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"ПРОЕКТ КОМПЛЕКСНОГО УПРАВЛЕНИЯ ЛЕСНЫМИ ЭКОСИСТЕМАМИ В КЫРГЫЗСКОЙ РЕСПУБЛИКЕ "(IFEMP)

КОНСУЛЬТАЦИОННЫЕ УСЛУГИ

ПРОВЕДЕНИЕ НАЦИОНАЛЬНЫХ ИНВЕНТАРИЗАЦИЙ ЛЕСОВ И ПОВЫШЕНИЕ ПОТЕНЦИАЛА

Контракт № KG/IFEMP/QCBS/NFI/01/2018

ОЦЕНКА ИНФОРМАЦИОННЫХ ПОТРЕБНОСТЕЙ

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Contents

1. Introduction

In the frame of the Integrated Forest Ecosystem Project (IFEMP), financed through a grant and loan of the World Bank and GEF the State Institution "Kyrgyz Forest and Hunting Inventory and Planning" (SIKFHIP) under the State Agency for Environmental Protection and Forestry (SAEPF; client) in close cooperation with the consortium of Unique-CAREC (consultant) is currently preparing for the second national forest inventory (NFI # 2) of Kyrgyzstan. Currently the project is in its inception phase.

In compliance with section Objective 1, task 1.1.1 of the ToR an assessment of information needs for all users (key line ministries, international reporting bodies, research institutions and other relevant stakeholders) including a review of national policy requirements to be addressed by NFI shall be developed.

In this survey, relevant stakeholders were asked about their "Information needs" on the forests in Kyrgyzstan or the forestry sector, which might be answered by the second National Forest Inventory (NFI # 2). The objective was to gather the key information needed to optimize the design, methodology and parameters collected during the upcoming NFI # 2.

2. Purpose of the information needs assessment

For the NFI # 1 a thorough information needs assessment has not taken place. However, national policy and international reporting obligations were considered for the NFI # 1. On this basis the FAO standard inventory design was used that was then customized to the methodology of the NFI # 1.

During the inception phase of this NFI # 2, a thorough information needs assessment has been conducted here. The consolidated information needs is supposed to be utilized to identify - from the perspective of the information needs – necessary changes and adoptions of the NFI # 1 methodology towards the NFI # 2 methodology. Since for the NFI # 2 a mapping component the NLCC is foreseen, in addition to the sample based inventory, the information needs assessment took the NLCC into consideration by a differentiation into information needs on statistical information at various spatial levels and information needs on mapped information.

This information needs assessment focuses on the analysis of the forest policy and the information needs from major forest sector actors. Since information on forests are essential for many policy fields, such as agricultural policy, rural development policy, energy policy, nature conservation and biodiversity policy, environmental policy, climate policy and industry policy the information requirements from these sectors was considered in the analysis.

It is considered that the information from the NFI is needed to define the national forest policy, is essential for the further development of the forest legislation and national forest programs, to intensify inter-sectoral cooperation and to facilitate international reporting, to the FAO forest resource assessment (FAO 2018a, FAO 2018b), the UN Framework Convention on Climate Change (UNFCCC) (IPCC 2003, IPCC 2008, 2006) and others such as the UN Convention on Bio-Diversity (CBD).

Further the information needs need to be provided with the necessary clarity that facilitates a translation into the NFI methodology: The information needs should be expressed specific, well defined and understandable; they need both to address the information content as well as the spatial dimension; the information needs to include precision requirements; and the information needs should consider both the assessment of the status and the assessment of changes from NFI cycle to NFI cycle, final the information needs and the consolidated information needs need to be realistic in terms of the possibility to achieve them within an NFI and the available resources.

The information needs for the NFI # 2 were elaborated based on intensive stakeholder consultations and the above mentioned literature study and were presented at the "National validation workshop on the outcome of information needs assessment" on 8th of August at SAEPF for discussion.

3. Methodology

3.1. Stakeholder analysis and round table

Before conducting the survey and parallel to the development/adaptation of the questionnaire a short stakeholder analysis on the NFI was conducted. Therefore, different organizations (e.g. research institution, governmental authority / NGO / Ministry; table 1) were listed and their potential interest and power with regard to the NFI # 2 were discussed within the consortium. During the information needs assessment the selection of stakeholders was also discussed in a meeting with TTFI (13.06.2019) The final list of main stakeholders was established during this process. For each organization at least one potential recipient was identified.

After the validation workshop (08.08.2019) an evaluation of interest and power of the selected stakeholders on a scale between 1 (low) and 10 (very high) was conducted, taking into account the INA results.

Table 1 provides an overview of the organizations that were finally selected for the information needs assessment, there type and participation in the round table and stakeholder survey.

Table 1: Overview of relevant stakeholders for the INA.

Type	Organization	Departmant	participation in round table (17.05.2019)	Questionnaire sent	filled out Questionnaire received
Government/State	Ministry of Agriculture, Processing and melioration	Department of water	x	NA	NA
Government/State	Ministry of Agriculture, Processing and melioration	Department of Pastures, Livestock, Fisheries	x	X	NA
Government/State	Ministry of Agriculture, Processing and melioration	Kyrgyzgiprozem	NA	X	X
Government/State	Ministry of Agriculture, Processing and melioration	The central unit (agricultural policy)	X	X	X
Government/State	Ministry of Education	University of Agricultural, Department of Forestry and Horticulture	x	X	X
Government/State	Ministry of Culture	Tourism agency	NA	X	X
Government/State	Ministry of Economy		NA	X	NA
Government/State	SAEPF	Forest ecosystem department	X	X	X
Government/State	SAEPF	Strategy and policy management department	X	X	X
Government/State	SAEPF	Department of Biodiversity and Protected Areas	X	X	X
Government/State	SAEPF	Kyrgyz forest hunting	X	X	X
Research	Institute of Biology (NAN KR)	Forest Institute	X	X	X
Government/State	National Statistic Committee	working group on UN SEEA reporting	X	X	X
Int	UNDP representation	Ecology program	NA	X	X
Int	FAO representative	Ecology project	X	X	X
Government/State	National register	GIS Center	NA	NA	NA
Government/State	Climate Finance Center		NA	X	X
Government/State	Project UNEP GEF	working group for reporting to UNFCCC (outsources to them)	NA	X	X
NGO	Association of forest users		X	X	X
NGO	Association pasture		NA	X	X
Research	CAIAG	Department 3 Monitoring Systems and data management	X	NA	NA

3.2. Stakeholder Survey

For the stakeholder survey, a questionnaire was developed that respected information needs of the NLCC and for the sample plot based forest inventory. For each selected organization recipients were identified (e.g. head of departments) that should answer on behalf of the respective organization. The recipients were encouraged to discuss the questionnaire among colleagues and informed that finally only one questionnaire for the respective organization should be submitted.

3.2.1. Survey on NFI related Information Needs

The information needs are generally divided into the following groups of data:

1. Forest resources, availability of wood and forest biomass

2. Carbon cycle in forests: LULUCF Accounting

3. Forest biodiversity

4. Forest health and vitality

5. Socio-economic information

6. Other ecosystem functions of forests

3.2.2. Information needs from "Land cover classification"

The land cover classification system that will be used has to be designed taking into consideration the already existing systems of land use / cover classes[1] on one side, but also the international standards such as the FAO land use classification system on the other. The technical possibilities in extracting different land cover classes from the satellite imagery are also very important, especially in context of the high level of accuracy, which is set as a target.

In achieving high overall accuracy, it is suggested to concentrate on the main forest types that exist in the country[2]. Related to this is the proposal for land use classification system shown in the following table.

It is important to note that this system outlined in Table 2 is just an initial proposal. During the inception the consulting team assessed the specific necessities of the counterpart in respect of the level of details and in the different land cover classes.

Table 2: Proposed system for land cover classification as concluded at the workshop and presented in the INA workshop on 08.08.2019.

Level 1 (basic level)	Level 2 (LC map)	Level 3 (field level)
1. Forest Density >10%	1 Spruce & fir forest	1 Spruce (>=60%)
		2 Fir (>=60%)
		3. Other (can be detailed further in the field manual)
	2 Juniper forest	1 Juniper turkestanica (>=60%)
		2 Juniper seravchanica (>=60%)
		3 Juniper semiglobosa (>=60%)
		Other (can be detailed futher in the field manual)
	3 Walnut forest	1 Walnut dominating (>=60%)
		Other (can be detailed further in the field manual)
	4 Pistachio forest	Pistachio forest (>=60%)
		Other (can be detailed further in the field manual)
	5 Other broadleaved and mixed forest	To be detailed further in the field manual
2. Other wooded land	Shrubs	To be detailed further in the field manual (needs to reflect national & international definition)
3. Other land	Other land (Bare land, glaciers, rocks etc.)	

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[1] "Integrated Assesment of Natural Resources 2008-2010 in Kyrgyzstan"
[2] Map of forest location in the Kyrgyz Republic scale 1:500000; Bishkek 2009

4. Agricultural land	Agricultural land (arable land, pasture / grassland	
5. Settlement (including mines)	Villages and towns	
	Mines, quarries	
6. Inland water resources	Waterbodies (lakes, reservoirs, rivers)	

3.2.3. Information needs from sample plot based NFI

In the questionnaire we asked the recipients to assess and describe in detail what their organization [department, agency] needs to know.

The respondents were asked about their detailed information needs concerning the above men-tioned six forest data groups:

1. Forest resources, availability of wood and forest biomass
2. Carbon cycle in forests: LULUCF Accounting
3. Forest biodiversity
4. Forest health and vitality
5. Socio-economic information
6. Other ecosystem functions of forests

In the tabular part of the recipient were asked to assign a priority (1-4) to each of the single param-eter:

Priority 1   not important

Priority 2   nice to know

Priority 3   important

Priority 4   essential

The recipients were encouraged to add parameter or comments if they felt that there was a need to be something explained.

Finally, all recipients were informed that information comes at a price, that data collected in an in-ventory are often costly, and not every information might be worth this price.

The tabular form of questionnaire, with all parameter, can be found below in Annex 7.1.

3.2.4 Evaluation of the priority of each forest data group by each organization

Finally, we derived average values and standard deviations of the priority ranking for each organiza-tion for each of the six forest data groups. Based on the priority ranking by the organizations we provide a comparison between the priorities of the different organizations with graphics.

3.2.5. Evaluation of the priority of a single parameter

For each parameter an average value and standard deviation were calculated.

