



Forest Management Planning and Monitoring System for Tajikistan

Technical and Institutional Set-up Recommendations

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Client

GIZ

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ABBREVIATIONS

CEP	Committee for Environmental Protection
EU	European Union
FHI	Forest and Hunting Inspection
FMI	Forest Management Inventory
FMIS	Forest Management Information System
FMP	Forest Management Planning
FMPPM	Forest Management Planning and Monitoring
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GoT	Government of Tajikistan
MinFin	Ministry of Finance
MU	Management Unit
NSP	Nama Support Project
SFA	State Forestry Agency
SFE	State Forest Enterprise

GLOSSARY

Diameter at Breast Height (DBH)	By international convention DBH is measured at 1.30 m above ground. DBH is one of the most common dendrometric measurements used for estimating basal area and timber volume of single trees and whole stands.
Forest Inventory	The systematic collection of data with regard to the national, regional /enterprise or management unit level.
Forest Management Plan	A coordinated programme for a management unit, regulating production, environmental and social activities for at least 10 years using specified targets, action and control arrangements.
Forest Monitoring	Process of the establishment, implementation and execution of assessment and control mechanisms (e.g., annual plans)

1 BACKGROUND

Tajikistan is a country with a low forest cover. However, despite the small area, forests are key for biodiversity conservation and provide important ecosystem functions. Land and forests have become a primary source for the livelihood for the poorest population of the country. The country's forests have been under severe use since 1991 due to the economic and energy crisis caused by the dissolution of the Soviet Union and the civil war. Historical high rates of deforestation and forest degradation reduced the country's forest area, which is currently estimated at 2-3% of the national total forest cover, i.e., between 280,000 and 400,000 ha. Economic losses from land and forest degradation amount to 3.8% of the GDP (PRISE 2015).

1.1 Forest Management Planning and Monitoring in Tajikistan

The forests in Tajikistan are diverse and include five main forest types: *Juniper forests*, *broad-leaf forests*, *small-leaf forests*, *Shibliak* (xerophytic light forests) and *Tugai forests* (Novikov, V., Safarov, N. 2003; Kirchhoff, J., Fabian A. 2010 and Akhmadov, Kh. 2008). The timber industry in the country is not well developed. Instead, non-timber forest products are of very high economic importance for both state forest enterprises and the local population. Existing forests experience high pressure from livestock grazing, as well as from illegal firewood harvesting.

The scarce forest resources, as well as the pressure on them, highlight the necessity of sustainable forest management to ensure the long-term protection and development of Tajikistan's forests. Developing a well-designed forest management planning (FMP) system that suits the needs of the sector is crucial for sustainable forest management.

The last FMP activities were conducted around 30 years ago. The lack of current FMP stands in the way of sustainable forest management planning and needs to be updated. In 2016, a group of national experts elaborated a proposal for a methodology on forest management planning for Tajikistan (TajikLes Service 2016).

1.2 Institutional Setting of Forest Management Planning and Monitoring in Tajikistan

In order to reverse the process of forest degradation, starting in 2013, after the decision of the Government of Tajikistan (GoT), substantial changes were introduced to the institutional, policy framework and law enforcement of the forestry sector. Fundamental institutional changes took place in two agencies, which were governing the country's forests – the Committee for Environment Protection (CEP) and the State Forestry Agency (SFA) under the Government of the Republic of Tajikistan. Before the end of 2013, the FA functioned under the CEP while today the two institutions operate independently.

The Forest Code accepted in 2011, created a new legal basis for joint forest management (JFM); it allows the rural population to lease state forest land and participate in its management. In 2013, the latest institutional changes were made that regulate the division of tasks between the

Forestry Agency (FA) (political function), the 42 State Forestry Enterprises (SFEs, management function) and a newly established Forest and Hunting Inspection (control function).

The major institutional challenge for forest management planning and monitoring (FMPM) is that the Forest Code is not fully implemented yet. The Forest and Hunting Inspection (FHI) as one of the central elements of the FMPM is not fully operational yet and its practical role in the control of forest activities is not fully clear to all stakeholders. At the same time, a lack of political attention and limited funds allocated to the forestry sector add further challenges towards the achievement of good forest governance. The weak institutional, financial and management capacities of the forest institutions are preventing them from fully using the economic potential of forests and from using the generated income for the prevention of illegal logging and grazing in the forests. As for forest management, although JFM is included in the Forest Code as part of the activities to introduce sustainable forestry, it remains poorly implemented and there is a limited awareness about it among staff members and the local population. Weak management and enforcement mechanisms of SFEs hinder proper protection and management of forest areas. Grazing control mechanisms are absent, only formal and informal negotiation between the SFEs and the local population is in place with short term (mostly one year or seasonal) perspective. SFE incomes from grazing fees are often higher than from forest product sales. Conflicts between overgrazing and open access forest land are common. Hence, currently forests of Tajikistan will remain poorly managed and will be utilized in a non-sustainable manner as a source of fuel wood and NTFPs for a growing population. Therefore, the rate of forest degradation might remain the same or even intensify.

1.3 Overall objective and Specific Tasks of the Assignment

As per the terms of reference, the objective and the specific tasks of this assignment were as follows:

Overall objective

The objective of the assignment is to outline methods for the sustainable and integrated planning and monitoring of forest management within the context of Tajikistan's forest governance system.

Specific Tasks

More specifically, the study addresses the issue at four different yet interrelated levels:

1. Providing advice on the introduction of a two-layered integrated forest management planning system for the Republic of Tajikistan:
 - Analysis of draft forest management planning methodology and international best practices on forest management planning;
 - Analysis of results of Integrated JFM (JFM 2.0) results from Tajikistan;

- Development of recommendations for a two-layered forest management planning system (first layer zoning of priority areas for management activities, second layer in-depth management planning adapted to type of forest and type of management);
 - Advise inter-agency working group on integrated forest management planning (integrating in particular pasture management and climate change adaptation)
2. Providing recommendations for the reform of the forest monitoring system of Tajikistan:
 - Investigation of the demands for forest monitoring of the Forestry Agency, the Hydromet and the CEP, as well as the NAMA Support Project
 - Advice on monitoring system that serves these needs
 - Advice on linking forest management planning and monitoring system
 - Advice on the participatory monitoring, the use of remote sensing and new technologies like drones and smart-phone apps.
 3. Giving advice on the role of the Forest Inspection in forest governance of Tajikistan:
 - Advising of inter-agency working group on the roles and responsibilities of the Forest Inspection in Tajikistan
 - Providing recommendations on the role of the Forest Inspection in the monitoring of forest management planning
 - Analyzing the financial structure of the forest inspection (FHI) of the Agency for forestry of Tajikistan (with a specially designated budget structure on forest usage)
 - Possibility of creating a special account under SFA subordination for payments acquired on marketing of forest products.
 4. Analyzing the existing institutional set-up and distribution of roles and responsibilities (functions and tasks) with regard to forest management planning and monitoring between the SFA, FI and State Forest Enterprises as well as CEP.
 - Analysis of current status;
 - Advice on improved forest governance.

2 METHODOLOGICAL STEPS

The methodology for the current project was coordinated beforehand and agreed upon with GIZ. It consisted of a desk study, a workshop with relevant stakeholders, semi-structured interviews with experts, on-site visits of two SFEs and the elaboration of recommendations in the form of a final report (the current document).

The following table highlights the main steps and tools of the methodology.

Table 1: Overview of the methodology steps and tools

Steps		Tools
Review of literature and documents	Desk study	<ul style="list-style-type: none"> Review the current draft methodology on forest management planning Review other methodologies elaborated in the past Literature review on governance, institutional set-up of forest management planning and monitoring Review of relevant policy documents
In-country mission	Field visits to SFEs	<ul style="list-style-type: none"> Simple testing of the inventory component of the methodology in the field Assessment of the feasibility of the proposed methodology
	Working session with national experts	<ul style="list-style-type: none"> Clarifying applied terminology Clarifying unclear methodological and technical steps with the national experts Presenting preliminary results of the analysis Presenting and discussing recommendations for the amendment of the methodology Presenting and discussing the institutional set-up of forest planning and monitoring
	Semi-structured interviews with individual experts	<ul style="list-style-type: none"> Discussing concrete technical and organizational aspects with experts in accordance with their field of expertise Discussing the preliminary recommendations
Provision of recommendations	Final report and recommendations	<ul style="list-style-type: none"> Highlighting the main findings Providing recommendations on the next steps

The assignment was conducted by a team of international experts from UNIQUE forestry and land use GmbH (the authors of the current report). The team was additionally accompanied and supported by GIZ representatives during the SFE visit.

2.1 Review of Literature and Documents

Technical Assessment of Forest Management Planning and Monitoring

For the topic of technical assessment of forest management planning and monitoring, the desk study included an analysis of the relevant documents on forest management planning and inventory which have already been elaborated in Tajikistan:

Table 2: Overview of the literature for the FMP analysis

Title	Author	Year
Методология по проведению лесоустройства на землях государственного лесного фонда в Республике Таджикистан /Methodology on the implementation of forest management planning within the state forest fund of the Republic of Tajikistan/	TajikLes Service	2016
Forest management planning in Tajikistan - Final report on the consultancy and backstopping mission for HESSEN-FORST and GIZ in the frame of the EU-funded regional Environment Programme for Central Asia "EURECA", component: Forest and Biodiversity Governance Including Environmental Monitoring (FLERMONECA)	Gradel A., Grünekle W.	2015
Recommendations for the development of a monitoring system for different forest types in Tajikistan	ForestEye	2014
Methodology for conducting inventory in forests of Tajikistan	Ilnazarov, B. / GIZ	2015
Forest Inventory Report Penjikent Leskhov	GIZ	2015
Joint Forest Management Manual	GIZ, EU Project FLER-MONECA	2015
Integrated Forest Management – Workshop results	GIZ	2016

These documents were provided by the GIZ.

According to the terms of reference for the current project, the focal point of the analysis was the methodology on the implementation of forest management planning within the state forest fund of the Republic of Tajikistan, which offers the implementation of a new system for forest management planning in Tajikistan.

Governance, Institutional Set-up of Forest Management Planning and Monitoring

For the analysis of governance and the institutional set-up of FMPM, the consultants' team conducted a desk study to review all key scientific and grey literature sources which exist in the country (Table 2 and Table 3). The analysis covered the thematic areas of the current reform process, the institutional set-up and the role of FHI within FMPM.

