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WATER USE AND ECOSYSTEM SERVICES: A CASE OF RUSSIA

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Annotation. *The article is focused on the possibility of implementing ecosystem services (ES) in water management system of Russia. Examples of international practice ES-oriented water use policy are reviewed. Modern structure of water use system in Russia is presented. The main environmental problems of Russia in connection with ES according to Common international classification of ecosystem services (CICES) are summarized. As a result, the authors propose a roadmap for reforming water use based on ES in order to improve water management. Key positions of possibility way of development Russia's water use system are highlighted and recommendations are given due to sustainable development goals.*

Key words. *Ecosystem services, water use, water management, water policy, environmental management, green economy, sustainable development, water resources, CICES.*

INTRODUCTION

The water management problem is identified as one of the goals of sustainable development. Access and availability to clean water is a critical and urgent issue for everyone [Sustainable development goals, UN, 2015]. Nevertheless, management of inland water bodies without an integrated approach may not have the required positive effect on conservation of water quality. This is the result of indirect impact of contiguous territory (forests, agricultural areas, urban areas, etc.). Disturbance of soil infiltration, loss erosion control are consequences of cutting down the forest [Mapulanga and Naito, 2019]. Another problem associated with water use is desertification and degradation of farmlands [Ortiz et al., 2021]. The mentioned elements are important, but insufficient for efficient environmental policy. Understanding the linkages between various natural components is a key point for water management [Corfee-Morlot et al., 2003] where each stakeholder must take responsibility for the decision-making process.

Ecosystem services (ES) are the benefits that mankind obtains from the environment [Costanza et al., 1997]. Inland aquatic ecosystems provide a variety of ES: drink water, food, water for irrigation, recreation, hydropower, habitat, etc. Extensive range of facilities ES concepts are applied worldwide [Water security, UNEP, 2009] in varying degrees, which confirms the feasibility of introducing it into modern water policy.

The objective of this study was to elaborate a way of application ES-based approach in Russia’s water policy framework, bearing in mind the geographical location, natural diversity. A review implementation of water management strategies of states and the European Union was carried out. Recommendations to current challenges are suggested.

The article is organized as follows. The first part reviews water use policy related to cases of implementation ES at the international level. The second part exposes problems of water management in Russia. The third part presents a conceptual framework and ways to improve Russia's water use policy through the implementation of ES, based on the experience of other countries.

WATER POLICY AND ES. REGIONAL AND INTERNATIONAL EXPERTISE

First, to follow the best practice, we consider how the water management system is organized in the case studies. At the international level, the United Nations published Resolution “International Decade for Action, Water for Sustainable Development, 2018 - 2028” (A/RES/71/222) that stresses the importance of the participation of stakeholders [Water for Sustainable Development, 2018 – 2028…, UN, 2012]. The World Meteorological Organization (WMO) presented the Associated Programme on Flood Management (APFM) that put emphasis on sustainability of water planning [A Tool for Integrated Flood Management…, WMO, 2012]. In recent decades, The European Union (EU) has presented the Water Framework Directive (WFD), Groundwater Directive, Floods Directive. These guidelines highlight the importance of integrated management of water resources [Directive 2000/60/EC, Directive 2006/118/EC, Directive 2007/60/EC, EU]. The WFD was difficult to use for several reasons. The participation of multitude stakeholders and weak methodologies complicated the governance process. However, subsequently, the WFD became quite effective [Giakoumis and Voulvoulis, 2018, Carvalho et al., 2019].

In Italy, the territory is divided into 8 water basins, where flood risk management principles are implemented, and water supply issues are addressed. Management plans are developed at the regional level. At the local level, River Contracts are used, extensively involving both local authorities and stakeholders. Strategic aims include reducing water pollution, minimizing flood risk, restoring watercourse quality within urban areas and exchanging water management experience.

Belgium's water policy differs from other river basin management by its international consideration due to transboundary transfers of surface water resources. Belgium is divided into 4 water basins, which are divided into 11 sub-basins and 103 smaller units. Instead of ‘ecosystem services’ the term 'blue services' in new editions, is used. Public participation in water management is strongly encouraged.

