

USER REQUIREMENTS STUDY

FOR
REMOTE SENSING BASED SPATIAL INFORMATION
FOR
THE SUSTAINABLE MANAGEMENT OF FORESTS

WORKPACKAGE REPORT

[Workpackage 1]

INTERNATIONAL USER IDENTIFICATION
AND PLATFORM CREATION

November 1998

ITC	In cooperation with	FAO	IKC N	NIVR
	IBN-DLO	WAU	DOFI	NEO
	Fokker Space BV	NLR	TNO-FEL	Vissers DataManagement

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Preface

This study originates from the problems observed with information availability for sustainable forest management. It aims at addressing the following issues:

1. Identification of users of spatial information for forest management
2. Assessment of the information needs
3. Translation of these needs into functional and system requirements
4. Identification and assessment of existing and planned technology for application in forest management
5. Assessment of the extent to which information requirements are and/or can be met by existing/planned technology
6. Preliminary assessment of the need for an “end-to-end” monitoring system
7. Creation of a national and international platform to support the study

Three Netherlands Ministries have sponsored the study, i.e. the Ministry for Economic Affairs, the Ministry of Foreign Affairs (Netherlands Development Assistance – Neda), and the Ministry of Agriculture, Nature Management and Fisheries.

The study has been carried out by the International Institute for Aerospace Survey and Earth Sciences (ITC) of Enschede, the Netherlands in cooperation with:

- Food and Agriculture Organisation of the United Nations (FAO), Rome, Italy
- National Reference Centre for Nature Management (IKC N), Wageningen, the Netherlands
- Institute for Forest and Nature Research (IBN-DLO), Wageningen, the Netherlands
- Wageningen Agricultural University (WAU), Wageningen, the Netherlands
- DO Forestry International (DOFI), Bennekom, the Netherlands
- Netherlands Geomatics and Earth Observation BV (NEO), Lelystad, the Netherlands
- Netherlands Agency for Aerospace Programmes (NIVR), Delft, the Netherlands
- National Aerospace Laboratory (NLR) Amsterdam, the Netherlands
- Fokker Space BV, Leiden, the Netherlands
- TNO-Physics and Electronics Laboratory (TNO-FEL), The Hague, the Netherlands
- Vissers DataManagement, Wageningen, the Netherlands

The study results have been laid down in the following reports:

Final Report User Requirements Study

Workpackage Reports

1. International user platform
2. Design of the user needs assessment study
3. Forest functions, management principles and information systems
4. User needs assessment for spatial forest information: results and analysis
5. Country studies
6. Remote sensing applications for forest management
7. User requirements versus existing capabilities
8. Proceedings of URS Workshop
9. User Requirements Study – Administrative Report

USER REQUIREMENTS STUDY

INTERNATIONAL USER IDENTIFICATION AND PLATFORM CREATION

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1. INTRODUCTION

1.1 Background

In 1996 the decision was taken by the Intergovernmental Forum on Forests (IFF), that every country should continue to develop and conserve its forests and forest lands in the context of the National Forest Programmes, NFPs. Since the NFP-process is rooted in the preceding TFAP and NFAP mechanisms, from the outset it was felt that the User Requirements Study should draw on the expertise and knowledge of national experts involved in the efforts to sustainably develop forests and forest lands. At the same time it has been recognized that only through national institutions and local forest/land use managers, improvement of forest management could be effectively pursued, and that therefore, the most important partners in the study and its follow-up would be found at the national level.

1.2 Study introduction

In order to benefit from the views and considerations of the national forestry people, the URS was introduced to 3 regional meetings, in Asia, Africa and Latin America, organised by FAO to enhance the implementation of the IFF recommendations. The audience consisted of national and local people concerned with planning and implementation of NFPs (appendices 1, 2 and 3).

In addition to this main target group (the field level users of information/data for sustainable forest management), the URS concept was introduced to international organizations with a mandate or stake in the development and conservation of forests (appendix 4). As such, the views of forestry and/or remote sensing experts of the following organizations were solicited: IIASA, WCMC, IUCN, WWF, UNEP, ITTO, ICRAF, Worldbank, WRI, UNDP, CCRS, CIFOR and the World Commission on Forests and Sustainable Development.

Furthermore, FAO - since 1985 providing coordination and support to the TFAP/NFAP/NFP process - was asked to be partner in the URS, and their considerations were incorporated in the questionnaire used for the study.

IUFRO, WFI, GFW and FRA are all developing information supply systems, but all draw on existing information. Nevertheless, these organizations/projects may be important partners in the follow-up to the URS.

Representatives of the above mentioned countries and organizations will participate in the international workshop to discuss the findings of the study. And they may also be part of the international platform to be set up to shoulder the efforts in to establish a global forest monitoring system to enhance the sustainable management of forests and forest lands.

Besides participation and presentation of the URS to FAO-organised meetings, the URS was presented at:

1. The Network Meeting on Global Forest Information Services, Resource Technology '98, Symposium, Rovaniemi, Finland, 8-12 June 1998 (appendix 5)
2. A large number of organisations involved in forest management in Brazil during a visit by two study team members (appendix 6)

2. SYNTHESIS OF OPINION

2.1 The results of interviews

The User Requirements Study brings together the information needs of foresters, planners and other interested individuals responsible for the sustainable development and conservation of forests, working at the practical levels in the forestry sector.

Since the URS ultimately intends to mobilize forces to start addressing the problem, identified by UNCED, of forest monitoring, without which the state of forests can not be assessed and no effective action can be taken against deforestation and forest degradation, the opinions of international policy and decision makers add dimension to the study results. It is therefore that as part of the study, 3 FAO-organised regional meetings of Focal Points of the NFP-process were attended and a wide range of representatives of international organizations with a mandate or stake in forestry were interviewed. The objectives of the URS were explained and possible follow-up scenarios, including FAME, discussed.

The following is a synthesis of observations, remarks and opinions of some 100 people who were approached in the course of this part of the URS, which also aims at generating international support for setting up the worldwide forest monitoring system, UNCED asked for.

2.2 Appealing and appalling facts

There is worldwide consensus that the lack of information about forests and forest lands makes it virtually impossible to plan forest development and conservation, to implement and monitor projects and programmes, and to take corrective measures if needed. As a consequence, forests rank low on the political agenda and budgets for forestry are insufficient to take the minimum action required to safeguard forests and strengthen their sustainable development and conservation.

The NFP-process, through which governments are committed to forest development and conservation, is obstructed by the fact that in many countries only roadside information about the forests is available. The need for remote sensing information is urgent and widespread. Even in the major forest countries information and data supply is deficient: illegal logging in Brazil, Indonesia and Russia can not be detected, leave alone addressed; Canada is unable to assess (all) its extensive forest lands and check change over time; and forest fires occur and spread without timely warning and action as a consequence of the absence of adequate monitoring.

Countries with depleted forest resources, especially in African and Asian regions, are often left with sparse bush or tree vegetation, vulnerable to further erosion or desertification, unnoticed due to the lack of information. Agroforestry activities, without any doubt the best answer to deterioration of soils and environment, can not be monitored by planning and implementing authorities, which are supposed to guide and assist (often poor) farmers in their desperate efforts to survive amidst deteriorating living conditions.

International organizations, including regional development organizations, don't have better information than the information derived from the FAO Forest Resources Assessment, which updates the world's forest cover once per 10 years. Of course, imagery of specific forest areas can be purchased from commercial companies, but it is becoming more and more difficult to obtain data without paying for it, and this limits its widespread use.

In summary: even baseline information is lacking in many countries and quarters.

2.3 Vital and viable decisions

In the search for effective and efficient solutions for the lack or absence of information and data concerning forests and forest lands, there are difficult dilemma's to be faced and difficult choices to be made.

Since the ultimate objective of improving the flow of information is to enhance the sustainable management of forests and forest lands, the right decision making level has to be identified and supplied with adequate information in order to maximize impact on the decision making process. Is it the forest manager at the local/concession level or the forest planner at the national/governmental level who could contribute best to enhancing sustainable forest management?

In the international discussions about monitoring forests, the focus is often on the tropical rainforests, habitat of a wealth of plant and animal species. But at least equally important is the monitoring of remnant forest areas in the dry and semi-dry tropics, of the vast and treasured boreal forests, and the monitoring of land use in areas with mixed agricultural (often agroforestry) systems, threatened by erosion and/or desertification.

Improving the information supply on forests and tree vegetations raises the question whether this should be done in isolation from the rural area in which those formations occur, or that an integrated land-use information supply system should be developed.

Presently, remote sensing data, if available, are used by governmental agencies and international organizations. The local levels and non-governmental organizations usually don't have the ways and means to acquire the necessary material for adequate assessing and monitoring. It seems imperative to make remote sensing information available to each and every interested individual, free of cost; and to stay away from centralized processing and distribution facilities, often linked to expensive international expertise. Low-tech training in spatial data handling, accessible to everyone, is equally imperative.

Six years have elapsed since UNCED expressed deep concern over the apparent impossibility to monitor the world's forests and pointed to the urgent need for an operational forest monitoring system if the sustainable management of forests was to be taken seriously. It is time now for moving forward to implementation: there is broad consensus that improved data supply on forests is indispensable for sustainable forest management.

2.4 Unmistakable and undeniable consensus

In spite of belonging to different constituencies and of having different interests, there is consensus among the people interviewed about the need for and potential of an operational forest monitoring system:

In many countries there is no forest database, there is no remote sensing information easily at hand and there is no control over the forests. Even the baseline information is often lacking.

Capacity building and low-tech training in spatial r.s. data handling are critical pre-conditions for developing successfully an operational and effective forest monitoring system.

An operational forest monitoring system must be developed and implemented through the National Forest Programmes, with the assistance and active participation of the Focal Points of the NFPs.

Since all countries are committed to report to the IFF on progress in planning and implementing projects and programmes for Sustainable Forest Management, the envisaged system would considerably support Governments in their endeavours to assess progress (or change).

It is highly desirable that the major forest countries are involved in discussions about the monitoring system to be set up, and reach agreement on priorities, selection of criteria and operationalization. At the same time it is important that also countries with depleted forest resources are represented in the discussions, and that information supply on rural development, desertification and agroforestry action (ICRAF's Alternatives to Slash and Burn programme!) is incorporated in plans and design.

Once remote sensing data are easily available and can be used for operational purposes, a sound basis is provided for successful negotiations and lasting mechanisms of cooperation. In this respect, the emerging Carbon-market is of particular importance.

The implementation of the existing Conventions (on Climate Change, Biodiversity Conservation and Desertification), will be greatly enhanced, since reliable and verifiable spatial data on forests and tree vegetation will be available to everyone and at all times.

The losses due to forest fires, illegal and destructive logging, desertification and erosion, if computed, would easily justify the building of a remote sensing based worldwide forest monitoring system, including adequate training of the data users.

The distribution of information/data is as important as their production.

It is expected that (sub)regional cooperation, to address similar forestry problems in neighbouring countries, will be strongly enhanced if and when accurate information on forest development and conservation is available.

International organizations involved in forestry realize that their work is often based on obsolete statistics and inaccurate information. Government representatives admit that often information on forests and forestlands is either not available or derived from guesses, and that unreliable figures enter into the official statistics.

3. EPIPROLOGUE

The results of the worldwide survey of opinions of experts responsible for the sustainable development of forests and forest lands, and the conservation of forest ecosystems, reveal that the present situation in regard to information supply must be urgently and drastically improved, if the world's forest resources are to be protected from further depletion and destruction, beyond the point of no, or very costly, repair.

The User Requirements Study should therefore become the driving force for designing, developing and implementing a forest monitoring system for continuous assessing the state of the world's forests and the timely detection of unwanted changes caused by logging, mining, droughts, floods, forest fires, etc.

Concerted action to provide responsible foresters, planners, decision makers and other interested individuals with adequate data and information must represent the prologue to stem further deforestation and forest degradation, and enhance sustainable forest development and conservation, as pursued by UNCED's Agenda 21.

Whilst lack of political will and/or deficient budgets for forestry have constrained for too longtime national and international efforts towards sound forestry practises, it is expected that with reliable and verifiable information, politicians and policy makers can be convinced that forests and trees are indispensable for rural development and stable environments.

A FAME-type of set-up, based on the findings of the User Requirements Study, is widely seen as a feasible and implementable mechanism for effective forest monitoring, worldwide.

APPENDICES

APPENDIX 1

PARTICIPATION REPORT ASIA-PACIFIC WORKSHOP ON INTERNATIONAL COOPERATION AND RESOURCE MOBILIZATION (YOGYAKARTA,19-21 FEBRUARY 1998)

Introduction

FAO is organizing a series of regional workshops in order to enhance the implementation of the IPF/CSD proposals for action. The Focal Points of the National Forestry Programmes in the Asia-Pacific region were the first to discuss (their) priority issues, being:

- Mechanisms for resource mobilization
- Facilitation of information exchange
- Mechanisms for monitoring and evaluating national forest programmes; and
- Promoting and facilitating implementation of the IPF/CSD proposals for action

Justification

The meeting was attended because of its relevance for the ongoing User Requirements Study: all participants are directly or indirectly responsible for Sustainable Forest Management (SFM) and all have agreed to provide answers to the 7 questions in the questionnaire.

