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Autor: Lund, H. Gyde / Boley, Margrett

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National Resource Inventorying and Monitoring Needs: The Said and Unsaid from UNCED

H. Gyde Lund[1] and *Margrett Boley*

«The main objective [of monitoring] is to reveal discrepancies between forecast and achievement in time for remedial actions to be taken» – *Paul Schmid-Haas* (1981).

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Introduction

Foresters and other resource specialists have carried out resource inventories for at least one hundred years in many countries. Increasing populations and demands for resources have created new demands for data beyond that about forest land and its timber resources. In addition, nearly all national natural resource issues, whether they be environmental, social, economic, ecological or political, are also global issues. For these reasons, there is an increasing need to inventory and monitor all our lands and resources and share the resulting information with the international community.

In June, 1992, the United Nations Conference on Environment and Development (UNCED) met in Rio de Janeiro, Brazil to discuss global issues. A number of «Agreements» (principles), «Statements», and «Conventions» related to the environment were negotiated at UNCED. These include (*FAO* 1993) the:

Rio Declaration on Environment and Development (Rio Declaration or RD);

A Programme of Action for Sustainable Development for Now Into the Twenty-first Century (Agenda 21 or A21);

[1] Gyde Lund is the successor of Paul Schmid-Haas as Head of the IUFRO Section S4.02 Forest Inventory.

Non-Locally Binding Authoritative Statement of Principles For a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests (Forestry Principles or FP);
United Nations Convention on Biological Diversity (Convention on Biodiversity or CDB);
United Nations Framework Convention on Climate Change – (Convention on Climate Change or FCCC).

In addition, UNCED led to the development of the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (Convention on Desertification or COD). If taken at face value, these documents add significantly to the information required from national inventory programs.

The UNCED Agreements and Conventions

The United States (U.S.), with some 177 other Governments, signed the UNCED Agreements (The Rio Declaration, Agenda 21, and the Forestry Principles). While they lack the force of international law, they carry a strong moral obligation to insure their full implementation. However, there does not appear to be any specific body to which Governments are to report progress under these Agreements.

A. The Rio Declaration (RD)

The *Rio Declaration on Environment and Development* is a political document or proclamation that outlines lifestyles that insure the planet's integrity as habitat for humankind and all living creatures. There are 27 principles presented (*Anonymous* 1992, 1993), of which two in particular should influence our inventory programs.

> *Principle 2:* «States have... the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.» This shows that we need international standards for sharing and comparing environmental data. That means that our inventory and monitoring programs have to include these standards.

> *Principle 10:* «At the national level, each individual shall have access to information concerning the environment that is held by public authorities... States shall facilitate and encourage public awareness and participation by making information widely available.» The implication of this principle is very obvious – our general publics should have access to the data we collect.

B. Agenda 21 (A21)

The Programme of Action for Sustainable Development for Now Into the Twenty-first Century is a longer, negotiated text of action steps, four sections, and 40 chapters. Each chapter deals with a different substantive area, identifying desirable outcomes, and the steps necessary to achieve them (*Anonymous* 1992, 1993). The following chapters offer specific needs relating to our inventory programs:

8. Integrating environment and development in decision-making
9. Protection of the atmosphere
10. Integrated approach to the planning and management of land resources
11. Combating deforestation
12. Managing fragile ecosystems: combating desertification and drought
13. Managing fragile ecosystems: sustainable mountain development
14. Promoting sustainable agriculture and rural development
15. Conservation of biological diversity
16. Environmentally sound management of biotechnology
17. Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection and rational use and development of their living resources
18. Protection of the quality and supply of freshwater resources: Application of integrated approaches to the development, management and use of water resources
40. Information for decision-making

For a country such as the United States, which has forests, mountains, inland waters, coasts, and deserts, all chapters apply.

C. Forestry Principles (FP)

The objective of the *Non-Locally Binding Authoritative Statement of Principles For a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests* is for Governments to contribute to the management, conservation, and sustainable development of forests and to provide for their multiple and complementary functions and uses (*Anonymous* 1992, 1993). The main emphasis of the Principles is for Governments to manage forest land on a sustainable basis to meet the social, economic, ecological, cultural and spiritual needs of present and future generations including forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products.

