

# Data and Information Collection for Sustainable Forest Management in Japan

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## Introduction

In 1951, the Forest Planning System was established in its original form under the Forest Law, mainly to recover the forest cover degraded during the period around the World War II. As the economy grew, demand on timber also grew rapidly, and so did the importance of the Forest Planning System. Data and information on forests were critical for formulating Forest Plans, based on which effective policy measures were to be taken to enhance forest productivity and to maximize timber production. Later, as the economy further grew and residential areas outreached toward the forest areas, importance of information on forests was recognized also as the basis for evaluating the consequences of converting forest lands into other purposes such as industrial and/or residential areas.

During the recent few decades, prevention of natural disasters has always been recognized as the most important function of forests by the people in Japan, while timber production has become relatively less important. Expectation on forests is also growing for their functions of protecting wildlife species and conserving biological diversity, mitigating global warming, being the place for recreation, etc. In order to meet diverse expectations and values put on forests, more sophisticated data collection scheme should be introduced, taking into account various aspects of the concept of Sustainable Forest Management.

This paper will summarize the system of data and information collection for sustainable forest management in Japan, and discuss how they could be improved so that those data and information would be effectively utilized for promoting SFM.

## State of Forests in Japan

Japan's land is consisted with small islands stretching from South-West to North-East (ranging from sub-tropical to sub-arctic zone). Approximately 25 million hectares (250 thousand km<sup>2</sup>) or two-thirds of Japan's national land area is covered by forests, most of which are located in steep mountainous areas.

Approximately 30 percent of the total forest area is owned by the national government<sup>1</sup>, and the

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<sup>1</sup> Most of the nationally-owned forests are managed by the Forestry Agency (these forests are described as "National Forests" in this paper), but some are managed by other government agencies such as the Ministry of Education, Culture, Sports, Science and Technology mainly as University Forests and the Defense Agency mainly as training fields.

rest are private forests<sup>2</sup>. Because of the widely-ranging natural conditions, various types of forests can be seen in Japan.

With volcanic soil base vulnerable to erosion, combined with large portion of precipitation concentrating in relatively short period of time of the year (e.g., rainy season, typhoon season), Japan has experienced countless natural disasters originating in mountainous areas, such as floods and landslides, since its dawn of the history.

Approximately 10 million hectares of forests, or 41% of the total forest area, are planted mainly with conifer trees. Major portion of planted forests are still young for harvesting but are needing labor-intensive management, e.g., brushing and thinning. Substantial part of planted forests will reach the harvesting stage in next 10 to 20 years.

Very small ownership size of privately-owned forests in Japan, typically under 5 hectares and many being even less than a hectare, it is a challenge to manage them systematically and efficiently.

### Conventional Data / Information Collection System on Forests in Japan

Conventional set of data collected on forests in Japan include information mainly related to the status of trees grown on the forest land, such as the species, age, average height, volume and annual growth of the trees grown on the forest, together with the location, name of the owner, size, site productivity class and legal designations of the forest, and so on. A piece of forest land which can be defined by a unique set of such data or “attributes” is called a “Small Unit” which has the literal meaning of smallest unit of forest management in Japan. Because of very small ownership size, typical size of logging operation is also very small, and thus small is the size of Small Units. There are more than 34 million Small Units in private forests across Japan, meaning that the average size of Small Units is approximately 0.5 hectare.

These data are collected and recorded as the comprehensive forest inventory, and are utilized as the basis for Regional Forest Plans, formulated by Prefectural Governments for private forests and by Regional Forest Offices for National Forests. “Forest Planning Maps”, 1/5,000 scale topographic maps with the areas of all Small Units shown, are also drawn by these authorities.

These inventory data, together with Forest Planning Maps, are updated at least every five years when Regional Forest Plans are revised. Since virtually all logging in forests shall be reported either to the mayors of municipalities or to Prefectural Governors in one way or the other, data on those harvested forests can be updated based on such reports, so that the latest state of those forests can be reflected, including whether they had been restocked or not. For forests that had not been logged during the five years’ interval of data-updates, information will be updated either by reflecting the result of a survey done for formulating Regional Forest Plans or simply by applying standard growth tables.

Since 1974, permission of Prefectural Governor is required to develop and convert any privately-owned forest land into other uses beyond 1 hectare in size. Upon application for permission, Prefectural Governor will assess the risks associated with the conversion in question, particularly in the light of whether it would likely cause problems in public functions of the land such as extreme erosion and/or landslides, flood or water shortage.

