

Principles of natural capital preservation in the context of strategy of state environmental safety

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Abstract. The article analyzes issue of strategy forming of state development through prism of state environmental safety, preservation of its natural capital in the process of formation and implementation of state environmental policy. Basic ecological, economic, social principles of natural capital preservation of Ukraine are considered. Possibilities of ecological network development of Ukraine are investigated. A comprehensive knowledge framework for the management of natural capital is shown.

1 Introduction

Consideration of state development strategy of modern countries is impossible without taking into account such important component as natural capital - the natural environment of mankind, our noosphere. It should be understood as a whole societal organism. People and products of their activities are in unity and interconnection. They perform simultaneously number of important functions of societal self-organization (e.g. biological - as a habitat for biological objects; physiological - as a source of physiological needs of all living beings on Earth; socio-economic - as means of production, basis for placement of various spheres of human activity, cognitive - as an object of scientific research and cognition, etc.).

It is no coincidence that the Sustainable Development Goals (SDGs) [1] approved at the United Nations Summit on Sustainable Development and the adoption of the Agenda for Development in September 2015 [1] and revised Sustainable Development Goals for Ukraine adopted in accordance with them in four key areas:

1. Fair social development;
2. Sustainable economic growth and employment;
3. Effective management;
4. Ecological balance and development of sustainability [2].

As we can see, one of these key areas directly reflects the content and purpose of the environmental function of the state. Moreover - 6 of the 17 main goals of sustainable development for Ukraine in one way or another relate to natural capital, environmental protection (Objective 6 -

Clean water and sanitation; Objective 7 - affordable and clean energy; Objective 12 - responsible consumption and production; Objective 13 - climate change mitigation, Objective 14 - conservation of marine resources and Objective 15 - protection and restoration of terrestrial ecosystems). According to these goals the effective preservation of Ukraine's natural capital for present and future generations is possible only through clearly planned and organized measures for formation and implementation of modern state environmental policy including preservation of natural capital and development of ecological network. It seems possible based on development of clear methodology for conservation of natural capital based on system of principles, methods and tools.

One of the most important principles of sustainable development is to ensure safe environment for life and health. One of the main criteria in this direction is the preservation of natural capital taking into account given environmental problems, economic instability and number of other factors. All this necessitates further development of preservation methodology of natural capital.

The article aim is definition of methodological principles and methods of natural capital conservation on the basis of foreign experience. The object of this scientific research is main components of the natural capital of Ukraine. The subject of scientific research is process of forming the methodology of public administration for natural capital preservation.

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2 Results

The term ‘natural capital’ was proposed by David Pearce [3], as a way to underline the role of nature in supporting the economy and human well-being. It is now recognised that human well-being depends on different types of resources or assets, which can be categorised in relation to four broad types of capital. All of these capitals support the economy and human well-being [3-5]:

- **Manufactured or ‘man-made’ capital:** assets used to produce goods and services, such as machines, tools, buildings and infrastructure. Financial capital includes money and other financial assets, and is sometimes seen as a distinct additional category.

- **Human capital:** assets in the forms of knowledge, education, motivation and work skills, mental and physical health.

- **Social capital:** includes social trust, norms and networks that facilitate social and intellectual interactions and solutions to common problems, e.g. neighbourhood associations, civic organisations and cooperatives, and the political and legal structures of a society.

- **Natural capital:** comprises of the ecosystems and abiotic assets of the planet that provide people with exploitable resources, e.g. solar radiation, fossil fuels and minerals, and generate a flow of benefits via ecosystem services, e.g. food, climate regulation and recreation.

While all four types of capital are needed to support human well-being, natural capital is arguably the most important one because it supports and underpins the other forms of capital. For example, minerals, metals and energy are needed to build the components of manufactured capital. Human and social capitals are heavily dependent on the physical health of individuals who are dependent upon ecosystem services to maintain good health. These services range from food, freshwater, timber and fibres, regulating ecosystem services, e.g. water purification, nutrient cycling, mitigation of floods, and benefits from open landscapes and urban parks that support recreation and well-being.

Natural capital: includes biotic and abiotic elements and comprises of all natural resources that human society draws upon. A sound analysis of ecosystem processes, combined with the general principles of environmental accounting, is the foundation for developing a natural capital accounting approach. Fig. 1 illustrates the main components of natural capital as currently understood – this has been developed from the natural capital figure in the first EU MAES report on the ‘Mapping and Assessment of Ecosystems and their Services’ [6].

