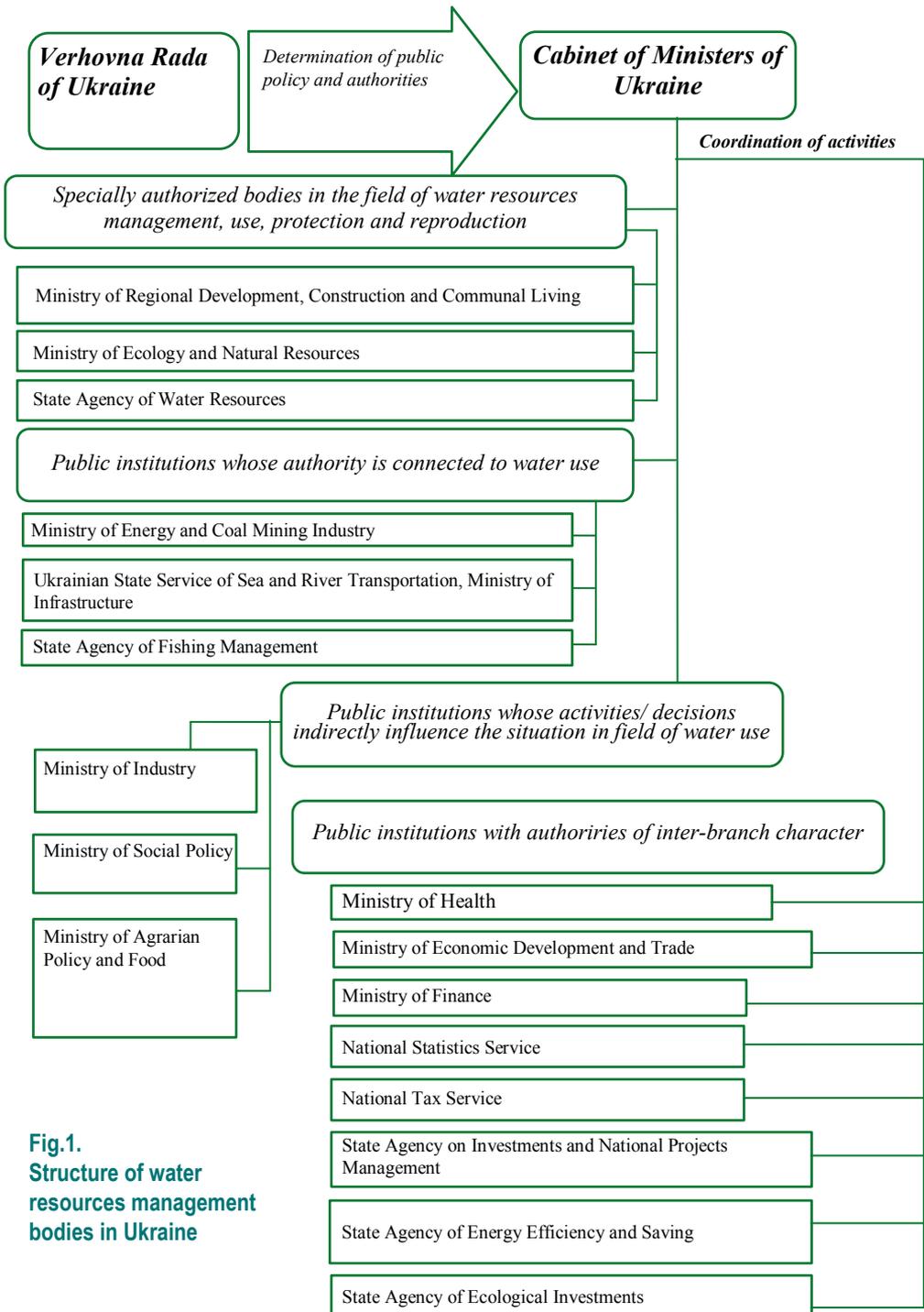


Fig.1.
Structure of water resources management bodies in Ukraine

INTEGRATED WATER RESOURCES MANAGEMENT IN UKRAINE

The implementation of state policy on sustainable development of the water economy is based on strategic objectives including the restoration and protection of water bodies, improvement of the technical and sanitary quality of water economy systems, rational water use. The Ukrainian Law on State Programme of Water Economy Development (№ 2988 - SH from 1/17/02) proposes priority actions which in the future (until 2011) will contribute to the improvement of the environmental status of land reclamation systems, reaching conformity of the water bodies environmental and resource status with the basic standard requirements, which guarantee the safety of the population and achievement of the balance between the levels of anthropogenic impacts on water bodies and their recharge capacity⁸.

The need to implement the principles of river basin management in Ukraine is set in the Water Code of Ukraine. One of the development areas of the water basin management is the

design and introduction of financial mechanism ensuring the direct link between the payments for water use and the funding of water conservation measures within the river basins.

According to the State Agency of Water Resources⁹, nine water basin management agencies (WBMA) (the Dnieper, the Dniester and Prut, the Danube, the Crimean, the Southern Bug, the Seversky Donets, the Western Bug, the Desnyanskiy, the Ros River) and five basin councils (the Dniester, the Danube, the Southern Bug, the Seversky Donets, the Western Bug) should have been set up¹⁰ by 2010.

According to the “Priorities of management reform and protection of water resources for the period 2006 – 2015” the establishment of the basin management agencies for the Tisza, the Pripyat, the Azov Sea, the Upper and Lower Dnieper is planned¹¹. The ecosystem approach to water use, protection and restoration is the most comprehensively laid down in the National project on environmental rehabilitation of the Dnepr river

⁸ Stashuk V.A. Ecological and economic basis of water resources basin management. –Dnipropetrovsk: Publishing House “Zoria”, 2006. – 480pp.

⁹ Site of the State Agency of Water Resources of Ukraine: <http://www.scwm.gov.ua/>

¹⁰ According to the State Agency of Water Resources: http://www.scwm.gov.ua/index.php?option=com_content&task=view&id=2&Itemid=3.

¹¹ Priority directions of reforming of water resources management and protection for the period 2006-2015. Official site of State Committee of Ukraine for Water Economy – 2009. December,27 http://www.scwm.gov.ua/index.php?option=com_content&task=view&id=195&Itemid

basin ¹². What places constraints on the introduction of river basin management approach is imperfect economic mechanisms, funded mainly by the state and the absence of legal framework for the functioning of basin agencies according to The polluter pays and Self-financing and self-sufficiency principles.

Comparative analysis of the managerial functions of the EU river basin agencies and their Ukrainian counterparts shows that they mostly operate in different water use areas. EU river basin agencies work on standardization and financial issues

of water use (charging water users, decisions about loans and grants) and research work (economic analysis of water use within the basin).

Ukrainian basin management agencies work on the direct implementation of water supply (ensuring the needs of the population and sectors of economy in water, implementation of its inter-basins transfer schemes), and on the control of the quality of surface water resources, compliance with environmental laws, as well as providing a number of fee-based services of organizational and consultative nature ¹³.



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Up to 1000 local people are involved in harvesting reed.

¹² Site «UNDP GEF Dnipro Basin Environment Programme». – 2009. – October, 22.

http://www.dnipro-gef.net:80/first_stage-ru/otchety-po-proektam

¹³ Tarasova M.L. Organisational and economic mechanism of water resources management in Ukraine – doctoral thesis speciality 08.00.03 – Economy and national economy management, Doneck - 2011-255pp

INTEGRATED WATER RESOURCE MANAGEMENT IN THE UKRAINIAN PART OF THE DANUBE RIVER BASIN

Reforming the system of water management in the Odessa oblast (region) started with the foundation of the Danube River Basin Water Resources Management Agency (WBMA) in Izmail, responsible for: water resources management of the Ukrainian part of the Danube River Basin within Reni, Bolgrad, Izmail and Kilia districts of the Odessa oblast; operation of the Danube water reservoirs Cahul, Karatal, Kugurluy-Ialpug, Katlabuh and Kilia; operation of hydraulic structures (high-water dams, locks, channels) (Fig. 2).

The Danube River Basin Council was founded in July 2008, in the Danube region of Ukraine, with the support of TACIS project “Improving cross-border cooperation in integrated management of water resources in the Lower Danube Euroregion”.

Representatives of regional and district councils, district administrations, public institutions (Basin Management, Department of Ecology, hydro-meteorological observatory, sanitary and epidemiologic service), water users, scientific and public organizations formed the Basin Board. The Secretariat of Basin Council was established as a permanent working



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Fig. 2. Watersheds in Odessa District

body, on the basis of the Danube WBMA.

In the framework of the TACIS project “Improving cross-border cooperation in integrated management of water resources in the Lower Danube Euroregion” the Management Plan for the Ukrainian part of the basin of the Lower Danube was developed ¹⁴.

The management of the river basin water resources can be implemented on the basis of basin agreement which is the main legal instrument

¹⁴ Dyakov O. Transfer to basin principle of water resources management in the Odessa region: problems and perspectives/ O. Dyakov. - <http://old.niss.gov.ua/Monitor/januar2009/18.htm>

and consolidates the relationship of the contracting parties. As of today, such agreements are concluded on the management of the Danube, as well as the Dniester and Southern Bug rivers.

In this way, in the Odessa region of the Ukrainian Danube region, the first steps towards creating a

system of river basin management have been made; favorable conditions for the implementation of the principles of integrated water resources management in the context of implementation of the Water Framework Directive 200/60 have been created.

WATER USE IN UKRAINE

Over the past 20 years production volumes in Ukraine decreased. The decline was especially notable in the early 90s. This was reflected to some extent in the volume of water withdrawal.

Although the total water withdrawal in 2009 declined in comparison with 1980 by almost 20 billion m³, the high level of transportation losses and the high proportion of discharged waste water remains the manifestation of deterioration in water use ¹⁵ (Fig. 3).