Portugal is divided into 10 basins, and 4 of them are closely linked to Spain for management. Water management for each site is well structured. The Water and Waste Services Regulatory Entity (ERSAR) controls prices for water use and monitors water quality. The General Direction of Natural Resources and Maritime Safety and Services (DGRM) is responsible for the management of marine resources (fisheries, aquaculture, environmental situation in the coastal zone, etc.). The term ‘ES’ is not mentioned directly, but its individual components, such as water supply, biodiversity conservation, stoke water management, fire protection, floods, droughts, are regarded. In Romania, at the regional scale project development invites stakeholders [Grizzetti, 2016].

The government of Canada adheres to the following goals: protection and improvement of water quality, enhancement water management policy [Forsberg, 1998]. The federal authorities deal with fisheries and navigation [Davies and Masumder, 2003]. Collaboration between scientists and local citizens is considered of an ES approach (for example Community based environmental monitoring (CBEM) in the George River basin) [Gerin-Lajoie et al., 2018]. Such experience may be particularly relevant in remote and inaccessible areas where residents have considerable knowledge of the environment and therefore can ensure that researchers' interests are accomplished.

In the United States, one of the main authorities regulating water resources management is the United States Environmental Protection Agency [U.S. Environmental Protection Agency]. A comprehensive law including, in particular, environmental issues, passed in 1970, is the National Environmental Policy Act (NEPA), which has been the point of reference for many environmental acts in countries around the world [NEPA, 1970]. The basic rules and requirements for the use, quality and management of surface drinking water resources are prescribed by the Safe Drinking Water Act, which is the base for other regulations [Safe Drinking Water Act, 1974]. Ground Water Rules (GWR) regulate groundwater management [Ground Water Rule, 2006]. The application of ES was first discussed in the report ‘Teaming with Life: Investing in Science to Understand and Use America's Living Capital [Teaming with Life: Investing…, 1998], which resulted in the creation of a work group in order to assess payments for ES. The term ‘ecosystem services’ within water resources management is also mentioned in The National Service Forest Plans amendments of 2012. The support and assistance in solving water management problems are provided by a GIS system in the US [EnviroAtlas, EPA], that allows the use of mapping data for decision-making. Another online resource contains a set of methodologies and examples of effective ecosystem service valuation [National ES Partnership, 2016] and, thus, helps to minimize conflict situations and helps to find trade-offs in environmental management issues [Schaefer et al., 2016]. The San Pedro watershed in southeastern Arizona was a pilot project for environmental management using ES. Further implementation of ES in other laws is encouraged due to achieving national environmental policy goals [Bear, 2014]. Thus, some ES concept foundations are attempted to use in many U.S. agencies and cited in various laws.

Local scale examples of the use of ES include improvements to the Great Dismal Swamp National Wildlife Refuge development plan and the Connecticut River Watershed development project. In the first case, decision makers refer to several government agencies (The Fish and Wildlife Service, Army Corps of Engineers, etc.), regional agencies, mayors and nongovernmental organizations. As a result, possible tradeoffs between recreational use of channels and maintaining high quality of drinking water are explored [Scarlett and Maillett, Incorporating Consideration…, 2014]. In the second case, the critical objectives were to reduce anthropogenic influences on river waters, increase public education, regulate invasive species and reduce flood risks. The implementation of the project was accomplished with stakeholder assistance on collaborative working partnership to eliminate other related problems, such as yield reduction, erosion, etc. [Scarlett and Maillett, Using an ES…, 2014]. To summarize, in the USA the decision-making strategy in water basin management is explicitly based on the concept of ES.

In Bhutan, water use is regulated by the National Integrated Water Resources Management Plan (NIWRMP), the Basin Management Approach. The National Environmental Commission (NEC) is the main authority for water resources management. Bhutan is divided into 186 water basins, each with a water use plan. In 2011, Bhutan established the Watershed Management Division. It is important to note that the guidelines follow the concept of ES as they not only focus on water quality conservation but also on indirect benefits such as forest conservation, erosion reduction [Norten, 2021].

The Mexican government developed The Payment Hydrological Environmental Services (PSAH) Program, which is the program to maintain water quality. This policy resulted in the payment of about $18 million to forest owners to perform preventive measures against threats and risks of declining water quality. The first steps to program implementation were made by a research group from the Instituto Nacional de Ecologia. The academic literature was endorsed by the state and applied in environmental management. The issues of this project include the conflicts with farmers and landowners due to prohibition of agricultural land expansion. The uneven compensation payments to beneficiaries are also a considerable problem, caused by disputes about the fact that some forest owners facing no water use problems receive more money than their counterparts in more vulnerable areas. However, this issue can be resolved by improving management and regulating the number of payments [Carlos et al., 2008].

