Forest Accounts of the Kyrgyz Republic

Kyrgyz Republic integrated forest ecosystem management project KR WAVES plus

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CONTENT

TABLES

FIGURES

ACRONYMS

CICES	Common International Classification of Ecosystem Services
FAO	United Nations Food and Agriculture Organization
FMIS	Forest Management Information System of the Kyrgyz Republic
GHGs	Greenhouse gases
GIS	Geographic Information Systems
GIZ	German Corporation for International Cooperation
GKR	Government of the Kyrgyz Republic
KR	Kyrgyz Republic
Kyrg-06	Unified state coordinate system of the Kyrgyz Republic
NCA	Natural Capital Accounts
NSC KR	National Statistical Committee of the Kyrgyz Republic
PAs	Protected Areas
SAEPF KR	State Agency for Environmental Protection and Forestry of the Kyrgyz Republic
SEEA EEA	System of Environmental-Economic Accounting Experimental Ecosystem Accounting
SEEA	System of Environmental-Economic Accounting
SFF	State Forest Fund
SNA	System of National Accounts
UFF	Unified Forest Fund
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
WAVES	Wealth Accounting and the Valuation of Ecosystem Services
WB	World Bank

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Foreword

This publication is one of the various technical reports developed under the WAVES Plus support to Natural Capital Accounting (NCA) for Forests and Tourism. The technical work on NCA in the Kyrgyz Republic examined the policy relevance for developing NCA in the country, applied the standard methodologies and obtained some interesting initial findings. The results of this work and the continuous engagement with Government contributed to determine feasibility of future implementation, helping to obtain recommendations for future work in the form of a preliminary roadmap for NCA implementation. The reports also provide clear recommendations for improvements of data collection by staff of the National Statistic Committee, State Agency of Environmental Protection and Forestry, and Department of Tourism to better account for the respective sector contribution and inform appropriate decision-making process.

This work is among the first systematic compilations of the System of Environmental-Economic Accounting (SEEA) for forests and tourism in the Kyrgyz Republic, in accordance with the United Nations international standards. The work on tourism accounts reviewed the methodology of calculation of the tourism share to economy and identified tourism satellite account tables that will enable reporting in compliance with the United Nations World Tourism Organization's (UNWTO)Tourism Satellite Accounting (TSA) Framework and standards. The work on forests is based on best practices and complementary guidance from the United Nations Food and Agriculture Organization (FAO), such as the SEEA handbook for Agriculture, Fisheries and Forests.

The "Forest Accounts of the Kyrgyz Republic" technical report emphasizes the importance of the goods and services forests provide to the Kyrgyz economy and its people. Forests and landscapes are also the unique selling points for international tourists that come to the Kyrgyz Republic for adventure sports, eco-tourism and cultural tours. However, climate change and the increasing pressure from the growing population threatens the wellbeing of the forest ecosystems. To address these challenges and unlock the full potential of the forestry sector, the government of Kyrgyzstan needs to design an effective policy framework. Accomplishing this would require filling in the data gaps, building institutional capacity and improving the IT infrastructure. This should be combined with a deeper understanding and recognition of the important role the forests can play in the sustainable development of the nation. Natural Capital Accounting is a tool that can contribute to address the above challenges.

Executive Summary

Over the past decade, forest areas and the quality of vegetation of the Kyrgyz Republic, including valuable walnut trees, have been steadily declining as a result of natural and anthropogenic factors. Forests are aging due to an overabundance of ripe trees (especially in spruce forests), as well as to grazing and haying that prevent natural recovery of vegetation and make it harder for new trees to take roots. Institutional and policy deficiencies also lead to inappropriate exploitation. Climate change and its effects on weather events and variability of temperatures also impact the quality of the forest cover. If left unmitigated, these factors can damage the productivity of the forests and their ability to provide environmental and economic services. The Climate Change Adaptation Program of the Forest and Biodiversity Sector estimates that with an increase in air temperature of +1.5 °C and a decrease of 10% in precipitations, Kyrgyzstan will need additional investments of 4,550.4 million soms (US$ 94.8 million) in the forestry sector to maintain the productivity of the ecosystem services.

The unique mountain forest of the Kyrgyz Republic provides important services to the environment and people of the country. High-mountain forests, which account for 90% of the forests in the country, carry out climate and water regulating functions and offer critical habitat for rare and endangered species of flora and fauna, including the country's flagship population of snow leopards. Despite that forest areas cover only 5.8% of the country's territory, the composition of these areas is quite diverse and boasts some 180 species of trees and shrubs, with walnut, coniferous-spruce, juniper and floodplain representing the most. Forests and landscapes offer unique scenic value for international tourists that come to the Kyrgyz Republic for adventure sports, eco-tourism and cultural tours.

Various actions have been undertaken to support the transition towards "green growth" and the achievement of the Sustainable Development Goals in the Kyrgyz Republic. This agenda has been taken up at the highest levels of Government under the 2040 national development strategy. This strategy states that the Kyrgyz Republic is a country with a "favorable environment for human life, developing in harmony with nature, preserving unique natural ecosystems, and wisely using natural resources". Yet, the same document recognizes that the forest economy is in stagnation due to poor institutional and technical capacities.

To address these challenges and unlock the full potential of the forest economy, the government of Kyrgyzstan needs to design an effective policy framework to translate the strategic principles into practice. Developing an integrated environmental and economic information system would show the potential for growth and improvement in the sector, promoting income-generating activities, better jobs and alternative income for rural population, as well as ensuring the conservation and sustainable use of forest resources.

Natural capital accounting (NCA) is recognized as one of the useful tool to provide consistent and comparable data to show how forests contribute the economic growth. NCA uses the System of Environmental-Economic Accounting (SEEA) as the internationally agreed methodology, which is consistent with the System of National Accounts (SNA) that is used for estimation of economic

activity, including indicators such as Gross Domestic Product (GDP).[1] Comparing alternatives and trade-offs between institutional sectors, NCA reveals the value of non-market forest products and ecosystem services, showing which economic activity such as agriculture and tourism benefit from forest ecosystems. This information is critical for the development of cross-cutting sustainable development policies. In this study, a pilot implementation of NCA for the Kyrgyz Republic's forests has been carried out for the year 2018.

Forests and their contribution to the economy

The Kyrgyz Republic's GDP in 2019 amounted to $ 8.45 billion with real annual GDP growth of 4.5%. The largest revenues from the forest fund are in the forest sector (97.021 million US dollars, or 62%), as well as the agriculture sector (57.6 million US dollars, or 36.8%). Tourism sector income related to forest areas is about 1.847 million US dollar or 1.2% of the total. For 2005-2014, the total sustainability capital, rooted in the country's natural resources, increased from $54.3 to $142.6 billion, or 2.6 times. Based on the NCA physical and monetary terms, forest products in the forest fund of the Kyrgyz Republic contributed 11.2 billion soms to the national economy in 2018; about 2% of the country GDP of 570 billion (at current prices). Compared with the "fast-track" forest accounts (put in place until 2014), the growth of the contribution of forests to the Kyrgyz Republic can be estimated at 1.87% (or 37 times).

This growth has two main driving forces: the 4-fold increase in the cost of natural resources and growing domestic demand. For example, 94% of the demand for forestry products is coming from the local households that use wood for fuel as well as the manufacturing industry, that relies on forests for commercial-grade timber. Even more importantly, 95.2% (or $148.9 million) of revenues generated from the forests stay within the communities that live nearby. This illustrates the important role forests play in supporting the fragile livelihoods of the rural poor that depend on the natural resources for their subsistence.

In 2018, the stock of natural forest land saw an increase of 2.1% going from 783,553 to 800,002 hectares, whereas artificial lands (which refers to man-made regeneration of forests) expanded by 3.3% with 56,283 hectares at the beginning of the accounting period and 58,147 hectares. These increases were not accompanied by positive valuations in monetary terms, because these showed an average 2.3% reduction reaching 210.3 and 15.3 million soms for natural and artificial lands, respectively. Figure 1 shows this contrast between physical value growth with simultaneous monetary drop for natural forests. The axis on the left shows thousand hectares, while the right shows thousand soms. It is interesting to note that in the Kyrgyz context, pastures and hayfields are equivalent to 1.4 times the area of forest land, both natural and artificial; a feature that defines the country's landscape and contributes to its steppe culture.

[1] Further explanations of forest accounts concepts and definition can be found in the following link: https://www.wavespartnership.org/sites/waves/files/kc/forest_resourcesbook.pdf

Note: The changes reflect the opening stock (Jan 2018) and closing stock (Dec 2018) of natural forests.

Figure 1. Physical and monetary forest asset account (2018)

Regarding flows of forest ecosystem services (mostly provisioning for these accounts), Forest Fund assets supplied the economy with 17,888 cubic meters of timber for industrial purposes and 178,647 cubic meters for fuel, which were complemented with 2,430 cubic meters of imports for both purposes. The Manufacturing Industry is responsible for 98.0% of the consumption of timber products for industrial purposes and households are responsible for 99.1% of the consumption of timber products for fuel, highlighting the importance of forests for household energy production and consumption as is evident in Figure 2, which shows the remaining 0.9% of the industrial uses of fuelwood.

Valuation of cultural ecosystem services, determined as the income of tenants of forest plots, received from renting accommodations for recreational purposes, amounted to 0.13 billion soms (1.85 million US dollars) or 0.02% of GDP for 2018. It is worth noting that this number does not fully reflect the role that forest ecosystems play in recreation and tourism and requires harmonization with tourism accounts. In terms of regulating ecosystem services, the assessment included only the carbon stock of the Forest Fund in 2010[2] of 1,363.975 million tons of CO_2.

Notwithstanding, this value reflects only one aspect and neglects irreplaceable water and thermal regulation functions, as well as protection against mudflows, landslides. The value of the forest as habitat of rare species and provider of other ecosystem services, such as pollination, remains unassessed.

[2] According to the first national forest inventory of the Kyrgyz Republic and the FAO TCP / KYR / 3102 (D) project «Capacity Building for National Forest and Tree Resource Assessment and Monitoring»

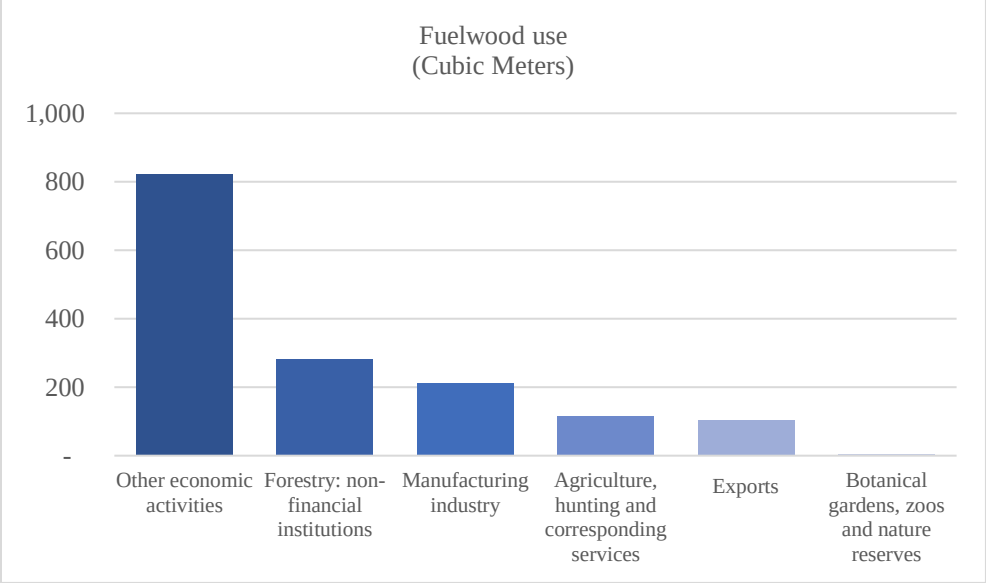

Figure 2. Use of fuel timber by institutional sector of the economy with individual values in cubic meters

Disaggregation of the total economic value of the flows of provisioning and cultural ecosystem services of the forests of the Kyrgyz Republic by groups of forest users and sectors of the economy of the Kyrgyz Republic (Figure 6) showed that rural households living in the forest areas receive the largest income from forest territories; while the incomes of tenants of forest plots and the forestry sector are small. There is no doubt that the obtained data need to be clarified, both in terms of verifying the accuracy of data on forest use by the households (by conducting additional surveys and questionnaires), and in terms of the completeness of data provided by tenants of forest plots (improving reporting on statistical form 2-LH). Regarding the sectoral distribution of income from forest lands, the largest share is in the forest sector. Meanwhile, the research revealed a significant amount of income of the agricultural sector from forest areas. Forests also contribute to the tourism industry and the service sector; the obtained indicators reflect only a small part of it.

Forests in the COVID-19 era

The income-generating potential of the forest will become even more important in the aftermath of the COVID-19 crisis. Travel restrictions and the global lockdown forced many seasonal workers to return to their remote home communities. With limited access to labor markets, the rural poor will turn to forests for income and survival. In Kyrgyzstan, this is true to about two hundred thousand people that live in the forest remote areas of the country.

Since 2015, the country has seen a gradual increase in agricultural production (by 11.7%) and in hunting and forest use (1.8%). But the strongest performing sector of the economy has been

tourism that experienced a remarkable 40.6% growth. Compared to its neighbors, Kyrgyzstan still lags behind in the development of the tourism infrastructure. For most international tourists, the attractiveness of the country is largely based on its undisturbed and authentic beauty and diversity of nature. Most sought-after activities include adventure tourism, eco-tourism, beach (especially the largest Issyk-Kul lake), and skiing. However, cultural tours have been gaining popularity too.

Overall, there is a strong political will to pursue tourism as part of the sustainable development agenda. The importance of tourism has been recognized in the national policy, where it was included as one of the four priorities of the National Development Strategy. However, to create a sustainable tourism industry, Kyrgyzstan should thoughtfully manage its natural capital, including forests and landscapes. These are crucial resources for the sustainable green growth of the country. As mentioned before that will require substantial resources to strengthen institutions and capacities to maintain and use the newly created natural capital accounts for forests.

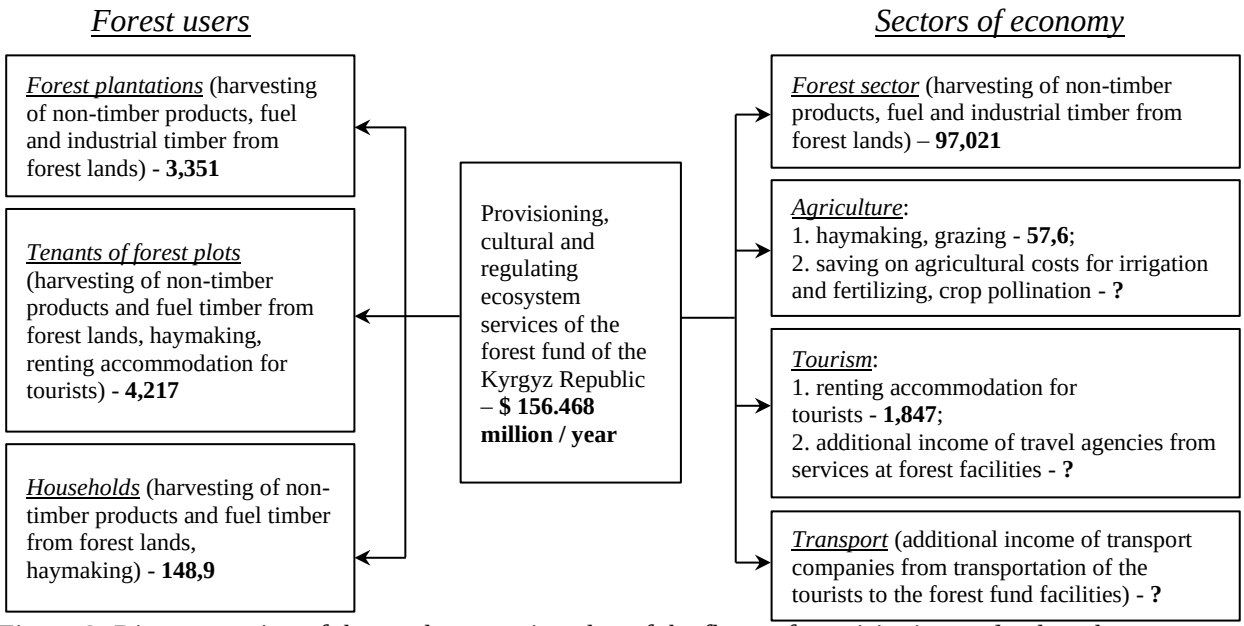

Figure 3. Disaggregation of the total economic value of the flows of provisioning and cultural ecosystem services of the forests fund in 2018 by groups of forest users and sectors of the economy of the Kyrgyz Republic, million US dollars / year

Towards policy driven natural capital accounts: The forest accounts roadmap

Developing the forest pilot accounts in the Kyrgyz Republic, allowed to identify five aspects that require substantial support to achieve a well development accounting system. In the near term the aspects to be considered include:

- **Data gaps:** The policy response to deforestation is lagging due to the lack of reliable and timely data such as the use of forest areas for grazing and haying, non-timber forest products and tourism. The lack of quantitative information halts the development of fact-based policy measures to increase the GDP contribution of the sector. Strict prohibitive measures from the government proved to be ineffective. Yet, while the reliable statistics are not available and monitoring capabilities are limited, the design of effective interventions is hardly possible.