3.2.6. Analysis of literature

In the frame of the information needs assessment, we reviewed national key documents with regard to demands on forest aspects related to the NFI. We also reviewed the main international reporting requirements. With regard to the evaluation, a priority ranking (1-4) in documents has to be implemented differently. We marked a parameter with "X" if it was mentioned in a respective document. For a final numeric evaluation of each parameter that includes stakeholder survey results and literature study "X" was translated into priority value "3".

The following literature has been reviewed:

▪ national legal documents: Forest Code (1999), The Concept of Forestry development of the Kyrgyz Republic (2019-2040), National Forestry Development Action Plan (2018), IFEM-project report: Results of a functional analysis and recommendations on the reform of the forest sector of the Kyrgyz Republic (Zakharenkov and Bortsova 2019)

▪ international reporting demands:

- FAO Global Forest Resources Assessment (FAO 2018a, FAO 2018b)

- United Nations Convention on the Conservation of Biodiversity (CBD 2013)

- SEEA: UN System of Economic Economic Accounting (SEEA 2019)

Demands of the reporting to the United Nations Framework Convention on Climate Change (UNFCCC) (IPCC 2003, IPCC 2008, 2006) have been assessed in within the stakeholder survey by interviewing the respective national working group on UNFCCC reporting (see table 1).

3.2.7. Identification of the parameters that are perceived as being most important

To answer the question, which parameter are perceived as being most important, we selected the parameter that received a ranking of 3 and higher in the stakeholder survey and simultaneously were mentioned at least in one of reviewed national and international documents.

3.2.8. Feasibility evaluation

Finally, UNIQUE-CAREC internally conducted a general expert evaluation on the feasibility of providing a specific information within an NFI ("yes" or "no"). In some cases, comments were in-cluded. The expert based feasibility evaluation was presented in a detailed excel table to the partic-ipants of the validation workshop.

All results of the stakeholder and literature survey, that are part of in this report, have been presented, discussed and agreed among the participants at the "National validation workshop on the outcome of information needs assessment" on 8th of August at SAEPF.

4. Results

4.1. Stakeholder analysis

Stakeholder analyses with regard to the power and interest to NFI #2 were carried out before and after the INA based on expert opinion within the UNIQUE-CAREC consortium. Figure 1 shows the revised version after the validation workshop on INA (8th of August 2019 at SAEPF). The interest and power of SAEPF departments on the NFI, especially the State forest inventory and hunting department is perceived as being highest among the stakeholders. Similar is the ranking of the Na-tional Statistic Committee. The working group on UNFCCC reporting and the Agriculture University are ranked with similar interest, but less power on the NFI project.
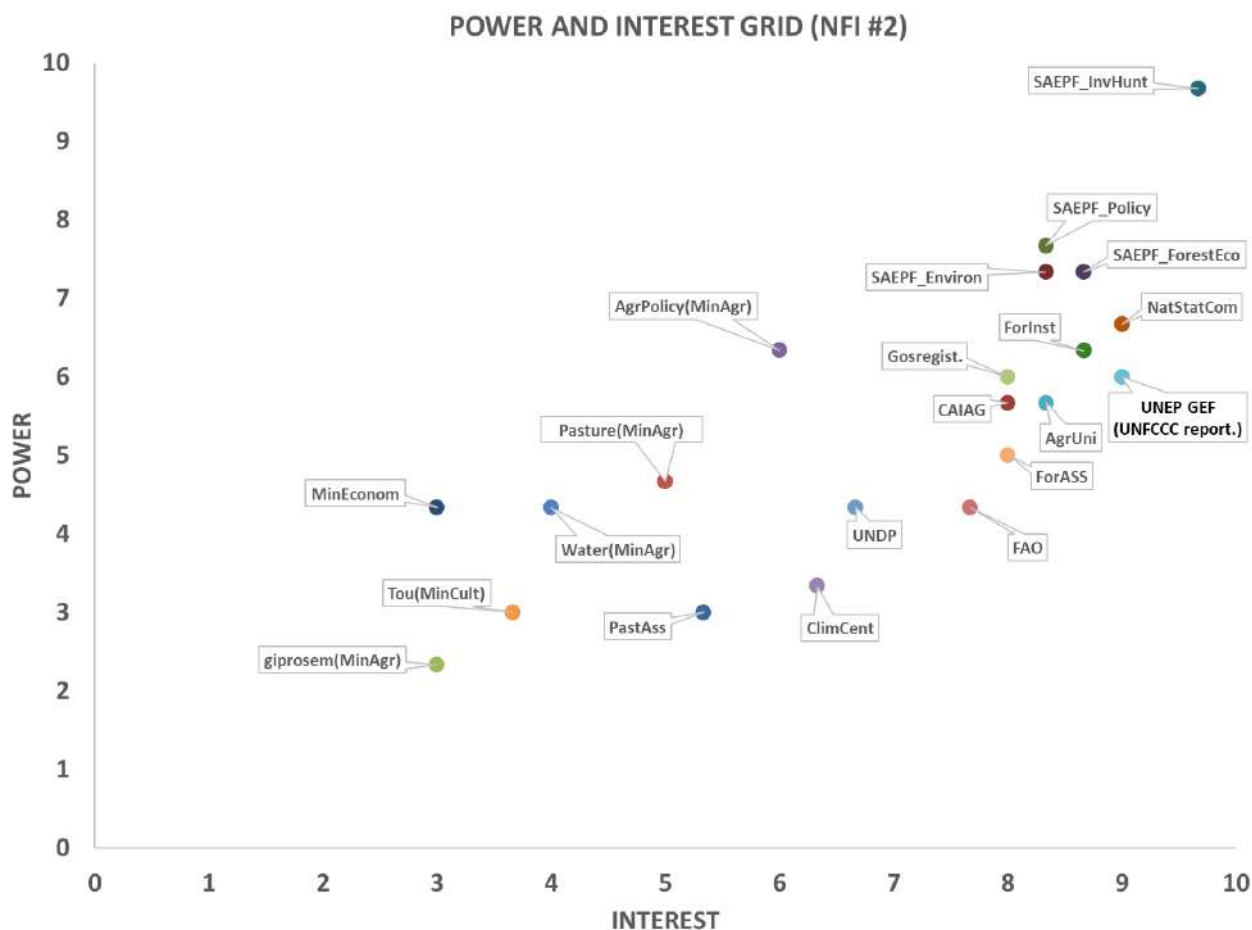
**Figure 1: Power and Interest Grid with respect to influence on NFI # 2. Ranking from 1 (low)-10 (high) Shortcuts: Water(MinAgr) = Department of Water Resources under the Ministry of Agriculture, Processing and Melioration; Pasture(MinAgr) = Department of Pastures, Livestock, Fisheries under the Ministry of Agriculture, Processing and Melioration; giprosem(MinAgr) = "Kyrgyzgiprozem" State Institution under the Ministry of Agriculture, Processing and Melioration; AgrPolicy(MinAgr) = the central unit (agricultural policy) under the Ministry of Agriculture, Processing and Melioration; AgrUni= University of Agriculture, Department of Forestry and Horticulture under the Ministry of Education; Tour(MinCult) = Department of Tourism under the Ministry of Culture; MinEconom = Ministry of Economy; SAEPF_ForestEco = Forest ecosystem department under the SAEPF; SAEPF_Policy = Strategy and policy management department of the SAEPF; SAEPF_Environ = Department of Biodiversity and Protected Areas under the SAEPF; SAEPF_InvHunt = "Kyrgyzlesoohotustroistvo" State Institution under the SAEPF; ForInst = Forest Institute of the Institute of Biology (NAN KR); NatStatCom = working group on UN SEEA reporting of the National Statistic Committee; UNDP = Ecology Programme of the UNDP; FAO = Ecology Project of FAO; Gosregist=GIS Center of the National Register Service; ClimCent = Climate Finance Center; UNEP GEF (UNFCCC report.) = working group for reporting to UNFCCC of UNEP-GEF; For-Ass = Association of forest users; PastAss = Association of pasture users; CAIAG = Department 3 (Monitoring Systems and data management) of the Central Asian Institute of Applied Geosciences.**