WATER USE MANAGEMENT SYSTEM IN RUSSIA

The Russian Federal Water Resources Agency is the main authority in the field of water use. Nowadays, the Russian water management system is regulated by the Russian Federation Water Code, which was passed in 2006 [Rozumovich, 2020]. Article 28 of the Russian Federation Water Code distinguishes 21 basin districts [Water Code of the Russian Federation, 2006]. To optimize the water management system, Article 29 of the Russian Federation Water Code establishes basin councils for a 5-year term. These councils include representatives of executive authorities, regional authorities, local governments, indigenous communities, etc. The objectives of basin councils are the development protection of water resources, definition limits for water consumption, reduction of flood negative consequences and flood prevention. Basin districts are monitored by the Federal Service for Hydrometeorology and Environmental Monitoring. The number of hydrological observation points decreased from 1992 to 2018 by 19 percent. Systematization of water bodies is carried out by the State Water Registry [State report «On the state and use of water resources, 2019]. The implementation of water management measures is based on the “Schemes of complex use and protection of water resources”. The term "complex" in the title does not fully disclose the meaning of the issues discussed in the document. Assessment of the water body condition eliminates other types of environmental management or insufficient in this case. For example, in the Don River basin, a key point is an assessment of biological, chemical pollution and technical conditions of treatment facilities [Scheme of integrated use and protection of water bodies, 2012]. Particular attention is paid to the problems of irrigation water management. However, the Scheme does not consider the land use system of contiguous territory. In addition, implementation of fish-farming projects and developing water tourism has considerable potential for growth economics. As some researchers [Tomakov et al., 2012] have noted, the existing system of watershed planning is not efficient. The Federal Service for Supervision of Natural Resources monitores water conditions and ensures compliance with laws [The Federal Service for Supervision of Natural Resources]. The certain tension is noted between authorities and Rosprirodnadzor. This is reflected in slowing decision-making processes as a result of bureaucratic barriers [Dontsova, 2010].

To summarize, the following water use management problems are noted:

- The issue with the openness of environmental monitoring data to the public, causing constant discussions about "silencing problems".
- Low involvement of the population in decision-making processes, lack of education policy from the state for participation in such processes.
- Opposition by the authorities to non-profit public organizations in the field of ecology. The emergence of the law on "foreign agents" has significantly affected the system of environmental NGOs [Kefner, Morgun, 2020]. This law restricts funding from abroad, and increases the dependence of Russian environmental organizations on government funding, which reduces the independence of company activities.
- Sanitary standards for water quality that do not take into account regional hydrochemical indicators.
- The problem of watershed pollution by domestic waste.

ES AFFECTED BY WATER USE. EXAMPLES AND CHALLENGES OF RUSSIA

The authors have assessed existing water management problems and selected components of ES according to CICES V5.1, which is used in international environmental management practice [The Common International Classification of ES]. Table 1 shows the main problems related to water use in different regions of the Russian Federation and the corresponding ES affected by land use. The problem of surface water pollution affects many regions of Russia. This is particularly true for densely populated regions and industrial cities, which are located nearby water bodies. The great complexity of communication between stakeholders may lead to not achieving the ultimate goals [The unhealthy "Revitalisation of the Volga", 2021]. Water pollution is a growing concern in the watershed of the Northern Dvina River. The main reason for this is that treatment plants of forest-based enterprises and pulp and paper mills have outdated equipment [Dushkova and Evseev, 2011]. Areas mentioned are directly related to using surface water resources for drinking and household needs. Pollution of the Volga River causes a decrease in the population of high value fishery species (sturgeon) [Ruban et al., 2019]. The Federal Program “Revival of the Volga” was created to address the problem of degradation of aquatic ecosystems and prevent water contamination in European Russia. One of the main objectives of the project was to reduce discharged polluted water by 3 times. However, according to the results of inspection, these values are poorly achievable [The unhealthy "Revitalisation of the Volga", 2021].

