Non-Timber Forest Product Databases

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PREFACE

Non-timber forest products (NTFP) are attracting more attention in recent years. Recognition that such products also have a role to play in sustainable management of forests is growing. Often termed as "minor" products, they include a wide variety of items such as fruits, nuts, spices, medicinal extracts, oils, gums, resins, bamboo and rattan, insect and animal products, among others. Proponents for emphasising the use and value of these products would stress that the term "minor" is indeed a misnomer.

Research and workshops on NTFP are also on the increase. However, most of these initiatives appear to be independently developed without any cohesive linkages. Furthermore, they are frequently regionally focalised and categorically based, e.g. bamboo, essence or medicines, and so forth. A number of databases on NTFP have been produced, or are in the pipeline, and perhaps a few more exist without any common knowledge to potentially interested parties. Any information available is mostly scattered and poorly advertised. Therefore, there is an urgent need to survey the existence of such databases to provide information to interested and potential actors on what is available on NTFP, to co-ordinate future work and to avoid duplication. Even more essential, such databases and research results should be easily accessible to researchers, government departments, non-governmental organisations and others working together to enhance the preservation and conservation of the forests that remain, apart from improving the socio-economic conditions of the rural poor. How this latter objective can be achieved is an important point for further discussion and examination.

The Center for International Forestry Research (CIFOR) has a mission to contribute to the sustained well-being of people in developing countries. One of CIFOR's activities in its medium term plan is the expansion and harmonisation of databases on properties and uses of tropical timbers and non-timber forest products. Therefore this survey of NTFP databases constitutes CIFOR's effort in that direction. More specifically, it is hoped that this activity will help to consolidate the scattered information and contribute to a process that will enhance harmonisation of these databases.

This report is the product of the activities mentioned above. It incorporates the results from the survey, brief reports about some databases and conclusions from the workshop. Further request for information about the eight databases presented during the workshop can be obtained directly from the participants whose contact addresses are provided in Annex 1. A sample of the questionnaire designed for the survey is found in Annex 2.

SURVEY ON NON-TIMBER FOREST PRODUCT DATABASES

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Introduction

"Non-timber Forest Products", "Non-wood Forest Products", "Minor Forest Products", "Multi-use Forest Produce", "Vernacular Forest Products", "Special Forest Products" - what is in a name? Distinct reasons for the choice of a name exist, but that is not the focus of this paper. For no other reasons than mere simplicity, the authors have chosen to use "non-timber forest products" (NTFP) here to encompass the wide variety of items derived from the forests other than timber, except for references made to individual institutions - then their own choices of names are maintained.

NTFP may seem to be a new bandwagon amidst current concerns about sustainable forest management to some people; but it is not. Traditionally, many forest dwellers and forest margin communities have benefited from a variety of forest products. No one will dispute that NTFP is important to the vast population of people living in and around the forests. Earlier forestry research, marginalised after World War II, gave special attention to the production capacity of forests and concentrated on NTFP, with many publications and some encyclopaedic work (Burkill 1935; Heyne 1950) concentrating mainly on non-timber products. Some of this type of studies have been discontinued, but are now re-appearing. The scope has also widened to include studies on valuation, marketing, economics and technological aspects of NTFP.

The Center for International Forestry Research (CIFOR) has a mission to contribute to the sustained well-being of people in developing countries (CIFOR 1994). *" Protecting the forest environment, which provides a high proportion of the household survival requirements of this vast population of people dwelling in and around the forests, is our major challenge"* (CIFOR News 1995, p. 2). One of CIFOR's activities to meet this goal is the expansion and harmonisation of databases on properties and uses of tropical timbers and non-timber forest products (CIFOR 1993). This survey of NTFP databases constitutes a contribution in meeting this challenge.

Many actors have surfaced calling attention to NTFP. Private companies such as Cultural Survival Enterprises and The Body Shop have done much to publicise the use of NTFP (Clay 1992). Non-governmental organisations (NGOs) like OXFAM and Friends of the Earth have also some input in this direction. The number of publications on NTFP is on the increase. Organisations such as FAO has devoted resources to publishing *Non-Wood News;* workshops on NTFP have proliferated in recent years (FAO 1995, pp. 40-43). Initiatives like the publication of *News* by the Centre of Minor Forest Products*, Economic Botany* and *Advances in Economic Botany* by the New York Botanical Gardens, and *the Journal of Ethnopharmacology* by Elsevier Scientific Publishers, add different perspectives to our knowledge. Other organisations like the International Network for Bamboo and Rattan have also devoted their resources to promote the importance of specific NTFP (INBAR undated). For all these known actors working on NTFP-related issues, how many more less known individuals or institutions are similarly pursuing the same course?

The widespread reliance on computers and the proliferation of software have changed the ways data and information are stored and published. Storing information in databases in current formats is a relatively new tool not available until mid- 1970s. Data can now be stored in many places and in many formats, but may be relatively inaccessible and poorly publicised. There is no doubt that existing databases on NTFP are much less developed than those on timber. Even when data related to NTFP are available, they are imbedded within larger categories. Extracting information is not straightforward, as seen from FAO' s

*Compendium of Computer-based Databases **of** Relevance to Forest Products Marketing* (FAO 1995a) and the International Trade Centre's databases. FAO 's *Non-Wood News* (March 1995) further acknowledged that an international system for the reporting of NTFP statistics is lacking. The absence of an acceptable and consistent classification of NTFP often resulted in NTFP-related data being unrecorded or lumped together with other products in existing classification systems and consequently diminishing their significance. Furthermore, most work on NTFP is frequently regionally focalised and categorically based - understandably given the wide spectrum of products and issues encompassed within the universal term of NTFP. Panayotou and Ashton (1992, p. 232) concurred that further research on NTFP to fill basic knowledge gaps is needed, and *the most critical gap in knowledge is the absence **of** standardized, unfragmented data relative to the conditions necessary and sufficient to sustain production of various forest goods and services. "*

Information is available, but how do we tap into it? How can we harness the data and make better use of them? In times of limiting resources, especially in face of financial cutbacks in many organisations, it is vital that efforts are co-ordinated and not duplicated.

An initiative to systematically organise such information is not apparent, and this is where our efforts could hopefully play a useful role. With this first step in surveying the existence of NTFP databases, we would like to make the data more readily accessible to users and open the path to a larger, more encompassing initiative.

Objectives and Methodology

The broad objective of our activity is to gather information on the state of the art on NTFP, especially to survey databases on NTFP, to assess such databases and their users, to check for their compatibility and possible linkages.

The specific objectives include:
- identify initiatives, people in institutions/organisations working on NTFP databases;
- inventory some of the existing databases using questionnaires;

- organise a workshop bringing together various interest groups on NTFP identified; and
- publish survey and workshop results.

The project was divided into three phases. During Phase 1, information about existing databases was sought from potential institutions. Once identified, a questionnaire was sent to these institutions in Phase 2. The questionnaire (see Annex 2) was structured according to seven main sections:

- Personal Data - name, address, name of organisation, etc.;
- Database Format - year of establishment, software, hardware, database model, etc. ;
- Data Content - type of data, subjects, regional coverage, number of records, etc.;
- Data Sources - type of data sources, etc.;
- Publication of Data - type of publication, charges for use, etc.;
- Database Users and Maintenance - user groups, frequency of use, accessibility of database, number of staff, etc.; and
- Database Integration - linkage with other organisationsl databases.

The limitations of the questionnaire survey should be clarified here. This survey is not comprehensive due to time constraints for one reason. New information were received about potential contacts and databases, but these could not be followed up in time to meet our deadlines. Second, regretfully some contacts with potentially interesting databases did not respond. Again, given the time limit for this project, it was not feasible for further follow-up work at this stage. Reasons for the lack of response could be due to a lack of interest in the survey, or to the possibility of inefficient communication channels for locations in Africa or Latin America, for example.

Upon the return of completed questionnaires, a preliminary analysis and selection process were carried out to invite ten participants to a workshop, our Phase 3 activity.

Results

During Phase 1, over 50 institutions and individuals were contacted and 23 institutions with potentially relevant databases were identified. Based on further information received, questionnaires were finally sent to 56 organisations in Phase 2. Thirty organisations completed and returned the questionnaires. Table 1 shows the distribution of questionnaires sent and completed by regions.

Table 1: Number of Questionnaires Sent and Type of Responses Received by Geographical Regions

Geographical Regions	Questionnaires sent	Questionnaires completed	No databases/ not relevant	No response
Africa	7	3	3	1
Asia	16	12	1	3
Europe	17	9	6	2
Latin America	3	1	1	1
Med i Middle East	2	1	0	1
Pacific Region	7	2	2	3
USA	4	2	0	2
Total	**56**	**30**	**13**	**13**

Many of the databases surveyed (30 percent) are found in Europe, with six from the United Kingdom and one each from Belgium, the Netherlands and Finland. Three (10 percent) each are located in China, India and Africa, with a scattering of others in Asia, the Pacific region and the Americas. The institutions which responded to our questionnaires and the names of their databases are shown in Table 2.

Table 2: Organisations with Databases

Country	Code	Institution	Name of Database
Australia	1	Conservation Commission	Alice Biodiversity System
Belgium	2	Universite Libre de Bruxelles	PHARMEL
China	3	Bamboo Information Center, Chinese Academy of Forestry	China Bamboo
	4	South China Institute of Botany, Academia Sinica	Aromatic and Medicinal Plants
	5	Subtropical Forestry Research Inst., Chinese Academy of Forestry	Bamboo Talk
Costa Rica	6	INBio	BIMS
Finland	7	INDUFOR	INDUFOR Database
India	8	Centre of Minor Forest Products	MFP Data Base
	9	Foundation for Revitalization of Local Health Traditions	INMEDPLAN
	10	Kerala Forest Research Institute	COMP, PROJ, BIC, PERSON
Indonesia	11	PROSEA	Preface, Personym, Organym, Textfile, Catalog
Kenya	12	ICRAF	MPTS
	13	Kenya Forestry Research Institute	Plants for Life
Korea	14	Natural Products Research Institute, Seoul National University	TradiMed
Malaysia	15	Dept. of Chemistry, Universiti Kebangsaan Malaysia	APINMAP (Malaysia)
Netherlands	16	Agricultural University	TWINVCOL
Philippines	17	SEAMEO Regional Center for Graduate Study and Research in Agriculture	APINMAP Integrated Database, Factual Database
South Africa	18	Hans Snyckers Institute	Hans Snyckers Literature Reference System

Table 2: Organisations with Databases *continued*

Country	Code	Institution	Name of Database
Thailand	19	Thai National Documentation Centre	APM; LIST; SERIALS; DIRECT; RUBBER; TECH; LIBR; GAZETTE
Turkey	20	Medicinal and Aromatic Plant and Drug Research Centre, Anadolu Univ.	FLOTURK
United Kingdom	21	Herbal Medical Database Ltd.	Herbal Medical Database
	22	Centre for Economic Botany, Royal Botanic Gardens	SEPASAL; Economic Botany Bibliographic Database; SEPASAL Contact Database
	23	Herbarium, Royal Botanic Gardens	Cyperacea of Economic & Ethno-botanical Importance
(with Brazil)	24	Project "Plantas do Nordeste"	Plantas do Nordeste
	25	International Centre for Underutilized Crops, University of Southampton	Indigenous Underutilized Crops; Indigenous Under-utilized Tropical Fruits
	26	WCMC	Plants Database, BG Database
United States	27	NAPRALERT, College of Pharmacy, University of Chicago	NAPRALERT
	28	Center for Tropical Forest Science, Smithsonion Tropical Research Inst.	CTFS Forest Dynamics Plots
Vanuatu	29	Conservation Section, Dept of Forests	Botanic Database
Vietnam	30	National Center of Science & Technology Information & Documentation	STDOC

General details

These organisations with databases are further categorised by type as shown in Table 3. Clearly, universities/educational institutions outnumber the others. The governmental agencies comprise mainly forestry departments or documentation centers. Some of these institutions maintain more than one database; information on a total of 48 databases were submitted. Both universities/educational institutions and governmental agencies together hold the largest number of databases. NGOs also possess a substantial number of databases.