Table 3: Overview of the literature of forest governance analysis

Title	Author	Year
NAMA Support Project feasibility study report	UNIQUE forestry and land use GmbH	2016

Current pathways towards good forest governance for ecosystem services in the former Soviet republic Tajikistan	Mislimshoeva B., Herbst P., Koellner, T.	2016
Forest Sector Analysis	Kirchhoff, J., and Fabian, A.	2010
Forest and Hunting Inspection decree, other normative documents	FHI	2015

2.2 In-Country Mission

Visit of State Forests Enterprises (SFE)

As a further, complementary component, field visits to two of the country's SFEs were conducted (Figure 1 and Figure 2). The SFEs were Muminabad and Dangara. The project team visited several areas within the SFE area and was accompanied by staff members of the according SFE. On the sites, exemplary inventory sample plots were measured (based on estimations). The measuring methods were based on the methods described in the Methodology (TajikLes Service 2016) and were subsequently discussed with the participating representatives of the SFE.

Furthermore, factors with a high impact on the current SFE situation were discussed, such as grazing, use of NTFPs, illegal logging, firewood demand and JFM.

The results of the field visits feed into the final results of this report.



Figure 1: During the field visit in Muminabad SFE



Figure 2: Pistachio plantations in Dangara SFE

Working Session with National Experts

The main aims of the working session with the national experts were:

- a) to give an overview of the current GIZ forest related activities and the initiation of the inter-agency working group
- b) to carry out an analysis of the strengths, weaknesses, opportunities and threats (SWOT) of Tajikistan's forest planning/monitoring system
- c) to develop a roadmap for forest planning and monitoring

The full protocol of all the outcomes of the working session is included in Annex I.

Semi-Structured Interviews with Individual Experts

Following the working session with the national experts, remaining technical questions were discussed in-depth during interviews with individual experts who were involved in the methodology development. Furthermore, FHI and SFA staff members were interviewed in order to analyze the institutional setting of FMPM. The consultant team used open-ended guiding questions during the interviews, which gave the respondents full freedom to express their point of view on the discussed topics. The information collected during the interviews was structured thematically to support the overall outcome of the study.

2.3 Deriving Recommendations

The last step of the methodology comprises recommendations and advice on the forest governance system and methods for sustainable and integrated forest management planning and monitoring, according to the TOR of the project. The overview of the links between the TOR, report analysis and recommendations is presented in Table 4.

Table 4: Links between TOR, report analysis and recommendations

TOR	Analysis	Recommendations
1. Advise on the introduction of a two-layered integrated forest management planning system for the Republic of Tajikistan:		
- Analysis of draft forest management planning methodology and international best practices on forest management planning;	3.1.2 3.1.3 3.1.5 4.1 4.2	Parallel development and implementation of inventory concepts Core element FMP
- Analysis of results of integrated JFM (JFM 2.0) results from Tajikistan;	3.1.5 4.5	Participation
- Development of recommendations for a two-layered forest management planning system (first layer zoning of priority areas for management activities, second layer in-depth management planning adapted to type of forest and type of management);	3.1.3 4.5	Implementation
- Advise the inter-agency working group on integrated forest management planning (integrating in particular pasture management and climate change adaptation).	3.1.3 3.1.4 4.3	Tools Production models
2. Recommendations for the reform of the forest monitoring system of Tajikistan:		
- Investigation of the demands for forest monitoring of the Forest Agency, the Hydromet and the CEP, as well as the NAMA Support Project;	3.2.2	Organization
- Advise on a monitoring system that serves these needs;	3.2.2	Governance
- Advise on linking forest management planning and monitoring system;	3.1.4 3.1.5	Governance
- Advise on the participatory monitoring, the use of remote sensing and new technologies like drones and smart-phone apps.	3.1.5	Governance
3. Advise the role of the Forest and Hunting Inspection in forest governance of Tajikistan:		
- Advising the inter-agency working group on the roles and responsibilities of the Forest and Hunting Inspection in Tajikistan;	3.2.2	Governance

- Recommendations on the role of the Forest and Hunting Inspection in the monitoring of forest management planning;	3.2.2	Governance
- Analyzing the financial structure of the forest and hunting inspection (FHI) of the Forestry Agency of Tajikistan (special designated budget structure on forest usage).	4.8	Financial impact
- Possibility of creating a special account under SFA subordination for payments acquired through the marketing of forest products.	4.8	Financial impact
4. Analyzing the existing institutional set-up and distribution of roles and responsibilities (functions and tasks) with regard to forest management planning and monitoring between the SFA, FI and State Forest Enterprises as well as CEP.		
- Analysis of current status;	3.2.1	Governance
- Advice on improved forest governance.	3.2.2	Governance

3 ANALYSIS AND MAIN FINDINGS

3.1 Analysis of Forest Management Planning and Monitoring

3.1.1 FMP in Tajikistan– different approaches on the inventory concept

The last Forest Management Planning process in Tajikistan was conducted approximately 30 years ago, which makes the need for an update quite evident. A proper forest management planning process is a key element, crucial for sustainable forest management.

In recent years, a lot of research and consultancy activities from national and international experts have been realized. The relevant topics range from FMP and inspection to inventory design. As an outcome, different studies have been elaborated (see Table 2).

Evaluated by national experts as the most relevant study for FMP is the “*Methodology on the implementation of forest management planning within the state forest fund of the Republic of Tajikistan*”, elaborated 2016 by TajikLes Service (further on abbreviated ‘*Methodology*’). The ‘*Methodology*’, intensively analyzed within this assignment and discussed with the national experts during the workshop, is a document which was elaborated within a national working group, supported by an international consultancy. The ‘*Methodology*’ can be seen as a draft rather than a final version where further improvements and amendments are necessary. The main input was provided by national experts, which supports the high level of general acceptance for the implementation of the designed methods.

The inventory concept, recommended in the ‘*Methodology*’, focus on a stand wise inventory approach for FMP. In contrast, recommendations of other studies (ForestEye 2014) clearly recommend a Forest Management Inventory (FMI) concept based on statistical related selection of sample plots, a method applied in a piloting project in Penjikent. The current study faces the problem to provide consistent recommendations in a situation where two inventory approaches for FMP are discussed in Tajikistan.

The **FMI approach** recommended a common approach for national/regional and enterprise level forest inventories. This approach can be valued as the state-of-the art approach suitable for national/regional forest inventories for Tajikistan. “The approach follows a two phase sampling design, where in the first phase the extent of the different forest types is determined based on the classification and interpretation of high resolution satellite imagery. In the second phase a random subset of the first phase sample is selected and visited in the field. In addition to that the establishment of permanent research plots has been recommended in all forest types to monitor tree growth as well as effects from alternative management practices (e.g. livestock enclosure experiments)” (ForestEye 2014). In principal an FMI can also be applied as substantial part of a Forest Management Plan on the Management Unit level. However the concept provided by ForestEye targeted a different scale: “Even though an inventory of each management unit would be worth striving, the limited resources and preliminary information is preventing such an inventory during the first assessment. Therefore, the proposed monitoring concept firstly aims at providing data on the mean conditions in the study areas. Detailed stand mapping as basis for stand-wise forest management could not be implemented on the whole area of more than 257,000 hectares [...] and a suitable approach for this task needs to be developed for a future phase of resources assessments”(ForestEye 2014).

As a result a statistically sound FMI method for the purpose of the FMP and derivation of stand data is not available, nor tested yet. A combination is possible in the future. This would mean that a stand-wise inventory for FMP will become to a certain extent superfluous if FMI based data can be applied on stand level. The previous stand inventory could be reduced to preparatory taxations (faster and less costly estimations of numerical data on stand level). This stand wise taxation can also be applied directly prior to concrete forest operations (operational plans), if a forest information and monitoring system is available allowing to store and update the stand information in it.

The traditional **stand-wise inventory** system, based on sample plots for each stand, was discussed with working session experts and individual interviews. This system has been chosen within the '*Methodology*' as the recommended method to be applied for the elaboration of FMP. As in most cases no information for the forest types and their variation is at hand, a stand-wise analysis was chosen as the inventory approach to be applied. In this case, a stand should be described clearly as the smallest unit of management (planning, monitoring and control). At this level the forest operations such as harvesting, planting and maintenance are planned and realized. Stand boundaries could be found in former maps and, most important, were valued as still valid according to experts.

Conclusion

As long as a Forest Management Inventory (FMI) concept ("first-best option") for FMP is not fully developed and tested, the proposed stand-wise inventory should be further improved ("second-best option") until a more sophisticated solution, based on statistical sampling and with an improved plot design has been established. Concrete recommendations are given in chapter 4.



Figure 3: A closer look into an old forest management map

3.1.2 The Process of FMP and its Optimization

Implementation of the FMP Process

Within the '*Methodology*', the process for the implementation of the FMP is described in detail and divided into three main implementation steps:

- A. Land organization (within the state forest fund) – ***mapping phase***
- B. Management planning on a stand level (for forest land and other state forest fund land) – ***inventory and planning***
- C. **Business plan**
- D. **Implementation and control**

