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A practical guide on developing national forest information systems

Mapping the organizational context and defining business and information-technology related objectives

Submitted by the secretariat

Summary

The following document, which was prepared by the secretariat under the project "Strengthening cooperation and national capacities in selected UNECE countries for sustainable forest management", contains a practical guide on developing national forest information systems. It introduces the first stages of the analysis, which are: (a) institutional mapping, (b) understanding the organizational context, (c) defining business and (d) information technology related objectives.

This document is submitted to the Joint Working Party for information.

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I. Introduction

1. Good, informed policymaking and management requires information, monitoring outcomes, reporting and adjusting tools. Information systems are an indispensable part of modern forest governance. Forest sector information systems should be aligned to forest management strategies, institutional landscapes, as well as to organizational, financial and overall administration capabilities. The use of forest information systems (FIS) is a cutting-edge innovation which significantly advances forest information management and brings numerous benefits to policymakers, all forest sector-related stakeholders and society in general. Prior analysis and strategic action are crucial for the successful development and implementation of forest information systems.

2. Under the Economic Commission for Europe Committee on Forests (UNECE) project "Strengthening cooperation and national capacities in selected UNECE countries for sustainable forest management" the secretariat prepared the following guide on developing national forest information systems. The guide is designed for national analysts, policymakers and forestry professionals looking for a deeper understanding of the needs, opportunities and constraints of developing/improving forest information systems for forest sector activities and sustainable forest management. It guides users through the process of performing the strategic analysis.

3. This guide also provided the main training material for participants in a capacity-building workshop held in October 2023 in Bishkek, Kyrgyzstan, for the countries of the Caucasus and Central Asia.

4. This practical guide includes several exercises covering all stages of the analysis. The exercises define the potential scope of a forest information system development programme in the forest sector.[1] Throughout this process, an attempt is made to specify possible objectives, stakeholders involved, methods and means as well as challenges of future implementation.

5. The exercises do not focus on technical implementation details. The analysis is more of a communication exercise for high-level stakeholders to ensure support and offer new insights by juxtaposing different points of view and needs.

6. For this reason, potential users should ideally have a fairly broad understanding of the forest sector in their country/organization/company in terms of policy and operational management as well as forest information management. Familiarity with the practical implementation of information technologies (IT) and opportunities is helpful.

7. This guide complements the *Guidelines for Developing Forest Information Systems* which was also prepared under the UNECE project "Strengthening cooperation and national capacities in selected UNECE countries for sustainable forest management".

II. Stages of the analysis

8. Various strategic planning frameworks help to structure the work of identifying objectives and actions, maintaining control and disseminating results. They are all based on a layered approach, from the general to the specific.

9. First, (1) external conditions are considered, then (2) needs and opportunities for intervention are identified, followed by (3) establishment of key performance indicators (KPIs) and (4) performance of a cost-benefit analysis, and finally (5) formulation of individual projects and their execution. The general strategy for building an information system can be designed and implemented at different levels. Therefore, the planning and implementation framework should be adapted accordingly.

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[1] This guide refers to the development of information system of the forest sector; however the methodology, steps and exercises proposed can also be applied by other institutions, organizations or companies within or outside the forest sector.

10.   This guide concentrates on the following elements of a FIS's IT governance implementation approach:

(a)   Institutional mapping;

(b)   Understanding the organizational context (mapping crucial forest sector activities and identifying the most important stakeholders);

(c)   Defining business objectives;

(d)   Defining IT-related objectives;

(e)   Identifying and assessing critical IT processes;

(f)   Assessing available and required critical IT resources;

(g)   Defining key performance indicators;

(h)   Identifying strategic actions.

A.   Stage A: Institutional mapping

11.   **Objective of the exercise:** Enhancing stakeholder understanding, promoting effective engagement in the context of forest information systems, managing stakeholder relationships and ultimately improving project outcomes.

12.   **What is a stakeholder:** Stakeholders are organizations and social groups of any size or individuals that act at various levels and in different sectors (domestic, local, regional, national, international, private and public). These actors have a significant and specific stake in a given set of resources and can affect or be affected by resource management decisions.

13.   **What is a stakeholder analysis:** Stakeholder analysis is the process of systematically identifying, categorizing, mapping and analysing information to determine:

(a)   which groups have an interest and/or influence in a project;

(b)   which groups are typically included or excluded;

(c)   whether each group is relevant to include;

(d)   which concerns are shared by various groups regarding the project;

(e)   whether the groups support or oppose the project, or whether the groups will benefit or be harmed by it.

