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Chapter 2

The measurement of socioeconomic benefits



As countries strive to achieve sustainable forest management, it is important to measure progress in all of the different dimensions of sustainability. Information is routinely collected about environmental and economic aspects of forest management, but measuring the social or socioeconomic benefits from forests is much more challenging, due to a scarcity of data and lack of a clear definition of what exactly should be measured.

There are some assessments of socioeconomic benefits from forests at the level of individual projects – e.g. in socioeconomic impact assessments and village-level case-studies – and some data collection is included in large-scale exercises such as FAO’s Global Forest Resources Assessment and the regional criteria and indicators processes. However, the collection and analysis of information about socioeconomic benefits remains comparatively weak and this should be addressed if the contribution of forests to society is to be properly recognized.

Key message

To measure the socioeconomic benefits from forests, data collection must focus on people, not only trees

With the exception of formal employment figures, forestry administrations have little information on how many people benefit from forests. Current data collection, which focuses on forests and trees, needs to be complemented by data collection on the benefits that people receive. This is best done by collaborating with public organizations undertaking such surveys.

The definition of socioeconomic benefits

Despite frequent references to social or socioeconomic benefits in many disciplines, there is no clear and commonly agreed definition of what exactly this means. For example, these benefits no doubt include some economic benefits, but they may also include more fundamental social benefits, such as: social justice; the preservation of culture; social harmony; freedom; and public security. The latter, however, are more often produced through societal change than through activities in individual sectors. The analysis

here will therefore focus primarily on socioeconomic (rather than social) benefits, where these can be defined as: “the benefits to society of economic activity”.

Economic activity is the production of all goods and services in a country and is usually measured as the gross domestic product (GDP). However, by referring to “socioeconomic benefits”, a reversal of perspective is required; it is now the consumption of goods and services (rather than production) that becomes the focus of interest and the contribution of a sector to socioeconomic benefits may be very different to its share of GDP. Agriculture provides a good example of this difference, in that it often accounts for a small proportion of GDP but delivers significant benefits to society by feeding the population and supporting (usually less developed) rural areas.

The final challenge to developing a definition of socioeconomic benefits from forests is to define exactly what is meant by “benefits to society”. The numerous socioeconomic impact assessments (SEIAs) that have been produced refer to a range of benefits, but the benefits mentioned tend to be

context-specific and focused on those aspects of human life affected by each project.¹ An alternative approach is to examine the frameworks, handbooks and methodologies used by different institutions to produce SEIAs. One recent and comprehensive study (Arora and Tiwari, 2007) has done exactly this and provides a useful working definition that can be adapted for the forest sector. Based on a review of the SEIA literature and SEIA practices in five major international agencies, as well as government and non-governmental organizations (NGOs), this study defines socioeconomic well-being as:

The status of a household where the basic social and economic needs for survival are fulfilled and the household has the capacity to improve its quality of life.

Although it does not refer directly to socioeconomic benefits, this definition implies that such benefits occur when basic needs are met and quality of life is improved.

The study then suggests that:

Socioeconomic well-being can be measured with the parameters of literacy and education, employment, income and consumption, shelter and urban services, health and nutrition, environmental concerns, safety and security, time use and availability.

This highlights the importance of measuring socioeconomic well-being across several different dimensions and the study then proposes a set of indicators for each. Although it is still context-specific due to the fact that its focus is on the transportation sector (it mentions, for example, time use and availability), it covers some of the basic needs that could be relevant to forestry.

A more general observation about socioeconomic benefits is that increased equality is coming to be seen as a major benefit. This can be seen in changes in public spending, which have increasingly focused on income redistribution and the creation of social safety nets over the past 50 years. The importance of this is that the magnitude of socioeconomic benefits depends partly upon who is receiving those benefits. Thus, income from forestry has a higher socioeconomic benefit when earned by relatively poor people. This distinction between different types of beneficiary is

not captured in GDP statistics and national income accounts, but should be examined in any assessment of socioeconomic benefits.