Table 3: Types of Organisation with NTFP Databases Surveyed

Types of Organisation	No.	No. of databases
Universities / Educational institutions	10	11
Governmental Agencies	6	16
Non-government Organisations	5	9
Research Institutes	4	5
Private Enterprises	2	2
Botanic Gardens/Herbarium	3	5
Total	**30**	**48**

Figure 1 and Table 4 reveal information on when the databases were established. One database was set up in the early 20th Century and two were established in 1974. The peak seemed to be in 1993 when eight databases were set up. Aggregating the data in five year groupings, as shown in Table 4, it can be seen that 17 were established in the 1980s and 26 in the 1990s. The three databases established prior to 1975 come from universities and botanic gardens. Governmental agencies, NGOs and private enterprises entered the scene only in the late 1980s. Most of the databases set up in the 1990s are found in governmental organisations and universities/educational institutions (42 percent and 23 percent respectively).
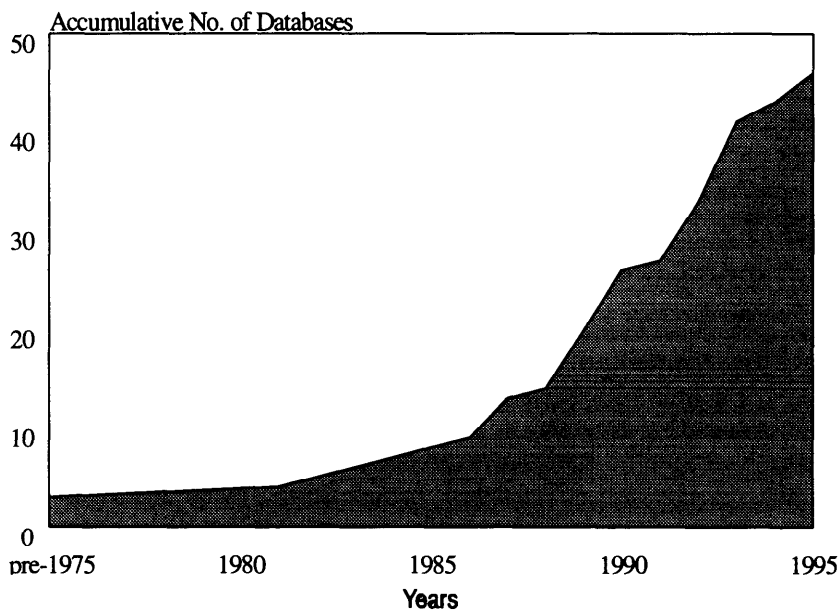
Figure 1: Year of Establishment of Databases

Table 4: Year of Establishment of Databases

Year of Establishment	No. of Databases
pre-1975	3
1980 - 1984	2
1985 - 1989	15
1990 - 1995	26
Total	**46***

*no information from 2 databases

Out of the 48 databases, 36 are fully operational, with eight in the advanced stage and three in the initial stage of development. Most of them are stand-alone databases which are not linked to integrated databases or other information systems. 44 databases are available in some kind of electronic format, utilising diverse software packages. The more common software mentioned include CDS-ISIS, FoxPro, MS Access, and Dbase. Majority of the databases employ a relational data model, with interactive features.

Content of the databases

NTFP databases can potentially contain a large range of products and issues. Some databases may be more general and include many products, while others are specific and deal only with one or a few related products. Some can also incorporate a wide variety of issues, and a couple concentrate on specific issues only. In the questionnaire (Annex 2), some categories grouped under "Products" include fruits, gums, resins, fibres, medicinal plants, and so on. Under "Issues" the groupings include biology/ecology, physical/chemical properties, collection, production, distribution, trade statistics, and so forth.

In this survey, all these combinations are found. Many of the databases cover more than one subject matter, with a couple dealing specifically with only one product. The product group covered most frequently is medicinal plants (Table 5). Under "Others" in the products covered, mention was made of flowering plants, weeds, rubber products, among others. Table 5 also shows the incidences for issues covered by the databases. The most common issues covered are biology/ecology, uses and propagation/cultivation. Information about distribution, markets, production, socio-economic issues, prices and trade statistics is more difficult to gather, and needs constant and continuous update to keep it useful. This difficulty is reflected in the scarcity of such databases. The category "Others" included issues concerning aboriginal names, taxonomy, disease patterns, research and so on.

The most common types of data captured are bibliographic data, followed by descriptive data. Again, numeric and graphical data are not easily available. The geographical area covered is predominantly at the country level, with only ten databases claiming to have global coverage.

Table 5: Incidences of Products and Issues Covered by the Databases

Products Covered	No. of Incidences	Issues Covered	No. of Incidences
Medicinal Plants	32	Biology/Ecology	33
Fibres	23	Uses	31
Oils	22	Propagation/cultivation	27
Other Food	20	Distribution	22
Fruits	20	Markets	18
Nuts	17	Physical/chemical properties	16
Spices and condiments	16	Collection	15
Gums	16	Technology	14
Resin	16	Production	13
Tannin	15	Socio-economic issues	11
Pigments/dyes	15	Prices	6
Insect products	12	Trade Statistics	5
Other animal products	5	Others	9
Others	12		

The number of records varies from 119 to more than one million. Information was not provided by ten databases. The details of the breakdown are as shown in Table 6. More commonly, the size of the databases is small, with 27 percent holding less than 1,000 records and 38 percent with less than 10,000 records. Out of the seven databases with more than 50,000 records, four are found in NGOs, and one each in governmental organisations, research institutes and private enterprises. The two databases with more than one million records were established in 1982 in one research institute, and in 1993 in one NGO correspondingly. 86 percent of those established in the 1990s contain less than 10,000 records.

Table 6: Number of Records in Databases

Number of Records	No. of Databases
<1000	10
1000 -<10,000	14
10,000 -<50,000	6
50,000 - <100,000	3
100,000 - <200,000	2
> 1 million	2
Total	37*

* no information from 10 databases, and 1 with various records

Data sources

Data are derived from both primary and secondary sources. The reason why the databases are established may also reflect the way data are gathered. Some institutions may have collected primary data during their research activities and need a database for storing and analysing the information. Others may have access to secondary data and see a need to collate and disseminate such information in an organised manner. Obviously, different approaches will have to be used for different types of data and to serve different purposes.

In the survey, 56 percent of the databases contain both primary and secondary data, 27 percent have only secondary data, and 17 percent use only primary data to compile their databank (Figure 2). Out of the mixed sources, 33 percent did not provide further breakdown of their sources, 30 percent rely predominantly on secondary data derived mainly from documents received, contacts with other institutions, literature review and data collected by others, and 26 percent claimed collection at source.
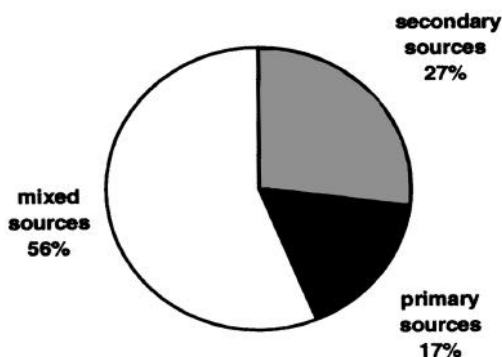
Figure 2: Data Sources

Maintenance

The questionnaire also sought information on the frequency of updates. Maintenance may be dependent on a number of issues such as the size of databases, sources of data, staff and resources available. Understandably, centers with limited resources may be unable to update their databases as frequently as desired especially if primary data collection is involved.

Majority of the databases (34 percent) are updated as and when necessary. 28 percent are updated at least once every 3-12 months; 17 percent are updated at least once a month. Two have no updates (Table 7).

Examining the number of records with frequency of updates, the size of the database seems to have no effect on the frequency of updates. The databases with more than one million records are updated less than once a year, or as and when necessary. Further analysis shows that only 28 percent of those with mixed sources, compared to the 63 percent of those with only primary data, are updated as and when necessary. Conversely, databases with mixed sources are updated more frequently than those with primary data (e.g. 18 percent versus 13 percent respectively at least once a month; 31 percent versus 13 percent respectively at least once every 3-12 months).

Table 7: Frequency of Updates

Frequency	No. of Databases	%
At least once a month	8	17
At least once every 1 - 3 months	5	11
At least once every 3-12 months	13	28
Less than once a year	3	6
As and when necessary	16	34
No updates	2	4
Total	**47***	**100**

*no information from 1 database

Users

Ultimately, the databases are established to serve the users. Databases are principally means to an end - for research purposes, for supplementing information to decision makers, and for developing policies, among other reasons. Information on these users and the frequency of usage was sought in the questionnaire.

Table 8 shows the main user groups and the ranking of frequency of . use by these groups. The most common users are researchers, followed by university staff and students, as indicated by a total number of 28 and 24 institutions respectively. Public administrators are the least common users of the databases. Researchers are also ranked as the most frequent users: 18 institutions ranked as them as the number "1" users, far exceeding the other categories of users. The number of "others" also ranked as the most frequent users include NGOs, the public, authors/editors, curators, medical professionals and aid agencies.

Table 8: User Groups and Ranking of the Most Common Users

User Groups/Ranking*	1	2	3	4	5	Total
Researchers	18	9	0	1	0	28
University Staff and Students	4	10	7	3	0	24
Field Project Managers	0	4	4	2	4	14
Private Enterprises	1	3	3	5	0	12
Public Administrators	1	2	1	3	3	10
Others	6	4	1	1	0	12

*ranking (in ascending order): 1= most frequent user, 5 = least frequent user

Further observations show that most databases are mostly underutilised, as seen in Table 9. Weekly usage is most common, followed by daily usage, but less than one third of the databases are used daily, and only 13 databases entertained users at least once a week. The daily users are mainly university and NGO related professionals (27 percent each), followed by government related personnel (18 percent). The weekly users comprise mainly government personnel (39 percent) and university staff and students (23 percent). The three databases established prior to 1975 are all used daily. The ones set up in 1990s have more weekly users. The bigger databases (more than 100,000 records) are also used daily.

Table 9: Frequency of Use

Frequency of Use	No.
At least once a day	11
At least once a week	13
At least once a month	6
Less than once a month	7
Total	37*

* no answer provided by 11 databases

Accessibility to databases is usually provided at the database center with staff assistance and through interaction with database staff via the various channels of communication such as letters, faxes, email and telephones.

Publication and Dissemination

The importance of the publication of such databases cannot be overlooked. The databases are set up to serve the users, as mentioned earlier. Various means of accessibility to the databases are also briefly mentioned above. The publication of information stored in the databases is another avenue to provide access to users. Publications are usually more visible, convenient and easily available than direct access to the databases themselves. In fact, many organisations would prefer access only to selected information, and the publication can be easily designed to suit the demand from the originators.

In the survey, twenty of the databases have not been published in any format, although four mentioned intentions to do so. Those which have been published are available in book form (17), diskette (10), CD-ROM (5) and electronic communication networks such as the Internet (3). A couple of institutions are also interested in using the Internet to publish their databases in the near future.

To date, 18 databases do not charge for use or requisition of their data. Six have yet to fix rates or are still undecided about whether to charge; and those who do charge have various rates. Some based their rates on per reference, per citation, per copy, per page, or per question. The cost cited varied substantially from USD 0.25 per citation to USD 250 per question.

Linkage to Other Networks

The trend is towards linking with other databases or network. Such tendency is dependent on the means of communications, computer hardware and software available. Present communication facilities provide exciting opportunities and possibilities for the future.

Most (29) of the databases are not linked to a network and four did not provide any answers, leaving a total of fifteen which are linked to some kind of network. Also thirty (inclusive of those already linked) would like

to be linked to a network, seven are uncertain but are willing to explore the possibility, ten did not respond to this question, and one does not wish to be linked to other networks.

Discussion

As mentioned earlier, this activity is not meant to be a representative survey of NTFP databases; rather the basis for the survey is an attempt to gather as much information as possible. It is hoped that it will have a snowballing effect on the collation of information about other databases which can be added to the results generated here. The global distribution of the databases surveyed can enhance and facilitate follow-up efforts if necessary.

Since NTFP incorporate such a variety of products and issues, it is difficult to classify and characterise all the databases. Nevertheless, attempts to find common grounds were made and the results were analysed first and foremost with that in mind. In this exploratory exercise, the results were used to provide a description of the available databases, rather than to perform an in-depth statistical analysis.

Looking at the results more closely, it is clear that NTFP related databases have mushroomed only within the last ten years. The technological improvements of computer hard- and software gave rise to possibilities of data storage not available twenty years ago. Growing concern in the depletion of the forests and eagerness in finding solutions to stem the rate of deforestation have also helped focus attention on NTFP. The combination of these factors probably resulted in such a sharp rise of NTFP databases.

Not surprisingly, many databases are set up by universities/ educational institutions and governmental agencies. The databases are very likely results of their research activities and are used by researchers. Botanic gardens also have a sound basis for the need of such databases by virtue of their raison d'être. Prior to 1975, the drive for establishing databases was probably different from those of the governmental agencies, NGOs and private enterprises that started their databases in the 1980s and 1990s.

It is rare to find databases covering all NTFP products and all related issues. Nevertheless, institutions like the Centre of Minor Forest Products, the Center for Tropical Forest Science, ICRAF, Indufor, the International Centre for Underutilized Crops, Kenya Forestry Research Institute, PROSEA and the Royal Botanic Garden at Kew have incorporated many plant products within their databases. Other institutions cover only a specific product, or a few related products and issues. Medicinal plants occupy a highly publicised role in promoting the importance of NTFP: INMEDPLAN and APINMAP have established networks for medicinal plants regionally, giving the product a great boost and exposure. Likewise oils, bamboo, and fruits and nuts have also contributed greatly to the economies of some countries, and databases of these specific products are also available.

Clearly related to technological innovations, improved data storage and retrieval facilities, easier access to library facilities, and better exchange of information, bibliographic and descriptive data prove to be a most convenient type of data to capture, as reflected in the findings. Quantitative data are harder to come by, and collecting such data would require more in-depth research and resources.

