

Задачей дальнейших исследований является обоснование методики расчета максималь-

ного стока для неизученных рек Горного Крыма.

#### Литература

1. Ресурсы поверхностных вод СССР [Текст] / Крым. – Л. : Гидрометеиздат, 1973. – Т. 6, вып. 4. – 848 с.
2. Атлас України. Інститут географії Національної академії наук України, 1999-2000 [Електронний ресурс] / Режим доступу : <http://igna.org.ua/>
3. Кузин, П. С. Классификация рек и гидрологическое районирование СССР [Текст] / П. С. Кузин. – Л. : Гидрометеиздат, 1960. – 455 с.
4. Гопченко, С. Д. Гідрологічні розрахунки: підручник [Текст] / С. Д. Гопченко, Н. С. Лобода, В. А. Овчарук. – Одеса : ТЕС, 2014. – 484 с.
5. Олиферов, А. Н. Реки и озера Крыма [Текст] / А. Н. Олиферов, З. В. Тимченко. – Симферополь : Доля, 2005. – 216 с.

UDC 911.3

I.G. Chervanyov, Doctor of Technical Sciences, Professor,  
O.O. Karasiov, Master of Geography,  
V.N. Karazin Kharkiv National University,

### THE INTANGIBLE NATURAL RESOURCES (INR) IN THE ASPECTS OF NATURAL CAPITAL OF NEW GEOGRAPHY: SOME PERSPECTIVES FOR UKRAINE

*І.Г. Черванієв, О.О. Карасієв. НЕМАТЕРІАЛЬНІ ПРИРОДНІ РЕСУРСИ В АСПЕКТІ НАТУРАЛЬНОГО КАПІТАЛУ «НОВОЇ» ГЕОГРАФІЇ: ДЕЯКІ ПЕРСПЕКТИВИ ДЛЯ УКРАЇНИ.* Стаття містить аналіз сучасних методологічних основ географії, присвячених кількісному вимірюванню нематеріального природно-ресурсного потенціалу. Автори пропонують новий підхід до оцінки нематеріальних природних ресурсів на основі існуючого зарубіжного досвіду оцінки культурних екосистемних послуг. Через концептуальний взаємозв'язок соціальних часу і простору, обґрунтовується сприйняття особистістю об'єктивних нематеріальних властивостей ландшафту крізь оцінювання нею самою суб'єктивної якості часу їх споживання. Це надає змогу кількісного оцінювання об'єктивних якостей ландшафту для особистості як оцінки нематеріальних природних ресурсів через допомогу оцінки суб'єктивної якості часу. Ця гіпотеза знайшла своє вираження в ідеї гео-соціального рекомендаційного сервісу. Останній не є самоціллю, а лише інструментом вивчення культурної значущості природи.

**Ключові слова:** нематеріальне природокористування, неогеографія, партисипативне картографування.

*И.Г. Черванёв, А.О. Карасёв. НЕМАТЕРИАЛЬНЫЕ ПРИРОДНЫЕ РЕСУРСЫ (НПР) В АСПЕКТЕ ПРИРОДНОГО КАПИТАЛА «НОВОЙ» ГЕОГРАФИИ: НЕКОТОРЫЕ ПЕРСПЕКТИВЫ ДЛЯ УКРАИНЫ.* Статья содержит анализ современных методологических основ географии, посвященных количественному измерению нематериального природно-ресурсного потенциала. Авторы предлагают новый подход к оценке нематериальных природных ресурсов на основе существующего зарубежного опыта оценки культурных экосистемных услуг. Через концептуальную взаимосвязь социальных времени и пространства, обосновывается восприятие индивидуумом объективных нематериальных свойств ландшафта через оценивание ним самим субъективного качества времени их потребления. Это дает возможность количественной оценки объективных качеств ландшафта индивидуумом как оценки нематериальных природных ресурсов с помощью оценки субъективного качества времени. Эта гипотеза нашла свое выражение в идее геосоциального рекомендательного сервиса. Последний не является самоцелью, а лишь инструментом изучения культурной значимости природы.