14.   **What needs to be analysed:** The process of identifying and analysing key stakeholders in a FIS analysis allows users to know their interests, positions, functions and roles as well as their degree of involvement and ability or inability to affect policy change.

15.   The mapping helps managers and organizations (e.g. government agencies or forest management enterprises) to gain a better understanding of who their key stakeholders are, their interests and concerns, and how they can be effectively engaged or managed.

16.   The mapping enables the identification of potential areas of collaboration or conflicts of interest, allowing for the development of appropriate strategies to address stakeholder needs and expectations. Stakeholder mapping also facilitates prioritizing stakeholder engagement efforts and ensuring that communication and decision-making processes are inclusive and transparent.

17.   **What are the steps in stakeholder mapping:** The following are the steps in stakeholder mapping:

(a)   Step 1. Plan the analysis;

(b)   Step 2. Identify stakeholders;

(c)   Step 3. Gather information;

(d)   Step 4. Fill in the Stakeholder Analysis Worksheet;

(e)   Step 5. Analyse the Stakeholder Analysis Worksheet;

(f)   Step 6. Apply the results.

18.   **Step 1. Plan the analysis:** Defining the purpose and scope of a stakeholder analysis is the crucial aspect of this preliminary step before the actual investigation is undertaken. This involves:

(a)   Identifying the objectives users wish to achieve;

(b)   Determining which stakeholders need to be involved;

(c)   Specifying the information required from each stakeholder;

(d)   Identifying the intended information users;

(e)   Determining how the information will be used to benefit the project.

19.   **Step 2. Identify stakeholders**: The first step in stakeholder identification is to create a list of groups that are known to have an influence and/or interest in forest sector policies and activities. This list serves as a starting point to further expand and analyse the identified stakeholders. To gather a comprehensive understanding of the stakeholders involved or impacted by the forest sector, a literature review is necessary. This involves conducting online and print searches of various sources, such as legal documents, websites, scholarly articles, company profiles, media publications, government and non-governmental organization (NGO) reports. Through this process, a wide range of stakeholders can be identified and analysed.

20.   At the beginning of the stakeholder identification process, it is important to create a comprehensive list of all actors that may have a potential interest in forest information systems. This list should not be constrained by pre-existing knowledge and assumptions on their involvement in potential future projects involving FIS implementation.

21.   During the analysis and stakeholder engagement stages, there will be an opportunity to confirm the relevance of each group's interest. Stakeholders can be categorized into the following groups: state entities, private sector, donors, civil society, international organizations, local NGOs, international NGOs, academia, local leaders or influencers, and others.

22.   Practical note: The range of services provided by forests is also reflected in the diversity of stakeholders. The composition and landscape of stakeholders varies from region to region and is also subject to change. Therefore, any stakeholder analysis presented here should be considered as a snapshot of the real situation. This applies in particular to the relationships between stakeholders, which can also change. The examples used in this document are therefore not a simple blueprint but should only serve as illustrations that may vary according to local conditions.

23.   **Step 3. Gather information:** The initial lists generated through stakeholder identification rely on secondary sources. However, to gather more comprehensive information, it is important to reach out to project actors directly. There are three primary methods to collect information directly from stakeholders: (1) electronic communication, such as email or online surveys, (2) interviews conducted in person or via phone and (3) workshops of focus groups consisting of multiple stakeholders. These methods provide opportunities to gather more detailed and nuanced information on stakeholder interests, positions and concerns, as well as to establish stronger relationships with key stakeholders.

24.   The goals of the analysis must be clarified before engaging stakeholders and be clearly communicated to them before conducting interviews. Goals help to identify and target those interests that need to be represented in the collaboration processes, and those that can be left out considering that stakeholders will come to the interview with their own biases (Golder and Gawler 2005).

25.   When conducting interviews, a standard questionnaire can be used based on the categories of the Stakeholder Analysis Worksheet. The specific type of interview questions should be tailored to the project or policy context as well as the cultural context of the

interviewed stakeholders. For example, questions may focus on stakeholders' positions on the issue at hand, inclusion or exclusion, alliances, conflicts or other relevant topics.

26. To ensure consistency across interviews, it is recommended to develop a standard interview protocol that may include guidelines for how to ask questions, how to record the responses (e.g., notes or recording), and other relevant information. By using a consistent interview protocol, it will be easier to analyse and compare the responses from different stakeholders.

27. In addition to collecting information from known stakeholders, conducting interviews during the outreach phase can be a useful way to identify additional groups who may have an interest in or be impacted by the project or policy. During the interviews, stakeholders can be asked to identify other groups who may not be on the initial stakeholder list but who may have relevant perspectives or concerns. This can help expand the list of stakeholders and ensure that all relevant groups are included in the stakeholder analysis process.