Over the past few decades, there have been numerous studies carried out at the village level on the impacts of forestry on poverty. These studies have shown that any attempt to examine forestry's impacts on inequality is likely to require considerable data collection and analysis that would be difficult and expensive to implement on a larger scale. A simpler way to examine if and how forests provide benefits for the poor is to try to identify beneficiaries that are generally known to be relatively poor or disadvantaged in some way. Hence the importance of collecting and analysing disaggregated data on how forests might benefit disadvantaged groups (such as women, youth and indigenous people) to give a better indication of socioeconomic benefits.

Current measures of the socioeconomic benefits from forests

Before proposing some measures of the socioeconomic benefits from forests it is useful to examine the information that is currently collected on this subject and is readily available for many countries. A small amount of information is collected as part of national population censuses and large-scale surveys (e.g. the use of wood energy) and this will be described later. Other than this, most of the readily available information is collected in FAO's Global Forest Resources Assessment (FRA) and the regional criteria and indicators (C&I) processes.

This information is examined and assessed below, taking into consideration the quality of the data that is currently available (for further explanation of this assessment, see Annex 1). In particular, the following analysis focuses on the validity of much of the data currently collected as measures of socioeconomic benefits.

Data collected in FAO's Global Forest Resources Assessment (FRA) and regional criteria and indicators processes

The FRA collects information from countries every five years, using an internationally agreed set of definitions and covering a range of topics relevant to sustainable forest management. A number of the questions asked in the FRA relate to the socioeconomic functions of forests.

¹ Employment and income generation, which are included in almost all studies, are an exception. Although this appears to contradict the statement that benefits primarily concern consumption rather than production, there is no real contradiction given that income provides the means to purchase goods and services for consumption.

The three main C&I processes also collect information on a number of aspects of sustainable forest management and, for each of the criteria, use indicators to measure progress. The countries covered by each process and the frequency of data collection are as follows:

- FOREST EUROPE, which collects information on 11 indicators of socioeconomic functions and conditions in forests for every European country (including the Russian Federation). The most recent data was collected for the years 2005 or 2010 and was presented in the *State of Europe's Forests 2011* report (FOREST EUROPE, 2011).
- International Tropical Timber Organization (ITTO) Criteria and Indicators, where data collected covers 33 tropical countries that together account for about 85 percent of the global tropical forest area. Countries provide information about 14 different economic, social and cultural aspects of forest management and use (ITTO, 2005) and the latest assessment covered the year 2010 (ITTO, 2011).
- The Montréal Process, which covers 12 temperate and boreal countries (including the Russian Federation again) that account for just over 80 percent of the temperate and boreal forest area or about half of the global forest area. The framework for reporting progress towards sustainable forest management includes a criterion on the "maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies" with 20 related indicators (Montréal Process, 2009).

A summary of the data collected in each of these four exercises is given in Table 1.

Assessment of the data quality and validity of indicators

The measures shown in Table 1 have been grouped into different types of indicators and a brief assessment of the data collected is presented below:

Economic indicators: Information about the value of production or contribution of the forest sector to GDP is collected by the FRA and all C&I processes. Data on forestry's contribution to GDP is available for almost all countries and, as it is collected as part of national income accounts, is likely to be quite accurate in many countries. The main concern with this data is that it may not capture the value added in informal production (e.g. production of woodfuel and non-wood forest products (NWFPs)), which may be significant in many tropical countries. For the same reason, information about the total value of production may be inaccurate for many countries.

With respect to the validity of these measures, the contribution of the forest sector to GDP is an indicator of the net income received by forest owners, shareholders and workers in the forest sector and, as such, is a valid measure of the socioeconomic benefits received by people involved in the sector. The total value of production is not such a valid measure of socioeconomic benefits, mainly because it does not measure net income.² The other economic indicators collected in these exercises (concerning trade and investment) are useful economic indicators but are not good measures of socioeconomic benefits, as they do not focus on the benefits that people receive.

² Value added in production is the correct measure of income, because it subtracts the cost of all materials purchased from other sectors from the value of production to give the surplus revenue that is then divided into income for capital (profit), land (rent) and labour (wages and salaries).

