

Strategic development of recreational technologies in forestry

Desarrollo estratégico de tecnologías recreacionales en silvicultura

Saida Olegovna APSALYAMOVA [1](#); Bella Olegovna KHASHIR [2](#); Oleg Zakireevich KHUAZHEV [3](#)

Received: 12/06/2017 • Approved: 30/06/2017

Content

[1. Introduction](#)

[2. Methodology](#)

[3. Results](#)

[4. Discussion](#)

[5. Conclusion](#)

[Acknowledgments](#)

[References](#)

ABSTRACT:

Rather significant amounts of natural resources are used for the functioning of the global economy and for the development of recreational technologies, and the emphasis is on the use of natural resources to support the economic development. An increase in labor productivity through more efficient and less costly methods of wood transporting and processing is an important component of sustainable forest management. A significant proportion of all converted wood becomes waste in the processing chain in all cases when wastes are not used for energy production or for other purposes. According to unconfirmed reports, in some forest countries more than half of the biomass harvested for standard commercial purposes is ultimately not used. Waste reduction provides enormous opportunities to procure benefits, including new workplaces. From this point of view, countries with rich forest resources are in a much better position than low forest cover countries, where almost every piece of wood is most often used as fuel. Several countries that have revised their national forest programs (NFPs) or forest policies after the economic crisis specifically address the issue of improving the production efficiency, while many other countries encourage the use of

RESUMEN:

Español Se utilizan cantidades bastante significativas de recursos naturales para el funcionamiento de la economía mundial y para el desarrollo de las tecnologías recreativas, y se hace hincapié en el uso de los recursos naturales para apoyar el desarrollo económico. Un aumento de la productividad laboral mediante métodos más eficientes y menos costosos de transporte y procesamiento de madera es un componente importante de la ordenación forestal sostenible. Una proporción significativa de toda la madera convertida se convierte en residuo en la cadena de transformación en todos los casos en que los desechos no se utilicen para la producción de energía o para otros fines. Según informes no confirmados, en algunos países forestales más de la mitad de la biomasa recolectada para fines comerciales estándar no se utiliza en última instancia. La reducción de desechos proporciona enormes oportunidades para adquirir beneficios, incluyendo nuevos lugares de trabajo. Desde este punto de vista, los países con recursos forestales ricos se encuentran en una posición mucho mejor que los países de cobertura forestal bajo, donde casi todos los pedazos de madera se utilizan más a menudo como combustible. Varios países que han revisado sus

improved technologies and introduction of practices of wood transporting and processing.

Keywords: Biodiversity, ecosystem, forest policy, innovations, investments, green economy, medical ecology, monitoring, payment for ecosystem services, forest protective functions, recreation.

programas forestales nacionales (PFN) o políticas forestales después de la crisis económica abordan específicamente la cuestión de la mejora de la eficiencia de la producción, mientras que muchos otros países fomentan el uso de tecnologías mejoradas e introducción de prácticas de transporte y procesamiento de madera.

Palabras clave: biodiversidad, ecosistema, política forestal, innovaciones, inversiones, economía verde, ecología médica, monitoreo, pago de servicios ecosistémicos, funciones de protección forestal, recreación.

1. Introduction

Approximately half of the countries that have revised after the crisis their NFPs or forest policy documents are considering the issue of the production efficiency. These countries pay more attention to the expansion of processing facilities, rather than to an increase in their efficiency. The majority of countries that have revised their forest policies have adopted measures aimed at promoting the use of biomass and relevant production facilities; only a minority of the countries specifically addressed the issues of waste reduction or reuse (Khashir 2015a).

In countries with relatively large forest resources and weak reprocessing capacity, policy makers generally pay insufficient attention to the problems of low efficiency of wood processing and waste reduction. Twelve of more than twenty NFPs or forest policy documents that were published for the period from 2007 to 2015 specifically address the issues of increasing the production efficiency, which is usually achieved through the use of more advanced technologies and transporting and processing methods (Khashir 2015b).

In 2013, the EU adopted a new Forest Strategy, which specifically addresses supply chain aspects. This new strategy establishes one of the guidelines – "ensuring the efficient use of resources, optimizing the contribution of forests and the forest sector to the rural development, economic growth and creating new vacancies along with sustainable forest management" (Khashir 2015c).