- **Technical and Institutional capacities:** Despite the policy efforts undertaken by the state to ensure a sustainable use of the forests, *The Concept of the Development of the Forest Sector Through 2040* acknowledges the poor planning development, inefficient financing mechanisms, low investment, unqualified personnel, and an overall lack of modern tools for economic planning, forecasting, organization, and accounting that empowers effective forest management.

- **Information technologies and research:** geographic information systems, as well as in-depth research to identify sacred places, socio-cultural locations and forest areas with cultural, historical and spiritual value for the Kyrgyz Republic need to be further developed, to provide the institutional underpinning for a continuous production of forest accounts at a longer term.

- **Institutionalization of forest accounts**: this would increase the power to inform policy makers. Coordination and awareness across various organizations needs to be increase from Government bodies at different levels, to academia, business associations, etc. Adopting the Decree of the Kyrgyz Republic on information resources. This would help streamline the production, transfer, storage and use of data in the field of forest management and other fields related to forest accounting.

- **Training:** Staff and key users of information have to be trained on the compilation of Natural Capital Accounting and its interpretation.

The World Bank funded project on Integrated Forest Ecosystem Management Project is supporting the State Agency for Environmental Protection of Forestry through provision of capacity building, training and IT infrastructure to establish a forest management information system (FMIS). The FMIS will store, analyze, retrieve and report on the data that are being generated from the ongoing National Forest Inventory, forest management plans and existing baseline information from forest cadaster. This will create a sound monitoring framework for forest data and enable National Statistic Committee account for environmental services provided by forests. This effort can be integrated in the roadmap for accounts implementation.

The need to ensure a more effective integrated forest management has prompted an institutional reform of the forest sector that aims to create a modern environment that favors practical policy applications based on consistent integrated information and indicators grounded on SEEA. Key steps to develop the roadmap are detailed in the following table.

Task	Date
Legislation framework for the establishment of forest accounts, the production of statistical data, and institutional arrangement among the executive bodies.	2020-2021
Organizational – Administrative support for the creation of a coordinating council, data sharing agreements,	2020
Methodologies and information support: Guidelines for the implementation, Testing UN methodological approaches, Analysis of the results, development and approval of methodological guidelines.	2021
Advocacy, human resourcing and technical support: Training programs, engage educational institutions, improvement of human resourcing, and improvement of the technical equipment	2022
Phased implementation of SEEA/EEA forest accounts: Implementation of assets accounts (physical and monetary), implementation of forest protection and restoration activities	2023

1. Introduction

1.1. Context

1. The economy of the Kyrgyz Republic is heavily dependent on the country's natural resources. However, there has been until now a broad lack of awareness of the true value of these resources and how to sustainably manage them for the benefit of the country's population. As a result, natural resources, notably forests, pastures, and natural wildlife habitats, have been placed under considerable strain due to inappropriate (and often unplanned or unmanaged) exploitation.

2. Various actions are being undertaken supporting a transition towards "green growth" and achievement of the Sustainable Development Goals in the Kyrgyz Republic: a set of green growth indicators has been developed with the support of UNDP. This agenda has been taken up at the highest levels of Government under the Kyrgyz Republic's national development strategy: 2040 Strategy, the mandate to modernize and digitize government data sets (TAZAKOM), and to show the real contribution of the forestry sector to GDP.

3. By demonstrating the potential for growth and improvement in this sector, there may be more potential in the future for increasing the involvement of local communities and of the private sector in investments that promote income-generating activities, value addition and better jobs, and alternative sources of income for rural populations. It is also important to ensure the conservation and sustainability of forest ecosystems, and strengthen their resilience to various external shocks, including climate change, to enhance the streams of ecosystem services they provide.

4. This technical report shows the results of the pilot implementation of Natural Capital Accounting (NCA) for Forests in the Kyrgyz Republic for the year 2018 under the KR WAVES Plus initiative, using the System of Environmental-Economic Accounting (SEEA) framework[3]. The objectives of this implementation are:
   - To improve understanding of the contribution of the forestry sector to economic development and thus facilitate improved sector management including investment allocation decisions.
   - To contribute to the achievement of the 2040 Strategy and to the process of the overall improvement and systemization of the System of National Accounts.
   - To raise awareness on the utility and importance of Natural Capital Accounting and ecosystem accounting and build technical capacity for their institutionalization.
   - To enhance inter-ministerial coordination on Natural Capital Accounting and strengthen information and information management systems, starting with the forestry sector.

[3] European Commission, Organisation for Economic Cooperation and Development, United Nations, and World Bank (2013). "System of Environmental-Economic Accounting 2012". New York: United Nations.

5. The second section of this document presents the rationale for the compilation of forest accounts in the Kyrgyz Republic, explaining the problems faced by the sector and why the country has dedicated efforts to undertake integrated environmental-economic accounting. The third section explains the methodological principles used in the compilation of these forest accounts. The fourth section addresses the gaps in data that have been identified during the compilation of the forest accounts.

6. The fifth section describes the results of the Forest Accounts of the Kyrgyz Republic, which include i) asset accounts for Forest Fund lands in physical and monetary terms; ii) asset accounts for timber in physical and monetary terms; iii) flow accounts in physical and monetary terms; and iv) flow accounts of ecosystem services in monetary terms.

7. The final section identifies lessons learned and proposes a way forward regarding measures needed to institutionalize the accounts within the country's statistical system.

1.2. Main findings of the Kyrgyz Forest Accounts

9. Forest products in the Forest Fund of the Kyrgyz Republic contributed 11.3 billion soms to the national economy in 2018; about 2% of the country's GDP of 570 billion (at current prices). This is important because one of the policy needs requires that the country assesses the impact of forest use on macroeconomic indicators.

10. In 2018, the stock of natural forest land saw an increase of 2.1% going from 783,553 to 800,002 hectares, whereas artificial lands (which refers to man-made regeneration of forests) expanded by 3.3% with 56,283 hectares at the beginning of the accounting period and 58,147 hectares. These increases were not accompanied by positive valuations in monetary terms, because these showed an average 2.3% reduction reaching 210.3 and 15.3 million soms for natural and artificial lands, respectively. shows this contrast between physical value growth with simultaneous monetary drop for natural forests. The axis on the left shows thousand hectares, while the right shows thousand soms. It is interesting to note that in the Kyrgyz context, pastures and hayfields are equivalent to 1.4 times the area of forest land, both natural and artificial; a feature that defines the country's landscape and contributes to its steppe culture.

Figure 4. Contrast between physical (thousand ha) and monetary (thousand soms) changes in opening and closing stocks of natural forests for the year 2018

11. Congruent with the growth of forest land, standing timber in both natural and artificial lands saw a net growth of 1.45%, reaching 32.63 billion and 3.76 billion cubic meters in 2018, respectively. The growth in volume did not see growth in value, because the value of natural growth was outweighed by the value of removals and a negative revaluation due to change in market prices, ending with a monetary reduction of stocks of 5.8% for a closing stock of 1.96 billion soms. Standing timber in artificial land behave similarly ending with a closing stock of 187.93 million soms in 2018.

12. Regarding flows, Forest Fund assets supplied the economy with 17,888 cubic meters of timber for industrial purposes and 178,647 cubic meters for fuel, which were complemented with 2,430 cubic meters of imports for both purposes. The Manufacturing Industry is responsible for 98.0% of the consumption of timber products for industrial purposes and households are responsible for 99.1% of the consumption of timber products for fuel, highlighting the importance of forests for household energy production and consumption as is evident in Figure 5 (note that the main axis begins at 98%).

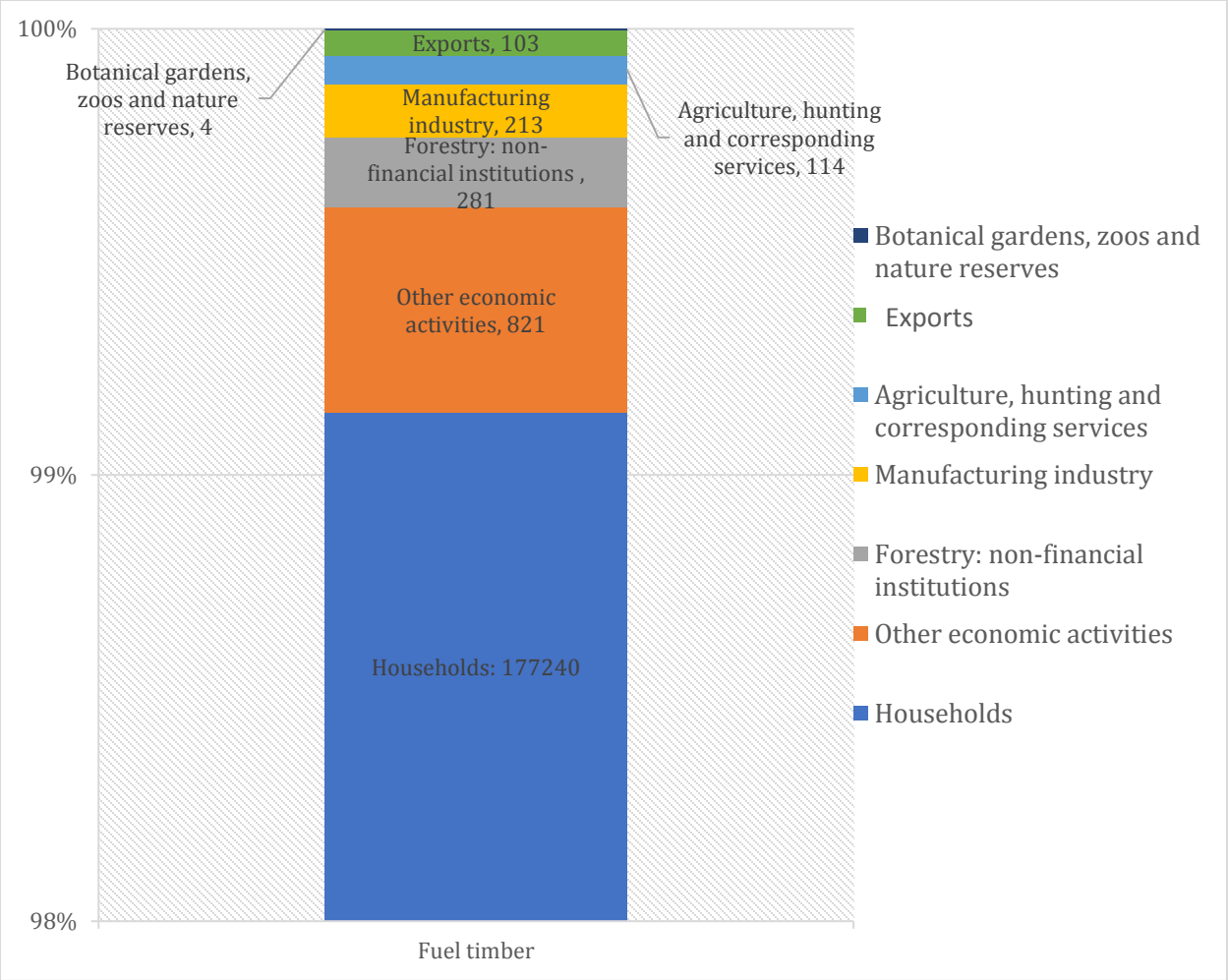

Figure 5. Use of fuel timber by institutional sector of the economy as percentages with individual values in cubic meters

13. When looking at individual commodities, the value of total domestic supply of 11.3 billion soms is overwhelmingly dominated by the provision of hay, pistachio, and walnut, followed by almond and wild apple as shown in Figure 6. Households account for 93.65% of total demand of 11.3 billion soms (domestic demand plus imports) in the forest accounts, outweighing agriculture, the forest sector, the manufacturing industry, and the remaining economic activities, which share the remainder. Given that the supply is mostly provided by households for own consumption, it follows that their demand is dominated by mostly imputed purchases of hay, pistachio, and walnut. This first exercise has allowed for the clarification of the distribution of benefits from the Forest Fund between different sectors of users at both the national and the global level. Since households benefit from the use of forests, measures to replace household income shortfalls during forest protection measures are needed with a special emphasis on energy use in the form of fuel timber.

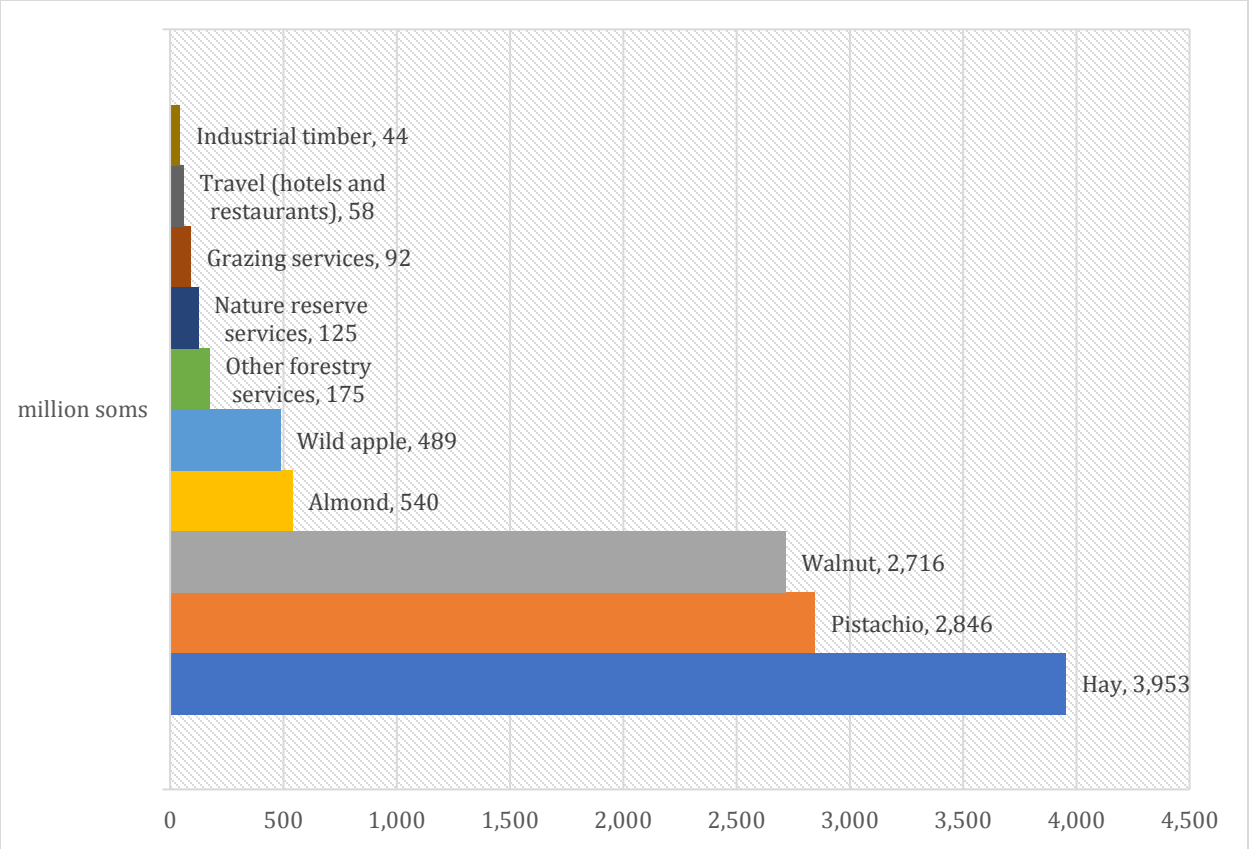

Figure 6. Value of total supply of top 10 Forest Fund products and services in million soms

14. In the case of provisioning ecosystem services, the economic value is defined as the cost of forest resource flows and amounted to 10.8 billion soms/year (154.621 million US dollars/year). Forest products contributed 2% to the GDP of the Kyrgyz Republic in 2018[4].