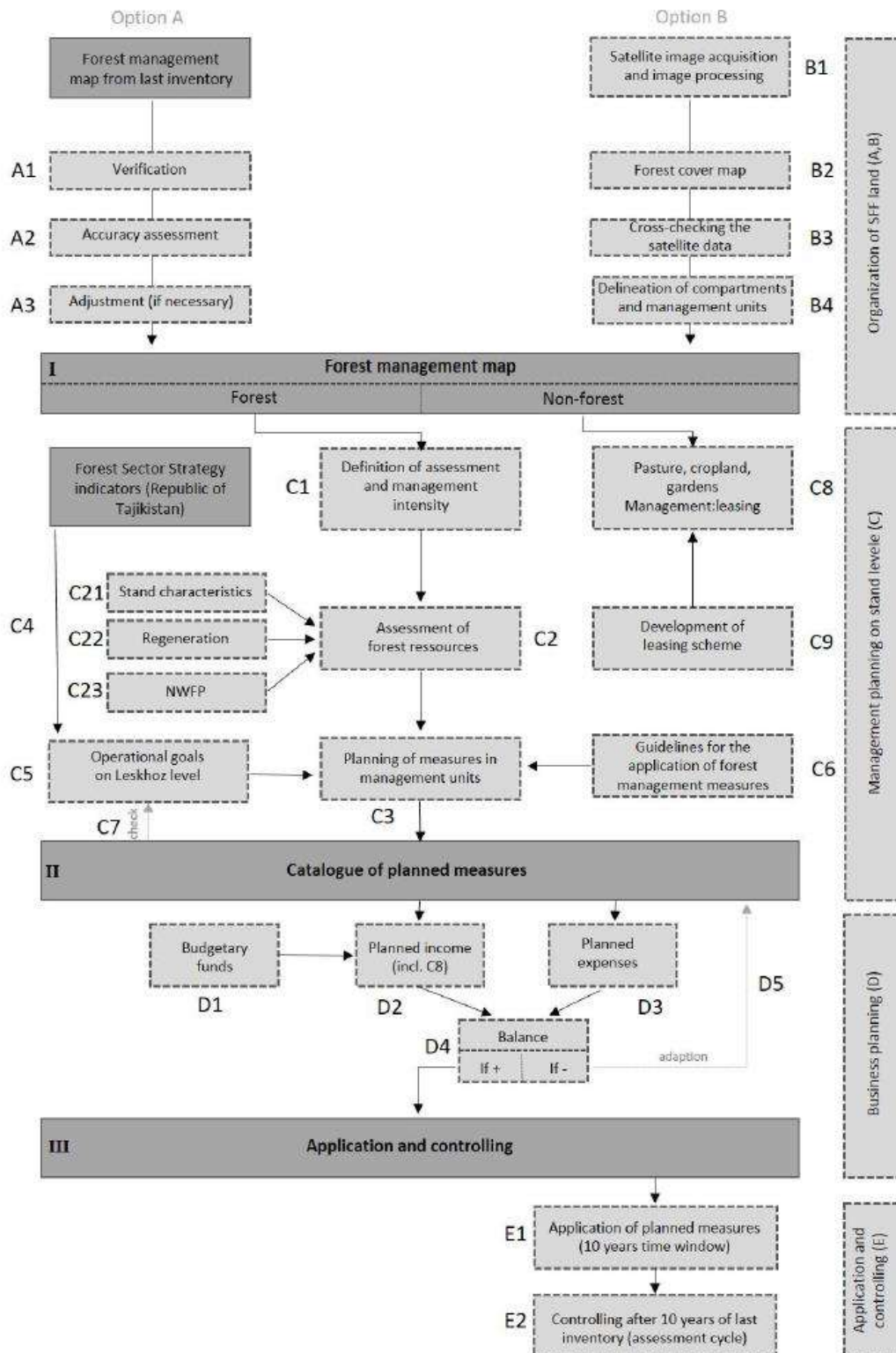


Figure 4: Flowchart for the implementation of FMP

(Source: Gradel, A. & Grünekle, W. 2015)

The ‘*Methodology*’ – as it is – contains all relevant elements for a FMP process implementation, regarding technical, financial and planning aspects.

However, when taking a closer look to all elements and their arrangement within the structure, some amendments and improvements could be made, ensuring the adaptation of the process to the forestry framework of Tajikistan. Mainly this changes concern the need to reduce the efforts and the complexity of the process

In the following sub-chapters these get analyzed in detail.

A. Mapping Phase

The ‘*Methodology*’ foresees two options for conducting the mapping for the FMP which are based on the initial situation:

- *Option A* deals with the update of **existing management maps** from the last recording activities. In this case, the process is focused on an update and verification of the material, resulting in correction (if needed) including an estimate of the precision.
- In case of the absence of the old map, *option B* foresees the production of a completely new map from satellite images resulting in a forest management map.

Conclusion “Mapping Phase”

Even if the existing forest management maps are outdated, they provide a solid basis for current ongoing mapping activities. In most cases, the quality of this material is sufficient – in terms of stand boundaries the maps are correct to a very high extent. This was confirmed by the experts during the on-site visits as well as during the workshop. Hence, the already existing information should be applied as much as possible to improve the efficiency of the process. However, regarding forest cover, forest structure and species composition, the data should be updated, especially in areas with strong anthropogenic influences, which has been the main driver of changes over the last 20-30 years.

Within the mapping phase, the FMP entity should strongly collaborate with the governmental institution responsible for the mapping – the Land Use Committee (the FAZO Institute “*Институт ФАЗО*” as a sub-entity of the Land Use Committee was also often mentioned as an important stakeholder and source for data). This institution is considered to provide enough capacity to meet the needs of FMP.

The SFA on its part (and the FMP unit in particular) should prepare the necessary data for the planning, that is, maps and sample plots – including their distribution and intensity. In this case, there will be a need for the improvement of the capacities, particularly of staff with GIS knowledge.

B. Inventory and Planning

When analyzing the different work and efforts spent, a general observation is that different approaches regarding inventory were presented and recommended in Tajikistan (for details see chapter 3.2.1).

Consistent recommendations for a modern and efficient inventory concept has been made (ForestEye 2014). For the moment, a stand-wise inventory concept for the development of FMP are favored by national experts (TajikLes Service 2016). Recommendations has been developed mainly based for the stand-wise inventory concept (see chapter below).

C. Inventory – Forest and Non-Forest Area (Phase 2)

The inventory component will subsequently provide the basic information for the planning process.

As a first step within the inventory component, the '*Methodology*' foresees the determination of the number of sample plots per stand as well as the determination of the intensity of management for the according forest types. Following this, the evaluation of the resources is conducted by using different criteria (C21, C22, C23, C24). After this step, the possibility of attracting the local population for JFM is evaluated.



Figure 5: Overview of the foreseen inventory component

C1 Determination of the Intensity of Sample Plots and Intensity of Management

The intensity of the sample plots per stand strongly correlates with the according forest type (heterogeneous vs. homogenous forest stands); therefore, it is recommendable to reverse the foreseen process and determine the management intensity first. This step then provides a basis for the definition of sample plot intensity.

If the inventory component of an FMP is conducted by using a sample plot design, it is crucial to select the plots in a manner that ensures the representative nature of the plots. In practice this can be delivered by a stratified distribution, which can very often be conducted on a map (and using satellite images), **prior to the field visits**. The stratification is based on the delineation of parcels which show a similar tree species composition and layering within a management unit. This process not only allows for the selection of sample plots in all forest types within a management unit, but also improves the efficiency and minimizes the costs for the FMP implementation, by avoiding repetitive sample plots and unnecessary field visits prior to measuring on the ground.

To achieve this in the best possible manner, it is also necessary to first determine the management intensity of the different units.

For the determination of the management intensity, the 'Methodology' describes a decision matrix which includes the following decision factors (see Table 5):

- Accessibility (rated from 0 to 3)
- Economical potential (rated from 0 to 3)
- Risk of erosion (rated from 0 to 3)
- Availability of trained labor (rated from 0 to 1).

Table 5: Scheme of the management rates for a MU

Класс ИОУ	Описание	Баллы ИОУ	Пример
1	Высокая ИОУ	9 - 10	Высокопродуктивные плантации фисташки
2	Средняя ИОУ	7 - 8	Продуктивный тугайный лес
3	Низкая ИОУ	4 - 6	Продуктивный тугайный лес с высокой речной динамикой
4	Нет ИОУ	0 - 3	Очень отдаленные редкие можжевельниковые леса

(Source: TajikLes Service 2016)

The rating for the management intensity described in Table 6 represents a very tight scheme for the determination of the management intensity. The extension of the management indexes for the assigned management intensity will lead to a clearer decision making process. It will help to avoid conflicting factors (e.g., MU with low erosion rates but high economic potential) from excluding each other, which might otherwise lead to a false management intensity determination. Table 6 illustrates the proposed amended scheme.

Table 6: Proposed amended scheme for the determination of management intensity class

Management intensity class	Description	Management intensity index
1	High	6 - 10
2	Average	4 - 6
3	Low	2 - 4
4	No Management	0 - 2

The steps described under C1 should all be conducted and finalized prior to the following activities.

C2 Evaluation of the Forest Resources

For the evaluation of forest resources for a given MU, the 'Methodology' foresees the data collection of four elements which characterize the MU – stand description, natural regeneration, NTFP and climate change. For the success of the FMP implementation it is crucial to adapt all

elements of the inventory component directly to the future planning needs and to the given framework (forest types, economic factors for the forestry sector on a regional and national level).

The standard procedure for the evaluation of the forest resources in the field involves the use of an analogue (on paper) template for the data collection. An alternative solution, which may facilitate the process, is the use of smartphones and relevant software (applications), allowing for digital data collection directly in the field. It is a user-friendly method which would allow the data to flow directly into the SFE database, and prevent eventual data loss and distortion of the results due to later digitalization processes.

The introduction of this kind of data collection method, however, will require considerable financial means for the purchase of hardware and software. This only makes sense after the establishment of a forest management information system. Furthermore, an additional cost factor would be training staff to be able to operate such a new system.

C 21 Stand Description

The stand description is an important element of the inventory component of an FMP, and should be designed according to the concrete future planning needs of the SFE. Regarding this topic, the '*Methodology*' includes all relevant elements for a stand description which are also applied internationally.

However, there are few critical points which need to be addressed and amended accordingly:

- Firewood – since firewood plays a highly important role in the forestry sector in Tajikistan, it is important to choose and establish a standard method for the measurement and estimation of the growing stock of firewood. Normally, the trees harvested for firewood are multi-stem trees (a result of the coppice-like extraction methods). In the past FMP process in Tajikistan, the volume of such trees was calculated by measuring the DBH of every single stem of a multi-stem tree.
- Site Class ("Bonitet") – the determination of the Site Class as foreseen in the current '*Methodology*' does not seem to be relevant in all forest types in Tajikistan. For forests with main management goals other than timber harvesting, the Site Class is not an important factor. Furthermore, not all professionals from the SFE can operate with these terms. Therefore, to simplify the process, it is recommended to exclude Site Class from the site description.
- The importance of the field forms – the forms used in the field should be designed to facilitate data collection in the best possible manner. These templates should foresee all important attributes and exclude the collection of data which will not be needed for further analyses. A very important point is to formulate the categories within the templates with exactly the same names that would be later used within the established database.

C 22 Natural Regeneration

In international forest inventory practice there are different data collection methods for the natural regeneration within a sample plot. This is an important indicator for the future development of the MU, since it also shows the impact level of livestock and addresses the need of future planting measures.

The following information should be collected for the natural regeneration:

- Height class
- Tree species
- Browsing impact

It is very important to work with standardized categories and use the same height classes for every tree species. Otherwise, this may cause problems and conflicts within the future database.

C 23 Non-Timber Forest Products (NTFPs)

NTFPs play a major role for the forestry sector in Tajikistan and have a high economic importance, as an income source for both local population and SFEs (Kirchhoff, J., Fabian, A. 2010). A first step towards the prevention of over- and inappropriate use of NTFP is the collection of reliable information on the resources available. Further data such as the regenerative capacity of certain species (if needed) could be also important.

Thus, for the elaboration of sustainable economic planning for Tajikistan's forests and forest fund land, the data on NTFPs is crucial.