2. Methodology

More than half of all countries make attempts to expand forest products markets and promote the utilization of biomass. However, only one third of them mentioned the issue of processing efficiency and the emphasis was on the production expansion rather than on waste reduction.

Some countries pay increased attention to the economic instruments aimed at improving processing facilities (for example, the Russian Federation and France), as well as to the export of products with high added value, but these measures are not directly linked to the improved processing efficiency or more efficient waste reuse (Khashir 2015d; Fernholz & Kraxner, n.d.).

Approximately 20 percent of the analyzed countries have reported changes in tax laws; many countries have applied tax rebates in order to accelerate the industrial development. However, there is no information that tax revenues are reinvested into efficiency measures or other public services, or into such infrastructure facilities as roads.

Several countries have introduced measures to improve production efficiency through changes in market rules and mechanisms relating to sales and auctions; a number of countries have introduced or strengthened the systems for holding auctions for distributing round wood that can significantly improve production efficiency; independent agencies have been established to improve the transparency of the forest products flow from forests to markets. According to NFPs, entities, which have been using forests for a long time and do not process wood volumes specified in contracts, will be obliged to put this wood for auction under the control of the Forest Administration, while it stipulates that 70 percent of coniferous wood from planted forests owned by the government must be sold through auctions; previously it was decided to sell 25

percent of the annually harvested wood through auctions starting from 2013 that should ensure greater flexibility in the supply of raw materials for industry (Khashir 2015e; Bgane, Zyza and Styagun 2016b).

3. Results

Many countries support production cooperatives as a means of increasing the efficiency of market transactions – they set up organizations of forest owners, who combine the volumes of harvested wood products to be used for industrial needs; thirty-nine countries took measures to increase the use of biomass.

Most countries in their reports indicated measures to increase the use of biomass, and 9 of 22 NFPs or forest policy documents that have been adopted since 2008 address the issue of the use of biomass with a focus on expanding biomass energy production. Many of more developed countries (especially European ones) have increased the use of biomass for energy production in order to increase the share of renewable energy consumed, as well as the share of waste burned at the end of the product life cycle, thereby reducing the volume of buried solid waste.

Thus, for example, the EU Renewable Energy Strategy sets the goal of achieving 20 per cent of renewable energy consumption by 2020; while it is provided that 42 per cent of this indicator will account for biomass. If this goal is achieved, the volume of wood used for energy production in the EU countries that have recently adopted strategies for the biomass use for energy production will be equal to today's total volume of wood harvesting. The EU strategy set an ambitious target for the production of electricity by using wood-based energy by 2030, and the issues of energy policy that have been adopted in 2015 provide for an increase in the share of non-fossil fuels in established generating capacities up to 30 percent by the end of the twelfth five-year plan, including on the basis of electricity production with the use of forest biomass (Food and Agriculture Organization of the United Nations, 2012; United Nations Economic Commission for Europe, 2014).

Countries that provide for biomass energy production in their NFPs mainly report that the focus is on the production of wood-based energy for household needs.

Some companies that use wood pellets as renewable fuel in boilers have set ambitious targets for using forest bioenergetic resources.

Countries use a variety of policies and practical measures to promote the production of renewable energy, including by using forest biomass. These measures often include reforestation projects in exchange for subsidies for the production of energy from wood materials and through the use of biomass, contribute to the protection of the healthy state of forests, when the exported biomass can be used as raw materials for the production of wood products and bioenergy.

Very few countries specifically mention in their reports to international bodies the problems of reducing or reusing waste, despite the potential importance of these topics in promoting sustainable forest management. Although most countries in their activities for the period from 2008 to 2015 have addressed the issue of expanding the use of biomass, only 25 percent of countries specifically link these measures to waste reduction, mainly in Europe and Africa. In NFPs or forest policy documents, the issue of waste is generally not considered, nor is the issue of their reuse.

This may be due to the fact that these issues are under the responsibility of various domestic institutions, and their consideration is not always considered relevant for sustainable forest management policies. Frequently used measures are generally related to improving production and processing efficiency and include information campaigns, innovative research, training and counseling services and legislative measures (Food and Agriculture Organization of the United Nations, 2010; Food and Agriculture Organization of the United Nations, n.d.).