Table 1. Russia's water management challenges, stakeholders and ecosystem services

Problems	Negative effects	Regions	ES (Group) (CICES V5.1)	Stakeholders
Pollution of surface water (lakes, rivers, channels)	Ecosystem changes caused by transformed chemical composition of water and temperature regime. Problems of water use for drinking, agricultural and industrial purposes.	Rivers of Baltic Sea basin, Dvina-Pechora basin, Volga River, basins of Ob, Lena and Amur rivers.	Provisioning (Biotic): 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6. Regulation, Maintenance (Biotic): 2.1.1, 2.1.2, 2.2.2, 2.2.3, 2.2.4, 2.2.5. Cultural: 3.1.1, 3.1.2, 3.2.1. Provisioning (Abiotic): 4.2.1. Regulation, Maintenance (Abiotic): 5.1.1.	**Regional level:** regional authorities, water treatment organizations, agricultural organizations (including fish farming), scientific research groups. **Local level:** smallholder farming, fishermen, hunters, tourists, local citizens, religious denominations.
Pollution of groundwater	Restrictions on the water use for drinking, agricultural and industrial purposes. Pollution of surface water.	Groundwater wells, local industrial intake.	Provisioning (Biotic): 1.1.1, 1.1.2, 1.1.3, 1.1.4. Provisioning (Abiotic): 4.2.2. Regulation, Maintenance (Abiotic): 2.2.4, 2.2.5.	**Regional level:** authorities, water treatment organizations, agricultural organizations, environmental organizations, scientific research groups. **Local level:** smallholder farming, local citizens.

Problems	Negative effects	Regions	ES (Group) (CICES V5.1)	Stakeholders
Alteration of water basins as a result of the construction of water reservoirs	Swamping, siltation, water logging. Ecosystem changes caused by transformed chemical composition of water and temperature regime. Restrictions on the use water transport.	Volga, Enisey, Don, Terek rivers. Hydropower facilities on small rivers.	Provisioning (Biotic): 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6. Provisioning (Abiotic): 4.2.1, 4.2.2. Regulation, Maintenance (Biotic): 2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6. Regulation, Maintenance (Abiotic): 5.1.1, 5.1.2, 5.2.1, 5.2.2. Cultural: 3.1.1, 3.1.2, 3.2.1.	**Regional level:** authorities, water treatment organizations, agricultural organizations (including fish farming), logging organizations, water transport companies, industrial fishery, tourism организации, environmental organizations, scientific research groups. **Local level:** small farmers, fishermen, hunters, tourists, local citizens, religious communities.
Floods	Damage to human settlements. Limits of water use for drinking, agricultural and industrial purposes during flooding.	Dvina-Pechora basin; Kuban, Terek, Enisey rivers; basin of Lena River, basin of Amur River. Rivers of Caucasus region.	Provisioning (Biotic): 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6. Provisioning (Abiotic): 4.2.1. Regulation, Maintenance (Biotic): 2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.2.4, 2.2.5. Regulation, Maintenance (Abiotic): 5.1.1, 5.1.2. Cultural: 3.1.1, 3.1.2, 3.2.1.	**Regional level:** authorities, water treatment organizations, agricultural organizations, environmental organizations, **Local level:** smallholder farming, fishermen, hunters, tourists, religious denominations.
Excessive consumption of groundwater	Drying of shallow aquifers. Decrease of surface runoff.	Moscow region, Kursk region, Zheleznogorsk, North-Dagestan cone of depression.	Provisioning (Biotic): 1.1.1, 1.1.3, 1.1.5, 1.1.6. Provisioning (Abiotic): 4.2.2. Regulation, Maintenance (Biotic): 2.1.1, 2.1.2, 2.2.2, 2.2.4. Regulation, Maintenance (Abiotic): 5.2.2.	**Regional level:** authorities, water treatment organizations, agricultural organizations, industry (mining, processing, etc.), environmental organizations, scientific research groups. **Local level:** smallholder farming, local citizens, fishermen.