The wide range of records available is indeed astounding. Most databases house between 1,000 - 10,000 records. Considering the infancy of NTFP databases, it is reasonable to forecast that the number of records will grow accordingly. Surprisingly, one of the databases with over one million records was established only in 1993. The success of this particular effort can be attributed to the support of a private enterprise providing significant resources for research and the reliance on parataxonomists, i.e. grassroots collectors who live in or near the forest reserves, for its data collection. Obviously, the size of the database is also related to the resources available to each center.

Likewise, updating is also dependent on resources available. Databases with primary data are updated less frequently than those with mixed data sources. Collection of primary data is costly. The types of data available also reduce the necessity for frequent updates. Should more data about time sensitive issues such as distribution, markets, production, prices and trade statistics be included, constant and continuous updates become necessary to maintain the value of the stored data.

The main user groups are researchers, university staff and students who also use the databases most frequently. This reflects the fact that many databases originate from university departments and are part of their research activities. It is realised that the distinction between researchers versus university staff and students is sometimes difficult, since the two groups are not mutually exclusive but overlap in a number of instances. However to group them together will inflate their numbers and skew the results even more. Keeping the two groups separate contributes to a more balanced analysis.

To continue, the type of users also reflects the reason for establishing the databases - and in most cases they are mainly for research purposes. Public administrators, field project managers, and policy and decision makers apparently do not make as much use of the databases as members from the research community. This is not surprising since they are not interested in data per se, but are more keen on concise information, with clear conclusions and recommendations.

The databases are not fully exploited as can be seen from the small number of databases used daily and weekly. Establishing and maintaining databases will not be cost effective if their potential is not fully utilised. However, one reason for the low usage could be related to the poor dissemination of knowledge and information about these databases, especially for the very recently established ones.

Many databases have been published in different formats, the most common form being books. With computers being the norm at almost all workplaces now, publishing on diskettes and CD-ROM is catching on. Electronic communication is not the usual practice at the moment, but the increasing availability of appropriate communication infrastructures and popularity of Internet may lead to an increase in this form of publication in the future.

The databases are mainly isolated entities and are not well linked with each other. Linkages that exist are usually restricted to specific products like INMEDPLAN's network on medicinal plants. The interest in joining some network is evident, but the big question is how that can be implemented to address such concerns of charges for use and ownership of databases, for example.

Conclusions

This report is meant to convey an overview of some NTFP databases. Obviously, the age of electronic communication and facilities is upon us. This has great impact on today's concept of how data can be collected, manipulated, stored and retrieved. This can clearly be seen in the number of databases in existence. Whether this is reflected in databases on other subjects is up to speculation: however it would not be a surprise if similar trends are observed in these other areas too. NTFP, as a subject in its own right, has gained greater exposure in recent years.

The whole spectrum of products grouped under NTFP is too extensive for any one database to do justice in trying to capture all the relevant data. It makes sense that some natural grouping are witnessed by networks concentrating on purely one or two related products. Linking such similar databases would not pose a great problem technically. To link very varied databases is also possible if formats of the database are compatible. The obstacles to complementarity lie beyond mere technical issues. Is there a need and enough interest generated to justify expenditure in such projects? In these days of cutbacks, financial and manpower constraints may not be conducive to such activities. Precisely for these same reasons, it makes sense to try to combine resources instead of repeating very similar activities. The shortage of manpower and resources can be directly related to the type of data covered, the number of subjects and issues incorporated, the type of data sources, the number of records, the extent of regional coverage, the accessibility of databases, the publication of information, the update and the maintenance of databases, and not least, the quality of these databases.

Until we know whether the need exists for the complementarity of databases, and until we can generate enough interests, it would be premature to make any decision about such linkages. This very simple survey of NTFP databases is thus a pursuit in that very direction.

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THE CONTRIBUTION OF PHARMEL DATABASE TO THE KNOWLEDGE OF THE NON-WOOD FOREST PRODUCTS*

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Introduction

PHARMEL (PHAR for <u>phar</u>macopoeia, ME for medicinal plant and L for traditional) is a database of traditional medicine and pharmacopoeia. This data bank was created in 1986 with the help of the "Agence de Coopération Culturelle et Technique" (A.C.C.T.), an international agency covering 47 French speaking countries and working for the development of cultural and technical relationships between them. It was founded by a group of doctors, pharmacists and botanists as a programme that gathers data concerning utilisation of plants and traditional medicine.

The Pharmel database has been incorporated in a more general project to verify traditional medicine that has been undertaken by the A.C.C.T. since 1977:

- upkeep of ethnobotanic research organised from 1977 to 1989 to prepare syntheses of medicinal plant knowledge at the national level; the reports of those missions, executed in eleven countries under the leadership of Professor Adjanohoun (Central African Republic, Mali, Niger, Cornores, Seychelles, Mauritius, Gabon, Dominique, Togo, Congo, Benin), have been the source of publications;
- since 1986 Pharmel assists the publication of the "Revue de Médecines et Pharmacopées africaines", a half-yearly journal taking up publications in this field by the scientists of the 47 fiancophone countries;
- since 1990, A.C.C.T. stimulates regional networks in West Africa, Central Africa and the Indian Ocean to select recipes for distribution.

There are two basic objectives for setting up Pharmel. A first objective is to develop a standardised methodology and an efficient tool to obtain a synthesis of collected field data, to answer, in time, to the local health priorities. For the validation of the research on usage of plants in traditional medicine, PHARMEL plays a fundamental role in the analysis of their common usage. The verification of similar recipes in fact produces a database that can largely increase the efficiency of follow-up research (chemical analyses, pharmacological tests, etc.). A second objective is to promote a network of local databases for sharing their data.

Database Format

A standard methodology for the complete and uniform sampling of information about traditional usage of medicinal plants has been developed. A complete coding system has also been created that permits registration of data about:

- the plant material used by the traditional therapists (characteristics, harvest methods, etc.);
- the ways to prepare and administer the medication (the pharmaceutical preparations, dosage, length of treatment, etc.);
- the therapeutic indications of the drugs, possible side-effects, etc.

The use of forms for recording the data permits a coherent collection of data that every user of Pharmel may exchange without modification or decode without difficulty. The detailed description of the forms and its codes has been published by the A.C.C.T. in 1989 under the title "Banque de données de Médecine Traditionnelle et pharmacopée (Pharmel). Notice pour la recolte et l'entrée des données" (E. Adjanohoun *et al.* 1989, 1994).

A special software has been developed to allow:

- the collection of new data and their incorporation in a datafile;
- the correction of existing data;
- the search for data on the basis of criteria defined by the user (for instance, selection of all plants used in the treatment of a disease);
- printout of the data.

This software runs on very commonly available hardware (IBM PC or compatible), with Dbase 3 and Foxbase; its use does not require

knowledge of informatics. A complete user's guide accompanies the database (Adjanohoun et *al.* 1992).

Status of Database

Initially, the database was a product of the A.C.C.T. but now it has come under the responsibility of the Université Libre de Bruxelles.

Data Content

The present content of the bank is summarised in Table 10. Till now, 19,691 different recipes have been captured and 4,000 different medicinal species are cited.

For each recipe, the following items are mentioned:

- collector (or author of the publication);
- Latin name of the plant used;
- country;
- parts of the plants used as medicine (stem, root, etc.; 75 different entries);
- traditional pharmaceutical preparations;
- direction for use;
- diseases (400 different entries);
- physiological effects;
- remarks.

More information on Pharmel database can be found in Waechter *et al.* (1991) and Lejoly (1993, 1994). Analyses of the data contained in the Pharmel database are carried out by Lejoly *et al.(* 1991, 1994) for anthelmintic African plants and by Richel (1995) on a regional base for West Tropical Africa.

Table 10: Numbers of medicinal plants and recipes quoted in the database Pharmel at the end of 1995.

Countries	Number of plants	Number of recipes	Number of indications
Canaries	22	22	45
Western Africa			
Mali	109	176	330
Niger	159	277	439
Benin	526	1,976	3,468
Togo	412	972	1,663
Burkina Faso	133	347	554
Ivory Coast	310	533	745
Senegal	500	1,467	3,210
Nigeria	271	437	968
Central Africa			
CAR	580	1,107	1,611
Gabon	299	459	683
Congo	1,229	3,413	6,320
Zaire	641	1,583	2,270
Rwanda	177	177	460
Burundi	502	2,717	5,073
Cameroon	65	92	125
Equatorial Guinea	46	56	108
Eastern Africa			
Uganda	281	469	628
Kenya	182	283	345
Southern Africa			
Zimbabwe	448	1,516	1,886

Table 10: Numbers of medicinal plants and recipes quoted in the database Pharmel at the end of 1995 *continued*.

Countries	Number of plants	Number of recipes	Number of indications
Mascareignes			
Mauritius	106	148	259
Seychelles	77	91	131
The Comoro Islands	124	202	305
Madagascar	518	750	1347
America			
Dominican Rep.	169	421	620
TOTAL	7,886	19,691	33,593

Regional Coverage

The following shows the coverage of the Pharmel database with the number of recipes in parenthesis:

- 8 countries in West Africa (6,185)
- 8 countries in Central Africa (9,604)
- 3 countries in East and Southern Africa (2,268)
- 4 countries including Madagascar and others islands (1,191)
- 1 country in North Africa (22)
- 1 American country: Dominique (421)

Data Sources

The data are derived from bibliographical sources; the list of the 51 references used is reported in Adjanohoun *et al*. (1994, p.132-136).

Maintenance

The database is maintained at Laboratoire de Botanique, Université Libre de Bruxelles

Users

Users of the database includes national centers for traditional medicine in each French speaking country and universities in tropical Africa (approximately one hundred users). Since 1994, my Laboratory is in

charge of surveys on traditional medicines and forest biodiversity, organised by Ecofac projects around forest reserves in six countries of Central Africa, using Pharmel database. Ecofac is a regional project of the European Community concerning the conservation and utilisation of forest ecosystems in Central Africa.

Accessibility

Two kinds of information are frequently given: which recipes exist in the Pharmel databank to cure a special disease and which recipes are known in all countries for a special plant. This information is available on request from the Laboratoire de Botanique, Université Libre de Bruxelles, and also by email: jlejoly@ulb.ac.be. The Pharmel software and bank are also available to users. The distribution is free of charge but the user has to contribute to the development of the network of local databases or to feed into the Pharmel database.

Staffing

No special staff are assigned specifically to Pharmel, but researchers, PhD students and sometimes technical staff of the University contribute their time and efforts when necessary.

Financial Resources

Funding for the activity comes from national (Belgium) or international (A.C.C.T.) agencies.

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A DESCRIPTION OF CHINESE BAMBOO DATABASE*

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Introduction

The establishment of database "China Bamboo" began in 1987, supported by the International Development Research Centre of Canada from 1988 to 1993, and by the International Tropical Timber Organisation from 1991 to 1994. This database is housed in the Institute of Scientific and Technological Information, Chinese Academy of Forestry (CAF). The activities of Bamboo Information Centre are partly supported by the CAF, its research staff, editors and librarians. Most of the bamboo literature used are kept in the library of the academy.

Data input started with the publishing of Bamboo Abstracts in 1988, which were edited according to the Oxford System of Decimal Classification for Forestry with some modifications, considering the specific features of bamboo literature. The data are indexed in accordance with the Thesaurus of Bamboo, which was compiled specifically by the experts of the CAF for the sorting and retrieval of bamboo literature. On the basis of this Thesaurus, an automatic indexing programme for bamboo literature will be made in the future, which will relieve the labour intensive indexing work.

The bibliographical and non-bibliographical data are sorted separately in different databases, which form a database complex - China Bamboo. This complex is accessible through the main and secondary menus.

Database Format

The software used include CDS-ISIS for DOS and FoxPro for Windows.

Data Content

The data in this database are of both bibliographical and non-bibliographical nature. China Bamboo consists of five parts, including 19 sub-databases with different types and structure. The contents are as shown in Table 11.

Regional Coverage

The database covers China and selected countries of other continents.

Number of Records

The number of records for each sub-database is shown in Table 11.

Data Sources

1. Bamboo Information Centre publishes Bamboo Abstracts both in Chinese and English. We have a network of correspondents in this country, we get bamboo-related information from these correspondents regularly.
2. All the bibliographical data are collected from the bamboo-related publications released in China, and partly in other countries, these materials are processed and edited in the CAF.
3. The statistical data are collected from the Ministry of Forestry, Ministry of Agriculture, Ministry of Light Industry, State Patent Office, State Standard Office, State Customs Administration.
4. Data concerning bamboo research projects and research personnel are collected from research institutions in this country.