**Ключевые слова:** нематериальное природопользование, неогеография, партисипативное картографирование.

**Background.** Over the past decades, geography has shown a tendency to ecologization, humanization, economization and informatization. These areas are dissimilar but they have an organic unity. Moreover, within these geography's trends there is an opportunity to talk about the cultural importance of nature as a resource. Resource-based approach allows to speak about the economic importance of the nature's properties, which are free public goods. Such properties are now externalities on the economy. Therefore, attempts to inventory and assess of such resources take place. Thereby, intangible natural resources are studied today as cultural ecosystem functions and services, as well as intangible natural (including geological and geomorphological) and cultural heritage.

One of the provisions of the Lund scientific school of T. Hägerstrand is the requirement to consider the space and time in the study of human geography in indissoluble connection. This school is focused on the study of everyday ordinary activities. The activities of the individual are studied in three-dimensional space and time. Similar positions exist in Russian sociology (A. G. Dugin, A.V. Pozdnyakov), as well as in the Ukrainian environmental geography (M. V. Bagrov, V. O. Bokov, I. G. Chervanyov, 2001- 2012) [3].

Intangible nature management is the use of natural resources, which does not cause exclusion and transformation of substances and energy and at the same time is profitable as an ecological rent in certain areas of economic activity, social life and personal satisfaction of human needs [12]. To the

greatest extent, it concerns the resort and recreation industry, which is becoming more and more significant in the economy of many countries.

The natural capital concept is a fundamental rational basis for the study of these resources. Natural capital consists of three components groups: sub-soil assets (geological resources), abiotic flows (linked to geophysical cycles) and ecosystem capital (linked to ecological systems and processes) [2-4,7].

**Summary of the literature.** Cultural ecosystem services draw the increasing attention of scientists. In particular, a review of publications explicitly dealing with cultural ecosystem services has 107 references only as of the year 2013 [13]. Some experts developed a comprehensive classification, approaches and sets of indicators to the assessment and mapping of the cultural ecosystem services [2,7,8].

The authors initiated a study of intangible natural resources and methods of their assessment in their publications [4,12]. We can state that there is an increased attention to non-material aspects of environmental protection and nature management for the needs of economy.

Available techniques involve sociological questionnaire apparatus [5,7,8]. It is representative of the number of visitors to each environmental space and the type of activities in its territory. It means primarily recreational potential of the ecological space. As a result, we see a concentration of recreants that allows its mapping and drawing conclusions about the cultural and ecological potential. It is obvious that this approach provides too narrow opportunities for mapping and assessment of the whole variety of cultural ecosystem services. In addition, this process is rather tedious, lengthy and expensive.

**Aim.** The presentation and analysis of the existing methodology based on quantitative evaluation of the intangible natural resource potential, as well as offering a new way of such evaluation using the subjective component of the complex subject-object approach and geoinformation technologies.

**Results.** Background demonstrated the need to study an integral direction of the research– the non-material (intangible) nature management. Quantitative assessment of intangible natural resources value for society and the economy, if it is resolved in the proposed subject-object basis, will be a step in the development of human geography.

Human imagination is always spatial. Geographic images, myths and archetypes of the collective and the individual unconsciousness are expressions of geographical space as a form of overcoming time and transferring it into a timeless ge-

ographical image. The passage of time for a person without imagination is an empty movement to death. Tourism and desire of new experiences have their origin in it.

The utmost importance of space for imagination is expressed in the idea of presentation of most of the symbols in the form of two-dimensional images. The vast majority of paintings are made through the flat model of the image. Active imagination completes perspective on its own. Map as a two-dimensional image also displays the structure of the imagination. Thus, the map that reflects the social time of individual can assess the social value of space. On this principle, we propose the concept of sociospatial advisory service.

The idea is to assess cultural ecosystem services and other intangible services that express the quality of the space through the quality of time that people spend in the perception of the landscape. Methodology with indicators of the reports [5, 7, 8] will be useful for the evaluation, but it will have qualitatively a new level of vision landscape intangible properties.