In addition, I attended (23-25 February) the meeting of the Asian-Pacific Forestry Commission (APFC), largely composed of Directors of National Forest Services.

Endorsement by the APFC of any proposal formulated by the workshop is indispensable, unless funding for such proposal would be found outside FAO.

Results

After a presentation on the background and objective of the URS, which met with strong interest from the 41 participants, among which 2 Ministers and 3 Directors-General of Forestry, (annex 1) from 18 Asian countries, 6 non-Asian countries and 4 international organizations, the URS-questionnaire was handed out. In view of the lively discussion which followed the presentation, it is felt that the request to engage in the proposed inter-active process will result in a satisfactory number of replies. Bilateral follow-up actions confirmed that many participants have limited access (if any) to remote sensing imagery to complement the roadside information which is also very limited. The (prohibitively high) cost to acquire imagery and the late delivery of ordered r.s. material were mentioned several times, as well as the problem of clouds over the forest area under study, frequently making the ordered material useless.

FAO asked that a similar presentation about the URS was made to the APFC-meeting, with the result that a large percentage of the decision makers in Asian-Pacific forestry could also be informed about origin and scope of the URS. The Commission welcomed the cooperation between FAO and the Netherlands.

Report

1. Background

The workshop's full title was: "Workshop on International Cooperation and Resource Mobilization; Implementation of the IPF/CSD Proposals for Action with special reference to National Forest Programmes", and the IPF texts 71 a,b and c were used to guide the meeting into the right direction (annex 2). The workshop developed the idea that an Asian-Pacific mechanism would have to be established in order to be able to give a follow-up to the plans and recommendations stemming from this workshop. As a consequence, the participants started to focus on concrete possibilities to contribute to SFM, (after all the ultimate goal of IPF/CSD) through enhancement of, in particular, the supply and exchange of information and data for monitoring and evaluating the implementation of NFPs. Not surprisingly, the URS was received as an opportunity to assess the needs of the region and as a chance to start the necessary networking of data and related information in support of (sub)regional cooperation. It has to be reported that in spite of FAO's invitation to the private sector (industries and NGOs), no representatives of that sector showed up in the workshop.

2. Highlights

As seen by FAO, the major issues and challenges in forestry worldwide are:

Sustainable Forest Management, Information Supply, and Future Needs (to be identified through Outlook Studies). The present situation of "forests in crisis" will have to lead to re-assessment, re-orientation and restructuring of forestry worldwide, if sustainable development is the ultimate objective.

It is widely recognised that many important and groundbreaking decisions have to be taken at the policy level.

The very limited report of the workshop (annex 3), indicates that four aspects received special attention, and that information is a central issue in each of these themes. Mr. Clément when introducing "FAO Donor Database in the A-P region" and "Information is the key for Sustainable Development" (see agenda: annex 4), noted that "we have no information system in place and that this workshop would mark the beginning of a new approach". The major objective of this new approach is: to improve the coordination and collaboration of partners in SFM by providing transparent, reliable and timely data and information, as the basis for sustainable partnerships (between countries and between countries and donors). The meeting arrived to the conclusion that it is impossible to enhance SFM without developing a network based on the urgent need for adequate information.

According to FAO's Regional NFP Advisor for Asia and the Pacific all countries in the region have (sometimes limited) experience with visual interpretation of areal photos. This is however a highly expensive and time consuming way of working. Digital interpretation is the technology of the future (so far only practised in developed countries), but it must be borne in mind that with digital interpretation of data the fieldchecks are becoming more important than ever.

In many countries it is not quite clear where the forests are. Once that is known and the data are available, present priority actions may be downgraded, as a consequence of a better understanding of the real underlying causes.

Improved remote sensing is indispensable for improved monitoring of the world's forests. High resolution (1:10 000) is what is wanted and the EU seems to have adopted a policy in which this is laid down. Their objective comes close (?) to that of FAME and future collaboration could be attractive for co-financing further steps (but also risky).

Participants mentioned that as far as that is affordable, Landsat imagery (1:250 000) is used. Prices seem to vary widely, but in general it was felt that without donor assistance frequent checks of selected forest areas was not possible (the Mekong Delta secretariat just completed its first forest cover baseline study: they spent US\$ 40 000 on imagery and more than 5 years with 4 people in each country to complete the map. They would like to update it every 3 years.....apart from the fact that updating every 3 years would be useless for timely detecting changes and taking action in the forests, such updates will not happen without donor funding).

India's satellite (not radar) seems to have similarities to our ideas of a user friendly data supplier. Since Landsat's life comes to an end within 1-3 years the USA wishes to start using the India satellite as a replacement. It is highly desirable to have in-depth discussions with colleagues in India to check what we could learn from their experience.

In addition and noting that since UNCED all countries are committed to report on their progress in planning and implementing national forest programmes for SFM, the identification and development of indicators for assessing their progress (one of IPF's proposals for action) can greatly be enhanced by providing the countries with r.s. data which are presently beyond their reach. (IUFRO will organize in August a meeting on indicators for sustainable forest development, which might be interesting for the URS).

The workshop noted that more and more information (and r.s. data) is locked up in commercial institutions, which want money for information provided (SPOT is a good example).

3. Personal conclusions and follow-up

By combining the workshop with the regional forestry commission meeting, FAO has created a forum in which URS (as a joint FAO-Netherlands undertaking) could be presented in an effective way. With similar workshops scheduled for Africa, Latin America, Near East and Eastern Europe, the URS can benefit from these fora of focal points responsible for SFM. But it remains important to approach also industries, NGOs and indigenous people's organizations as well as the international organizations already engaged in remote sensing activities and programmes.

The most critical conclusion emerging from the collective and individual discussions is that: unless FAME has a clear advantage over existing or future forest information systems, the world will turn to any (maybe next best) system which is offered on the market. It is quite clear (for the participants spoken to) that FAME's attraction lies in:

- radar-based data
- data delivery free of charge
- fast digital interpretation
- decentralized data supply, enabling users to effective monitoring of forests
- low-tech training provided to the users for direct access to FAME.

Another important conclusion is that the URS must identify:

- who exactly is (are) the person(s) which can and ultimately will effectively contribute to SFM? (the forest managers? the planners? the politicians?)
- what data are concretely needed to enable that person to enhance SFM? (and is the translation of pre-processed data into maps really within reach of everybody?)
- what do we want to contribute to the ongoing international process of enhancing SFM: speed up the interpretation of data? to increase the resolution for easier processing of data? to detect quicker occurring forest changes?)

The answers will differ from person to person, from level to level, from country to country, and from region to region, which means that we have to identify common denominators.

Even if and when we find the technical answers to these questions, we have to realise that politicians need to be convinced as well, in order to facilitate the policy change(s) required to enhance SFM.

And finally, it was the opinion of several people met, that the URS will anyhow considerably contribute to getting the issues better understood and the priorities right.

For the time being IKC's major concern will be the development of the interactive process leading to clear answers to the critical questions posed to the partners in the tropical regions. Once the answers have been processed, the emerging common denominators may be discussed (at FAO HQ?) with selected partners, i.e. from major forest countries, like Brazil, Canada, Cameroon, Indonesia and Russia. One of the important pre-conditions for future collaboration to consolidate plans and conditions would be the adoption by the principle partners of the same (FAO's) classification system for forests and forest cover.

A final obser vation is that the critical importance of RESPAS developing-while-working projects (as initiated ? in Ecuador) and of regional projects in support of NFPs (as operational in Latin America) seems to have increased considerably. It would be logical to give special attention to those capacity building possibilities (for funding by DGIS), regardless the outcome of the URS.

APPENDIX 2

PARTICIPATION REPORT AFRICA FORESTRY AND WILDLIFE COMMISSION AND NFP FOCAL POINTS (DAKAR, SENEGAL: 14-17 APRIL 1998)

Introduction

In the series of meetings, organised by FAO, to enhance the implementation of IPF/IFF recommendations, a regional meeting of Directors of Forest Services and Focal Points of the National Forest Programmes (NFP-process) in Africa took place in Dakar/Senegal, 14-17 April 1998 (agenda: annex 1).

Worldwide, FAO is concerned about major issues like: forest loss/degradation, low forest value, weak institutions, lack of information and financial constraints severely affecting the sound development and conservation of forests. In Africa, as became clear, forests and forest lands are threatened by more and complexer issues than anywhere else, often originating from insufficient information, human and financial resources. Planning, implementation and monitoring are therefore in need of improvement, if forestry is to contribute to development.

Justification

As a follow-up to dispatching from the Netherlands the URS-questionnaire, rapporteur participated in the above mentioned meeting, in order to explain the background of the User Requirements Study and to enhance participation of the African Focal Points of the NFP-process (39 countries have developed their National Forest Programme) in identifying info/data needs for sustainable forest management and land use.

Listening to the African perception of forest and forest land development, it became clear that the info and data needs of African decision makers are urgent and require immediate attention, particularly in regard to training as preparation to receiving, processing and using remote sensing data.

Results

Some 65 representatives (annex 2) of 25 African countries and 10 international and non-governmental organizations, were informed about the background and purpose of the URS, and the formal presentation (which was held under severe time constraints) provoked so much interest that the meeting asked twice to further elaborate and explain the potential for the African countries. Since the (total) lack of information and data supply was mentioned quite often as one of the basic obstacles to effective forest and land use management, the response to the questionnaire may be of particular interest to the URS, especially because of the importance in Africa of adequate information for land-use management (countries with sparse forest resources still need to sustainably manage their "forest lands", where tree growing and agriculture are combined).

Report

In his opening address, FAO's Regional NFP Advisor expressed his deep concern about the many problems confronting the Africans responsible for sustainable forest development and conservation:

- Insufficient funding for the forestry sector
- Ever increasing fight against desertification
- Population growth
- Very strong dependency of people on fuelwood, charcoal, trees and forests
- Political instability
- Enpooverishment of urban and rural people

In particular the increased deforestation rates, droughts and serious land degradation are found to be alarming. To take the necessary measures against these processes, African countries depend widely on external funding, and this - the meeting said - must change. At the same time it was recognised that many countries, and forest services, were frustrated in their efforts by the W.B.-imposed Structural Adjustment Programmes.

In a spirit of renewal of efforts, many information/data related questions were extensively discussed:

The collection of data is obsolete and data presently used are often going back to 1985. AFRICOVER is an ongoing, very ambitious project, for monitoring landuse in entire Africa. But the ultimate product is a snapshot view of the forest resources: "having statistical information on your forests and forest lands is one thing, but knowing what is going on is another" (in reference to FRA). Likewise: "Knowing what is going on is one thing, but being able to act timely another" (referring to FAME). Combining active monitoring with regular and intensified assessments of the forest resources, was seen by the meeting as the starting point for improved forest management, including the development of community and agroforestry action and effective measures against further desertification and land degradation. "We need areal pictures", was stressed time and again.

FAO acknowledged that it is underserving member countries in regard to info/data supply: too often raw material is distributed without sufficient analysis, and planning and extension in many countries are not based on accurate data. Also the lack of workshops to discuss technical information produced at FAO-HQ was criticized. "FAO must launch a monitoring system, helping the countries to get updated".

FAO will step up its efforts and expects a substantial improvement with FRA and FAME as complementary undertakings. FAME is seen as an operational tool, whereas FRA is for national and international levels, aiming at better information about forest (and forest land) areas, categorization dynamics, functions and services of forest and trees, and the comparability of data.

Capacity building (more and better information, planning, monitoring, networking and training) in the permanent institutions needs priority attention: "figures are circulated time and again without additions or corrections" and: "since UNCED we have produced next to nothing; we are only talking and no progress is made at the field level". "FAO has done a lot for TFAP, resulting in many NFPs, but countries have neither money for implementation, nor strong institutions to take the lead in forestry matters". The indication that FAME could lead to receiving r.s.data for free and access to software and training in data processing and mapping at local and unit levels, brought about a wave of interest and enthusiasm.

The meeting agreed that there has been too little involvement in the international debates on forestry (IPF/IFF). However, it was recognised that regional consultations and namely subregional mechanisms, like CILSS, SADC, IGAD, ECOWAS and UMA are more likely to enhance the sustainable use of forest resources, than the participation in international fora (which is considered to be often too expensive).

The implementation of IPF/IFF proposals and recommendations need (sub)regional discussion to avoid that issues or decisions are dealt with against the will of certain countries. "Consultations at the regional level will help to understand and act on the issues. We did that for the TFAP, why don't we do that for the IPF/IFF proposals?"

Regional cooperation would also enhance the comparability of data, maps and situations, and subregional approaches to address common problems in neighbouring countries are likely to receive easier funding than individual country action.

Personal conclusions

1. There is a widespread and even desperate need for more and better information on Africa's forests and forest lands. Data supply and training will make a very positive impact on the presently rather discouraged forestry community.
2. The alarming situation in regard to energy supply, makes it necessary to distinguish between i.e. "the usefulness of criteria and indicators" and "the urgent need to provide impoverished urban and rural populations with charcoal and fuelwood". In other words: first comes first, and the many marginal situations in Africa need to be improved at the basis, giving priority attention to implementation and farmer's needs.
3. Capacity building leading to trained and well informed people is a precondition to successful implementation of local initiatives. The clear expression of decision makers in the meeting to be ready for a renewed effort based on (sub)regional cooperation in forestry and related areas, provides an opportunity for a forceful follow-up to the URS in Africa.