Table 11: Data Content and Number of Records of China Bamboo Database

Parts	Sub-databases	Records
Bamboo Bibliography	Bamboo literature (abstracts)	2526
	Full text of Bamboo Literature	
	(1) Genetics and Breeding	21
	(2) Bamboo Entomology	23
	(3) Bamboo Culm Anatomy	12
	(4) Bamboo Physiology	16
	(5) Bamboo Timber Utilisation	11
	(6) Bamboo Products Market	17
Bamboo-related documents	Bamboo-related Patents	301
	Bamboo-related Standards	5
	Bamboo Thesaurus	2440
Bamboo Research	Bamboo-related Institutions	54
	Bamboo-related Officials and Professionals	29
	Bamboo-related Meetings	10
	Bamboo Research Projects	101
Bamboo Industry	Bamboo Resources: Data on bamboo resources from the national forest resource survey.	76
	Raw Bamboo Production: Area of bamboo plantation, dried yield of bamboo shoot, total of raw material.	171
	Bamboo Products: Data on the volume and output value of various kinds of bamboo.	300
	Bamboo Culm Market: The purchase and sale of bamboo culm in domestic market.	558
	Export of Bamboo Products: Quantity and price of exported bamboo products, arranged according to destination.	1392
	Import of Bamboo Products: The quantity and price of imported bamboo products.	1120
Illustrated Bamboo Database	Bamboo Processing Machines: Data on Chinese bamboo processing machines, including raw material processing, bamboo flooring, shuttles, toothpicks, bamboo mats, chopsticks, plybamboo, particle board.	71
	Bamboo Species: Data on bamboo species, varieties and forms, including morphology, biology, use, distribution.	104
	Bamboo Insects: Data on bamboo insects, including morphology, biology, occurrence, behaviour, damage caused and control measurers.	22
	Micromorphology of Bamboo Culm: SEM (scanning electron microscope) pictures of major bamboo, species, including microform, density and micromorphology.	64

Users

Most of the users are from institutions of scientific research and higher learning, experts from bamboo processing enterprises and governmental officials are also using our information. Bibliographical data, such as bamboo literature, catalogues and abstracts, are used mainly by the scientific researchers and university teachers and students, while the data on production, price and other facts are mainly used by decision makers and businessmen.

output

1. "Bamboo Multimedia CD-ROM" on FoxPro for Windows will be released.
2. Publications:
    - Bamboo Abstracts (biannual);
    - Catalogue of Chinese Bamboo Literature, Beijing, 1989;
    - Selected Papers on Recent Bamboo Research in China, ISBN 981-00-2618-8, Beijing, 1991;
    - Directory of Chinese Bamboo Processing Machines, ISBN 981-00-3436-9, Beijing, 1992;
    - Bamboo and its Use - Proceedings of International Symposium on Industrial Use of Bamboo, Beijing, 1992;
    - Substitute Bamboo for Wood in China (an album) Beijing, 1993;
    - Substitute Bamboo for Timber in China (a research report) Beijing, 1994;
    - A Compendium of Chinese Bamboo, ISBN 981-00-3436-0, 1994; and
    - A Thesaurus of Bamboo.

Staffing

Bamboo Information Centre consists of four persons, a project manager and a project assistant (full time), a chief editor and a computer engineer (part time). These four persons are responsible for the updating and maintenance of the database. Specialists of the Library of the CAF are helping us in literature collecting, researchers of the Academy are helping in solving scientific and technical problems.

Financial Resources

Bamboo Information Centre has no permanent financial resources, all the expenses for its activities are covered with the income from information service.

Existing Database Network and Integration

The Institute of Scientific and Technological Information is developing a network, which will be connected to information highway, China Bamboo will be a part of it.

BIODIVERSITY INFORMATION MANAGEMENT SYSTEM*

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Introduction

Biodiversity inventories, through the development and management of biological, ecological, taxonomic and related systematic information on living species and systems, increase the value and promote the sustainable use of raw biological resources.

Instituto National de Biodiversidad's (INBio) present national inventory programme intends to complete the inventory of the estimated 500,000 species for Costa Rica and induce broad national participation in the process. The basic field work is being conducted by a group of lay people who are trained for the vocation of a "parataxonomist". Based out of INBio's 26 Biodiversity Offices located in the country's Conservation Areas, the parataxonomists collect specimens for the national inventory. They receive feedback, planning and guidance from the Institute's staff of curators who work within a larger network of national and international curators and taxonomy experts.

To facilitate the management and manipulation of species and conservation information accumulating in the Institute's inventory databases, INBio has designed and implemented a computerised Biodiversity Management Information System (BIMS) since 1993. Once information is appropriately formatted, the Institute concentrates on making its biodiversity information available to a larger cross-section of society, both inside and outside of Costa Rica, through INBio's "Program for Biodiversity Information Dissemination".

Database Format and Status of Database

The system is in a developing and integration phase, but some modules are already in use.   The modules access data from oracle database. Other applications from the Biodiversity Prospecting Division will interact with BIMS through the local area network.

Data Content

BIMS is a specimen-based, integrated system composed of several modules. In general, the system is divided into four components:

1. **Inventory Module:** This captures and processes all inventory related information, such as lot, specimen, and locality data. There are around two millions records of specimens. It is composed of the following submodules:

a. Administrative submodule: System definitions are set, user control is established, and certain sensitive processes are executed.

b. Lot submodule: It captures information of specimen lots coming from the field. The data include date of specimen collection, name and geographic information of the collection locality, elevations, a list of the participating collectors, habitat description, collecting methods, etc.

c. Specimen submodule: This stores individual specimen information, namely the voucher number, preservation method used, specimen type (organism, photograph, observation, etc.), collection to which specimen belongs (wet collection, dried and pinned, etc.), field notes and post annotations about the specimen and description of its components, if it has been dissected for study.

d. Identification submodule: The submodule gathers data entered by curators and other specialists about specimen identification. This information includes, for each specimen, sex, life stage, date of identification, a list of the identifiers, and taxonomic classification. The taxonomic classification can be entered at the species level, or any higher level.   Taxonomic levels above species can be updated. A history is kept on all identifications done on each specimen.

e. Reports submodule: Among the various types of reports, this Inventory module will have specimen, locality, taxonomic reports.

2. **Taxonomy Module:** The module manages taxonomic information of all kingdoms and comprises eighteen levels. Valid taxa and temporary names are handled by the Hierarchic Tree Structure. Other associated taxonomic information, also managed by this submodule, are scientific and popular descriptions, taxon uses, authors, life forms, synonyms and common names.

3. **Geographical Information Module:** BIMS interacts with a GIS application. Spatial analysis and graphic reports are available to the user. Image processing is also incorporated.

4. **Bioprospecting Information Module:** In addition to BIMS a Biodiversity Prospecting Information System accumulates information on all bioprospecting activities and processes starting from the collection, taxonomic identification, natural history, location, field data and processing to laboratory activities (chemistry and/or biotechnology) selection of samples for screening and results.

Parallel to the steps followed for sample processing - collection, chemical processing, packaging and delivery - the Biodiversity Prospecting Program has developed an information system responding to multiple types of users. The Prospecting Information Management System's primary objective is to capture, organise information and generate reports regarding samples and also the laboratory process.

The system modules are organised as follows:

a. The *central nucleus of the process* (processing notebook) co-ordinates the traffic of samples between modules and facilitates the creation of executive reports permitting the samples to be monitored and given the appropriate follow-up from their collection in the field to the results of biological testing.

b. *The insect collection module* is divided into two parts:
  i. A Filemaker (Macintosh) database exists for each eco-chemist who uses a PowerBook to manipulate important information in the field.
  ii. A central module developed in FoxPro for Windows which brings field information together and automatically assigns a

code to the samples in order for them to arrive at INBio's laboratory for processing.

c. The *plant collection module* allows the organisation of information brought in from the field by botanists.

d. The *drying module* is responsible for the wet extraction process during which the information generated is similar for both plant and insect samples. Given this, only one module is needed for both sample types.

e. The *chemical processing module* has been developed using FoxPro for Windows. The module automatically receives information concerning the samples to be processed from the central nucleus, and permits the information generated during the extraction process to be saved. The module varies depending on the protocols followed in the chemistry laboratory.

f. The final component, the *delivery control module* houses information relevant to delivery, including the delivery date for each sample, the package number, etc.
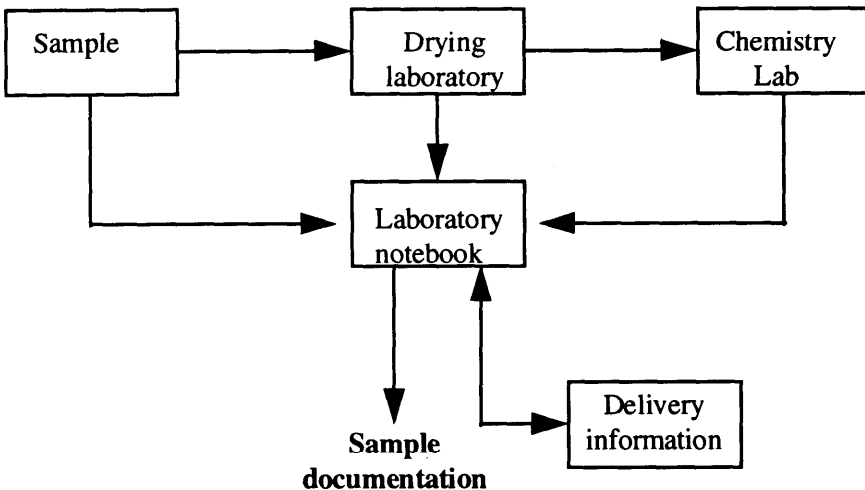
Figure 3: Using the Laboratory Notebook to Construct a Sample History

System Design

Structure of the principal database tables

An essential part of plant sample processing focuses on gathering collection data which is later introduced into the system, taking into consideration the following information:

- Sample code
- Project code
- Consecutive field collection code

- Date of collection

- Collecting site code

- Exact collection site
- Field expedition code
- Taxonomic identification code
- Level of taxonomic identification
- Comments

Since various parts (branches, leaves, roots) of a plant sample collected may be separated, a list of parts associated with the plant sample is required and includes the following information:

- Bar code
- Sample code
- Plant part

- Voucher
- Weight
- Sample condition (damaged weight missing, in process etc.)

Information amassed in the field for insect samples is directly delivered to the system in electronic format with the following data included:

- Barcode
- Sample code
- Consecutive field collection code

- Life stage (egg, larva, etc.)
- Collector
- Collection period
- Collection method (light trap, net, etc.)

- Entomologist
- Sex (male, female, mixed)
- Method of preservation (frozen, alcohol, etc.)
- Weight of insect
- Type of host (plant or other)
- Host voucher
- Taxonomic identification code for the host

- Collecting site code

- Exact collection site
- Insect voucher
- Taxonomic identification code
- Level of taxonomic identification

- Level of taxonomic identification of host
- Date of delivery to INBio
- Project
- Comments

This information is processed and verified in INBio before it is introduced into the collection database.

If the project protocol requires the sample to undergo wet extraction preceding the chemical processing, then, in addition to the collection information gathered, the samples are labelled with respective bar codes and sent through the drying process. The following information is obtained for drying:

- Barcode
- Sample code
- Type of sample
- Date of delivery to INBio
- Date of delivery to INBio
- Hour of delivery to INBio
- Initial presentation (frozen, alcohol etc.)
- Weight
- Type of drying
- Weight of material to be dried

- Dry weight
- Type of grinding
- Ground weight
- Date of process termination
- Hour of process termination
- Weight delivered
- Number of bags

- Destination
- Comments

Whether or not the material requires drying, the samples are next delivered to the chemistry laboratory where the following information is registered:

- Bar code
- Sample code
- Consecutive laboratory notebook code
- Weight for processing
- Number of bags or bottles

- Date of arrival in laboratory
- Protocol
- Weight for extraction

- Comments

As various bottles are obtained from each sample depending on the solvents used, the following information must be stored for each bottle:

- Barcode
- Sample code
- Solvent
- Extract weight

- Bottle weight
- Bottle number
- Date of extraction
- Stage (process, damaged, etc .)

output

Data produced by the system will also be used to produce printed information, such as field guides, brochures, slides, etc.

Accessibility

Inventory data are accessible through Internet through the following address: hppt://www.inbio.ac.cr/

Staffing

Staff members at INBio include the following:
- 1 Co-ordinator
- 4 Systems Analysts.
- 2 System and Networks Administrators.
- 1 Multimedia Program Co-ordinator.
- 1 GIS Co-ordinator.

Existing Database Network and Integration

A local area network connects the BIMS database with applications programmed for, and running on UNIX equipment, Macintoshes, and PC compatibles. A character-based interface is developed for those external users interested in accessing the databases through Internet.

THE MFP DATABASE : A STRIDE TOWARDS CATERING TO THE INFORMATION NEEDS OF NTFP USERS*

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Introduction

Forests have been looked upon by foresters primarily as a source of a single product - timber; but the forests also provide a wide range of other products such as food, fodder, medicines essential oils, gums and resins, tans and dyes, fibres and flosses, bamboos and canes, and miscellaneous products like honey, silk, lac, bidi wrapper leaves, etc., to name a few. These products are collectively referred to by many different names viz., Minor Forest Products (MFP), Non Timber Forest Products (NTFP), Non Wood Forest Products (NWFP) or Special Forest Products. For various reasons like the localised use, knowledge limited with indigenous people, low revenue earnings as compared to timber, etc., they have not been given adequate attention in forest management. With the growing importance of MFPs, it has now become apparent that besides catering to dietary, medicinal and other pressing needs (fodder and fuel), they can serve as raw materials for enterprises, thus providing opportunities for income and employment generation.