34 reports of countries contained the information about the documents about the investments,

and the most of the reports were prepared in the Russian Federation, Belarus and Switzerland. These types of instruments can provide guidelines, advisory services and address the issue of the improved access to information by using information technologies. Less than 25 percent of reports of countries directly address the issue of supporting research programs aimed at improving production and processing efficiency (Food and Agriculture Organization of the United Nations, 2015; Bgane, Zyza and Styagun 2016a).

In Europe, during a large part of recent studies supported by governments, the focus falls on the possibilities of forest wood energy use, waste reduction, as well as on more optimal reuse in the final stage of the product life cycle. The attempts are also made to carry out research in the forest sector aimed at increasing the use of biomass, especially logging waste, while the measures to develop new forest products, increase competitiveness and promote the development of economy based on renewable bio-resources are reported. Some countries have introduced programs on new methods of use of wood in construction.

Three of 22 recently adopted NFPs or forest policy documents refer to the effective regulation. Several countries, mostly in Europe, reported on the introduction of additional rules relating to forest residues and efficiency. In particular, recent amendments made to the primary legislation and derivative regulatory legal acts include changes related to the secondary and tertiary stages of biomass processing, as well as regulations for the management of forests that grow on lands in both public and private ownership. The main purpose of the changes is to allow the use of wood waste.

Promoting fair and equitable sharing of benefits from the use of traditional forest-related knowledge and practices, only a few countries specifically address the issues of traditional forest-related knowledge (FRK) and related practices in the recently adopted national forest policy, several countries have taken measures to improve understanding and documenting traditional FRK, including through mechanisms established in the context of the Nagoya Protocol on Access to Benefits and their Allocation, and took measures to improve traditional FRK mainly through improved property rights and access to natural resources (Food and Agriculture Organization of the United Nations, 2014; Bgane, Zyza and Styagun 2016c).

Despite the importance and contribution to the socioeconomic and sociocultural benefits of traditional FRK and relevant practices, many countries criticize such knowledge. The extent, to which traditional FRK contributes to the socioeconomic benefits, is not sufficiently understood. Similarly, policymakers do not sufficiently understand the negative consequences of the destruction of traditional FRK.

A small number of countries reported on measures focused mainly on traditional FRK and practices. However, the importance of sociocultural aspects of sustainable forest management is widely recognized; the widespread use of traditional FRK is referred to in less than 25 per cent of the analyzed national forest policy documents and reports, and this shows that in the national forest policies adopted in the period from 2007 to 2015 this issue was not considered in most countries and only some countries mention the protection of traditional FRK in the NFPs or forest policy documents recently adopted. Nevertheless, a wide range of policies and projects is related to traditional FRK.

The issue of the distribution of benefits was considered in almost three quarters of NFPs or forest policy documents that were issued after 2010 and almost in three-fourths of reports of the countries to international bodies; however, almost no report had a direct mention of traditional FRK. A number of policies and programs involve taking an attempt to support "fair" or "equitable" distribution of benefits, but the definitions given differ from each other, and the implementation of these measures in many cases is not entirely understandable (Food and Agriculture Organization of the United Nations, n. d.). Measures taken by countries are mainly aimed at documenting, protecting and disseminating traditional FRK as a contribution to the sociocultural stability; research, documentation, protection and dissemination of knowledge, training, and vocational training are the aspects of traditional FRK that is most relevant to the socioeconomic benefits. At the same time, some countries report on taking measures to

promote the use of traditional FRK in sustainable forest management and protection, as well as on the use of traditional FRK in forest enterprises and research institutions.

Similarly, they report on having conducted comparative research on the collection of incense by using traditional methods in comparison with new improved methods. The projects on medicinal plants are implemented to promote the development by transferring this knowledge to future generations through their registration by using modern technology. Some countries also sponsor higher education institutions that carry out research on documenting the knowledge of indigenous peoples associated with traditional non-woody forest products, as well as on expansion of technical ties with tribal communities.