D. Convention on Biodiversity Conservation (CBD)

The *United Nations Convention on Biological Diversity* is developed to insure effective mechanisms to halt the destruction of biological species, habitats, and ecosystems. The goals of the Convention are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the use of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, considering all rights over those resources and to technologies, and by appropriate funding.

E. Convention on Climate Change (FCCC)

The *United Nations Framework Convention on Climate Change* has the goal to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Governments should achieve such a level within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The tracking of changes in vegetation cover is implied in this Convention. Vegetation cover, such forests, serve as sinks of carbon dioxide and serve as reservoirs in the form of biomass. Loss of vegetation cover, thus, increases the level of greenhouse gases in the atmosphere. Maintaining or increasing vegetation cover, especially the forest cover, can help mitigate climate change, both by preventing emissions, and by sequestering the carbon content of standing vegetation crops (forest) (*Gupta* 1994).

F. Convention on Desertification (COD)

The objective of the *United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa* is to combat desertification and mitigate the effects of drought through effective action at all levels.

Inventory Requirements – The Said

Our preliminary analysis of the UNCED documents shows some very obvious inventory requirements.

A. Woven into the UNCED documents are a variety of common information requirements (*Anonymous* 1992, 1993). These include:

1. Meeting the social, economic, ecological, cultural, and spiritual needs of present and future generations.
2. Providing reliable data and information and to collaborate where necessary, with relevant international organizations, to improve data and information continuously and to ensure its exchange.
3. Strengthening information, systematic observation, and assessment systems for environmental, economic, and social data related to the various resources at the global, regional, national and local levels.
4. Collecting, consolidating and exchanging existing information and establishing baseline information on aspects relevant to the program area including:
   Meteorological, hydrological and physical data – A21/13.7(a)[2]
   Data on natural resources relating to food and agricultural production and planning – A21/14.1(b)
   Terrestrial, aquatic, and coastal and marine environments data – A21/15.6(c)
   Assessment and management of coastal areas and all seas and their resources – A21/17.8(a)
5. Gathering multi-sectoral information (forest, wildlife, soils, water, etc.) and integrating the data from these sectors with adjacent areas. Developing integrated information systems for environmental monitoring, accounting and impact assessment.
6. Harmonizing the methodologies for programs involving data and information activities to insure accuracy and consistency. Use compatible standards and systems.
7. Involving the local population in the data collection process.
8. Enhancing research support and improving public access to information.

B. According to UNCED and the Conventions, areas and indicators to be inventoried and monitored are summarized in *tables 1* and *2*.

Information gathered from UNCED or the Conventions are to be reported to and monitored by either the United Nations Commission on Sustainable Development (UNCSD) (*FAO* 1993) or by the Conference of the Parties (COP) in the case of the Conventions.

[2] Note: This shorthand is used to identify the specific UNCED document and section or chapter where the requirement is located. A21/13.7a = Agenda 21, Chapter 13, Part 7a.

Table 1. Areas to be monitored according to documents arising from UNCED (*Anonymous* 1992, 1993).

Area	*A21*	*FP*	*CDB*	*FCCC*	*COD*
Low-lying coastal				4.8(b)	
Arid and semi-arid				4.8(c)	
Suitable for reforestation		6(d)			
Suitable for afforestation	11.4(a)	6(d)			
Prone to natural disasters	13.7(c)			4.8(d)	
Liable to drought and desertification				4.8(e)	
High urban atmospheric pollution	13.7(d)			4.8(f)	
Fragile ecosystems				4.8(g)	
Forested	10.11(d) 13.7(b)			4.8(c)	

Note that UNCED lists areas to be inventoried and monitored beyond forested lands. In addition to these new area requirements, much of the data listed above are usually not included in most national «forests» inventories. Therefore, Governments must either make provisions to gather the data in the forest inventories or obtain in the information in separate efforts.

Table 2. Indicators to be monitored according to documents from UNCED (*Anonymous* 1992, 1993).