4. Many countries in Africa are located in the dry or semi-dry tropics. Trees rather than forests, and crops rather than logs characterize the rural areas. But the need of adequate data for land-use planning, food production and desertification control in those countries is equally urgent.
5. Subregional cooperation is probably the most stimulating way to confront the serious forestry problems which almost all the African countries are facing. Any follow-up to the URS should aim at using and strengthening the existing subregional mechanisms.

APPENDIX 3

PARTICIPATION REPORT NFP FOCAL POINTS IN LATIN AMERICA AND THE CARIBBEAN (SANTIAGO DE CHILE, 3-5 JUNE 1998)

Introduction

FAO's third regional workshop on International Cooperation and Resource Mobilization for National Forest Programmes was organized in Chile, 3-5 June 1998. Except for Colombia, Cuba and Nicaragua all Spanish/Portuguese speaking countries of the region were represented (annex 1) and there were 10 representations from international cooperation institutions.

The meeting was organized to analyse existing mechanisms for cooperation, coordination and resource mobilization, and to identify potential improvements in the NFP process. Better monitoring of forest resources is among the priorities of the countries in the region, other priorities being: forest policies, legislation, strategies to reach SFM, criteria and indicators, training and evaluation. Poverty alleviation was considered by the meeting to be of overriding importance.

Justification

Although the initial response to the URS-questionnaire was particularly good from the Latin-American region, it remains important to understand the context in which statements on information exchange and data supply are made. Latin America is very actively involved in the NFP-process (all countries have developed their national forestry action programme) and also in certain sub-regions (Central America, Amazon region and the Mercosul area) new developments are taking place. Without the direct interaction with keyplayers one would miss the chances for follow-up and partnership, which are indispensable elements for the successful completion of the URS. In addition, it became clear that "el control forestal", the supervision over forest resources in order to enhance SFM, is considered to be a key factor. And there is no control without up to date information about the state of the forests.

Results

Rapporteur was given the opportunity to explain to the meeting the background of the URS, the ultimate objective of enhancing data supply through remote sensing and to solicit further collaboration in the efforts to identify information requirements for sustainable forest management. In the presentation, it was stressed that regional cooperation would strengthen the possibilities for effective action (like in Central America) and that the continuous monitoring of forests is indispensable for periodical planning, assessing and evaluating status and progress of projects and programmes. Also it was pointed out that the URS (and the envisaged follow-up to the study) basically deals with 3 fundamental questions:

- Which data are required to enhance sustainable management of forest lands?
- What is needed to facilitate the processing and dynamic use of the required data?
- How to promote effective action towards SFM on the basis of improved data supply?

It is important to note that the meeting recognized the absence in the entire region of adequate, updated and accessible databases. The URS, therefore, generated lively interest among the participants and additional responses to the questionnaire were received. It is felt that Latin America offers excellent opportunities for identifying gaps in info/data supply and for future in-depth discussions on the subject.

Report

The Regional NFP Advisor, in his introductory report, stated that FAO's work in the region focussed on support to the NFPs, using the donor-funded regional support project to provide for workshops and to facilitate information and communication. He stressed the need for an info-strategy, since it was felt that regional cooperation lacked the necessary information for joint action. Monitoring of forests was inadequate and without a drastic improvement of data supply there was little hope that timely decisions in favour of forest conservation and development could be taken. Forest policy and legislation were still rather weak in many countries, but the NFP-process had generated the interest of politicians and governments. This, however, had not yet led to increased budgets for forestry.

There was special attention for the "Protocol of Kyoto" which could lead to Debt-for-CO2 swaps, offering great opportunities for forestry action: environmental services, such as undisturbed water supply, biodiversity conservation and CO2 sequestration, can be greatly enhanced by sound forestry practices. Again, information exchange and transfer of technologies were said to be indispensable for taking full advantage of the forthcoming Carbon-market, as the verification of status or progress requires r.s. data. In addition, information exchange and technology transfer/sharing form the basis for regional cooperation in support of the successful implementation of NFP-projects.

As in Africa, it was felt that the LA-countries were insufficiently involved in the international debate on forests, which, to the judgement of the meeting, was held among diplomats rather than experts. FAO's Forestry Commission for Latin America and the Caribbean needs strengthening and regional priority themes require informed discussion there before the region as a whole could make progress in international fora such as the IFF. In the Amazon Pact as well as in the South Cone countries, inventories are carried out to identify the information needs for better decision making, and the representatives of both subregional groups showed a keen interest in the URS.

Meanwhile there is much to learn from the achievements of the countries in Central America, which through collective and integrated action have advanced considerably in subregional forest conservation and development.

The urgent need for monitoring was best expressed by the representative of Brazil: deforestation and forest fires can only be brought under control with timely r.s. data at hand and with the capabilities to process, interpret and use them.

As for Central America, the data bases for forestry were said to be completely obsolete. Advanced in forestry for CO2 sequestration, the countries of this subregion (and notably Costa Rica) desperately need the information for controlling progress and taking full advantage of the Carbon Market, which pays (Norway) US\$ 10 per ton carbon (some 200 000 tons over a period of 10 years) sequestered by forestry action, providing environmental services to compensate for pollution.

The question was raised whether at the national level sustainable forest development is possible in a non-sustainable economy, as experienced in many countries. Poverty continues unabated, especially in the rural areas, but increasingly as well in the cities. As is the case in Central America, 92% of the wood production is used for fuel,

illustrating that rural (and urban) populations are still highly dependent on forest resources. The answer to the question lies therefore in sustainable use of forest land, leading to sustainable livelihoods of the rural poor.

Conclusions

1. Quoting several interventions during the meeting: "there is no database, there are no remote sensing data easily at hand, there is no control over the forests in the Latin American region". A direct approach to correct this situation by facilitating data supply could have a major impact and safeguard the forest resources of the region.
2. There is no lack of capable people in Latin America, the problem is political will and scarcity of funds for forestry. Regional and subregional cooperation and consensus building have already proven to be forceful tools to fight indifference and political hobby horsing.
3. The emerging Carbon Market is expected to provide great opportunities for forestry worldwide, and particularly for Latin America. Reliability, verification and credibility are key aspects in future international cooperation, and remote sensing data, presently not available for operational purposes, will provide the basis for successful negotiations and lasting mechanisms of cooperation.

APPENDIX 4

REPRESENTATIVES OF INTERNATIONAL ORGANIZATIONS, CANADA AND RUSSIA ON URS/FAME

What follows is a summary report of what transpired during the discussions with representatives of leading organizations and countries in international forestry and/or forest monitoring. In spite of the fact that the organizations contacted to obtain views on the URS have different objectives, they are unanimous in the conclusion that the information supply on forests is extremely weak and that the User Requirements Study could be the start of a process leading to effectively addressing this issue. The URS/FAME initiative is considered to be long overdue and there is great interest in participating in the further development of the concept.

A few questions emerged frequently and apparently need special attention in the forthcoming workshop:

1. Where are the forest management decisions taken: at the local or the national level? And what does that mean for the distribution and processing of remote data sensing data?
2. Should information supply be limited to information on forests/forest lands only, or should the aim be to develop an integrated land-use information system?
3. Even if it would be feasible to deliver r.s. data to the PC of every interested user, wouldn't it be better and cheaper to aim at data processing and consequent distribution (via internet) by (low cost) receiving stations at the national or sub-national level?
4. The envisaged operational forest information system will considerably strengthen the implementation of the various conventions (climate change; biodiversity conservation; desertification control) in each of which forests/trees play a central role. That underlines the need for mobilizing political support, and for further technical-technological preparations for improved data supply.

More specific comments are provided hereafter:

Russia: Mr. Anatoly Pisarenko, former Director of the Russian Forestry Center.

Due to the lack of funds, forest inventory has lost the quality and accuracy that it had during the USSR. But the former inventories (5-year State Forest Accounts) were largely done by using (hundreds of) airplanes, with extensive field verification and it is far too costly to retain this modus operandi. Moreover, forest monitoring (different from forest assessing) has become critically important for detecting forest changes/forest disturbances, such as forest fires. There is, therefore, an urgent need to re-instate remote sensing, and URS/FAME is considered to be a timely initiative in which Russian experts will take a great interest.

IIASA International Institute for Applied Systems Analysis: Mr. Sten Nilsson, Deputy Director and Leader Forest Resources Project.

IIASA has a good picture of the Russian forests and well developed ideas on how to address its major problems, such as legislation, ownership, corruption and management. Russia is committed to sustainable development, but not yet ready to review the present institutional and policy framework. Transparency and predictability are 2 priority areas, and information is essential to that. The recent radar-based Siberia-project aims at the selection of the right parameters for building a new inventory system. Frequent cloud-cover makes radar indispensable. To compliment radar imagery, SPOT material is used, but delivery is slow and the material expensive.

Disturbances, like forest fires, logging operations and insect plagues, are best suitable for remote sensing applications, and by revealing the real situation (not acknowledged by central institutions) IIASA attempts to enhance desirable changes in the institutional framework.

Access to remote sensing techniques and data, as everywhere in the world, is still too complicated, and training is considered of great importance in order to enable every interested individual to receive, screen, process and map data.

IIASA: Mr. Anatoly Shvidenko, Senior Research Scientist, Forest Resources Project.

Russian forests are predominantly (95%) boreal, and their condition is worrying. An inventory update is needed, but more important is to be able to monitor the indicators for sustainable forest practices. Since harvesting has become a commercial activity, exact data are required, but not available. Also for forest fire fighting the envisaged monitoring system must be really operational, and mean more than data supply for inventories only. "If one could estimate the losses due to forest fires, one could easily justify the launching of a forest monitoring satellite".

IIASA: Mr. Alf Öskog, Research Scholar, Forest Resources Project.

Remote sensing was for too long time technique-driven and there was no interest in the users. But that is changing, forestry people at the national level begin to realize that forest managers at the local level need better data too. Better information will lead to better decision-making, which in turn will allow for cost reduction and increased sales (Referring to Sweden, Mr. Öskog revealed that in 1996 and 1997 the forest authorities bought and used imagery for 75% of the national territory; in 1998 imagery for half the country was purchased and this shows the shift from expensive and cumbersome fieldwork to remote sensing monitoring).

Prices of imagery were too high but are coming down. Information supply is suffering from the monopoly position of satellite operators, that is why the URS/FAME initiative is very opportune. But data do not need to be delivered for free, because there are anyhow alternative costs to be considered, if the use of r.s. data would be disregarded.

Investments nowadays apply for 90-95% to space segment and ground station, only some 5% to the users. Therefore, education, hard- and software have to be accessible for all interested users. "Operational constraints are often politically driven and therefore hard to remove".

IIASA: Mr. Vladimir Stolbovoi, Senior Applied Systems Analyst, Forest Resources Project.

Boreal forests contain large areas of grasslands, swamps, bushes and shrubs, making balanced land-use necessary. Monitoring this, in itself, is not interesting, but monitoring the interactions between people and land - the human induced change of forest lands - is. And necessary to minimize the negative reactions of the environment to people's interventions, and to maximize the positive outputs. "The Conventions must receive figures about these interactions, and the Conventions will ultimately pay for those data/figures; for example: the Kyoto propocol requires carbon balances of entire regions, not of forests only. That's why a satellite should provide data of various kinds allowing for incorporation into an integrated land-use information system".

Those indicators must be selected which can be monitored and predicted in a repeatable and cost-effective way. "FAME is timely, innovative and future-oriented. The envisaged data/information supply is indispensable for monitoring adherence to the international agreements".

WCMC World Conservation and Monitoring Centre: Mr.Mark Collins, Chief Executive.

The WCMC tries to function as interface between experts and politicians: foresters do not always use to its best extent the available information, and the politicians often do not have the appropriate information to take the right political decision for implementation. "There is no question that we need much more and better monitoring of forests, aiming at improving the informed decision making process.

WCMC: Mrs. Valerie Kapos, Senior Forest Ecologist.

The Centre works on an internet-based single entry information base: the Global Forest Information Service (GFIS) to facilitate access to information. Much of the information is collected from national sources and is of a non remote sensing nature. Additionally, NASA research results and other global studies are used, but the value of those global studies is often questionable due to too many estimates and guesses.

Training is considered to be indispensable, even for making people aware of the existence and utility of information. The process of awareness raising will lead to information needs at the managerial levels, as is described in IIED's paper on Forest Resources Accounting (strategic information for sustainable forest management).

"URS/FAME generated data can be integrated in other land-use data systems, rather than developing an integrated land-use information system as advised by IIASA"

"There is quite a big gap between the forest managers and the bosses, who must want to do something with the produced information".

IUCN The World Conservation Union: Mr. Simon Rietbergen, Programme Officer Forest Conservation. More and better information on forests is important, but even more important is that the information reaches a much larger number of managers and policy makers. Bad and weak management of public forests is causing social conflicts everywhere in the world, and improved information supply will help in conflict resolution through informed decision making.