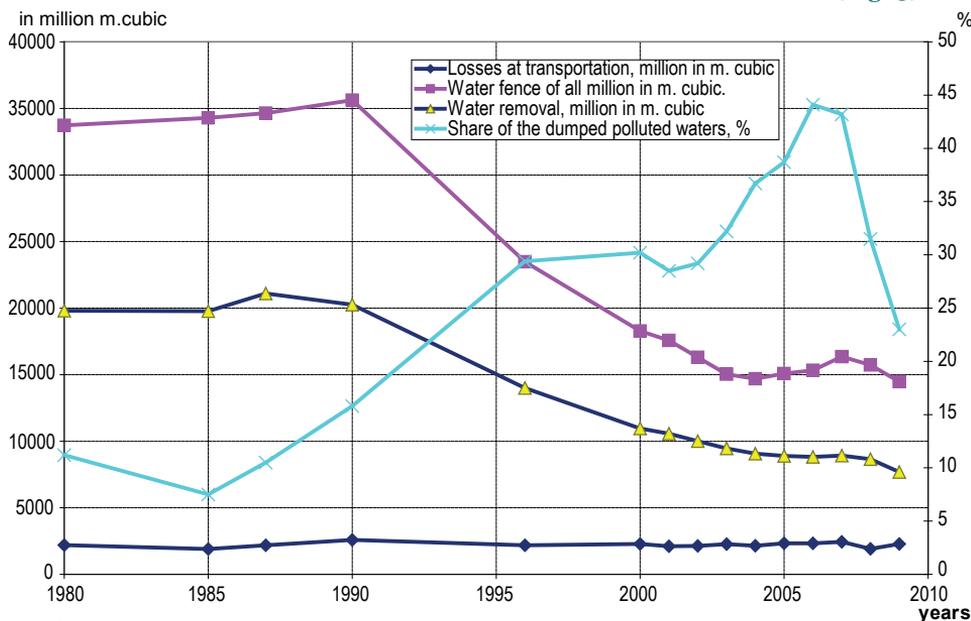


Fig. 3. Characteristics of water withdrawal and discharge in Ukraine

¹⁵ Khvesyk M. GolYan V Rationalization of Water Use in the Modern Civilized Measure: Strategic Choice of Dominant and Institutional Ordonnance Mykhaylo Khvesyk, Vasyl Gol Yan. — The Economist Ukr J. — №4. — 2011 — P.34-35

In 2009, 14 478 million m³ of water was withdrawn from natural sources. Compared to 2008, the total intake decreased by 1 251 million m³, which in turn could be linked to the fall by 15% of Ukraine's GDP under the conditions of the global economic

crisis¹⁶.

The country main water users remain the electric power companies, communal and agricultural companies, and metallurgy (Fig. 4).

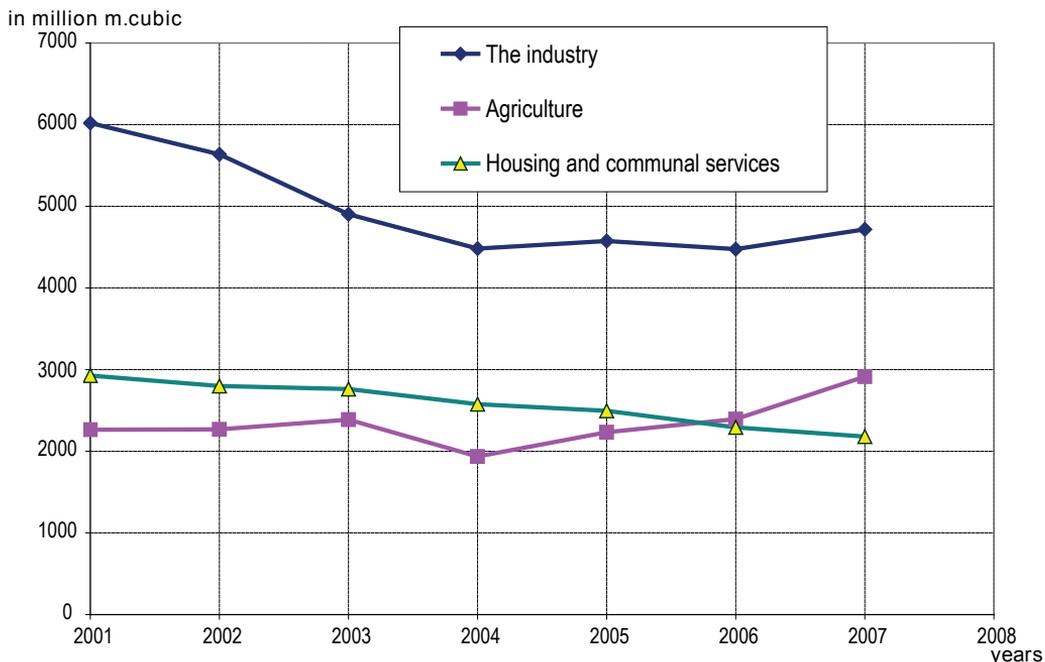


Fig. 4. Dynamics of water use by the main sectors of the economy of Ukraine (excluding marine waters)¹⁷, 2001-2007, mil.m³

¹⁶ Economic crisis in Ukraine (2008-2009) URL: <http://ru.wikipedia.org/?oldid=38626755> (date of address: 22.10.2011).

¹⁷ According to State Agency of Water Resources: <http://www.scwm.gov.ua/>

WATER USE IN THE ODESSA REGION

Water resources of the Odessa region consist of groundwater and surface water. The stocks of surface waters in the region are unevenly distributed. The northern and central parts of the region are characterized by limited reserves, and the southern part related to the basin of the Dniester and the Danube, has a large supply of water.

In 2009, water withdrawal totaled to 2 134.0 million m³, which was 453.0 million m³ less than in 2008. Reduced amount of withdrawal of surface freshwaters in 2009 was mainly due to decrease in the volume of water

transfer in the water exchange carried between the lake Sasyk and the Danube reservoirs and Tatarbunary water canal.

In 2009, 322.6 million m³ of fresh water was used in the region (Fig. 5), including 33.77 million m³ from ground sources, respectively: on housing - 122.0 million m³; on production - 61.12 million m³; on agriculture - 12.21 million m³; on irrigation - 71.29 million m³; on fisheries - 54.63 million m³ and on other sectors - 1.35 million m³.

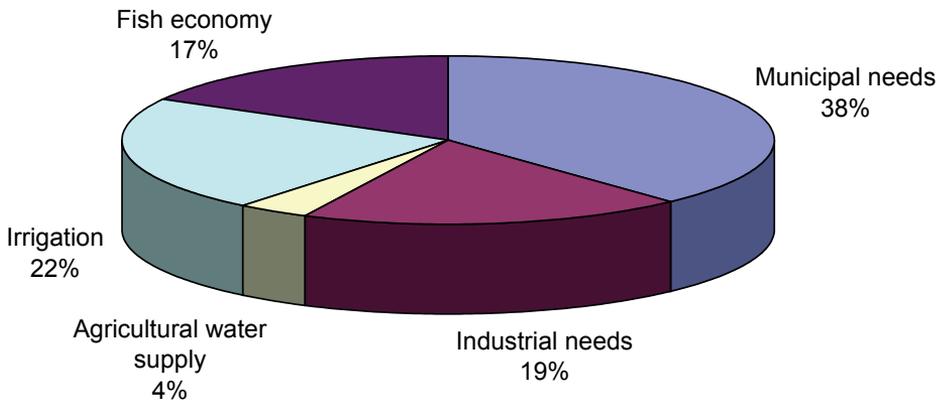


Fig. 5. Structure of water consumption in the Odessa region by economic sectors

In 2009, the volume of water used for housing needs was reduced by 1.5 million m³. The volume of water use increased: for industrial needs - 6.2

million m³, irrigating - 7.5 million m³, agricultural use - 0.02 million m³ (Fig. 6).

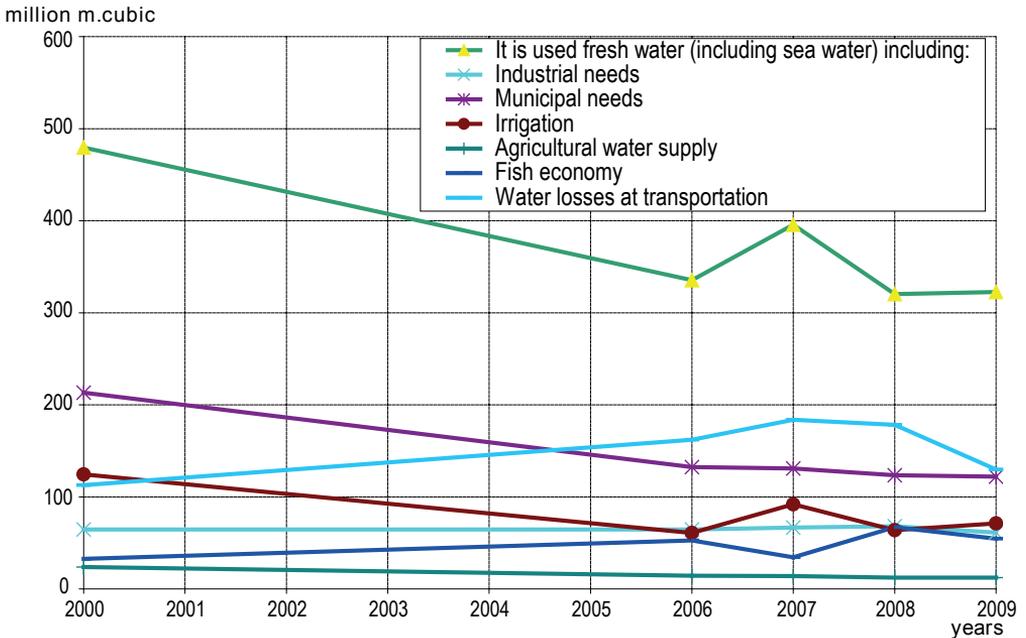


Fig. 6. Dynamics of water use in the Odessa region by economic sectors

UKRAINIAN AGRICULTURAL POLICY AND WATER USE

Ukraine has favorable natural conditions for agricultural production, which is a traditional activity. The absence of land reform, poor logistical support for agriculture, disparities in prices for industrial and agricultural products, state of the social development of rural areas impede the development of agriculture. This has led to deterioration of the capital stock

and equipment in agriculture, and to a decline in production volumes.

In 2000, agriculture in Ukraine improved the dynamics of development, which is associated primarily with the important reforms conducted in this year, as well as with positive effects of devaluation caused by the financial crisis in late 1998 and

early 1999.

According to the Land-Utilization Institute of Ukrainian Academy of Agrarian Sciences ¹⁸ about 3.2 million ha of degraded and unproductive arable land in Ukraine need conservation. This is due to the high level of tilled land, increased area of row crops, straw burning after harvest of cereals, decrease of the use of organic and mineral fertilizers.

The reduced number of livestock led to the decrease in areas under fodder crops, including annual and temporary grass.

According to the State Committee on Land Resources of Ukraine (in 1996), 19 360.4 thousand ha of farmlands were exposed to wind erosion, 13 284.2 thousand ha - to water erosion (the so-called washed earth). Due to erosion, about 11 million tons of humus is lost every year.

The main factor determining significant development of erosion processes in Ukraine is the high intensity of developing agricultural

lands and the use of imperfect farming technologies. Application of organic fertilizers decreased from 257 million tons in 1990 to 12 million tons in 2007, or by nearly 20 times, which created a substantial threat to the preservation of fertility. Due to the dramatic decline in livestock, the use of organic fertilizers per utilized agricultural area decreased 9 times.