4.2. Stakeholder Survey

### 4.2.1. Importance by stakeholders with regard to groups of forest data

The priority ranking of the parameters in each forest data group was averaged for each organization. The results of the single forest departments of SAEPF are presented as one organization. The comparison between the different organizations shows different preferences. With regard to information related to forest resources the Agricultural University, the National Statistic Committee, the Forest Research Institute and the SAEPF have the highest interest. The standard deviations indicated that for example the Agriculture University assigned the highest priority to each parameter of this forest data group, whereas the prioritization of Forest Research Institute varied strongly between different parameters. Organizations that are especially focusing on specific tasks, that are less connected with forest showed lower interest (e.g. Kyrgzgiprosem, the pasture user association and the Tourism department of the Ministry of Culture. See figure 2. With regard to the forest data group on carbon cycles in forests, we found even less consensus between the organizations. For example, the working group for the UNFCCC reporting, the Forest Research Institute and SAEPF assigned high values, indicating high interest. Several other organization ranked their interest much lower (see figure 3). Interest on information related to forest biodiversity (figure 4) was also ranked highest among research and education institutions and the SAEPF. Interest on information on forest health and vitality was especially ranked high among the same stakeholders, the National Statistic Committee (related to UN SEEA reporting), the working group on UNFCCC reporting and UNDP (see figure 5). Socio-economic functions of the forests were ranked relatively high among educational and research institutions, SAEPF, the National Statistic Committee and by the Tourism department and the Climate finance Centre (see figure 6). Finally, the forest data group on other ecosystem functions was most interesting for the Forest Research Institute, the National Statistic Committee and UNDP (see figure 7).
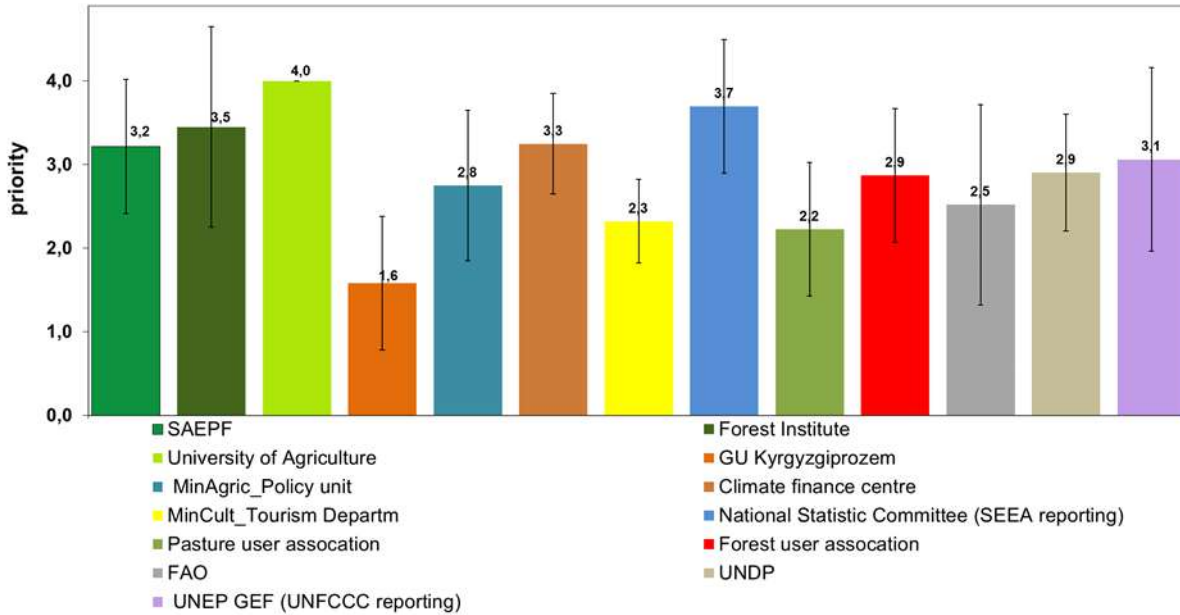
Figure 2: Comparison of the prioritization of the forest data group "Forest resources, availability of wood and forest biomass" per organization.
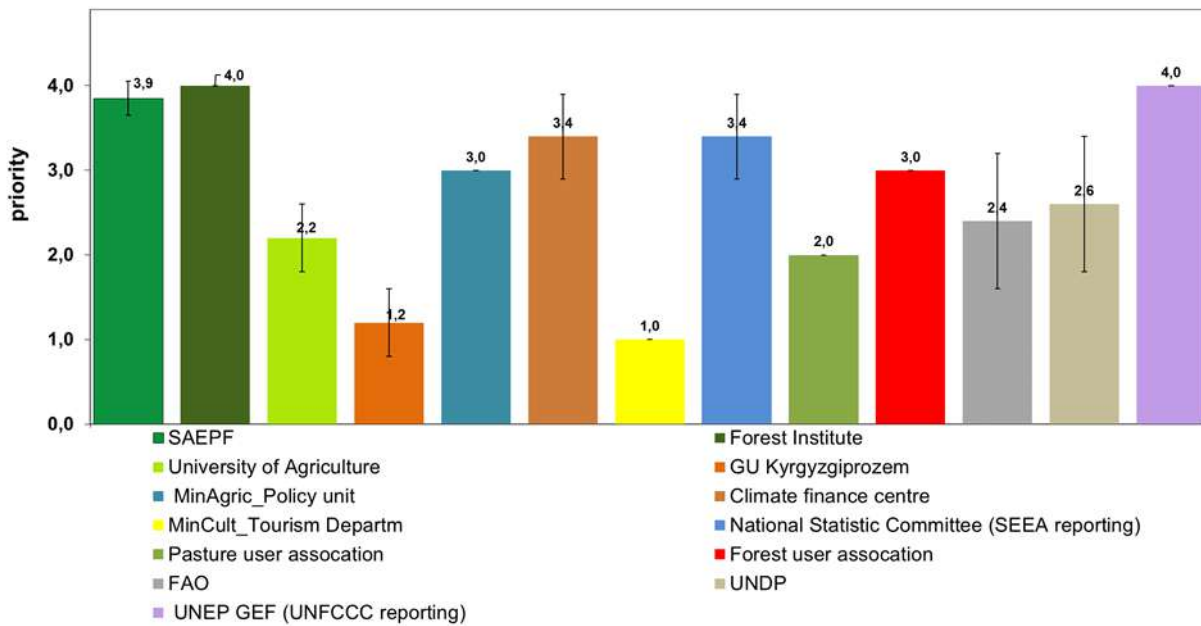
Figure 3: Comparison of the prioritization of the forest data group "Carbon cycle in forests: LULUCF Accounting" per organization.
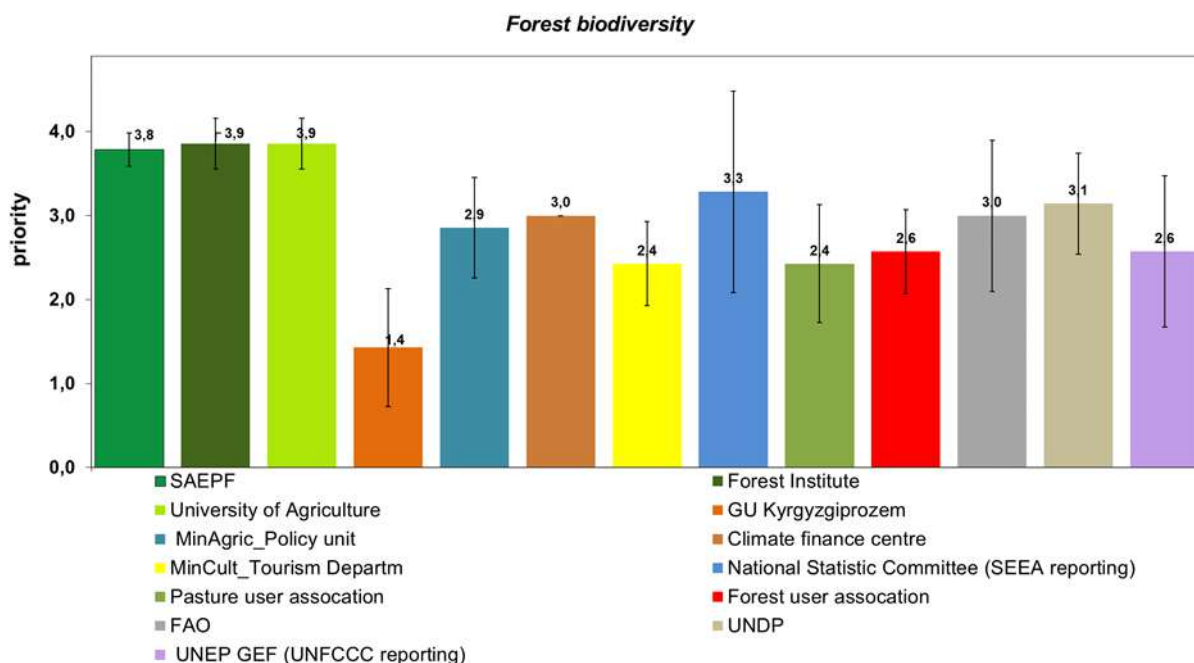
Figure 4: Comparison of the prioritization of the forest data group "Forest biodiversity" per organization.
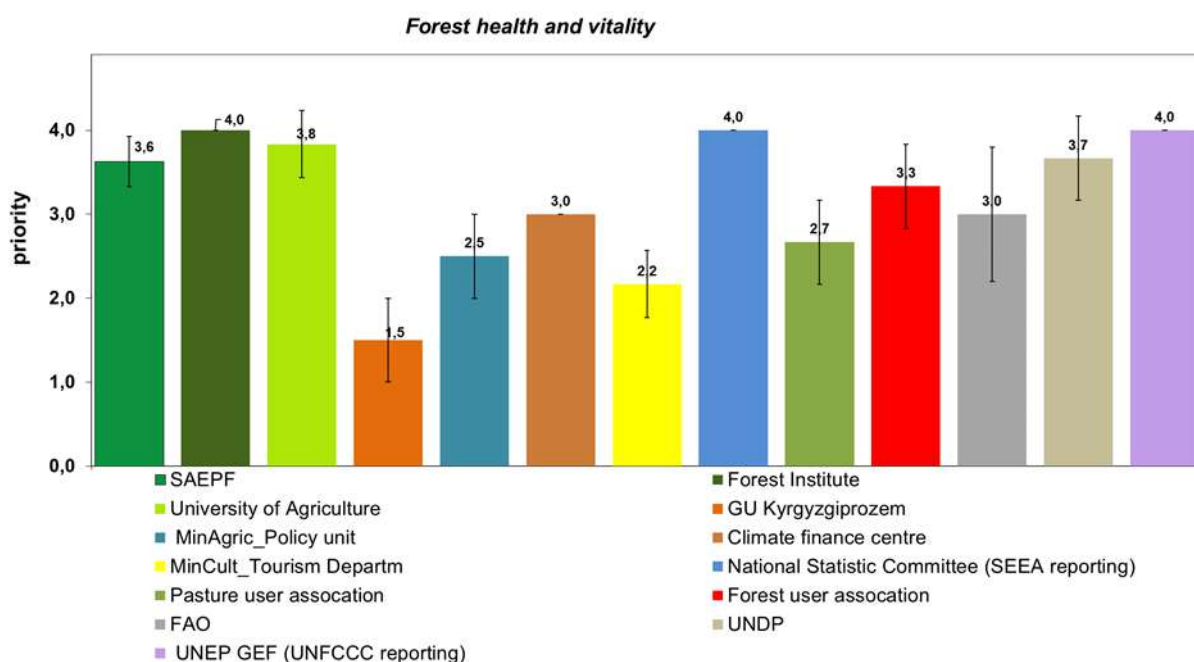
Figure 5: Comparison of the prioritization of the forest data group "Forest health and vitality" per organization.
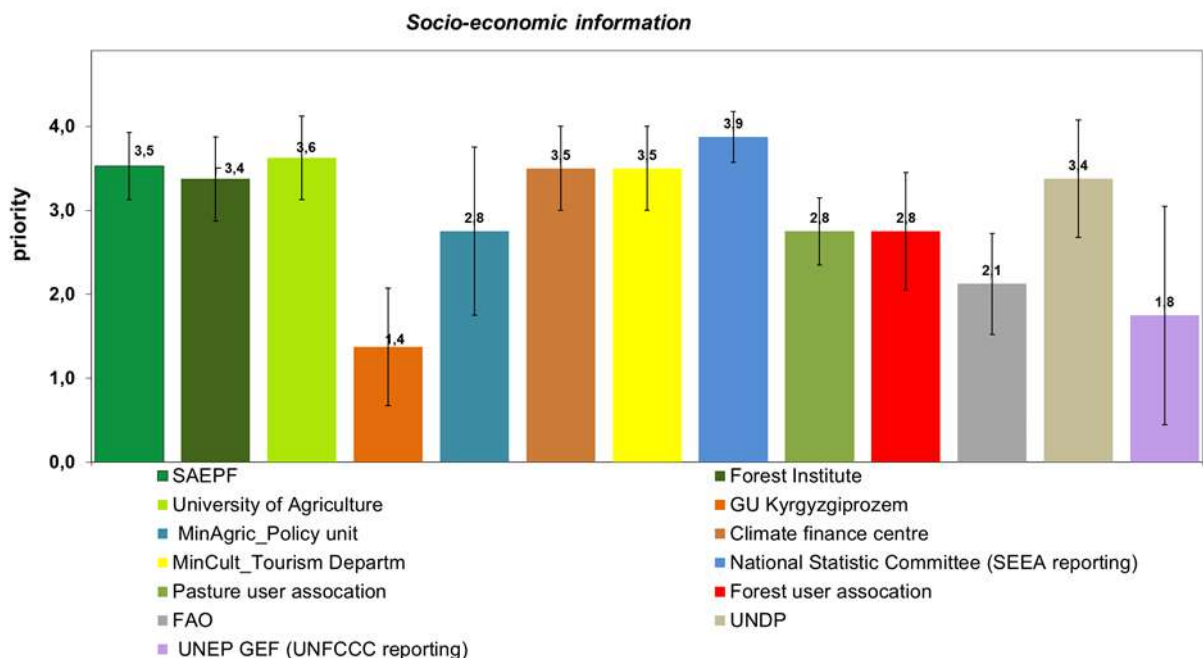
Figure 6: Comparison of the prioritization of the forest data group "Socio-economic information" per organization.
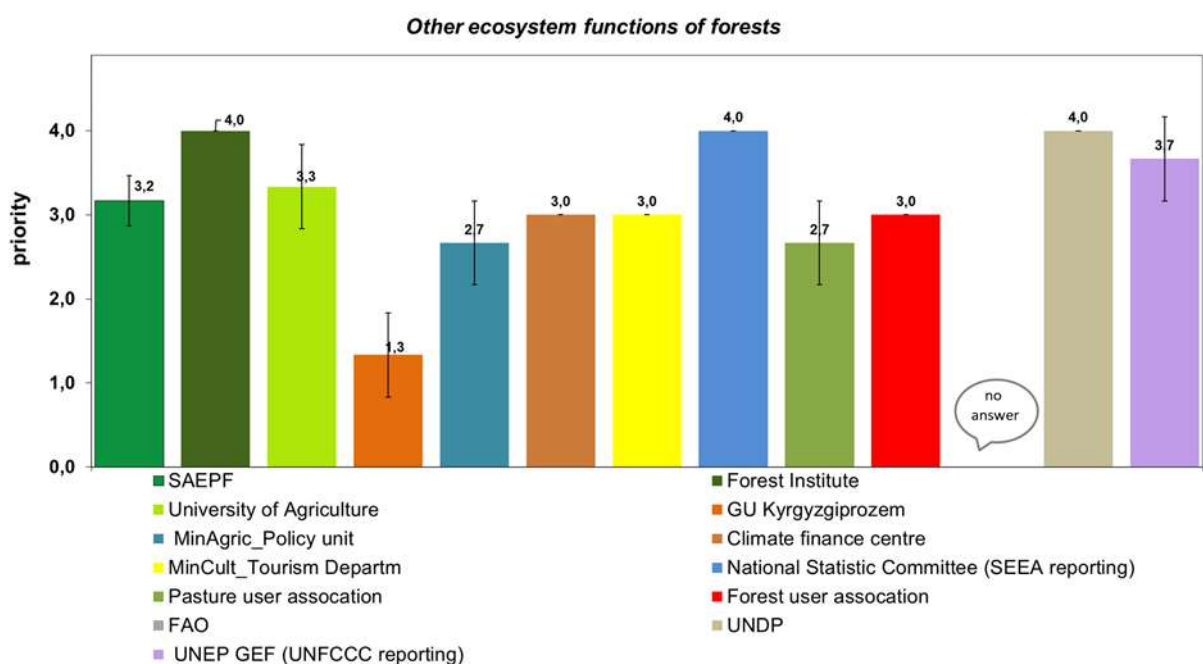
Figure 7: Comparison of the prioritization of the forest data group "Other ecosystem functions in forests" per organization.