FAME is very necessary but insufficient to warrant sustainable forest practices. Political support and policy change are indispensable elements.

With the changing world (shrinking governmental influence and budgets, decentralization, devolution of power and resources to the civil society) the information needs shift from the higher "abstract" levels of government to the needs of NGOs and local people's organizations to manage their forests.

IUCN has a global and operational network of governmental and non-governmental forest managers, which can be mobilized to develop further the URS/FAME user aspects.

WWF World Wide Fund for Nature: Mr. Jean-Paul Jeanrenaud, Head Forests for Life.

One of the goals of WWF is to hold and reverse forest loss and degradation by the year 2000. Together with IUCN and UNEP, WWF supports WCMC in their efforts to "improve information supply on the conservation and sustainable management of forests and their biodiversity". There is great interest in linking WCMC's Global Forest Information Service (GFIS) to the URS/FAME endeavours, specifically to

1. help to get the baseline information right
2. enhance international political support for safeguarding forests, trees and forest lands.

It is stressed that the distribution of data and information is equally important as their production.

Worldbank: Mr. Jim Douglas, Forests Adviser Rural Development Department.
Mr. Charles Feinstein, Chief Global Climate Change Unit.

The need for better information is felt especially in the new programme "Carbon and Forests" which was recently started up in support of the enhancement of the Kyoto-protocol. The "Prototype Carbon Fund" (US\$ 100 million to facilitate and demonstrate the possibilities of Joint Implementation projects) was established for developing alternatives for energy with CO₂-emission. This Fund supports the application of results of research and analysis, not the large scale projects. There is a widespread feeling in the Worldbank that much of their work could be improved if better/more information on forests would be available. It will not be difficult to find partners in the Bank for further developing the FAME-initiative. "Better monitoring of forests is indispensable for the implementation of and adherence to the Climate Change and Biodiversity Conservation Conventions"

WRI World Resources Institute: Mr. Nigel Sizer, Team Leader Forest Frontiers Init.

Global Forest Watch: Mrs. Catherine Plume, Associate Information Program.

WRI's Forest Frontiers Initiative aims at monitoring the world's large, natural tracts of "frontier" forests, using data and information from national and inter-national sources, and SAR data provided by NASA, on the basis of a MoU between the two parties. Tracking of deforestation and developments in the frontier forests is a WRI objective, and an early warning system for detecting disturbances has become a priority. To that purpose WRI produced a blueprint for a Global Forest Watch (the original idea developed by the World Commission on Forests and Sustainable Development), which envisages an independent, decentralized early warning monitoring network to track logging, mining, and other large-scale development activities within or around the world's remaining "frontier" forests.

WRI/GFW is eager to see an operational forest monitoring system in place, on the basis of which early warning will be enhanced and facilitated.

UNDP UN Development Programme: Mr. Winston Mathu, Senior Tech. Advisor.

UNSO, Office to Combat Desertification and Draught

The FAME initiative is long overdue. As far as Africa is concerned, the area of interest must be well defined: what is the definition of forests/forest lands; what is the degree of detail; what is the target group?

"Concentrate on the local, not at the political levels". Even the baseline information is lacking or not accessible. UNDP can provide funds for pilot projects to improve the data supply.

UNDP EIS, Environmental Information Systems, Mr. Peter Gilruth, Advisor.

Balanced land-use is important in semi-dry countries. Forests/trees are part of the ecological picture, but defined forest land may be completely empty. Good information on soils will influence the spectrum of design of the system. At a recent NASA workshop on end-user needs, it was concluded that trends are more interesting than one time pictures of the situation.

UNDP GEF, Global Environment Facility: Mr. Richard Hosier, Principal Technical Advisor on Climate Change.

"It became clear at the Kyoto-conference on Climate Change that CO2 sequestration by forests/trees/agroforestry is not yet operational, among other things because of the lack of data". GEF is not yet involved in forest-related greenhouse gas sinks".

UNDP GPF, Global Programme on Forests: Mr. Ralph Schmidt, Principal Forestry Advisor.

Apart from stressing the need for better information about forests, and highlighting the efforts through the Global Programme on Forests to build capacity in countries for enhancing the sustainable management of forests, attention was drawn to the fact that governments need substantial financial support for bringing about improvements in forest management. The keynote address at the 1996-workshop on financial mechanisms and sources of finance for sustainable forestry stresses: " We need to devote a great deal more attention to the huge and rising flows of private capital. It is these flows that will determine whether natural forests have a sustainable future or not".

Canada: Canadian Forest Service: Mr. Peter Hall, Assistant Director Science Branch

"In spite of being considered a developed country, Canada:

- has not yet a forest classification
- is unable to assess its forest land, and
- cannot check change over time, mainly due to the high costs involved in monitoring Canada's huge forest resources".

The national inventory consists of a compilation of provincial inventories, which are not based on a standardized classification, and therefore not well comparable. Canada is strongly interested to participate in FAME.

CCRS: Canada Centre for Remote Sensing: Mr. Frank Ahern, Research Scientist Application Division.

"P-band satellite data would be a very important addition to what is already available". "Data are in the first place needed to improve planning and informed decision making, and therefore the aim should be to increase the information/data flow to governmental offices. For the same reason we should build (low cost) centralized data processing facilities with internet distribution of processed data or maps to any interested end-user. The cost factor is very important: keep the cost down by keeping the data rate low and by choosing a high resolution (preferably 25meter, but up to 100 meter would be acceptable)".

Good engineering is required to prepare "low-tech" software, with costs, which can be considerably lower than those related to Landsat imagery. The focus must be indeed on forests/land degradation/watersheds etc., with a frequency of once per 3 months. "Canada does not have its deforestation figures; FAME would help Canada too!".

CIFOR, Center for International Forestry Research: Mr. Reidar Persson.

"Many organizers of forest inventories do not interact with the users of the information; they do not know what will be done with the information, how it will be used and by whom" . "The need to identify the important questions cannot be stressed hard enough". "In Asia most countries cannot give information about plantations or changes, or about the use of the forests, and yet these are priority aspects for planning and monitoring progress".

"The knowledge gained through monitoring and inventory must be fed into a political process, to be of any use".

WCFS, the World Commission on Forests and Sustainable Development: Mr. Ola Ullsten, Co-Chair.

At all the regional hearings organized by the Commission to collect the opinions of the civil society, the lack of data and poor information about the world's forests was mentioned. The results of the URS have to be incorporated in the final report of the Commission, if that is feasible. Focussing on what the civil society can

contribute to the sustainable development and conservation of forests, the Commission intends to enhance the establishment of a "Forest Trust", which could be seen as a "civil society forest rules enforcing agency", a permanent consultative group, consisting of 4 entities: a Forest Watch, a Forest Ombudsman, a Forest Award and a Forest Council. The controlling mechanism would be based on a Forest Capital Index, which would provide an objective indication of the state of the forest and the occurrence and extent of change. For all this, remote sensing data supply is pivotal and cooperation with FAME is considered to be highly desirable.

EPIPROLOGUE

Whilst the User Requirements Study aims at identifying the information needs of the end-users, which are: institutions and individuals responsible for safeguarding trees, forests and forest lands, and their protective and productive values, the above report makes clear that international organizations, with crossborder, regional and global responsibilities are indispensable for generating political support for policy change regarding data and information supply.

There is no doubt that international organizations, which in fact represent Governments in policy development for the sustainable development of forests, have an important role to play in the discussions which will entail the follow-up to the User Requirements Study. Whatever will be the outcome of this study, a new dialogue will be initiated in order to give a feasible reply to UNCED's request for a global forest monitoring system to provide for adequate and reliable data and information about the state of the world's forests.

APPENDIX 5

NETWORK MEETING ON GLOBAL FOREST INFORMATION SERVICES, RESOURCE TECHNOLOGY 98 SYMPOSIUM, ROVANIEMI, FINLAND, 8-12 JUNE 1998

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1. Introduction

As part of the implementation of the User Requirement Study (Work package 4.2), a mission was carried out to Rovaniemi, Finland from June 7-14, 1998. The mission consisted of Wietske Bijker from ITC, and Cathrien de Pater and Herman Savenije, both from IKC Natuurbeheer.

The major purpose of the mission was to attend the International Meeting on the Global Forest Information Service (GFIS), which was organised by IUFRO Group 4.02 and which took place from 8-10 June 1998. In the rest of this report it is referred to as "the IUFRO Workshop on GFIS", or "the workshop". A major reason to participate in the workshop was that it would assemble representatives from some key international and regional organisations, such as WFI, WCMC, IUFRO, which were scheduled to be visited separately under the WP 4.2 programme. Hence, the workshop gave an excellent opportunity to see these organisations within a short period and with limited travelling.

The specific objectives for attending the workshop were:

- to inform the organisations on the background, objectives and preliminary findings of the URS;
- to get an overview of the initiatives and programmes of the organisations met;
- to discuss possible co-ordination and co-operation;
- to carry out interviews for the user needs assessment of the URS.

The major findings of the mission with respect to the workshop are given in Chapter 2.

In Chapter 3 the outcomes of the discussions with individual organisations are briefly reported.

The IUFRO Workshop took place in the margin of the International Symposium Resource Technology 98 which took place from 8-12 June 1998. Its theme was "World of Information" and a number of presentations were made which were relevant to the URS. The major observations of the mission are presented in Chapter 4.

The most important conclusions of the mission and possible actions to take are summarised in Chapter 5.

2. The IUFRO workshop on GFIS

2.1 Background, objectives and programme

The workshop was the third meeting in a row to discuss the possible outline of a global forest information system. It was preceded by: 1) a World Forest Monitoring Workshop (Portland, 1996); and 2) a workshop to discuss the provision of forest information on the Web held at the World Forestry Congress (Antalya, October 1997). These workshops were convened in response to the need for better information on forests, which had been expressed in several internationally accepted documents such as the Forest Principles and Agenda 21, the Convention on Biological Diversity, and the IPF/IFF Proposals for Action. In Antalya, the International Union of Forestry Research Organisations (IUFRO) was mandated to take the initiative further forward, which they did by organising the present workshop. The results of the workshop will be presented in an discussion paper at the International Consultation on Research and Information Systems (ICRIS). This is an IFF inter-sessional meeting to be held in Ort/Gmunden, Austria on 7-10 September 1998, and which is organised by the governments of Indonesia and Austria.

The workshop participants came from various international, governmental and non-governmental organisations. Almost all of them were involved in the design or implementation of forest monitoring. There was one participant from the South (Brazil) on a total of 15. Another 10 persons from different organisations had been invited but did not participate or cancelled their commitment at the last moment. A complete list of participants and other persons met is presented in Annex 3.

A tentative agenda was sent out beforehand, but the programme deviated freely from it according to perceived needs. The result is presented in Annex 1.

The specific objectives of the workshop were:

1. to identify constraints in finding a balance between the needs for information and the supply of it;
2. to provide a pragmatic outline of the GFIS;
3. to outline a report for the ICRIS meeting in September 1998.

2.2 Results of the workshop

After a short introduction, the participants presented their initiatives in relation to the subject of the workshop: The CAB-I database, the database of WCMC, initiatives by FAO, EFI, IUFRO and WFI, as well as the URS study. As for the latter, questionnaires were distributed among the workshop participants as well as several other Symposium attendants. Several important databases were listed most of which are accessible via the Internet (see Annex for references). The participants seemed to be convinced that the GFIS should work via Internet/WWW, although the URS group stressed that this would hamper the access of users in remote areas not having the resources to browse the web. The general idea was that all information on forests should be made accessible through Internet/WWW.

Possible structures for the intended forest information system were discussed. It was agreed that the system should contain metadata with hyperlinks pointing to the actual location of the data at the site of the owner of these data. Most likely, it would have a number of regional nodes/servers. It was stressed that GFIS should not develop into a centralised institution, but should be a co-operating network in which institutions could make their data available. As to the quality of the data, providers who wanted to be included in GFIS would be requested to present the source and age of their data, as well as - if possible - their own assessment of the accuracy of the data. A first tentative list of users of information on forest was drawn up. The URS matrix was presented by us as a possibly suitable framework and it was accepted for inclusion in the report to ICRIS.

In a separate session, the forest databases of FAO, EFI, IUFRO, WCMC, and CAB-I were viewed (on-line) and discussed. The FAO database is not yet accessible through the web. The EFI database is only partly accessible to the general public while the remainder is open to members only. It contains the Forest Resources Assessment (FRA) 1990 data of FAO (Europe only), with value added in the form of graphs and maps. The IUFRO database is available for free but does not contain spatial information. The CAB-I is also purely bibliographical and requires payment.

Eliot Christian of the US Geological Survey presented the Global Information Locator Service (GILS) software, both in his keynote address as well as in the workshop. For more information see Annex 4. This freely available software could be of great importance to the GFIS. GILS provides an extra access to a site by remapping the site in the GILS format, which is done in addition to the existing structure of the site; *ergo*, this structure does not have to be changed. In this way, information from sites with different structures can be accessed without requiring a unified structure for all sites attached. GILS also provides a way to solve language problems, to search for numbers and dates, as well as to make queries involving pattern recognition.