The design of a new adapted method for FMP (the new proposed '*Methodology*') provides the opportunity to include - where possible - an NTFP inventory component within the forest inventory and therefore allow a higher efficiency for the overall survey.

In Tajikistan there is broad experience in working with different methodologies for the yield estimation of different existing species dating from the Soviet time. For example, for the important grass and weed species used for medical purposes, established inventory methods including yield tables already exist. These species, even if distributed within the state forest fund, generally do not occur within forest formations, which makes it impossible to include NTFP data collection on these species within the inventory component of the FMP. Furthermore, every single species from this group may be observed in a different period throughout the year. This fact underlines the differences in the occurrence of the NTFP species due to their broad variety. Therefore a unified measuring method for all NTFP species does not exist. Data on other NTFP types growing on trees (e.g., walnuts, pistachios, apples) may on the contrary very well be collected during the inventory component (during the sample plot measurement in the field).

The field visits showed that the SFE and their staff provide a lot of knowledge on the local conditions and yield rates, and are able to determine the NTFP types that are important in the acceding stands. The local population can also be a relevant source for obtaining more data.

As proposed within the '*Methodology*', there are two possibilities for measuring NTFP resources – statistical survey methods on the field on the one hand, and a social survey approach including interviews of local population and experienced SFE staff on the other.

For the statistical measuring approach, international experience (Wong 2000) suggests grouping the relevant NTFP into categories using a typology based on how much certain NTFP species differs from a tree. Tree products form the simplest NTFP group for an assessment within the FI component of an FMP. This can be done directly on the field, using a productivity assessment based on yield tables. The second group of tree-like species may also be measured on the field using a slightly modified field form for the inventory. Also here, yield tables can be applied. The third group, consisting of non-tree-like plants, is problematic to be included within the forest inventory within the FMP process mainly due to aspects such as spatial distribution, and botanical distinction of the species. These group of species – when economically relevant to the correspondent SFE – can be measured using methods apart from the forest inventory sample plots. If the species is of high importance for the region measurements can be undertaken according to the already existing methodologies used in the Soviet time, and adapted to the growing period of the plant. As an alternative, the social survey approach may be also applied. Gradel and Grünekle (2015) suggest a similar method distinguishing between bushes and herbs in the measurement and estimation of NTFP resources within a FMP process. They underline the need of a clear definition of these group and the corresponding species, which will prevent a redundant measurement of the same species in two different categories. Both the '*Methodology*', as well as the document elaborated by Gradel and Grünekle (2015) describe the possibilities for the NTFP assessment within the FMP process. Furthermore, even though these should be updated and adapted - yield tables dating from the Soviet time exist and have been provided to TajikLes Service recently. Also, there are skilled experts working in this field in Tajikistan, whose knowledge should be mobilized for the measurement and assessment phase.

Previous to this step, it is crucial to first deduce the important species for every SFE. Economically important species contributing to the livelihoods in the region and occurring within the state forest fund should be clearly defined. On a later stage, these are the species that should be measured on the field, and their use should be planned later within the forest management plan. Such assessment should be made for every SFE in the country in order to improve the efficiency and concentrate the efforts where they are needed. If a NTFP species is not quantifiable within the FI component of an FMP but is nevertheless of economic importance, it should be additionally measured. A classic example for an important NTFP species in Tajikistan would be the pistachio production within the Dangara SFE, where the pistachio harvest forms - next to the pasture - the highest income source for the enterprise, and thus the elaboration of a FMP without the estimation of the according resources would not be economically reasonable.

Figure 6 illustrates a proposed method for the integration of NTFP surveys within the forest inventory including periodic monitoring in order to gather reliable information and dimensions range for a sustainable harvest. It is possible that the according stages of the shown concept are performed by different actors e.g. SFA, SFE and local communities. Applying participatory concepts for the management planning of NTFP is of great importance due to the high interest of the local population for these resources.

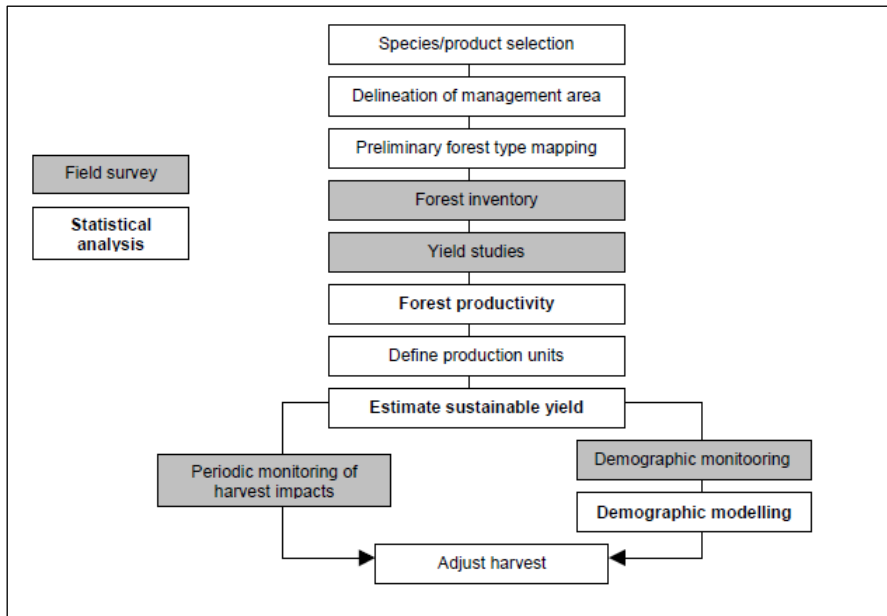


Figure 6: Flow chart of a basic strategy for sustainable NTFP management
 (Source: Peters 1994 in Wong 2000)

C 24 Climate Change

For the estimation of the climate change impact, indicators such as landslides/level and impact of erosion, as well as the danger of floods may be used for each sample plot. The occurrence of foreign invasive species is also an indicator for the climate change impact.

Within this category, the observed elements should be noted and directly considered in the planning, especially if adaptation measures could be formulated.

At a later stage this results should be intersected with relevant climate change modeling maps and data on a regional and national level to derive measures for climate change mitigation and adaptation within the forestry sector.

Proposed Indicator (C 25) – Biodiversity

Within the proposed ‘Methodology’ it is foreseen to integrate the evaluation of biodiversity into C 24 climate change. Due to the fact that biodiversity is an important factor for the quality of a given management unit and its conservation (and respective management) needs, it is recommendable to undock climate change and biodiversity indicators from each other within the inventory component.

The following factors should be quantified and qualified during the biodiversity evaluation:

- Number of tree and shrub species
- Vertical layers within a stand
- Horizontal layers within a stand (number of different habitat types)
- Estimated volume of dead wood

Planning of the 10-Year Period (Phase 3)

As stated earlier in this report, for the last 20 to 30 years no FMP has been conducted in Tajikistan. This leads to the fact that long-term management planning is not an integrated part of the daily work routine within an SFE.

Long-term planning based on FMP should be established as a leading guidance to the elaboration of annual plans and include the active participation of all interested groups on a regional and local level. Only done in this manner, this will ensure the sustainable development of the forestry sector.

The FMP should include the main objectives for the next 10-year period, as well as a road map describing the required measures to achieve that. Crucial elements here are the wood harvesting plan, the NTFP harvesting plan for the species relevant for a given SFE¹ and the silvicultural measures which ensure the proper development of the forests.

For the elaboration of the FMP on a national level, a team of well-trained forest assessors (таксатор) should be established that will later on conduct and support the FMP process at all stages, starting with the inventory in the field and on SFE level. These experts should be strongly involved within the planning process and facilitate the process of dividing the activities included in the 10-year planning into the annual plans of the SFE.

One important output of the interviews with experts was the fact that currently there are good experts in this field who could be trained according to the new '*Methodology*'. To ensure the long-term provision of expert know-how, the experienced assessors should be accompanied by young SFE staff and train them accordingly during the establishment and implementation of the FMP process.

Annual Plans (Phase 4)

The annual plans of the SFEs are currently created without a leading 10-year plan and are often elaborated via top-down approach. This means that harvesting rates and annual harvest of NTFP is fixed by the central entity (SFA) for each SFE. In future, this process should be led by the 10-year plan of the relevant SFE, which is coordinated by and agreed upon with the SFA.

Main Finding

The overall proposed '*Methodology*' should be further amended to the concrete requirements of the forestry sector in Tajikistan. More attention should be given to economically relevant topics such as NTFPs, as well as to topics such as climate change and biodiversity. Due to the fact that wood for technical purposes is not of high importance for the country, the FMP should concentrate on the measurement of fuelwood. Some amendments in the methodology process should therefore be conducted prior to the implementation.

¹This may strongly vary depending on the occurrence of the NTFP species.

3.1.3 The Relevance of Forest Development Types as an Orientation for the FMP

Forest management planning aims at developing forest stands based on forest inventories, and concretized by measures to be implemented within the next 10 years. FMP should be supported by the definition of forest development types (FDT). In that context, FDT not only stress current silvicultural situations, but also aim at general land use objectives, taking into account site conditions, demands of the rural land users and social as well as ecological goals.

In comparison to the widely known forest types (FT), the FDT offer a clear idea about the forests' future development. Concrete measures to be implemented for different age phases of the forests are included as well. The measures facilitate the FMP because specific silvicultural treatments for the age phases (sampling phase, thicket phase; young/old pole phase, maturing phase, phase of over-maturity) were described.

FDT is summarized as, "The long-term goal for forest development on a given locality (climate and soil conditions) in order to accomplish specific long term aims of functionality (ecological-protective, economical-productive, and social-/cultural functions)." (Bo Larsen 2008.)

While forest types concentrate on a current status which groups stands of the same function, the core element of FDT aims at describing management targets and strategies, including silvicultural procedures and techniques to be achieved the intended FDT (Landesbetrieb Forst Baden-Württemberg 2014). A forest typology system based on forest development types is used in several states in Germany and is commonly used – with slightly different names – in many forest management planning regulations all over Europe and even in Canada and China (UNIQUE, 2012).

Therefore, FMP could be regarded as a key instrument to implement the FDT.

Forest Typology of Tajikistan

Field visits and discussions with different experts in Tajikistan clearly presented the picture of the existing forest types and their importance according to economic, ecological and social aspects. The main forest types include (Akhmadov 2008):

- Juniper forests
- Broad-leaf forests
- Small-leaf forests
- Xerophytic light forests
- Tugai forests.