4.2.2. Importance by stakeholders with regard to selected topics

Some important topics are more interesting to some organizations and institutions. We have se-lected the most important parameters, around which there are many discussions and suggestions. Forest area of the Kyrgyz Republic is a very important indicator. They use data on the forests of the republic in their reports and when planning the strategic documents. Almost all organizations and institutions have expressed high interest; the diagram in Figure 8 confirms it.
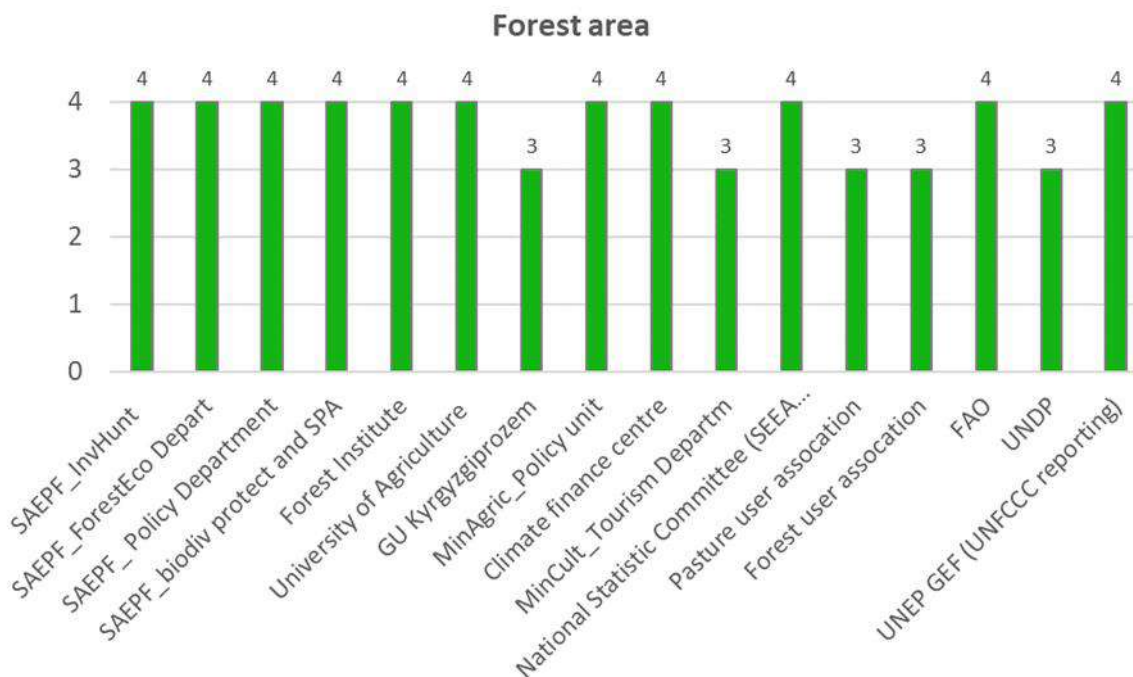
Figure 8: Level of interest in "Forest area" by organizations.

 "Carbon storage" in natural ecosystems is very important for many organizations, in recent years there have been signs of climate change, an increase without a rainy season and air temperature. Most of government organizations and almost all international organizations are implementing projects related to climate change, determination of the amount of carbon in our ecosystems. The Figure 9 shows that more than half of the organizations are interested in determining the carbon, but there are organizations that do not use this information at all. For example, "Kyrgyzgiprozem" State Institution, Department of Tourism.
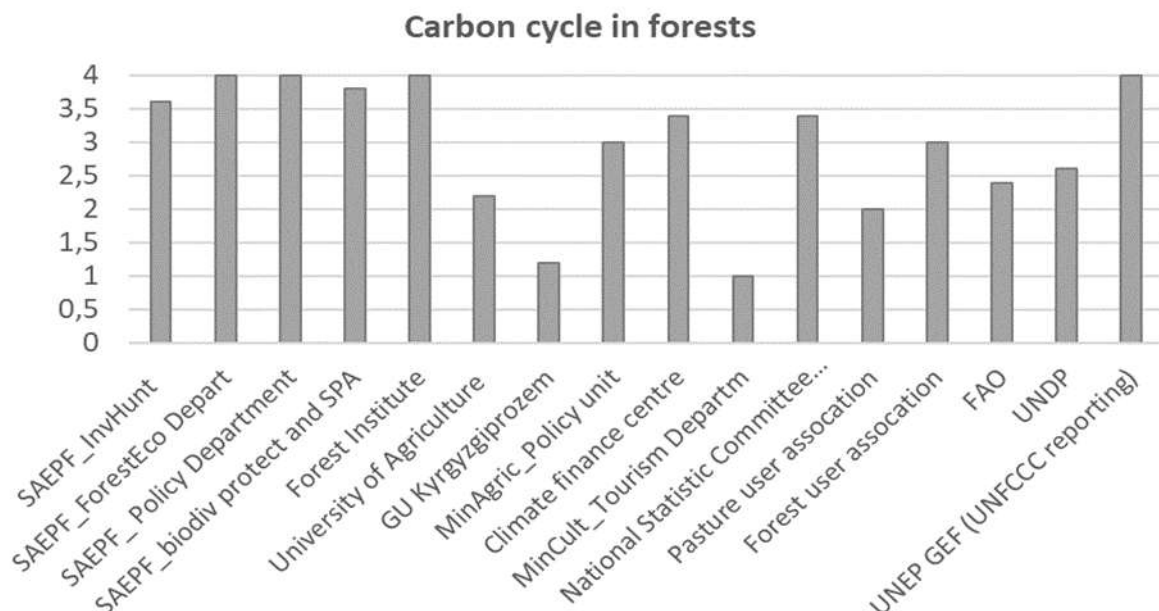
Figure 9: Interest in the "Carbon cycle" by organization.