Most of the workshop time was spent to draft an outline for the document to be presented to the ICRIS in September and brainstorm about its contents. The resulting outline is as follows: 1) Background; 2) User information needs; 3) Existing website information; 4) What information to include in the proposed system; 5) How to make it happen; 6) Alternatives; 7) Financing; 8) Challenges; 9) Conclusions. A timeframe was established and writing tasks were divided among several workshop participants. The EFI Co-ordinator for this meeting, Mr. Risto Päivinen, will take charge of co-ordination and editing. The report would be ready by 9 July 1998. The language issue, i.e. the selection of languages to be supported in the information system, was not discussed but flagged and left to a later date.

Through the combined efforts of the FAO representative and the URS group, the focus on users and user needs was strengthened, including on users in remote areas and/or with limited resources and access to the Internet. The WFI representative stressed the importance of working out mechanisms for *access* of users to forest information, a point which had also been stressed in the IPF/IFF Proposals for Action and in the Portland workshop. He elaborated this point in his keynote address to the Symposium, which because of its high relevance to the URS study is included in this report (annex 5).

3. Discussions with WCMC and WFI

3.1 World Conservation and Monitoring Centre (WCMC)

Dr Valerie Kapos of WCMC informed us about the current position of WCMC. WCMC is one of the world's most important providers of information on nature conservation. They are an independent organisation based in the UK and strongly connected with the World Conservation Union (IUCN) and the World-wide Fund for Nature (WWF). WCMC as an independent institution is free to hold official as well as non-official data.

Among the information services which they provide and develop, they are now setting up an Internet server to make *spatial* data available in an interactive way. The server comprises forest cover maps from different sources which they are presently harmonising (this work is done by Susan Iremonger of WCMC, also present at the workshop). The legend of the harmonised maps is presented at the WCMC website (see Annex 6 for the website's address). With regard to protected areas, to WCMC's experience the location of a protected area is often known, but its boundaries are not.

In the GFIS pilot at the WCMC website a questionnaire is included too. The objective of the questionnaire is to make an assessment of what the visitors of the GFIS pages want and what they think that others want. The results of the questionnaire were presented at the RT '98 Symposium. They indicated that the framework is a useful one, not only for delivering forest information at regional and global scales, but also as a model for the development of national information services. Further discussion of the GFIS pilot at the workshop resulted in that it was well received while the importance to assess user needs was stressed. Possibly a new or modified in-depth questionnaire will be attached to the site.

WCMC has also executed a user requirement study for the TREES project. The results, which are of course highly interesting for the URS, will be forwarded to us by Dr. Kapos.

3.2 World Forest Institute (WFI)

Information was exchanged between the Director of WFI (till 1998), Dr. Eric Landis and ourselves. WFI was established in 1989 and functions as a clearinghouse for information. Their employees generally number from 5 to 15. WFI does not *keep* information (e.g. libraries) itself but refers to other information sources or delivers customised packages, depending on the question, the client, and the fee. Basically, anybody can approach WFI for information. Clients are predominantly private forest companies, but also governmental agencies (such as USAID) or environmental organisations. The information provided, although starting off from forestry, widely exceeds the forestry sector. Investors, for instance, need information on countries and markets as much as forest information. To WFI's experience, users are mostly very well aware of their information *needs* but 80% do not know how to ask the right *questions* in order to get what they want. This is an iterative process for which they need guidance from WFI - in this case - as a 'broker'. See annex 5 for further discussion of this subject. It was agreed that we will keep further contact with Dr. Landis and WFI.

4. Highlights of the RT '98 sessions

4.1 General

The Resource Technology '98 Nordic International Symposium on Advanced Technologies in Environmental and Natural Resources. (RT '98) was organised by the Finnish Forest Research Institute (METLA) in combination with the Resource Technology Institute (RTI) in Colorado, USA, and several

other Finnish institutes. It was the seventh in a series of meetings which usually are organised bi-annually by RTI to discuss the advances of environmental and natural resources technologies. RT '98 was especially focused on Nordic part of the world and was the first to be held outside North America. Its theme was "Meeting of the Networks".

The symposium was very well organised but attention was not overwhelming. This was perhaps because the focus of the symposium was not very clear. There were some 130 participants including those from the workshop, coming from 26 countries. Most of them were from Finland and other northern countries including Russia, Sweden, Norway, UK, Ireland, Croatia, but also New Zealand and Australia. The full participants' list is available with us. Whenever relevant, URS questionnaires were distributed among participants and discussed with some of them.

4.2 Highlights from the presentations

A diverse array of subjects was treated at the Symposium. All presentations will be published at the RT '98 website (see Annex), and some are or will be available with us directly. Many presentations were focused on forests although this was not explicitly the theme of the Symposium. In the sessions we attended, the focus appeared to be more on information exchange than on in-depth debate of issues.

It was interesting to note that almost all keynote addresses emphasised the fact that information systems, from whatever angle to be considered, should first and foremost take the human dimension into consideration. This both for reasons of sustainability and for efficiency. However, the question how to operationalise this concept was hardly dealt with, perhaps because few of the participants were trained to do so. Exceptions were: 1) the keynote address by Dr. Landis (see annex 5); 2) two presentations on participative planning of forest and parks management in Northern Finland (respectively by V. Hiltunen, and L. Kajala & E. Vålky); and 3) a presentation on technology transfer and education in New Zealand (M. McKercher).

In the session on technologies showcases and decision support systems, several models were presented, including the effect of silvicultural practices such as thinning, forest fires, and (sustainable) forest production. Not all of them included a clear analysis of who the user of these models would be and what the needs were. The session also included a presentation on the use of TDR and gamma-rays (ground-based and airborne) for mapping of soil moisture conditions to select sites for regeneration. More details on the RT'98-programme and presentations can be found at the Internet site: <http://www.metla.fi/event/rt98/>

5. Conclusions

On the whole, our participation in the workshop was quite successful. Through our presence and by presenting the study to this audience the URS has definitely put on the "international map". In the discussion paper to the IFF-ICRIS Inter-sessional in Vienna reference will be made to the URS. At the same time we got a positive feed-back as to the relevance of the URS. Good contacts have been established with some of the international key players in improving information supply on forests, some of which may be suitable participants to attend the final URS-workshop.

During the workshop there was an open atmosphere, the discussions were excellently moderated, and although participants started off from different angles, they came to a consensus on all issues debated. In no way was our status as "observers" an obstacle for our participation; on the contrary, our views were welcomed, taken seriously, and have - in our opinion - contributed constructively to the development of thought.

The debate initially appeared to be rather "supply-driven", not in the least since most participants were actually providers, not users of information. However, during the later stages the users' perspective became the over-all focus, which confirms the importance of the URS. Except ourselves, also the representatives from WFI, FAO and IUFRO prompted this shift. The importance of a user-oriented approach and attention

for the “human dimension” being crucial factors for sustainability and efficiency was also stressed by several keynote speakers at the Symposium.

The linkage of the workshop to the RT '98 Symposium was also very fruitful. Some elements of the symposium presentations resonated in the in the workshop and will be used in the ICRIS report. The RT'98 gave a good overview of the technological advances in the generation and supply of information. In this respect in the final panel discussion of the RT 98, Terry Daniel of the Resource Technology Institute noticed the great explosion of new, often complementary technologies that have emerged (computer, remote sensing, etc.) and that the great challenge particularly lies in integrating these (pilot scale) experiences into operational, wider applicable systems and that in the coming years major emphasis must be put in a better exchange and co-operation to ensure such integration. What is clear from both events is that ***access to forest information*** is the key issue: how to make the wealth of information that is already present available to the users in the formats they need, at the proper time and at reasonable costs.

A handicap of both meetings certainly was the absence of Southern representations, except from Brazil. Our efforts, together with those of FAO and IUFRO to bring the Southern perspective forward at suitable moments were reasonably successful although they were of course only a poor substitute.

The most common issues identified in connection with the GFIS were:

- Funding: existing libraries and other data systems are increasingly struggling for funds while more funding is needed to set up the necessary networks;
- The need for simplicity and user-friendliness of whatever system is going to be created;
- The diversity of data and data structures, and the difficulty to aggregate them. This was especially a handicap for FAO who are bound to the systems of their member countries;
- The political sensitiveness of data aggregation and publishing;
- The quality of data in terms of authenticity and proof to misinterpretation and misuse.

6. Actions to be taken

1. It is important that the URS group keeps active contact with the initiatives around ICRIS, GFIS, and related subjects.
2. The URS group should be actively involved in the compilation of the draft report of the workshop to ICRIS (see 0, by commenting on it and using it where applicable.
3. The Netherlands delegation to ICRIS (probably from LNV and NEDA) should be well informed of the workshop results and the report to ICRIS.

Mission Programme

7 June	Travel Netherlands - Rovaniemi
8-10 June	Workshop and Symposium attendance
11-12 June	Symposium attendance; report writing
13 June	Report writing
14 June	Travel Rovaniemi - Netherlands

Workshop Agenda

Mon. 8 June	Introduction of participants; Presentation of participants' programmes/initiatives: <ul style="list-style-type: none">• Portland workshop• WCMC Forest Information System Prototype• IUFRO network• JRC/EU: TREES - Tropical Forests Information System• EFI: EFI database• CAB-I: TREE-CD, Global Forestry Compendium• ITC-IKC-N: URS• Oxford Forestry Institute: Library Services• INPE Brazil: Amazon deforestation• FAO: FAO database• EEA: EIONET Brainstorm on user requirements Brainstorm on constraints Brainstorm on structure
Tues. 9 June	Simultaneous computer presentations of participants' databases and websites Discussion on the contents of the ICRIS report Discussion on further action
Wed. 10 June	Discussion on details of the ICRIS report Discussion on timetable & further action

Annex 3. Persons consulted

PARTICIPANTS AT THE NETWORK MEETING

Name	Institute & Country	E-mail address
Sten Folving	Joint Research Centre (JRC), Italy	sten.folvin@jrcit
Susan Iremonger	World Conservation Monitoring Centre (WCMC), UK	susan.iremonger@wcmc.org.uk
Valerie Kapos	WCMC, UK	valerie.kapos@wcmc.org.uk
Eric B. Landis	Harry Reid Centre for Environmental Studies, voorh. World Forestry Institute (WFI), USA	elandis@ix.netcom.com
R. Michael Martin	Forestry Planning and Statistics Branch, FAO, Italy	michael.martin@fao.org
Risto Päivinen	European Forest Institute (EFI), Finland	risto.paivinen@efi.joensuu.fi
Gillian Petrokovsky	Commonwealth Agricultural Bureau (CAB) International, UK	g.petrokovsky@cabi.org
Tim Richards	Space Applications Institute, JRC, Italy	tim.richards@jrc.it
Heinrich Schmutzenhofer	Int. Union of Forestry Research Organisations (IUFRO), Austria	hschmutz@forvie.ac.at
Andreas Schuck	EFI, Finland	Andreas.Schuck@efi.joensuu.fi
Thelma Krug	Instituto Nacional de Pesquisas Espaciais (INPE), Brazil	thelma@ltd.inpe.br
Roger Mills	Oxford Forestry Institute (OFI), UK	roger.mills@plants.ox.ac.uk
Wietske Bijker	ITC, Netherlands	bijker@itc.nl
Herman Savenije	IKC-N, Netherlands	h.j.f.savenije@ikcn.agro.nl
Cathrien de Pater	IKC-N, Netherlands	c.h.de.pater@ikcn.agro.nl

INVITED BUT NOT PRESENT

Steven E. Johnson	International Timber Trade Organisation (ITTO), Japan
Mark Gillis	RPF
David L. Evans	Spatial Information Technologies Laboratory
Christopher Prins	UN/ECE/FAO
Jeffrey A. Sayer	Centre for International Forestry Research (CIFOR), Indonesia
Jag S. Maini	United Nations/Secretariat International Forests Forum (IFF), New York
C.T.S. Nair	Forestry Research Support Programme for Asia & the Pacific FORSPA), Thailand
Sara Wu	World Forestry Institute (WFI), Portland
Mario Ramos	Global Environmental Facility (GEF), USA
Dirk Bryant	World Resources Institute (WRI), USA

OTHER PERSONS CONSULTED & GUESTS AT THE NETWORK MEETING

Ben Delbaere	European Centre for Nature Conservation (ECNC), Netherlands	delbaere@ecnc.nl
Shivaji Shiva Prasad	Sir Sandford Fleming College, Canada	sprasad@flemingc.on.ca
Hannu T. Saarenmaa	European Environmental Agency (EEA), Denmark	hannu.saarenmaa@eea.eu.int
Martti Varmola	Finnish Forest Research Institute (METLA), Finland	martti.varmola@metla.fi
Alan Thorn	New Zealand Forest Research Institute, New Zealand	thorna@fri.cri.nz
Malcolm McKercher	Taranaki Polytechnic, New Zealand	M.McKercher@Taranaki.ac.nz
Eliot J. Christian	US Geological Survey, USA	echristi@usgs.gov
Vladimir N. Bocharnikov	Pacific Institute of Geography, Russian Academy of Science	sergei@kronline.vladivostok.ru

Annex 4. Global Information Locator Service (GILS)