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<sup>2</sup> Within Japan’s policy framework, “private forest” is defined as any forest other than those owned by the national government. Therefore, in addition to privately-owned forests, “private forests” also include forests publicly owned by prefectural or municipal governments and those owned by communal bodies.

In order for Prefectural Governors to assess such risks correctly, potentiality of forests' functions have been evaluated since 1977, originally in four categories, i.e., timber production, land disaster prevention, nurture of water resources, and recreational / conservational services. Later in 1987 the category of recreational / conservational services was replaced by two categories, i.e., recreational / cultural services and conservation of living environments, which made up five categories in total. Potentiality is evaluated in three-level relative scale for each of those five categories, for all forests in Japan. The scores are recorded and updated together with the data mentioned above.

The conventional method of collecting, recording and updating data on forests is now facing constraints in budget and human resources. In order to economize on these labor-intensive processes, the Forestry Agency is financially supporting Prefectural Governments for their introduction of Geographic Information System (GIS) and conversion of conventional data into digital formats. By 31 March 2001, 21 out of 47 prefectures have installed GIS system for forest planning, and approximately 41% of all Forest Planning Maps for private forests have been digitized and combined with digital data in those systems. We expect that the management of National Forests will also introduce GIS in the near future, and thus basic data and information on all forests in Japan will be handled in GIS within 5 years or so.

### 1999 Forest Resources Monitoring System

In order to collect comprehensive data and information on forests, to assess the progress toward sustainable forest management, and to incorporate such assessment into forest-related policies, the Forestry Agency of Japan has started the Forest Resources Monitoring System in 1999, which monitors changes in quality and quantity of forests on a nation-wide scale incorporating some of the C&I identified in the Montreal Process.

Under the System, data are collected on some 15,700 permanent monitoring plots, 10,500 of which are located in private forests and the rest in National Forests. The plots have been chosen systematically on 4km x 4km grid points covering forests all over Japan. Each plot is a circle of 0.1 hectare in size, divided into three parts by concentric circles with radius of 5.64 meters, 11.28 meters and 17.84 meters, respectively. The System is designed so that some 3,100 plots or one-fifth of the total number of plots are visited and data collected every year, which means that each plot will be visited every 5 years in rotation.

From each plot, information are collected such as the species names, diameter at breast-height (DBH), viability, and state of bark and cavity of all standing trees that have DBH of more than 1 centimeter in the center-most circle, more than 5 centimeters in the middle part, and 18 centimeters in the outer-most part of the plot. Twenty trees are randomly selected across the plot to measure the heights. Data on the diameter of rootstocks at ground-height are also collected for those exceeding 5 centimeters. Diameter, length and extent of decomposition of fallen trunks are measured for those with more than 5 centimeters in diameter, only in the center-most circle of the plot. In the center-most circle, dominance and cover rate of all herbal and fern species are also recorded with their names, and the names of all herbal and fern species seen in the outer two circles are also recorded.

With the data collected under the System, we will be able to report on 18 out of 28 natural/biological indicators identified by the Montreal Process. Since 39 out of 67 Montreal indicators are social and/or economic ones, we will be able to report significant portion of indicators.

There are some gaps and weaknesses in the System, particularly in relation to the modality of data collection, i.e., collection of data from permanent sample plots. For instance, the System is

not suitable for monitoring the state of animals, birds and insects, although their tracks left in the plots can be recorded, which is relevant to “the number of forest dependent species” (1.2.a of Montreal Process indicators) or “the status (threatened, rare, vulnerable, endangered, or extinct) of forest dependent species at risk of not maintaining viable breeding populations” (1.2.b). We have been relying on more specific scientific surveys to get information on the state of animals, birds and insects. Although the state of forests can be estimated with a certain statistical accuracy, the System may not be enough to estimate the geographic pattern or distribution and their change over time, which is relevant to “fragmentation of forest types” (1.1.e), considering the small forest ownership in Japan.

In order to overcome some of these gaps and weaknesses in data collection under the System, the Forestry Agency of Japan has been proposing to the financial authority to launch a new project “Forest Resources Geographic Monitoring and Assessment Project” for analyzing geographic pattern or distribution of forest types and vegetation using high-resolution satellite imagery. If our project proposal is accepted, we will be able to analyze and report on the extent to which forest types are fragmented in Japan. This project is also expected to enable us to economize significantly on conventional data collection, with much of our financial and human resources diverted from labor-intensive survey works to more value-added policy development works.