Table 1: Information currently collected regularly on the socioeconomic benefits from forests

Type of indicator	FRA	FOREST EUROPE (Criterion 6)	ITTO (Criterion 7)	Montréal Process (Criterion 6)
Economic indicators	Value of forest product removals. Contribution of forestry to GDP.	6.2 Contribution of the forest sector to GDP. 6.3 Net revenue of forest enterprises. 6.8 Imports and exports of wood and products derived from wood.	7.1 Contribution of the forest sector to GDP. 7.2 Value of domestic production (products and services).	6.1.a,b Value and volume of production. 6.1.c Revenue from forest based environmental services. 6.1.f,g Value and volume of trade. 6.1.h Export and import shares. 6.2.a,b Investment and expenditure (on various forest-related activities).
Labour indicators	Forestry employment.	6.5 Number of persons employed. 6.6 Frequency of occupational accidents and diseases.	7.7 Training and labour development programmes. 7.8 Existence and implementation of health and safety procedures.	6.3.a Employment in the forest sector. 6.3.b Wage rates, average income and injury rates.
Consumption indicators	Wood removals. Area of forest removed for other land uses.	6.7 Consumption per head of wood and products derived from wood. 6.9 Share of wood energy in total energy consumption, classified by origin of wood.	7.6 Number of people depending on forests for their livelihoods. 7.9 Area of forests used for subsistence uses and traditional and customary lifestyles.	6.1.d,e Consumption of wood and non-wood forest products. 6.3.d Area and percent of forests used for subsistence purposes.
Other use indicators	Area of forest designated for social services.	6.10 Area where public has access rights for recreation and intensity of use. 6.11 Number of sites having cultural or spiritual values.	7.10 Number and extent of forests available primarily for: research and education; and recreation. 7.11 Number of important archaeological, cultural and spiritual sites protected.	6.4.a Area and percent of forests available/managed for recreation. 6.4.b Number and type of forest visits and available facilities. 6.5.a Area of forests managed for cultural, social and spiritual values.
Governance and participation indicators	Involvement of stakeholders in forestry policy. Involvement of stakeholders in forest management.		7.4 Mechanisms for cost and benefit sharing. 7.5 Conflict-resolution mechanisms. 7.12 Tenure and use rights in public forests. 7.14 Involvement of local people in forest management.	6.3.e Distribution of revenues derived from forest management.
Other indicators	Forest ownership and management rights (in public forests). Public expenditure and revenue collection.	6.1 Number of forest holdings, by ownership and size classes. 6.4 Total expenditure on forest service provision.	7.3 Forest industry structure and efficiency. 7.13 Use of indigenous knowledge in forest management.	6.1.f Recovery or recycling of forest products. 6.3.c Resilience of forest-dependent communities. 6.4.b The importance of forests to people.

Sources: derived from FOREST EUROPE (2011), ITTO (2005) and the Montréal Process (2009). Note: the numbering reflects the criteria and indicators numbers used in each process.

■ Women working in a plywood factory, China.



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Labour indicators: Information about the number of people employed in forestry or the forest sector is collected in the FRA and all criteria and indicators processes and most countries provide this data.³ The employment data provided by developed countries is reasonably accurate, but for less developed countries the exclusion of employment in informal activities is again problematic. Another concern is whether part-time employment figures are converted to full-time equivalents (FTE) in the figures provided by some countries.

As an indicator of socioeconomic benefits, employment statistics are useful because they show the number of people that derive some benefits from activities in the sector. However, unlike the value added data, they do not indicate the magnitude of those benefits. Thus, they are more useful as indicators of the distribution of socioeconomic benefits than as indicators of the size of those benefits.⁴

The other labour-related indicators collected in these exercises measure health and safety and human resource development. Health and safety statistics are very relevant to any assessment of socioeconomic issues in the forest sector, but the availability of data is quite weak. Similarly, information collected by ITTO about human resource development is also potentially relevant,

³ Many countries provide employment data as part of the ITTO indicator for the number of people depending on forests for their livelihoods.