The primary issues that need to be solved in agriculture are: conversion to organic farming; increase of the use of mineral and organic fertilizers and pesticides to an optimum level with simultaneous high-quality regulation, observing their necessary territorial, quantitative and qualitative proportions; implementation of soil conservation measures, erosion control measures; eco landscape design and planning of agricultural activities and land use at all hierarchical levels; optimal eco-humus system of soil cultivation within the individual farms; ensuring ecological safety of individual agricultural objects ¹⁹.

¹⁸ <http://www.uaan.gov.ua/viddil.php>

¹⁹ Kupinets L.E. Ekologization of food complex: the theory, methodology, mechanisms. - Odessa: Institute of market problems and economic-ecological researches of NAS of Ukraine, 2010 - 712 pp.

IRRIGATION ON THE SCALE OF UKRAINE

Land reclamation is a major factor in the intensification of agriculture, an important component of sustainable agricultural production, especially in years with unfavorable climatic conditions. Reclaimed land is actually an insurance fund of the Ukrainian state.

Within Ukraine there are three climatic zones: humid Forest zone (25% of the area), not humid Forest-Steppe zone (35%) and dry Steppe (40%).

Irrigated lands are spread on an area of 2.33 million ha. The main irrigated lands are located in the steppe zone - 2.0 million ha (86% of the total irrigated area), 324 thousand hectares in the forest-steppe zone and 9.5 thousand hectares in the forest zone are irrigated. The share of irrigated land in the total agricultural land is 7.2%. In the Autonomous Republic of Crimea the ratio of irrigated area to arable land is 30%, in Kherson region - 26%, in Zaporizhsky - 13%, in Dnipropetrovsky - 11%, in Odessa - 11%, in Nikolaev - 11.1%, in Donetsk - 8% ²⁰. Because of the poor technical condition of the irrigation network and lack of irrigation systems considerable part of irrigated land remains unused.

Services of water supply to agricultural producers are among the main ones in the water management system of Ukraine. Typical Ukrainian practice is the compensation of water users for adverse weather conditions. An element of fostering the development of irrigated agriculture in Ukraine is the offset of 50% to 80% of consumed water to farmers using irrigated land. This is one of the measures of state support to rural areas, approved by the Government of Ukraine “On urgent measures to mitigate the negative effects of drought and ensure the formation of grain resources for harvest year 2007” on June 4, 2007, № 794.

Compensation of 35 million UAH from the state budget in 2007 was paid to agricultural enterprises of all forms of ownership and management (except the budget ones), which include farmers, private agricultural enterprises, physical persons and entrepreneurs growing open field crops on irrigated areas or filling rice-fields with water. In addition, the state reclamation pump installations received 7 million UAH from budgetary funds to cover the expenditures for electricity used for water delivery ²¹.

²⁰ Staschuk V.A. Ecological and economic basis of water resources basin management. – Dnipropetrovsk: “Zoria” Publishers, 2006. – 480 pp.

²¹ Institutional insuring of ecologically balanced water use in modern conditions: Monograph / M.A.Khvesyuk, V.L.Golyan, O.V., Jarotska, N.V. Korjunova. – Donetsk: “Jugo-Vostok Ltd”, 2008. – 455 pp.

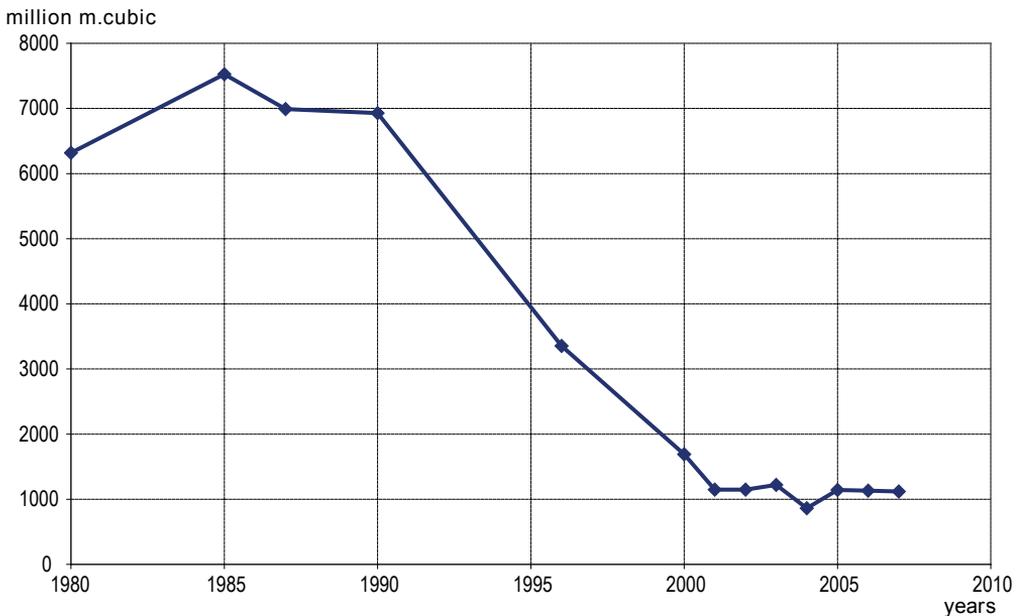


Fig. 7. Dynamics of water use for irrigation and its share in total water use in Ukraine ²².

In 2007, 1131 million m³ of water was spent on irrigation, which represents 5 times less than in 1990 (Fig. 7). The main reasons for this are the stagnation of agricultural production in areas of the Black Sea economic region, low investment capacity of

agricultural enterprises with respect to the introduction of modern irrigation equipment, as well as the incapacity of water users to pay for special utilization of water resources for irrigation.

IRRIGATION IN THE ODESSA DISTRICT

As to natural moisture, the territory of the Odessa region lies in unfavorable for agricultural production climatic conditions. The irrigation system in the area is developed.

There are 231.3 ha of reclamation land, of which 226.8 thousand ha

of irrigated land, out of which 220 thousand ha of public networks (Appendix 8). The length of irrigation network is 5 370 km, of which large main canals and pipelines, belonging to the Regional Water Department - 998.1 km. 8 684 hydraulic equipments are placed on the irrigation network,

²² According to State Agency of Water Resources: <http://www.scwm.gov.ua/>

3 119 of which are state owned. 242 public pumps deliver water to the system. The balance value of the reclamation funds is 1 482.6 mil UAH. In the pre-crisis period, in the Odessa region the gross share of irrigated area of different crops was as follows: 20% of the cereals, 40% of the fodder, 80% of the vegetables, 100% of the rice. At the same time the share of irrigated land only amounted to 8.9%. Nowadays, with no additional cost, it is possible to supply water for irrigation of 140 - 150 thousand ha ²³.

In 2010, water withdrawal and supply to water users was carried out in accordance with contractual obligations. As a whole in the nine

districts of the region agreements were signed with 212 water users for 68.1 hectares of irrigated area.

Before the beginning of irrigation season there was water exchange of 3.84 million m³ in reclamation network, worth to the value of 303 thousand UAH, water reservoirs of 18.9 million m³ were filled to the value of 1.8 million UAH. During the irrigation season 71.2 million m³ of drainage water to the value of 1.4 mil. UAH was pumped. In 2008 in Odessa region 63.8 million m³ of water was supplied for irrigation (2.3 mil.m³), of which 51.8 million m³ (81% of the regional volume) to the farms in the Danube Region (Fig. 8).

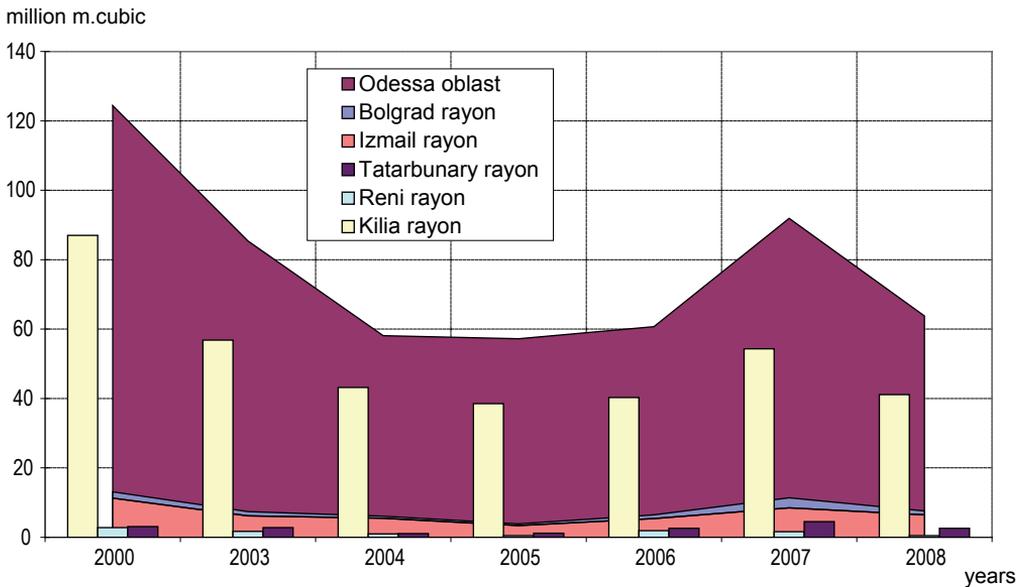


Fig. 8. Use of water for irrigation in the Danube Region and the Odessa region

²³ According to the information of the Odessa Regional Water Management Department: http://www.watermd.od.ua/index.php?mod=pages&page=%20melioration_ukr

In the past three years, in the Odessa region more than 600 hectares of trickle irrigation were put into operation each year, currently 4 263 ha are covered by trickle irrigation. The value of the service of delivery of 1m³ of water in the Odessa region is 3.6 kopecks, and for the rice systems it is 1.2 kopecks. The value of electricity supply for 1m³ of water from intake point is 7 kopecks.

What is needed in the infrastructure of agriculture as one of the most water-intensive industries is renovation and improvement of existing irrigation systems, bringing irrigation to optimum ratio with other reclamation measures, improvement of soil properties and increase of their fertility, use of advanced water-saving technologies and irrigation regimes,

preventing flooding of land.

In the fisheries sector, the main problem is to convert the fish ponds into an effective barrier ecological construction, by radical improvement of technical condition on the ponds.

In light of the growing environmental crisis phenomena and the introduction of energy power consumption limits in agriculture, there is a need to improve irrigation regimes and norms. The perspective is water saving and reduction of irrigation norms by minimization of evaporation, which can be achieved by night irrigation, underground and trickle irrigation, reduction of the total volume of irrigation.