15. Valuation of cultural ecosystem services, determined as the income of tenants of forest plots, received from renting accommodations for recreational purposes, amounted to 0.13 billion soms (1.85 million US dollars) or 0.02% of GDP for 2018. It is worth noting that this number does not fully reflect the role that forest ecosystems play in recreation and tourism and requires harmonization with tourism accounts. In terms of regulating ecosystem services, the assessment included only the carbon stock of the Forest Fund in 2010[5] of 1,363.975 million tons of CO_2.

16. Notwithstanding, this value reflects only one aspect and neglects irreplaceable water and thermal regulation functions, as well as protection against mudflows, landslides. The value of the forest as

[4] The value of GDP for 2018 is taken according to the data of the National Statistical Committee of the Kyrgyz Republic, at current prices, and is equal to 570 billion soms (8160.53 million US dollars).
[5] According to the first national forest inventory of the Kyrgyz Republic and the FAO TCP / KYR / 3102 (D) project «Capacity Building for National Forest and Tree Resource Assessment and Monitoring»

habitat of rare species and provider of other ecosystem services, such as pollination, remains unassessed.

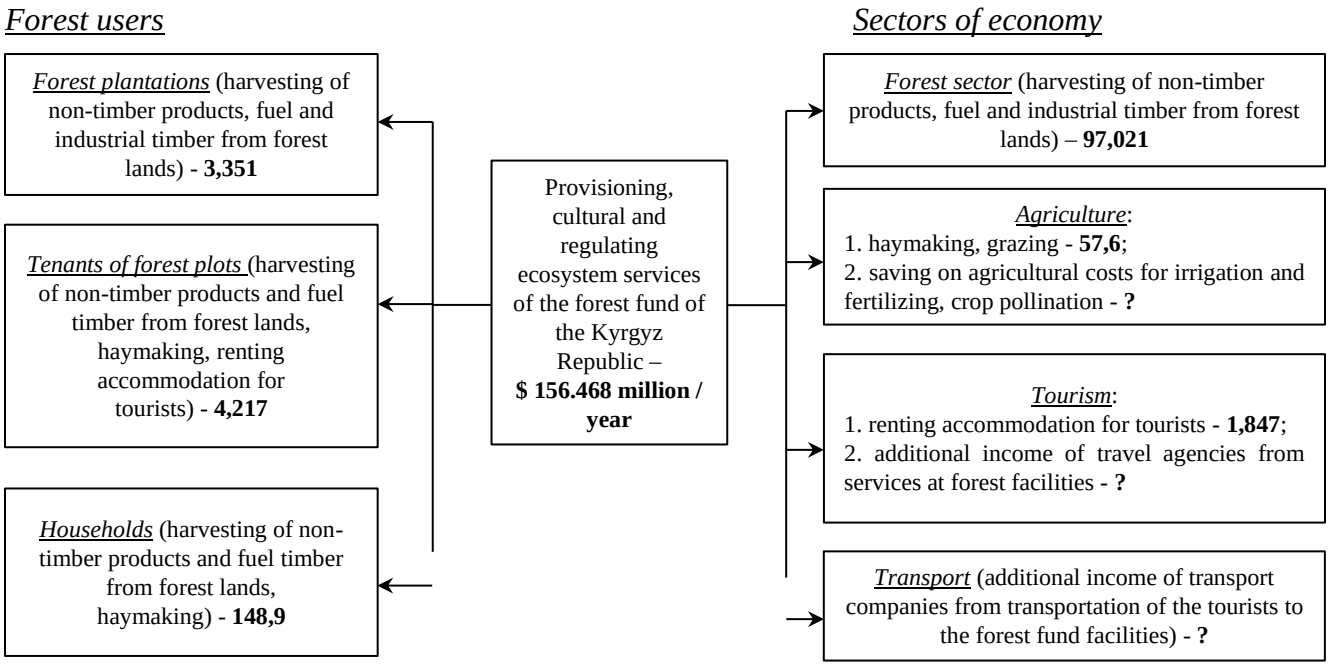

Figure 7. Disaggregation of the total economic value of the flows of provisioning and cultural ecosystem services of the forests fund in 2018 by groups of forest users and sectors of the economy of the Kyrgyz Republic, million US dollars / year

17. Disaggregation of the total economic value of the flows of provisioning and cultural ecosystem services of the forests of the Kyrgyz Republic by groups of forest users and sectors of the economy of the Kyrgyz Republic (Figure 7) showed that rural households living in the forest areas receive the largest income from forest territories, while the incomes of tenants of forest plots and the forestry sector are small. There is no doubt that the obtained data need to be clarified, both in terms of verifying the accuracy of data on forest use by the households (by conducting additional surveys and questionnaires), and in terms of the completeness of data provided by tenants of forest plots (improving reporting on statistical form 2-LH). Regarding the sectoral distribution of income from forest lands, the largest share is in the forest sector. Meanwhile, the research revealed a significant amount of income of the agricultural sector from forest areas. Forests also contribute to the tourism industry and the service sector; the obtained indicators reflect only a small part of it.

2. Rationale and applications of forest accounts

2.1. What are the problems the forest sector is confronting?

8. The forests of the Kyrgyz Republic are diverse and rich in valuable species, featuring more than 180 tree and shrub species, of which walnut, coniferous-spruce, juniper, and floodplain[6] are most predominant. About 90% of the country's forests stand between 700 to 3,500 meters above sea level. However, both natural and socioeconomic factors contribute to a tendency towards aging of forests in the country. Moreover, there is an overabundance of overripe trees (especially true for spruce forests), on the one hand, as well as grazing and haying on the other, which harm the restoration of tree vegetation whereby young trees don't have a chance to take root.

9. Severe weather conditions create high vulnerability for mountain forest ecosystems and negatively change their condition. Changes in climate have an impact on the physiology and metabolism of trees and wildlife, as well as on the functioning of ecosystems. The Climate Change Adaptation Program of the Forest and Biodiversity Sector estimates that with an increase in air temperature of +1.5 °C and a decrease of 10% in precipitation, Kyrgyzstan will need additional investments of 4,550.4 million soms (US$ 94.8 million) in the forestry sector in order to be able to maintain the productivity of ecosystem services.[7]

10. While the contribution of Kyrgyzstan to the increase in the global concentration of greenhouse gases (GHGs) that negatively affect climate is relatively small (13,046 Gg CO_2-equivalent or 2 tons per capita per year in 2011), its forest resources play a large role in global processes of prevention of the negative effects of climate change. Kyrgyz forests sequester carbon, regulate rivers' water flows, and help prevent mudflows, landslides, and snow avalanches in mountainous terrain.

11. Notwithstanding, traditional economic measures from the System of National Accounts (SNA) place the contribution of the forest sector at around 0.05% of GDP.[8] Forests of the Kyrgyz Republic are underestimated, because ecosystem services of the forest provided to households (such as the use of forest areas for grazing and haying, non-timber forest products, tourism, etc.) remain hidden by traditional National Accounts.

12. About two hundred thousand citizens of the Kyrgyz Republic live within the borders of forests and are completely dependent on forest resources[9]. These individuals place pressures on

[6] Review of the political and institutional framework for financing environmental protection in the Kyrgyz Republic. Bishkek: 2019. 114 p.
[7] Climate Change Adaptation Program of the Forest and Biodiversity Sector for 2015-2017.
[8] National Statistical Committee of the Kyrgyz Republic, 2016.
[9] The main causes of forest degradation and deforestation in Kyrgyzstan. Bishkek: MED "Biom", 2001.

deciduous forests, walnuts, pistachios, and almonds, which mainly grow in regions with high population density, and from a government response standpoint, strict prohibitive measures have proven ineffective to halt deforestation. While illegal logging has a negative impact on the qualitative and quantitative state of forests and forest ecosystems, reliable statistics are not available, and monitoring capabilities are significantly limited.

13. The Forest Code (FC), which became effective in 1999, establishes that all forests, irrespective of their ownership status, comprise the Unified Forest Fund (hereinafter "Forest Fund") of Forest of the Kyrgyz Republic. It includes forests and associated land, as well as land that is not covered by forest, but that is suitable for afforestation. Within the Unified Forest Fund, the State Forest Fund (SFF) is made of state-owned forests, which is distinct from municipal land and privately-owned land. Despite the increase in the area covered by forest in Kyrgyzstan, the total area of the SFF has decreased by 20 percent, from 3,279.3 to 2,619.7 thousand hectares, between 2003 and 2016.[10] Conservation and restoration is carried out by the State Agency for Environmental Protection and Forestry (SAEPF). It is important to understand that when we mention the Forest Fund in this document, we are referring to all forests in the Kyrgyz Republic.

2.2. Why is the country dedicating efforts to develop these accounts, for what purpose?

14. As previously stated, the mountain forests of the Kyrgyz Republic ensure the livelihoods of households and carry out important environmental protection functions. However, over the past decade, their area and the quality of vegetation, including especially valuable walnut trees, has been steadily declining. Traditional forest statistics and national accounting methods fail to reveal important functions of forests that contribute to human well-being and natural capital, and this underestimation leads to errors in policy design and ineffective forest management.

15. The country has taken policy steps to ensure sustainable use of the forest for its people through the adoption of the Concept of the Development of the Forest Sector Through 2025 (hereinafter "the Concept"), which states that the Kyrgyz Republic is a country with a "favorable environment for human life, developing in harmony with nature, preserving unique natural ecosystems, and wisely using natural resources." Notwithstanding, the same document recognizes that the forest economy is in stagnation due to poor development planning, inefficient financing mechanisms, low investment, unqualified personnel, and an overall lack of modern tools for economic planning, forecasting, organization, and accounting that empowers effective forest management.

16. The need to ensure a more effective integrated forest management has prompted an institutional reform of the forest sector that aims to create a modern environment that favors practical policy applications based on consistent integrated information and indicators grounded on the

[10] Concept of the green economy in the Kyrgyz Republic "Kyrgyzstan is the country of green economy" (Approved by the resolution of the Jogorku Kenesh of the Kyrgyz Republic dated June 28, 2018 No. 2532-VI)

internationally agreed conceptual framework for Natural Capital Accounting System of Environmental and Economic-Accounting (SEEA), as well as on definitions, classifications, and accounting principles that can aid in the monitoring of the forest through time and facilitate international comparisons. Box 1 shows the objectives of the reform. An important fraction of the population of the Kyrgyz Republic derives increasing value from forests. However, most of the value that is derived from them is not represented via market transactions. For that reason, it is important to compile Experimental Ecosystem Accounts (SEEA-EEA) in addition to SEEA-Central framework in order to quantify those additional benefits that are reaped by households, in the form of production for own consumption, carbon storage, and industries related to forests indirectly, such as tourism.

Box 1. Objectives of the forest reform proposed by the Government

- Enhancement of efficiency of implementation of forest activities considering the ecological, economic, and social factors.
- Ensuring of the further improvement and development of forest, flora, and fauna use.
- Prevention of degradation and conservation of the forest ecological systems.
- Improvement of the guarding of forests irrespective of the ownership forms.
- More precise identification of influence of the other sectors on the status of forests and biodiversity, including through comprehensive monitoring.
- Development of the network of the specially protected territories and territories with unique nature resources.
- Determination of the technical norms for sustainable forest management.
- Improvement of the legislation relating to guarding and use of forest resources, as well as resources of flora and fauna.
- Determination and clear-cut separation of powers of the bodies of state governance and the private sector.
- Improvement of the systems of the joint forest management and leasing relations.
- Improvement of the economic mechanism in the forestry sector with the purpose of introduction of the efficient system of financing of the special forest activities.
- Improvement of the forest science and education.
- Enhancement of awareness of the population about the status of the forestry sector.

2.3. Who is demanding the forest accounts and how will they be used?

17. At the national level, there are several efforts that have made the need for Natural Capital Accounting a pressing issue. The forestry program, through consultation with several stakeholders of the forest sector, has supported various initiatives that have shaped a sustained policy of three pillars—State, Man, and Forest—over the past two decades. This has prompted a decentralization of forest management, seeking the involvement of local communities in decision making, especially through the development of community-based forest management (CBFM) and joint forest management (JFM) arrangements. These initiatives include:

18.

- Decree of the President of the Kyrgyz Republic "On the New National Forest Policy in the Republic" No. 300 of October 6, 1998.

- Forest Code of the Kyrgyz Republic of July 8, 1999, Law of the Kyrgyz Republic No. 66[11].
- Matrix of indicators for monitoring and evaluating the progress of transition of the Kyrgyz Republic towards sustainable development (based on the OECD Green Growth framework)[12].
- National Development Strategy of the Kyrgyz Republic for 2018-2040[13],
- The concept of the green economy in the Kyrgyz Republic "Kyrgyzstan is the country of green economy" (Approved by the Resolution of the Jogorku Kenesh of the Kyrgyz Republic dated June 28, 2018 No. 2532-VI).
- Program and action plan for adaptation to climate change in the "Forest and Biodiversity" sector for 2015-2017.[14]
- National priorities for the conservation of biological diversity of the 2025 and the Action Plan for their implementation for 2014-2020.[15]
- The program of improvement and development of state statistics of the Kyrgyz Republic for 2015-2019[16];
- The concept of development of the forest sector of the Kyrgyz Republic for the period to 2025[17] and the Action Plan for the implementation of the Concept of development of the forest industry of the Kyrgyz Republic for 2019-2023 (hereinafter "the Action Plan")[18], as

[11] As amended by the Laws of the Kyrgyz Republic of June 28, 2003 No. 119, June 28, 2003 No. 120, March 3, 2005 No. 41, July 2, 2007 No. 94, July 25, 2012 No. 132, March 11, 2013 No. 38, July 30, 2013 of the year No. 178, March 13, 2014 No. 43, July 2, 2015 No. 142, July 25, 2016 No. 135.

[12] Decree of the Government of the Kyrgyz Republic of February 19, 2015 No. 48-r.

[13] Approved by Decree of the President of the Kyrgyz Republic dated October 31, 2018 No. 221;

[14] Order of the SAEPF of April 17, 2015 No. 01-9/110. The document addresses ecosystem-based adaptation issues, and measures aimed to strengthen ecosystem management that provides a wide range of public benefits.

[15] Decree of the Government of the Kyrgyz Republic dated March 17, 2014 No. 131.

[16] Approved by the Decree of the Government of the Kyrgyz Republic of March 24, 2015 No. 144; (As amended by the Decree of the Government of the Kyrgyz Republic of November 15, 2016 No. 589;

[17] This Concept was developed based on the assessment of the implementation of the strategic directions of the Forest Sector Development Concept, approved by the Decree of the Government of the Kyrgyz Republic dated April 14, 2004 No. 256 (hereinafter referred to as the Concept 2004), and subject to changes at the global and national levels.

The concept is based on the 12 objectives of UN Sustainable Development Goal No. 15, "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" (SDGs adopted at the 70th session of the UN General Assembly - "Transforming our World: The 2030 Agenda for Sustainable Development.").