Most of the measures aimed at documenting and exchanging traditional knowledge are part of special programs, including the establishment of forest museums, forestry knowledge extension programs, in the framework of which relevant knowledge is transferred to children and young people, as well as the wider use of traditional FRK and participation of indigenous people in management plans, as it takes place on tribal lands and is implemented in cooperation with forest companies in conjunction with other countries. The establishment of a center of traditional FRK served as an institutional approach to the preservation of traditional FRK.

A number of countries provide for the documentation and exchange of traditional knowledge, in particular through national biodiversity strategies and plans prepared in accordance with the Convention on Biological Diversity and the related work in the context of the activities of the Access and Benefit-Sharing Clearing House. For example, it may be mentioned that indigenous communities participated in community-based cartography initiatives supported by local and international research and manufacturing associations, which document their knowledge in the form of land-use maps (Khashir 2015d; United Nations Economic Commission for Europe, 2015)

The participation of traditional users in the development of forest policy and forest planning is noted in more than half of NFPs and forest policy documents. Upon reports to the international bodies, measures to attract traditional users are taken and regulations recognizing the traditional rights of local users in protected areas are introduced in new legislation of some countries. Such regulations indicate that the local population living within or near the concession areas should be involved in the process of issuing permits, including forest management agreements that provide for management of forest equity and benefit-sharing. They also provide for the principle of prior consent of holders of traditional knowledge for the conservation and sustainable use of natural resources, which is guaranteed by the law. Some countries entrenched the rights of participation in conservation of forest resources and newly established forest plantations, while NFPs indicate that further regulation of sustainable use of biodiversity will be based on both scientific knowledge and knowledge of local communities.

The issue of income and benefit-sharing mechanisms between concession holders and local communities was addressed in 17 NFPs or forest policy documents and in the reports of 54 countries submitted to international bodies. Many countries, however, require logging companies or institutions responsible for the management of protected areas to share their income and benefits with their local communities. However, less than one third of countries referred to a "fair" or "equitable" benefit sharing in their reports. One of the benefit sharing mechanisms used is an independent Board of Trustees engaged in promoting transparency in the use of funds for the distribution of benefits in order to ensure a transparent distribution of 30 per cent of income from the lease of land to the respective communities, and after the decentralization process municipal authorities retain 50 percent of the revenues from concessions and logging licenses; a similar sharing of benefits among the various participants is also provided by other NFPs (UN Environment, 2015).

Many governments, based on international commitments, intend to expand access and take measures to share the benefits of resources, as well as to protect intellectual property rights. However, in many cases the results achieved remain limited. The Nagoya Protocol on Access and Sharing of Benefits from their use for the implementation of the Convention on Biological

Diversity contributes significantly to the promotion of the third objective of the Convention, providing a basis for stricter legislation and greater transparency for both suppliers and consumers of genetic resources. The related Clearing House mechanism provides the information on access to and distribution of benefits in countries that have ratified the Convention on Biological Diversity (CBD) and developed a national biodiversity strategy.

Recognition of a wide range of values derived from forest-related products and services and their accounting in sales markets. A wide range of forest-related values and useful properties is widely recognized in the NFP and forest policy documents as an integral part of sustainable forest management. However, only a few countries have taken special measures to address this issue in the planning of practical operations.

Many countries define a wider range of useful properties of forests and recognize them within the framework of national reporting. Some countries have introduced, and many of them have changed government compensation schemes for providing public goods that have not been recognized in markets while they still pay for the provision of ecosystem services through markets. This issue is investigated and monitored in some other countries, especially with regard to recreation, water and carbon consumption, for example, services regulating carbon sequestration, use, consumption and climate change issues, waste decomposition and disinfection, water and air purification, pollination of crops, pest and plant disease control (Table 1).