28. **Step 4. Fill in the Stakeholder Analysis Worksheet:** The Stakeholder Analysis Worksheet should be filled in using the following guidance.

(a) **What is the stakeholder's primary interest in FIS:** Describe relations of stakeholder groups to forest information processing, their use and linked policies. For example, through expertise or knowledge of the area, as a key decision maker, or by potential direct impact from developing FIS. Assign a value from 1-5 to the stakeholder's interest. If the stakeholder has a high degree of interest, a rating of 5 should be given, if a low degree, a 1.

(b) **To what degree is the stakeholder group relevant to developing an FIS:** Assign a value from 1-5, 5 being the highest relevance, for each group listed. Within this column, the following questions can be answered: What is the current role of the stakeholder? What is the potential role of the stakeholder to the future FIS development? What is the potential contribution of the stakeholder to the FIS development?

(c) **To what degree is the group involved in the policymaking process:** A value from 1-5 should be assigned, 5 being the highest, and a written explanation should be given if necessary – taking into account how this group has been involved in decision-making on policy and policy formulation both historically and presently.

(d) **Does the stakeholder group support or oppose the FIS development:** A spectrum of stakeholder's types that can be provided is: supporter, moderate supporter, neutral, moderate opponent, and opponent.

(e) **Will the developed FIS benefit or harm the stakeholder group:** Possible impacts are: benefit, harm, neither; how the groups will be affected should be explained.

(f) **What alliances exist with other stakeholders:** Any collaboration between relevant stakeholders should be listed and described.

(g) **What conflicts exist with other stakeholders:** Any conflicts between stakeholder groups should be described.

29. Practical note: A large paper version of the Stakeholder Analysis template for workshop venue where participants add their comments in the table can (should) be prepared. This will be useful for the analysis of the organizational context.

30. **Step 5. Analyse the Stakeholder Analysis Worksheet:** After gathering information on as many stakeholders as possible, the evaluator should analyse the data collected using the Stakeholder Analysis Worksheet. This analysis aims to gain a better understanding of each stakeholder group's interests, influence, positions, relevance, partnerships and conflicts.

31. The scale of 1 to 5 used in the Worksheet provides a simple way to assign a numerical value to the set of criteria, based on the evaluator's opinion of the stakeholder group's characteristics. However, opinions can vary. Therefore, it is recommended to seek information and feedback from as many actors as possible to ensure a more accurate rating.

32. In addition, the question *What is the stakeholder's primary interest in FIS?* is used to gain a clear understanding about the principal areas of interest of each stakeholder (or group

of stakeholders). Furthermore, the response to this question helps to get to know which parts of the value chain they are linked to and what might be their likely position toward changes in the value chain elements.

33.   The purpose of the question about degree of stakeholder relevance is to analyse how important particular stakeholders are for developing a FIS. An important issue is to realize what it means for the participants of this exercise to be "relevant" and to arrive at common understanding. This might be not so easy a task as opinions may be influenced by social factors and individual interests.

34.   The involvement of the group in the policymaking process depends on the formal structure of governance, but also on the actual estimated influence in decision-making.

35.   Each group should be assessed to understand whether they support or oppose the project or policy to build FIS. In addition to classifying them into supporters, moderate supporters, neutral, moderate opponents, or opponents, it is important to look for the reasons for their position. It might happen that a group will be internally divided in their position, this should be described and, if possible, explained.

36.   In addition to the perceived influence and position towards the project or policy, further analysis is recommended with a focus on analysing whether the stakeholder group will benefit or be harmed by the project. In particular, real or potential harm as well as financial or other benefits, should be analysed.

37.   The final issue is understanding which alliances exist with other stakeholders. This form of linkage may foster collaboration and build support for the project or policy, but alliances might also be formed to oppose it. Therefore, if conflicts with other stakeholders exist (or could potentially appear) they need to be described.

38.   **Step 6. Apply the results:** The analysis should be documented in the form of diagrams with attached explanations/descriptions. Another approach is to classify stakeholders by their power (influence) and interest. One may also visualize influence vectors, how the stakeholders can influence each other.

39.   Practical note: The names of the stakeholders that have been identified earlier should now be placed on a diagram similar to those described in this section. A large sheet of paper with four named quadrants should be made available in the workshop venue. If sticky notes have been used previously, they can now be easily transferred to the analytical diagram. If necessary, vectors of influence can be then drawn directly on the diagram using table markers.

B.   Stage B: Understanding the organizational context

40.   **Objective of the exercise:** The objective of this exercise is to analyse how the forest sector is organized, what linkages and dependencies exist between various stakeholders and how they contribute to create added value in the forest sector. These outputs will be used later for determining needs and opportunities for improvements through the development of an FIS.