Our natural and manmade ecosystems provide many ecosystem services for the benefit of mankind. The principles of ecosystem services in Kyrgyzstan are not yet used; although there are first results of the assessment of ecosystem services and the introduction of Payments for ecosystem services (CAREC has successfully implemented several pilot projects in this direction). Citizens of Kyrgyzstan increasingly are ever more aware the importance of conserving all ecosystems that provide vital ecosystem services. The Figure 10 shows that "Cultural Ecosystem Services - Ecotourism" is important for many organizations.
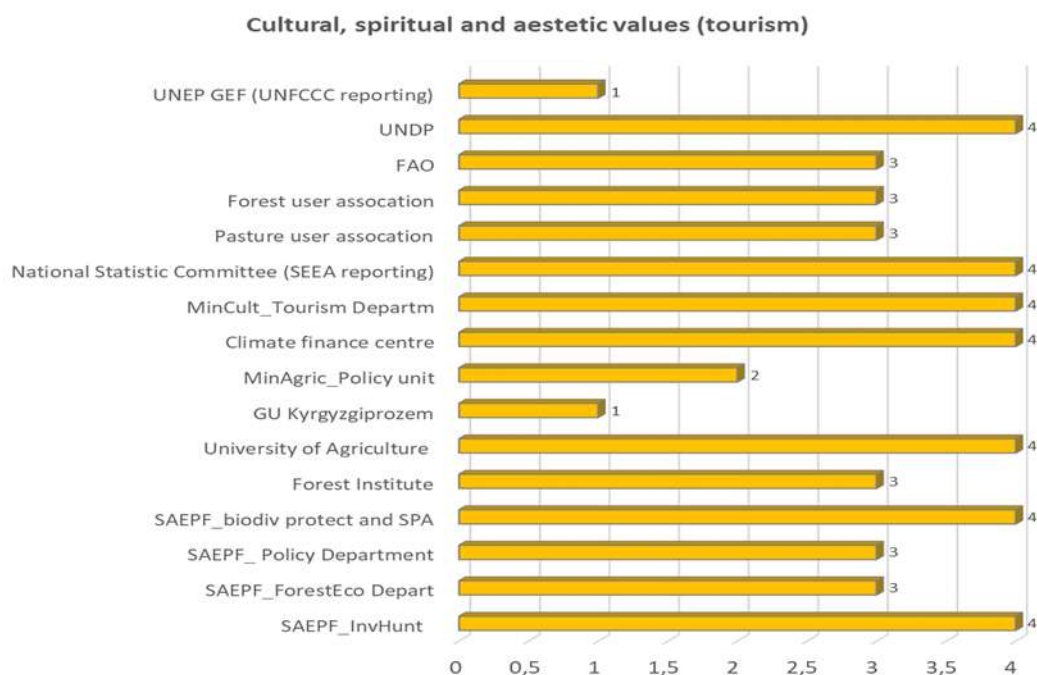
Figure 10: "Cultural Ecosystem Services - Ecotourism" by organizations.

Forests of Kyrgyzstan are valued by protective and environmental functions, and there are many different products in the forests: wild fruits, nuts, honey, etc. The interest in collecting non-wood products for organizations and institutions is different. The National Statistical Committee in their reports start showing the amount of these products used and therefore they are very interested in it, as well as the Association of Forest Users. The institutions under the

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SAEPF are involved in determining the amount of collection and use of non-wood forest products; their grade is also above average. The level of interest of organizations is shown in the Figure 11.
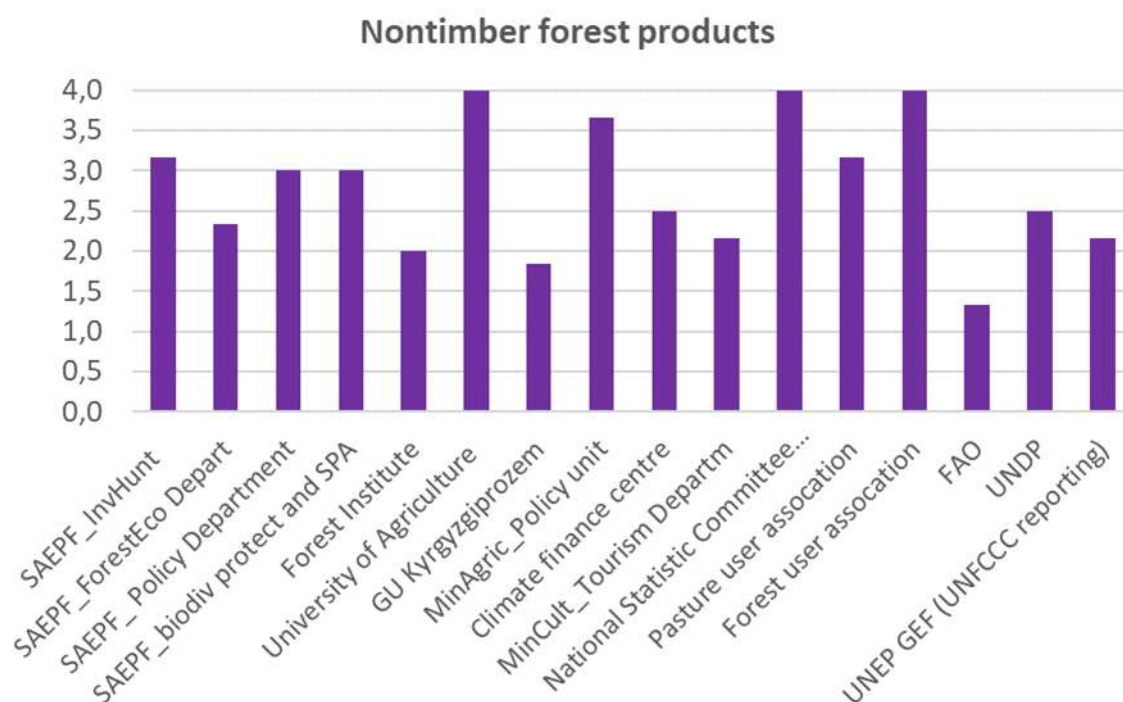
Figure 11: Level of interest of organizations in the use of non-wood forest products.

The growing stock of trees and their increment (increase in stock over a certain period of time) is a special indicator of forests that are not used by all interested organizations and institutions. The Figure 12 shows that the institutions under the SAEPF, the National Statistical Committee, and the UNEP project on the preparation of the National Climate Change Report use these indicators. Some organizations like "Kyrgyzgiprozem" State Institution and the Association of Pasture User do not use data on forest stocks at all, and this is true.
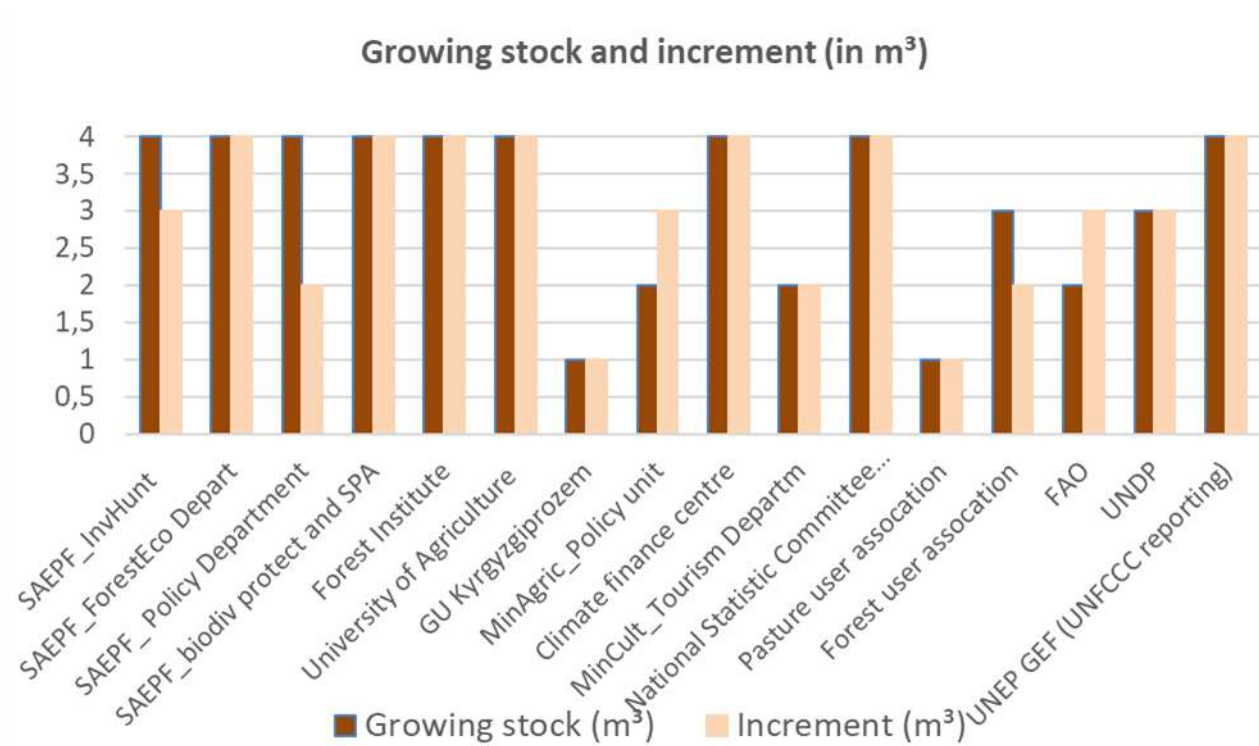
Figure 12: Interest of organizations in growing stock of trees and their increment.