Despite the wide prospects of MFPs/NTFPs , the biggest constraint has been the lack of information. It is true that information does exist but is inadequate and scattered. With the wide horizon of utilisation must come the knowledge of their productivity, developmental potential and the necessary basic information required for the development of silvicultural, extraction/utilisation and market management strategies. The continuance of enterprises is also put to question if the entrepreneur is ignorant of the location and extent of availability of the particular species/raw material. The lack of information has been put on record as one of the major obstacles to the development of MFP.

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* Paper prepared for the NTFP Database Workshop organised by CIFOR, Bogor, Indonesia, 6-8 December 1995.

This situation laid the foundation for the origin of a database on MFPs to make available all MFP/NTFP related information at one place. The Centre of Minor Forest Products, Dehra Dun (India) took the lead and thus came up the MFP Database.

The database built up by the Centre of Minor Forest Products has been named the ' MFP Database' in concurrence with the consensus at the International Seminar on ' MFP in Forestry' organised by the Centre in April 1993, on the adherence to MFP as the apt nomenclature for various non-wood or non-timber forest products.

The idea of the MFP Database was an outcome of the experiences gathered during my long career at the MFP Division of the Forest Research Institute, Dehra Dun of the Government of India (now called the Indian Council of Forestry Research & Education) and various consultancies and assignments fulfilled for the FAO, etc. How could we profess the wider acceptance of MFP and its utilisation in a systematic and sustainable manner when the knowledge was not available? The zeal of a researcher or entrepreneur would dissipate running from pillar to post for information. To achieve this, a project proposal incorporating the idea of the MFP Database was submitted to the Ford Foundation who readily came forward with their benevolent support and offered funds to develop the same.

Thus, with the financial support of the Ford Foundation, the database was initiated in 1993 to serve as a tool to support and strengthen the capacities of forest managers and users with respect to the utilisation of MFPs as well as for the overall maintenance of the floral wealth of India.

Database Format

The format of the database was designed by the author with the help of an assorted group of NTFP users representing foresters, scientists and researchers including ecologists environmentalists, social scientists, botanists, chemists and entrepreneurs in the Seminar organised by the Centre. The fields or parameters for input of information were discussed at length. These were then circulated to a large number of people for their comments and were also discussed at various fora including the Joint Forest Management National Support Group Meeting at New Delhi in June 1993. The structure was suitably modified to incorporate the

suggestions made to widen the applicability and usefulness of the database. The format finally drawn up is as shown in Table 12.

The MFP database was conceptualised as a complete Management Information System (MIS) with a User-Friendly Operating Environment. The system displays a Retrieval Menu with a basic query system for filtering out the information from the comprehensive database. The retrieval menu provides a query of identifying species - State-wise, Use-wise, as well as those falling within different Agro-Ecological Region, Eco-Floristic Zone, Forest Type.

As the operator selects an option for querying the database, a Window is displayed from which the user can select a particular item by moving the cursor. As the cursor is moved up and down, it scrolls through the various item choices. Thus a user can narrow down to the desired information. The operator can thus interactively search for detailed information on a particular species. The database uses codes wherever possible; the Codes Dictionary is linked with the database such that information displayed on the screen is Codeless and more meaningful to the user or even a layman.

The programme has been developed in Clipper 5 language, maintaining compatibility with dBASE structures. The programme has been successfully tested with sample data while detailed information collection is underway.

Status of the Database

The database is still under development, and the collection and input of species' details are in progress. Also new species are being added to the broad list. At the present stage of development, the database contains preliminary data on about 1280 species. The database is expected to be available in a fuller and richer composition by the end of 1996.

Table 12. List of Parameters

Parameters
1. Botanical Name of Species
2. Family Name
3. Trade Name/Local Name
4. Habit
5. Distribution
6. Zone Code - Agro-Ecological
7. Zone Code - Eco-Floristic
8. Forest Type
9. Rainfall
10. Altitude
11. Temperature
12. Soil Type
13. Uses
14. Part, Used for
15. Active Ingredients
16. Value-Added Products
17. Technology Used
18. Yield - per tree and per ha
19. Potential Production
20. Actual Production
21. Cultiv. Possibilities and Expected Prod.
22. Closest Substitute
23. Supply
24. Demand
25. Trade Economics
26. Silvicultural Requirements
27. Phenology
28. Methods of Propagation by Seeds
29. Vegetative Methods of Propagation
30. Nursery Techniques
31. Harvesting Technique: (Maturity Time, Time of Harvesting, Periodicity, Stage of Plant Growth, Method of Collection (Leaf, Bark, Flower/Fruit, Root)
32. Grading & Processing

Table 12. List of Parameters *continued*

Parameters
33. Storage
34. Pests, Diseases (in Field/During Storage/Remedies)
35. Economics of Cultivation/Production
36. Employment Potential: Present and Future - from Cultivation/Harvesting/MFP based Industries
37. Additional Advantages/Utility
38. Important References
39. Resource Persons

Data Content

A thoughtful look at the parameters will reveal the broad range of information covered to make the database more useful and far reaching. For a vast country like India with its diversity of vegetation and forest cover, it is by no means an easy task to pool all information at one go. Preliminary screening has been accomplished from a long list of about 3000 economic plants that are reported to occur in India. About 1280 species have been selected and basic information like taxonomical data, distribution, uses, etc., have already been fed into the database. A further shortlist of about 30 species that have a high rating in terms of their commercial importance has been prepared and efforts now concentrate on the collection of information about these species.

Glancing through the parameters, it becomes evident that the data content is largely descriptive which can be most effectively utilised by the user groups. Numeric data on yield, trade economics, the demand and supply, etc., are also available. Important bibliographical references are also given for each species for better communication and planning in the future.

Regional Coverage

The scope of the database in terms of geographical spread covers the whole of India which is bestowed with varied climatic conditions from tropical (including desert) to temperate and alpine zones. Information can also be accessed regarding the MFP species found in each of the 25 states of the Indian Union and their uses. Database of India may be useful to other countries in similar climatic zones as well for identification of MFP

species which may be introduced and grown in different countries for socio-economic development, eco-system conservation and biodiversity maintenance.

Number of Records

At the present stage of development, the database houses 1280 records.

Data Sources

The sources of data are primarily secondary and derived from published works like

- the Wealth of India, Economic plants of India, Red Data Book and other reference books, scientific journals, magazines, newsletters, etc.,
- procedings of various workshops and seminars which report recent research findings and achievements,
- case studies that reveal area or product specific information and details.

Wherever and whenever funds are available, attempts have been made to collect primary data from the grassroots level related to production, marketing and utilisation data of MFPs.

Maintenance and Users

The database is still being developed and is therefore updated as and when necessary or upon receiving new pieces of information from the Documentation staff.

Even at this stage of its evolution, the database has been furnishing information to foresters, entrepreneurs and researchers about the MFP species - their uses, methods of propagation and utilisation perspectives for socio-economic development for different states. In its complete shape, the database is likely to benefit not only the foresters, entrepreneurs and researchers but also the policy makers and planners, the chemists, the economists, the environmentalists, the social scientists, etc. in the sustainable management of the natural resources with the optimal utilisation of MFPs.

Output/Publication/Accessibility

The MFP Database is at this stage, able to furnish a hard copy of the MFP species according to the region or according to the category of utilisation. This information is available on request at present. However, a region-wise list of species is likely to be published by March 1996. Production of a book on "MFP Resources of India" and small bulletins entitled "Ready Reckoners" in the shape of monographs on MFP species are also envisaged. This will be a regular publication of the Centre of MFP from the MFP Database.

Staffing

Two computer personnel are engaged in entering the data being skimmed out by the supporting staff who concentrate on scanning relevant MFP/NTFP information and collecting data from the Forest Department and other research organisations and MFP based enterprises. Total staff engaged include one Senior Research Fellow, one Junior Research Fellow, two Computer Programmer and Operators, supported by the field staff of the Centre of Minor Forest Products, all under the direct supervision of the Managing Director.

Financial Resources

The creation of the database in 1993 was the most important component of the Ford Foundation funded project on "Assessment of NTFP Resources of India for Better Management" which the Centre is currently executing.

Existing Database Network and Integration

The MFP Database is in a stage of development and therefore has so far not been joined to other networks. In the years to come it shall be attempted to link the MFP Database to the other Database networks within India or if need be integrate it to a broader database on forestry.

A REPORT ON INMEDPLAN DATABASE*

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Introduction

The Indian medicinal heritage has perhaps the longest unbroken history in human civilization. Traditional health culture in India functions through two streams; the local folk stream which is located in the villages of India, and the codified or shastriya stream. Systems like Ayurveda, Sidda, Unani and Tibetan are expressions of the latter. The two streams have a symbiotic relationship.

Today, traditional medicine continues to play a vital role in the lives of rural and particularly tribal people. It is recognised to be essential for their self reliance in primary health care. It is believed that in specialized areas like respiratory, gastro-intestinal tract and liver disorders, skin diseases, orthopaedics, ophthalmology and mental health, the Indian traditional medical systems can make original contributions to the world of medicine.

Medicinal plants form the main resource base of traditional medicine. Over 7,000 species of plants found in different ecosystems are used for medicine by the people of India. In fact, India has one of the richest ethno-botanical traditions in the world.

Information on Indian medicinal plants is available in many geographically distributed specialized centers located across the country and is therefore not easily accessible. Hence, the need to create a national database network to link the different centers which are working on various aspects of medicinal plants.

The Indian Medicinal Plants Distributed Databases Network (INMEDPLAN) was established in June 1993. Nine specialized institutions across India have joined together with the Foundation for Revitalization of Local Health Traditions (FRLHT) to form the network.

The project is supported by the Government of India and is coordinated by FRLHT which is the network secretariat for INMEDPLAN.

Data Content

The nine specialized institutions, known as the nodal agencies, develop databases on different subjects related to medicinal plants. The agencies and the information they manage are as follows :

1. Agrotechnology
   Central Institute of Medicinal and Aromatic Plants (CIMAP) P.B. No. 1, P.O. Ram Sagar Misra Nagar, Lucknow 226 016.

   Information available: Propagation, manures & fertilisers, harvesting yield, pests & diseases, cultivation economics, sources of planting material supplies and other relevant information.

2. Bibliography and Abstracts
   Publication & Information Directorate (PID), Dr. K. S. Krishnan Marg, New Delhi 110 012.

   Information available: Plant references, source, title, author, institution and abstract of the article, the journal and the year in which published.

3 Botany
   Botanical Survey of India (BSI), 192, Kaulagarh Rd. Dehra Dun 248 195 (U.P.)

   Information available: Morphology, taxonomy and distribution (Indian and World). Reference specimens, herbarium, etc.

4 Ecology
   Dept. of Ecology, French Institute, 11, St. Louis St., P.B. 33, Pondicherry 605 001

   Information available: Natural conditions in which medicinal plants occur viz. topography, climatic factors, edaphic factors, distribution pattern, etc.

5 Ethnomedicine
   Tropical Botanical Garden   and Research Institute (TBGRI), Karimancode, Pacha-palode P.O. Thiruvananthapuram 695 562

Information available: Location of ethnic source, disease for which plant is used, plant part used, plant part condition (fresh/dried), medicine form, administration mode, etc.

6. Pharmacognosy

   Ayurveda Research Institute, Poojappara, Thiruvanathapuram, Kerala 695 502

   Information available: Macroscopic and microscopic description of plant, officinal part, histology, taste, odour and other distinguishing features.

7. Pharmacology

   Central Drug Research Institute (CDRI), Chattar Manzil, P.B. No. 173, Lucknow 226 001

   Information available: Screening data (x 115), type of test, test results, etc.

8. Photochemistry

   Regional Research Laboratory (RRL), Canal Road, Jammu Tawi 180 001

   Information available: Isolation technique, constituent/compounds, chemical class, structure, part containing constituent, percentage yield, analytical techniques, bio-activity evidence (invivo/invitro), biosynthetic studies, etc.

9. Traditional (Indigenous) Systems

   Centre for Indian Medical Heritage (CIMH), PB 7102, Ramanathapuram, Coimbatore 64 1045

   Information available: System of medicine (Ayurveda), scripture references, indigenous classification, properties, processing, clinical usage, formularies in which used, etc.