Indicator	*A21*	*FP*	*CDB*	*FCCC*	*COD*
Biomass	11.4(a)				
Climate	10.11(d)				
Ecosystems and Habitat		2(a)	7(a) 1		
Emission sources and removals		2(a)		1(b); 2(c); 7.2(d); 12.1(a)	
Employment		2(a)			
Energy	12.29(b)				
Fodder		2(a)			
Food	12.29)(b)	2(a)			
Fuel		2(a)			
Land cover	11.4(a)				
Land degradation	14.47(b)				16
Land productivity	11.4(a)				
Land use	11.4(a)				
Landscape diversity		2(a)			
Medicine		2(a)			
Minerals	12.29(b)				
Plants and Animals	11.4(a); 12.29(b); 13.7(b)	2(a)	7(a) 1		
Recreation		2(a)			
Shelter		2(a)			
Soils	10.11(d); 12.29(b); 13.7(b)				
Water and Water Use	12.29(b); 13.7(a&b)	2(a)			
Wildlife	10.11(d)	2(a)			
Wood Stocks		2(a)			

The Needs – the Unsaid

There are several gaps between what is presented in the UNCED documents and in their implementation. These are the missing or «unsaid» requirements.

A. There may be an implementation gap between the signers of the UNCED documents and the people who are to collect the data in the field to meet the obligations. Gretta Boley and I, for example, have the responsibility of developing national inventory direction for the USDA Forest Service in areas of watershed and forestry respectively. The first time that we learned of the inventory requirements in UNCED was in the preparation of this paper. Here we have a situation of a country agreeing to gather and make information available with no noticeable provision for forwarding those needs to those that will have to obtain the data.

B. Detailed information requirements are lacking. For example, what information do we need about «soils» to meet the requirements of Agenda 21 Chapters 10, 12, and 13? Do we need to measure the texture, depth, Ph, chemical composition, etc.? What criteria should Governments use to determine if any of their lands are suitable for reforestation or afforestation? The international community needs to be more specific about the required information.

C. To follow Rio Declaration 2, Governments need to be using the same standard definitions and procedures for capturing these data. Such standards and definitions are lacking. For example – information on forest cover is needed to meet many of the UNCED requirements. Crown or canopy closure and vegetation life forms are usually the basic data elements we use to identify forest land. For countries to be comparable, they need to use the same threshold for crown closure and the same definition for tree. Some international organization has to take the lead in developing the rules and regulations. Guidance on how this may be done can be found in *Lund* (1987) and an example product in *Resource Inventory Coordination Task Group* (1989).

D. Another requirement is the need for Governments to track changes between now and the year 2000. Many countries do not have the necessary plots established to produce statistics for the current situation much less data for the year 2000. It may be the year 2000 before countries have their plots in place. The question becomes, then, how do we go back in time to generate the «before» situation. Historic remote sensing, such as archived Spot, Landsat, or AVHRR imagery may provide a partial solution. We could use existing imagery to provide part of the «before» information in the year 2000.

E. While there are requisites in UNCED for gathering data, the requirements to monitor a nation's compliance and for upward reporting are not clear. This is understandable since implementing the UNCED agreements are voluntary. The statements in the various Conventions are binding to the nations that signed them. Governments are to report accomplishments periodically to a Conference of Parties (COP). However, these Conventions do not cover all the lands and resources discussed in UNCED. A Forestry Convention, for example, is lacking.

F. As mentioned above, we are to report accomplishments under UNCED to the UNCSD and to the Conference of Parties for each Convention. In addition, we often report the same or similar data for various periodic global assessments conducted by the Food and Agriculture Organization (FAO) of the United Nations. Dual or multiple reporting of some of the same information to different UN entities is not efficient. We should be able to collect and report data once and only once to the UN community.

Recommendations

Our recommendations, based on our preliminary review of the UNCED documents and the Conventions, suggest national and international follow-up actions.

A. National Governments

1. Governments should take their UNCED obligations seriously. They need to:
   essentially inventory and monitor all their lands and resources,
   do so in an integrated manner, and
   make the resulting information readily available to the public and the international community.
2. Those that signed the UNCED documents and Conventions need to make sure the information requirements are passed along to those agencies and individuals that have the responsibility for gathering the data.
3. The minimum area data required, in all likelihood, includes: Earth cover by ownership, status (protected, non protected), use, cover type, ecological classification, geology, climate, soils, and topographic data (slope, aspect, elevation). Other information we should gather includes vegetation type, height, crown closure, geographic coordinates (for tying with other data in a GIS) (*Päivinen, et al.* 1994).