The lease of Forest Fund's land is an important topic, as it is related to the socio-economic situation of the local population. According to the SAEPF more than 23,900 Agreements for Lease of SFF's Lands were drawn up in 2017, state revenue amounted to more than 52 million soms. About 2 million people live in the forests or close to the forest resources in the republic, who rent forest lands for different periods of use. The Figure 13 shows that almost all organizations except "Kyrgyzgiprozem" State Institution and international organizations are interested in this topic.
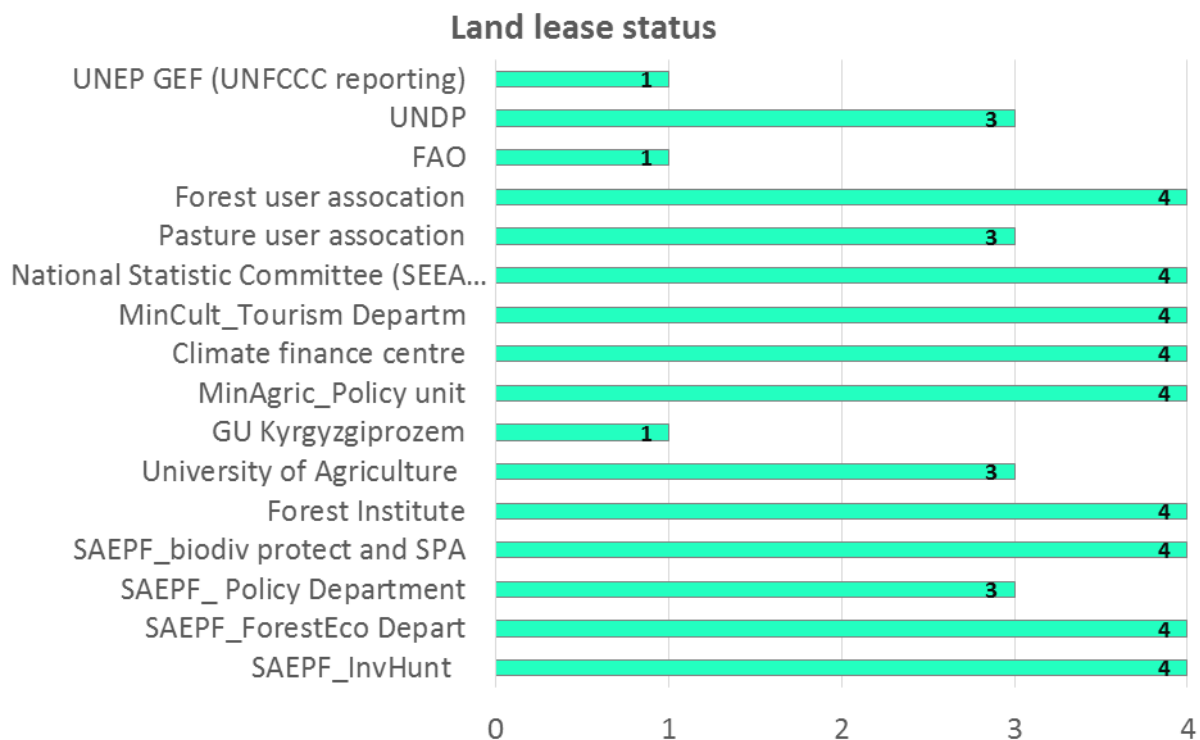
Figure 13: Interest of organizations in lease of State Forest Fund's lands

4.2.3. Parameters added and proposed by stakeholder

The topics indicated in the questionnaire were not final and the organizations or institutions were able to add additional topics of interest to each block. The survey results show that some organizations have added topics. Some topics are repeated, they have been included in the question-naire, and some topics are completely new:

- Gathering of mushrooms;
- Forest maturity (qualitative, quantitative, household, technical, natural, renewable);
- Forest zonation outside the SFF;
- The presence of wild animals in the forest, species animals and plants of Red List;
- Ecological corridors and migration routes;
- Tailings sites;
- Forest zonation outside the SFF according to ecosystem services;
- Information about the soil, the state of humus.

Only the organizations, which proposed new parameters, evaluated their importance. We included them in the overall table (see Annex 7.2). However, most of these new parameters cannot be included in NFI #2.

4.2.4. Comments of participants

The Questionnaire also contained a column where organizations were supposed to comment their grades. According to the results of processing, it is clear that not all organizations gave their comments, and the Ministry of Agriculture, the UNDP Environmental Programme and others gave the most important comments. Below we list the most important comments:

- Is there official / unofficial data on the amount of firewood;
- Alien invasive species - common pine was delivered, which became the carrier of the bark beetle;
- Forest area – to divide into naturally renewable and cultivated forests, as well as by type;
- Aboveground biomass / underground biomass / forest litter / carbon stock / soil or-ganic matter - it is also interesting for other categories of land (for example, pasture);
- Information should be added: - the presence of wild animals; - division by forest type in accordance with the uniqueness of the territory; regional and national importance; the presence of species of Red List; migration corridors;
- Examination of the presence of harmful insects for trees and shrubs;

4.3. Overall perceived importance of single parameters by considering the literature review

The literature studies on national and international documents showed that a large number of the parameters in the questionnaire are relevant. A detailed numeric evaluation is less feasible compared to the stakeholder survey. The literature review on parameters, however, turned out to be a useful addition for determining the importance of single parameters.

Overview of the parameters perceived as being most and less important

We considered parameters that are simultaneously a.) mentioned in national documents, b.) needed for international reporting and c.) received an average value of 3.0 and higher in the stakeholder survey as highly important. Overall, 29 parameters fulfilled these criteria. The standard de-viations varied between 0.5 and 1.1.

The most important parameters with values above 3.4 and 3.6 were forest area, afforested area and regenerated area. All three parameter had also standard deviations below 1, indicated quite consensus on the importance of these three parameters among the different stakeholders (see figure 14).

PARAMETER WITH AVERAGE PRIORITY 3.0 AND HIGHER IN THE FRAME OF THE STAKEHOLDER SURVEY AND MENTIONED IN NATIONAL DOCUMENTS AND RELEVANT FOR INTERNATIONAL REPORTING
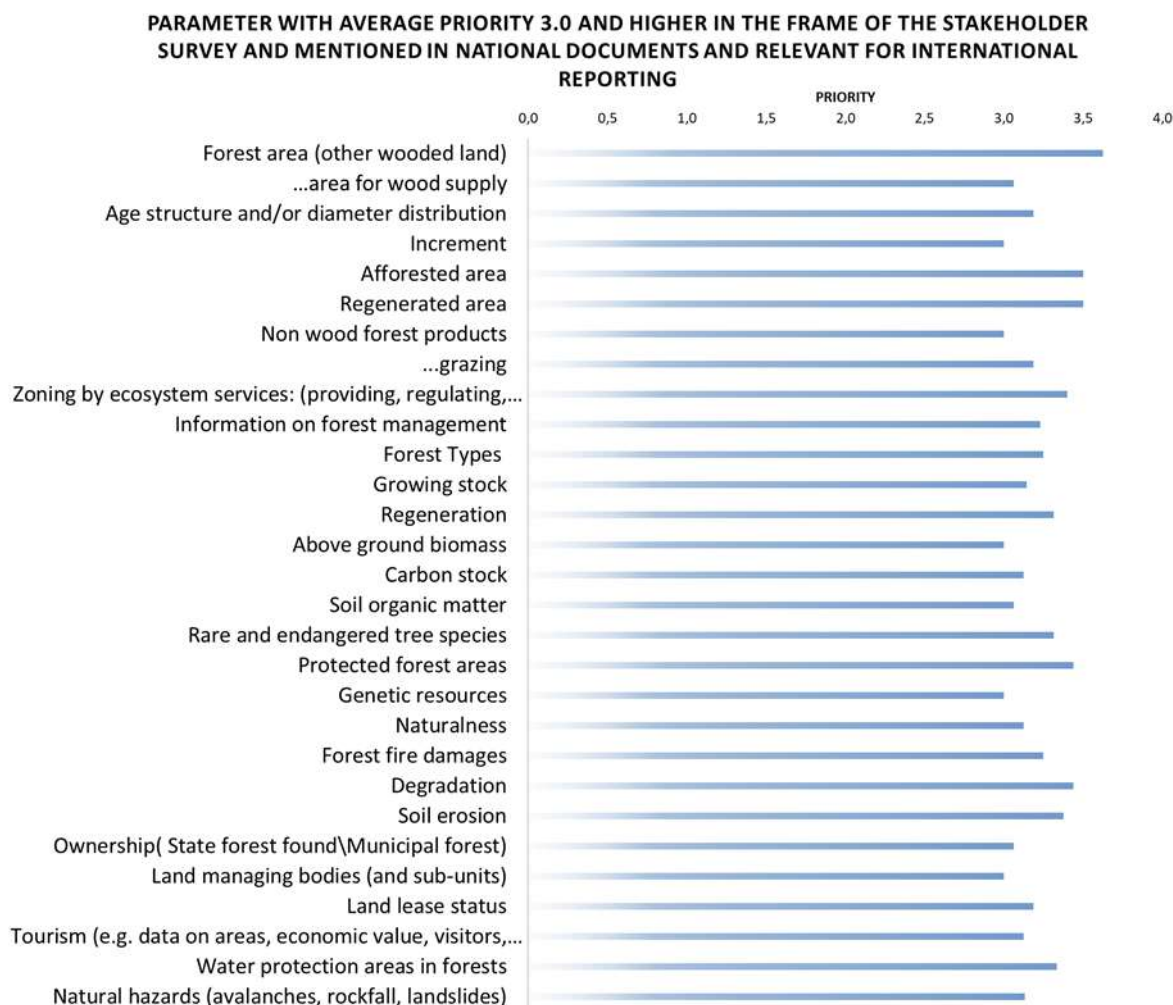
Figure 14: Parameters, which received an average value of 3.0 and higher in the priority ranking of the stakeholder survey, are mentioned in national documents and are relevant for international reporting.

PARAMETER WITH AVERAGE PRIORITY BELOW 3.0 IN THE FRAME OF THE STAKEHOLDER SURVEY AND NOT MENTIONED IN NATIONAL DOCUMENTS AND NOT RELEVANT FOR INTERNATIONAL REPORTING
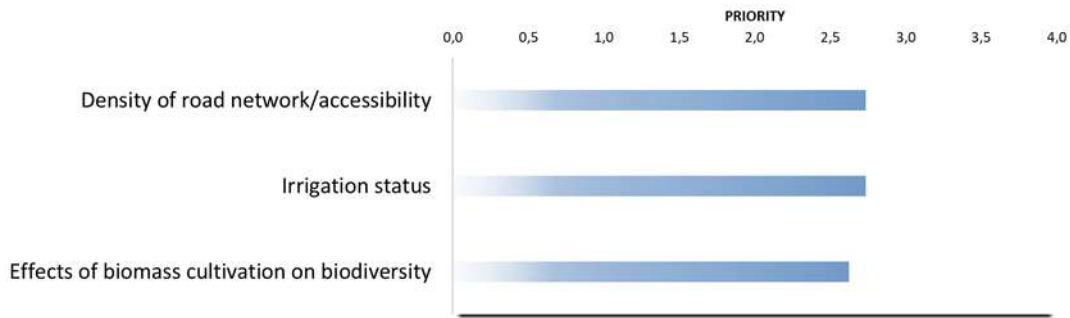
Figure 15: Parameters, which received an average value below 3.0 in the priority ranking of the stakeholder survey, are not mentioned in national documents and are not relevant for international reporting.