Regional Coverage and Number of Records

The project covers entire India. The number of plant species for which data are available for each subject head is given below:

Table 13: Subjects and Number of Records

Subject Head	No. of plant species for which data are available	Fields by which database can be searched
Agrotechnology	150	bot. name, propagation technique, seed storage, tissue culture, fertiliser, market price
Ayurveda	385	bot. name, scriptural references, indigenous classification, properties, processing, formulations clinical usage
Bibliography & Abstracts	over 4,000	bot. name, source, title, author of the article, institution, journal and the year in which published.
Botany	130	bot. name, family, genus, species, local name, infraspecific category, habitat, status, distribution, phenology, reference specimen, herbarium
Ecology	100	bot. name, topography, climatic and edaphic factors, distribution pattern, herbarium
Ethnomedicine	100	bot. name, location of ethnic source, disease for which plant is used, plant part used, plant part condition, medicine form, administration mode
Pharmacognosy	180	bot. name, macroscopic, micro-scopic description of plant, officinal part, histology, taste, odour
Pharmacology	1,200	bot. name, extraction medium, type of activity, toxicology studies, compound isolated (if any)
Phytochemistry	375	bot. name, isolation technique, compounds characterised, part containing constituent, bioactivity evidence, references

Data Sources

The source for INMEDPLAN data is of two types. Primary data in the case of Pharmacology is generated by the research done by the nodal agency (in this case, the Central Drug Research Institute at Lucknow). All other data are from secondary sources like published literature, books, journals, etc.

The data are collected by the nodal agency for their respective subject heads. INMEDPLAN has a standard data structure for each head of data and data are documented and entered into the computer in this standard format.

Maintenance and Users

INMEDPLAN is right now in a 'natal' stage and updating of the data is a continuous process. Annual targets are being set to increase the number of plant species for which data are to be collected by each member of the network.

INMEDPLAN is serviced by a network secretariat (NS), the responsibility of which has been accepted by FRLHT. The responsibilities of NS are :

- Publish national data standards for each specializing head of information.
- Publish common standards for plant nomenclature to be followed by each nodal agency.
- Encourage participation of other smaller agencies possessing data, as satellite agencies of INMEDPLAN. Their contribution will be based on the standard data formats as published by the NS.
- Publish a consolidated multi-disciplinary index of the data on this network.
- Publish periodic newsletter to enhance user awareness .
- Liaise with international databases to strengthen the database building activity of the network. The NS has direct access to **NAPRALERT** and **Chemical Abstracts** databases of U.S.A.
- Clearing house for requests and queries, passing them on to the appropriate nodal agencies.

INMEDPLAN serves the following user community:
- Agriculture community
- Community health workers
- Medicinal research
- Pharmaceutical industry
- Practitioners of Indian systems of medicine
- Students & institutions involved in plant research
- Medicinal plant conservationists, etc.

Accessibility

INMEDPLAN is right now at a developing stage. An individual or organisation located geographically remote from the subject centre can now request for data of his specific interest from these organised "off-line" databases. Alternately, the network secretariat at FRLHT forwards user request to the appropriate nodal agency. FRLHT can be accessed via E-mail and users can utilise this facility to request for data.

As a step towards providing 'on-line' access, five of the nodal agencies, namely PID, Delhi; CDRI, Lucknow; RRL, Jammu; BSI, Dehra Dun and CIMH, Coimbatore are linked to FRLHT directly by E-mail. Very soon other nodal agencies will also be similarly connected. In future, INMEDPLAN will also be made available through Internet.

Staffing and Financial Resources

Each nodal agency has a designated nodal officer who is a subject specialist and is responsible for the development and maintenance of their database. The network secretariat has a Program officer who is responsible for co-ordinating the activities of the network and perform the role of the network secretariat.

Initial funding for INMEDPLAN has been provided by the Danish International Development Agency (DANIDA).

INMEDPLAN also generates revenue through marketing of its data and in future hopes to bring out CD-ROMS which would be of use to Pharmaceutical industries and researchers.

PROSEA DATABASES*

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Introduction

PROSEA (Plant Resources of South East Asia) is a foundation under Indonesia law, with an international charter, domiciled in Bogor. It is an autonomous, non-profit, international agency, governed by a Board of Trustees. PROSEA focuses on the documentation of information on plant resources of South-East Asia. PROSEA consists of a Network Office in Bogor (Indonesia) co-ordinating six Country Offices in South-East Asia, and a Publication Office in Wageningen (the Netherlands). Its objectives are to document and make available the existing wealth of information on the plant resources of South-East Asia for education, extension work, research and industry, to make operational a computerised databank on the plant resources of South-East Asia, to publish the results in the form of an illustrated multi-volume handbook in English, and to promote the dissemination of the information gathered. Its activities include the establishment and operation of databases, the publication of books, and the dissemination of reports and research results.

PROSEA documentation system has been developed for information storage and retrieval called SAPRIS (South-East Asia Plant Resources Information System), which is now only called PROSEA DATABANK, and consists of six databases:

- BASELIST : primarily a checklist for more than 6,200 plant species;
- PREPHASE : references to literature from South-East Asia;
- PERSONYM : references to specialists;
- ORGANYM : references to institutions and their research activities;

- CATALOG : references to secondary literature; and
- TEXTFILE : all PROSEA publications and additional information.

The PROSEA Foundation is publishing a multi-volume handbook on the plant resources of South-East Asia. This activity is dependent on the development of the above databases, most of which are computerised. BASELIST, which has two versions (first and final), contains a basic list of species. It was meant to be a starting point and was designed to help editors and authors check the correct scientific plant names, decide which species should be considered for inclusion in the handbook and which commodity group each species can best be assigned to. The PREPHASE database contains, firstly, references to literature from South-East Asia, which were published since 1928 following the appearance of Heyne's ' De Nuttige Planten van Indonesie' and, secondly, all grey literature mostly kept in universities as unpublished theses. The PERSONYM database comprises references to specialists working within South-East Asia and beyond, dealing with South-East Asia's plant genetic resources. The ORGANYM database has references to institutions in the region and their research activities which can support PROSEA activities. The CATALOG database stores references to world secondary literature, compiled through on-line system with several institutional databases in the world. The TEXTFILE database keeps all PROSEA publications and additional information, and it will also be kept in the form of CD-ROM.

Although the PROSEA project (which was later changed to a Foundation) itself was formulated in 1985, the databases were established only in 1988, following the signing of the Agreement of Co-operation between Wageningen Agricultural University, the Netherlands and five institutions in South-East Asia, i.e.:

1. Forest Research Institute of Malaysia FRIM), Kepong, Malaysia;
2. Indonesia Institute of Sciences (LIPI), Jakarta, Indonesia;
3. Papua New Guinea University of Technology (UNITECH), Lae, PNG;
4. Philippine Council for Agriculture, Forestry and Natural Resources Research & Development (PCARRD), Los Baños, Philippines;

5.   Thailand Institute of Scientific and Technological Research (TISTR), Bangkok, Thailand.

The 6th institution, Institute of Ecology and Biological Resources (IEBR), Hanoi, Vietnam, joined PROSEA in 1990.

Database Format

Except for BASELIST, which is presently dormant in the form of a published book, the rest of the databases are in the form of computerised data using INMAGIC software programme. Their formats are as follows:

PREPHASE
ET (Title in English); OT (Original title); AU (Author(s)); CS (Corporate source/affiliation); SD (Source data); AN (References, Illustration, Tables, Maps); DT (Document types); LI (Literary indicator); LA (Language text and Language summary); AV (Availability); TA (Species/genus/family); CO (commodity groups: A-V); SU (Subject: l-21); AB (Special notes); CY (Country); and ABS (Abstract).

PERSONYM
NA (Name specialist); AD (Work address);   (Present Function); IN (Main research interest: l- 11); PU (Major publications); CO (Commodity groups: A-V); TA (Species/genus/family); NTS (Notes); and CY (Country).

ORGANYM
LA (Name of organisation in local language); AN (Acronym); EN (Name of organisation in English); AD (Address); I-ID (Head); PI (Parent institution); AC (Activities: 1- 11); PU (Publications); CO (Commodity groups: A-V); TA (Species/genus/family); NTS (Notes); and CY (Country).

CATALOG
NO (Catalog number); TI (Title); AU (Authors); CS (Corporate source); SD (Source data);   DT (Document type); LA (Language); AV (Availability); TA (Taxa); CO (Commodity groups: A-V); SU (Subject: l-21); ID (Identification); and AB (Abstract).

TEXTFILE
TI (Title); SO (Source); FA (Family); 2n (Chromosome number); SY (Synonyms); MS (Species); TG (Trade groups); VN (Vernacular names); OD (Origin & distribution); US (Uses); PT (Production & trade); PR (Properties); BOT (Botany); OB (Observations); DS (Description); WA (wood anatomy - only for timbers); GD (Growth & development); BI (Botanical information); EC (Ecology); AGR (Agronomy); PP (Propagation); HU (Husbandry); SM (Sylviculture - only for timbers); DP (Diseases and pests); HA (Harvesting); YI (Yield); HI-I (Handling after harvest); GRB (Genetic resources and breeding); FU (Prospects); and AU (Author).

Status of Databases

PROSEA databases are currently not available to the public, but part of the PREPHASE is published as PROSEA Bibliographies which are for sale, and the printout of the content is also available upon request. The ORGANYM data will be included in a Directory of Institutions, which will be published next year. Accessibility to the CATALOG database should be made through special arrangements due to the patent owned by some other participating organisations.

Data Content

The first four PROSEA databases contain taxa of the plants, commodity groups and subject, and, especially for PERSONYM and ORGANYM, the activities/main interests. The taxa are expressed in species/ genus/family, the commodity groups are divided into groups A-V (see Notes).

Regional Coverage

PROSEA Foundation covers six countries in South-East Asia, i.e. Indonesia, Malaysia, Thailand, Vietnam, Philippines and Papua New Guinea, plus the Netherlands. In each country there is a Country Office which supplies data to the Network Office in Bogor which then compiles all data into each database accordingly.

Number of Records

The number of records (until the end of 1995) is as follows:

PREPHASE	29,567
PERSONYM	5,302
ORGANYM	654
CATALOG (database)	51,875
CATALOG (CD-ROM)	90,771
TEXTFILE	1,781

Data Sources

Data of most databases originate from institutions in the six Country Office. The CATALOG data were especially gathered through on-line systems with several institutional databases, namely AGRICOLA (USA), AGRIS (Italy), CABI (UK), KIT (the Netherlands), TROPAG and USDA (USA).

Maintenance

The maintenance of PROSEA databases is carried out as and when necessary, but the PREPHASE database was updated when the Bibliography on certain commodity groups was published. The ORGANYM database is edited during publication of the Directory of Institutions, and the PERSONYM database is maintained at the time of publishing the Directory of Researchers.

Users

The users of our databases comprise those professionally concerned with plant resources in South-East Asia and working in education, extension, research and commercial production (direct users), and those in South-East Asia depending directly on plant resources, obtaining relevant information through extension (indirect users).

Output/Publication/Accessibility

PROSEA's output consists of the following:

1) A multi-volume handbook comprising 22 sets of handbooks (so far eight sets have already been published, either as hard bound or paperback editions),

2) Bibliographies (paperback editions) with six sets having been published so far, i.e. Pulses, Edible Fruits and Nuts, Dye- and Tannin-producing Plants, Forages, Timber Trees - Major Commercial Timbers, Rattans and Vegetables;

3) Miscellaneous: A Selection; Basic List (first and final versions), Proceedings First Symposium and Second Workshop.

Apart from books, PROSEA also maintains databases which can be accessed by any interested inquirer.

Staffing

The compiling process of PROSEA databases is implemented by Databank Officers, both in the Publication Office (Wageningen) and the Network Office (Bogor) in co-ordination with the six PROSEA Country Officers in South-East Asia, supported by many scientists all over the world.

Financial Resources

PROSEA finding comes from various donor agencies such as:

Indonesia	:	Indonesian Institute of Sciences (LIPI), Yayasan Sarana Wanajaya (YSW);
The Netherlands	:	DGIS, Ministry of Agriculture, WAU, Tropenbos;
Other donors	:	EC, FINNIDA, IDRC, ITTO, UNESCO, etc.

Existing Database Network and Integration

So far networking and integration within PROSEA are through the exchanging of data within member countries in the form of floppy disks. The data, in WordStar software, are later imported into INMAGIC. Sending data through Internet is still under consideration. No network has yet been established with databases outside of PROSEA.

THE PLANTS FOR LIFE DATABASE*

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Introduction

Kenya's forests are rich in plant species diversity and particularly interesting because of the wide range of ecological and climatic conditions. From time immemorial, these forests have provided a variety of products and services, first purely for subsistence. However as people developed, timber assumed a major role in their affairs and appeared to be the only significant output of the forests. Consequently, forest management systems were aimed at maximising the production of wood and wood products.

The belief that forests are of value only for wood production in a macro-economic context has now been drastically modified due to realisation that forests also provide a wide range of other products such as medicines, food, oils, gums and resins, tans and dyes, fibres and miscellaneous products like honey, to name a few. These are collectively referred to as non-wood forest products (N-WFP).

Preliminary socio-economic surveys carried out among various forest-adjacent communities in Kenya clearly reveal that NWFP contribute significantly to non-cash economies, providing subsistence goods and services and to some extent as items of trade. The same studies indicate a great diversity of NWFP valued by the rural communities as well as a significant variation in the ways and extent to which they are used from one forest to another. The same variation exists even among households and within a community.