ECONOMY OF WATER CONSUMPTION PRICE

The development of market relations in Ukraine requires the establishment of economic relations in the field of water use, which will take into account the interests of the state, the owners/managers of water resources, and the individual water users.

In order to development of fee-paying water using the following tasks have to be solved: providing economic conditions for the development of market relations in the field of natural resources use; development of payment mechanism for the use of water resources; raising a trust fund; development of market mechanisms

for rational water use, taking into consideration environmental requirements.

The payment for water use as natural resource occupies a special place in the economic mechanism of water management.

In Ukraine, chargeable water use was introduced in the 1980s.

On the basis of new methodological approaches to economic valuation of water, the so-called “rental concept” was developed in 1992, on the basis of which temporary tariffs on water

use for all water users were identified, approved by the Cabinet of Ministers of Ukraine (1994) upon presentation

by the Ministry for Ecological Safety of Ukraine.

SPECIAL USE BY PRIMARY WATER USERS ²⁴

The concept of payment for water use is based on the principles of ownership of water resources of Ukraine, the Law “On Environmental Protection”, and the Water Code of Ukraine. According to this concept the special water use is any of the following types of water use: withdrawal of water with the use of facilities or technical devices, discharge of sewage waters and pollutants, use of water obtained from water bodies or from other water users, and use of water without its removal from water bodies for hydropower engineering, fishery and water transport on the basis of a permit issued in the prescribed manner (Fig. 9).

Special use is based on the licensing system and fees. The order, rules, regulations and payments for each kind of special water use are established by normative and legislative acts on the state level and

depend on financial, environmental and social policy of the country. Compliance with the break-even policy and environmental security of water use *provides* for the organization of management process in accordance with the principles of sustainable development to balance the interests of all stakeholders: business, consumers and environment agents.

The “special water use”, defined by article 48 of the Water Code of Ukraine²⁵, shall be subject to mandatory environmental taxation in addition to payment for the direct volume of water used. According to the Tax Code of Ukraine ²⁶, charges for special use of water consist of: 1) Fees for special water use from water bodies, 2) environmental tax for the direct discharge of pollutants into water bodies.

²⁴ With Maria Tarasova

²⁵ Act of the Cabinet of Ministers of Ukraine “On charge rates for special water use” of 18.05.1999 №836.- Site of Verhovna Rada “General Legislation”.-2010.- July,8.
<http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=836-99-%EF>

²⁶ Tax Code of Ukraine: (e-resource)//Site of Ministry of Finance of Ukraine.-2010.-October,7.
http://www.minfin.gov.ua/control/publish/article/main?art_id=85496&cat_id=71369

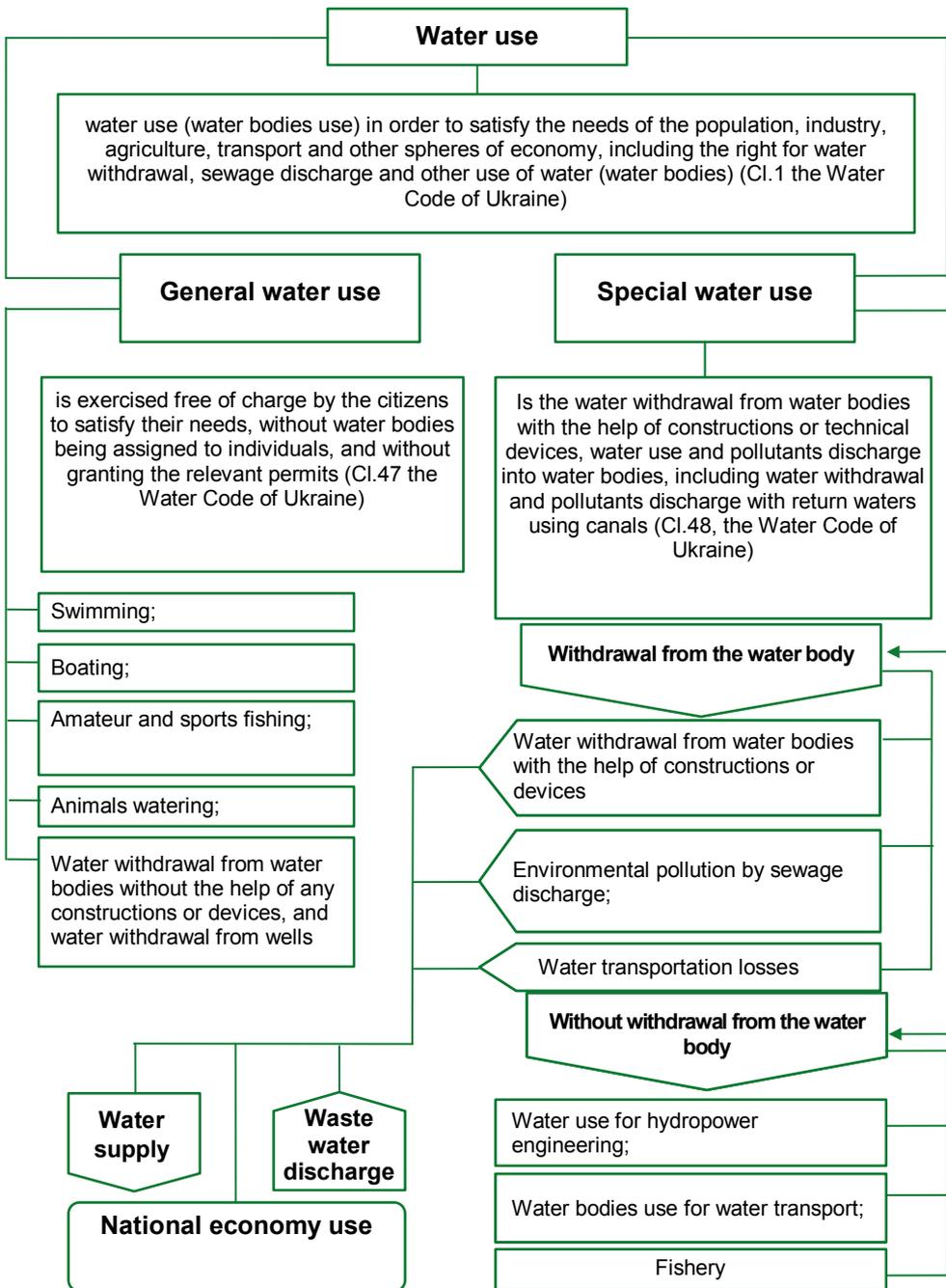


Fig. 9. Structure of water use classification in Ukraine.

The charge rates on water resources special use are set by the Cabinet of Ministers of Ukraine Resolution № 836 of 18.05.99 “On the charge rates for special use of water resources

and the payments for water use for hydropower engineering and water transport” (Table 1). Despite the correction process, these rates remain relevant.

Table 1. Charge rates on special use of water resources and surface water bodies (1999).

River basins, including all kind of tributaries	Charge rates, kop./m ³
The Dnieper North of Kiev (the Pripiat and the Desna), city of Kiev included	5,04
The Dniپر South of Kiev	4,79
The Ingulets excluded	7,31
The Ingulets	9,83
The Severskiy Donets	5,54
The Jujniy Bug (without the Ingulets)	6,80
The Ingul	3,02
The Dniestr	3,02
The Wisla and West Bug	2,27
The Prut and Siret	2,27
The Tisa	2,02
The Danube	10,08
The rivers of Crimea	12,1
The rivers of Azov region	5,54

In total, in Ukraine there are 45 regions, according to the charge rates for water intake. The ratio of the lowest and the highest fee for 1 m³ of water intake from surface sources is 1 to 32.

According to Section XVI of the Water Code of Ukraine “Charges for special use of water” the list of water uses subject to environmental charges,

includes:

- » The use of water taking into account its losses from the water supply system by water withdrawal (primary water users) and/or from water withdrawal equipment of the primary water users on the basis of the charge rates (Table 1), the actual volume of used water, and the prescribed limits ²⁷;

²⁷ The limits of the special water use of water bodies with state importance are determined directly by the State Agency of Water Resources, the limits for water bodies of local importance are determined by the relevant local authorities (basin management administration). According to the data of the State Agency of Water Resources the payments for special water use in Ukraine represent between 500 thousand and 1 billion UAH per year.

- » The charge rate is set according to “the prevalence of water resources, their quality, reproduction capacity, accessibility, comprehensiveness, efficiency, location, possibility of processing and neutralization of waste and other factors” and is subject to differentiation based on: whether the water body is a surface or groundwater source; type of water basin to which the surface water body belongs; location of the underground water body; type of economic activity.
- » A coefficient of 0.3 is applied to the charges of housing and communal companies and a coefficient of 0.005 is applied to the charges of the thermo-electric power stations.
- » For special use of mine, quarry and drainage water the charge is set according to the actual volumes of water and the charge rate (5.93 UAH/100m³ of water). For water included in drinks ingredients the charge is set according to the volume of water and the charge rates: 25.60 UAH/1 m³ of surface water and 29.86 UAH/100 m³ of underground water.
- » For the use of water without withdrawal from water bodies for hydropower engineering the charge is set according to the standard charge rate (5.24 UAH/10 000 m³ of water for all rivers in 2011), the actual volume of water passed through the turbine, and limits on

water use.

- » For water transport the charge is set in accordance with time of use of surface water during the reporting period and the charge rates: 0.09 UAH/ton-km for cargo self-propelled and non-propelled fleet, and 0.01 UAH/per person per night of operation for passenger ships.
- » For fish-breeding the charge is set according to actual volumes of water needed for replenishing of the ponds while breeding fish or other aquaculture in the fish farms (including the volume of water needed for filtration and evaporation), and charge rates: 27.52 UAH/10 000 m³ of water in case of operation of surface water bodies, and 33.09 UAH/10 000 m³ in case of operation of groundwater bodies.

These types of charges, except losses in water supply systems, are considered general operating costs, and are included in the cost of production, and in the economically grounded tariff for the provision of piped water supply and sanitation service. The owners of water supply networks are charged for the water loss.

According to the Water Code, the charges for special water use from water bodies of national and local importance are allocated (Fig. 10).