⁴ The Montréal Process indicators include a section on wage rates and average incomes, but many countries do not collect this information.

but only a few countries provide information and this is mostly qualitative rather than quantitative.

Consumption indicators: FOREST EUROPE and the Montréal Process indicators collect information about the consumption of wood products; data about wood energy use is collected in Europe; and NWFP consumption data is collected as part of the Montréal Process indicators.⁵ With the exception of the latter, most countries have reasonably accurate data on consumption. If socioeconomic benefits are considered to be consumption benefits, as discussed earlier, then these figures are valid measures of the benefits that people receive from forest use. However, if socioeconomic benefits are defined as meeting basic needs and contributing to quality of life, then these measures will be imprecise because they include a wide range of end uses of forest products that may be difficult to evaluate according to this definition. To assess how this consumption meets different needs, it would be more useful to produce disaggregated statistics, as is done in Europe for wood energy.

ITTO and the Montréal Process indicators also collect information about the area of forests used for subsistence and ITTO asks countries to report on the number of people dependent on forests for subsistence. Very few countries are able to provide this information and the accuracy of the data provided may be inaccurate due to the lack of a clear definition. For example, the countries providing information to ITTO about the numbers of forest-dependent people showed a wide range of assumptions and calculation methodologies. In addition, the validity of these measures is questionable. Reporting on the area of forests used for subsistence is focused on measuring forest area rather than numbers of people or quantities of goods and services extracted to meet human needs. The number of people who depend on forests is also, like the employment data, more an indication of the distribution of benefits than the level of benefits that people receive from their use of forests.

Other use indicators: The FRA and all criteria and indicators processes ask countries to provide information about the areas of forests designated or used for various social purposes (most commonly recreation, but also education, research and conservation of cultural or spiritual sites). The definitions used to collect this

⁵ In addition, it should be noted that FAO and ITTO also collect information about the production and trade of all forest products every year, from which consumption can be calculated.

information are quite precise and most countries do provide some data, but in some cases the information is only partial or qualitative rather than quantitative. In addition, many countries noted that a number of these uses occur across a large part of the forest estate and in the same areas (i.e. where forests are managed for multiple uses) rather than being limited to a few specific areas. Collecting data about forest area leads not only to this problem of imprecision but also to the problem of validity (noted previously) that forest area is a measure of the potential supply of benefits rather than their consumption.

The data collected by FOREST EUROPE and the Montréal Process also includes estimates of forest visitor numbers. This is a potentially more useful indicator of the socioeconomic benefits provided by forests because it is a measure of forest use. However, few countries systematically collect this information and the information that is collected often does not cover the entire forest area used by visitors.

Governance and participation indicators: Information about benefit sharing is included in the ITTO and the Montréal Process indicators. Like the employment statistics, this is an indicator of the distribution rather than the magnitude of socioeconomic benefits and is therefore useful to show how some of the income generated in the sector is distributed to local people living in and around forest areas (who are likely to be relatively poor).

In the country reports provided to ITTO and the Montréal Process, many countries provide information on benefit sharing, although much of the information describes the policies and regulations in place rather than measurable achievements. Furthermore, where real results are described, most of the information given is qualitative rather than quantitative, so it is not possible to calculate how much income in the sector is specifically targeted towards local people or the value of other benefits that they may receive. This is a topic that deserves much more attention in the future.

The other data collected by ITTO and the FRA refers to the rights of local people and the ways in which they are involved in forest management. While this, at first glance, may not appear relevant to the subject of socioeconomic benefits, social justice, safety and security are basic human needs that, in many tropical countries, may be affected by activities in the forest sector. Many countries do provide information, describing if and how local

people, communities and indigenous people may be involved in forest management, planning and decision making. However, as with benefit sharing, most of the information provided is qualitative rather than quantitative and focuses more on what should happen rather than measurable results.