The Concept was developed on a bottom-up principle, with the participation of all interested parties, and contains goals, objectives and strategic directions of the long and medium-term vision, as well as an Action Plan for the implementation of the Concept for 2019-2023 (hereinafter referred to as the Action Plan).

[18] The Action Plan includes the priority areas for the development of the forest sector for 2019-2023 in details and step-by-step implementation of the tasks. The comprehensive nature of the measures will allow to coordinate the capabilities of state bodies, public and international organizations in the implementation of the Action Plan for the implementation of sustainable forest management as much as possible.

well as a matrix of indicators for monitoring and evaluating the implementation of the Action Plan and budget for the Action Plan[19].

19. Translating these principles into practice have had its difficulties and forest sector stakeholders will benefit from integrated environmental and economic information that allows evidence-based policy discussions with the authorities.

20. According to the Concept of Development of the Forest Sector of the Kyrgyz Republic for the period to 2025, economic factors dominate the priorities in the development of the Kyrgyz forest sector. Forest resources are defined as natural capital, which is considered as a combination of forest resources and ecosystem services. In this context is recognized that the implementation of SEEA forest accounts will contribute to the increase in the contribution of forestry to GDP to 1%.

21. Table 1 shows the purposes, areas of analysis, indicators and capacity needs for the implementation of forest accounts).

[19] Decree of the Government of the Kyrgyz Republic of May 27, 2019 No. 231. Ministry of Justice of the Republic of Kyrgyzstan; http://cdb.minjust.gov.kg/act/view/ru-ru/14276?cl=ru-ru

Table 1. Purposes, areas of analysis, indicators and capacity needs for the implementation of forest accounts

No.	The purpose of implementation of forest accounts of the Kyrgyz Republic	Purpose justification	Areas of analysis	Used indicators	Forest accounts of the Kyrgyz Republic for the development of indicators
1	Improving the assessment and accounting of economic benefits from forest ecosystems for all institutional sectors of the economy	1. Assess the impact of forest use on macroeconomic indicators.	Analysis of the impact of deforestation or land-use change on aggregate macroeconomic indicators	Economic contribution of forest resources and products to GDP / GRP	Flow accounts for Forest Fund resources and products Flow accounts of provisioning, cultural and regulating ecosystem services of the Forest Fund
		2. Determine the total economic value of the Forest Fund and forest areas, including the non-market value of forest products and ecosystem services of forests not included in the SNA. 3. Identify the economic value of deforestation and transfer of lands for other categories of use, including loss of ecosystem benefits, affecting all institutional sectors of the Kyrgyz Republic.		Economic value of natural assets of the Forest Fund as part of natural capital. Economic assessment of depletion of forest assets	Land and timber asset accounts of the Forest Fund Flow accounts of provisioning, cultural and regulating ecosystem services of the Forest Fund Flow accounts for Forest Fund resources and products including activities of households Flow accounts of provisioning, cultural and regulating ecosystem services of the Forest Fund. Accounts of spatial parameters and the state of ecosystems of the Forest Fund
		4. Clarify the distribution of benefits from the Forest Fund between different sectors of users, for example, state forestry, tenants of forest plots and households, as well as other users of regional, national, and global levels. 5. Assess trade-offs between competing forest uses. 6. Substantiate economic relations between forest users of the upper and lower courses of water flows (rivers), based on the results of the assessment of regulating ecosystem services.	Economic analysis of alternative types of forest management and their best combination for planning local/regional land use and development.	Economic contribution of forest resources and products to GDP / GRP	

No.	The purpose of implementation of forest accounts of the Kyrgyz Republic	Purpose justification	Areas of analysis	Used indicators	Forest accounts of the Kyrgyz Republic for the development of indicators
2	Improving the measurement of the value of forest ecosystems for all sectors of the national economy (primarily agriculture, tourism). Improving macroeconomic management, considering the impact on the Kyrgyz Forest Fund	1. Assess the impact of non-forest sectors of the economy on forest management throughout the economy.	Analysis of the entire chain of causal relationships; from macroeconomic policies and policies of non-forest institutional sectors of the economy, to decisions on types of forest management and deforestation.	Economic assessment of depletion of forest assets	Land and timber asset accounts of the Forest Fund
		2. Measure the relationship between economic activity and the demand for resources and products of the forest sector and the Forest Fund.		Economic contribution of forest resources and products to GDP / GRP Economic contribution of tourism on forest lands to the total value added of the tourism sector	Flow accounts for Forest Fund resources and products Flow accounts of provisioning, cultural and regulating ecosystem services of the Forest Fund
		3. Assess the impact of non-forest institutional sector policies on the ability of the Forest Fund to provide critical goods and services.		Economic assessment of depletion of forest assets	Land and timber asset accounts of the Forest Fund
		4. Show the impact of macroeconomic policies on the Forest Fund (both direct and indirect consequences).		Economic assessment of depletion of forest assets Losses of forest resources because of fires.	Land and timber asset accounts of the Forest Fund
		5. Measure the external environmental impacts of forestry and their consequences for non-forest institutional sectors		Public expenditures on the protection and reproduction of forests Growth of artificially grown timber	Flow accounts for Forest Fund resources and products. Flow accounts of provisioning, cultural and regulating ecosystem services of the Forest Fund Land and timber asset accounts of the Forest Fund

No.	The purpose of implementation of forest accounts of the Kyrgyz Republic	Purpose justification	Areas of analysis	Used indicators	Forest accounts of the Kyrgyz Republic for the development of indicators
					Accounts of spatial parameters and the state of ecosystems of the Forest Fund.
3	Improving the resilience of households under climatic and other uncertainties and risks	1. Identify territories of potential social conflicts related to the loss by households of previously available flows of forest ecosystem services.	Disaggregation of forest accounts to regional and local levels makes it possible to identify household income flows from the consumption of forest ecosystem services over time, as well as to predict socially dangerous depletion of natural capital (Forest Fund).	The economic contribution of forest resources and products to GDP / GRP, disaggregated at the territorial (oblast, district) and sectoral (in terms of households) levels. Economic assessment of depletion of forest assets at the regional and district levels	Flow accounts for Forest Fund resources and products including activities of households Flow accounts of provisioning, cultural and regulating ecosystem services of the Forest Fund including activities of households Accounts of spatial parameters and the state of ecosystems of the Forest Fund Ecosystem asset accounts of the Forest Fund
		2. Predict the prevention of possible ethnic conflicts in multinational territories in the field of forest management. 3. Substantiate measures to replace household income shortfalls during forest protection measures.			Flow accounts of provisioning, cultural and regulating ecosystem services of the Forest Fund including activities of households Accounts of spatial parameters and the state of ecosystems of the Forest Fund Ecosystem asset accounts of the Forest Fund

22. At the international level, there have been efforts to reform the Kyrgyz Republic to better respond to the needs of sustainable development and the Green Economy. Specifically, Natural Capital Accounting for forests provides a standardized way to monitor indicators for 7 Sustainable Development Goals, which have been adopted by the country (SDG2, SDG6, SDG8, SDG11, SDG12, SDG15, and SDG17). As a member of the international statistical community, the Kyrgyz Republic also benefits from adopting Natural Capital Accounting to better interact with the following:
    - Green Growth / Green Economy Initiatives by UNDESA[20], UNEP[21], UNDP[22], OECD[23].
    - Beyond GDP[24].
    - World Bank Natural Capital Accounting[25] / Wealth Accounting and the Valuation of Ecosystem Services (WAVES)[26].
    - Aichi Goals of CBD Strategic Plan for 2011-2020 (e.g. Goal 2: By 2020, monetary value of biodiversity is included in national and local development and poverty reduction strategies, in planning processes, and in national accounting systems).

23. Natural Capital Accounting for forests is a useful planning tool for coordinating policies of various ministries and assessing intersectoral interaction, allowing them to compare alternatives and trade-offs between institutional sectors, in order to preserve and efficiently use the ecosystems of the Forest Fund of the Kyrgyz Republic. They reveal the value of non-market forest products and ecosystem services, which show which economic activities, such as agriculture and tourism, benefit from forest ecosystems. This information is crucial for the development of cross-cutting sustainable development policies.

24. At the sectoral level, forest accounts will improve the analytical powers of SAEPF and its structural divisions with a positive impact on sustainable management of the forests, as well as a more sustainable use of non-forest uses. By revealing the non-market contributions of ecosystem services, SEEA-CF and SEEA-EEA forest accounts are a powerful information tool for promoting policies that integrate economic activities related directly and indirectly to the forest, such as agriculture and tourism.

25. Natural Capital Accounting for forests will provide a better identification of areas of susceptible to lower flows of ecosystem services from forests, which can prevent negative social and

[20] A Guidebook to the Green Economy Issue 4: A guide to international green economy initiatives by UNDESA: https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=916&menu=1518
[21] Green Growth Indicators by UNEP: https://www.unenvironment.org/resources/report/green-growth-indicators
[22] Green Economy in Action by UNDP: https://www.undp.org/content/undp/en/home/librarypage/environment-energy/integrating_environmentintodevelopment/green-economy-in-action.html
[23] Towards Green Growth by OECD: https://www.oecd.org/env/towards-green-growth-9789264111318-en.htm
[24] https://ec.europa.eu/environment/beyond_gdp/index_en.html
[25] https://www.worldbank.org/en/topic/natural-capital
[26] Wealth Accounting and the Valuation of Ecosystem Services: https://www.wavespartnership.org/

economic impacts to vulnerable populations. It will also help improve the resilience of those households whose livelihoods depend on forest ecosystems.

3. Methods and data

3.1. Natural Capital Accounting principles

26. Natural Capital Accounting for the Forest Fund of the Kyrgyz Republic has relied upon international standards for the development of this implementation, which have been adapted to the specific institutional and organizational conditions of the country. Three principles have guided the effort, namely i) step-by-step implementation of SEEA/EEA forest accounts, taking into account available data, regulatory requirements and needs of integrated forest management; ii) flexible and modular approach, in accordance with the priorities of the Kyrgyz Republic in forest management, development of national statistics, and international comparisons; and iii) cross-cutting inter agency interactions. The local adaptation of Natural Capital Accounting for forests is firmly grounded in:

27.

- System of Environmental-Economic Accounting 2012 – Central Framework.
- System of Environmental-Economic Accounting 2012 – Experimental Ecosystem Accounting.
- The 2019 technical Recommendations in support of the SEEA 2012 - Experimental Ecosystem Accounting.
- The Forest Accounting Sourcebook: Policy applications and basic compilation.
- The Forest Code and other legal documents of the Kyrgyz Republic in the field of accounting for stocks and use of forest resources and forest ecosystem services.
- Analysis of data on various aspects of forest management in the Kyrgyz Republic, available in statistical and administrative accounting systems, as well as data obtained during field studies.
- Identification and analysis of the interconnections of ecosystem structures and processes and further identification of generated forest products of ecosystem services provided by lands of the Forest Fund which are summarized in Figure 8.

3.2. Methodology for forest accounting

28. The following SEEA/EEA forest accounts have been developed for the Kyrgyz Republic for the year 2018:

- Asset accounts for Forest Fund lands in physical and monetary terms.
- Asset accounts for timber resources of the Forest Fund in physical and monetary terms.
- Flow accounts for the Forest Fund in physical and monetary terms.
- Flow account of ecosystem services of the Forest Fund.

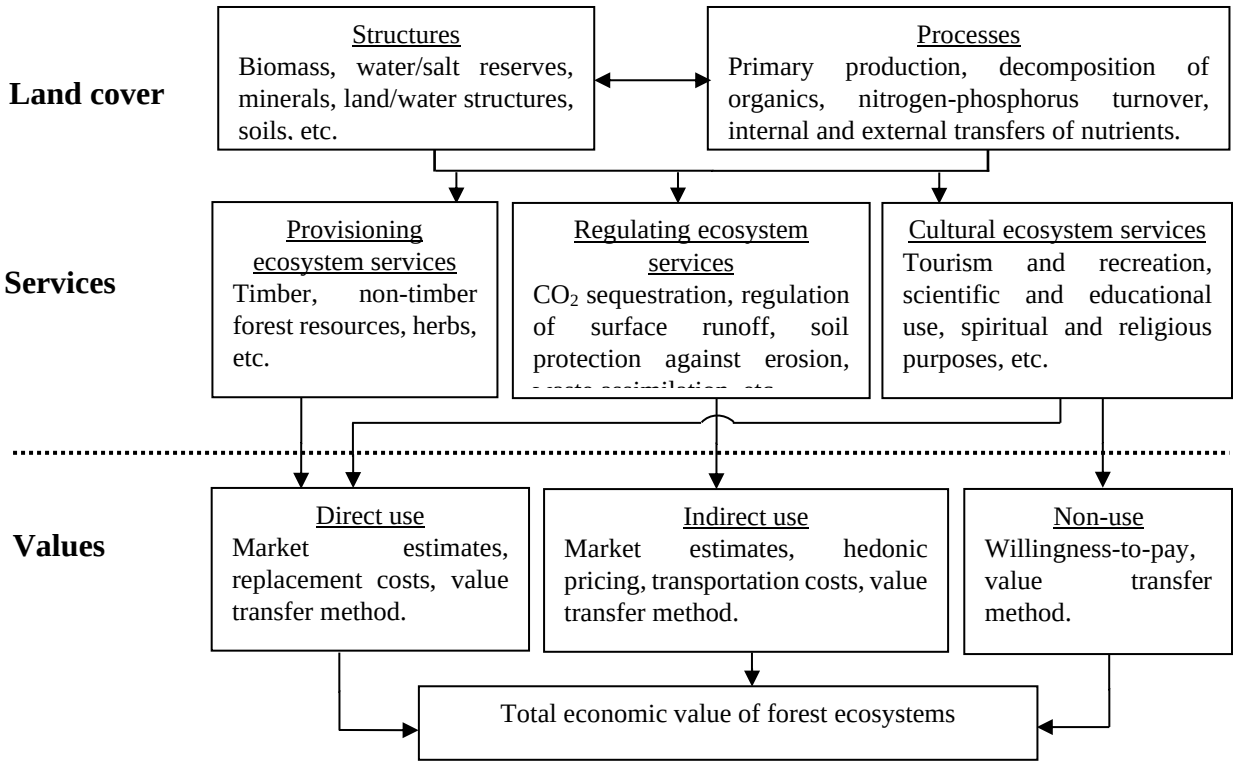

Figure 8. The total economic value of forest ecosystems. Source: Based on UN et al (2014)

29. Asset accounts, both in physical (e.g. kg, ha, tm, individual units) and monetary terms (i.e. soms) follow the accounting structure of SEEA in which we assess an initial opening stock equivalent to the availability of that resource at the beginning of the year (in the Kyrgyz case available forest land and non-forest land associated with the forest, as well as standing timber). After that, we report the additions to stock (for example, from afforestation or natural expansion), deduct the reductions of stock (due to deforestation or natural reductions), record any positive or negative revaluations of the stock in the case of monetary values, to find the availability of the resource at the end of the accounting period or closing stock. Table 2 shows the general form of an asset account for forests.

Table 2. General form of asset accounts for forests

No.	Indicator
1	**Opening value of stock**
Additions to stock (+), total for the reporting year	
2	Additions (afforestation, natural growth)
3	Reclassifications
Reductions in stock (-), total for the reporting year	
4	Reductions (removals, felling residuals, natural losses)
5	Reclassifications
6	**Revaluations of lands due to change in market prices (in the case of monetary stocks)**
7	**Closing value of stock of land**

Source: Economic Commission et al. (2013)

30. In the case of flows, Forest Fund assets provide products and services that are made available to the economy each year. In this case, flows from the environment to the economy are accounted for in a supply table, and then track how those products and services are used by institutional sectors of economic activity and exported to the rest of the world in a use table, both in monetary and in physical terms. Figure 9 shows a highly aggregated diagram of supply and use tables for forest resources, both in physical and monetary terms. Blocked out cells are null by definition. The supply table explains that natural sources flow from the environment (1), but at the same time, industries (disaggregated by the State Classification of Economic Activity – 3, based on the International Standard Industry Classification) are offering products (according to the Statistical Classification of Products – 2, based on the Central Product Classification - CPC) manufactured from those natural resources to the economy (2).