Code (Group)

1.1.1. Cultivated terrestrial plants for nutrition, materials or energy. 1.1.2. Cultivated aquatic plants for nutrition, materials or energy. 1.1.3. Reared animals for nutrition, materials or energy. 1.1.4. Reared aquatic animals for nutrition, materials or energy. 1.1.5. Wild plants (terrestrial and aquatic) for nutrition, materials or energy. 1.1.6. Wild animals (terrestrial and aquatic) for nutrition, materials or energy. 2.1.1. Mediation of wastes or toxic substances of anthropogenic origin by living processes. 2.1.2. Mediation of nuisances of anthropogenic origin. 2.2.1. Regulation of baseline flows and extreme events. 2.2.2. Lifecycle maintenance, habitat and gene pool protection. 2.2.3. Pest and disease control. 2.2.4. Regulation of soil quality. 2.2.5. Water conditions. 2.2.6. Atmospheric composition and conditions. 3.1.1. Physical and experiential interactions with natural environment. 3.1.2. Intellectual and representative interactions with natural environment. 3.2.1. Spiritual, symbolic and other interactions with natural environment. 4.2.1. Surface water used for nutrition, materials or energy. 4.2.2. Ground water for used for nutrition, materials or energy. 5.1.1. Mediation of waste, toxics and other nuisances by non-living processes. 5.1.2. Mediation of nuisances of anthropogenic origin. 5.2.1. Regulation of baseline flows and extreme events. 5.2.2. Maintenance of physical, chemical, abiotic conditions

Unfortunately, surface water pollution also negatively impacts the cultural ES. Some lakes and rivers are no longer used as recreational facilities due to deterioration of water quality (decreased transparency, deterioration of water quality). This reduces the number of people involved in water tourism, recreational fishing and beach recreation. It is worth noting that significant pollution of surface waters in Moscow, where about 77% of the water samples taken from ponds and streams do not meet the standards for microbiological indicators and 60% of samples - for sanitary indicators [Andreeva, 2014]. Urban citizens have an increased risk of disease in case of consumption of caught fish or recreation activity.

Construction and operation of hydraulic facilities affects a large number of ES and, despite many positive aspects, often leads to negative consequences [Briones-Hidrovo, 2019]. The major cluster of hydropower plants is located on the Volga River and in Siberia [Report on the functioning of the Unified Energy System of Russia…, 2021]. Increased risks of ecosystem disturbance are caused by the lack of laws in the management areas of potential flooding and in the vicinity of reservoirs [Mitina et al, 2020].

Catastrophic floods in Russia occurred in the Far East, Irkutsk Region, Zabaikalsky Krai, Yakutia and Krasnodar Krai. Floods had different causes, such as intense rainfall, ice jams and rapid snow melt [Dobrovol'skii and Istomina, 2009]. Issues of flooding are discussed in research and academic literature, there is a wide national legislation gap between theory and practice [Kireeva et al., 2019, Shalikovskiy and Kurganovich, 2016, Ayzel, 2021]. Special attention should be paid to the problem of groundwater contamination in case of its further use for drinking water supply. Chemical and biological pollution focuses are located almost throughout the country [Pykhtin et al., 2019]. The largest number of pollution focuses are on the European part of Russia [Luk’yanchikov, 2016].

Coal mining complexes disturbes regulating ES. For example, Partizansk Coal Basin located in the South of the Russian Far Eastern Region, is marked with a decreased soil quality and increased surface water salinity [Arefieva, 2019]. At the Levikhinskoye sulfide copper deposit, concentrations of pollutants were higher than during mining operations. The source of water with increased mineralization is the collapse zone, with increased sulfate concentrations [Rybnikova , Rybnikov, 2019]. According to [Malkovsky et al., 2019], deep injection of liquid radioactive waste (LRW) is widely used on an industrial scale in Russia. It is crucial to inject LRW in non-leaky aquifers with impermeable aquicludes, as long-lived radionuclides remain pollutants for a long time and migrate with groundwater flow, penetrate to surface water and shallow groundwater used for drinking purposes. In order to prevent the migration of radionuclides, clay barriers are successfully implemented [Krupskaya et al., 2019]. However, examples of radionuclide pollution are known even in such cities as Moscow [Malkovsky et al., 2020].