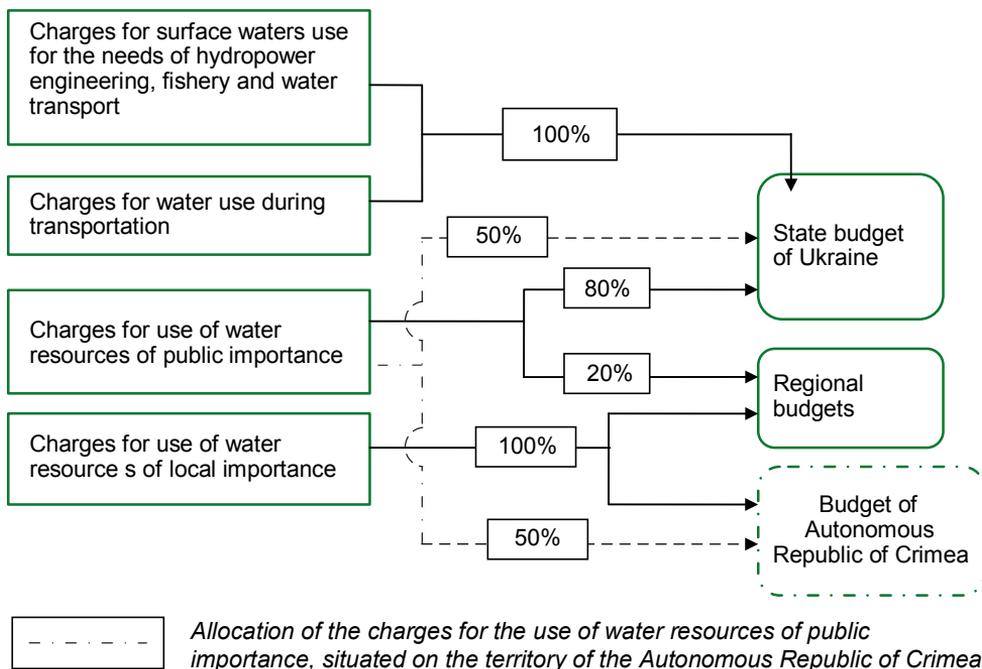


Fig. 10. Allocation of the charges for the special use of water in Ukraine ²⁸

Environmental taxes on the discharge of pollutants directly into water bodies are considered general operating costs and are included in the cost of production. It is determined based on the charge rates, the actual volume of discharged pollutants, the fixed discharge limits, and the correction coefficient, determined on the location of the source of contamination.

The tax rates for discharging pollutants into water bodies (Table 2) are set based on the type of pollutant prevailing in the discharge.

The allocation of the tax for the discharge of pollutants directly into water bodies (up to 2011 “environmental pollution tax for discharging waste waters”) is done in accordance with the provisions of the environmental law (Fig. 11).

²⁸ Tarasova M.L. Organisational and economic mechanism of water resources management in Ukraine – doctoral thesis speciality 08.00.03 – Economy and national economy management, Doneck- 2011 – 255 pp.

Table 2. Rates of the environmental tax for discharge into water bodies

Main contaminants	Rate UAH/t
Ammonium Nitrogen	52,5
Organic substances	21
Suspended matters	1,5
Oil products	309
Nitrates	4,5
Nitrites	258
Sulphates	1,5
Phosphates	42
Chlorides	1,5

WATER CHARGES FOR SECONDARY WATER USERS

The charges for special water use by secondary water users is calculated according to an aggregate costs, including salaries, administrative costs, monitoring, etc. Thus in each area in the Ukrainian Danube region the irrigation tax depends on the number of pumping stations. The most expensive water in the area is in Tatarbunary and Kilia – up to 12 kopecks (Appendix 5).

However, the actual payment is not for water, but for the electricity spent on water pumping. Agricultural producers (farmers) in Ukraine do not actually pay for water (as a kind of special water use in accordance

with the Law of Ukraine “On Environmental Protection”, № 1268-XII of 26.06.1991, Article 38²⁹). Moreover, the cost of water supply to the field is borne by the state in the form of subsidies for the activities of the regional water management administrations.

In case of non-fulfillment of technical, sanitary and environmental conditions of use of water resources of Ukraine disciplinary, administrative, civil, and criminal penalties are stipulated, through economic penalties including full compensation of the economic losses, caused by the offender.

²⁹ Art. 38. General and special use of natural resources: The use of natural resources in Ukraine is realized according to the rules of general and special use of natural resources. ...According to the rules of the special use of natural resources the citizens, enterprises, administration and organizations can assume possession, use or rent of nature resources on the basis of special permits registered according to the fixed rules for payment for the operation of manufacturing or other activities and on preferential terms in the cases foreseen by the Ukrainian law.

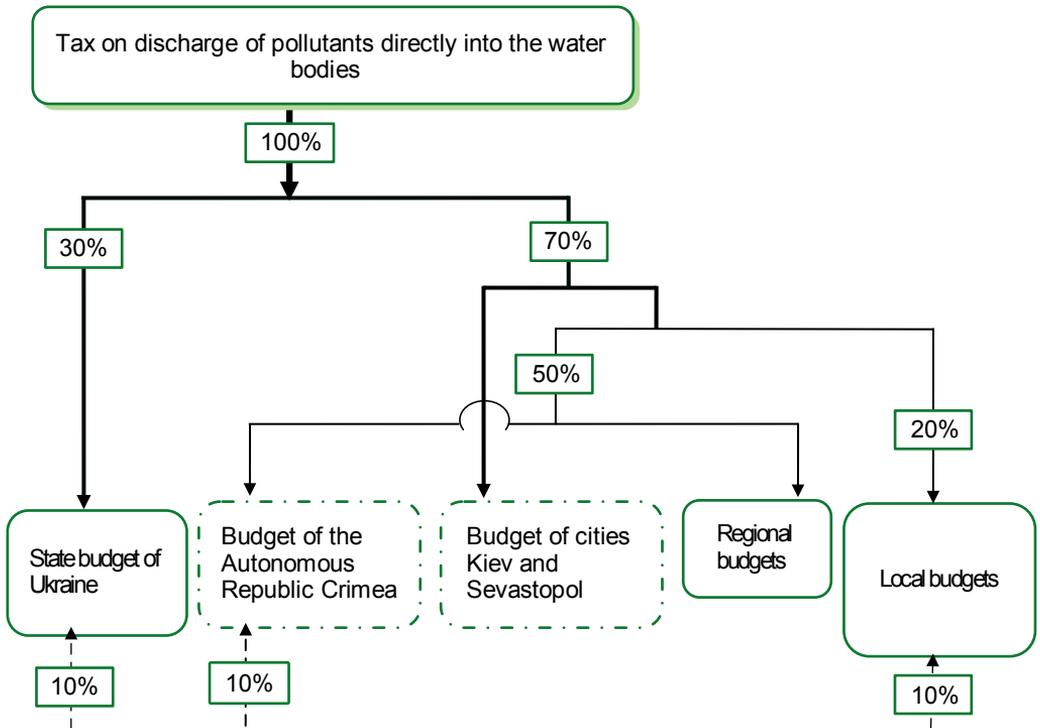


Fig. 11. Structure of the environmental tax on the discharge of pollutants directly into water bodies

FINANCIAL MECHANISM OF WATER USE AND WATER RESOURCES PROTECTION

Financial and economic state of water management, conservation and reproduction of water resources is determined by the tariff, fiscal and investment policies of the state. The main sources of generation of funds, to be used for the provision of water supply and sewage outfall services and funding of water protection programs and activities are:

- Payments made by economic agents for using centralized water supply and sewage outfall services (UAH 77 688 mil. in 2009)
- Rents for use in industrial quantities of water from surface water bodies (UAH 1.2 million.)
- Charges for special water use (UAH 708.97 mil.)

- Current costs of the business on nature protection, related to the operation and maintenance of nature conservation instruments (UAH 4 272.97 mil.);
- Investments in fixed assets, with the aim of building and reconstruction of environmental facilities, purchase of equipment for environmental activities: sewage water purification, protection and remediation of soil, groundwater and surface water (UAH 1 712.71 mil)
- Taxes for pollution of environment through sewage discharge (69.7 mil.)
- Penalties for administrative offences in the field of water resources protection (0.981 mil.)
- Payments for damages and losses incurred as a result of violations of

environmental laws in the field of water resources (UAH 4.14 million).

The main sources of financing the environmental protection costs, as in previous years, are the enterprises' own funds covering respectively 76.5% of capital investment and 95.8% of operating costs. The state and local budgets covered 20.5% and 4.1%, respectively. In 2009 UAH 54.06 mil from the development costs of the State Budget of Ukraine was planned to be spent on protection and reproduction of water resources, UAH 3 mil of which to be spent directly on sewage waters purification.

A comparative analysis of the structure (Table 3) of State Budget of Ukraine and the expenditures on water protection measures indicates improper use of nature conservation funds.

Table 3. A comparative analysis of receipts from the use of water resources and public expenditures on water protection measures

Receipts		Expenditures	
Direction of Financing	UAH mil	Direction of Financing	UAH mil
Leasing of ponds in river basins	1,2	International cooperation	1,2
		Applied scientific investigations	2,7
Charges for special water use	708,9	Capacity building	3,7
Tax for pollutions by discharges	20,9	Monitoring of nature resources condition	25,0
		Purification of sewage water	3,0
		Management and control	4,0
		Establishment of national environmental network	14,4
Total	731,0	Total	54,0

FINANCIAL MECHANISMS IN OTHER NATURE MANAGEMENT SECTORS

In 2007, the taxes for special use of forests amounted to UAH 173 million.

Forests reproduction in 2007 was executed on an area of 73.6 hectares, including 60 thousand hectares of planting and seeding and 13.6 hectares of natural reproduction (to the total amount of UAH 60 million according to estimations).

In 2007, the forestry enterprises of the State Forestry Committee undertook forest protection measures on an area of 150.1 thousand hectares. Biological methods of forest protection from pests were applied on an area of 132.3 thousand ha (88%). Over UAH 2.3 mil was spent on forest protection measures.

In 2007, payments for land into Ukraine's budget were UAH 3.8 billion.

In 2007, the State budget of Ukraine provided funding of UAH 9.5 million for land protection, in fact the State Committee for Land Conservation financed activities for the total amount of UAH 9.4 million.

The funds were used as follows: UAH 4 466.3 thousand on construction of erosion-preventive facilities and UAH 1 855.7 thousand on land reclamation.

The Land Code of Ukraine and the Law on the Protection of land hold the farmers responsible for soil fertility restoration. Land restoration is carried out in other sectors of the economy as well. Every year, the companies of Gosugleprom (Coil-administration) plan the works on land resources protection, which are grouped in 15 directions. In 2007, a total of 98 types of work were carried out to the amount of UAH 39.4 million.

WHAT IS NECESSARY TO BE DONE TO IMPROVE THE ECONOMIC MECHANISMS OF NATURE MANAGEMENT?

Fiscal management of water use today makes a start from the need to strengthen the budget role of bringing water resources in the economic turnover. The low percentage of revenues for special use and use of water for hydropower engineering and transport in the budgets on different levels requires reviewing the charge rates for special water use.