According to these components, incomplete classification of intangible natural resources can be viewed as follows (their general model is shown in Fig. 1):

1) geological, geomorphological, natural heritage that provides knowledge, values, and other cultural products:

1.1) abiotic intangible natural heritage: cognition of meteorological and hydrological phenomena;

1.2) biotic intangible natural heritage (ethology, sociobiology and evolution (arguably analogous to the creative process that produces an object of cultural heritage), landscapes, soundscapes, toponymy, animism, opinions about wildlife in human societies, human food security and health, the conservation movement, taxidermy, bird watching) [6];

2) other valuable landscapes, seascapes, ecosystems;

3) cultural ecosystem services:

3.1) physical or experiential use of ecosystems and land-/seascape: recreation, health, information and knowledge;

3.2) intellectual representations of ecosystems and land-/seascape: spiritual & symbolic, art, other [2].

Intangible natural resources generate additional profits – ecological rent. Ecological rent in this sense is existing and perspective opportunities for economic territory development that are determined by high quality and sufficient quantity of natural resources, and which are public goods. Thus, the profit that is obtained because of the in-

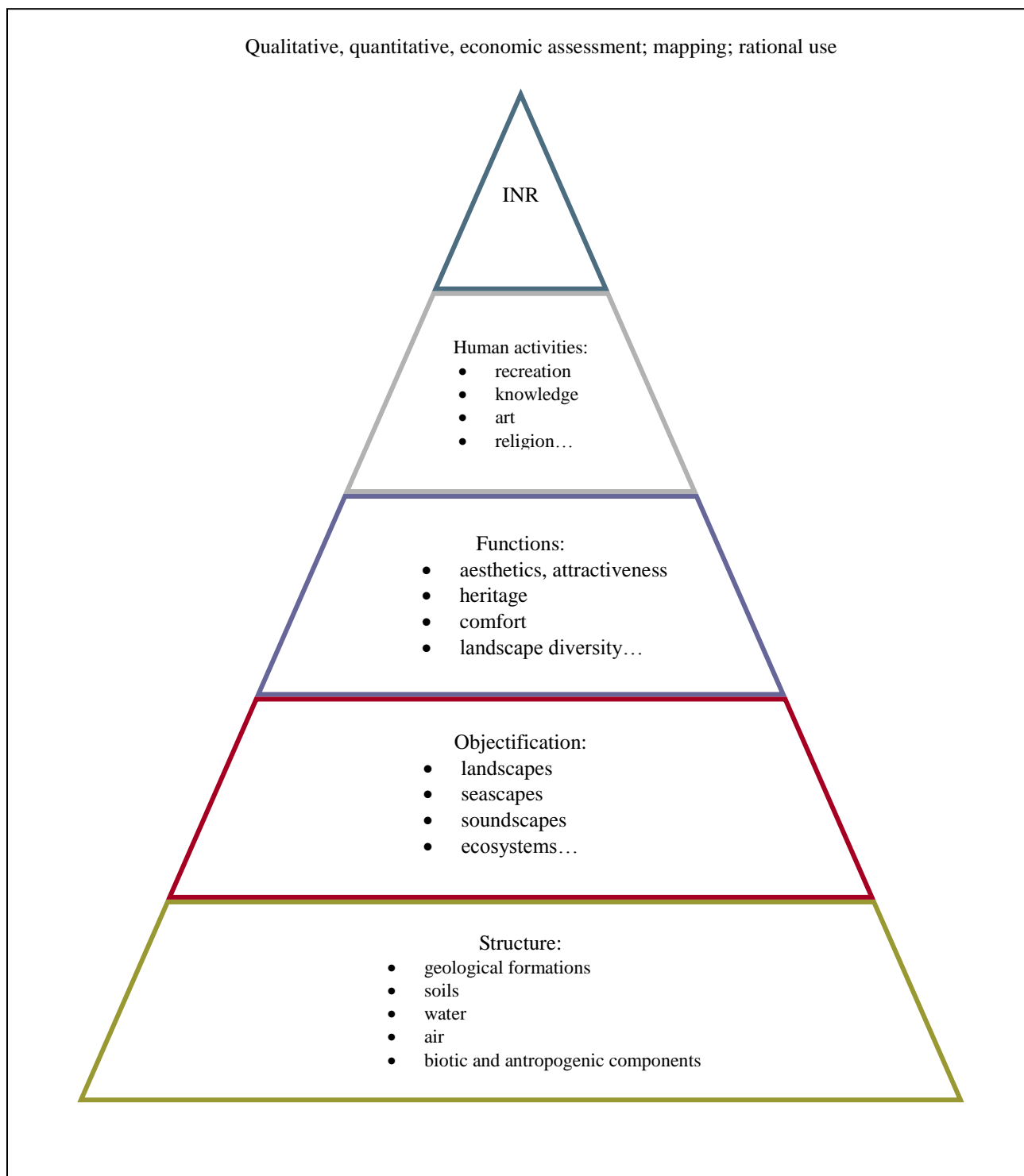


Fig. 1. The analytical model of the structure of Earth's intangible natural resources (INR)

tangible nature management is the monetary equivalent of the cultural ecosystem services value.

Nature of the ecosystem services in the intangible nature management field necessitates a binary subject-object approach. It will be based on the scientific characteristics of the object – a territorial resource that forms the natural resource potential, on the one hand, and the subject – society relations through its representatives (find consumers of eco-

system services). To solve the first problem, we have proved the possibility to use information landscape analysis [9]. Its essence is to assess the value of information entropy by Shannon, a measure of which is the quantity of information by Hartley, Brillouin and others.

While reports operate on the number of visitors / recreants / tourists per unit area of ecosystem and use the classical sociological surveys, the pro-

posed service will make users as a data collection tool. Geosocial component will allow users to mark on the map the natural spaces that they visit, as is the case in Foursquare. The need for self-presentation will stimulate them. In this case, users will be able to assess the quality of time that they spent in natural spaces within the framework of the proposed recreational, tourist, scientific activities' indicators. The service will be able to give recommendations for planning trips, recreation, tourism and other types of intangible interaction with nature.