Table 1. Types of measures to recognize a wide range of values of forests and trees and to reflect them in the market place

Ecosystem services	Measures
Supporting services (e.g. nutrient dispersal and cycling, seed dispersal, primary production)	Determining a type and magnitude of values of goods and services
Regulating services (e.g. carbon sequestration and climate regulation, waste decomposition and detoxification, water and air purification, crop pollination, pest and plant disease control)	Recognizing values in accounting frameworks and compensation schemes
Provisioning services (e.g. food, water, minerals, biochemical substances, energy)	Establishing markets where these do not exist
Cultural services (e.g. recreational experiences (including ecotourism), cultural, intellectual and spiritual inspiration)	Strengthening markets where these are not well developed or functioning

Recognition of a wide range of valuable qualities provided by forests holds a central position in achieving sustainable forest management, while the value of forest goods, especially forest products, is relatively well known – and this is often reflected in markets. Nevertheless, many services provided by forests are not taken into account. Table 1 shows the widespread classification of services and types of policy measures adopted. Until the value of the benefits provided is quantified and recognized, economic and political decisions will be made on the basis of incomplete and biased information. This issue is extremely important for forests where the value of the assets and ecosystem services they provide is significantly higher in comparison with what is currently recognized, especially in the context of overall state planning and budgetary processes (Khashir 2015a; Bgane, Zyza and Styagun 2016d).

The NFPs or forest policy documents that were adopted after 2008 specifically address ecosystem values, but only a few specific actions are provided. Most countries have policies, legal frameworks and fiscal mechanisms to promote and protect at least some of the non-

market benefits that forests provide. For example, almost every country has developed policies and practical measures to promote soil and water protection. These programs are usually managed under specific regimes, and the activities on their management are paid through specific government, fiscal or budgeting mechanisms, e.g. with regard to hydrological services. Policies thus usually make reference to and recognize that forests protect water catchment areas, help prevent soil erosion, protect infrastructure, etc. and emphasize the importance of forest ecosystem services for community development and poverty reduction (United Nations, 2008).

The NFPs or forest policies adopted contain a specific reference to the ecosystem values; a number of other countries consider these issues through the adoption of specific measures. This refers to the NFPs that provide for the payment for the conservation of healthy forests through state revenues gained through payments for environmental services such as water supply, infrastructure and biodiversity protection, and potential income from carbon sequestration. These NFPs are aimed at the development of financial instruments for funding the provision of ecosystem services, including in urban and suburban areas to increase their aesthetic and environmental values and provide opportunities for environmental education (Food and Agriculture Organization of the United Nations, n. d.; United Nations Economic Commission for Europe, 2014).

The EU Biodiversity Strategy aims to improve knowledge of ecosystems and their services, including forests, in the EU Member States by assessing the economic value of services and by promoting the integration of these values into accounting and reporting systems at the EU and national level by 2020. This concept-based document is aimed at greater recognition of forest values and maintaining these values through their use while taking measures to enhance and promote recreation and ecotourism to provide valuable socioeconomic benefits to citizens, in national parks. Numerous examples of the promotion of recreational activities are provided in country reports; measures to increase physical and/or legal access to forests or to promote forest-based tourism, especially ecotourism, are taken.

At the same time, the relevance of forest-related recreation and tourism, including local tourism around urban conglomerates, are increasingly recognized. For example, forest strategies of many EU countries are based on a combination of climate change mitigation and the development of ecotourism. Ecotourism, which contributes 13 percent of national GDP, funds a set of new protected areas within national parks. Besides, some NFPs prescribe support for ecotourism and set the target of a 25 percent increase in tourism and recreation services in rural areas for the period up to 2025 with the subsequent replication of these measures to encourage ecotourism also in other countries.

Tourism offers the potential to provide economic development and plays an important role, through the provision of increased income and employment, in conserving nature and generating funding for the maintenance of national parks. At the same time, tourism's contribution to the economic diversification of specific regions is emphasized, through the establishment of ecologically sustainable tourism and recreational areas and activities.

Modern national-level research programs to classify and quantify ecosystem services exist in at least 6 countries, and 13 or more countries have made further progress in recognizing forests in their national systems of accounts. As the political importance of ecosystem services is growing at the national and international levels, the efforts should be made to assess and explain the human values provided by certain ecosystem functions, with the development of the national-level research programs for the classification and quantification of ecosystem services, such as the National Ecosystem Assessment Program. The National Ecosystem Assessment Program, as well as more recent environmental and economic reports, upon the survey conducted by the government, foresees a full economic assessment of forest products and services to support land-use decisions, including the assessment of ecosystem functions in relation to water supply, infrastructure protection, conservation of biological diversity and the generation of potential income, and promotes research for the socioeconomic and

environmental values of forest resources, with a careful consideration of the issue of planning and organizing systems for reporting on natural capital, including on forests (Khashir 2015c; Bgane, Zyza and Styagun 2016a).