31. Products from the rest of the world can be imported as well (3). Finally, all institutional sectors in the economy and the environment itself can create residuals (4, 5, 6, 7). Conversely, the use table in Figure 9 shows that once available, those natural sources or products can be used by industries (8) as inputs to manufacture products, while the products made by industries in the supply side can be purchased by other industries as inputs (9), by households (10), or they can be exported (11), while residuals can be used as inputs for industries as in recycling (12), exported, as is the case with certain residuals (13) or discarded to the environment (14).

Supply table					
	Industries (ISIC)	Household Final Consumption	Flows to/from the rest of the world	Flows from the environment	Total
Natural sources				1	
Products (CPC)	2		3		
Residuals	4	5	6	7	
Use table					
	Industries (ISIC)	Household Final Consumption	Flows to/from the rest of the world	Flows to the environment	Total
Natural sources	8				
Products (CPC)	9	10	11		
Residuals	12		13	14	

Figure 9. Diagram form of flow accounts tables for forest

3.3. Data sources, gaps and limitations

34. For this implementation, the following data sources were used:
- Official statistics produced by the National Statistical Committee of the Kyrgyz Republic.
- Official administrative data in the form of databases from government bodies, such as the SAEPF and its subordinate structures in the regions of the Kyrgyz Republic; the State Registration Service under the Government of the Kyrgyz Republic; the Ministry of

Economy; Ministry of Agriculture; Food Industry and Land Reclamation; the Ministry of Emergency Situations; and the Ministry of Finance of the Kyrgyz Republic, among others.

- Expert data that describe the phenomena and facts of an unregistered [27] economic phenomena. This is necessary in situations where official statistical and administrative data are not available. When using expert data, appropriate assumptions were made.
- Geographical Information Systems.
- Data in physical terms for available quantitative data (for example, data on the mass of harvested nuts); available quantitative data obtained on the basis of conversion and a combination (for example, an assessment of the volume of hay harvesting by the number of livestock).
- Data in monetary terms, obtained by multiplying data in physical terms by the corresponding price (for example, the value of standing timber stocks is obtained by multiplying the harvesting volume (cubic meters) by the cost of 1 cubic meter of standing timber).
- For asset accounts, market price of the resource in its natural environment (for example, auction prices for standing timber); market price of the product obtained from the resource minus the costs of harvesting the resource, processing, transportation, etc. (for example, the market value of the round timber minus the cost of procurement, processing and transportation) multiplied by the physical volume of the estimated resource.
- For flow accounts, the value of the product obtained using the resource at the consumer's price. Data in monetary terms are represented in monetary units (som, dollar, etc.).

35. In general, the revision of data gaps on the forest accounts of the Kyrgyz Republic showed that there are large data gaps for the compilation of the asset account of non-forest lands of the Forest Fund, which form a single natural complex with forests, and asset accounts of timber. It was also difficult to find systematic information characterizing changes in the assets of forest and non-forest lands, as well as timber, during the reporting year 2018 (both for anthropogenic and natural reasons).

- Among the flow accounts of ecosystem services provided by the Forest Fund of the Kyrgyz Republic, the largest gaps were identified in flow accounts of regulating ecosystem services, where there is almost none of the required data (not only official, but also expert). Moreover, according to the methodology of ecosystem accounting, these data should be provided not only in physical terms but also in a spatial manner. There is a need to produce geographic Land Use Land Cover information on the area and location of forests that provide various regulatory ecosystem services, such as water protection, protective, sanitary, and recreational, environmental protection, etc.

[27] Unregistered economy - economic activity that is not fully covered by the system of state statistical accounting (Source – https://investfuture.ru/dictionary/word/neregistriruemaya-ekonomikaunregistered-economy).

- As for cultural ecosystem services, there is no information on the activities of travel agencies, educational, scientific, and cultural institutions on the lands of the Forest Fund.

- Finally, in the case of flow accounts for provisioning ecosystem services, data are mostly available; but there is no disaggregation of the expenses by producers and consumers of products and services.

4. Core accounting tables

37. This section presents the results from the compilation of Natural Capital Forest Accounts of the Forest Fund of the Kyrgyz Republic for the year 2018, both in physical and monetary terms. When we mention the Forest Fund in this document, we are referring to all forests in the Kyrgyz Republic. Here we present aggregated versions of the main tables of the exercise along with a description of relevant aspects of each of them. Fully disaggregated tables can be found in Annex 1. The pilot exercise of Forest Fund lands successfully compiled the following sets of accounts:
    - Asset accounts in physical and monetary terms.
    - Asset accounts for timber in physical and monetary terms.
    - Flow accounts in physical and monetary terms.
    - Flow accounts of ecosystem services in monetary terms

4.1. Asset accounts in physical and monetary terms

38. The following asset accounts describe how the stocks of forest land changed in 2018, due to additions, reductions in the case of physical accounts, and those categories along with appreciation or depreciation of the stock for monetary accounts. In physical terms, Table 3 and Table 4 show the physical composition of assets in hectares for forest land and non-forest lands within the Forest Fund, respectively. In 2018, the stock of natural forest land saw an increase of 2.1% going from 783,553 to 800,002 hectares, whereas artificial lands expanded by 3.3% with 56,283 hectares at the beginning of the accounting period and 58,147 hectares at the end as shown in Table 3. In this exercise, non-forest lands that form a single natural complex with forests were also considered. Table 4 shows that there were no changes to the area under this category in 2018 with an unchanged stock of 8,480 hectares for agricultural land; 1.2 million hectares of pastures and hayfields; 1.2 million hectares for other types of land; and 1,407 thousand hectares for infrastructure (roads, fire breaks, power lines, pipelines). Changes are not shown due to a lack of information for 2018. In the Kyrgyz context, it is important to note that pastures and hayfields (Table 4) are equivalent to 1.4 times the sum of natural and artificial area of forest land (Table 3).

Table 3. Physical asset account for forest land in 2018, hectares

No.	Transaction	Forest lands						
		By type			By protection category			
		Undisturbed	Natural	Artificial	Water protection	Protective	Sanitary and recreational	Forests of Protected Areas
1	**Opening stock of forest land 1 Jan 2018**		783553	56283	1114	1012278	3496	135879
2	**Total additions to stock (+)**		16699	1864				
3	Managed expansion of the area			1864				
4	Natural expansion of the area		16699					
5	**Total reductions in stock (-)**							
6	Managed reduction in the area							
7	Natural reduction in the area							
8	**Closing stock of forest land 31 Dec 2018**		800252	58147	1114	1012278	3496	135879

Source: author's own elaboration. See Table 17 of Annex 1 for disaggregation.

Table 4. Physical asset account for non-forest lands that form a single natural complex with forests in 2018, hectares

No.	Transaction	Non-forest lands that form a single natural complex with forests				Total
		Agricultural land (except pastures and hayfields)	Pastures and hayfields	Other lands	Land under roads, fire breaks, power lines, pipelines	
1	**Opening stock of forest land 1 Jan 2018**	8480	1194830	1179232	1407	2383949
2	**Total additions to stock**					
3	Managed expansion of the area					
4	Natural expansion of the area					
5	**Total reductions in stock**					
6	Managed reduction in the area					
7	Natural reduction in the area					
8	**Closing stock of forest land 31 Dec 2018**	8480	1194830	1179232	1407	2383949

Source: author's own elaboration. See Table 18 of Annex 1 for disaggregation.

38. In monetary terms, Table 5 shows that the physical expansion of the natural forest that occurred in 2018 (see Table 3 above) had a market value of 4.6 million soms, but a negative revaluation of stocks due to market prices, resulted in a lower value of the stock of natural forests, going from 216.4 to 210.3 million soms. This represented a 2.9% decrease in monetary terms. In addition, artificial forests showed a 1.7% reduction in its monetary stock at the end of the accounting period due to a negative revaluation that outweighed the positive value of the managed expansion of that area, going from 15.5 to 15.3 million soms.

Table 5. Monetary asset account for forest lands in 2018, thousand soms at current prices

No.	Transaction	Forest lands							Total
		By type			By protection category				
		Undisturbed	Natural	Artificial	Water protection	Protective	Sanitary and recreational	Forests of pas	
1	**Opening stock 1 Jan 2018**		216470	15549	308	279659	966	37539	1728983
2	**Total additions to stock (+), including**		4613	515					12180
3	Managed area expansion			515					515
4	Natural expansion of the area		4613						11665
5	**Total reductions in stock (-)**								44
6	Managed area reduction								
7	Natural reduction in the area								44
8	**Revaluations due to change in market prices (+/-)**		-10830	-778	-15	-13991	-48	-1878	-86499
9	**Closing stock 31 Dec 2018**		210253	15286	292	265668	918	35661	1654619

Source: author's own elaboration. See Table 19 of Annex 1 for disaggregation. Note: approximately 73.77 per 1 US$.

Table 6. Monetary asset account for non-forest lands that form a single natural complex with forests in 2018, thousand soms at current prices

No.	Transaction	Agricultural land (except pastures and hayfields)	Pastures and hayfields	Other lands	Land under roads, fire breaks, power lines, pipelines	Total
1	**Opening stock of forest land 1 Jan 2018**	276443	763247			1039690
2	**Total additions to stock (+)**					
3	Managed expansion of the area					
4	Natural expansion of the area					
5	**Total reductions in stock (-)**					
6	Managed reduction in the area					
7	Natural reduction in the area					
8	**Revaluations due to change in market prices (+/-)**	-13822	-38162			-51985
9	**Closing stock of forest land 31 Dec 2018**	262621	725084			987706

Source: author's own elaboration. See Table 20 of Annex 1 for disaggregation. Note: approximately 73.77 per 1 US$.

Asset accounts for timber of the Forest Fund in physical and monetary terms

39. While areas presented above provide an overall understanding of the availability of forest land for various purposes (i.e. production, water protection, conservation, recreation) and open the door for a more comprehensive valuation outside SNA's boundary of production, the asset accounts explained in this section are more closely tied to the traditional value of the forests for the economy

in the form of timber, both in physical as well as in monetary terms. Standing timber in natural forest land saw a net growth of 1.4%, going from 32.22 to 32.63 billion cubic meters in 2018, while timber in artificial land grew by 1.5% going from 3.70 to 3.76 billion cubic meters as shown in Table 7. This is consistent with the fact that between 1990 and 2010, the Kyrgyz Republic gained 14.1% of its forest cover, or around 118,000 hectares[28]. In monetary terms, Table 8 shows that that growth in volume was not accompanied by a growth in value, because the value of natural grown was outweighed by the value of removals and a negative revaluation due to change in market prices. For that reason, natural forests saw a monetary reduction of stocks of 5.8% between the beginning and end of the accounting year (2018), showing a closing stock of 1.96 billion soms. Standing timber in artificial land saw a similar relative reduction in monetary stocks, going from 239.19 to 187.93 billion soms in 2018 (Table 8).

Table 7. Physical asset account for timber in 2018, thousand cubic meters

No.	Transaction	Forest lands						
		By type			By protection category			
		Undisturbed	Natural	Artificial	Water protection	Protective	Sanitary and recreational	Forests of pas
		A	B	C	D	E	F	G
1	**Opening stock of timber 1 Jan 2018**		32183745	3703421	34678	31513746	108830	4229912
2	**Total additions to stock (+)**							
3	Natural growth		450830	56283				
4	Reclassifications							
5	**Total reductions in stock (-)**							
6	Removals		512	724		1236		
7	Felling residuals							
8	Natural losses							
9	Catastrophic losses							
10	Reclassifications							
11	**Closing stock of timber 31 Dec 2018**		32634063	3758980	34678	31512510	108830	4229912

Source: author's own elaboration. See Table 21 of Annex 1 for disaggregation.

[28] Global Forest Resources Assessment. FAO (2010).

Table 8. Monetary asset account for timber in 2018, thousand soms

No.	Transaction	Forest lands							Total for timber of the Forest Fund
		By type			By protection category				
		Undisturbed	Natural	Artificial	Water protection	Protective	Sanitary and recreational	Forests of pas	
		A	B	C	D	E	F	G	P
1	Opening stock 1 Jan 2018		2078617	239189	2240	2035344	7029	273193	2317806
2	Total additions to stock (+)								
3	Natural growth		11479	1433					12744
4	Reclassifications								
5	Total reductions in stock (-)								
7	Removals		28804	40730		69534			69534
8	Felling residuals								
9	Natural losses								
10	Catastrophic losses								
11	Reclassifications								
12	Revaluations due to change in market prices (+/-)		-103931	-11959	-112	-101767	-351	-13660	-115890
13	Closing stock 31 Dec 2018		1957361	187932	2128	1864043	6677	259533	2145125

Source: author's own elaboration. See Table 22 of Annex 1 for disaggregation. Note: approximately 73.77 per 1 US$.

4.2. Flow accounts of Forest Fund resources in physical and monetary terms

40. The following tables show the supply of forest products from the environment to the economy, and how those products are processed and delivered as inputs to economic sectors. It also shows which sectors use those products and in what proportions, both in physical and monetary terms. Supply and use tables are an important tool to understand which sectors depend on forest products the most and develop public policies, accordingly, for the purpose of incentivizing or limiting the use of environmental resources. Table 9 shows that in the accounting period, the assets discussed in sections 4.1 and 0 supplied the economy with 403,635.2 metric tons of non-timber forest products, which were complemented with 459.5 metric tons of imports to provide an availability of 404,094.7 metric tons of non-timber forest products. These were provided mainly to the *Forestry* sector and by the *Tenants of forest plots* who then distribute it commercially, as well as by households for own consumption (see Annex 1 for these details). It is worth noting that, household production for own consumption accounted for 99.1% of the supply of non-timber products under the Forest Fund (Table 10), such as walnuts, almonds, pistachios, mushrooms, wild apples, apricots, cherries, pears, hay, medicinal herbs and fruits. There is correspondence in the use of non-timber forest resources shown in Table 11, because household final demand is responsible of that same 99.1% of consumption. Forest Fund assets were able to supply the economy with 17,888 cubic meters of timber products for industrial purposes and 178,647 cubic meters for fuel (Table 10) which were complemented with 2,430 cubic meters of imports for both purposes. Conversely, Table 11 shows that the Manufacturing Industry is responsible for 98.0% of the consumption of timber products for industrial purposes as expected, while households are responsible for 99.1% of the consumption of timber products for fuel. The generalized use of fuelwood warrants future assessments of indoor air quality.

Table 9. Physical supply table of natural resources from the environment in 2018, various units

Aggregated product groups	Unit	From forests	Total
Non-timber forest products	kg	403,635,183	403,635,183
Industrial timber	m^3	17,888	17,888
Fuel timber	m^3	178,647	178,647
Planting material	pieces	541,461	541,461
Wild game	animals	1,000	1,000

Source: author's own elaboration. See Table 23 of Annex 1 for disaggregation.

Table 10. Physical supply table of forest goods and services in 2018, various units

Aggregated product groups	Unit	Production	HH Production for own consumption	Households	Government	Gross capital formation	Rest of the World	Total
Non-timber forest products	kg	3,123,276	400,511,907				459,533	404,094,716
Industrial timber	m^3	17,889	0				2,302	20,191
Fuel timber	m^3	8,283	170,364				128	178,775
Planting material	pieces	541,460	0				0	541,460
Wild game	animals	1,000	0				0	1,000
Agricultural products	kg	1,206,615	0				0	1,206,615
Raw milk	liter	982,000	0				0	982,000
Dairy products	kg	50,672	0				0	50,672
Services	n.d.							

Source: author's own elaboration. See Table 23 of Annex 1 for disaggregation.