These forest types cover the majority of Tajikistan's forests. The further elaboration of FDTs, including suitable measures for each age phase, would be complementary to the process of introducing a new system of FMP in Tajikistan.

In the case of "mixed stands", the advantage of FDT could be demonstrated as follows; during the field visits in September 2016, it became obvious that many stands were classified as "mixed stands" due to the existence of a variety of different tree species. These stands are partly used for fruit or nut collection, firewood supply and cattle grazing (see picture below). An inventory of these sites could be conducted by using the existing forest typology as well as the common

inventory techniques. However, for the planning process of these sites, the identification of measures is far more difficult. Conflicts in the use of stands (different land users, lack of natural regeneration), a sub-optimal tree species composition, and a certain lack of maintenance highly endanger the productivity of sites and any efficient and sustainable land or forest use. In that case, the existence of FDT helps to formulate measures and facilitates the planning process between the local forester, the planning team and local users. Hence, the definition of a FDT is far beyond the description of the status, it provides a clear vision for the future including necessary measures to be applied.



Figure 7: Cattle grazing in so-called mixed stands. Different land use purposes overlap with negative effects on the development of forests.

Main Finding

FMPs do not exist in Tajikistan. The definition of FDT is of high priority due to the fact that FMP needs a baseline for the definitions of measures. FDT supports the definition of clear land use targets, strengthens the formulation of clear measures and facilitates the monitoring of FMP.

International best practice example:

Forest Management Planning in Baden-Württemberg (Germany)

The state forest administration of Baden-Württemberg (ForstBW) implements a combined approach of an FMI and a stand wise taxation and individual stand description. Main arguments to shift from a strict stand based inventory and yield planning to a forest (development) type (strata) based inventory were:

- High costs of statistical sound stand wise inventories in close to nature mixed and multi structured forest stands;
- Lack of yield models / yield tables for these kind of stands;

- Improved increment data as one of the main indicator of a sustainable yield.

The FMI is herewith stratified and the crucial unit is not the stand any more, but the according forest (development) type stratum. In a first phase the FMI is implemented and delivers averages and standard deviations for all numerical data in a stratum (i.e. 152 ha of 40-50 year old Beech-Fir forests). As the operational level is still the forest stand, in a second phase the stand description and stand wise planning including yield planning is performed. Each stand is classified for its forest (development) type and numerical stand data are derived based on the FMI data plus estimations of deviations using a combined measuring and estimation approach (some heights, some basal area measurements). The final sustainable yield is developed based on the stand wise assessments combined and compared with model based yield calculations on stratum level (55 m³/ha shall be harvested on each of the 152 ha of 40-50 year old Beech-Fir forests). This method proved to be efficient and at the same time meets the accuracy needs of the planning unit. Prerequisites for this approach are:

- The definition of forest types;
- Management strategies defined for each forest type using development phases of tree grows to describe measures and interventions (i.e. thicket phase, early thinning phase, late thinning phase, maturing phase and regeneration phase).

International best practice example:

Forest Management Planning approach Montenegro (FODEMO project)

In this approach the advantages of a statistical sound FMI and the improved increment assessment using permanent plots should be combined with the target to deliver numerical data (volume, basal area, number of trees etc.) on a stand level, wherever an active management is planned.

Each stand can be stratified into a forest type and treatment phases (age, tree height and DBH). As many stand are uneven-aged, each sample plot is classified for its treatment phase. Based on a combination of forest function, site class based productivity assessment and accessibility, each stand is stratified for its management intensity and in result an inventory intensity. For each of these strata a certain density of plots is measured (100 x 100 m to 200 x 400 m). The costs are concentrated on the intensively managed productive stands. But data are available for all strata. The yield planning is organized in a two-phased approach as in the example from Baden-Württemberg, Germany.

This approach combines the tradition – as in all former Soviet countries - of a stand based inventories and yield planning with the modern approach of statistical sound permanent sampling resulting in high accuracy values for volume and increment. Prerequisites are as well (as described for the example from Baden-Württemberg) defined forest types and management strategies defining standards for measures and harvesting rates by stand or tree dimensions (treatment phases).

3.1.4 The Underestimated Role of Forest Management Information System (FMIS)

At the moment, almost no data on forest resources is gathered and stored in digital format. Some attempts to digitalize relevant SFA data have been initiated in the last few years, which consisted of transferring data from an analogue, paper format into MS Word format. Considering the fact that MS Word format does not allow any processing and analysis of data, and moreover that there is no central database system collecting all relevant data on forests and forest management in Tajikistan, there is an evident necessity for change.

The collection of all relevant data into one, standardized database will ensure proper data storage, processing and reporting. This data base forms the core part for storage and processing data (see Figure 8). The forest management information system (FMIS) for Tajikistan will provide access to all relevant users (such as SFE staff) and stakeholders according to their fields of work and will ensure that duplication of efforts is avoided.

This system should include geospatial information and enable collecting, recording and reporting information on forests and other land use types (e.g., pastures) within the state forest fund. The establishment process of such a system should include representatives of all future user groups to ensure a suitable design and functionality. The establishment of a modular system which allows for the gradual upgrade to new functionalities is recommended.

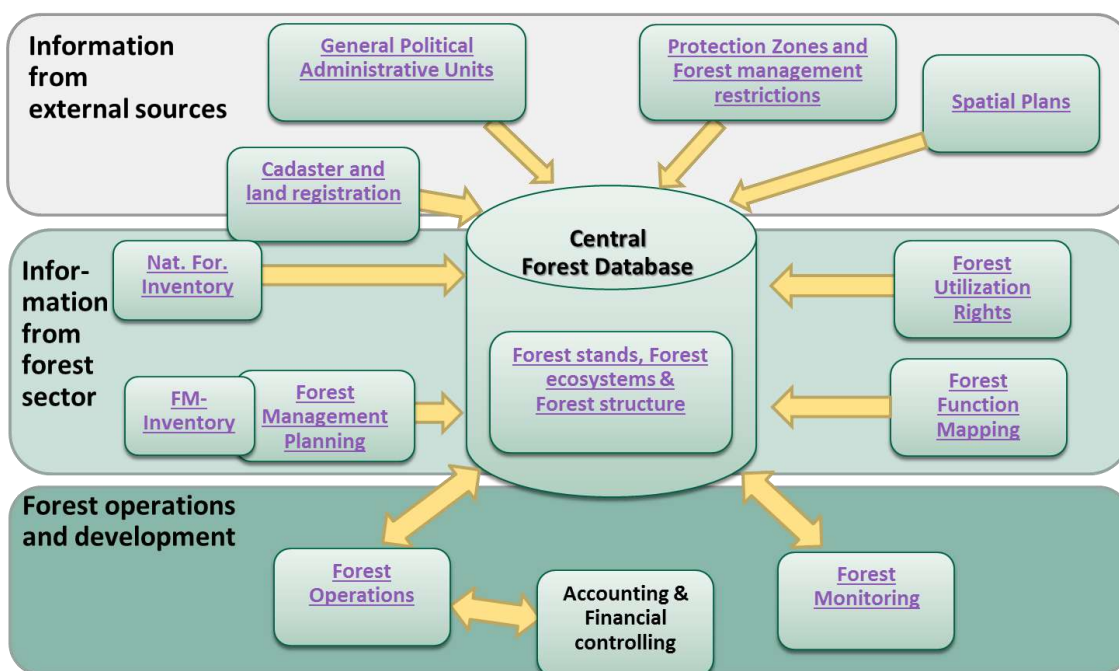


Figure 8: Role of a central forest database within a Forest Management Information System

Modules and functions of an FMIS should reflect the following key characteristics:

General Features

- Permanent geospatial information system (centralized geo-database management system (DBMS), general GIS software (e.g., QGIS))

- Modular structure so that modules can be added later and it will support multiple functionalities as soon as these are needed
- User interfaces shall be developed or adapted to fit the expected low level of IT literacy of the future users
- Modules and core functions: central forestry and pasture database (geospatial and quantitative data, including data from external sources (national statistical entity, Committee on Land Use, CEP, Hydromet and others)
- Web-GIS portal to allow for different levels of access to the information and standardized data exchange functionalities (bi-directional data exchange with external databases)
- Module for protected areas and critical biodiversity data
- Module for integrated resource management planning purposes
- Support tool in the business processes of integrated forest ecosystem management
- Modules for operations and activity-based monitoring where annual work plans or ten-year management plans and actual records of interventions are recorded
- Interfaces for financial accounting systems or ERP (Enterprise Resource Planning) systems
- Module for forest and pasture incidence monitoring and change detection like fire, flood, pests, etc.
- Module for lease agreements (including grazing, hay making) and forest tickets for NTFP, as well as on JFM contracts
- Module for climate and climate modelling
- Module to present areas of erosion and flood risk
- Data access definition for a number of user groups (public, SFA, forest sector, other governmental bodies): who has access to what data, and in which format (access to raw digital data vs. access to limited final products, such as static .pdf maps)
- Reporting functions in all modules.

Clarity on the legal status of data (ownership, legal access, data sharing between ministries, cost of data access among others) is a challenge the project will have to tackle.

The FMIS should have a web-based portal to facilitate differentiated access to various user groups. For example, levels of sensitive information should be accessible only to a precisely defined user group using a username and password. SFE should be able to upload the data collected during the FMP process and download the resource information they need (e.g., maps).

The entire process should be coordinated by a FMIS management team, consisting of forestry, GIS and database management professionals and information communications technology professionals.

Examples from international experience show that the process of the establishment of an FMIS is long and may take up to several years, depending on the initial level. To enhance the process from the beginning on, it is important to consider it within the FMP design and implementation process. As stated before, for example, even the definition of attributes and elements to be included in the inventory templates are of high relevance for such system. This will ensure a smooth transition of this data within the FMIS at a later point in time.

Main Finding

A forest management information system is crucial for the long-term sustainable management of data. The establishment of an FMIS is a long process that should involve all relevant stakeholders, while assessing their needs. The system should be developed based on modules, in order to allow the gradual improvement and extension of its functionalities.

3.1.5 Joint Forest Management and Forest Management Planning

The joint forest management (JFM) approach allows the involvement of persons (or groups of persons) to participate in forest management activities, supporting forest restoration processes and receiving a pre-agreed share of the harvest. This approach has been working in Tajikistan for several years already and has been implemented within all forest types of the country. JFM is based on a cooperation between SFE and the local population, who is contracted for a period of twenty years. The activities are based on five-year plans and, in addition, annual plans are elaborated for each plot in agreement with the user.