As for renewable resources accounting, forestry should be a priority, focusing on the protection of pilot watersheds, based on the preparation and publication of a first version of a guide to using the satellite technology for reporting on the state of the environment, including pilot physical accounts for forestry, monitoring of the state of the environment, with the continuation of work on strengthening environmental and natural accounting, with ecosystem accounts that include mangrove forest ecosystems, working on forest accounts on a pilot basis in national environmental and natural capital accounting, working on natural capital accounts, including for land/ecosystems, forestry, undertaking an economic evaluation of forest goods and services with the aim of estimating the total economic value of forests, insofar as environmental and natural resources are part of the national accounting system, compiling the environment accounts in a part relating to a number of environmental aspects, including forests and land.

Such accounts are now an established part of the System of National Accounts on integrating natural resources wealth, specifically timber, into national balance sheet accounts and into the annual estimates of national wealth, by capturing natural values in the nation's balance sheet and in its study on measuring natural capital related to forests and water, with the calculation of the national wealth per capita by using statistics from both the national accounts and the natural resource accounts, including forests, with the use of government payment programs to compensate private providers for the costs of public services not recognized by the market, often in the context of biodiversity protection schemes (Khashir, 2015b; Bgane, Zyza and Styagun 2016b).

Countries with significant private or non-state community-owned or managed forest lands have, in particular, developed mechanisms to compensate owners of such lands for some of the costs deriving from legal or contractual obligations that restrict forest ownership rights or require actions to ensure the maintenance and provision of public goods, and in this case the government acts as a third party, "buying" services for the public as service consumers.

For example, the Forest Biodiversity Program METSO II in Finland and the KOMET Program in Sweden provide compensation for limitations placed on forest management in the interests of nature conservation.

In industrialized countries, forest-related compensation programs often form part of agro-environmental scheme or biodiversity protection schemes; this applies in particular to the EU's rural development program for the period up to 2025 and the US Resource Conservation Program. In developing countries, many such schemes focus on reforestation, avoiding deforestation and sustainable forest management more broadly, on the conservation of natural forests and countering landslides.

Some countries continue to conduct experiments and research on market-based payments for ecosystem services, especially for water and carbon services, while payment schemes based on bilateral negotiation and contracts between providers and users remain relatively few, the attention is mainly focused on the payment for water and carbon sequestration services, the purpose of which is to link international buyers with local providers.

The implementation of a research project on payment for ecosystem services that contribute to climate change adaptation, which produced recommendations on incentives for water catchment management, aiming to facilitate landowner participation in emerging markets for ecosystem services by establishing technical guidelines and a new Office of Environmental Markets (OEM) under the Department of Agriculture tasked with catalyzing the development of markets for ecosystem services (Khashir 2015e; Bgane, Zyza and Styagun 2016c).

Payments for carbon sequestration in the context of REDD+ are still in the piloting phase. Market-based systems for carbon have suffered from the prolonged financial and economic crises in Europe, political obstacles in the United States of America, slow progress in

negotiations on the United Nations Framework Convention on Climate Change and the absence of full operational details for REDD+ until late in 2017. However, since 2008 more than 100 REDD+ pilot projects have been implemented and tested, as well as piloting designs of payment schemes and implementation mechanisms, many of which are located in various countries, as of the end of 2015 17 countries with forest land eligible to receive REDD payments had developed national policies or adopted national REDD+ strategies, and 31 countries had undertaken REDD pilot projects, about 44 countries have taken legal action (based on case law or civil law) on the definition of carbon rights, and thereby rights to carbon credits. Around seven countries have taken action or made efforts to inform and consult with indigenous peoples and local communities on REDD+ as part of the work on establishing REDD payment schemes.

In recent years, the number of countries involved in establishing national carbon market emission trading schemes (ETS) has increased. Major corporate offset buyers also take an active part in the development of the Voluntary Carbon Market (VCM), where forestry projects are common. The two first REDD projects to grant credits under the Voluntary Carbon Standards were implemented in 2015, and the first REDD temporary carbon emission reduction (CER) credits were granted in 2014 (Khashir 2015a; Bgane, Zyza and Styagun 2016d).