Table 11. Physical use table of forest goods and services in 2018, various units

Aggregated product groups	Unit	Production	HH Production for own consumption	Households	Government	Gross capital formation	Rest of the World	Total
Non-timber forest products	kg	1,862,333	0	401,032,037		903,119	297,227	404,094,716
Industrial timber	m^3	19,885	0	0		1	305	20,191
Fuel timber	m^3	1,433	0	177,240		-1	103	178,775
Planting material	pieces	527,344	0	2,783		11,333	0	541,460
Wild game	animals	420	0	580		0	0	1,000
Agricultural products	kg	753,782	0	392,705		60,128	0	1,206,615
Raw milk	liter	644,454	0	337,547		-1	0	982,000
Dairy products	kg	752	0	49,745		175	0	50,672
Services	n.d.							

Source: author's own elaboration. See Table 23 of Annex 1 for disaggregation.

41. In monetary terms, Table 12 shows that national Forest Fund assets supplied the economy with 11.3 billion soms worth of forest related commodities, of which non-timber forest products represented 94.2% (including, walnut, almond, pistachio, mushroom, wild apple, apricot, cherry, pear, seeds, planting material, hay, medicinal herbs and fruits and wild game); 0.6% were timber forest products, both for industrial purposes and fuel; 0.1% represented agricultural sub products;

and 4.4% were attributed to forest-related services. These were complemented with 74.3 million soms worth of imports of all products. When looking at individual commodities (see Annex 1 for details), the value of total domestic supply is dominated by the provision of hay (35.1%), pistachio (25.3%), and walnut (24.1%); followed by almond (4.8%) and wild apple (4.2%); with the remaining 6.5% spread over 23 commodities of timber products, non-timber products, agricultural sub products, and forest services. Table 13 shows the uses in monetary terms of the previously described commodities. For the Forest Fund lands of this exercise, the use is carried out predominantly by households, who consume 93.65% of total demand of 11.3 billion soms in the forest accounts, with agriculture accounting for 0.9%, the forest sector itself 0.7%, manufacturing industry 1.78%, and the remaining 0.21% spread out over the rest of activities. Given that the supply is mostly provided by households for own consumption, it follows that their demand (see Annex 1 for details) is led by purchases of hay (37.1%), pistachio (26.4%), and walnut (24.8%); followed by almond (5.1%) and wild apple (4.6%).

Table 12. Monetary supply table of forest goods and services in 2018, 1000 soms at current purchaser prices

Aggregated product groups	Production	HH Production for own consumption	Households	Government	Gross capital formation	Rest of the World	Total
Non-timber forest products	188,907	10,427,088				61,429	10,677,424
Industrial timber	31,636	0				12,026	43,662
Fuel timber	3,852	20,957				796	25,605
Planting material	49,393	0				0	49,393
Wild game	21	0				0	21
Agricultural products	16,522	0				0	16,522
Raw milk	14,938	0				0	14,938
Dairy products	6,213	0				0	6,213
Services	499,018	0				0	499,018
Total	810,500	10,448,045				74,251	11,332,796

Source: author's own elaboration. See Table 27 of Annex 1 for disaggregation. Note: approximately 73.77 per 1 US$.

Table 13. Monetary use table of forest goods and services in 2018, 1000 soms at current purchaser prices

Aggregated product groups	Production	HH Production for own consumption	Households	Government	Gross capital formation	Rest of the World	Total
Non-timber forest products	151,912	0	10,497,887		8,685	18,940	10,677,424
Industrial timber	42,875	0	0		0	787	43,662
Fuel timber	318	0	24,679		-1	609	25,605
Planting material	47,461	0	460		1,472	0	49,393
Wild game	9	0	13		-1	0	21
Agricultural products	13,659	0	6,497		731	0	20,887
Raw milk	9,637	0	5,302		-1	0	14,938
Dairy products	79	0	6,134		0	0	6,213
Services	149,693	0	71,718	238,532	26,036	13,039	499,018

Source: author's own elaboration. See Table 28 of Annex 1 for disaggregation. Note: approximately 73.77 per 1 US$.

4.3. Flow accounts of ecosystem services

42. In this section we present the current developments of a pilot implementation of an ecosystem service account for the Forest Fund of the Kyrgyz Republic which offers an estimate of the extended contribution of the forest to the economy. Ecosystem services include i) provisioning services which are accounted for in the supply and use tables from section 4.2 (output of timber and non-timber forest products: walnut, almond, pistachio, mushroom, wild apple, apricot, cherry, pear, seeds of tree species, planting material, industrial timber, fuel timber, hay, medicinal herbs and fruits, and game); ii) regulating services (mainly pollination, CO_2 sequestration, and others); and iii) cultural services (tourism and recreation, education, and others). At this point, preliminary figures have been compiled for provisioning and cultural services, while regulating services have only been estimated for carbon stocks of the Forest Fund in 2010.

Table 14. Value of ecosystem services and natural assets in monetary terms in 2018, US$ million/year at current prices

Concept	Unit	Value
Value of natural assets		
Land assets	US$ million	37.839
Timber assets	US$ million	30.709
Value of ecosystem service flows		
Provisioning ecosystem services flow	US$ million / year	154.621
Cultural ecosystem services flow	US$ million / year	1.847
Regulating ecosystem services flow (CO_2 sequestration) *	US$ million / year	78.0 (*)

Source: author's own elaboration. See Annex 2 for more details on Ecosystem Service Accounts.
(*) —approximate value.

43. Provisioning services account for those products that are being supplied to the economy by Forest Fund lands shown in Table 12, equivalent to 11.3 billion soms. The value of cultural ecosystem services has been determined on the basis of data on the number of days of rental housing by visitors of forest plots and on the revenue and expenses of tenants of forest plots connected with rent, equivalent to 129 million soms in 2018. For regulating ecosystem services, it is currently possible to determine only the state of Forest Fund ecosystems in terms of the size of carbon stocks of the Forest Fund as of 2010. Based on the available data of the 1st National Forest Inventory of the Kyrgyz Republic (2010), the corresponding total value was determined as 1.363.975 million tons of CO_2. We assumed that the possible rate of sequestration and annual increase in carbon stocks of the Kyrgyz Forest Fund is equivalent to 0.2% of its stocks according to the results of the 1st National Forest Inventory of the Kyrgyz Republic, i.e. 2.73 million tons of CO2 per year. For valuation purposes, the price of the carbon emission quota was set at 25 Euro per ton of CO2-eq . The economic value of the flow of regulating forest ecosystem services of the Kyrgyz Republic for carbon sequestration in 2018 amounted to 2.73 million tons of CO2/year * 28.61 $/t CO2-eq. = $78 million/year. Both the value of cultural ecosystem services and provisioning services sum 11.33 billion soms, equivalent to 2% of GDP.

44. It is important to note that the Kyrgyz Republic has a great number of large and medium sized rivers offering significant hydropower potential, estimated at 140-170 TWh, of which only about 10 per cent has been exploited. The country is highly dependent on hydropower, which produced around 90 per of total electricity generated in 2019. At the end of 2017, the water volume at

Toktogul sat at almost 18.75 billion cubic meters, which was higher than 2016 by 12% and enabled power exports to neighboring countries. This has not been considered in this assessment, but there are contributions from forests to annual water yield and soil erosion prevention (that reduces costs associated with dredging of hydroelectric dams), which are important ecosystem services to hydroelectric production that should be taken into account in future implementations of ecosystem accounting.

5. Lessons learned and way forward

45. This exercise has revealed interesting data and institutional gaps that need to be addressed in order to ensure the production of Natural Capital Accounts for Forests in a continuous and sustained manner. In the first place, we believe that implementation and approval of the results of the second national forest inventory would provide a quick win in the formalization of forest compilation efforts. Additionally, in order to better comply with the information needs of forest accounts, existing forms of statistical monitoring in the field of forest management would need to be adjusted in terms of disaggregation, degree of processing, and selling prices (wholesale or retail), for example. We have also identified the need to add SNA accounts and plan accordingly to obtain disaggregated data or conduct research to obtain missing data for the accounts.

46. In the case of accounts of ecosystem services, Table 15, shows measures to increase the information for the flow accounts of ecosystem services of the Forest Fund of the Kyrgyz Republic, based on their current status. One group of recommendations are related to adjustments to the disaggregation of SNA classifications that allow for a better match with forest accounting. A second set of recommendations are related to improving geographic information, and conducting in-depth research to identify sacred places, sociocultural locations, and forest areas with cultural, historical, and spiritual value for the Kyrgyz Republic.

Table 15. Measures to improve information for the flow accounts of ecosystem services of the Forest Fund of the Kyrgyz Republic by type of account

No.	Account	Measures to improve information
1	Account of provisioning ecosystem services for forest lands	1. Statistical institutionalization of data on types and volumes of forest use of non-tenant households in terms of provisioning ecosystem services. 2. Expansion and refinement of the classification of products (goods and services) within Statistical Classification of Products-2 in terms of forest products, in order to obtain a more adequate picture of the value of specific types of forest use 3. Disaggregation in the tables of the SNA of the general indicator of the expenses of forest users by type of products and services sold
2	Account of regulating ecosystem services for forest lands	1. Approval of the results of the 2nd national forest inventory of the Kyrgyz Republic. The results should not only meet the needs of the forest classification within the SEEA (by age, species composition, type, etc.), but also contain information about the protective status of forest areas and their spatial location 2. Development of cartographic materials on the forest territories of the Kyrgyz Republic in the Kyrg-06 system, with the data on the type of land cover and altitude 3. Conducting scientific research on the identification and spatial arrangement of the regulating ecosystem functions of forest areas, in order to obtain data for the assessment of regulating ecosystem services. 4. Build capabilities in ecosystem service modeling (e.g. InVEST) in order to better understand the benefits in annual water yield and soil erosion mitigation from forests for ecosystem service accounting.
3	Account of cultural ecosystem services for forest lands	1. Statistical institutionalization of data on types and volumes of forest use of non-tenant households in terms of cultural ecosystem services.

		2. Obtaining data on the income of travel agencies from activities in the territories of the Forest Fund, as well as information on the incomes of protected areas from visitors of the forest areas 3. Expanding and clarifying the Statistical Classification of Products-2 (goods and services) in terms of tourism as a type of forest use in order to obtain a more adequate picture of the value of cultural ecosystem services of the Forest Fund 4. Disaggregation in the tables of the SNA of the general indicator of the costs of forest users by type of products and services sold 5. Conducting scientific research to identify sacred places, sociocultural dominants and other unique objects in forest areas that represent the cultural, historical and spiritual value of the Kyrgyz Republic in order to give them an appropriate status as sources (assets) of cultural ecosystem services

47. Increasing the organizational capacity of forest accounts and increasing the capacity and awareness of key agencies will provide the institutional underpinning for a continuous production of forest accounts in the long term. Table 16 provides a detailed list of measures to improve that capacity, divided in regulatory, organizational, and administrative, professional, and technical support.

Table 16. Measures to improve capacity and awareness of key institutions to produce forest accounts for the Kyrgyz Republic in the long term

No.	Type of measure	Measures for key agencies
1	Regulatory support (sufficiency of legislative norms and strategic planning documents)	National Statistical Committee of the Kyrgyz Republic - Supplement the Regulation on the National Statistical Committee of the Kyrgyz Republic (Section 6 of Chapter III) with the functions: - coordination of activities in the field of official statistics in the preparation of national accounts in accordance with the requirements of international statistical standards SNA-2008 and SEEA, as well as Tourism Satellite Accounts TSA, health and other accounts. - development of a methodology for compiling national SEEA accounts of the Kyrgyz Republic and its approval
		SAEPF under GKR - Supplement the Regulation on the Agency (Section 6 of Chapter 4) with the powers to develop forms and summarize the data of the primary accounting of forest and other controlled SAEPF natural resources, with the aim of subsequent transfer of the completed forms to the National Statistical Committee of the Kyrgyz Republic for the formation of natural resource accounts within SEEA, but also TSA.
2	Organizational and administrative support (the elimination of existing and potential gaps in the system of departmental organizational and administrative documentation, as well as in the implementation of the necessary interagency communications)	National Statistical Committee of the Kyrgyz Republic - the creation of an interdepartmental working group on the implementation of SEEA and TSA, in order to coordinate interaction in the production of data for the current tasks of developing accounts.
		SAEPF under GKR - adoption of a regulatory document on the implementation of the agency's powers in the field of SEEA accounts. A similar mechanism is suggested to coordinate with the Ministry of Information, Culture and Tourism of the Kyrgyz Republic.
		Conclusion of the Agreement on cooperation and data sharing between the NSC and SAEPF, defining a specific set, formats, and timing for the provision of data for the compilation of forest accounts. These institutions have to coordinate with respect to definitions and classifications with the

No.	Type of measure	Measures for key agencies
		Ministry of Information, Culture and Tourism of the Kyrgyz Republic for the compatibilization of these efforts with Tourism Satellite Accounts.
3	Professional and informational support (correspondence of professional experience and available knowledge in the field of SNA / SEEA of key employees and ordinary specialists to current needs)	Supplementing training programs for specialists of SAEPF and its subordinate organizations with issues of terminology of sustainable development, accounting and assessment of natural resources and ecosystem services, SEEA, ecosystem accounting, etc.
		Supplementing training programs for specialists of National Statistical Committee of the Kyrgyz Republic with issues of methodologies and practices for the compilation of SEEA forest accounts of and ecosystem accounts of the Forest Fund, the integration of data in the tables of the SNA, etc.
		Increasing the number of experts working at key agencies (the National Statistical Committee of the Kyrgyz Republic and the SAEPF under GKR) considering the large volume and long-term nature of the work on SEEA development, including the initial compilation of accounts and their further maintenance (with necessary adjustments)
		Regular participation of leading NSC KR and SAEPF experts in the work of UNECE and OECD on the SEEA development and implementation
4	Technical support (sufficiency of technical equipment and software, financial and other resources)	1. Providing computer equipment and necessary software to automate calculations. 2. Organization of network communications, especially in the transition to regionalization of accounts, and their subsequent aggregation at the country level. 3. Providing visualization tools using GIS technologies. 4. Allocation of necessary funding, in accordance with Appendix 4 to the Decree of the Government of the Kyrgyz Republic dated May 27, 2019 No. 231 "On approval of the Concept of development of the forest sector of the Kyrgyz Republic for the period until 2040".

48. One key step that is necessary in legislative and administrative spheres is related to the adoption of the Decree of the Government of the Kyrgyz Republic (or the Law of the Kyrgyz Republic) on information resources. This will help streamline production, transfer, storage and use of data in the field of forest management and other fields related to forest accounting. This will also provide the Government of the Kyrgyz Republic with a firm legal base to create the coordinating council for the implementation of the SNA / SEEA as the basic information platform for sustainable socio-economic development and green growth

49. Additionally, there is a need to develop and implement a Comprehensive Training Plan on the System of Environmental-Economic Accounting of the Kyrgyz Republic for the effective forest management. This training plan would allow key users with a common language to understand and build upon the development of forest accounting, to better assess the state of natural resources and ecosystem services, and raise the level of the discussion around the Green Economy. Preferably, this plan would permeate into the bachelor's and master's programs of higher education institutions of the Kyrgyz Republic.

50. The lack of some information should not be regarded as an obstacle for the implementation and publication of forest accounts and accounts of flows of ecosystem services of the Forest Fund of the Kyrgyz Republic[29]. Even in countries with high statistical capacity and developed statistical traditions, not all SEEA accounts are published with 100% cells filled. Rather than hinder the decision to compile forest accounts, data gaps show the way to improve the capabilities of the Kyrgyz statistical system.