In terms of JFM, the '*Methodology*' includes an estimation of the possibility to attract the local population for JFM activities on an MU level. This is deemed a very important factor that should be considered in the planning. In the MU of SFE (for those that already have JFM contractors), it is crucial to include the local population in the planning phase of the FMP. The long-term character of the JFM approach (20 years) as well as the long-term character of the FMP (10 years) provide a sound base for a participatory approach between the FMP and JFM.

Both planning approaches should be well coordinated and matched; this can be achieved through the active inclusion of local JFM contractors (forest users) in the FMP process:

- an overall agreement between the forest users and the SFE should be achieved regarding the aims and measures of the 10-year FMP, and
- annual plans of the SFE and the JFM plots should be well coordinated.

The role of forest users in the forest management planning and monitoring is important. However, motivating forest users to be actively involved in the forest planning and monitoring (mainly due to insecure tenure rights) remains challenging. During the workshop on Integrated Forest Management in September 2016, an increase in the involvement of forest users in the planning and monitoring process was proposed, which could be reached through trainings (technical and management), strengthening the joint work of foresters and forest users, and financial motivations for forest users. The financial motivations could be achieved through joint marketing of NTFP, bonus from the SFE side, competitions, production and marketing of seeds and seedling etc.

The JFM approach is an important factor for sustainable forest management and the relevant coordination with the FMP should be granted in order to ensure a mutual definition of goals and measures for long-term sustainable development of the forest sector in Tajikistan.

One possibility to achieve a successful participatory process is the establishment of a social audit, in parallel to the elaboration of the annual management plan. Prior to the planning, the activities of the last year could be evaluated and assessed directly on the field in a joint group including the responsible representatives of the SFE and the JFM tenants. A low percentage (e.g. 5%) of the reported results and management practices should be then verified on the field, by a field visit of the entire group. The results could later be discussed and used for the adjustment of the planning of the next year. A further positive impact of the social audit concept derives

from the on-field discussion with all participants, which also provides a certain training, where the SFE representative is the facilitator of the discussion and the tenants group the evaluator (through the discussion of the achieved results).

Best practice example:

Participatory monitoring concept using new technologies in Kenya

A possible method that combines both participatory monitoring and the using of new technologies is the concept of data collection and management information system using mobile technologies and web servers. This concept has already been tested and delivered positive results within the Kenya Agriculture Carbon Project funded by the World Bank² with about 30,000 individual farmers in more than 1,750 groups. The data on the different farm management practices is collected once a year and used for carbon accounting and project monitoring. Every year data on more than 120 parameters is being collected including aspects such as socioeconomics, agricultural practices, energy and livestock from every group of farmers. The self-reporting concept is designed as follows:

- Each farmer records his own activities and provides the results to the group secretary
- Each group of farmers (approximately 15 to 20 farmers) has one group secretary, responsible for the data collection and summary
- The secretary provides the data to the local NGO, responsible for the project by sending an SMS-message
- The group secretary sends a number of messages once a year according to the different information categories of interest
- A technical process of validation takes place
- the data feeds a centralized database server that processes and analyses it
- In parallel, 5 % of the groups are selected randomly and visited on the field for the aims of data verification
- As a result, the data calculation and analysis allows an emission calculation for the management practices of the farmers

This self-monitoring model used in Kenya could be technically implemented in every other country for the recording and analysis of different types of land use data. Using a mobile services provider, the general costs are relatively low, whereas the outgoing SMS for the farmer and the incoming SMS on the server are free. The setup of the system, the contract with the service provider (if there is one offering such services in the country), and the training for the users should be taken into consideration as additional expense and effort.

Technically it is possible to link the database from the self-reporting system with the future FMIS that should be established in Tajikistan. However, if there is such intent, it is very important to consider this in advance and structure the FMIS in a manner that allows this feature.

² For further information on the project you can visit: <http://www.worldbank.org/en/news/press-release/2014/01/21/kenyans-earn-first-ever-carbon-credits-from-sustainable-farming>

Main Finding

JFM and FMP are two (even though of a very different nature) instruments contributing to sustainable forest management which should be well coordinated, especially with regard to each other.

3.2 Governance and Institutional Setting for Forest Management Planning and Monitoring

3.2.1 Current Institutional Set-up and Distribution of Roles and Responsibilities

Substantial work has been accomplished in Tajikistan to provide a legal basis for institutional reform of the forestry sector, including the division of functions between the different bodies to implement sustainable forest management, as well as the establishment of the Forest and Hunting Inspection (FHI). This process has made slow progress and the different stakeholders have yet to find their role between supervisory, control and management functions over the forests.

Our findings show that there are currently three main stakeholder involved in the forest management planning and monitoring (FMPM):

State Forest Agency (SFA) – Long-term and Annual Planning and Monitoring

- SFA conducts annual monitoring (at least paper-based) of forest activities such as harvesting of NTFPs and firewood collection
- Long-term management plans and respective annual plans are developed by SFA experts in most cases in a central and paper based manner
- The developed management and annual plans are implemented by SFEs and reported back to SFA
- The entire planning and monitoring process is paper-based

Committee for Environmental Protection – Random Monitoring of SFEs

- Since January 2014, CEP is no longer involved in the planning stage of the forest management activities
- CEP does random selection control of SFEs` work by visits to each SFE every other year on average
- CEP also monitors JFM activities in their areas, but direct interactions with the local population is only done in the presence of SFA staff
- For their control CEP officers use a list of region-specific guiding questions with the key parameters such as planting activities, survival rates of reforestations and the cutting of trees, etc.
- If any deficits or irregularities are found by CEP inspectors, these have to be resolved directly between the CEP and the SFA; if conflicts can then still not be settled the issues might be taken to court (the most frequent irregularities found by the CEP is the illegal harvesting of timber and firewood)

<ul style="list-style-type: none"> ▪ Any fines collected by the CEP for the violation of environmental regulations are transferred to the Fund for Environmental Protection ▪ In addition to the SFA's own activity monitoring and the CEP monitoring, the Environmental Police (a unit of the Ministry of Internal Affairs) has a policing function in the environmental sector
Forest and Hunting Inspection – approval of plans and random monitoring
<ul style="list-style-type: none"> ▪ FHI is newly established and currently formulating its normative documents in order to fully start functioning from next year onwards. The role of FHI in the FMPM is fully described in chapter 3.2.3

3.2.2 Proposed Institutional Set-up for Forest Management Planning and Monitoring

The proposed design for setting up the institutions involved in FMPM is strongly aligned with the NAMA Support Project (NSP). While the NSP monitoring and evaluation system has a more complex design, we propose a simplified setting, which is required for the establishment of primary FMPM systems (Figure 9). The overall aim of the proposed institutional set up is to enable an interplay of the relevant institutions and to conduct monitoring in an independent and transparent manner. The central linking element in this setting is the central database, which enables transparency of applied and planned activities of FMPM and is based on the following principles:

- Keep it simple – the database structure and templates for data collection/entering should be applicable to the local conditions and knowledge in order to be performed by the local foresters of the SFEs with a sufficient level of confidence.
- Keep it relevant – the data entered in the database should directly contribute to the evaluation of the defined objectives in the planning processes in order to improve future learning and planning (adaptive learning and planning cycles).
- Focus on detecting change – the database information should lead to the identification of impacts of forest management objectives and their translation into concrete management decisions in the field over time.
- Use and discuss the results – to ensure that results are shared and discussed among all stakeholders in order to initiate reflection and adaptive learning for future planning and management decisions.

In Tajikistan the roles of forest policy formulation, actual forest management and the control of the latter are distributed between three agencies:

- Forest policy formulation (SFA)
- Forest management planning and implementation (SFEs)
- Control of forest management (FHI)

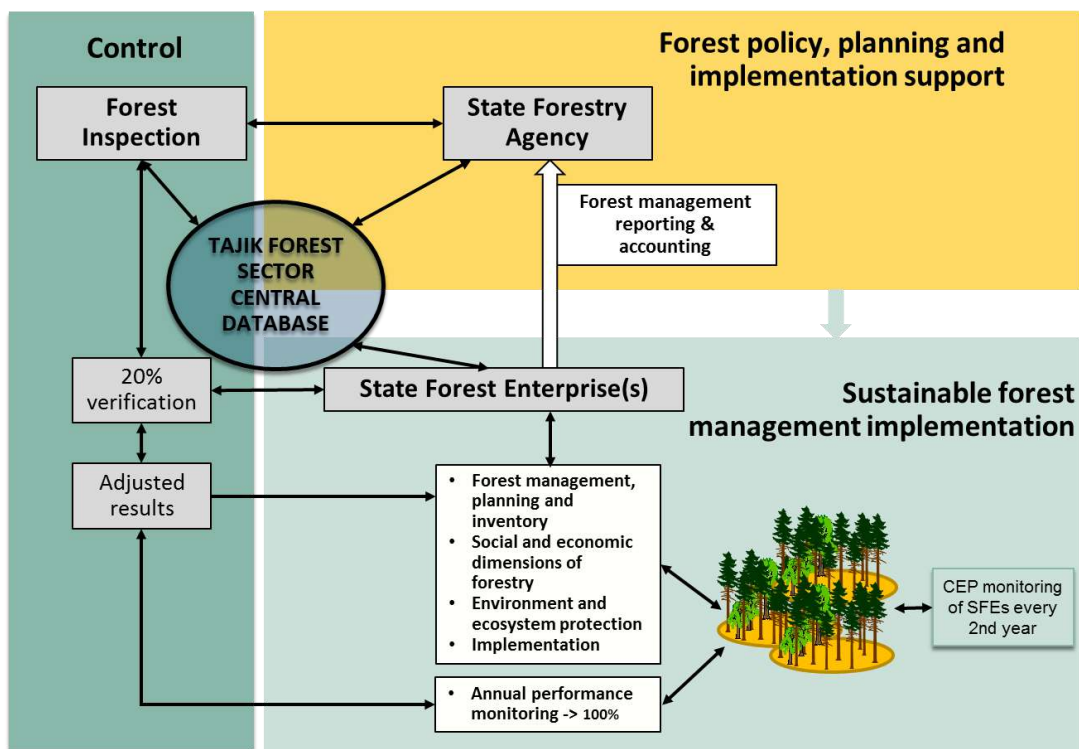


Figure 9: Institutional setting of forest management planning and monitoring

State Forestry Agency (SFA)

SFA's main role is to oversee the planning and implementation of forest management in the country. SFA is the institution with the mandate to manage the database and to assure its functionality and accessibility for all relevant stakeholders.