In a number of countries, forest-related payment schemes have integrated climate change aspects, with the development of a strategic plan that includes financial mechanisms such as incentive payments for reforestation (PINPEP), afforestation/reforestation under the Clean Development Mechanism and payments for environmental services, especially water, as well as supporting the transfer of more land into both community forest management and REDD+. In this case, any funded project must comply with the National Plan on Climate Change and the requirements of the environmental service incentive system that includes a REDD+ program.

Ecosystem Service Payment Programs are often faced with challenges such as incomplete scientific information, complex terms of contractual relations, dependence on external funding and difficulties in identifying providers and users. Many countries have therefore explored and piloted a variety of Ecosystem Service Payment Programs at different administrative levels, aiming to ensure adequate funding for essential services.

Strengthening the links between policies and benefits gained is based on the results of a comprehensive analysis of statistical data, national reports, policy statements and other documents, provides a significant amount of information on the socioeconomic benefits derived from forests, and the policy decisions taken by the governments to enhance such benefits.

4. Discussion

Based on the findings of the analysis, recommendations can be made on how to further strengthen the links between policies and benefits, in particular, more concerted efforts will be required to increase the availability of relevant information, including evidence of policy implementation and, as a result, improved welfare.

The socioeconomic benefits from forests are mostly derived from the consumption of forest goods and services; there are billions of people that use forest products to meet their needs for food, energy and shelter. In addition, large (but currently unknown) number of people may benefit indirectly from the environmental services provided by forests. The number of people, who gain income and are employed in this sector, is relatively small. However, if informal activities are included, this nevertheless reaches tens – if not hundreds – of millions of people.

Forest policies must specifically address the role of forests in providing food, energy and shelter; many countries have made great progress in strengthening forest tenure and access rights and supporting forest user groups. However, there still appears to be a major disconnect between a policy focus on formal forest sector activities, first of all, and, to a lesser degree, the huge numbers of people using forests to meet their needs for food, energy and shelter.

5. Conclusion

Many of the socioeconomic benefits from forests are compatible with the development of greener and more sustainable economy. Most people using forest products to meet their needs for food, energy and shelter live in less developed countries, although their number is also increasing in developed countries that aspire towards greener economies.

The main difference between the two types of consumers is the efficiency and sustainability of consumption, so that the potential of forests to contribute to sustainable development would be achieved at a larger scale; countries should address the weaknesses through policy reforms and knowledge and technology transfer.

More reliable information about socioeconomic benefits from forests may help to raise awareness and monitor progress towards sustainable forest management. The information about the socioeconomic benefits from forests available to policymakers is often insufficient. There is a lack of quantitative information, in particular, about the socioeconomic benefits or indirect benefits from forests. Stronger efforts to collect data and monitor trends and collaboration with specialized national agencies are needed.

To meet the growing and changing demands, sustainable forest management must include measures on more efficient production. Demand for many of the benefits derived from the consumption of forest products is likely to continue to increase as the number of population increases and the lifestyles change, whether due to the emerging middle class, the global shift to the predominantly urban living or other factors. These demands will have to be met by means of limited or declining resources. To avoid significant degradation of these resources, more efficient production techniques must be adopted, including in the informal sector.

Acknowledgments

The study was conducted with the financial support of the Russian Humanitarian Fund in the framework of Research Project No. 15-02-00261 "The Concept of the Strategic Development of Forestry in the Russian Federation".