[29] In particular, it is noted in the documents of the Joint OECD/UNECE Seminar on the Implementation of SEEA, February 21-22, 2018 http://www.unece.org/index.php?id=47522

Annex 1. Forest Resource Accounts: Detailed Accounting Tables

Table 17. Physical asset accounts for forest land in 2018, hectares

No.	Transaction	Forest lands														
		By type			By protection category				By species composition				By age composition			
		undisturbed	Natural	artificial	water protection	protective	sanitary and recreational	forests of PAs	nut	spruce	juniper	flood-plain	young	middle-aged	ripening	ripe and overripe
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**Opening stock of forest land in 2018**		783553	56283	1114	1012278	3496	135879	625492	1581526	1473760	78744	90133	91318	93432	231375
2	**Total additions to stock (+), including**		16699	1864										3862	10616	11046
3	Managed expansion of the area			1864												
4	Natural expansion of the area		16699											3862	10616	11046
5	**Total reductions in stock (-), including**												160			
6	Managed reduction in the area															
7	Natural reduction in the area												160			
8	**Closing stock of forest land in 2018**		800252	58147	1114	1012278	3496	135879	625492	1581526	1473760	78744	89973	95180	104048	242421

Table 18. Physical asset accounts for non-forest lands that form a single natural complex with forests in 2018, hectares

No.	Transaction	Non-forest lands that form a single natural complex with forests							
		Agricultural land (except pastures and hayfields)		Pastures and hayfields		Other lands		Land under roads, fire breaks, power lines, pipelines	
		SFF	Urban and municipal	SFF	Urban and municipal	SFF	Urban and municipal	SFF	Urban and municipal
		A	**B**	**C**	**D**	**E**	**G**	**H**	**I**
1	**Opening stock of forest land in 2018**	8480		1194830		1179232		1407	
2	**Total additions to stock, including**								
3	Managed expansion of the area								
4	Natural expansion of the area								
5	**Total reductions in stock , including**								
6	Managed reduction in the area								
7	Natural reduction in the area								
8	**Closing stock of forest land in 2018**	8480		1194830		1179232		1407	

Table 19. Monetary asset accounts for land in 2018, thousand soms at current prices

No.	Transaction	Forest lands															Total for forest lands of the forest fund
		By type			By protection category				By species composition				By age composition				
		undisturbed	natural	artificial	water protection	protective	sanitary and recreationa	forests of PAs	nut	spruce	juniper	flood-plain	young	middle-aged	ripening	ripe and overripe	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	**Opening stock of forest land in 2018**		216470	15549	308	279659	966	37539	172803	436923	407151	21754	24901	25228	25812	63921	1728983
2	**Total additions to stock (+), including**		4613	515										1067	2933	3052	12180
3	Managed expansion of the area			515													515
4	Natural expansion of the area		4613											1067	2933	3052	11665
5	**Total reductions in stock (-), including**												44				44
6	Managed reduction in the area																
7	Natural reduction in the area												44				44
8	**Revaluations of stocks due to change in market prices (+/-)**		10830	778	15	13991	48	1878	8645	21859	20369	1088	1246	1262	1291	3198	86499
9	**Closing stock of forest land in 2018**		210253	15286	292	265668	918	35661	164158	415064	386782	20666	23611	25033	27454	63775	1654619

Table 20. Monetary asset accounts for non-forest lands that form a single natural complex with forests in 2018, thousand soms

No.	Transaction	Non-forest lands that form a single natural complex with forests								Total for non-forest lands of the forest fund
		Agricultural land (except pastures and hayfields)		Pastures and hayfields		Other lands		Land under roads, fire breaks, power lines, pipelines		
		forest fund forests	communal forests	forest fund forests	communal forests	forest fund forests	communal forests	forest fund forests	communal forests	
		A	**B**	**D**	**E**	**G**	**H**	**J**	**K**	**M**
1	**Opening stock of forest land in 2018**	276443.3		763246.7						1039690
2	**Total additions to stock (+), including**									
3	Managed expansion of the area									
4	Natural expansion of the area									
5	**Total reductions in stock (-), including**									
6	Managed reduction in the area									
7	Natural reduction in the area									
8	**Revaluations of stocks due to change in market prices (+/-)**	13822.2		38162.3						51984.5
9	**Closing stock of forest land in 2018**	262621.1		725084.4						987705.5

Table 21. Physical asset account for timber in 2018, thousand cubic meters

No.	Transaction	Forest lands														
		By type			By protection category				By species composition (forest types)				By age composition			
		undisturbed	natural	artificial	water protectio	protectiv e	sanitary and	forests of PAs	nut	spruce	juniper	flood-plain	young	middle-aged	ripening	ripe and overripe
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Opening stock of timber in 2018		32183745	3703421	34678	31513746	108830	4229912					3039832	5835423	5092142	21919771
2	Total additions to stock (+), including															
3	Natural growth		450830	56283									84397	91318	93432	231375
4	Reclassifications															
5	Total reductions in stock (-), including															
6	Removals		512	724		1236							512			724
7	Felling residuals															
8	Natural losses															
9	Catastrophic losses															
10	Reclassifications															
11	Closing stock of timber in 2018		32634063	3758980	34678	31512510	108830	4229912					3123717	5926741	5185574	22150422

Table 22. Monetary asset account for timber in 2018, thousand soms

No.	Transaction	Forest lands															Total for timber of the forest fund
		By type			By protection category				By species composition				By age composition				
		undisturbed	natural	artificial	water protection	protective	sanitary and	forests of PAs	nut	spruce	juniper	flood-plain	young	middle-aged	ripening	ripe and overripe	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Opening stock of timber in 2018		2078617	239189	2240	2035344	7029	273193					196330	376886	328881	1415708	2317806
2	Total additions to stock (+)																
3	Natural growth		11479	1433									2149	2325	2379	5891	12744
4	Reclassifications																
5	Total reductions in stock (-)																
7	Removals		28804	40730		69534							28804			40730	69534
8	Felling residuals																
9	Natural losses																
10	Catastrophic losses																
11	Reclassifications																
12	Revaluations of stocks due to change in market prices (+/-)		103931	11959	112	101767	351	13660					9817	18844	16444	70785	115890
13	Closing stock of timber in 2018		1957361	187932	2128	1864043	6677	259533	0	0	0	0	159859	360367	314816	1310084	2145125

Table 23. Physical supply and use table for products from Forest Fund lands in 2018, various units

Interaction with nature		Supply/Use		Aggregated product groups	Unit	Production from Economic Activities	HH Production for own consumption	Households	Government	Gross capital formation	Rest of the World	Environment	Total
From environment to economy	Physical	Supply	1	Non-timber forest products	kg							403,635,183	403,635,183
			2	Industrial timber	m3							17,888	17,888
			3	Fuel timber	m3							178,647	178,647
			4	Planting material	pieces							541,461	541,461
			5	Wild game	animals							1,000	1,000
Within the economy	Physical	Supply	1	Non-timber forest products	kg	3,123,276	400,511,907				459,533		404,094,716
			2	Industrial timber	m3	17,889	0				2,302		20,191
			3	Fuel timber	m3	8,283	170,364				128		178,775
			4	Planting material	pieces	541,460	0				0		541,460
			5	Wild game	animals	1,000	0				0		1,000
			6	Agricultural products	kg	1,206,615	0				0		1,206,615
			7	Raw milk	liter	982,000	0				0		982,000
			8	Dairy products	kg	50,672	0				0		50,672
			9	Services	n.d.								
		Use	1	Non-timber forest products	kg	1,862,333	0	401,032,037		903,119	297,227		404,094,716
			2	Industrial timber	m3	19,885	0	0		1	305		20,191
			3	Fuel timber	m3	1,433	0	177,240		-1	103		178,775
			4	Planting material	pieces	527,344	0	2,783		11,333	0		541,460
			5	Wild game	animals	420	0	580		0	0		1,000
			6	Agricultural products	kg	753,782	0	392,705		60,128	0		1,206,615
			7	Raw milk	liter	644,454	0	337,547		-1	0		982,000
			8	Dairy products	kg	752	0	49,745		175	0		50,672
			9	Services	n.d.								
	Monetary	Supply	1	Non-timber forest products	thousand soms	188,907	10,427,088				61,429		10,677,424
			2	Industrial timber	thousand soms	31,636	0				12,026		43,662
			3	Fuel timber	thousand soms	3,852	20,957				796		25,605
			4	Planting material	thousand soms	49,393	0				0		49,393
			5	Wild game	thousand soms	21	0				0		21
			6	Agricultural products	thousand soms	16,522	0				0		16,522
			7	Raw milk	thousand soms	14,938	0				0		14,938
			8	Dairy products	thousand soms	6,213	0				0		6,213
			9	Services	thousand soms	499,018	0				0		499,018
		Use	1	Non-timber forest products	thousand soms	151,912	0	10,497,887		8,685	18,940		10,677,424
			2	Industrial timber	thousand soms	42,875	0	0		0	787		43,662
			3	Fuel timber	thousand soms	318	0	24,679		-1	609		25,605
			4	Planting material	thousand soms	47,461	0	460		1,472	0		49,393
			5	Wild game	thousand soms	9	0	13		-1	0		21
			6	Agricultural products	thousand soms	13,659	0	6,497		731	0		20,887
			7	Raw milk	thousand soms	9,637	0	5,302		-1	0		14,938
			8	Dairy products	thousand soms	79	0	6,134		0	0		6,213
			9	Services	thousand soms	149,693	0	71,718	238,532	26,036	13,039		499,018

Table 24. Physical supply table for forest resources in 2018, various units

Types of economic activity, State Classi-fication of Economic Activity-3:				Production [P1]										Final consumption of households		Collective consumption of government bodies	Accumulation, changes of stocks of material circulating assets	Flows from the rest of the world	Flows from the environment	TOTAL
				Agriculture, hunting and corresponding services	Forest sector and corresponding services, forestries: non-financial institutions	Forest sector and corresponding services, forestries: non-budgetary institutions	Forest sector and corresponding services, tenants of forest plots	Manufacturing industry	Hotels and restaurants	Botanical gardens, zoos and nature reserves	Other economic activities	Private household production of a variety of goods for own consumption								
Forest products, Statistical Classification of Products-2:				01.00.0	2			10.0-33.0	55.0 - 56.0	91.04.0	03-09; 34.0-54.0; 57.0-90.0; 92.0-97.0	98.10.0	based on surveys of rural households	P31	based on surveys of rural households	P32	P5/P52	P7		
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Products	Walnut, kg	02.30.40.300	17	0	0	187915	960291	0	0	0	0	0	8653843					0		9802049
	Almond, kg	02.30.40.300	18	0	0	353	20	0	0	0	0	0	1350000					40		1350413
	Pistachio, kg	02.30.40.300	19	0	0	2836	84803	0	0	0	0	0	5039400					603		5127642
	Mushroom, kg	02.30.40.100	20	0	0	0	280	0	0	0	0	862	862					0		2004
	Wild apple, kg	02.30.40.900	21	0	0	0	195670	0	0	0	0	0	9514600					212440		9922710
	Apricot, kg	02.30.40.900	22	0	0	0	19137	0	0	0	0	0	0					158236		177373
	Cherry, kg	02.30.40.900	23	0	0	0	1220	0	0	0	0	0	0					14		1234
	Pear kg	02.30.40.900	24	0	0	0	9005	0	0	0	0	0	0					84472		93477
	Others (barberry, hawthorn, sea buckthorn, rosehip, etc.), kg	02.30.40.900	25	0	0	0	425	0	0	0	0	0	634377					0		634802
	Seeds of tree and shrub species (pure), kg	02.10.12,000	26	0	0	0	0	0	0	0	0	0	0					2300		2300
	Planting material, pcs	02.10.11.000	27	0	5325	522937	13198	0	0	0	0	0	0					0		541460
	Industrial timber, $м^3$	02.20.11-13,.15	28	0	833	13597	3459	0	0	0	0	0	0					2302		20191
	Fuel timber, m3	02.20.14 ,000	29	0	0	6243	2040	0	0	0	0	85182	85182					128		178775
	Hay, kg	01.19.10.710	30	1659275	0	0	0	0	0	0	0	0	374962251					0		376621526
	Medicinal herbs and fruits, kg	02.30.40.900	31	0	0	2046	0	0	0	0	0	0	355712					1428		359186
	Wild game, animals	01.70.10.200	32	850	0	0	150	0	0	0	0	0	0					0		1000
	Cereals, etc., kg	1.11	33	418932	0	69070	46548	0	0	0	0	0						0		534550
	Potatoes, kg	01.13.51	34	602916	0	0	59629	0	0	0	0	0						0		662545
	Honey, kg	01.49.21	35	9095	0	0	0	0	0	0	0	0						0		9095
	Other products, kg	1.99	36	0	0	0	425	0	0	0	0	x						0		425
	Raw milk, liter	01.49.22	37	982000	0	0	0	0	0	0	0	0						0		982000
	Milk processing products (cottage cheese, kurut, sour cream, homemade butter, airan), kg	10.51.1	38	50672	0	0	0	0	0	0	0	0						0		50672
	Grazing services	01.62.10.930	39																	0
	Travel services related to hotels and restaurants	55.0-56.0	40																	0
	Nature reserve services	91.04.12	41																	0
	Forest growing services	02.40.10.100	42																	0
	Other forestry services	2.40.10.120-190	43																	0
	Logging services	02.40.10.200	44																	0
	TOTAL			3723740	6158	804997	1396300	0	0	0	0	86044	400596227	0	0	0	0	461963	0	407075429
	RESIDUALS PRODUCTION FLOWS																			

Table 25. Physical use table of forest resources in 2018, various units

Types of economic activity, State Classi-fication of Economic Activity-3:				Production [P1]										Final consumption of households		Collective consumption of government bodies	Accumulation, changes of stocks of material circulating assets	Flows from the rest of the world	Flows from the environment	TOTAL
				Agriculture, hunting and corresponding services	Forest sector and corresponding services, forestries: non-financial institutions	Forest sector and corresponding services, forestries: non-budgetary institutions	Forest sector and corresponding services, tenants of forest plots	Manufacturing industry	Hotels and restaurants	Botanical gardens, zoos and nature reserves	Other economic activities	Private household production of a variety of goods for own consumption								
Forest products, Statistical Classification of Products-2:				01.00.0	2			10.0-33.0	55.0 - 56.0	91.04.0	03-09; 34.0-54.0; 57.0-90.0; 92.0-97.0	98.10.0	based on surveys of rural households	P31	based on surveys of rural households	P32	P5/P52	P7		
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Products	Walnut, kg	02.30.40.300	1	0	0	0	0	570972	100760	0	0	0		197475	8653843		-1	279000		9802049
	Almond, kg	02.30.40.300	2	0	0	0	0	413	0	0	0	0		0	1350000		0	0		1350413
	Pistachio, kg	02.30.40.300	3	0	0	0	0	74419	0	0	0	0		13657	5039400		-250	416		5127642
	Mushroom, kg	02.30.40.100	4	0	0	0	0	88	38	0	0	0		988	862		0	28		2004
	Wild apple, kg	02.30.40.900	5	0	0	0	0	140255	46752	0	0	0		204790	9514600		5800	10513		9922710
	Apricot, kg	02.30.40.900	6	0	0	0	0	72452	31051	0	0	0		71678	0		0	2192		177373
	Cherry, kg	02.30.40.900	7	0	0	0	0	551	138	0	0	0		545	0		0	0		1234
	Pear kg	02.30.40.900	8	0	0	0	0	49234	8688	0	0	0		31694	0		1	3860		93477
	Others (barberry, hawthorn, sea buckthorn, rosehip, etc.), kg	02.30.40.900	9	0	0	0	0	260	0	0	0	0		165	634377		0	0		634802
	Seeds of tree and shrub species (pure), kg	02.10.12,000	10	0	0	710	1590	0	0	0	0	0		0	0		0	0		2300
	Planting material, pcs	02.10.11.000	11	10565	2507	500458	0	0	0	13814	0	0		2783	0		11333	0		541460
	Industrial timber, м³	02.20.11-13,	12	0	0	0	0	19786	0	0	99	0		0	0		1	305		20191
	Fuel timber, m3	02.20.14 ,00	13	114	281	0	0	213	0	4	821	0		92058	85182		-1	103		178775
	Hay, kg	01.19.10.710	14	760705	0	0	0	0	0	0	0	0		0	374962251		898570	0		376621526
	Medicinal herbs and fruits, kg	02.30.40.900	15	1223	0	0	0	1878	2	0	154	0		0	355712		-1001	1218		359186
	Wild game, animals	01.70.10.200	16	0	0	0	0	385	35	0	0	0		580	0		0	0		1000
	Cereals, etc., kg	1.11	17	165127	0	0	0	289354	0	0	0	0		70769			9300	0		534550
	Potatoes, kg	01.13.51	18	48276	0	0	0	149849	87412	0	12488	0		313797			50723	0		662545
	Honey, kg	01.49.21	19	310	0	0	0	0	614	0	0	0		8066			105	0		9095
	Other products, kg	1.99	20	0	0	0	0	0	200	120	32	0		73			0	0		425
	Raw milk, liter	01.49.22	21	33472	0	0	0	610982	0	0	0	0		337547			-1	0		982000
	Milk processing products (cottage cheese, kurut, sour cream, homemade butter, airan), kg	10.51.1	22	0	0	0	0	0	752	0	0	0		49745			175	0		50672
	Grazing services	01.62.10.930	23																	0
	Travel services related to hotels and restaurants	55.0-56.0	24																	0
	Nature reserve services	91.04.12	25																	0
	Forest growing services	02.40.10.100	26																	0
	Other forestry services	02.40.10.120	27																	0
	Logging services	02.40.10.200	28																	0
	TOTAL			1019792	2788	501168	1590	1981091	276442	13938	13594	0	0	1396410	400596227	0	974754	297635	0	407075429
	RESIDUALS FLOWS TO THE ENVIRONMENT																			