Other indicators: All four exercises also collect a range of other information related to social or economic aspects of forest management. Information about efficiency, expenditure, revenue collection and recycling is generally easy to quantify and many countries seem to be able to provide statistics easily, although these measures are not particularly relevant to the measurement of socioeconomic benefits. Conversely, some of the more relevant variables (e.g. the importance of forests to people) are much more difficult to quantify and few countries seem able to provide this information.

The other piece of information that is collected in the FRA and by FOREST EUROPE and ITTO concerns the ownership of forests.⁶ Information on the area of privately owned forests is collected and most countries are able to provide this information. Analysis of the FRA 2010 data suggests that about 25 percent of the world's forests are owned or managed by local people (Whiteman, 2013), who presumably receive some socioeconomic benefits from these areas. However, because this is a measure of area rather than numbers of people that benefit from ownership and management rights, it is not particularly useful as a measure of socioeconomic benefits.

In addition, FOREST EUROPE also collects information about the number of forest holdings in a country. This is potentially more useful as this number is probably close to the number of forest owners and could be used as a rough estimate of the number of people benefiting from forest ownership. However, the information collected is incomplete, suggesting that countries have more difficulty collecting and reporting this information.

Forest-dependent people

The concept of the number of “forest-dependent people” first appeared in discussions about forestry almost two decades ago (Lynch and Talbott, 1995; Ruiz Pérez and Arnold, 1996) and is frequently mentioned in discussions on the socioeconomic benefits of forests. It has also

⁶ This information is collected by ITTO as an indicator of the enabling environment for sustainable forest management (Indicator 1.2) rather than a socioeconomic indicator.

featured prominently in national and international discussions about forestry. For example, improving the livelihoods of forest-dependent people is mentioned as part of one of the four global objectives for forests in the Non-Legally Binding Instrument on All Types of Forests adopted by the UN General Assembly in December 2007 (UN, 2008).

The World Commission on Forests and Sustainable Development (WCFSD) produced the first global estimate of the number of forest-dependent people, suggesting that 350 million people depend almost entirely on forests for subsistence and a further 1 billion on woodlands and trees for their essential fuelwood, food and fodder needs (WCFSD, 1997). Shortly afterwards, the World Bank (2002) estimated that 1.6 billion rural people depend upon forests and, since then, various other estimates have been made using different definitions and assumptions. The most recent review and synthesis of all of these estimates (Chao, 2012) suggests that the number of forest-dependent people is in the range of 1.2–1.4 billion people or just under 20 percent of the global population.

The number of forest-dependent people appears, at first glance, to be an indicator of the importance of forests for social well-being, because it attempts to measure the number of people that derive some socioeconomic benefits directly from forests. Indeed, measuring the number of people deriving benefits from forests (rather than number of hectares of forest) is more valid than some of the other indicators of socioeconomic benefits described

previously. However, there are several issues related to the measurement and interpretation of these estimates.

The first issue is that forest dependence is not defined in many of these studies and, even where it is defined, it is unclear whether the data collected is compatible with the definitions used. For example, the study by Chao (2012) defines forest people as “people who traditionally live in forests and depend on them primarily and directly for their livelihoods”. The report then explains that there are many different types and levels of dependence (see also Byron and Arnold, 1997), and it is unclear whether the estimates presented in the report (from numerous country studies) are compatible with the definition provided. In particular, given that the intensity of use or level of dependence is not accurately quantified in many of data sources, it seems somewhat ambitious to claim that almost one-fifth of the world’s population live in forests and depend on them primarily for their livelihoods (see Box 1).

In addition to the problem of definitions, a second issue concerns the quality of the underlying data and the techniques used to calculate these estimates. The only comprehensive study of the quality of data used to estimate the number of forest-dependent people (University of Reading, 2000) concluded that there are no reliable global or regional sources of data. Some global and regional data is available on different aspects of forest dependency, but there are many data gaps and uncertainties about how statistics have been collected. The report also suggested that it would be difficult

Box 1: How many people live in or near forests?