Annex 5. Keynote Address of Dr. E. Landis, Director WFI

Annex 6. Some current or planned databases/networks/websites relevant to URS

ACRONYM	FULL NAME	LOCATION	WEBSITE ADDRESS	REMARKS
CAB-I	Commonwealth Agricultural Bureau International	Oxford, UK	http://tree.cabweb.org	Forestry and Agroforestry Abstracts (free accessible for all member organisations)
CATIE	Database for Central America	Turrialba , Costa Rica	http://catie.ac.cr	also involved in TROPIS
CIFOR	Centre for International Forest Research	Bogor, Indonesia	http://www.cgiar.org/cifor http://www.cgiar.org/cifor/research/tropis.html	TROPIS: tree growth and permanent plot information system
EFERN	European Forest Ecosystem Research Network	Vienna, Austria	http://efern.boku.ac.at	A data base on all forestry research on European forests
EFI	European Forest Institute	Joensuu, Finland	http://www.efi.fi	Data base on forest resources and forest production and trade in Europe
ETFRN	European Tropical Forest Research Network	Wageningen	http://www.etfrn.org	Data base on European Tropical Forestry Research
FAO	Food and Agriculture Organization	Rome, Italy	http://www.fao.org/waicent/faoinfo/forestry	Information on the state of the world forests (FRA) and forest products, world wide
CEOS-GOFC	Committee on Earth Observation Satellites-Global Observations for Forest Cover.	Canada	http://www.ccrs.mcan.gc.ca/ccrs/tekrd/internat/gofc	GOFC intends to link international efforts to provide data for forest monitoring
ICFRE	Indian Council of Forestry Research and Education	Dehra Dun, India	http://www.nic.in/envfor/icfre	(library based) data base on forestry research
IUFRO	International Union of Forest Research Organisations	Vienna, Austria	http://iufro.boku.ac.at	Data bases on research, researchers, institutes, meetings
JRC/SAI	EU Joint Research Center/Institute for Space Applications	Italy	http://www.jrc.it/jrc	TREES Programme
MFN	Mountain Forum Network	UK with nodes in 4 continents	http://www.mtnforum.org/mtnforum	Mountain Forum on-line library and reference data base
OFI	Oxford Forestry Institute	Oxford, UK	http://www.plants.ox.ac.uk/library	CABI-OFI Forestry Information Service
WCMC	World Conservation and Monitoring Centre	Cambridge, UK	http://www.wcmc.org.uk	Various data bases on forest and protected areas; prototype GFIS
WFI	World Forest Institute	Portland, USA	http://www.vpm.com/wfi	Broker organisation on forestry information
WRI	World Resources Institute	Washington, USA	http://www.wri.org	Planning a data base on the forest situation in so-called Forest Frontier Areas

APPENDIX 6

BACK-TO-OFFICE REPORT - MISSION TO BRAZIL 17- 24 MAY 1998

Terms of Reference: see Annex 1

Programme: see Annex 2

Information sent to Brazilian organizations: see Annex 3

Persons contacted: see Annex 4

Mission members: Messrs A. de Gier (ITC, WP0) and P. van Laake (FAO, WP 4.3).

Mr. M. Heering (WP1) could not participate due to a last-minute health problem. INPE cooperated intensively in the organization, but could not participate in the mission itself. English, Portuguese and Spanish were the languages used.

General procedures: The ToR as defined in ITC by the envisaged mission members, were presented to and agreed upon by the Director of INPE, dr. M. Barbosa, prior to departure. Prof. Beek was instrumental in these first contacts. Subsequently, dr. Thelma Krug (INPE) assisted in contacting the Brazilian organizations, making the necessary appointments, and forwarding the information prepared in ITC. While in Brazil, the aims of the mission were explained with each contact. Contacts with Thelma Krug o INPE, took place on Monday 18 (at Sao Paulo airport), and Thursday 20 and Saturday 23 May (both by telephone).

Overall conclusions: The mission was successful and the URS endorsed. All but one (IICA) of the envisaged organizations were contacted. Fruitful, and often very open discussions were held with the representatives in a very friendly atmosphere. All organizations had received the forwarded information, and promised to send back the questionnaire within two weeks. Where appropriate, the suggestion was made to copy and further distribute the questionnaire within the organization, to be returned to ITC as soon as possible.

Support to the URS study was given by all organizations. The issue of sustainability formed a major point of discussion with INPE and INPA, and some concern was expressed that the issue of sustainability in Brazil was still in its infancy, indicating that timber extraction received the main attention until now. This made it clear that the FAO study in Brazil (and other countries) will have to show what is understood in each case under sustainability, in order to put the outcome in a proper perspective. INPE's support in contacting the relevant organizations was highly valued. The support and hospitality of the Netherlands embassy was very much appreciated.

The objective of identifying an organization and consultant(s) to carry out the country study was also successful, as far as interest was concerned by the organization approached, IPAAM, in Manaus.

Details:

17-5 Telephone contact with Thelma Krug, agreeing to meet 18-5 at São Paulo-Garulhos Airport

18-5 **INPE.** Meeting with Thelma Krug in São Paulo, finalizing arrangements, obtaining meeting addresses and telephone numbers. Thelma has made a list of other organizations in Brazil to be informed about the URS, and would send the information and questionnaire to these within a week. She would then collect the questionnaires and forward them to ITC. Thelma also will prepare a letter, to be signed by all organizations contacted during the mission, in support of the URS.

She mentioned the Brazilian Symposium of RS from 11-18 September, where the URS might be given attention. Both government and private organizations will attend.

The participation of INPE in the URS (WP 5 and 6) was discussed briefly, and more at length on 23 May. INPE will inform ITC within one week if it sees itself a particular role in the URS. It was noted that Brazil is developing optical satellites, together with China. INPE sees a clear role for itself during the pre- and feasibility studies for FAME. At the same time, ITC may put forward suggestions to INPE. These proposals should be channeled through the scientific leader of the URS.

The links between the organizations to be visited was made clear: INPE and INPA pertain both to the Ministry of Science and Technology; IBAMA is under the Ministry of Environment and EMBRAPA under the Ministry of Agriculture. SAE, in contrast, is directly under the Presidency, as is their SIVAM/SIPAM programme. All, but SAE, report thus to a minister. INPE sees its role as presenting facts (data), while IBAMA is looking at the underlying causes, although more and more information (on deforestation) is nowadays provided as packages by several ministries jointly. Cooperation between ministries, however, is not always easy to achieve.

- 18-5 **Dutch Embassy.** An initial meeting was held with mr. Steegers (Economic Affairs) and mr. Servatius. They were briefed about the mission. The Embassy kindly supplied transportation during most of the visits in Brasilia. The de-briefing lunch meeting next day was confirmed.
- 19-5 **IBAMA/Brasilia.** Meeting with mr. Celia Paiva dos Santos and ms. Noemia Nascimento. IBAMA conducted a deforestation assessment project from 1990-1996, together with 33 partners, none of whom resided in Manaus. IBAMA's part is to concentrate on the production of standard GIS-based cartographic maps (using ArcInfo, ArcView and ERDAS). They have developed a shell for this, and 70% of their current work is in filling the system with data. The remaining 30% goes into system management. Clouds from a major problem, and they are considering the use of multi-stage sampling for forest assessment. Thematic maps can subsequently be custom-made. This gives an interesting parallel with the FAME concept, where certain information will be standard for multiple users, while other will have to be custom-made, suiting local needs and conditions. IBAMA's greatest problem is the lack of forest data and information. Satellite data all come through INPE, but there is a problem of timeliness. DIREN is IBAMA's national directorate for forest management (i.e., timber exploitation), of the national forests. DIREN, however, was not contacted, while it is noted that it was never mentioned by any organization in Brazil. DIRCOF is IBAMA's organization of law enforcement and control. We saw change maps (satellite-based) of forest areas, where assessment about the legality of deforestation was to be determined. DIRCOF is the agency to issue forest concessions, that is land for conversion to agriculture. In the Amazon area, illegal, selective logging is a major problem. Most logging is done by landless persons, the "semmadeiros". As a result wood floods the market, with consequent low prices, making real forest management a too costly issue. Mr. Paiva was in 1996 in the FAME meeting at INPE. Mr. Paiva made a remark with regards their work on the southern fringe of Legal Amazonia, the "Arco de Deflorestamento" (encompassing 9 states). Climatic models predict a fire disaster, similar to that in Roraima in the north, in about three months from now, but on a much larger scale. It was mentioned that, contrary to the Roraima case, precautions are being taken in getting people and fire fighting material in time to the area, with assistance of the World Bank (ProArco project). IBAMA makes a distinction between the traditional fires (queimadas), and the large scale clearing fires (incendios). Their models use data to predict where, and how fires will start.
- 19-5 **Secretaria dos Assuntos Estrategicos**
This organization on strategic issues functions directly under the presidency of Brazil. The SAE coordinates two linked programmes: SIVAM and SIPAM, both related to Legal Amazonia, which covers 9 Brazilian states and 1/3 of the world's forests. The programme's aims are stated to be the protection and sustainable development of Legal Amazonia, including environmental monitoring, land use development, vigilance, and air traffic control in the as yet largely uncontrolled air space in the area. The total budget is huge: US\$ 1.4 billion, a large part of which is for the purchase of dedicated hardware, such as ground and mobile radar stations, AWACS-type air planes, satellites, and many other sources of data. These data are to be used for virtually all governmental entities, interested in or dealing with Legal Amazonia. The programme has its main office in Brasilia, and three regional offices in Manaus, Belem and Porto Velho respectively. We were very kindly received by dr. Inaldo Seabra de Noronha and other representatives of the SIVAM/SIPAM office. An important project is the Geopolitical and Economical Zoning Project, of which the General Coordinator participated in the meeting. A promise was given to send the completed questionnaire to ITC shortly. We were urged to continue discussing the SIVAM/SIPAM programme in the afternoon, where we were shown a Powerpoint presentation.

This programme is clearly one of the major political ones in Brazil, dealing with security and geopolitical issues. We met several high ranking military officers of the programme. A number of issues, relevant for the URS, are also relevant for this programme, especially the standardization for data supply.

- 19-05 **EMBRAPA.** The office is located 18km outside Brasilia. EMBRAPA is an agricultural research corporation of the Ministry of Agriculture. Its mandate is the development of methods, in contrast to IBAMA, which has an operational programme. They cooperate with, e.g. INPE, on deforestation assessment. They have three priority programmes: Agroforestry systems, with the emphasis on the energy balance; Forest species identification; and the assessment of selective logging/forest degradation. In Amazonia they have 6 centres, two of which work with remote sensing (one in Manaus). A third one is starting in Boa Vista, after the Roraima forest fires. Forestry (programme 8) is a minor part of the overall programme. The head office of this programme is in Belem. The main geographical emphasis of EMBRAPA is on the Cerrados: i.e., the forested area bordering the south of Legal Amazonia. It is this ecological zone, where most deforestation has taken place. As a result, 40% of beef production comes from the Cerrados; Amazonia production is nearly nil, with an exception in the south of the state of Para. Nevertheless, large areas of Amazonia are pasture now, but we were informed that cattle density is low, due to low pasture productivity. Major threats of Amazonia are gold mining and timber extraction. The URS study met with approval, and the questionnaire was nearly completed. It would be sent shortly to the ITC.

We were informed that 36 universities in Brazil have a forestry curriculum, two of which combine forestry and remote sensing, and one environment and remote sensing. EMBRAPA is developing GIS technology and conducting appropriate GIS training (20 persons per year for two weeks) for people active at municipality level. They expect the 6000 municipalities in Brazil to become the future GIS-centres. Municipalities typically cover areas between 10 000 and 50 000 ha.

- 20-5 **Programa Piloto para a Proteçao das florestas tropicais do Brasil (PPG7).** This Pilot programme to conserve the Brazilian tropical rain forest is supported by the G7 countries. Also The Netherlands contributes to this programme. It was originally proposed to cost US\$ 1.6 billion. The first phase has started in 1991 with a budget of US\$ 250 million, of which 50 million will be administered by the World Bank and the remainder through bilateral co-financing. It contains three sub-programmes, one of which is on Natural Resources Policy. The projects comprising this sub-programme have clear links with the URS study and with FAME in general: Ecologic-economic zoning; Environmental monitoring and vigilance; Control and Environmental fiscalization; Strengthening of Environmental organizations; Environmental education and training. The PPG7 programme is the largest one in the world on tropical rain forests. Data acquisition and Information supply are core issues. Mention was made about the use of airborne radar, according to an (undefined) IBAMA method. Unfortunately, no further information could be found. Data and information obtained, e.g., in cooperation with INPE, are supplied to a variety of users, e.g., IPAAM (to be visited in Manaus). Sustainable forest management is considered very important, and the question was raised to which extent developed countries could assist Brazil in this. This programme could be an important partner in future components of the FAME programme.
- 20-5 **Ambassade de-briefing.** During a lunch at the Ambassador's residence, the Ambassador, mr. Van Haren, was de-briefed about the outcome so far and thanked for the logistical support given. Also present were the economic assistant mr. Steegers and mr. Le Grand, 3rd Secretary. Mr. Van Haren expressed his discontent about the lack of interest by the ministry of VROM in the FAME initiative, which he would address once more in The Hague. He also mentioned a meeting on 18-6 in The Hague on the PPG7 project.
- 20-5 **Meeting with FAO representative.** At the request of Patrick van Laake, a meeting with the FAO Representative, mr. Fuller, was held, briefing him on FAO's participation in the URS and concentrating on operational issues regarding possible contracts of Brazilian staff in the Brazil study.