Intangible natural resources mapping will be performed using creation of geosocial advisory service within the concept of the Internet Web 3.0 [1]. This service will use a participatory new-geographical approach and will become like a "cast" of society. It will allow to study the nature of Ukraine and the entire world through its social significance. It is interesting that on the Internet there are quite a large number of projects dealing primarily with obtaining the views of residents about the quality of urban space. New-geographical mapping allows to use a participatory approach to territorial management.

It would include an interactive web map filled via crowdsourcing<sup>1</sup>, with social network and entertainment features. It would contain a database of individual evaluations of personal time of users with spatial reference to different places. Such as universal assessing criterion, the personal time would allow to evaluate the cultural benefits of ecosystems and non-material (informational) resources of places in general. Furthermore, it would evaluate the benefits of the cultural landscapes and the urban landscapes. In addition, such kind of an assessment in a mapping form would be able to contain the recommendations for the tourists. The map would help to select some places for recreation, as well as it would be a good instrument for the participatory territorial management, the branding and the sustainable development. This environmental map would use the methods of new-

geography and the axiological component of the environmental level of comfort. Consequently, it would make possible to draw the attention to the positive and negative properties of the landscapes. It would point out the environmental problems, such as unpleasant odor, noise or visual pollution.

The proposed service combines a geo-social network (such as Foursquare) and advisory services (such as music Last.fm). A Geo-social network allows the self-presentation, and advisory service – orientation in the cultural environment for user. Thus, union of their opportunities for study of geographical space will allow to obtain very effective sociological material in a large volume. Actually, users will apply the service in order to stand out and find new places to visit according to the recommendations of the users with common interests. This will ensure the interest of the audience to the service. It is important that the service would contain maps of environmental comfort based on the principle of the unity of time and space. It is assumed that the user will evaluate the quality of service time in the places that he visited (places are organized and classified by layers), and will get personalized recommendations about, first of all, places for tourism and recreation. This will create a set of axiological reports on classified landscapes.

**Conclusions and further work.** The service offered in this article can be a modern and effective way for comprehending the importance of nature as a producer of intangible benefits. The World Wide Web makes it possible as fully as possible demonstrate the possibilities of the complex subject-object approach to evaluation of the intangible natural resources and its subjective component. The results need to harmonize with the existing achievements of the Ukrainian and world science. The authors state the presence of extensive opportunities for research in this area. In the coming years, the practical implementation of the proposed service will occur.