One way to check the validity of the estimated number of forest-dependent people is to compare this with the number of people living in or near forests. To do this, the latest available information about global land cover (vegetation) was overlaid with population census data to examine how many people live in areas with different levels of forest cover and the results are as follows:

- 3.1 billion live where there is little or no vegetation (<5 percent)
- 1.9 billion live where there is some vegetation (5-10 percent)
- 600 million live where there are some shrubs and sparse woody vegetation (10-15 percent)
- 500 million live in open forests (15-25 percent)
- 750 million live in closed forest (>25 percent)

These figures suggest that the number of people living in or near forests might be around 750 million. In addition, some of the 500 million people living in open forests may depend on them for their livelihoods. Even under the most optimistic assumption (that everyone living in open forests is forest-dependent), the total number of forest-dependent people would only be 1.25 billion, which is at the bottom end of the range quoted in Chao (2012). Thus, the results suggest that the number of forest-dependent people may be much lower than currently estimated.

Sources: Global Land Cover Facility; LandScan, 2010.

■ A man in Adarawa, Niger, collects wood for cooking. It is difficult to estimate of the numbers forest-dependent people.



to aggregate or synthesize the data that is available from the many local and national studies that have been carried out. Apart from differences in definitions, measurements and methodologies used, it would be very difficult to combine numbers of people living in forests, employed in forestry or using forest products, as these are all measurements of different types of forest benefits.

Perhaps the most serious problem with the available estimates of the number of forest-dependent people is that the figures are of little use for policymaking. For example, while an increase in income or employment in forestry would generally be viewed unambiguously as an improvement in the socioeconomic benefits derived from forests, it is unclear whether an increase in the number of forest-dependent people would represent an increase in the well-being of people or not. Indeed, their dependence on forests is often due to a lack of alternative ways to make a living and their well-being might be improved if their dependence on forests was reduced.

The conclusion of this brief analysis concurs with the statements made by Byron and Arnold (1997) that the number of forest-dependent people is not a particularly useful measure of the benefits derived from forests. Instead, disaggregated information about the different types of uses, the benefits derived from these uses and

the distribution of those benefits is likely to be needed to quantify the complex relationships between people and forests in ways that can be useful for forest management and policymaking.

Summary assessment

Four main conclusions can be drawn from current attempts to measure the socioeconomic benefits from forests.

Area statistics are a very poor indicator of

socioeconomic benefits: A wealth of data is collected about the areas of forest managed or used for different purposes. Although the accuracy of this data is quite high, its validity (as an indicator of socioeconomic benefits) is low because the figures do not show how many people receive these benefits or the amount of benefits that they receive.

New approaches to data collection will be required:

To measure socioeconomic benefits, people rather than forests must be the focus of attention but, with the exception of employment statistics, forestry administrations appear to have relatively little information about the numbers of people receiving different types of benefits from forests. However, relevant information may be collected in countries in other surveys and collaboration on these efforts could lead to more useful results.

The importance of different benefits will vary between countries and regions:⁷ The ways that forests contribute to well-being are likely to depend greatly on the level of development in a country. For example, the indicators of socioeconomic benefits developed and agreed by the member countries of ITTO are very different to those used by FOREST EUROPE. Put simply, the contribution of forests to meeting basic needs is likely to be more relevant for less developed countries, while improvements to quality of life may benefit everyone. Measuring these different types of benefit will lead to different challenges (e.g. measuring informal and subsistence activities in less developed countries or trying to quantify how forests contribute to quality of life in countries at different levels of development).

A number of different measures will be required:

Based on the assessment of the number of forest-dependent people and the points made in the previous paragraph, it does not appear useful or feasible to try to consolidate or aggregate the many different socioeconomic benefits from forests into one simple measure. Instead, it is more useful to identify and focus on a few key measures that can be defined and measured accurately and are valid indicators of the different ways that forests can contribute to well-being.

A proposed definition of the socioeconomic benefits from forests

Socioeconomic benefits from forests are the basic human needs and improvements in quality of life (higher order needs) that are satisfied by the consumption of goods and services from forests and trees or are supported indirectly by income and employment in the forest sector.