References

- Bgane Yu.K., Zyza V.P. and Styagun A.V. (2016a). Formirovanie kontseptsii sotsialno-ekonomicheskogo razvitiya lesnogo sektora [Formation of the Concept of Social and Economic Development of the Forest Sector]. *Ekonomika i predprinimatelstvo*, 1(2(66-2)), 45-49.
- Bgane, Yu.K., Zyza, V.P. and Styagun, A.V. (2016b). Aspekty ekonomiki ekosistem v sfere uslug lesopolzovaniya [Aspects of Ecosystem Economics in Forest Use Services]. *Ekonomika i predprinimatelstvo*, 1(2(66-2)), 49-51.
- Bgane, Yu.K., Zyza, V.P., and Styagun, A.V. (2016c). Razvitie sfery prirodopolzovaniya i obespecheniya mediko-ekologicheskoi bezopasnosti [Development of the Sphere of Nature Management and Provision of Medical and Ecological Safety]. *Ekonomika i predprinimatelstvo*, 1(2(66-2)), 85-89.
- Bgane, Yu.K., Zyza, V.P., and Styagun, A.V. (2016d). Otsenka vliyaniya investitsionnykh protsessov na prirodnye sistemy [Assessment of the Impact of Investment Processes on Natural Systems]. *Ekonomika i predprinimatelstvo*, 1(2(66-2)), 53-59.
- Fernholz, K. & Kraxner, F. (n.d.). *Certified Forest Products Markets*. UNECE/FAO Forest Products Annual Market Review. Geneva: UN Economic Commission for Europe. Retrieved May 17, 2017, from www.unece.org.
- Food and Agriculture Organization of the United Nations. (2010). Global Forest Resources Assessment – 2010. Rome. Retrieved May 17, 2017, from www.fao.org.
- Food and Agriculture Organization of the United Nations. (2012). *Forecast of the Russian*

Federation Forest Sector Development until 2030. Rome. Retrieved May 17, 2017, from www.fao.org.

Food and Agriculture Organization of the United Nations. (2014). *The State of the World's Forests – 2014*. Rome. Retrieved May 17, 2017, from www.fao.org.

Food and Agriculture Organization of the United Nations. (2015). Terms and Definitions. Forest Resources Assessment Working Paper 180. FRA-2015. Rome. Retrieved May 17, 2017, from www.fao.org.

Food and Agriculture Organization of the United Nations. (n.d.). Country Reports. Rome. Retrieved May 17, 2017, from www.fao.org.

Khashir, B.O. (2015a). Organizational and Economic Mechanisms for Monitoring of Processes Ensuring Sustainable Development of the Forest Sector. *Biosciences, Biotechnology Research Asia*, 12(2), 1345-1349.

Khashir, B.O. (2015b). Economic Mechanisms of Competitiveness in Nature Management, Environment Protection and Ensuring Medico-Ecological Safety. *Biosciences, Biotechnology Research Asia*, 12(2), 1451-1458.

Khashir, B.O. (2015c). The Economic Value of Forest Ecosystem Services. *Journal of Environmental Management and Tourism*, VI(1(11)), 291-297.

Khashir, B.O. (2015d). Legal Aspects of Ecosystem Services Related to Efficient Forest Exploitation. *Journal of Environmental Management and Tourism*, VI(1(11)), 53-61

Khashir, B.O. (2015e). "Green Economy" Ecosystems in the Forest Sector Services. *Biosciences, Biotechnology Research Asia*, 12(Spl. Edn. 2), 643-649.

UN Environment. (2015). *Towards a Green Economy. Forests Investing in Natural Capital*. New York: UNO. Retrieved May 17, 2017, from <http://www.unep.org>

United Nations Economic Commission for Europe. (2015). *Seminar on Environmental Services and Financing for the Protection and Sustainable Use of Ecosystems*. Geneva. Retrieved May 17, 2017, from <http://www.unece.org>.

United Nations Economic Commission for Europe.(2014). *Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Recommendations on Fees for Ecosystem Services in the Context of Water Resources Management*. Geneva. Retrieved May 17, 2017, from www.unece.org/env/water/.

United Nations. (2008). *International Standard Industrial Classification of All Economic Activities* (Statistical documents series M, No. 4, Ed. 4). New York: UN. Retrieved May 17, 2017, from www.unstats.un.org.

-
1. Kuban State Technological University, Russia, 350072, Krasnodar, Moscow Street, 2
 2. Kuban State Technological University, Russia, 350072, Krasnodar, Moscow Street, 2. E-mail: x03@inbox.ru
 3. Kuban State Technological University, Russia, 350072, Krasnodar, Moscow Street, 2
-

Revista ESPACIOS. ISSN 0798 1015
Vol. 38 (Nº 48) Year 2017
Indexed em Scopus, Google Schollar

[Index]

[In case you find any errors on this site, please send e-mail to webmaster]