ROAD MAP: TOWARDS SUSTAINABLE WATER MANAGEMENT IN RUSSIA

Introducing sustainable environmental practices and standards in water use is one of the best and most effective ways to optimize the water management system in Russia. Keeping in mind the ecological problems, a key point to improve national governance systems is the need to clarify management methods of water use. Fig. 1, presented below, is a road map that may be used for solving water problems in future. All water basins of Russia should be considered at the national level. The regional level corresponds to the scale of basin districts in accordance with the Water Code of the Russian Federation. sub-basins are allocated within each basin district, according to available financial and labor resources, at the local level. First of all, it is necessary to identify key objectives for water basins at the national level. This strategy should include objectives for each watershed, highlighting the significant issues to be addressed. The next step is to have a person responsible for implementing strategy for each water basin. In this stage, strategy is a transition to the regional level. It seems reasonable, given the vast territory of the country and the regional climatic, economic, environmental and social specificities of the regions.

At the regional level, work is carried out on implementing the national water use strategy. Focus groups are established to address issues It is reasonable to presume that the division of watersheds into smaller units to provide an individual nature management approach. This can help ensure flexible managerial decisions. Expert groups (regional authorities, scientists, public organizations, etc.) define boundaries of sub-basins in which the supervisor are appointed at the regional scale. Features of sub-basins are defined based on human resources capacity, spatial position and economic activities. List of problems is drawn up based on experience and scientific knowledge for each sub-basin.

The methodologies for evaluating ES for each sub-basin are then compiled. Important regional characteristics of sub-basins may be overlooked if the ES are evaluated at the federal level. Conversely, if ES are considered at the local level, problems arise due to the lack of highly qualified personnel. This practice is carried out by a regional basin focus group. As a result, a document of the most important ES for each sub-basin and a list of significant ES is produced. Subsequently, the focus group determines the range of data that needs to be collected for evaluation ES to select the area of work for sub-basin.

Next, a focus group representative together with the local authorities ensures the collection of information for the evaluation ES. This can include field surveys, collection of archived information, population surveys, etc. The result could be a database, geographic information system or report. It is important to present the results of the work at local level to the general public in meetings with stakeholders. This will help to avoid conflicts and choose the best option in case of existing controversial solutions in the future. The decisions are based on the results of public discussion and a document is developed to implement the chosen solution locally.

Analysis of the decisions made and rethinking of the results is done by establishing a local monitoring network and the reporting data to the regional level. The regional focus groups consider the results of the monitoring, adjust the implemented policies and report the results to the federal level. It can be determined which basins and sub-basins are doing well and which are not. Accordingly, the focus group staffing is revised, the list of problems is changed, or the methodology for calculating ES is modified.

To summarize, this framework can allow for a more efficient water management system. The demand for information, large databases, geoinformation systems, and highly qualified staff is increasing. The negative aspects include high qualification requirements for decision-makers of watersheds, regional focus groups: impartiality, high awareness of the current development of economic activity of the region. External influences, pressure on decisions made and corruption are only a small part of the problems to be solved in the future.