As a working definition to be used for the analysis presented in the rest of this report, it is proposed that the assessment of socioeconomic benefits from forests should focus on improvements in human well-being that arise from the consumption of forest outputs.⁸ Thus, the above definition captures both the basic and higher order needs that may improve peoples' lives. It also includes

⁷ The regions used in this publication are: Africa; Asia and Oceania; Europe; Latin America and the Caribbean; and North America. Latin America and the Caribbean includes South America, Central America and the Caribbean. Oceania has been combined with Asia due to its relatively small size. The countries included in each region can be found in the Annex tables.

⁸ Following the FRA definition of forests, agricultural tree crops (with the exception of rubber trees) are excluded from this analysis, but the definition includes a reference to benefits from trees outside forests, because it will be practically impossible to identify whether benefits have come from forests or other trees.

the benefits of income and employment in the sector that enable people to meet their needs through the consumption of marketed goods and services.⁹

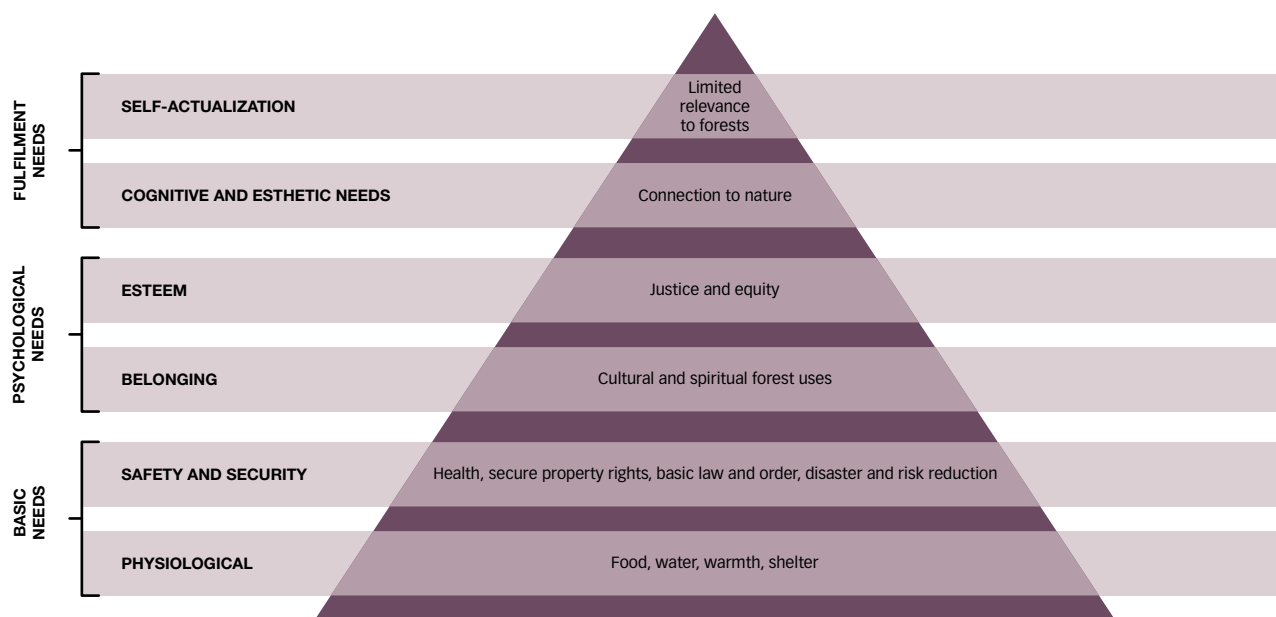
It should be noted that the definition above and the following analysis does not include the indirect, non-use or existence benefits that may be provided by forests. Forests are known to provide a wide range of environmental services that may indirectly benefit many people and their existence may also provide benefits for current and future generations without them directly consuming forest outputs. These are not included here for several reasons. First, there is the practical consideration that comprehensive and reliable information about the value of such benefits is not available for many countries. Secondly, the aim is to make a clear distinction between the socioeconomic benefits from forests and the contribution that forests make to the global environment that are already measured in numerous different ways in exercises such as the FRA. Finally, by focusing on those benefits that are likely to have a more direct and measurable impact on peoples' lives, this analysis will provide new useful information for policymakers that should complement what is already known about the many other benefits provided by forests.