41.   **What is a value chain analysis:** Value chain analysis (VCA) is a frequently employed technique, especially in large-scale programmes, to develop an understanding of how activities and actors that are involved in bringing a product from production to consumption are linked. A value chain is understood here as the set of activities through which actors get increased value from products or services. "There is a simple element at the heart of value chain analysis. The idea of a chain is a metaphor for connectivity. It highlights the point that most goods and services are produced by a complex and sequenced set of activities" (Humphrey and Navas-Alemán 2010).

42.   **Why is value chain analysis important in FIS development***:* A FIS is always embedded in a larger network of activities, which create relationships and constraints that have to be addressed and opportunities that can be exploited. Mapping of the value chain in which the FIS will be placed helps to identify (i) existing components, (ii) actors, (iii) activities and (iv) linkages – both vertical and horizontal, and thus facilitates later a structured

discussion about these opportunities, constraints and possible optimal solutions (Stein and Barron 2017).

43. **What methods are used in value chain analysis:** The range of methods that are commonly used for researching value chains are:

    (a)   Desk studies;

    (b)   Interviews;

    (c)   Focus group discussions;

    (d)   Surveys;

    (e)   Document analysis; and

    (f)   Participatory observations.

44. As there is not a single, universally applicable method for studying value chains, usually a combination of them is used. However, the analysis should focus on the organizational context, not on details of particular elements of the value chain structure and/or their performance.

45. **What are the steps of organizational context analysis:** The following are the steps of organizational context analysis:

    (a)   Step 1. Identify activities in the forest sector and business objectives behind them;

    (b)   Step 2. Identify actors related to the forest sector activities;

    (c)   Step 3. Establish linkages between the actors and relate the actors to the activities;

    (d)   Step 4. Add contextual notes.

46. If the scope of the digital transformation programme is limited to a single part of the value chain or a single organization, the organizational context analysis may be simplified.

47. **Step 1. Identify activities in the forest sector and business objectives behind them:** The exercise starts with brainstorming on the type of activities carried out in the forest sector (or part of it, depending on the analysis scope) which are necessary for its functioning. Create a list of these activities. Practical note: Names of activities should be written on sticky notes and placed on a whiteboard.

48. While listing activities, business objectives should be assigned to each activity. Business objectives are the measurable results that are aimed to be achieved by carrying out a specific activity in order to accomplish a longer-term vision. Practical note: Business objectives should be written on sticky notes and placed next to the appropriate activities.

49. **Step 2. Identify actors related to the forest sector activities:** Using the results of the institutional mapping exercise, key actors involved in the forest sector should be identified. It is likely that additional activities and business objectives will appear. In this case, the results of step 1 should be updated too. Practical note: Names of actors should be written on sticky notes and placed next to the appropriate activities/business objectives.

50. **Step 3. Establish linkages between the actors and relate the actors to the activities:** Once necessary objects have been identified, their linkages and dependencies should be analysed. The focus should be on those links that are important to understand how the forest sector operates and is governed. Those of marginal importance should be omitted. It is important to add descriptions of how and why the two objects are connected.

51. From a practical point of view, it is usually beneficial to present the linkages between the institutional stakeholders in the form of a graph. The actual approach should be aligned with the content and objectives of the analysis. Practical note: The sticky notes that have been created in the previous steps should be clustered around related ones, leaving enough space for drawing links and placing other notes. Then appropriate links should be drawn. In case of mistakes or need to improve the object placement, the link should be erased, and the analysis started again.

52.   **Step 4. Add contextual notes:** In the context of developing and implementing forest information systems, adding contextual notes is a crucial step in the organizational context analysis. Contextual notes provide relevant information and insights about the actors, activities and linkages identified in the previous steps. These notes help in understanding the broader context within which the forest sector operates, enabling better decision-making and effective system design.

53.   Practical note: To add contextual notes effectively, it is necessary to conduct interviews, surveys and research to gather comprehensive information about the forest sector and the actors involved. This should include socioeconomic factors, environmental considerations, regulatory frameworks, technological advancements and any other relevant contextual details. Additionally, perspectives and expectations of stakeholders should be considered to gain a well-rounded understanding.

C.   Stage C: Defining business objectives of a forest information system programme

54.   Objective of the exercise: The objective of this exercise is to enhance identification and understanding of the key business objectives and goals that should be achieved through the implementation of FIS, and understanding how FIS can support decision-making and value creation within the forest sector (or a part of the sector, depending on the analysis scope).