Parameters, which received an average value below 3.0 in the priority ranking of the stakeholder survey and that are also not mentioned in national documents and are not relevant for international reporting were considered as least important (see figure 15).

Standard deviations were relatively high, ranging from 1.0 to 1.2, which indicates that, the opinion on the importance on these topics is perceived relatively different among different stakeholders. For example, all three parameters presented in figure 15, were perceived as being of high importance at SAEPF departments that conduct regularly fieldwork, whereas international organizations and the working group on UNFCCC reporting perceived these parameter as being less important.

5. Conclusions from the information needs assessment

5.1. Meaning for INA for NFI # 2 and differences to NFI #1

Our INA focused on the analysis of the information needs from major forest sector actors, which were elaborated during intensive stakeholder consultations and in close collaboration with the TTFI. Additional demands, formulated in national documents and international reporting were considered.

At this stage – considering our actual knowledge on the country and from our interpretation of the TOR there will be, compared to NFI # 1 a stronger focus on

- the assessment of the major land cover classes as mapped information, including the assess-ment of forests and shrub land with high mapping accuracy

- the provision of highly accurate information on all six major forest/shrub land types.

This was not addressed by NFI # 1 as the creation of a forest map was not part of the NFI # 1. Secondly, the NFI # 1 applied a systematic tract design with a moderate number of tracts. Both together has resulted in a low number of tracts that covered forests and these six major forest types. Pistachio forests and walnut forests occurred merely by one/respectively two tracts, the remaining four types occurred merely by less than 20 tracts. In total forest/shrub lands where assessed on 113 tracts. With this number of tracts, the NFI # 1 merely could provide information with sufficient statistical error on the total forest/shrub land as a whole. This is also visible from the report on the NFI # 1 that provides information on the statistical accuracy on the forest/shrub land area but not for the other information presented.

These considerations highlight how important the information needs assessment is for NFI #2 and that in anticipation of the intensive use of the outcomes of the NFI #2 and of future

repetitions the information needs assessment needs to be done with the strong involvement and engagement of all stakeholders.

5.2. What is possible to answer by NFI means?

As outlined, the NFI #2 of Kyrgyzstan will provide data to generate meaningful information for policy formulations to plan for and monitor the sustainability of the forests of Kyrgyzstan for the overall benefit of the country. In this context, the multiple functions of forests are considered. This refers not only to the production function mainly wood and non-wood forest products, but also to the functions of biodiversity conservation, of soil protection, of water protection, and of recreation and tourism.

The information needs of the NFI #2 refer to traditional and very specific forest information on the area of forest and of different forest types (e.g. in terms of species composition and management), on actual growing stock, growth and yield, infrastructure and forest health, but also to more difficult topics like biodiversity status, forest structure, degradation status, naturalness.

Many variables can directly be observed, like "tree species" or "tree diameter" – but for other variables more or less complex indicator systems need to be applied. Examples are "biodiversity" or "health" which cannot always directly be observed.

The definition of variables that are included into the NFI will be guided by some general efficiency considerations:

In general

1) The initial set of variables of the NFI has been defined along the actual information needs; however, only variables that can realistically be integrated into forest inventory fieldwork can finally be selected.

2) Each variable needs a justification why it is assessed To collect data for which there is no analysis plan is usually meaningless, unless there is the suspicion that these variables may become relevant in the future in the context of "emerging issues".

3) As discussed during the validation workshop: There are limits when it comes to variables that require specialized skills or knowledge or that are very time consuming or that are logistically too demanding. There are also limitations with respect to financial resources, the time frame, methodology and technique and personnel capacities. Also, the specific field conditions in Kyrgyzstan create limitations.

Considering these points, experts of the UNIQUE-CAREC consortium elaborated a table of feasibility. This "Feasibility table" provides for every single parameter the current estimation on the provision of the respective information within the NFI. Obviously, a lot of the above mentioned most important parameters can be provided, although sometimes additional information may be needed. There are difficult parameters, such as "naturalness", that can hardly been fully assessed, since the definition of the natural state via respective indicators of certain forest types are needed. There are, however also parameters that are clearly not part of an NFI, such as the collection of medical plants or the assessment of the cultural / spiritual values of certain sites. The feasibility table in Annex 7.2 provides an overview on the question if the NFI can provide information of single data parameters (yes vs. no).

5.3. Outlook beyond the NFI information needs

Looking beyond the planning and realization of the NFI #2 the participants of the validation workshop concluded on two recommendations to the SAEPF. Since the NFI is not yet men-

tioned in the forest law the participants agreed that it may be useful for SAEPF to think about to develop a proposal for introducing the NFI into the Forest code. In addition, the participants recommended that upon completion of NFI #2 SAEPF should identify synergy effects between NFI and FMP inventory and to consider possibilities of combining both inventories in the future.

6. Literature

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7. Annex

7.1. Questionnaire: table of parameters

Forest resources, availability of wood and forest biomass

Groups of forest data	Forest data, demanded by key policies, related to forests	Yes/no - if yes: Priority 1-4	Comments	Available data / information	From where
1 Forest resources, availability of wood and forest biomass	Forest area (other wooded land)				
	…area for wood supply				
	Age structure and/or diameter distribution				
	Increment				
	Fellings: Harvested wood				
	Afforested area				
	Regenerated area				
	Shrubland				
	Forest area available for non-wood-products				
	Non wood forest products				
	…fruit trees				
	…hay				
	… other agri crops				
	…grazing				
	…collection of medical plants				
	…beekeeping				
	Zoning by ecosystem services: (providing, regulating, cultural and supportive)				

Groups of forest data	Forest data, demanded by key policies, related to forests	Yes/no - if yes: Priority 1-4	Comments	Available data / information	From where
	Amount of wood dead due to biotic or abiotic damage (and left in the forest for decay)				
	Information on forest management				
	Forest Types				
	Growing stock				
	Regeneration				
	shrub and ground layer composition				
	Tree/shrub species composition and distribution (actual)				
	Storey structure				
	Mixture - horizontal and vertical				
	Timber quality				
	Tree damages				
	Land suitable for forest production not currently used (e.g. abandoned land, shrub land)				
	Density of road network/accessibility				
	Site quality				
	Irrigation status				
	Please add if there are others:				

Groups of forest data	Forest data, demanded by key policies, related to forests	Yes/no - if yes: Priority 1-4	Comments	Available data / information	From where

Carbon cycle in forests: LULUCF Accounting

Groups of forest data	Forest data demanded by key policies, related to forests	Yes/no - if yes: Priority 1-4	Comments	Available data / information	From where
2 Carbon cycle in forests: LULUCF Accounting	Above ground biomass				
	Below ground biomass				
	Litter				
	Carbon stock				
	Soil organic matter				
	Please add if there are others:				

Forest biodiversity

Groups of forest data	Forest data demanded by key policies relevant to forests	Yes/no - if yes: Priority 1-4	Comments	Available data / information	From where
3 Forest biodiversity	Rare and endangered tree species				
	Protected forest areas				
	Genetic resources				
	Introduced tree species				
	Naturalness				
	Landscape patterns				
	Effects of biomass cultivation in biodiversity				
	Please add if there are others:				

Forest health and vitality

Groups of forest data	Forest data demanded by key policies relevant to forests	Yes/no - if yes: Priority 1-4	Comments	Available data / information	From where
4 Forest health and vitality	Forest fire damages				
	Invasive alien species				
	Degradation				
	Soil erosion				
	Storm, snow, drought - abitotic damages				
	Grazing damages				
	Please add if there are others:				

Socio-economic information

	Forest data demanded by key policies relevant to forests	Yes/no - if yes: Priority 1-4	Comments	Available data / information	From where
	Ownership (State forest found\Municipal forest				
5 Socio-economic information	Land managing bodies (and sub-units)				
	Land lease status				
	Illegal logging (area subject to illegal harvests)				
	Illegal logging (amount of wood)				
	Recreation (e.g. forest areas managed for recreation, facilities available, public satisfaction)				
	Tourism (e.g. data on areas, economic value, visitors, providers)				
	Cultural, spiritual and aesthetic values (e.g. as perceived by resource users)				
	Please add if there are others:				

Other ecosystem functions of forests

	Forest data demanded by key policies relevant to forests	Yes/no - if yes: Priority 1-4	Comments	Available data / information	From where
6 Other ecosystem functions of forests	Water protection areas in forests				
	Natural hazards (avalanches, rockfall, landslides)				
	Presence and quality of watercourses within forest habitats				
	Please add if there are others:				

7.2. Feasibility table of a NFI

Original parameters according to the questionnaire and additionally added (partly new) parameters by organizations during the information needs as-sessment. The potential that a certain parameter / variable can be provided within an NFI was evaluated by experts with "yes" or "no". Brackets indicate that a clear answer is yet nit fully possible, since it depends on certain circumstances or additional information (see comments).

Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
1 Forest resources, availability of wood and forest biomass	Forest area (other wooded land)	3,6	0,5	3,5	0,5	X	X	Yes	
	…area for wood supply	3,1	1,0	3,1	1,0	X	X	No	
	Age structure and/or diameter distribution	3,2	1,0	3,1	1,0	X	X	Yes	
	Increment	3,0	1,1	2,9	1,0	X	X	(Yes)	
	Fellings: Harvested wood	2,5	1,2	2,6	1,1	X	X	(Yes)	**Information on stumps will be assessed**
	Afforested area	3,5	0,8	3,3	0,7	X	X	(Yes)	**low accuracy, better from national statistics**
	Regenerated area	3,5	0,8	3,3	0,7	X	X	(Yes)	**low accuracy, national statistics needs to be added for State Forest Fund land**
	Shrubland	3,1	0,7	3,1	0,8	X		Yes	
	Forest area available for non-wood-products	2,9	1,0	2,7	1,0	X		Yes	
	Non wood forest products	3,0	0,8	3,0	0,6	X	X	(Yes)	**Partly if it is related with trees or shrubs (i.e. fruit trees)**
	…fruit trees	2,9	0,9	2,9	0,8	X	X	Yes	
	…hay	2,7	1,1	2,8	1,0	X	X	No	**better to be derived from national statistics (Lezkhozes operations)**

Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
	… other agri crops	2,6	1,1	2,6	1,1		X	No	better to be derived from national statistics (Lezkhozes operations)
	…grazing	3,2	1,0	3,1	1,0	X	X	No	better to be derived from national statistics (Lezkhozes operations)
	…collection of medical plants	2,9	0,9	2,9	0,9	X	X	No	better to be derived from national statistics (Lezkhozes operations)
	…beekeeping	2,8	1,0	2,9	0,9	X	X	No	better to be derived from national statistics (Lezkhozes operations)
	Zoning by ecosystem services: (providing, regulating, cultural and supportive)	3,4	0,9	3,3	0,9	X	X	(Yes)	with addtional data possible
	Amount of dead wood due to biotic or abiotic damage (and left in the forest for decay)	2,8	1,0	2,9	0,9		X	Yes	
	Information on forest management	3,2	0,6	3,1	0,5	X	X	(Yes)	Status information can be assessed, not the activities of a full decade
	Forest Types	3,3	1,0	3,1	0,9	X	X	Yes	
	Growing stock	3,1	1,1	3,1	1,1	X	X	Yes	
	Regeneration	3,3	1,0	3,2	0,9	X	X	Yes	
	Shrub and ground layer composition	2,9	0,9	2,9	0,8		X	Yes	
	Tree/shrub species composition and distribution (actual)	3,1	0,8	3,1	0,8	X		Yes	
	Storey/layer structure	2,7	1,1	2,5	1,2	X		Yes	
	Mixture - horizontal and vertical	2,9	1,1	2,8	1,0		X	Yes	

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Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
	Timber quality	2,3	0,9	2,3	0,9	X	X	**Yes**	**possible to assess the timber quality (marketability)**
	Tree damages	2,7	0,9	2,6	0,9	X	X	**Yes**	
	Land suitable for forest production not currently used (e.g. abandoned land, shrub land)	3,1	0,8	3,1	0,8	X		**(Yes)**	**only partly, as non-forest land is not assessed**
	Density of road network/accessibility	2,7	1,0	2,7	1,0			**(Yes)**	**As statistical approach - "Plot distance to nearest road"**
	Site quality	3,0	0,9	2,9	1,0			**(Yes)**	**Only if additional information on soil, climate are available for each plot**
	Irrigation status	2,7	1,2	2,5	1,2			**Yes**	
Additional added parameter (partly new)	….mushrooms	4,0	0,0	4,0	0,0	X		**No**	
	Forest maturity (qualitative, quantitative, household, technical, natural, renewable)	3,0	0,0	3,0	0,0			**(Yes)**	

Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
	Zonation: *1) lands and stands of SFF according to their physical characteristics: protection category, percentage of artificially planted stands, species and age composition. Separately indicate the location and boundaries of virgin forests, their species and age composition;* *2) lands covered by trees and shrubs outside the SFF according to their physical characteristics: type of tree and shrubbery vegetation (in accrodance with Forestry Code) and species composition of tree and srubby vegetation.*	4,0	0,0	4,0	0,0	X		(Yes)	
2 Carbon cycle in forests: LULUCF Accounting	Above ground biomass	3,0	1,1	2,9	1,0	X	X	**Yes**	
	Below ground biomass	2,9	1,1	2,8	1,0	X	X	**Yes**	**Related with above ground biomass**
	Litter	2,8	1,0	2,8	0,9	X	X	**No**	
	Carbon stock	3,1	1,1	3,0	1,0	X	X	**Yes**	
	Soil organic matter	3,1	0,9	2,9	0,8	x	X	**(Yes)**	**not direct assessed but derived from secondary data**
partly new	Carbon emission from 1 ha of forest territory by type of forest (as far as possible)	4,0	0,0	4,0	0,0			No	**possible to use data from NFI for this question**
3 Forest biodiversity	Rare and endangered tree species	3,3	0,9	3,2	0,9	x	X	**(Yes)**	**Only tree and shrub species**
	Protected forest areas	3,4	0,6	3,3	0,6	X	X	**Yes**	**Result of GIS work, if boundaries of protected areas are provided**

Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
	Genetic resources	3,0	1,0	2,9	1,0	X	X	No	
	Introduced tree species	2,8	1,0	2,7	0,9	X	X	Yes	
	Naturalness	3,1	0,9	3,1	0,9	X	X	(Yes)	**Secondary data analysis using set of indicators for naturalness**
	Landscape patterns	3,5	0,6	3,4	0,6			(no)	
	Effects of biomass cultivation in biodiversity	2,6	1,0	2,4	0,9			No	
Additional added parameter (partly new)	*fragmentation*	4,0	0,0	3,5	0,5		X	(Yes)	**with help of Satelite data, but not with field data**
	Presence of wildlife in the forest	#DIV/0!	#DIV/0!	3,0	0,0	X		No	
	Forest type	3,0	0,0	3,0	0,0			Yes	
	Endemicity (uniqueness) of the forest	4,0	0,0	4,0	0,0			Yes	
	Regional and national significance of forests	4,0	0,0	4,0	0,0	X		No	
	The presence of wild animals in the forest	4,0	0,0	4,0	0,0	X		No	
	The presence of wild and rare animals of Red List	4,0	0,0	4,0	0,0			No	
	The presence of rare plants on forest lands, included in Red List	4,0	0,0	4,0	0,0			No	
	Migration corridors (+aqua) and the corridors on forest lands	4,0	0,0	4,0	0,0	X		No	
	The location and boundaries of habitats and migration routes of rare and endangered species of animals, birds, insects, plants, etc.	3,0	0,0	3,0	0,0			No	

Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
	Location of nets of all-product lines, power lines, unsurfaced roads and other infrastructural lines that contribute to the fragmentation of the habitat of wild species	3,0	0,0	3,0	0,0			No	
	Location and boundaries of forest areas changed as a result of exploration and mining, as well as reclamation	3,0	0,0	3,0	0,0			No	
4 Forest health and vitality	Forest fire damages	3,3	0,9	3,1	0,8	X	X	(Yes)	**Partly; statistical approach via asssessment of fire damage signs at each plot**
	Invasive alien species	3,1	1,0	3,0	0,9	X		(Yes)	**and shrub species**
	Degradation	3,4	0,7	3,3	0,7	x	X	Yes	
	Soil erosion	3,4	0,7	3,3	0,7	X	X	Yes	
	Storm, snow, drought - abitotic damages	2,9	0,9	2,7	0,9			(Yes)	**Partly; statistical approach via asssessment of fire damage signs at each plot**
	Grazing damages	3,5	0,7	3,4	0,7	X		Yes	
Additional added parameter (partly new)	*Pests and deseases*	#DIV/0!	#DIV/0!	3,0	0,0	X	X	(Yes)	**See above, partly**
	Forest Protection Categories	#DIV/0!	#DIV/0!	3,0	0,0	X	X	(Yes)	**See above at Zoning by ecosystem services**
	Change of plantation species	4,0	0,0	4,0	0,0	X		No	
	Forest pests, insects	3,0	0,0	3,0	0,0	X		No	

Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
	Location and boundaries of authorized and unauthorized waste disposal	3,0	0,0	3,0	0,0			No	
	Location and boundaries of forest areas covered by forest diseases, other types of infectious diseases	3,0	0,0	3,0	0,0	X		No	
5 Socio-economic information	Ownership(State forest found\Municipal forest)	3,1	0,9	3,1	0,8	X	X	Yes	
	Land managing bodies (and sub-units)	3,0	0,7	3,0	0,6	X	X	(Yes)	**with additional data**
	Land lease status	3,2	1,1	3,1	1,1	X	X	No	
	Illegal logging (area subject to illegal harvests)	3,2	1,0	3,1	1,0		X	(Yes)	**Partly, from stump inventory**
	Illegal logging (amount of wood)	2,9	1,0	2,9	0,9	X	X	(Yes)	**Partly, from stump inventory**
	Recreation (e.g. forest areas managed for recreation, facilities available, public satisfaction)	2,9	1,0	2,9	0,9	X	X	(Yes)	**See above at Zoning by ecosystem services**
	Tourism (e.g. data on areas, economic value, visitors, providers)	3,1	1,0	3,1	1,0	X	X	(Yes)	**See above at Zoning by ecosystem services**
	Cultural, spiritual and aesthetic values (e.g. as perceived by resource users)	3,0	1,0	2,9	1,0			No	

Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
Additional added parameter (partly new)	The presence of natural monuments and the uniqueness of landscapes	3,0	0,0	3,0	0,0	X		No	
	Zonation of SFF lands and lands covered by tree and shrubs, not included in the SFF in accordance with their productivity in: (a) wood (by species); (c) non-wood forest products (by species); (c) grazing (by types); (d) haying; (e) honey production	3,0	0,0	3,0	0,0	X		No	
	Zonation of the SFF lands and lands covered by tree and shrubs, not included in the SFF, in accordance with attendance them by vacationers and tourists. With the boundaries of the most visited places and territories.	3,0	0,0	3,0	0,0	X		No	
	Location and boundaries of areas (a) urban forests of the SFF indicating: artificial and natural plantations, species and age composition; (c) lands covered by trees and srubs not included in the SFF located in the territories of settlements, indicating: the type of tree and shrubby vegetations (in accordance with the Forestry Code) and the breed composition of thelands covered by trees and shrubs.							No	
6 Other ecosystem	Water protection areas in forests	3,3	0,7	3,2	0,7	X	X	(Yes)	See above at Zoning by ecosystem services

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Groups of forest data	Forest data demanded by key policies relevant to forests	Average priority for organizations	SD of the priorities of organizations	Average priority for organization including literature	SD of the priorities of organizations including literature	mentioned by reviewed national documents	relevant for international reporting (FRA, CBD)	What can be provided by a NFI? Yes/no	Comments
	Natural hazards (avalanches, rockfall, landslides)	3,1	0,8	3,1	0,8	X	X	(Yes)	partly, actual damages assessed
	Presence and quality of watercourses within forest habitats	3,0	1,0	3,0	0,9		X	No	
Additional added parameter (partly new)	quality improvement (humus) and function of soil for biodiversity and improvement of forest soils	4,0	0,0	4,0	0,0			No	
	soil formation	3,0	0,0	3,0	0,0			No	
	air cleaning	4,0	0,0	4,0	0,0			No	
	Ecosystem value of the forest, including for business structures.	4,0	0,0	4,0	0,0			No	