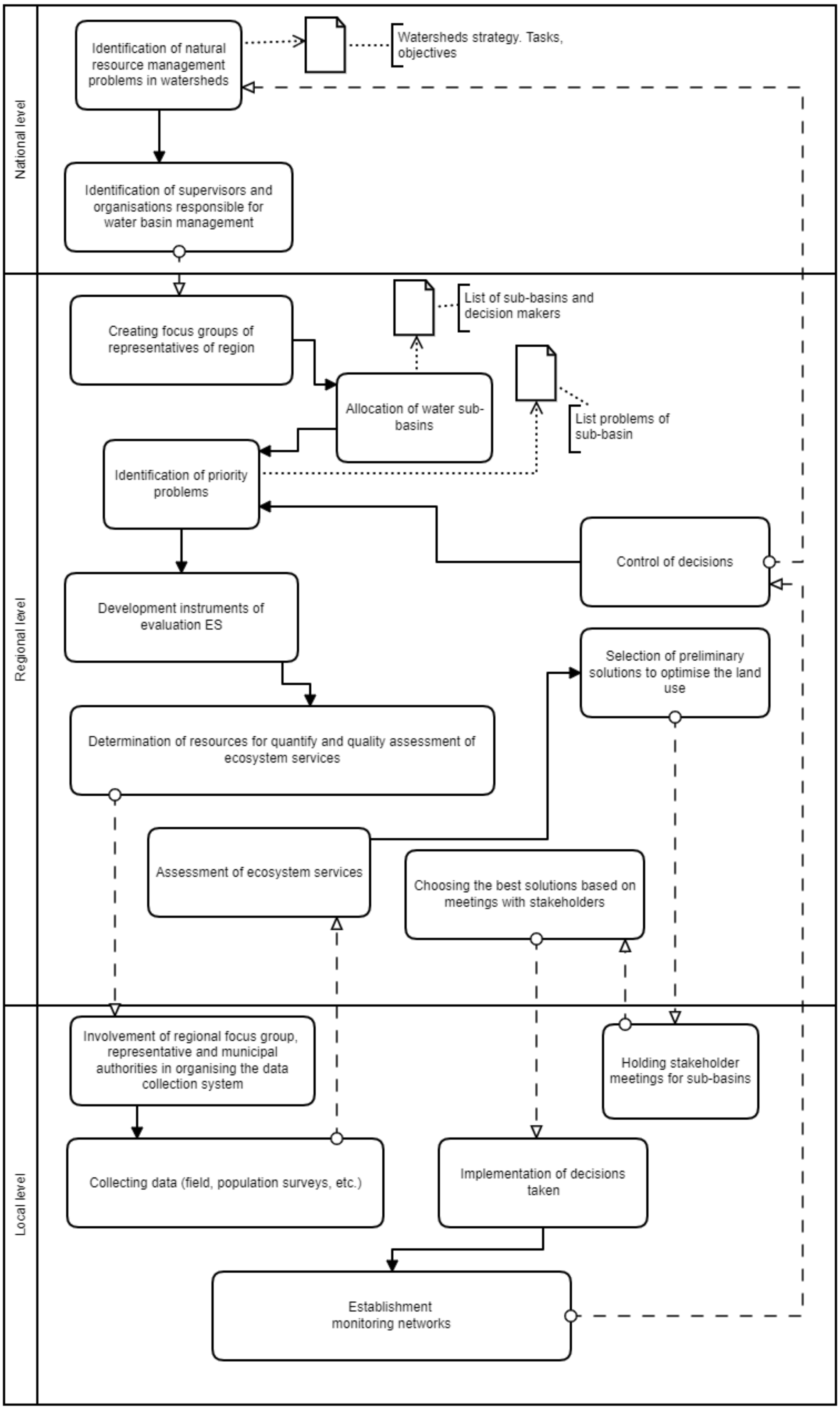

Figure 1. Russia's water use road map considering the ecosystem services

CONCLUSION

Our study provides some examples of water management systems in the international aspect. Variability of water use strategies in countries of the world depending on economic and social development is noted. High role of international relations and creation of focus groups and public participation in solving environmental problems in water use is substantial. Importantly, consideration of the components of ecosystems is prevalent in decision-making. ES are rarely mentioned in laws, but instead the terms "green economy" or "blue economy" are often used. Evaluating the benefits of nature also often appears indirectly in conservation strategies. Unfortunately, the Russian water use system is currently not very effective, resulting in the number of regional and local issues in different regions of the country. Wide areas of basins and poor communication with the local population do not allow to provide a high level of water quality. The European part of the country is characterized by pollution of waterbodies, high impact of tourism and recreation activity. The southern areas of central Russia experience a shortage of water resources for agricultural and drinking purposes. The Far East region is affected by floods. Locally, there are problems of excessive withdraw of groundwater and surface water as mining activities and for drinking needs. Therefore, concerted efforts are needed to ensure integrated and effective management of water use.

The authors have proposed a roadmap showing improving the water use management system by the introduction of the ES concept to address these issues. In general, the environmental safety improvement of water use may be achieved by following principles:

- The regional peculiarities of territory are advised to be considered when using the basin approach.
- The implementation of ES is possible only at the local level due to the high error of their assessment within large territories and its expensive cost.
- It is very important to take into account the opinions of all stakeholders in order to minimize conflicts later when identifying problems at the local level.
- Public monitoring is one of the most effective tools in environmental management, therefore, transparency of decisions made is an integral part of sustainable water use. Consideration of public opinion in decisions is an obligatory condition.
- With the increasing importance of geo-information systems, which can meet the needs for information about the environment, it is necessary to create regional, local GIS systems.

Thus, there is a great potential for development of the water use system in Russia. Monitoring data on the state of water bodies is very limited, therefore, it is necessary to increase public accessibility to information on the environmental conditions. Introduction of ES based on international experience into the water use strategy of Russia seems to be a small but very important step in the whole system of state nature management.

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