According to Kenya Forestry Master Plan (1994), exploitation of these resources would promote improved management of woody plants and create a sustainable form of economic activity to benefit many of the rural poor. This in turn would also support rural development, create

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alternative source of income by providing gainful employment and uplift the living standards of the local communities.

However, exploitation of NWFP mostly depends on indigenous knowledge on plants by the local communities. Such knowledge has been accumulated over years of experimentation, innovation and observation, and has been passed on from generation to generation forming part of the social culture within the community (Kabuye 1993).

With the diverse interest of the younger generation, much of the indigenous knowledge on NWFP is unfortunately being lost before it is recorded in written form. Hence it may never be accessible to researchers, various practitioners and other communities. Yet it is this knowledge that would guide their conservation, utilisation and sustainable use and give the necessary basic information required for their development and management.

The Plants for Life project therefore aims at collecting, assimilating, documenting and making readily accessible to interested users, indigenous knowledge on NWFP occurring in Kenya. This paper briefly outlines the history, objectives and progress of the project in establishing a database on NWFP.

Dealing mostly with medicinal and food plants, the project has been christened Plants for Life. It was established in 1990 under the Non-Timber Forest Products Research Programme of the Kenya Forestry Research Institute (KEFRI). Its objective is to collect, evaluate and document local traditional knowledge on NWFP which are of use or value to different communities of Kenya and build up a database with the necessary basic information required for their conservation, development and management.

The database is in the process of computerisation using Word Perfect and much of it is already available in floppy disks. The format is yet to be decided upon but the project is considering two types of formats, i.e. data entry in species and related information and data retrieval in uses - that is, species vs. uses. Any information on such programmes would be most welcome.

Data Content

The data are of multi-disciplinary ethno-botanical approach which pay respect to uses and cultural values of plants and indigenous knowledge attached to them. These are collected in the field from the local communities and are mainly descriptive in nature and cover a wide range of NWFP. These are summarised in Table 14. They include medicines and drugs, vegetables, fruits, beverages, fodder and browse, tannins, dyes, oils, gums and resins, fibres, utensils and items of culture and entertainment. These are products of biological nature that may be extracted from natural and plantation forest ecosystems and woodlands in the arid and semi-arid lands (ASALs) of Kenya. They can be utilised within households, have social cultural or religious significance or be marketed for cash income (Aluma 1995). Some can be used directly as harvested or converted into other forms (products) before final use.

In addition related information such as scientific and local names of plants, their description, distribution, habitat and frequency as well as resource persons is recorded on labels that go with authentic herbarium specimens for permanent preservation. All plant identifications are confirmed at the East African Herbarium to ensure most up-to-date scientific names as in Index Kewensis.

Regional Coverage and Number of Records

The project covers the whole of Kenya but only five out of forty-five districts have so far been partially covered. These are however an ideal representative as they are in the arid and semi-arid areas of the country and are occupied by pastoral and sedentary agricultural communities. These are communities who still derive most of their remedies and nourishment from wild plants and therefore hold tremendous knowledge on NWFP.

At the present stage, the Plants for Life database has documented data on 800 plant species, most of them medicinal.

Data Sources

On the whole, knowledge and experience of NWFP in Kenya are location specific and vary in several aspects. The Plants for Life project has established strong working relationship with traditional medical

practitioners (TMPs), farmers and pastoralists from different communities known to be active collectors and/or users of NWFP. Through these groups, Plants for Life has been able to identify knowledgeable persons on use or value of plants. These are generally rural elderly people (men and women) and are the major source of data on NWFP. Plants for Life therefore documents first hand or primary information.

Table 14: Examples of Important Non-wood Forest Products Occurring in Kenya

Types of Non-wood Forest Products	Examples of Species
Medicine and Drugs	*Warburgia ugandensis* *Rhamnus staddo*
Wines and Beer Flavours	*Borassus aethiopum* *Kigelia africana*
Tannin, Resins and Gums	*Acacia meansii* *Commiphora confusa* *Acacia senegal*
Stimulant Drugs	*Catha edulis* *Rhoicissus revoilii*
Spices and Seasoning	*Piper guineense* *Tamarindus indica*
Insect Repellents	*Ocimum basilicum* *Schinus molle*
Salt Substitutes	*Salsola dendroides* *Typha domingensis*
Wild Fruits	*Ximenia americana* *Carissa edulis*
Vegetable (leaves)	*Moringa oleifera* *Portulaca oleracea*
Dyes	*Euclea natalensis* (black) *Trichilia emetica* (red)
Ropes and Basketry	*Dombeya burgessiae* *Phoenix reclinata*
Oils	*Balanites aegyptiaca* *Eucalyptus globulus*
Perfumes	*Justicia odora* *Tarchonanthus camphoratus*

Maintenance and Users

As a young project, updating of the database is a continuous process with new information from the field being added as and when necessary. The ultimate goal of the project is to provide baseline information for researchers, foresters, pharmaceutical industries, traditional herbalists, entrepreneurs and other interested groups on how to:-

- improve the exploitation and utilisation of NWFP to enhance their contribution to the forestry subsector;
- conduct resource assessment studies;
- determine the appropriate methods of harvesting, processing and storage, and develop and recommend suitable alternative methods that will result in higher yield and quality of products on a sustainable basis;
- carry out socio-economic studies to identify benefits and marketing avenues including pricing of the products; and
- introduce and promote the cultivation and management of important indigenous tree species, e.g. *Acacia senegal, Boswellia neglecta, Commiphora myrrha, Warburgia ugandensis* and *Moringa* spp.

Staffing

Currently, Plants for Life has two research officers - one is a plant taxonomist, three field technicians, four nursery attendants and a secretary who also enters data into the computer. These are government employees under KEFRI and may be called upon to serve in other projects in the Institute.

Financial Resources

The necessary strengthening of the infrastructure of Plants for Life has been achievable through initial generous support from International Development Research Centre (IDRC) and now the African Academy of Sciences (AAS). Funding is renewable on a yearly basis and covers field operations only. KEFRI, which has a mandate to undertake scientific research and development in forestry and allied natural resources, guarantees continuity of the project should funding from external donors being terminated.

Special Features of Plants for Life

To promote the results of its objectives, Plants for Life has initiated several extension and promotional activities. These involve setting up demonstration botanic gardens on the farms of selected TMPs, supplying seeds and seedlings of medicinal and nutritional (fruits) plants to herbalists and small scale farmers and assisting them to start their own nurseries. Local communities are thus directly involved in Plants for Life database, first as sources of information on NWFP and later as conservators and promoters of the same in their communities.

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THE APINMAP AND ITS DATABASES*

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Introduction

The Asian Pacific Information Network on Medicinal and Aromatic Plants
(APINMAP) was established by the United Nations Educational,
Scientific, and Cultural Organization (UNESCO) in 1987. APINMAP is a
voluntary association whose primary aim is to promote information
exchange in the field of medicinal and aromatic plants in Asia and the
Pacific. It is primarily designed to assist its 14 member countries to
improve their capability to collect, process, disseminate, and use research
information and data on medicinal and aromatic plants. At present, its
members include Australia, China, India, Indonesia, Republic of Korea,
Malaysia, Nepal, Pakistan, Papua New Guinea, the Philippines, Sri
Lanka, Thailand, Turkey, and Vietnam.

This specialised information network is a regional co-operative
programme working within the framework of the UNESCO-supported
Regional Network for the Exchange of Information and Experience in
Science and Technology in Asia and the Pacific (ASTINFO). Perceived to
support information generators, processors, and users, APINMAP seeks to
achieve its objectives by:

- making available information on medicinal and aromatic plants, either
  acquired from abroad or generated by research and development
  activities in the region;
- assisting in the development or strengthening of specialised
  information services and information handling capabilities of member
  states;

- providing guidance in the development of information products and services appropriate to various target user communities of the network;
- promoting resource sharing activities and services; and
- providing linkages to other regional and international networks or services in the field of medicinal and aromatic plants and chemistry of natural products to ensure optimal utilisation of resources.

Network Structure

As specialised as it is, APINMAP's structure combines both centralised and decentralised approaches. It is composed of four major bodies with different functions as follows:

- **Management Board.** This body, composed of the heads of the National Nodes, handles policymaking, planning, and review of the Network's activities.
- **Secretariat.** As elected by the members of the Network, the Philippine Council for Health Research and Development (PCHRD) serves as the Network's current Secretariat. It oversees the administrative matters concerning the Network and ensures continuous communication links between and among the National Nodes, Network Center, funding institutions and other co-operating bodies.
- **National Node (NN).** This is the institution designated by the members to serve as the national focal point of APINMAP activities in their respective countries. It is responsible for the collection, collation, and dissemination of information on medicinal and aromatic plants in the country.
- **Network Processing Center (NPC).** The Information Resources Unit (IRU) of the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA) was elected by the Network members to co-ordinate the overall technical processing of APINMAP data and Information products. It is also responsible for consolidating the data collected from the NNs, processing them, and redistributing copies of the merged data to the NNs. Aside from these, IRU also advises and arranges training for the NN staff, co-ordinates activities in accordance with the approved work plan of the Network, and assists

the Philippine-based Secretariat in disseminating information on APINMAP activities and products.

APINMAP acquires its strength from the information activities of the NNs of each participating country. The NNs collect data and provide information services to users at the country level.

Data Content

So far, APINMAP has developed two databases - the integrated database and the factual database.

A. *Integrated Database (IDB)*

This database was started in 1987, as an initial activity of the Network, to establish an inventory of published and unpublished literature produced or available in the member countries of the Network. The literature maybe scientific or an extension type of publication. It also includes literature published outside the region but is primarily about the plants growing in the Asian and the Pacific region. It also compiles research projects, institutions and researchers on medicinal and aromatic plants. The subject areas covered by this database are: agriculture and forestry; plant biology; chemistry and chemistry of natural products; pharmacy, health and medicine (including veterinary medicine); ethnology; industrial applications; economics; policies and legislation; education, extension and information; and the general aspects about the plants.

The integrated database can provide to its users the following information:
* literature references on a plant or on a particular area or field of study;
* extension literature available in the region;
* list of references on a plant growing in a particular country;
* list of researches conducted on a plant or in a field of particular study relating to the plant;
* list of institutions dealing with the plant; and
* list of experts on medicinal and aromatic plants.

B. *Factual Database (FDB)*

As a result of more research data being generated by rapidly multiplying academic and research institutions, APINMAP felt the need to establish a

mechanism that will store, disseminate, and update scientists or researchers on the latest information on medicinal and aromatic plants. In 1989, the APINMAP Network Center began to work on the development of a factual database which will store data derived from researches and make them easily accessible to the Network users.

FBD Database Description

The database provides users with data pertaining to five major areas of study on the plants. These are botany, chemistry, pharmacy, medicine, and marketing. In each area of study, data items to be included have been identified. The major consideration for selection of the data items was provision of information that will guide users on the proper identification and use of the plants. A group of subject specialists was formed to undertake this task. It was composed of a botanist, chemist, pharmacist, and a medical doctor.

FDB Database Structure

The data are stored, maintained, and processed within a relational type of database system. It runs on the micro CDS/ISIS software provided by UNESCO. The data items are grouped into data sets according to subject and its correlated fields. These data sets are:

Data Set Plant (PLT) which contains the botanical description, chemical contents, and geographical distribution of the plant. It includes the following information:

- type of plant: indicates whether plant is medicinal or aromatic or potentially medicinal;
- scientific name of the plant: includes data on its genus, species, and authority. Added to this is the plant's common English and local names;
- botanical description of the plant: characterises its height, stem, leaves, flowers, fruit, seed;
- habitat of the plant: provides data on its type and altitude;
- mode of living, life duration, place of origin and conservation status;
- other uses of the plant;
- propagation methods; and
- country, province where the plant is growing

Data Set Plant Phytochemistry (PHY) which contains data on the chemistry of plants and plant processes. This data set includes the following information:

- chemical contents of the plant, including the plant part where the chemical can be obtained;
- name of chemical and its amount of concentration; and
- bioactivity which also indicates the extract type and its form of testing.

Data Set Indication/Preparation Administration (IPA) which contains data on the indication (i.e. ailment, disorder, disease), preparation, and administration of the plant. This data set includes the following information:

- name of ailment, disorder, or disease the plant can cure;
- part of the plant used;
- type of preparation and instructions on how to prepare it;
- concentration on the strength of the preparation and its shelf life;
- administration of the medicine, including data on its dosages, adverse effects, precautions, and the direction for its use;
- the use of the plants in combination with other plants; and
- clinical trials performed in using the plant.

Data Set Marketing *(MKT)* which contains information on the marketing aspects of the plant. It provides data on the following:

- plant part used;
- name of manufacturers of the product, including complete mailing address, cable, telephone, telex, and fax numbers;
- status of product, whether the company has been certified or not;
- local outlets and foreign markets;
- patent data;
- product name; and
  status of product, whether it is traditional, commercial, or experimental.

Regional Coverage and Number of Records

Both databases cover the Asia Pacific countries namely the 14 members of APINMAP. The Integrated Database contains 15,355 records while the Factual Database stores 3,184 records to date.