Fig. 1 makes a distinction between ecosystem capital and abiotic resources. In reality, there is no clear-cut boundary between biotic and abiotic components [9]. For example, water is an abiotic factor but is included under ecosystem capital as living organisms play a modulating role in its cycle and water plays a key role in all ecosystem processes [7, 8]. However, this distinction helps to identify and classify different types of natural capital, which is important in the context of developing a natural capital accounting approach. Another dimension in Fig. 1 is the relationship between the concepts of ‘assets’ and ‘flows’. According to standard economic theory, natural

capital is the sum of the different physical assets of nature, e.g. mineral deposits or tonnes of biomass, and benefit flows would not really be part of natural ‘capital’. However, for ecosystem capital in particular, the same natural processes govern ecosystem assets and ecosystem services, so it is often difficult to draw a line between the two. Secondly, in the context of monetary accounting, the value of the asset stock is often derived from the flows it generates. Lastly, in many less-specialist discussions, flows are considered as part of natural ‘capital’. For these reasons, Fig. 1 shows ecosystem and abiotic assets and flows in the same colour but with different background shading. The second key feature of assets and flows is their depletability. Some are, under current circumstances, unlimited, i.e. ‘non-depletable’ – for example, sun light and wind depend on solar radiation, which humans cannot influence. Most abiotic assets are, for obvious reasons, classified as ‘depletable’ because they do not renew themselves and their stock is therefore reduced over time by exploitation, e.g. fossil fuels and minerals. Ecosystems and associated service flows are also ‘depletable’ since over-exploitation can lead to the extinction of species or depletion, e.g. fish stocks. Outright habitat destruction, e.g. the conversion of forests or grassland to urban areas, ultimately destroys ecosystems and the regulation and maintenance, or other services, they generate. Ecosystem capital is particularly vulnerable because many species and habitats depend on specific conditions being maintained, and human society heavily exploits it via agriculture, forestry and other land uses. This part of natural capital can therefore be considered as a component for which society has a particular ‘duty of care’ – it is fragile, and human actions have already negatively impacted much of it. However, with suitable management and care ecosystems are capable of delivering a sustainable flow of flow of ecosystem service benefits into the foreseeable future [9].

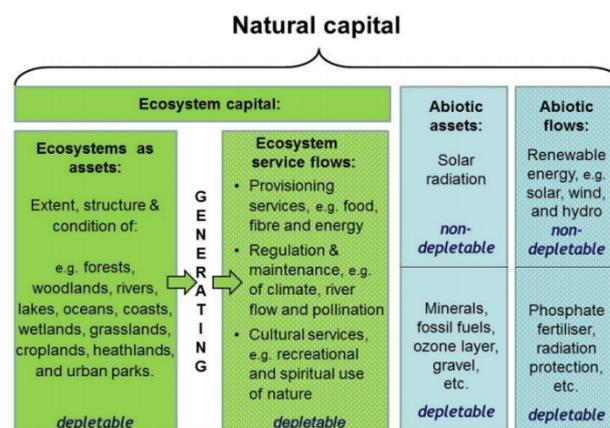


Fig. 1. Components of natural capital [9].

Strategy of natural capital preservation is defined by modern science as one of the most important functions of the state - fundamental component of the building process legal democratic state with developed market economy [10]. According to T.I. Pishenin, “Currently there are two approaches to solve the environmental problem. Globalist approach is based on the principle that developed

countries with great potential can destroy the whole world, and therefore other countries to ensure environmental security. Most developed countries try to reap obvious globalization benefits. Current approach is based on recognizing of national safety priority reached through self-sufficiency through the by sustainable development of their own environmental safety of production. Existence of such approach is explained by the fact that in the modern world the main factor in making most important decisions are still nation-states. Therefore, acting on the world stage, each state cares primarily about their own interests” [11].

However, manifestations of Ukraine’s conscious position on its environmental interests, clear strategy, and what is more importantly - appropriate actions since independence can not be traced as far as O. Palienko notes: “Ukraine is one of the most environmentally unreliable countries in Europe. The country’s economy was formed without taking into account objective needs and interests of the population, while the protection of environmental measures was carried out on a residual basis. As a result, its economy is oversaturated with chemical, metallurgical and mining industries [10].