#### References

1. Bawab, H. (2014). *Effects of Web 3.0 in the New Digital World*. [online] LinkedIn Pulse. Available at: <https://www.linkedin.com/pulse/20140324055730-14091619-effects-of-web-3-0-in-the-new-digital-world> [Accessed 6 Feb. 2015].
2. Bortnik, L., Grischenko, N., Chervanyov, I. (2013). *The natural capital as object of environmental economy and some factor of sustainable development // "Visnyk of Karazin Kharkiv National University, № 1049. – Geography – Ecology – Ecology, 38. Pp. 220-229.*
3. Bagrov, N., Rudenko, L., Chervanyov, I. (2012). *The "new" Geography of the Information age: the Ukrainian realizes and trends // Geography, Ecology and Environment. Moscow: RAN. Pp. 64-71.*
4. Chervanyov, I., Bokov, V. and Karasiov, O. (2013). *Non-material nature management – the resource of development of the information society and an object of constructive geography. The Human and the Environment. Problems of*

<sup>1</sup> Crowdsourcing – the use of a particular social group for the implementation of socially important objectives by the volunteers, often via Internet resources and other information channels

- Neoecology*, [online] (3-4), pp.78-82. Available at: [http://journals.uran.ua/ludina\\_dov/article/view/20167/17793](http://journals.uran.ua/ludina_dov/article/view/20167/17793) [Accessed 18 Dec. 2014] (in Ukrainian).
5. Church, A., Fish, R., Haines-Young, R., Mourato, S. and Tratalos, J. (2014). *Cultural ecosystem services and indicators*. UK National Ecosystem Assessment Follow-on. [online] UNEP-WCMC, LWEC, UK. Available at: [http://www.nottingham.ac.uk/cem/pdf/Church\\_et\\_al\\_2014\\_NEA\\_CES.pdf](http://www.nottingham.ac.uk/cem/pdf/Church_et_al_2014_NEA_CES.pdf) [Accessed 24 Jan. 2015].
  6. Dorfman, E. (2012). *Intangible Natural Heritage: New Perspectives on Natural Objects*. New York: Routledge. Available at: [https://books.google.com.ua/books?id=Q1fFBQAAQBAJ&printsec=frontcover&hl=ru&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](https://books.google.com.ua/books?id=Q1fFBQAAQBAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false) [Accessed 24 Jan. 2015].
  7. European Commission, (2014). *Mapping and Assessment of Ecosystems and their Services. Indicators for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020. 2nd Report - Final*. [online] Luxembourg: The Publications Office of the European Union. Available at: [http://ec.europa.eu/environment/nature/knowledge/ecosystem\\_assessment/pdf/2ndMAESWorkingPaper.pdf](http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/2ndMAESWorkingPaper.pdf) [Accessed 3 Jan. 2015].
  8. European Commission, (2014). *Mapping and Assessment of Ecosystems and their Services. An analytical framework for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020. Discussion paper – Final* [online] Luxembourg: The Publications Office of the European Union. Available at: [http://ec.europa.eu/environment/nature/knowledge/ecosystem\\_assessment/pdf/MAESWorkingPaper2013.pdf](http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/MAESWorkingPaper2013.pdf) [Accessed 3 Jan. 2015].
  9. Karasov, O. (2014). *Information variety of Ukraine's landscapes: a study using satellite images Landsat-5 TM, in the context of the intangible nature management*. In: 6th Youth School-Conference "Remote sensing of environmental components: production, processing and analysis of data". Moscow: IG RAS, pp.18-21 (in Russian).
  12. Karasyov, O., Chervanyov, I. (2013). *Intangible nature management. Problems of continuous education and cartography*, [online] (18), pp. 70-73. Available at: [http://goik.url.ph/files/compilation\\_18.pdf](http://goik.url.ph/files/compilation_18.pdf) [Accessed 18 Dec. 2014] (in Ukrainian).
  13. Milcu, A. Ioana, J. Hanspach, D. Abson, and J. Fischer (2013). *Cultural ecosystem services: a literature review and prospects for future research*. *Ecology and Society* [online] 18(3):44. Available at: <http://dx.doi.org/10.5751/ES-05790-180344> [Accessed 6 Feb. 2015].