The practice of direct government subsidies and subsidies for water management has shown its helplessness. Commercialization of water component of the economy is required, and the solution of this problem depends on the efficient operation of financial institutions in the water resources market. Taking this into account, national water policy elements should be introduced, which get financial and credit institutions interested in investing resources into rational economic use of water resources ³⁰.

Current tax system requires improvements, which consist of consistent enhancement of the role of payments for water use, introduction of taxes like excise taxes on products,

the use of which is associated with damage caused to the water resource potential. At the same time it is necessary to extend tax facilities to companies and organizations that master high efficient technology, such as closed and non-waste systems of water use.

It is necessary to encourage the businesses not only to reimburse the hazardous substances emissions, wastewater discharges and excessive use of natural resources, but to provide a permanent limitation of the negative impact on the environment through the development of environmental infrastructure and the use of the mechanisms of payment for ecosystem services ³¹.

The analysis of the present structure of the bodies associated with the use and protection of water resources, their inherent functions and the scope of their activities leads to the conclusion that the modern organizational structure of water management hinders the introduction of economic instruments. Today, there is no water body administration which is capable of working on self-financing

³⁰ Khvesyk M. GolYan V, Khvesyk J.M. Institutional environment of sustained water use in market relations conditions: national and regional dimensions: Monograph. – NAS Publishers, 2005. – 280pp

³¹ Doroguntsov S.I., Khvesyk M.A., Golovyynskiy I.L. Water resources of Ukraine (problems of theory and methodology): Monograph.-K.: Publishing centre “Kyivsky Universytet”, 2002. – 227pp

basis. Its absence deprives the price of water of its most important function: to be a source of income for the companies from which they can reimburse expenditures and generate profit.

Transfer of water charges into the budget made it impossible to accumulate financial resources for the reproduction processes, since it is not associated to the investments in water management, the payment has not become a lever for its development, nor it has become a steady source of budget funds.

Also principles of interaction between basin management bodies and the relevant subsections of the Ministry of Environment of Ukraine and other agencies remain vague, and this again creates the same regulatory vacuum for targeted development of appropriate water management projects that will dramatically alter the functional orientation of water use in general and in its different sectors.

A great mass of water users (agriculture, population), not covered by the payment for water use, remained outside the scope of this economic inducement.

The effective price has to reduce the pressure on water resources. This is

especially true for agriculture. There is no system of sound water tariffs based on consumption volumes, the reason for this partly consisting in the lack of control of water intake and poor management information system and data collection system.

The elaboration of tariffs should be a reasonable compromise between different political goals, namely taking into account actual price for the services, a cost-effective prices criterion and social equity. This requires intelligent information about the real cost of water, the number of services actually received by different sectors, including communal, the condition of the infrastructure and necessary investments ³².

An important factor is also the lack of water quality record in the formation of tariffs for end consumers. The introduction of such a mechanism would encourage measures to improve water quality of the primary consumers and water enterprises.

Besides, state water management departments are monopolists in the market for water supply. This situation can be remedied if independent bodies - special commissions ³³ - have the authority to approve tariffs for housing and communal services for the city or

³² Management plan of the Ukrainian part of the Lower Danube basin. Information and analytical report, Program of neighborhood Romania-Ukraine, project 2007/141-164 Development of cross-border cooperation in integrated management of water resources in Euroregion "Lower Danube", 2009

³³ <http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=1682-14>

region, as the Law of Ukraine “On natural monopolies” has envisaged. Natural water monopolists will

become public companies, which, in turn, will have to be legalized.



© Maxim Yakovlev, Danube Biosphere Reserve

Fauna in the Danube Biosphere Reserve includes 1,925 species.

REQUIREMENTS FOR THE INTRODUCTION OF MECHANISMS OF PAYMENTS FOR ECOSYSTEM:

- Introducing into Ukrainian legislation the categories of ecosystem services, payments for ecosystem services (PES) and investment in ecosystem services;
- Developing a mechanism for economic and environmental transfer associated with the implementation of the principle of payment for ecosystem services;
- Endorsing amendments to the Law of Ukraine “On Environmental Protection” and the Budget and Tax Code of Ukraine on the reallocation of the environmental charges/ taxes in favor of enterprises under programmes (projects) implementing PES;
- Initiating the establishment of agencies for ecosystem services as part of the system of public-private partnership.

Verkhovna Rada of Ukraine registered a draft Law of Ukraine, which envisages changing the allocation structure of the charges on the use of natural resources. Beginning with January 1, 2013, in Ukraine, 70% of this charge will remain at the company³⁴. With this aim in view, companies and organizations have to develop plans for environmental policy and environmental activities. On the other hand, these 70% may be a reserve for the implementation of PES in Ukraine.

The issues of the basin management autonomy should be solved with priorities to water management and protection business in the context of attracting investment resources for the implementation of promising innovative projects and the commercialization of public water management sector.

³⁴ According to information from Tatiana Timochko, chairman of All-Ukrainian ecological league, 25.10.20011

POTENTIAL PES SCHEMES

Reedbed management

In the past, the reed was used by paper production factory of Izmail but after the collapse of the Soviet Union the production was ceased and the resource remained unused. Today, the reed is harvested and sold on international markets to be used in construction and production of light furniture (it is known that reed from Ukraine was used for making sun-protecting umbrellas in Greece, for

example).

There is a lot of reed in the Danube delta which should be reasonably managed in order to conserve the sustainable environmental status of the wetlands. The implementation of PES-scheme of reedbed management is proposed on the basis of the Danube Biosphere Reserve (Ukraine) (Appendix 1).

Erosion control measures

Large part of the lands in the Danube area is plowed (on the place of formerly naturally existing steppes). Mainly cereals are cultivated and practices are entirely intensive. The quantities of fertilizers or pesticides loads to the soil are not monitored and there are no good agricultural practices to ensure the balance. Farmers use mainly fertilizers because the livestock breeding in the region is in decline. This resulted in high pollution of underground water. For this reason, according to the experts the quality of surface water is better than the underground water.

Taking all this into account a possible PES scheme is to harvest the reed and use it both as manure and for prevention of wind erosion by the use of reed mats (Appendix 2).

The second identified possibility

of the decision of this problem are restoration of old gardens with the row-spacings sowed by a grass and decrease in level of use of pesticides and fertilizers. In this case farmers could pay to owners of a garden. Use of involved with grasses pollinators involved with grasses can be additional benefit (service) for farmers and can potentially reduce the expense of fertilizers.

The third potential possibility is the bookmark of vineyards - under condition of their organic use.

Fourth option is the restoration of steppe habitats but this would have very low economic value.

Fifth option is the restoration and creation of forest protection belts (Appendix 2) – the issue is that borders between plots are not private

property and then the payment

scheme would work very hard.

Water quality and water resources management

The free-of-charge use of water basins by aquaculture producers in the area is an ordinary practice in the Danube river basin. The river basin has mainly lakes which are used for irrigation, drinking and some of them for fishery activities.

The aquaculture producers as a rule pay neither for the special water use nor for the maintaining of infrastructure which regulates the water regime. Their only input is planting the basin with fish.

The fish catch consists not only of the bred fish but also of Danube native species. Since the most common species are silver carp, grass carp, carp, they overtake the place of the other species. There are two more issues: (1) nobody regulates how much fish is caught – usually the catch declared is much lower than the real one; also, species that are not bred are caught and sold but not declared (2) water is polluted with the fertilizer used by the fish farms but because of corruption it is not possible to impose penalties.

In addition, after being used in the

lakes the polluted water is discharged in the Danube River, which is used water supply by the cities of Kilia, Izmail and Vilково.

In fact, the fish farms use the infrastructure and the resources (such as water, the natural function of the basin to produce fish feed) and infrastructure (gates) for free.

Solving these issues can be achieved by using the experience of international institutions such as the International Commission for the Protection of the Danube (ICPDR). It is necessary to connect the managers with other similar businesses in Europe to share their experience. Measures are necessary to convince the fish farms managers to pay for the ecosystem services; to convince the state representatives that measures should be taken in accordance with the requirements of the EU Water Framework Directive.

As a measure to compensate the damage caused to the Danube Biosphere Reserve it is necessary to propose the building of sturgeon factory near Kiliya ([Appendix 3](#)).

Wetlands restoration and ecotourism

In order to restore wetlands in the Danube-adjacent region of Ukraine it is necessary to take the following actions: to make detailed inventory of

flood-lands with further exclusion of certain zones from economic usage; to develop strategy for implementation of a complex plan for gradual

exclusion from use of degraded agricultural lands and restoration of wetlands; to develop and implement mechanisms for excluding parts of wetlands from the agricultural rotation in view of future restoration of the natural habitats of these areas; to develop and implement a plan for restoring Danube flood-lands located between Danube-adjacent lakes and the river according to the Program of environmental network of Ukraine; to create the Green Corridor of the Lower Danube taking into consideration anti-floods protection of territories; to include the Danube-adjacent lakes and flood-lands to the Danube Biosphere Reserve of the National Academy of Sciences of Ukraine; to create trilateral biosphere reserve of the Lower Danube including the respective territories in Moldova and Romania; to restore and increase the area of riverine forests, flood-meadows and polders along the Danube (Appendix 4).

Rehabilitation of the Sasyk estuary can be realized by converting it into its natural state of marine estuary through removing the dam. The aim of the project is to overcome the adverse impact of converting

the Sasyk estuary into a fresh water reservoir and to create environmental conditions for sustainable social and economic development of the adjacent areas. Activities within the project are to develop and realize the plan of rehabilitation of the Sasyk estuary through dam removal; to guarantee the future environmental use of the Sasyk estuary by including the entire estuary in the Danube Biosphere Reserve, to combine environment protecting and recreational use of the Sasyk estuary through construction of a yacht port, to reconstruct the Danube–Sasyk canal to be used for rowing; to develop infrastructure for environmental, rural, recreational, historical, ethnical and sport tourism; to increase the attractiveness of the Sasyk coastal areas for recreation construction which must take into consideration the environmental status of the estuary (Appendix 5).

The Danube region has a considerable potential for ethnical, cultural, rural and environmental tourism development thanks to its outstanding natural resources, architecture, applied art and original folklore. The PES can find the place in tourism projects too (Appendix 6).

Implementation of PES schemes in other regions of Ukraine ³⁵

Ukraine, as a whole, is characterized as low water-secured country. Local businesses, housing and agriculture already experience the problem.

Conversion of agriculture and forestry to the new economic mechanisms could work, but economic opportunities are still not assessed.

³⁵ with Nataliya Zakorchevnaya.