Table 26. Monetary supply table of forest resources in 2018, 1000 soms at current purchaser prices

Types of economic activity, State Classi-fication of Economic Activity-3:				Production [P1]										Final consumption of households		Collective consumption of government bodies	Accumulation, changes of stocks of material circulating assets	Flows from the rest of the world	Flows from the environment	TOTAL
				Agriculture, hunting and corresponding services	Forest sector and corresponding services, forestries: non-financial institutions	Forest sector and corresponding services, forestries: budgetary institutions	Forest sector and corresponding services, tenants of forest plots	Manufacturing industry	Hotels and restaurants	Botanical gardens, zoos and nature reserves	Other economic activities	Private household production of a variety of goods for own consumption								
Forest products, Statistical Classification of Products-2:				01.00.0	2			10.0-33.0	55.0 - 56.0	91.04.0	03-09; 34.0-54.0; 57.0-90.0; 92.0-97.0	98.10.0	based on surveys of rural households	P31	based on surveys of rural households	P32	P5/P52	P7		
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Products	Walnut	02.30.40.300	1	0	0	19088	101251	0	0	0	0	0	2596153					0		2716492
	Almond	02.30.40.300	2	0	0	10	4	0	0	0	0	0	540000					7		540021
	Pistachio	02.30.40.300	3	0	0	1268	47386	0	0	0	0	0	2796867					123		2845644
	Mushroom	02.30.40.100	4	0	0	0	43	0	0	0	0	104	43					0		190
	Wild apple	02.30.40.900	5	0	0	0	2414	0	0	0	0	0	475730					11206		489350
	Apricot	02.30.40.900	6	0	0	0	769	0	0	0	0	0	0					40465		41234
	Cherry	02.30.40.900	7	0	0	0	36	0	0	0	0	0	0					1		37
	Pear	02.30.40.900	8	0	0	0	191	0	0	0	0	0	0					5612		5803
	Others (barberry, hawthorn, sea buckthorn, rosehip, etc.)	02.30.40.900	9	0	0	0	47	0	0	0	0	0	70416					0		70463
	Seeds of tree and shrub species (pure)	02.10.12,000	10	0	0	0	0	0	0	0	0	0	0					3808		3808
	Planting material	02.10.11.000	11	0	456	44738	4199	0	0	0	0	0	0					0		49393
	Industrial timber	02.20.11-13,	12	0	443	22391	8802	0	0	0	0	0	0					12026		43662
	Fuel timber	02.20.14 ,00	13	0	0	3608	244	0	0	0	0	9031	11926					796		25605
	Hay	01.19.10.710	14	16275	0	0	0	0	0	0	0	0	3937104					0		3953379
	Medicinal herbs and fruits	02.30.40.900	15	0	0	125	0	0	0	0	0	0	10671					207		11003
	Wild game	01.70.10.200	16	18	0	0	3	0	0	0	0	0						0		21
	Cereals, etc.	1.11	17	5027	0	860	559	0	0	0	0	0						0		6446
	Potatoes	01.13.51	18	7921	0	0	783	0	0	0	0	0						0		8704
	Honey	01.49.21	19	1332	0	0	0	0	0	0	0	0						0		1332
	Other products	1.99	20	0	0	0	40	0	0	0	0	0						0		40
	Raw milk	01.49.22	21	14938	0	0	0	0	0	0	0	0						0		14938
	Milk processing products (cottage cheese, kurut, sour cream, homemade butter, airan)	10.51.1	22	6213	0	0	0	0	0	0	0	0						0		6213
	Grazing services	01.62.10.930	23	92375	0	0	0	0	0	0	0	0						0		92375
	Travel services related to hotels and restaurants	55.0-56.0	24	0	0	0	0	0	58173	0	0	0						0		58173
	Nature reserve services	91.04.12	25	0	0	0	0	0	0	124813	0	0						0		124813
	Forest growing services	02.40.10.100	26	0	0	26036	0	0	0	0	0	0						0		26036
	Other forestry services	02.40.10.120	27	0	7035	168081	0	0	0	0	0	0						0		175116
	Logging services	02.40.10.200	28	0	0	22505	0	0	0	0	0	0						0		22505
	TOTAL			144099	7934	308710	166771	0	58173	124813	0	9135	10438910	0	0	0	0	74251	0	11332796

Table 27. Monetary use table of forest resources in 2018, 1000 soms at current purchaser prices

Types of economic activity, State Classification of Economic Activity-3:			Intermediate consumption [P2]										Final consumption of households		Collective consumption of government bodies	Accumulation, changes of stocks of material circulating assets	Flows to the rest of the world	Flows to the environment	TOTAL
			Agriculture, hunting and corresponding services	Forest sector and corresponding services, state forestries: (as in the form No. 1-LH)	Forest sector and corresponding services, forestries: budgetary institutions	Forest sector and corresponding services, tenants of forest plots (as in the form No. 2-LH)	Manufacturing industry	Hotels and restaurants	Botanical gardens, zoos and nature reserves	Other economic activities	Private household production of a variety of goods for own consumption								
			01.00.0	02.00.0						03.00.0 - 97.00.0, 98.20.0	98.10.0	based on surveys of rural households	P31	based on surveys of rural households	P32	P5/P52	P6		
	Forest products, Statistical Classification of Products-2:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Products	Walnut	02.30.40.300	1	0	0	0	0	60857	10739	0	0	0	31297	2596153		0	17446		2716492
	Almond	02.30.40.300	2	0	0	0	0	21	0	0	0	0	0	540000		0	0		540021
	Pistachio	02.30.40.300	3	0	0	0	0	39501	0	0	0	0	9362	2796867		-125	39		2845644
	Mushroom	02.30.40.100	4	0	0	0	0	11	5	0	0	0	124	43		0	7		190
	Wild apple	02.30.40.900	5	0	0	0	0	4237	1412	0	0	0	7420	475730		57	494		489350
	Apricot	02.30.40.900	6	0	0	0	0	14196	6084	0	0	0	20423	0		0	531		41234
	Cherry	02.30.40.900	7	0	0	0	0	16	4	0	0	0	17	0		0	0		37
	Pear	02.30.40.900	8	0	0	0	0	2774	490	0	0	0	2238	0		-1	302		5803
	Others (barberry, hawthorn, sea buckthorn, rosehip, etc.)	02.30.40.900	9	0	0	0	0	25	0	0	0	0	22	70416		0	0		70463
	Seeds of tree and shrub species (pure)	02.10.12,000	10	0	0	1101	2707	0	0	0	0	0	0	0		0	0		3808
	Planting material	02.10.11.000	11	904	214	44966	0	0	0	1377	0	0	460	0		1472	0		49393
	Industrial timber	02.20.11-13,.15	12	0	0	0	0	42661	0	0	214	0	0	0		0	787		43662
	Fuel timber	02.20.14 ,000	13	17	144	0	0	32	0	1	124	0	12753	11926		-1	609		25605
	Hay	01.19.10.710	14	7461	0	0	0	0	0	0	0	0	0	3937104		8814	0		3953379
	Medicinal herbs and fruits	02.30.40.900	15	102	0	0	0	156	0	0	13	0	0	10671		-60	121		11003
	Wild game	01.70.10.200	16	0	0	0	0	8	1	0	0	0	13			-1	0		21
	Cereals, etc.	1.11	17	2130	0	0	0	3405	0	0	0	0	804			107	0		6446
	Potatoes	01.13.51	18	662	0	0	0	1785	1042	0	149	0	4486			580	0		8704
	Honey	01.49.21	19	43,65	0	0	0	0	89	0	0	0	1199			44	0		1332
	Other products	1.99	20	0	0	0	0	0	18	11	3	0	8			0	0		40
	Raw milk	01.49.22	21	555	0	0	0	9082	0	0	0	0	5302			-1	0		14938
	Milk processing products (cottage cheese, kurut, sour cream, homemade butter, airan)	10.51.1	22	0	0	0	0	0	79	0	0	0	6134			0	0		6213
	Grazing services	01.62.10.930	23	92375	0	0	0	0	0	0	0	0	0			0	0		92375
	Travel services related to hotels and restaurants	55.0-56.0	24	0	0	0	0	0	0	0	0	0	47217			0	10956		58173
	Nature reserve services	91.04.12	25	0	0	0	0	0	0	0	0	0	24501		98229	0	2083		124813
	Forest growing services	02.40.10.100	26	0	0	0	0	0	0	0	0	0	0			26036	0		26036
	Other forestry services	02.40.10.120-19	27	0	523	8611	23407	0	0	2271	0	0	0		140303	1	0		175116
	Logging services	02.40.10.200	28	0	41	0	16	22449	0	0	0	0	0			-1	0		22505
	TOTAL			104206	922	54678	26130	201216	19963	3660	503	0	173780	10438910	238532	36921	33375		11332796

Annex 2. Ecosystem Service Accounts: Detailed Accounting Tables

Table 28. Physical supply table of provisioning ecosystem services of the forest in 2018, various units

				Institutional sectors										Forest fund ecosystems			
				Agriculture, hunting and corresponding services	Forest sector and corresponding services, forestries: non-financial institutions	Forest sector and corresponding services, forestries: budgetary institutions	Forest sector and corresponding services, tenants of forest plots	Manufacturing industry	Hotels and restaurants	Botanical gardens, zoos and nature reserves	Other	Private household production of a variety of goods for own consumption		Forest lands	Non-forest lands		
				01.00.0	2			10.0-33.0	55.0 - 56.0	91.04.0	03-09; 34.0-54.0; 57.0-90.0; 92.0-97.0	98.10.0	based on surveys of rural households		Pastures	Land under crops	Other lands
				1	2	3	4	5	6	7	8	9	10	11	12	15	16
Provisioning ecosystem services	Walnut, kg	02.30.40.300	1											9802049			
	Almond, kg	02.30.40.300	2											1350373			
	Pistachio, kg	02.30.40.300	3											5127039			
	Mushroom, kg	02.30.40.100	4											2004			
	Wild apple, kg	02.30.40.900	5											195670			9514600
	Apricot, kg	02.30.40.900	6											19137			
	Cherry, kg	02.30.40.900	7											1220			
	Pear kg	02.30.40.900	8											9005			
	Others (barberry, hawthorn, sea buckthorn, rosehip, etc.), kg	02.30.40.900	9											634802			
	Seeds of tree and shrub species (pure), kg	02.10.12,000	10											0			
	Planting material, pcs	02.10.11.000	11											541461			
	Industrial timber, м^3	02.20.11-13,.15	12											17888			
	Fuel timber, m^3	02.20.14 ,000	13											178647			
	Hay, kg	01.19.10.710	14											0	376621526		
	Medicinal herbs and fruits, kg	02.30.40.900	15											357758			
	Wild game, animals	01.70.10.200	16											1000			
Products	Walnut, kg	02.30.40.300	17	0	0	187915	960291	0	0	0	0	0	8653843				
	Almond, kg	02.30.40.300	18	0	0	353	20	0	0	0	0	0	1350000				
	Pistachio, kg	02.30.40.300	19	0	0	2836	84803	0	0	0	0	0	5039400				
	Mushroom, kg	02.30.40.100	20	0	0	0	280	0	0	0	0	862	862				
	Wild apple, kg	02.30.40.900	21	0	0	0	195670	0	0	0	0	0	9514600				
	Apricot, kg	02.30.40.900	22	0	0	0	19137	0	0	0	0	0	0				
	Cherry, kg	02.30.40.900	23	0	0	0	1220	0	0	0	0	0	0				
	Pear kg	02.30.40.900	24	0	0	0	9005	0	0	0	0	0	0				
	Others (barberry, hawthorn, sea buckthorn, rosehip, etc.), kg	02.30.40.900	25	0	0	0	425	0	0	0	0	0	634377				
	Seeds of tree and shrub species (pure), kg	02.10.12,000	26	0	0	0	0	0	0	0	0	0	0				
	Planting material, pcs	02.10.11.000	27	0	5325	522937	13198	0	0	0	0	0	0				
	Industrial timber, м^3	02.20.11-13,.15	28	0	833	13597	3459	0	0	0	0	0	0				
	Fuel timber, m^3	02.20.14 ,000	29	0	0	6243	2040	0	0	0	0	85182	85182				
	Hay, kg	01.19.10.710	30	1659275	0	0	0	0	0	0	0	0	374962251				
	Medicinal herbs and fruits, kg	02.30.40.900	31	0	0	2046	0	0	0	0	0	0	355712				
	Wild game, animals	01.70.10.200	32	850	0	0	150	0	0	0	0	0	0				
	Cereals, etc., kg	1.11	33	418932	0	69070	46548	0	0	0	0	0					
	Potatoes, kg	01.13.51	34	602916	0	0	59629	0	0	0	0	0					
	Honey, kg	01.49.21	35	9095	0	0	0	0	0	0	0	0					
	Other products, kg	1.99	36	0	0	0	425	0	0	0	0	x					
	Raw milk, liter	01.49.22	37	982000	0	0	0	0	0	0	0	0					
	Milk processing products (cottage cheese, kurut, sour cream, homemade butter, airan), kg	10.51.1	38	50672	0	0	0	0	0	0	0	0					
	Grazing services	01.62.10.930	39														
	Travel services related to hotels and restaurants	55.0-56.0	40														
	Nature reserve services	91.04.12	41														
	Forest growing services	02.40.10.100	42														
	Other forestry services	02.40.10.120-19	43														
	Logging services	02.40.10.200	44														

Table 29. Physical flow accounts of cultural ecosystem services of the forest in 2018, number of rental days per year

		Institutional sectors		Forest fund ecosystems				TOTAL
		Forest sector and corresponding services, tenants of forest plots (data of form No.-2LH)	Botanical gardens, zoos and nature reserves (NSC KR data)	Forest lands	Non-forest lands			
		2	91.04.0		Pastures	Crops	Other lands	
	No.	1	2	8	9	10	11	12
Supply table								
Ecosystem service - natural conditions for recreation	1			311412			57861582	58172994
Product - a service of rental housing for travelers	2	311412	57861582					58172994
Use table								
Ecosystem service - natural conditions for recreation	3	311412	57861582					58172994
Product - products consumed for rental housing for travelers	4	311412	57861582					58172994

Table 30. Monetary flow accounts of cultural ecosystem services of the forest in 2018, thousand soms at current purchaser prices

		Institutional sectors		Forest fund ecosystems				TOTAL
		Forest sector and corresponding services, tenants of forest plots (data of form No.-2LH)	Botanical gardens, zoos and nature reserves (NSC KR data)	Forest lands	Non-forest lands			
		2	91.04.0		Pastures	Crops	Other lands	
	№ п/п	1	2	8	9	10	11	12
Supply table								
Ecosystem service - natural conditions for recreation	1			128010			689	128699
Product - a service of rental housing for travelers	2	173585	934					174519
Use table								
Ecosystem service - natural conditions for recreation	3	128010	689					128699
Product - products consumed for rental housing for travelers	4	45575	245					45820