### Reflecting the Monitoring on Forests in Policy Formulation

Through continuous collection of data under the Forest Resources Monitoring System, combined with conventional data and information as well as with information collected under the newly-proposed Forest Resources Geographic Monitoring and Assessment Project, we will be able to assess our progress toward sustainable forest management in more comprehensive manner in the near future, particularly as we go through the second round of data collection under the System starting 2004.

Forestry Agency of Japan is allocating budget to a three-year program for developing methodologies for analyses of data collected under the Forest Resources Monitoring System, so that meaningful conclusions can be reached in terms of both statistical / scientific validity and usefulness for policy development. In FY2000 which was the first year of the program, a computerized database system was established. In the latter two years of the program, it is expected that methodologies will be identified for analyzing data, and that the database software will be customized to incorporate such methodologies.

In July 2001, the Government of Japan revised the Forestry Basic Law, which was originally enacted in 1964, and enacted the new Forests and Forestry Basic Law, in order to set new guiding principles for Japan’s forest policies in accordance with the concept of sustainable forest management. In accordance with the new Basic Law, the Government established the new Forests and Forestry Basic Plan which: (i) outlines basic directions of forest management policies, (ii) provides with goals to be sought by all stakeholders concerned, including national and local governments, forest industry and forest owners, as well as consumers of forest products, and (iii) identifies policy programs that should be implemented in order to meet those goals. The Plan was approved by the Cabinet on 26 October 2001, just 10 days before this meeting.

The new Basic Law states that the Plan shall be reviewed and revised as necessary every 5 years or so. In the new Basic Plan, statement is made clearly that the review and revision of the Plan shall be based on the evaluation of policies implemented according to the Plan. In this context, it is highly expected that the assessment on our progress toward sustainable forest management, that shall become available in the near future, provide a firm basis for such evaluation of policies.

## Practical Approach for Utilizing C&I for Monitoring, Assessment and Reporting (MAR)

Ideally, assessment of progress toward sustainable forest management should incorporate as a wide range of perspectives as possible. Criteria and Indicators are developed by various processes in order for each country to collect data and information on forest management with reference to such indicators. For example, 7 criteria and 67 indicators have been identified and agreed upon by Montreal Process member countries. The ultimate goal for those member countries would be to collect data on all 67 indicators and assess sustainability of their forest management using all available data.

In reality, however, different countries are in different stages of development as regards to collection and assessment of data on their forest management. It would take a long time for some countries to reach the stage of using complete set of agreed indicators (or, can we ever reach that stage?).

A practical approach to address this problem would be to set a timetable for national reporting and to report on practical key indicators optimizing existing resources in the country. In promoting the work of MAR, it is important to start reporting as soon as possible with available information, even though the report may not be perfect, and in the second round of reporting, increase the number of indicators reported. In the case of Montreal Process, member countries are supposed to present their country reports in the year 2003. The Forestry Agency of Japan is working on the country report, which will be based mainly on the conventional data/information collection system. More than half of the 67 indicators will be reported in the year 2003 using conventional data and information. More number of indicators will be measured and comprehensive report can be made in the medium term, e.g., in the second round of reporting, with the effective use of the Forest Resource Monitoring System.

In implementing such a practical approach, the experience of Montreal Process member countries could provide useful suggestions to other countries. In the preparation of Portland Workshop in August 2001, member countries selected one measurable indicator out of each criterion. The selection of such key indicators needs intensive discussions on which indicators are keys for national reporting and regional reporting respectively.

As discussed in the IPF report, criteria and indicators should be used as a framework for promoting best forest practice and reflected in policy formation process. Identifying practical key indicators and setting a timetable for reporting will expedite the incorporation of monitoring and assessment into policy evaluation and formation processes.

## Conclusion

There is little sign that the rate of deforestation and degradation of forests have significantly slowed down on global scale. It is our urgent task, therefore, to concentrate our resources on the most cost-effective actions to address global deforestation. Identifying practical key indicators and setting timetable for reporting, as discussed above, would contribute to fulfilling that task. Criteria and Indicators, as identified and agreed upon by various international processes, could provide us with "ambitious" definitions of sustainable forest management, whereas the proposed approach may be a practical strategy bridging monitoring and assessment to policy development promoting sustainable forest management.