A PES mechanism to fight the water pollution of Calmius River from housing outfall is under development. The scheme will aim at creating forest-

protecting strips along the river and communication with citizens aiming at decreasing the river pollution (Appendix 7).

CONCLUSIONS

Ukraine has a well developed system of charges for water resources use, including, direct charges for the water resources withdrawal and a system of tariffs for secondary water users. Since 2011 an environmental tax on discharges of pollutants into water resources operates. There is also a system of fines.

Institutional inactivity, which manifests itself in the “conservation” of the Soviet administrative system of water management, is characterized by high monopolization, unprofitability, and therefore, unattractiveness for foreign investors to develop the water economy sector of Ukraine.

Nowadays the payment for

ecosystem services remains out of a legal Ukrainian field and official mechanisms of ecological economy, but has interesting prospects of implementing in the Ukrainian conditions.

A serious barrier to the introduction of payments for ecosystem services is the fiscal and budgetary legislation of Ukraine. Legal mechanisms of “horizontal” payments for the use of ecosystem services are missing.

However, the main barrier to the formation of a system of payments for ecosystem services is the weak willingness of the consumers to pay irrespective of their financial situation and organizational status.

MANAGEMENT OF REEDBED IN THE DANUBE DELTA REGION – STENSOVSKO-ZHEBRIYANSKY FLOODPLAIN

Location: South of the Odessa oblast, Kilia rayon (area)

Area – 9 700 ha

Background: The Danube delta has unique geographical position and rich natural resources. However much further intensification of traditional nature using (including fishing) leads to the decline of its economic and ecological potential. Real alternatives are needed. A good opportunity for Ukrainian part of the delta is the use of the reed resources. Its greatest supplies in Europe are coming from the delta of the Danube. Already today from the Ukrainian Danube delta about 800 thousand sheaves of reed are exported in a year. And that makes about 6–8% of the European market. More than thousand persons are employed in this economic sector. Volumes of the harvested reed can be trebled under condition of having minimum negative influence on the natural Danube ecosystems.

The main measures: The primary production of reed biomass on the territory of the Danube Biosphere Reserve accounts for about 900 thousand tons. That is, it is possible to consider this resource almost unlimited. In reality, necessity of the



© Danube Biosphere Reserve

Fig. 12. Danube Biosphere Reserve.

landscape mosaic maintenance, reed restoring and regulation of the balance of biogenesis substances demands working out and implementing of effective system of reed management. In particular, it concerns Stensovsko-Zhebriyansky floodplains.

The role of stakeholders: Now on the territory of the Danube Biosphere Reserve (DBR, Ukrainian part of the Danube Delta) the reed is harvested

on an area of 3.8 thousand hectares located in island territory of Belgorod and in Stensovsko-Zhebrijansky floodplains. DBR together with Open Company “Ecoforpost” carries out the melioration actions in Stensovsko-Zhebrijansky floodplains, the channel restoration, management of the hydrological mode and the biogenic component of ecosystem.

Benefits and expected results:

Cooperation of the Danube Biosphere Reserve with Open Company “Ecoforpost” on management of Stensovsko-Zhebrijansky floodplains can form a basis for introduction of the PES mechanism. Involvement of an external investor can provide stability to the ecosystem services (quality, quantity of reed) and also to improve the environmental conditions of the floodplains.

RESTORATION OF FOREST BELTS AND OTHER ANTI EROSION ACTIONS IN REGION OF THE LOWER DANUBE

Location: South of the Odessa oblast (region), Kilia, Izmail, Reni rayons (areas)



© Google Maps

Problem/background: Creation of wood strips and other plantations in agricultural landscapes is a long time known method of fight against soil erosion which is widely used in Ukraine and in the Danube Region. Thanks to the creation of an extensive network of wood strips on farmlands in Ukraine it was possible to reduce the impact of the phenomenon known as “black” storms when strong wind worn out the dry top layer of the soil. Forest belts are also a place of dwelling for many species. Unfortunately, the cases of cutting

down of strips of woods have recently expanded. Further destruction of forest plantations especially in a steppe zone leads to simplification of the structure of the agro landscape, soil erosion and reduction of biodiversity.

In territory of the Odessa oblast there are 47.3 thousand hectares of forests, 70 % of which require reconstruction estimated to UAH 14.2 mil. Barrier to the forest restoration represents the fact that the land does not belong to farmers but to local village councils.

In turn, the conversion of the land from agricultural to forest category is inaccessible to farmers.

The main measures: The Izmail Forestry is ready to carry out restoration/planting of forest belts. The plantation costs (including the seedling) account for UAH 1.6 thousand per 200 square meters. Simultaneously, on separate sites, vineyards can be planted with anti erosion purposes (this has its advantages regardless of the high costs - up to UAH 80 thousand per hectare). The use of reed mats for

soil protection in the winter (in the conditions of snowless winter) also is recommended.

The role of stakeholders: Involving of farmers in the process of forest belts planting can be connected to the realization of Kyoto Protocol mechanisms and other green investments schemes.

Benefits and expected results: using of alternative measures against erosion will allow keeping the soil fertility and will promote carbon deposition.

RESTORATION OF RESOURCES IN THE UNIQUE AQUATICS OF THE DANUBE RIVER AND THE NORTH-WESTERN PART OF THE BLACK SEA

Location: The Danube Delta.

Problem/background: On the basis of long-term research in all Black Sea basin 6 species of sturgeon were observed: Russian sturgeon (*Acipenser gueldenstaedtii* Brandt & Ratzeburg, 1833). Starry sturgeon (*Acipenser stellatus* Pallas, 1771), Spiny sturgeon (*Acipenser nudiiventris* Lovetsky, 1828), Sterlet sturgeon (*Acipenser ruthenus* Linnaeus, 1758), Sturgeon (*Acipenser sturio* Linnaeus, 1758), Beluga (*Huso huso* Linnaeus, 1758), Persian Sturgeon (*Acipenser persicus colchicus* Marti, 1940). Due to the river flow regulation, the degradation of spawning grounds and water pollution, the number of all species of sturgeon has decreased. Currently, all sturgeons are listed in the Red Book of Ukraine. According to the last data, the Spiny sturgeon is considered to be extinct in the region. Reducing of the sturgeon abundance in the Black Sea basin led to the release of the feed niche previously occupied by these species. The favorable habitat conditions, feeding and wintering areas in the western Black Sea can significantly increase the scale of the artificial reproduction of sturgeons and their mass

introduction to the Black Sea basin, in particular to the Danube Delta.

In order the artificial reproduction of sturgeon and its introduction into the Black Sea Basin to succeed, the productivity of the Danube sturgeon plant should not be less than 8.0 million units of young fish with the potential resources to bring its capacity to 10.0 million units/year.

As a result of regulation of the Danube River in the Iron Gates most of the spawning habitat of beluga, which earlier rose to Vienna, was lost. Sturgeons, in particularly starry sturgeon, are in a more favorable situation. The following ratio of species is proposed for a sturgeon plant on the Danube River: Starry sturgeon - 40% - 3.2 million units; sturgeon - 30% - 2.4 million units; beluga -30% - 2.4 million units.

The main measures

The decision to build the sturgeon plant in the area of Kilia is supported by Department of Fisheries of the Ministry of Agrarian Policy of Ukraine.

The project aim is to prevent the negative impacts on the aquatic resources and to reduce the anthropogenic impact on the Danube Delta and the North-Western part of the Black Sea.

Objectives:

- Creation of facilities for artificial breeding, cultivation, introduction of sturgeon and sea aquaculture;
- Application of European methods of control and protection of aquatic resources in conditions of increasing anthropogenic load;
- Creation of a unified system of data collection and data management in relation to the status of aquatic resources of the Danube River and the north-western Black Sea;
- Introduction of new technologies in aquaculture in the frame of pilot projects on restoration of unique and valuable aquatic species.

The role of stakeholders and a willingness to pay

The compensation funds from the negative effects of exploitation of navigable channel “Danube-Black Sea” to the Danube Delta Biosphere Reserve can be the source of investment for the creation of the fish plant. Until recently, these funds were accumulated in the accounts of the City Council Vilkovovo, but the funds can be redirected!

Amount of funding - 2.5 million euros.

Benefits and expected results

Restoration of the Danube and Black Sea sturgeon populations and other species of valuable aquatic resources; the planned 8.0 million specimens, in condition of 1% of commercial return can ensure the annual production of 1637 tons.

RENATURALIZATION OF POLDER IN THE AREA BETWEEN THE LAKES KARTAL AND KUGURLUY

Location: South of the Odessa oblast, Kilia rayon (areas)

Area – 1300 ha

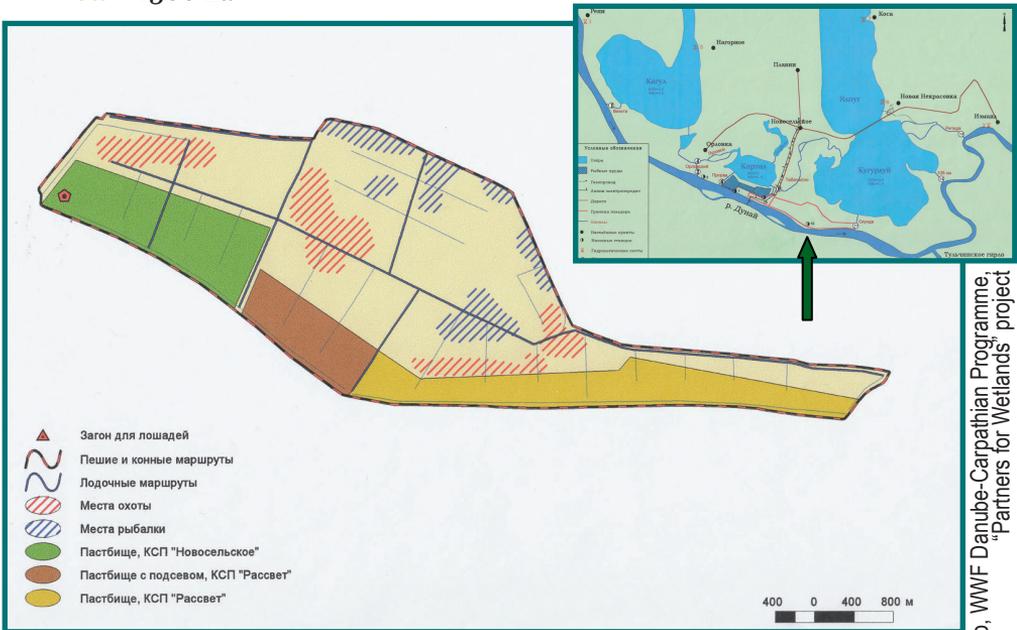


Fig. 13. Potential usage of the polder.