At the same time, it can not be said that our state did not have its own environmental policy at all. Thus, number of legislative and normative legal acts were adopted. The Law of Ukraine “On the Ecological Network of Ukraine” (2005) deserves special attention in the light of the chosen issues [12]. This Law regulates relations related to formation, preservation and rational, inexhaustible use of the ecological network. According to this law the ecological network is only territorial system formed to improve conditions for formation and restoration of environment, increase natural resource potential of Ukraine, preserve landscape and biological diversity, habitats and growth of valuable species of fauna and flora, genetic fund, ways of migration of animals through combination of territories and objects of the nature reserve fund. Also other territories with special value for environmental protection and are subject to special protection.

Development of science and technology due to formation and accumulation of intellectual capital allows more efficient use of natural capital- says O. Badrak. Along with emergence of new technologies that determine efficiency of natural resources in production processes there are previously unaccounted factors in the formation of gross national product. They still do not have a socio-economic status. Special role in this process belongs to economical use of natural resources in economic activity and environment protection from possible negative socio-environmental effects and risk prevention. It will contribute to collection of environmental rents and “green” taxes [13].

Concept of ecological network is manifestation of such environmental innovation aimed at more efficient use and preservation of natural capital. Structural elements of this network include:

- territories and objects of nature reserve fund;
- water fund lands, wetlands, water protection zones;
- forest lands;

- field protective forest strips and other protective plantings;
- health-improving lands;
- recreational lands;
- territories that are places of residence or growth of species of fauna and flora listed in the Red Book of Ukraine, etc. [12].

The legislator provided that inclusion of territories and objects in the list of territories and objects of ecological network does not lead to change in form of ownership and category of land for relevant land plots and other natural resources, their owner or user. At the same time the issue of ecological network management arises. Ukrainian researcher R. Miroshnichenko proposes to differentiate state regulation in the field of environmental safety on three levels. The first level according to researcher includes management of central public authorities of the state by a set of mechanisms. Their activities are aimed to monitor environmental situation in the country and nature of global impacts on it. Second are aimed at formation of socially adequate state policy on environmental safety management methods and ensuring effective functioning of mechanisms of public administration and state control over compliance by all authorities, institutions and organizations and individuals with current legislation [14].

In our opinion it is quite obvious to single out the third level - regional government; the fourth - level of local public authorities and self-governing institutions of territorial communities, civil society organizations and, finally, the fifth - level of specific economic entities and environmental facilities. It will comply with legal norms. It stipulates that public administration in the field of formation, preservation and use of the ecological network is carried out by:

- The Cabinet of Ministers of Ukraine;
- The Council of Ministers of the Autonomous Republic of Crimea,
- specially authorized central executive body for environmental protection, environmental safety, protected areas, as well as hydrometeorological activities and its territorial bodies;
- other central executive bodies;
- local executive bodies;
- local governments [13].

Numerous NGOs are also involved in this process. Formation, preservation and use of the eco-network is carried out according to the following basic principles:

- a) ensuring of ecosystem functions integrity of components elements of ecological network;
- b) conservation and environmentally sustainable use of natural resources on the territory of the ecological network;
- c) stopping loss of natural and semi-natural areas (occupied by plant groups of natural origin and complexes changed in the process of human activity), expansion area of the ecological network;
- d) state support providing, stimulating subjects of management when creating territories and objects on their lands nature reserve fund, other subject areas special protection, development of the ecological network;

e) ensuring participation of citizens and their associations in the development of proposals and decisions on the formation, preservation and use of eco-network;

e) ensuring connection of the national eco-network with the eco-networks of neighboring countries that are members of the Pan-European Eco-network, comprehensive development of international cooperation in this field;

f) improving composition of the lands of Ukraine by providing scientific relationship between different categories of land;

g) systematic consideration of environmental, social and economic interests of society [12].

It should be noted that idea of the ecological network as an environmental technology arose in the 80s of last century. In 1993 Dutch experts proposed creation of European Ecological Network (EEN) at the international conference on the environment in Maastricht. The EEN program was a part of the Pan-European Strategy for the Conservation of Biological and Landscape Diversity, adopted in 1995 at the Conference of Ministers for the Environment of European countries in Sofia.