Against this background, the specific tasks of SFA include:

- Setting strategic priority for forest management (e.g. economic, ecological, climate change integration), agreeing long-term management planning with SFE
- Developing and agreeing on an appropriate and user-friendly database structure with all institutions, format and templates for data collection
- Coordinating between all involved institutions to deliver required data in agreed format
- Enabling involved institutions to deliver data (training, technology, software, etc.)
- Ensuring that annual monitoring is conducted by the SFEs (and if/when needed, representative of SFA)
- Enabling SFA involved staff to analyze the data and develop participatory MP and AP
- Providing reports to the Committee for Environmental Protection (CEP), which oversees natural resource use, land protection, subsoil, forests, water, and other resource in Tajikistan

Forest and Hunting Inspection (FHI)

- The role of the recently established FHI is described in more detail chapter 3.2.3

State Forest Enterprises (SFEs)

Typically, the SFEs are the operating entities in forest management planning and implementation. This involves activities related to the three dimensions of sustainable forest management, i.e., the economic, ecological and social dimensions of forestry. At the operational level, forest resources are managed in long-term, medium-term and short-term management cycles which are laid down in overall forest sector policies (long-term), periodic (i.e. 10 year) management plans (medium term), and annual operational plans (short-term).

The specific tasks of the SFE can therefore describe as including:

- Conducting long-term (jointly with SFA) and annual planning, their implementation and monitoring (in the planning and monitoring, it is key to involve local population)
- Collection of data through direct SFE activities as well as local population
- Identifying a staff member who is responsible formatting and entering the collected data into the database as well as reporting

Committee for Environmental Protection (CEP)

Mandate and demands of CEP have been discussed in a meeting with the CEP management. It has been confirmed that the role of CEP in the FMPM would remain as it is currently practiced (for a detailed description see chapter 3.2.1).

3.2.3 Mandate and Role of the Forest and Hunting Inspection (FHI) as part of the overall Forest Governance system of Tajikistan

FHI's Role in Forest Management Planning and Monitoring

Within the framework of the NAMA Support Project, the Forest and Hunting Inspection (FHI) is the core institution with regards to the overall monitoring of the NSP. It represents the link between the SFE's performance monitoring and the aggregated monitoring and reporting of the entire project to the State Forest Agency and the NAMA facility M&E.

The role of FHI in FMPM, as highlighted in Figure 10, is based on the assumption that this proposed setting will be smoothly upgraded to the NSP M&E system once the project starts. As per FHI representatives, management plans (MP) and annual plans (AP) prepared by the SFEs need to be presented to the FHI. The FHI will investigate if the MP and AP of the SFE are in line with the forestry policy, indicators of the forestry strategy, apply required technical methodologies and do not have any negative impact on the environment. After giving its "no objection" within two weeks the MPs and APs are submitted to the SFA for approval. The SFA will conduct an internal proofing process after which the MP and AP will be sent to SFE for implementation. Once implemented, the SFE would conduct 100% annual performance monitoring. The FHI will establish the independent verification which will verify the implementation of at least 20% of the implemented MP and AP. The selection of the random sample would be done on the basis of the data in the FMIS. The FHI does its information collection at two levels: a) at the national level (here, the SFA has to agree to inspection protocols) and b) at district level FHI counter-checks the planning and implementation data provided by the SFA.

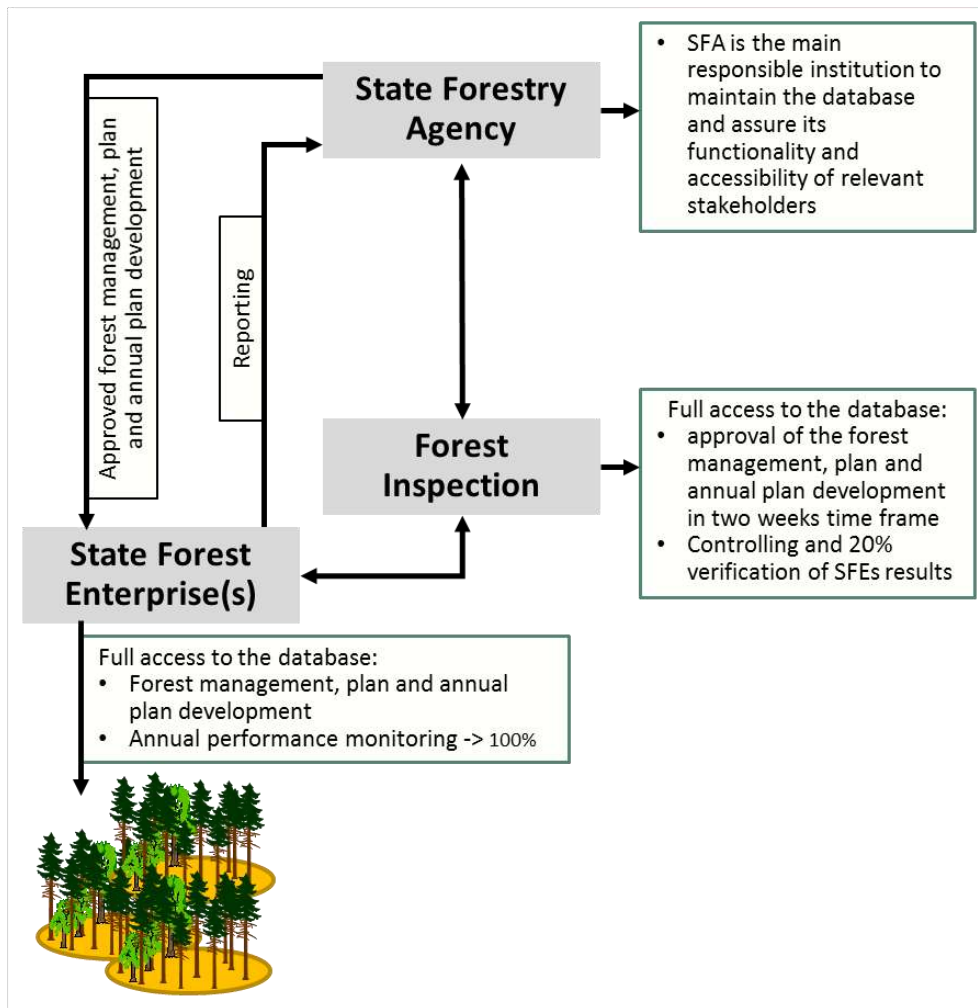


Figure 10: The role of FHI in the forest management planning and monitoring

The overall tasks of the FHI are specified in article 19 of the Forest Code and the FHI Decree issued in 2015 which includes:

- Applying state control for protection, restoration and sustainable use of forest and hunting resources
- Giving warning messages, detection and suppression of violations of fire safety in the forests
- Conducting control over the issuance of documents or hunting and the use of forest resources
- Qualitative and quantitative confirmation of forestry and hunting performed work on the basis of approved hunting and forest management plans
- Control over the implementation of forest management and hunting plans, management plans and annual plans
- Organization of the activities of public inspectors

Next to its overall mandate, the decree specifies details on:

- The scope of activities of the FHI
- The staffing of the FHI

- The rights of the members of the FHI
- Staffing structure and the tasks of the head of the FHI
- Organigram of the FHI

Status of the FHI Establishment

- **Formal status:** Currently the decree including the organizational structure of the FHI has been approved by the SFA.
The Ministry of Finance (MinFin) was reluctant to approve the decree specifying the organigram and staffing structure of the FHI, fearing that this might be perceived as a commitment of MinFin to take over the responsibility of paying the staff of the new agency.
- **Staff:** FHI's head is appointed and dismissed by the Director of the SFA. The Head of the FHI is at the same time a Chief State Inspector for controlling of forest and hunting resources. The two deputies are appointed by the head of FHI and are dismissed by the SFA. There are nine executive and five administrative positions which are all currently filled. FHI targets to appoint one inspector per three SFEs (i.e. three Inspectors in each of the five regions). The current total of 14 FHI staff members will be increased to 20 in 2017.
A minimum requirement for the professional staff of the FI is a minimum of five years of experience in the forest sector; as a result, most applicants of the FHI were involved in the forest sector.
- **Financial structure:** As a subsidiary of SFA prepares the annual budget (jointly with the SFAs), which is then approved by the MinFin.
Fines could serve as an additional income for the FHIs; however, administrative fines are directly transferred to the budget of the country. The damage payment is received by the respective SFE. According to the administration code of Tajikistan, FHI is to control 20 types of environmental damages.

3.2.4 SWOT Analysis of the Forest Management Planning and Monitoring

The SWOT analysis was conducted during the working session with the national expert group. The main strengths, weaknesses, opportunities and threats are shown in Figure 11. Here, the existing legal frameworks are highlighted as a strength. However, for their implementation, several weaknesses remain to be overcome.



Figure 11: SWOT analysis on forest management planning and monitoring in Tajikistan

4 RECOMMENDATIONS: THE PROPOSED WAY FORWARD

4.1 Parallel development and implementation of inventory concepts

Besides the improvements of the 'Methodology' harmonizing the two different inventory approaches currently discussed in Tajikistan is of high importance. Following recommendations on that topic has been derived according to the discussions and based on the analysis of the studies already conducted in Tajikistan:

- As a first step, aiming on the improvement of the stand-wise inventory approach, we recommend to take over the FMI plot design adopted to different forest types.
- As a second step, a statistically sound sampling design, as described in the FMI concept, should be adapted to the needs of stand-wise approach and tested.
- For both steps, the need to integrate questions of forest inventory and a continuous forest monitoring with the regular task to develop and implement Forest Management Plans on a stand-level is obvious. Further work on concepts should take this into consideration.
- Moreover, a demand for a combined systematic training in parallel to the future FMP concept improvement should be planned and realized on:
 - an inventory and monitoring theory and methods, and
 - an integrated approach in FMP combining both tasks on Management Unit level and stand level.
- To guarantee a smoothly running FMP process, future development on FMP and the underlying inventory concepts should be coordinated on the national level and accompanied by international expertise, both from a single source.

4.2 Core Element of the FMP: Development of the 'Methodology'

With the draft of the '*Methodology on the implementation of Forest Management Planning for the state forest fund of Tajikistan*', a very important first step has been made toward the re-introduction of a system of sustainable forest management; a crucial process in the country.