Background: In the years 1980-84 on the territory of the polder land-reclamation works were conducted and an irrigation system with three pumping stations was created. As a result of ceasing of the state grants, irrigation has not taken place since 1994 and recently the evacuation of the water from the drainage

cannels has stopped. Currently the collective agricultural enterprises of «Novosel'skoe» and «Sunrise» use the polder territory mainly for livestock grazing.

As a result of the ceasing of the operations and further destruction of the hydrological management system

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the polder territory is intensively flooded and overgrown by reed. Area suitable for growing of agricultural crops declined to 10-15 % of the total polder area.

The main measures: The project of renaturalization of the polder aims at renewal or creation of a system of possibly complete variety of floodplain biotopes. Good access of visitors to the restored sites will be ensured corresponding to the conception of controlled tourist activity; conditions for seasonal livestock grazing are created on the flood meadows. The basic types of plants which form the floodplain biotopes were conserved on adjacent areas. In the case of restoration of the periodic flooding, the restoration of the wetland will be achieved by the forming of floodplain biotopes with high biodiversity.

The role of stakeholders

Reference costs of the equipment located on the channel of Skunda represents 400 thousands of Euro. About 250 thousand Euro is needed for constricting of environmental infrastructure. Partly the project is already realized within a TACIS project in 1998-1999. However, disagreement of stakeholders to co-ordinate restoration measures appeared an insurmountable barrier to the completion of this project. Thus, the project waits for completion already more than 10 years.

Benefits and expected results

The realization of the project will allow reconstruction of the water regime of the environmentally important area of flood land of the Danube. Natural habitats will be restored. Conditions for sustainable nature using, livestock grazing, equestrian tourism, sporting fishing will be created.

RENATURALIZATION OF THE SASYK ESTUARY

Location: south of the Odessa oblast, Tatarbunari and Kiliya areas.

This is one of the largest water bodies in the north-western part of the Black Sea. Its southern part is adjacent to the Zhebriyanskaia Gulf of the Black Sea. The Estuary has a connection to the Danube River through its artificial canal.

Area - 210 km², volume of water - about 0.5 km³, depth to 3.2 m

Problem/background: The transformation of Sasyk Estuary environmental status is related to the implementation of the project for construction of the Danube-Dniester (Dnieper) irrigation system in the 1980s. The project implied desalination of marine water in Sasyk Estuary by separating it from the Black Sea with a 14 km long dam; pumping and discharging the salt water into the sea and filling the dam with fresh water from the Danube via the Danube – Sasyk canal. This reservoir was supposed to irrigate the lands of Tatarbunari and Saratsky areas of the Odessa oblast on area of 29.2 thousand hectares (first phase) and then on further 28 thousand hectares (second phase).

The environmentally and economically groundless creation of



Fig. 14. The Sasyk

the Danube-Dniester irrigation system on the base of conversion of marine Sasyk Estuary to fresh water reservoir caused negative environmental transformation and caused severe economic, environmental and social problems and conflicts.

The negative changes in the environmental state of Sasyk Estuary are the following: simplification of the biological structure of the water body – decrease of the number of species, especially of valuable fish species;

development of eutrophication (development of blue-green algae that are quite dangerous to humans), deterioration of fishery resources. Furthermore the medicinal mud of Sasyk Estuary (as reservoir) was damaged by the introduction of significant amounts of hazardous substances and compounds with waters from the Canal Danube - Sasyk. The negative economic consequences of reorganization of Sasyk Estuary are deterioration of recreation and sanitary potential of the region, water pollution, intensified abrasive process during high water levels of the reservoir, negative impact on Stentsovsko Zhebriyanskie floodplains of the Danube River (territory of the Danube Delta Biosphere Reserve).

The main measures

Renaturalization of the Sasyk Estuary involves its restoration to its natural state as marine estuary. In order to rehabilitate the Sasyk Estuary cost-effective options for its “marine” use are offered: conservation, recreation and tourism, including sailing, fishing and transport (river - sea port).

The role of stakeholders and a willingness to pay

On August 10, 2009 the Odessa Regional State Administration and the Odessa Regional Council adopted the order number 615/A-2009 - 420/2009-PR, according to which a working group is created to develop and implement the project

“Improvement of marine ecosystem of the Sasyk Estuary by the construction of connecting canal and rehabilitation of adjacent territories”. Finances were allocated to develop feasibility study of destroying the dam. The Cabinet of Ministers by Decree № 757 from August 18, 2010, created an Interdepartmental Commission on expediency and consequences of the elimination of the dam on the Sasyk Estuary.

The project “Aladin” identified potential sources of investment to build a tourist complex on Sasyk Estuary.

The investors of the Sasyk yacht club and the building of Sasyk Marine Trade Port (Russian State Property Fund) can be the financing source for the operations on the rehabilitation of the estuary.

The costs for planning and technical measures for the rehabilitation of the Sasyk Estuary by building a connecting canal are approximately € 4-6 million.



Fig. 15. The Sasyk Estuary marina project.

Benefits and expected results

The flooding areas will decrease; the ecological state of the estuary will improve which will answer the needs of the local population (swimming, fishing of quality fish). As a result of the project implementation the health and environmental condition of the villages and resorts will improve, water security and quality of fishery

products will increase. The number of tourists will increase. Conditions for reforming the irrigation system will be created; the functions of natural spawning in the North-Western part of the Black Sea will be resumed. The example of renaturalization of such a large natural object is unique and it will help attracting additional investments in future.

BOGATAYA FARM

Location: the Odessa Oblast, the Izmail area, village of Bogatoe

Area: 20 hectares

Problem/background: The tourism potential of the Danube region is represented with very favorable climatic conditions and valuable natural resources. Abundant living resources such as hunting resources of birds and mammals, fish of the Danube Lakes, mouth of the Danube and coastal zone, medicinal plants are very important for tourism. Under normal circumstances it is very difficult for tourists to get acquainted with the natural wealth of the Danube region. An option is the establishment of environmental museum with elements of zoological park, the creation of “green pharmacy” which would be represented by the medicinal and rare plants of the Danube region.

The main measures

Creation of a historical, cultural, ecological and ethnic Tourist Information Centre “Bogataya Farm” involves the creation of:

- Landfill for growing of local medicinal plants (Green Pharmacy);
- Zoo with the local fauna;



© Valentina Lavrenova

The farmstead “Bogataya”

- Dendropark, which presents local rare and endangered plants;
- Introduction of pheasants in the surrounding lands.

The role of stakeholders and willingness to pay

Private entrepreneur Valentine Lavrenova and her partners are willing to invest their own and borrowed funds in the development of “Bogataya Farm”.

Amount of funding - 150 thousand euros.

Benefits and expected results

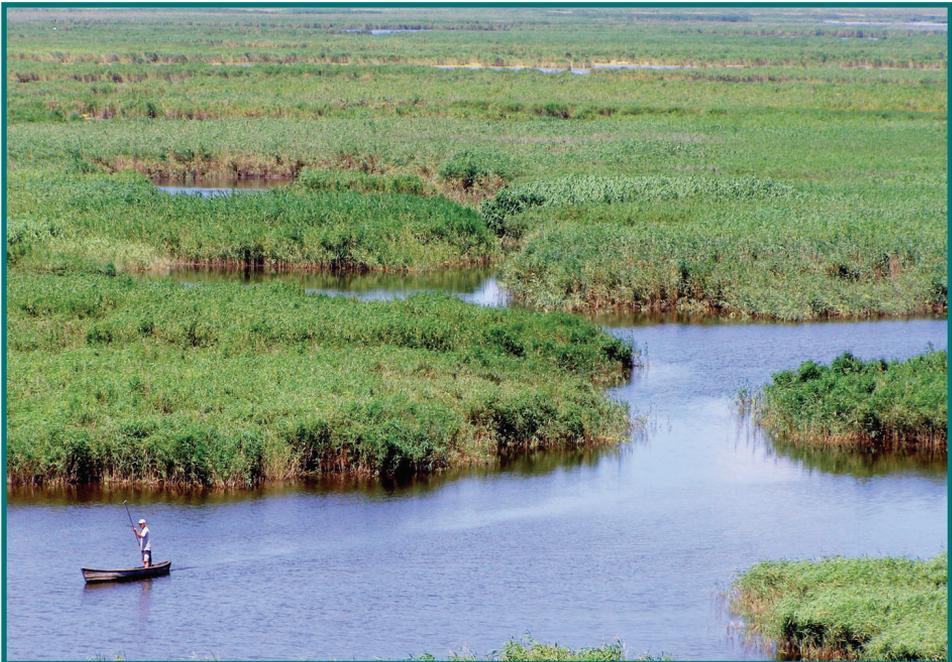
Private investment in new environmental tourist destinations will be realized in the frame of development of the concept of rural

tourism in the Danube Region.

The pheasant will be reintroduced in the surrounding lands.

Green tourism complex will be created including sports facilities, certified eco-beach, trails for horseback

riding, pier, fish hatcheries, crayfish hatcheries, frog farm, pheasant farm, “the street of craftsmen” who represent local crafts (handmade textiles of wool, hemp, silk, yard for the processing of a reed; smithy; traditional production of organic food).



© Maxim Yakovlev, Danube Biosphere Reserve

Reedbeds – typical of the Danube Biosphere Reserve.

INTRODUCTION OF PES MECHANISM IN THE KALMIUS RIVER BASIN

Location: 4 regions of Donetskaya oblast.

River Kalmius runs into Azov sea

Length – 209 km, **area of the basin** – 5070 km²

Background: The water of Kalmius River is used in the industry and agriculture. The basin takes more than 60% of the waste water of the industry of the region (350 thousand pollutants). Flow regulation by

dams leads to decrease of the water exchange, creation of stagnant and unhealthy zones, siltation of the river beds and shallowing of the rivers. The high level of water pollutions as a result of inefficient operation of most of the waste water treatment equipments and water transfer systems of the businesses and the lack of water protection bands along the rivers of the basin lead to breaking the environmental law, namely ploughing the floodplains up to the river edges, “wild construction development”,



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illegal dumping, quarries for sand, etc.

The basic measures

Brining order in the coastal protective zones, implementation of the forest melioration, where it will have the maximal impact to reduce the water pollution in Kalmius river basin.

Stakeholders' role

The private enterprises having industrial activity in immediate

proximity with the river beds being also water polluters will take part in creation of the scheme. The PES scheme will be put into practice under direct guidance of Severskiy Donets River Basin Council.

Benefits and expected results

Improvement of quality of water in basin of Kalmius river by streamlining of economic activities and carrying out of forest ameliorative actions in coastal zones.



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