Structural elements of the EEM should be the so-called ecological nuclei, ecological corridors and buffer zones. Ecological nuclei are small, ecologically valuable and large in size. They usually have natural conservation status. Their main task is to preserve biological and landscape diversity in the reference natural areas, to help maintain the ecological balance in the region. Ecological cores should be interconnected by ecological corridors - strips or massifs of relatively unchanged, restored or artificially created natural landscapes. These can be river valleys, lakes, swamps, gullies, forests and strips, reclamation canals, etc. Buffer zones with regulated limited management are created in order to prevent negative impact of human economic activity on natural complexes.

Thus, from the above three structural components a kind of network is formed. It is more or less evenly covers the region. Such ecological network creates acceptable conditions for the preservation of biological and landscape diversity of a particular natural - territorial complex. The latest along with other environmental measures greatly contributes to maintaining sustainability of regional ecosystem. The ecological networks of individual states in particular the National Ecological Network of Ukraine are an integral part of the European ecological network. Its creation is provided by the Law of Ukraine "On the national program of formation of the ecological network of Ukraine for 2000-2015".

Scientists highlight following conditions for principles improving of state environmental policy and state regulation of environmental safety in Ukraine [14-29]:

- intensification of social factors use of environmental protection;
- formation of public opinion on building positive image of ecologically sustainable development of citizens in the state;

- carrying out measures to promote environmental activities among the population and positive attitude towards the environment;

- integration of regions and their ecological potential into single system with clear definition of development priorities;

- education of ecological thinking of citizens;

- application of the best international experience of developed countries of the world in combination with national features;

- creation of single methodological basis for the formation of normative indicators with their legislative consolidation;

- attraction of economic incentive instruments for preservation of natural capital (grants, bonuses, eco-grants, eco-credits, emissions trading, introduction of "green economy" instruments), etc.

Thus, concern for natural capital preservation of the Earth is increasingly coming to forefront of human civilization development of and its very existence. The first cosmonaut of Ukraine Leonid Kadenyuk was the most successful in this regard, noting: "It should finally be understood that environmental safety is an integral part of overall safety, prosperity and peace on Earth and prerequisite for sustainable development" [30].

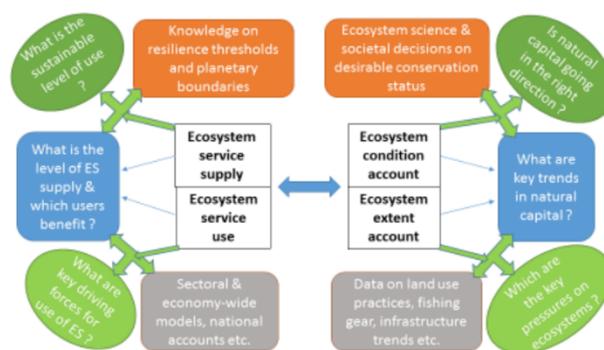


Fig. 2. A comprehensive knowledge framework for the management of natural capital [9].

Fig. 2 illustrates that various analytical tools need to be combined to enable the different analytical angles to manage natural capital in an integrated perspective via a range of policy instruments. Natural capital accounts remain central to the overall analytical approach but are complemented by other knowledge sources. A brief summary of the benefits and limitations of natural capital accounting brings up the following key points [9]:

Benefits of the ecosystem accounting developing:

- Better information flow on status and trends as for the ecosystems.
- More thorough approach to describe and to measure ecosystem services.
- More integrated support and perspective in understanding our links with natural capital.
- Underpins the analysis of environment with its links to economy.
- Helps in bringing consideration into ecosystem as a part of economic policy making.

Ecosystem accounting and its outputs are only positive as:

- Our ecological and modelling knowledge of ecosystem processes.
- Actual in-situ biodiversity monitoring data and other data input.
- Related tools and analysis that help translate it into policy decisions.

3 Conclusions

Conducted scientific research provides grounds for grouping principles of natural capital conservation by the following three components: biological (environmental), economic, organizational (managerial). Since the organic world on Earth consists of separate complex formations of different levels. Each formation has specific problems, so different levels of biological principles are identified. It is also proposed to include sustainability principle (ecological balance) and development of “green economy”. Economic principles of natural capital conservation can be mandatory (licensing, taxation, payments) and incentives (grants, market assistance, bonuses, grants, insurance, etc.). Organizational principles are related to implementation of public administration mechanisms in the field of natural capital conservation.

Improving and applying methodology of natural capital conservation on the basis of the best foreign experience, taking into account national characteristics and the current regulatory framework will create an effective mechanism for natural capital conservation in Ukraine.

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