- 21-5 **Instituto de Proteção Ambiental de Amazonas (IPAAM).** On 21 and again on 22 May, this Institute was visited (Messrs. Rui Moura Bananeira and dr. Vicente de Paulo Queiroz) to discuss their possible involvement in the detailed study in Brazil. Dr. Sombroek, under GTZ assistance, had worked until recently in this Institute, and recommended it for the country study. The Institute deals exclusively with the state of Amazonas, and not with the much larger Legal Amazonia. We emphasized the reason for choosing Brazil, representing the tropical lowland rain forest, where the URS would put emphasis on the spatial information needs for conservation purposes. It was noted that even this Institute considers sustainable forest management largely an issue of timber extraction. IPAAM considered itself appropriate for being involved in the Brazilian study, and it was tentatively decided that this Institute would implement it by recruiting a suitable consultant.
- 22-5 **Instituto Nacional de Pesquisas Amazônia (INPA).** Here we met Dr. Antonio Donato Nobre, head of the GIS-lab. His lab is very well-equipped with computer and other research equipment. The lab cooperates with several institutions in the US and Japan. Dr. Nobre is very concerned about the dwindling Amazon forest, and takes into consideration also the human and social side, such as the lives of the rubber tappers. He cautions about the risk that information about the Amazon forest, intended to be used for sustainable forest management, may also be used against it. He suggested the so-called Extractive Reserves to conduct the detailed Brazilian study in.
- 23-5 On this day we rented a small boat to make a trip on the Rio Negro, the Solemois, and the Amazon itself, at the point where the two contributing rivers meet. Sea ships sail 4-8 days up-river to anchor in Manaus. The sight of a flowering *Victoria regia* near a seasonally flooded forest completed this very pleasant, positive trip to Manaus.
- 23-5 Return flight to Sao Paulo
- 24-5 Flight Sao Paulo-Amsterdam

TERMS OF REFERENCE
MISSION TO BRAZIL
18-23 MAY 1998

In the framework of the User Requirements Study (URS), commissioned to ITC by the Dutch ministries for Agriculture, Development Cooperation, and Economic Affairs, and especially in relation to the implementation of Work Package 1 of the URS, a mission to Brazil will be fielded from 18-23 May forthcoming.

The activities to be developed under WP1 include:

- Identify main stakeholders in international and national organizations and individuals, including Brazil
- Approach and inform international stakeholders, specifically in Brazil, about the objectives of the study
- Muster their active involvement and participation in the study

The mission will also introduce work packages 4.2 and 4.3: User needs assessments in specific countries. Brazil is one of the proposed countries.

To carry out the corresponding activities, representatives of the participating international institutes will carry out the mission.

The specific objectives of the mission are:

- To identify the representatives of the Brazilian stakeholders in forest management at national and state level (IBAMA, EMBRAPA, G7-Office, Ministry of Environment, and others) and in Manaus (INPA, University of Amazonas, Secretariat for the Environment, and others)
- To contact the identified representatives, to inform them specifically about the planned URS study in Brazil, and to foster their active participation in its implementation.

To reach the above objectives, INPE, as mission member, will contact the relevant organizations willing to participate, and to provide names of the organizations' representatives. The representatives should be acquainted with the use of remote sensing data in forest management. The final selection of organizations will take place by the mission members. INPE will forward background information on the URS and FAME, and make arrangements for meeting these representatives, as far as possible in their own locations. Representatives will be requested, through INPE, to send information concerning the mandate of their organizations to the mission members, for them to prepare their visit. Questionnaires on user requirements for remote sensing based spatial information will be sent in time to the representatives, for in-depth discussion during the mission.

The Netherlands Embassy in Brasilia will be timely and fully informed about the mission.

ANNEX 2 Programme schedule

Sunday	17-05	10:25 19:35	Departure from Amsterdam Arrival in Sao Paulo – Stay in Hotel Brasilton
Monday	18-05	09:00 14:15 15:45 16:30	Preparatory discussions with INPE staff in Sao Paulo. INPE mission member(s) join Dutch team. Contact person: Dr. Thelma Krug Departure for Brasilia Arrival Brasilia – Stay in Hotel Carlton Courtesy visit and briefing Dutch Embassy – Contact person: Huub Steegers
Tuesday	19-05	09:00 11:00 14:00 16:00	Visit IBAMA – Contact person: Mr. Celio Paiva, IBAMA/ Remote Sensing Centre Visit Secretario dos Assuntos Estrategicos (SAE) – Contact person: Dr. Inaldo Seabra de Noronha Visit to IICA – Contact person: Visit Embrapa/CPAC – Contact person: Dr. Eduardo Assad
Wednesday	20-05	09:00 11:00 15:00 20:30 22:30	Visit WB representative of G7 project; Contact: Dr. Neli Aparecida de Mello Debriefing at Netherlands Embassy and lunch Mr. R. Fuller, FAO Representative Departure for Manaus Arrival Manaus– Stay in hotel Plaza Hotel
Thursday	21-05	14:00	Visit to Secretario do Estado do Meio Ambiente – Contact person: Dr. Vicente de Paulo Queiroz Nogueiro (= IPAAM)
Friday	22-05	9:00 14:00	Meeting at INPA – Contact person: Niro Higuchi and Antonio Donato Nobre Visit to IPAAM – Contact person: Dr. Vicente de Paulo Queiroz
Saturday	23-05	10:00 14:45 19:15	Wrapping up mission and report writing Departure for Sao Paulo Arrival Sao Paulo – Hotel Brasilton
Sunday	24-05	20:55	Departure for Amsterdam
Monday	25-05	13:15	Arrival Amsterdam

ANNEX 3

Information sent to Brazilian organizations

Dear Madam, Sir,

Herewith we would like to request your participation in the definition of user requirements of spatial information in our “User Requirements Study for the Sustainable Management of Forests, for Remote Sensing-based Spatial Information”. Details of the User Requirements Study are found in ADDENDUM 1.

The User Requirements Study (URS) has been commissioned to the International Institute for Aerospace Survey and Earth Sciences (ITC) in The Netherlands, and is being implemented together with the Food and Agriculture Organization (FAO) of the United Nations, and other Dutch institutes (IKC, NLR, WAU). An important part of the URS will take place in Brazil, with INPE as the participating organization.

If you are willing to participate in the definition of the requirements, you will be contacted by INPE to set up a meeting with staff in your organization, who are active as user of spatial information, at a date, time and location to be arranged. A short questionnaire is attached (ADDENDUM 2), which we would like to elaborate on during our meeting with your staff.

The outcome of this study may lead to the development of an end-to-end operational Forest Monitoring system (FAME) in support of forest management world-wide. For your information a brief outline, in Portuguese, of the preliminary FAME concept can be found in ADDENDUM 3.

It would also be very much appreciated if you could indicate if your organization would be interested to participate in an eventual implementation of FAME.

Please be so kind to inform us on the above.

Yours sincerely,

Alfred de Gier

Professor of Forest Survey
International Institute for Aerospace Survey and Earth Sciences (ITC)
P.O.Box 6
NL-7500 AA Enschede
The Netherlands

ADDENDUM 1

USER REQUIREMENTS STUDY FOR THE SUSTAINABLE MANAGEMENT OF FORESTS FOR REMOTE SENSING BASED SPATIAL INFORMATION

1. INTRODUCTION

1.1 Background and rationale

The increased interest in sustainable forest management, which includes all activities such as inventory, planning, monitoring and control, both nationally and internationally has increased the need for proper decision support systems. A basic prerequisite for such systems is the timely availability of information. Information required for decision support systems refers both to spatial (e.g. area under different types of forest) and non-spatial (e.g. availability of staff and budgets).

Problems related to information availability have been confirmed in UNCED 1992, Agenda 21 Chapter D. FAME - an abbreviation of Forest Assessment and Monitoring Environment, a concept for an end-to-end forest monitoring system developed by a number of Dutch organisations in consultation with FAO was to address the problems related to spatial information. The FAME concept comprises the hardware and software to directly provide individuals and organisation involved in forest management with the required information (in stead of data) and the related expertise acquired through education and training geared towards supporting forestry decision support systems.

A study commissioned in 1993 by the Dutch Beleids Commissie Remote Sensing (Consultation on user needs for RESPAS) confirmed the findings of UNCED. Although remote sensing was reportedly being used worldwide for forest management, constraints identified comprised: “acquisition and distribution in time, cost of satellite data, cloud cover, data comparability, dedicated hardware and software, expertise and standardisation of methodology.” As long term solution to this problem “an end-to-end system comprising a dedicated satellite system and associated ground facilities” was suggested. It was finally concluded that “the need for a remote sensing satellite dedicated to global forest monitoring should be examined.”

The issue has raised interest with knowledge-institutes and industry in the Netherlands and a preliminary “end-to-end” concept was developed, based on a preliminary assessment of the operational constraints of the existing infrastructure for forest monitoring. This concept covers all forested areas on earth and would directly provide information to stakeholders/users in forest management. Various studies were undertaken into technical solutions for the generally observed problems. Results of these studies have been based on assumptions about the need for information, rather than the actual requirements of the users.

It became apparent that it would make no sense to embark on a study of the feasibility of any technical solution before actual user needs had been identified in sufficient detail and whether such needs would be satisfied by an “end-to-end” concept as proposed under FAME. At the same time it has become clear that an overall study is needed to identify to what extent existing (and short-term planned) remote sensing systems which provide forest data can be used as alternatives to meet these needs.

The process may eventually result in the development and implementation of an end-to-end forest monitoring system, possibly including a satellite with sensor(s) dedicated to global forest monitoring and will comprise a number of steps. Each of these subsequent steps will logically follow the previous one although some degree of overlap between steps will positively contribute to the ultimate end result due to the interchange of thoughts and expertise of the players in each of the subsequent steps.

Provisionally the following steps are foreseen:

- User requirement study
- Pre-feasibility study
- Formulation of terms of reference for a feasibility study
- Feasibility study
- Development and design

- Implementation and operation

In a pre-feasibility study a number of issues have to be addressed before a decision can be taken whether or not to proceed with a feasibility study for further development:

- Information is required about technical alternatives being pursued elsewhere in the world which (intend to) address the identified user requirements. Subsequently a first preliminary assessment should be made of these solutions, both from a technical and from a financial perspective, and how these solutions can be merged into an end-to-end system that will substantially contribute to sustainable forest management.
- The main characteristic elements of such an end-to-end system will have to be defined. These include the hardware and software elements and last but not least the required training and education to guarantee that the system will be compatible with existing forest management decision support systems. Training and education will take place in a framework of institutional strengthening.
- Before a feasibility study can be started, an overall cost analysis is required to obtain a rough order of magnitude estimate of development costs of the various alternative solutions. The results of this analysis will be used in the political discussions on the next phases of the program. Moreover a preliminary financial and organisational study is to be carried out into the operational phase of a monitoring system.

Once the issues above have been addressed and conclusive evidence has been built up to confirm the need for an end-to-end monitoring system and a provisional concept has been defined, terms of reference have to be spelled out for a study to assess the feasibility of such a system in all its aspects related to both technical, financial and institutional aspects.

1.2 Objectives of the study

Framework

Point of departure for this study is the overall goal of sustainable forest management which can be defined as “managing forest resources and associated lands to meet the social, ecological, cultural and spiritual needs of present and future generations” [Forest Stewardship Council 1996].

Forests serve different functions/purposes in the range between exploitation and conservation. Each of these functions/purposes requires different management approaches. Proper management requires decision support systems that are based on sound information. In forest management the following decision making levels (and provisional user organisations) can be distinguished:

- Global: multinational [UN/FAO/ITTO] and international [WCMC/WWF] organisations;
- Regional: a.o. basin-wide organisations, Amazon, Congo, Mekong;
- National: NFAP, ministries, national NGO’s;
- Sub-national/provincial/state: forestry departments, NGO’s
- Management unit: Local (traditional) users or user groups (CBO’s), concession holders, conservation unit, reserve/park

Objectives

Taking this framework into account, this user requirement study aims at addressing the following objectives:

1. Identification of the stakeholders/users and their interests, and the decision makers in sustainable forest management;
2. Assessment of the information needs (particularly for spatial information) of the decision makers in sustainable forest management, when taking into consideration the various stakeholders’ interests; and identification of the decision support systems in use;;
3. Translation of the information needs into functional and system requirements;
4. Identification and assessment of the existing and planned remote sensing technology for applications in forest management;
5. Assessment of the extent to which identified information requirements are and/or can be met by remote sensing technology applications, available both at present and in the foreseeable future, and/or alternative non-remote sensing based solutions;
6. Based on the results of 1-4 above, preliminary assessment of the extent to which an end-to-end remote sensing based monitoring system will contribute to addressing deforestation and forest degradation.

7. Creation of a national and international platform to support the user requirement study with representative discussion forums of informed, interested and real users of remote sensing data for sustainable forest management.