4. Because integrated data collection and analyses are desired, national governments need to identify which of their agencies/ministries will take the lead.
5. For «upward reporting», Governments should report data once and only once to the International Community. This means Governments should insure there is communication between their reporting agencies to maximize and coordinate information sharing and to avoid possible conflicting data. Guidance for integrating and coordinating inventories at the national level are provided in *Lund* (1986, 1987, 1995) and *Lund* and *Wigton* (1994).
6. Since Governments are to track changes between 1992 and the year 2000, they will need to set up an inventorying and monitoring program probably involving use of permanent plots and remote sensing. A good monitoring program takes time to develop and requires a long term commitment. This need is often overlooked.

B. International Community

1. To follow the stipulations given in the Agreements, the international community needs to be more precise in the specifications of data required, terms to be used, definitions, and establish time frames and protocols for reporting.
2. Since the recommendations from UNCED apply to all levels – national through global – the international community also should be looking at integrated assessments and reporting. While we have good data on some sectors, we do not fully understand how various sectors relate to one another (*Rodenburg* 1992).
3. To be most efficient, it would be best to have one group responsible at the national level and one entity responsible at the global level for passing and receiving information. Rather than reporting the same data several times to different International Groups, we recommend that data be collected once and reported once. This may mean there should be one global data base and report or an assessment springing from UNCED. Suggestions for strengthening links between the global community and national governments are provided in *Lund* (1987, 1990b, and 1993) and *Lund* and *Preto* (1990).

As our friend *Paul Schmid-Haas* (1985) once wrote (and to whom we dedicate this article) – «national inventories... should be holistic as far as possible, and their results internationally comparable. We need a worldwide overview of the developments, so we can monitor our natural environment and save and protect as much forests as possible». It is only by our meeting the UNCED obligations and through international cooperation that we will be able to

address and solve the economic, social, and environmental problems we face in our common home – our planet Earth.

Summary

This article examines the inventorying and monitoring needs resulting from the agreements reached at the United Nations Conference on Environment and Development (UNCED) held 3–14 June 1992 in Rio de Janeiro, Brazil. The documents reviewed include: the Rio Declaration on Environment and Development, A Programme of Action for Sustainable Development for Now Into the Twenty-first Century, Non-Locally Binding Authoritative Statement of Principles For a Global Consensus on the Management, the Conservation and Sustainable Development of all Types of Forests, the United Nations Convention on Biological Diversity, and the United Nations Framework Convention on Climate Change. In addition, the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa resulted as an outcome of UNCED. The requirements in these documents should influence how we design our national inventory programs.

Zusammenfassung

Nationale Erfordernisse zur Inventur und Überwachung von Ressourcen: Das Gesagte und das Nichtgesagte bei der UNCED

Die Deklarationen der United Nations Conference on Environment and Development (UNCED), die im Juni 1992 in Rio stattfand, haben einen direkten Einfluss auf nationale Programme zur Erfassung und Überwachung von Wäldern. Die Bedeutung verschiedener Dokumente der Rio-Konferenz für nationale Walderhebungen wird dargestellt. Besonders wird auf die bestehenden Diskrepanzen zwischen den internationalen Übereinkünften und nationalen Walderhebungsprogrammen eingegangen. Der Beitrag schliesst mit Empfehlungen auf nationaler und internationaler Ebene zur Berücksichtigung der Deklarationen von Rio bei der nationalen Inventur und Überwachung von Wäldern.

Résumé

Inventaire et surveillance des ressources – ses exigences sur le plan national: les dits et les non-dits de la CNUED

Les déclarations de la Conférence des Nations Unies sur l'environnement et le développement (CNUED), qui s'est tenue à Rio en juin 1992, ont un impact direct sur le programme national d'inventaire et d'observation des forêts. Cet article explique

l'importance pour les inventaires forestiers nationaux (IFN) de divers documents issus de la Conférence de Rio. Il analyse notamment les divergences existant entre les accords internationaux et les programmes d'IFN. L'article conclut en recommandant aux pays de prendre en considération les déclarations de Rio lorsqu'ils planifient l'inventoriage et l'observation de leurs forêts. Traduction: *Monique Dousse*

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Authors: H. Gyde Lund and Margrett Boley, USDA Forest Service FIERR and WSA respectively, P.O. Box 96090, Washington, DC 20090-6090, USA.