55.   What are business objectives of a FIS programme: The business objectives of a FIS development programme/strategy are fundamentally different from the forest sector business objectives, and one should take caution not to mix the two notions. While the forest sector business objectives are the motivation for activities of the forest sector stakeholders, the FIS programme business objectives describe how successful execution of the FIS development programme should influence the forest sector (or its part).

56.   For example, assuming that a legally established duty of a forestry government agency is communication with citizens on forest-related issues, *the agency's business objective* would be *providing comprehensive information on the country's forest resources to the public*. This business objective would be realized through the activity of sharing data on forests over the Internet. While analysing possible points of intervention through a FIS, one of *the business objectives of the FIS programme* could be *improving the quality and scope of the agency's communication with the public*.

57.   What is the purpose of defining business objectives of the FIS programme: The goal of value chain analysis and value chain mapping is done to better understand the current system in order to identify strategies for improving. Business objectives of the FIS programme depend to a large degree on policy objectives, but it is vital to identify the most important business objectives of the FIS programme through a structured discussion informed by the VCA results and input from members of the analytical team (steering committee). Resources available for developing the FIS are usually limited and care should be taken to identify and choose the FIS programme business objective so that maximum cost/outcome value is achieved.

58.   **How should points of intervention for a FIS programme be identified:** There are many types of value chain interventions that lead to defining concrete business objectives. Interventions can be classified, for example, as the following four types (Humphrey and Navas-Alemán 2010):

(a)   **Strengthening the weakest link**. This type of intervention addresses the issue of weak links in the chain. The efficiency of the chain as a whole depends upon the performance of each of the linkages. A value chain intervention starts from a diagnosis of the impact of a particular link in the chain on the performance of the chain as a whole.

(b)   **Improving knowledge and resource flows.** Poor flows of knowledge are commonly found in value chains. Knowledge is either poorly communicated, or not communicated at all. This leads to missed opportunities or to inefficiencies in the value chain

operation. One implication of targeting these flows is that knowledge deficits at one point in the chain may be addressed by interventions involving actors at other points in the chain.

(c) **Improving linkages. The efficiency of a value chain depends on the readiness of the actors to exchange information and collaborate.** Poor linkages, e.g. lack of trust between parties involved, result in high transaction costs or transaction failures. Value chain interventions address these problems in a variety of ways, including trust-building initiatives, providing indicators of organization/company reputation and setting up institutions to manage risk. While in practice improving linkages is closely related to the second objective, improving knowledge and resource flows, they are analytically distinct.

(d) **Developing new or alternative links in the chain.** If the overall efficiency of the chain depends on the functioning of each of the links, value chain interventions can identify alternative linkages.

59. There is considerable underutilized potential in value chains that can be tapped into by improving flows of knowledge and resources, improving relationships and establishing linkages as well as by improving capabilities at specific points in the chain. Outside interventions may be needed to unlock this potential. In other words, strategies to improve the forest sector functioning should focus as much on linkages as on its assets.

60. What are the steps in defining business objectives of an FIS development programme: The steps in defining business objectives of an FIS development programme are,

(a) Step 1. Participatory analysis;

(b) Step 2. Validation of the findings;

(c) Step 3. Identifying solutions.

61. **Step 1. Participatory analysis**: In this step, the task is to identify possible points of intervention using the intervention typology described in the introduction and attempt to quantify expected benefits that would result from each intervention. They should be marked on the value chain (context) map prepared in the previous exercise.

62. The question to be addressed is what activities carried out in the forest sector could be improved/changed using information technologies in order to have a positive impact on the sector. Practical note: This step could be organized as separate discussion groups taking notes of their proposals for intervention, together with justifications, and marking them on the value chain map.

63. **Step 2. Validation of the findings:** After the brainstorming session on possible points of intervention, the findings should be summarized and discussed. Proposed items should be evaluated for their relevance, urgency, cost and expected benefits. Care must be taken to ensure coherence between all proposed business objectives of a FIS development programme.

64. **Step 3. Identifying solutions**: The final step is choosing from the proposed points of intervention those items which are deemed to be most suitable to the current situation. They should be ranked with business objectives assigned to each of them. There is no single approach to identifying and ranking solutions.

65. Different factors should be considered, including: political priorities, legal obligations, existing strategies and policies, cost-effectiveness, available resources (both financial and human), organizational circumstances etc.

66. For a FIS development programme more limited in scope, there may be only one or a few points of intervention with a limited number of business objectives. All identified solutions should be listed and ranked with their respective business objectives to be achieved within the FIS development programme.

67. The next stages of the guide are presented in document ECE/TIM/EFC/WP.2/2024/6.

Annex

References

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