With respect to the needs that are most relevant to forestry, the analytical framework will follow the hierarchy of needs first postulated by Maslow (1943), which presents a general framework describing human needs. A summary of the needs that are most likely to be met in some way by the socioeconomic benefits from forests is presented in Figure 1. Such an approach is similar to other studies that have drawn linkages between human needs and environmental goods and services, such as the Millennium Ecosystem Assessment (MEA, 2005).

At the bottom of the pyramid are the basic physiological needs for food, water, warmth (energy) and shelter. Forests provide a number of goods and services that can be used to meet some of these needs. Above this comes safety and security. Forests may contribute to human health in a number of ways (e.g. the collection of medicinal plants and the use of woodfuel to boil and sterilize water) and may also help to reduce the risk of natural disasters (floods, landslides, etc.). Forests do not directly contribute to

⁹ Income and employment in first-stage processing of forest outputs (e.g. employment in sawmilling) will also be counted as socioeconomic benefits from forests, because these activities are directly linked to forests and can usually be measured or estimated quite easily.

Figure 1: Hierarchy of needs that may be satisfied by the consumption of forest goods and services



Sources: Adapted from Maslow (1943).

security, but the policy and legal framework related to the access and use of forests may contribute to providing secure property rights and basic law and order in forest areas.

Cultural and spiritual uses of forests can contribute to meeting some psychological needs; and measures that attempt to ensure fair and equal access to forests, the sharing of forest benefits or an increase in forest benefits received by the poor can support a more just and equitable society. As noted previously, a focus on the distribution of human well-being in society has been a major feature of measures to support socioeconomic development in recent years.

At the middle and higher levels of the hierarchy of needs, the connections to forests are likely to be less direct and more difficult to measure. For example, the presence of forests and wood products in a country may help to support a connection between people and nature and owning a forest or working with forests and nature may contribute to self-actualization. However, it would probably be difficult to measure these benefits in a robust and meaningful way and the availability of information about this is likely to be very limited. Thus, these potential benefits are noted here for completeness but are not investigated in the following analysis.

Measurement of the socioeconomic benefits from forests

In accordance with the definition presented above, the measures that will be used to quantify the socioeconomic benefits from forests will focus largely on the numbers of people that use forest goods and services in a variety of different ways. A summary showing how the production and consumption of wood products, non-wood forest products and forest services can contribute to different needs is shown in Table 2. Where possible and appropriate, the extent or intensity of use will also be estimated or at least described.

Because most information about the consumption of forest goods and services is collected and organized by type of output, the analysis will systematically examine how each output contributes to one or more needs. Some products will contribute to several needs and, where this occurs, the different benefits will be noted. For example, the production and consumption of woodfuel is not only the main source of energy for many people, but it also generates income and employment, and contributes to food security (as a major source of fuel used for cooking) and human health (where it is used to boil and sterilize water). The analysis will then summarize the results by the different types of needs that are met in various ways by forest goods and services and assess where gaps in information exist.

Table 2: The linkages between the production and consumption of forests goods and services and fulfilment of human needs

Main areas where forests can contribute to meeting different needs	Income from forestry	Collection, purchase or use of forest outputs			Institutional arrangements for forestry
		Wood products	Non-wood forest products	Forest services	
Physiological needs					
• Food	X	X	X	X	
• Water	X			X	
• Energy	X	X	X		
• Shelter	X	X	X		
Safety and security					
• Health	X	X	X		
• Disaster and risk reduction				X	
• Secure property rights					X
• Basic law and order					X
Belonging (social need)					
• Cultural and spiritual uses				X	
Esteem					
• Justice and equity	X	X	X		
Aesthetic needs					
• Connection to nature		X	X	X	