To improve this process towards a successful implementation of FMP, several aspects should be considered:

- Establishment of a long-term planning mind-set and coordinating the elaboration of annual plans according to the 10-year plans
- Following the approach of using old, but still relevant data material where possible and updating it (e.g. forest management maps)
- Aiming at a good collaboration between the FMP unit of SFA and the Land Use Committee responsible for the mapping
- Capacity building for the FMP unit of SFA regarding mapping and GIS
- Having in mind the future establishment of an FMIS when designing the FMP process
- Collecting the data in a manner that allows the easy and proper digitalization on a later stage
- Concentrating the FMP design on fuelwood and NTFP as main income sources for an SFA

- Designing user-friendly but extensive templates for the field data collection and for the planning
- Include biodiversity next to climate change as important factors within the FMP

4.3 Production Models: Forest Development Types

As shown in the chapters above, the role of Forest Development Types (FDT) is considered to be of high importance for the implementation of FMP in Tajikistan. FDT figure as a role model for the planning. By having a clear vision about the future forest and proposing a list of measures for the development phases, FDT serve as a guideline for the planning process as well as for monitoring and control mechanisms. FDT offer clear targets, make the silvicultural measures easy to identify and provide efficient and transparent mechanisms for implementation and monitoring.

Recommendation regarding FDT:

- **Decision on FDT**
- Decision about the development of FDT for Tajikistan. This target is addressed at the decision-makers at the Forest Agency. A working group involving practitioners as well as scientists, equipped with necessary resources should be responsible for this task.
- **Concentration**
- For efficiency reasons, in a first step FDT for max. 70 to 80 % of forests/land under the use of the Agency should be developed.
- **Linkage to Forest Management Planning**
- The development of FDT should work closely together with the unit/entities developing the FMP. Both elements are closely connected.
- **Structuring the FDT**
- FDT should be structured due to its needs for the FMP. One of the main advantages for the practical use could be seen in the guidance for the planning and monitoring process. Role models already exist, and should be used as an orientation structuring the specific FDT of Tajikistan (Figure 11).

Forest Development Types

Structure

1. Background:
Regional focus, historical background, general ecological relevance, climate change
2. Goals:
long-term silvicultural goals / land use goals
3. Silvicultural measures
According to development phases (sampling phase, thicket phase; young/old pole phase, maturing phase, phase of overmature stands) silvicultural measures are formulated
4. Joint forest Management:
Definition of the role of forest users and their land use rights
5. Ecological Targets:
Specific protection status; role of certification
6. Others
Other topics like biotic/abiotic risks; prevention mechanisms.

Figure 12: Draft structure of how Forest Management Types could be structured

4.4 Tools: Decision and Development of an FMIS

While finalizing the FMP methodology, the experts should have in mind the upcoming need for the establishment of a forest management information system. The FMP process should be planned and implemented in accordance with the requirements of such a system. Next steps for the establishment of a FMIS are:

- Establishment of an inter-agency working group including different stakeholders to address their specific needs for the system
- Building the system based on modular principle to allow for the gradual improvement and addition of new functionalities
- Establishing different levels of access for the different user groups
- Capacity building and trainings for the future users of the FMIS.

4.5 Participation: JFM and its Integration in the wider FMP

The FMP design should include a participatory element allowing local forest users with JFM contracts to be involved in the elaboration of the 10-year plans. Moreover, the according annual plans of the SFE and the JFM plots should be coordinated in the same manner. These measures would provide a sound base for a long-term sustainable forest management.

The development of a self-reporting system for the JFM tenants and forest users, or the establishment of a social audit practice (or both) are possible methods to strengthen the participation

approach in the planning and monitoring phase; and to provide benefits for both users, SFEs and policy makers.

4.6 Implementation: Prioritizing within a Two-Layered Approach

To enable the implementation process of the FMP as soon as possible, a two-layered approach can be applied. With the definition of priority zones, the process may start within the first priority zone sooner than with the second one.

For the identification of priority SFE there are two recommended possibilities:

- Concentrate on economic important SFEs
- Start with ecologically or socially critical SFEs

4.7 Organization: Proposed Institutional Set Up for Forest Management Planning and Monitoring

- Establishment of an inter-agency working group to discuss specific roles and responsibilities to the FHI and other relevant stakeholders in Tajikistan
- Agreeing on the respective roles of all the involved institutions (SFA, FHI, SFE, CEP)
- Development of a communication strategy among all participating partners of FMPM

4.8 Financial Impact: Creating Additional Revenues

- Multiple levels and types of fines (SFA, CEP, FI) are in place and require harmonization
- Define what types of fines get administered by which entity and through which mechanism the fines can be channeled to get reinvested in the development of SFM

4.9 Governance: Good Governance towards Sustainable Management of Forest Land

- Promote improved forest governance by establishing and facilitating an inter-agency working group that clarifies the roles of stakeholders and serves as a clearing-house mechanism to address and settle issues of governance in the forest sector
- Make information and documents pertaining to issues of forest management accessible to a wide audience in the NRM/forest sector

As part of the way forward, we recommend to also refer to the roadmap which was developed during the working session with national experts. The roadmap represents the opinion of key experts on urgent topics to get started with and those which are most realistic to achieve. The roadmap also highlight the leading organizations and supporting organization for the addressed issues (see Table 7).

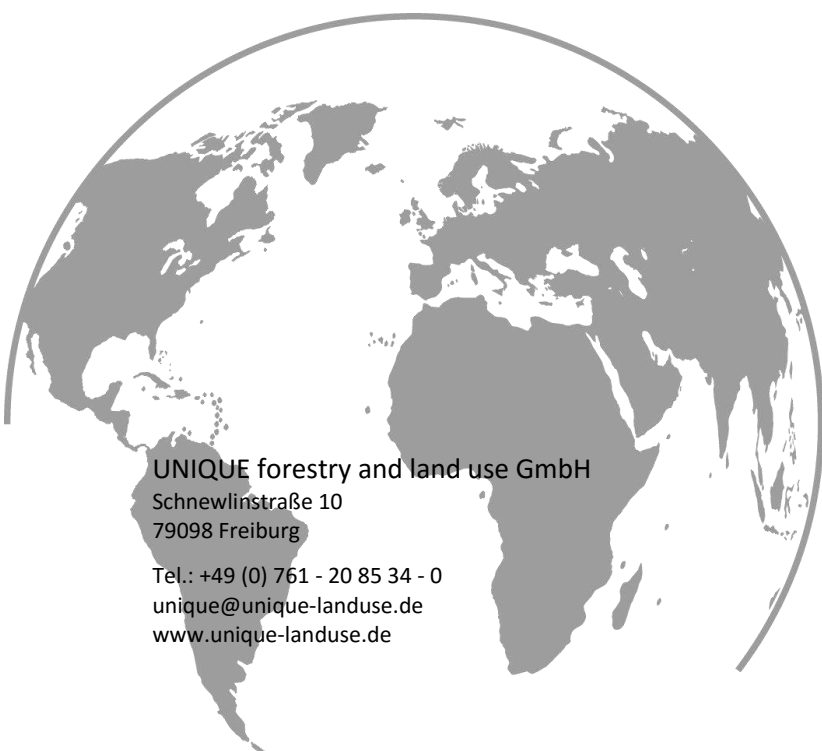
Table 7: Roadmap of next steps

	Urgent topics, to get started with	Organization to take the lead	Support organization
1.	Provision of qualified staff (will be realistic only if SFEs have the freedom to market forest products)*	Ministry of Education, SFA	International / national organizations, local companies
2.	Provision of a higher salaries	Government, SFA	MinFin
3.	Harmonizing laws and regulations	SFA, Ministry of Justice	All related ministries
4.	Establishment of a database and technology and equipment to collect data *	SFA	International organizations
5.	Support of international organizations to forestry	SFA	International organizations
	Most realistic to achieve	Lead organization	Support organization
1.	Prevent further degradation of forests and pastures	Min of Agriculture, SFA	Local government and international organizations
2.	Development of a database and technology and equipment to collect data	SFA	International organizations
3.	Provision of qualified staff (will be realistic only if SFEs have the freedom to market forest products)	Ministry of Education, SFA	International and national organizations, national companies
4.	Speed up the process of implementation of new ideas and innovations	SFA	International/national companies, NGOs, Ministry of Industry and New Technologies

* overlap of topics that are both urgent and realistic to achieve

5 REFERENCE LIST

- Akhmadov, Kh., 2008. Forest and forest products country profile: Tajikistan. Report. GENEVA TIMBER AND FOREST DISCUSSION PAPER N° 46. UNECE and FAO.
- Bo Larsen J., 2008. "Forest development types" - Developing adaptive forest management models in a science-stakeholder dialogue.
- FHI, 2015. Forest and Hunting Inspection decree, other normative documents.
For further description on FMT see: UNIQUE, 2012. FODEMO II Forest Management Planning Manual Work step 10: Silvicultural planning. Forest Development Types – Systematization and their use in forest management planning.
- ForestEye, 2014. Recommendations for the development of a monitoring system for different forest types in Tajikistan.
- GIZ, 2015. Forest Inventory Report Penjikent Leskhoz.
- GIZ, 2016. Integrated Forest Management – Workshop results.
- GIZ, EU Project FLERMONECA, 2015. Joint Forest Management Manual.
- Gradel, A., Grünekle, W., 2015. Forest management planning in Tajikistan. Final report on the consultancy and backstopping mission for HESSEN-FORST and GIZ in the frame of the EU-funded regional Environment Programme for Central Asia "EURECA", component: Forest and Biodiversity Governance Including Environmental Monitoring (FLERMONECA).
- Ilazarov, B. / GIZ, 2015. Methodology for conducting inventory in forests of Tajikistan.
- Kirchhoff, J., Fabian A., 2010. Forestry sector analysis. Report.
- Kusters, K., de Graaf, M., Buck, L., 2016. Guidelines: participatory planning, monitoring and evaluation of multi-stakeholder platforms in integrated landscape initiatives. Working paper. Wageningen, the Netherlands: Tropenbos International and EcoAgriculture Partners.
- Landesbetrieb Forst Baden-Württemberg, 2014. Richtlinie landesweiter Waldentwicklungstypen.
- Mislimshoeva, B., Herbst, P., Koellner, T., 2016. Current pathways towards good forest governance for ecosystem services in the former Soviet republic Tajikistan. Forest Policy and Economics, 63, 11-19.
- Novikov, V., Safarov, N., 2003. Tajikistan State of the Environment. Forest resources.
- PRISE, 2015. Tajikistan: Country Situation Assessment.
- TajikLes Service, 2016. Методология по проведению лесоустройства на землях государственного лесного фонда в Республике Таджикистан / Methodology on the implementation of forest management planning within the state forest fund of the Republic of Tajikistan.
- UNIQUE forestry and land use GmbH, 2016. NAMA Support Project feasibility study report.
- Wong, J. L. G., 2010. The biometrics of non-timber forest product resource assessment: a review of current methodology. ZF0077 Forest Research Programme.



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