Emphasis in addressing the objectives will be placed on getting answers to the following questions for each of the identified functions/purposes of forests and the levels of decision making in forest management:

- Who are the users at each of these levels, actually and potentially?;
- What are the responsibilities and tasks of each of these users and their impact on sustainable forest management?;
- Which are the information needs (in forestry terms) and flows in decision making?;
- What are these needs translated into technical requirements?;
- What is the actual and potential role of remotely sensed data in decision making and what are the limitations presently experienced, in terms of availability, costs, expertise and institutional frameworks?;
- In what other ways (alternatives) could the need for remotely sensed data be foreseen, and what would be the opportunities, costs etc. of these “other ways”?

The answers to these questions should subsequently allow us to draw conclusions with respect to a possible need for improvements in information provision. These may be partial solutions that resolve isolated problems related to sustainable forest management. Such partial or even more comprehensive solutions could very well not be based on the use of remote sensing. Ground surveys will be part of the assessment of alternative solutions as these have proven to address the requirements for long times.

SPATIAL¹ INFORMATION NEEDS FOR SUSTAINABLE FOREST MANAGEMENT

Invitation for an interactive inquiry

Dear Colleague,

The growing need for adequate and timely information on forest resources and the increasing number of problems to update and distribute this information to the right locations has been emphasised at various fora, such as UNCED 92, IPF/IFF, as well as at the recent World Forestry Congress where the topic “Monitoring and Assessment of Forest Resources” was placed as topic number 1.

Previous studies on information were largely based on general assumptions rather than on facts about the specific actual and future needs of the so-called “end-users”, i.e. those persons involved in policy and implementation in forest management (for conservation, production, ...).

The present study has the purpose to assess the specific **spatial information needs of different end-users** involved in forestry to facilitate sustainable forest management at different levels of operation - local, national, regional and international. Specifically, the study seeks to identify the **current status, bottlenecks and needs for improvement** in the supply and use of spatial information on forests. The study has been commissioned by the Netherlands government and is implemented under the co-ordination of ITC² and other Dutch organisations in close co-operation with FAO.

Because you are an important end-user, we would like to make use of your expertise and your insight in the specific needs for spatial information on forest resources in your working environment.

We therefore kindly invite you to complete the attached questionnaire, which takes about 30 minutes

Our proposal is to follow up on this questionnaire inquiry in an interactive dialogue(by E-mail/fax), if you agree.

The results of the study will be used to assess the need for and feasibility of a world-wide Forest Assessment and Monitoring Environment (FAME), which has been initiated by a group of Dutch organisations . You can find more information on this inquiry and the FAME initiative at the Internet **web-site:**
<http://www.neonet.nl/forests/>.

As we believe that this study will be of great interest to you, we will send you the final report of the study .

Please be assured that all information submitted by you will be treated confidentially.
We highly appreciate your kind co-operation.

Yours Sincerely,

¹ Spatial information : geographically referenced information

² ITC: International Institute for Aerospace Survey and Earth Science, Enschede, the Netherlands

INQUIRY FORM:

SPATIAL INFORMATION NEEDS FOR SUSTAINABLE FOREST MANAGEMENT

I): INQUIRY

We kindly request you to answer the following questions (*you can use as much space as you need*):

1. What are the main objectives in forest management of your organisation?
2. What are your tasks in the organisation for which you need spatial information on forests?
3. Which type of spatial information on forests do you currently use?
4. How do you presently obtain this information specified in your answer to question 3. ?
5. Which additional spatial information would you require for better forest management?
6. Which improvements do you think are needed for a better supply of spatial information?
7. Do you have any additional remarks in relation to the above questions?

II): PERSONAL DATA:

Name of your organisation:

Your name:

Your position:

Address:

Country

Fax:

Telephone:

E-mail:

Can we contact you for more interactive discussions on the subject?: **yes/no**

Please return the completed form to the (E-mail or fax)address below

Naam van de URS-contact persoon

ADDENDUM 3

FAME: AVALIAÇÃO DE FLORESTAS E GESTÃO DO MEIO-AMBIENTE Fornecimento operacional e contínuo de informação vital para gestores de florestas a nível mundial com o fim de promover uma gestão de manutenção de florestas

PORQUE O FAME?

As florestas mundiais são uma preocupação crescente. O abate de árvores e a degradação das florestas originam cada vez mais problemas do meio-ambiente e de perda de recursos naturais. Isto requer uma gestão de manutenção de floresta. Esta gestão baseia-se num fluxo contínuo de informação sobre o estado das florestas e as mudanças correntes com o fim de planear e controlar as intervenções da gestão. Visto que as florestas se encontram em áreas de acesso difícil é necessário conjugar uma observação remota com sistemas de informação geográfica (GIS-Geographical Information Systems) para dispor duma ferramenta adequada para adquirir tal informação.

Apesar da existência de vários tipos de satélite de observação remota e GIS, ainda não foram criados sistemas operacionais de apoio a gestão de florestas de áreas vastas. Num certo número de estudos conduzidos pela FAO que tem como objectivo descobrir impedimentos para o uso operacional foram detectados vários obstáculos por gestores em mais de 20 países. Estes obstáculos podem ser de natureza política e financeira ou estar relacionados com requerimentos funcionais ou de realização .

Os mais significantes são os seguintes: Para muitas áreas de interesse não existem dados disponíveis porque os sensores estão desligados , não há capacidade suficiente de recepção ou os dados não estão devidamente arquivados. Mesmo quando há dados disponíveis estes nem sempre são acessíveis o que impede uma distribuição adequada dos dados pelos gestores. Os dados de observação remota são, frequentemente, dispendiosos para a maior parte dos gestores envolvidos em gestão e controle. Isto porque gestão exige uma procura constante de dados para a área de interesse. Mesmo quando há dados disponíveis e acessíveis e meios financeiros para a sua aquisição, há ainda outro problema a encarar. Estes dados podem chegar com meses ou anos de atraso e já não servem assim de apoio ao processo de tomar decisões e originam problemas de ocasionalidade. Além disso, a adequação limitada de sensores existentes para demonstrar características de interesse para aplicações de floresta, levanta problemas de usabilidade; os sensores ópticos existentes demonstram limitações na discriminação de áreas florestais e não-florestais e na deteção de degradação florestal. No entanto, até no caso de ter sido comprovada a usabilidade, nuvens persistentes na zona tropical impedem os sensores ópticos de filmarem a área e o sistema revela-se inútil. Sistemas de radares conseguem penetrar as nuvens. Porém, sensores de radar por satélite não são próprios para aplicações florestais. Isto dificulta a discriminação de áreas florestais e não florestais.

E, por fim, mesmo tendo superado estes obstáculos, muitos países não têm capacidade suficiente para usar adequadamente esta técnica. É preciso estimular o desenvolvimento dos recursos humanos e de capacidade institucional urgentemente visto que a maior parte dos países prefere não estar dependente de terceiros no que diz respeito a recepção de dados e interpretação.

O conceito FAME, que está presentemente a ser desenvolvido, tem como objectivo resolver as limitações acima indicadas. É certo que dentro de programas florestais e de espaço não existem planos para criar um sistema operacional semelhante nas próximas décadas.

O QUE É FAME?

Fame é um sistema operacional de gestão de florestas para adquirir informações sobre qualquer alteração na floresta directamente no local indicado, isto é, o escritório do gestor da floresta. O programa contém todos os componentes necessários para melhorar a gestão de manutenção das florestas mundiais. Inclui cursos e treinos e desenvolvimento e uso do sistema 'end to end' com estações baseadas em PCs, processamento de dados e funções de arquivo integradas opcionalmente com GIS, assim como um satélite com sensor

especifico que abrange a superficie total mundial. Este conceito inclui uma coerência inseparavel dos segmentos de espaço e solo, e tem como objectivo ultrapassar os obstaculos acima indicados. A disponibilidade sera assegurada atraves dum satélite com órbita de alcance mundial que permite controlar todas as florestas. O sensor a bordo do satélite estará em operação continua e a transmissão dos dados a terra sera constante. As estações de recepção estarão programadas para registar a area de interesse durante a passagem do satélite. A acessibilidade será garantida atraves da transmissão directa do satélite para a estação de recepção. Precos acessiveis tornar-se-ão uma realidade pois a estação receptiva podera funcionar sem grandes despesas e os dados provenientes do satélite serão gratuitos. Visto que o gestor da floresta pode receber os dados directamente do satélite deixara de existir o problema do "momento certo". A usabilidade tornar-se-a possivel pelo design integrado de segmentos espaco e solo.

Alem da estação de terra, que cuida do recebimento dos dados, o sistema processa os dados do satélite em mapas de imagem temáticos que podem ser usados na interpretação ou input num SIG. Este SIG pode ser organizado de maneira a gerar a informação pedida localmente, dependendo do tipo de operações que o gestor da floresta tem de efectuar. Alem disso, será criado um sensor especifico para facilitar a identificação de processos relevantes para aplicações de floresta. A capacidade sera baseada em programas educativos e treinos. Os treinos abrangem varias areas assim como interpretação dos dados de satélite e aplicação da ferramenta SIG, nivel da tomada de decisões e desempenham um papel vital na promoção do uso apropriado das ferramentas tecnologicas. O treino poderá tambem ser complementado por pesquisa ou por desenvolvimento da aplicação adaptada a uma situação especifica definida pelo cursista. A independencia sera assegurada pela recepção directa e-resultando do treino especifico- pela capacidade de processar e interpretar os dados localmente.

FAME está previsto para funcionar em 2002. Neste momento está-se a fazer um inventório pormenorizado das exigencias e necessidades do consumidor.

PASSADO HISTORICO

Em 1985 foi lançado o Plano de Acção da Floresta Tropical. O TFAP (Tropical Forestry Action Plan) foi movido por FAO, UNDP, WRI e o Banco Mundial e com importante participação do Canada e dos Países Baixos. O objectivo da TFAP e dar apoio aos governos de países (tropicais) na gestão de florestas principalmente na sua conservação e manutenção. Neste momento, países não tropicais tambem estão envolvidos e ha no total 135 países a participar na preparação e implementação de Programas Florestrais Nacionais (NFP, National Forestry Programs).

Apesar de esforcos internacionais consideraveis, da melhoria de coordenação de doador, estimulo da aproximação nacional da participação da população local e NGOs, o abate de arvores aumentou de 11,3 milhoes de hectares para mais de 15 milhoes de hectares por ano durante o periodo de 1980 a 1990, segundo as estatisticas de FAO.

A Conferencia das Nações Unidas sobre o Meio-Ambiente e Desenvolvimento (UNCED United Nations Conference on Environment and Development), que ocorreu em 1992 no Rio de Janeiro deu origem a *Ágenda 21* que constitui a base internacional para se poder passar à acção. Esta *Ágenda* foi assinada por 178 países participantes. Os capitulos 11 (Combate a eliminção da floresta) e 40 (Informação para tomada de decisoes), assim como o Anexo III (declaração das autoridades não vinculativo, de principios para um consenso global da gestão, conservação e desenvolvimento de manutenção de todos os tipos de floresta) da *Ágenda 21* realca a importancia da gestão de manutenção das florestas como condição para o desenvolvimento da manutenção. Alem disso, a UNCED concluiu que para haver uma gestão efectiva e um controle eficiente é necessario juntar dados de campo a conhecimentos locais e a informação derivada de observação remota, apoiada por sistemas de informação geografica SIG.

O programa de acção da UNCED intitulado "Estabelecer e/ou Fortalecer capacidades para planeamento e avaliação periodica de florestas e programas, projectos e actividades respectivas (incluindo comércio e processos) tem como base a seguinte afirmação:

“Avaliações e estimativas periódicas são componentes essenciais de planeamento a longo termo para efeitos de estimativa quantitativa e qualificativa e para rectificação de insuficiências”. Este mecanismo continua a

ser, por vezes, um dos aspectos ignorados de gestão, conservação e desenvolvimento. Em muitos casos, há mesmo falta de informação básica sobre a área e o tipo de floresta, potencial existente e o volume da colheita.

Sendo assim, a gestão e controle do estado da floresta é extremamente importante para a sua manutenção pois só através da recolha, processamento e uso da informação actualizada juntamente com conhecimentos e pericia adequados se conseguira preparar, tomar, executar e avaliar as decisões certas.

O conhecimento deste facto foi também transmitido nas recomendações feitas às Nações Unidas, resultado da reunião FAO/ECE Kotka (Finlândia 1992).

Nestas recomendações, afirma-se: "é importante criar ferramentas de observação remota para aplicações florestais e investigar a necessidade de um satélite específico para as florestas."

Alem disso, a Agenda 21 afirma que a gestão de florestas só poderá ser efectiva se o processo de por à disponibilidade conhecimentos e informação relevantes fizer parte da evolução da capacidade nacional. Somente quando os peritos locais puderem recolher, processar e interpretar informação independentemente existirá uma contribuição para o desenvolvimento da manutenção das florestas.

Se deseja informação sobre FAME, [especialmente se faz parte da comunidade (usufruidora) florestal], gostaríamos de tomar conhecimento do seu interesse. Por favor contacte: Escritório do programa FAMEITC

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Países Baixos