Data Sources: Data Collection Policy

The APINMAP databases cover literature or data about medicinal and aromatic plants growing in Asia and the Pacific. Hence, research work and publication done outside the region that deal with plants found in Asia and the Pacific qualify for inclusion in the databases. This policy also applies to the directory of experts. Scientists or researchers who are nationals of countries outside the region but doing or have conducted studies about medicinal and aromatic plants growing in any country in Asia and the Pacific are included in the directory.

To avoid duplication of data for the integrated database, the NNs inform the NC when their inputs include information from foreign journals. Source of the research data on the other hand, is disregarded in the factual database. More importance is given to whether an information was obtained through scientific or ethnomedicinal means.

Maintenance

The APINMAP databases are updated quarterly with the inputs submitted by the NNs at specific schedules agreed upon with the NC. This continuous updating assures the users (decision-makers and planners, academicians, researchers, scientists, health care personnel, students and potential entrepreneurs) of the delivery of high quality information service.

Accessibility

The databases can be accessed through the NNs of the member countries and the NC. For users within the member countries, search requests should be addressed to the country's NN. Users from non-member countries of the network may forward their search to the NC or to NN. Search results are sent to users in computer printouts or in diskettes.

Staffing and Financial Resources

With financial support from UNESCO and SEARCA, the APINMAP activities, particularly the maintenance of the databases, are carried out by an information specialist, documentation assistant, programmer and a data encoder.

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SUMMARY OF WORKSHOP
SURVEY ON NON-TIMBER FOREST PRODUCT DATABASES
BOGOR, INDONESIA
6-8 DECEMBER 1995

Lay Cheng Tan, Manuel Ruiz Pérez, Michael Ibach

Introduction

A workshop was held at CIFOR in Bogor, Indonesia from 6-8 December 1995, bringing together a group of people, identified during the survey, who are working on NTFP databases. With due regard to time and financial constraints, it was not possible to invite all respondents to attend the workshop. A smaller group would also enhance the purpose of the workshop which was to encourage closer interactions among the database representatives and to allow more intensive discussions. Together with the CIFOR team and other CIFOR staff in attendance, thirteen participants took part in the discussion. A list of the participants is available in Annex 1.

The first paper in this document provided an overview of NTFP databases surveyed and the subsequent papers supply a more in-depth description of some of these databases. This section summarises the outcome of the workshop and the expected outputs as identified by the workshop participants.

The objectives of the workshop were principally to:
- review the findings of the survey;
- present databases and learn from each other's experiences; and
- explore potential activities for the future.

The workshop was divided into three main sessions:

Day 1: Presentations of Survey Results and Individual Databases

Day 2: Analysis and Discussion of Issues (i.e. Format, Contents, Users, Publication and Pricing; Integration of the Databases)

Day 3: The Way Forward (Identifying Future Activities)

Highlights From The Workshop

The presentations from the participants were interesting in their diversity. The degree of sophistication in some of the databases is revealing and contrasting, but that in itself does not detract from the importance of each and every database presented. Some databases are well formatted and employ extensive computer facilities, others are more basic or still in their initial stages of development. The breadth of this continuum offered participants a wider perspective of NTFP databases, and hopefully fuel further efforts in their own databases.

The discussion on issues related to the databases was divided into five sessions covering Format, Contents, Users, Publication and Pricing, and Integration. Rather than to describe the discussion in detail, the main points are highlighted below.

Format
- The formats used in the databases are diverse;
- It is not practical to change the formats of existing databases - it should be up to individual database centers to decide their own formats;
- The database should be formatted according to users' needs and requirements;
  There may be two types of formats to be considered - input versus output format.
  * The input format may be more extensive to include more fields.
  * The output format may be tailored to users' specific request for information; and
- Ultimately, the format in itself is not crucial for our purposes at this workshop.

Contents
- Contents of the databases are also diverse;
- Some databases are product specific; some are region specific;
- Biological/physical characteristics have good coverage;
- Socio-economic/market/statistical characteristics have poorer coverage - but the demand for such information is increasing;

- Smaller and more specific databases, rather than one large database incorporating all information, are recommended. Tools to draw upon different database sources are available and should be provided;
- The more specific databases (socio-economic/market/statistical characteristics) could also be classified according to the dynamics or speed of information change e.g. data that need only be updated every few years versus data that should be updated frequently on a regular basis.
- Indigenous and protected species, and social culture/management of forest products are two categories to be considered as additional information for input.

Users

- User groups are varied, but researchers and university staff/students are the main users;
- Users also influence the format, content, output of the databases;
- The objectives of some databases may change depending on users' needs and requirements;
- Conducting surveys of users' needs is useful in streamlining the databases; and
- Increasing the number of users is desirable.

Pricing

- It should be up to the individual database centers to set their own pricing policies;
- The trend seems to be in favour of having some charges for use, if for no other reason than to try to be self sufficient;
- However, it is recognised that the costs of running the centers cannot be recovered from revenues received from charges for use alone;
- A differential charging system is more acceptable - users with less resources should pay less, and users with more resources should be charged more; and
- The extent to which the databases serve as a public good, similar to the role played by many libraries, should be further evaluated.

Publication

- The tendency seems to move towards publishing the databases in electronic format;
- The publication format should also consider facilities available to user groups:
  - floppy discs for those with computer facilities
  - books and hard copies for those without access to computer facilities;
- CD-ROM could be used for high data volume; and
- Internet can serve as a useful tool for networking and dissemination of some information and services.

Integration

- Merging the databases is not practical at this point in time;
- Integration of efforts should focus at the <u>meta-data</u> level, i.e. to provide data about data;
- Integration efforts are facilitated by computerised databases. New information technologies may support such efforts further;
- Future efforts should be directed towards the common elements - e.g. the focus on NTFP, the information base available on biological/ecological/geographical/uses, bibliographical type of information, wide range of users.
- More details about the common elements of the databases are needed;
- Efforts should be undertaken to support issues such as better dissemination of information, training and database design, among others.
- Regional initiatives to achieve such integration efforts are recommended.

Future Activities and Outputs

Finally, the last session identified four major activities that can be realised in the immediate future. The first output is the production of a CIFOR Occasional Paper which will consist of results from the survey, descriptions of some databases and results from the workshop - the evidence of this effort is as seen in this publication.

In connection to the integration of efforts at the <u>meta-data</u> level, the production of a directory of NTFP databases was well accepted and should involve the contribution of all participants in the first instance. The spread of the databases surveyed encompasses a wide geographical area, and the participants also hail from many countries and regions. It is felt that contacts with these institutions and resource persons have been strategically established to facilitate the further tapping of information from other databases which are still unknown. A format for incorporating information about the databases into a directory is shown below:

- Name of organisation:
- Contact person:
- Address:
- Telephone:
- Fax:
- Email:
- Name of database:
- Date of establishment:
- Subject coverage: (issues and products as listed in questionnaire)
- Geographical coverage: (e.g. district/province, country, regional, global)
- Type of database: (e.g. bibliographic/reference, description/text, numeric, statistics, graphics/illustrations, directory)
- Language(s) :
- No. of records:
- Software used:
- Procedure to access database: (written request, phone, on-line, etc.)
- Distribution media: (e.g. diskette, CD-ROM, Internet publications/books)
- Level of development: (e.g. operational, advanced, initial)

It is hoped that the first copy would be produced in the second half of 1996, but updates for this directory can and should be made as and when necessary.

The third activity concerns support for CD-ROM development and production. As mentioned earlier, CD-ROM publication is gaining

momentum and is suitable particularly for large databases. CIFOR has the facility to support staff members from other institutions in the production of CD-ROM and is willing to provide assistance in that direction as far as its manpower and other resources permit. CIFOR will act as a focal point to collect proposals from interested parties.

Finally, the impetus for further action lies in the hands of individual participants and their institutions. Regional initiatives to achieve further integration and collaboration should not be neglected. The dissemination of information and providing assistance within each region is necessary. It cannot be over emphasised that CIFOR alone cannot achieve its mission and mandate. The survey of NTFP databases is a small project, but it is an integral component of CIFOR's thrust to increase knowledge on NTFP, and to ultimately contribute to the sustained well-being of people dependent on forests.

ANNEX 1: LIST OF PARTICIPANTS

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ANNEX 2: SURVEY OF DATABASES ON NON-TIMBER FOREST PRODUCTS

Based on the description of the survey and its purpose we sent you earlier, we would like to ask you to kindly take 10 to 15 minutes of your time to fill out this questionnaire. Please provide your information as completely as possible. Your input will be highly valued and will contribute to a better understanding of the present situation. The results will be shared with respondents.

1.   **PERSONAL DATA**

1.1   Name (Optional): _____

1.2   Position: _____

1.3   Organisation: _____

1.4   Address: _____

                         _____

1.5   Country: _____

1.6   Telephone: _____ 1.7 Fax: _____ 1.8 E-mail: _____

IMPORTANT: If you have more than one database, please provide separate copies of the questionnaire for each database you maintain.

---

2.   **DATABASE FORMAT**

2.1   If you have more than one database, are you databases operational as

        'stand-alone' databases, or are they linked?

        ☐ 'Stand-alone' databases

        ☐ Linked through an interface (data can be commonly accessed)

        ☐ Others (please specify) _____

2.2   Name of your database: _____

2.3   When was your database established? _____

2.4   Is your database available in electronic format?

☐ Yes   ☐ No (If no, please go to Q. 2.5)

2.4.1   Which software do you use? _____

2.4.2   Which hardware do you use?

☐ Standard PC ☐ Others (specify): _____

2.4.3   Hardware configuration:

2.4.3.1   Your system   2.4.3.2   Minimum requirements

Processor: _____   _____

RAM: _____   _____

Graphics: _____   _____

Hard disc memory: _____   _____

Others (specify): _____   _____

2.4.4   Which database model do you use?

☐ Relational   ☐ Hierachial   ☐ Others (specify): _____

2.4.5   Does your database have one of the following features?

☐ Interactive facilities (e.g. identification keys for products)

☐ Decision support systems (i.e. computes information to assist

decision making)

☐ Expert systems (i.e. gives advice based on expert knowledge

incorporated in software)

☐ Others (specify): _____

2.5   Status of your database:

☐ Fully operational

☐ Advance stage of development, to be operational soon

☐ Initial stage of development

3.   **DATA CONTENT**

3.1   Which type of data do you capture? (Tick all appropriate boxes.)

☐ Bibliographic   ☐ Description (Text)   ☐ Numeric

☐ Graphical   ☐ Others (specify):_____

3.2   Which subjects does your database cover? (Tick all appropriate boxes,

i.e. if the subject appears in at least one third of all your records.)

3.2.1. Issues   3.2.2. Products (please specify if able)

☐ Biology/Ecology   ☐ Fruits _____

☐ Physical/Chemical Properties ☐ Nuts _____

☐ Propagation & Cultivation   ☐ Other food (specify) _____

☐ Collection   ☐ Spices and condiments _____

☐ Production   ☐ Gums _____

☐ Technology   ☐ Natural pigments/dyes _____

☐ Uses   ☐ Resins _____

☐ Distribution   ☐ Fibres _____

☐ Markets   ☐ Tannins _____

☐ Trade statistics   ☐ Essential oils _____

☐ Prices   ☐ Medicinal plants _____

☐ Socioeconomic issues   ☐ Insect products _____

☐ Others (specify)_____ ☐ Other animal products _____

                       ☐ Others (specify) _____

3.3   Which regional level does your database cover? (Tick all appropriate boxes)

☐ Sub-country (e.g. district, province)   ☐ Country

☐ Regional (e.g. groups of neighbouring countries) ☐ Global

3.4 Please list the individual fields that are covered for each record in your database (please include a sample of a record):

1 _____   11 _____

2 _____   12 _____

3 _____   13 _____

4 _____   14 _____

5 _____   15 _____

6 _____   16 _____

7 _____   17 _____

8 _____   18 _____

9 _____   19 _____

10 _____   20 _____

3.5 How many records are in your database _____

3.6 How often do you update your database?

☐ at least once a month   ☐ every 1-3 months

☐ every 3-12 months   ☐ more than 1 year

☐ as and when necessary   ☐ no update

4. DATA SOURCES

4.1 What kind of data do you have? (Tick all appropriate answers.)

☐ Primary data   ☐ Secondary data

☐ Primary & Secondary
     (specify % of composition: Primary:_____ Secondary: _____)

4.1.1 What are the sources of your **primary data**? (Tick all appropriate answers.)

☐ Collection at source by your staff from your own institution (e.g. field research)

☐ Others (specify): _____

4.1.2 What are the sources of your **secondary data**? (Tick all appropriate answers.)

☐ Contacts with institutions   ☐ Literature review

☐ Documents received   ☐ Library acquisition

☐ Data collected by others

☐ Others (specify): _____

5. PUBLICATION OF DATA

5.1 How do you publish your database? (Tick all appropriate answers.)

☐ Not published   ☐ Book form   ☐ Diskette

☐ CD-ROM   ☐ Electronic communication networks (eg Internet)

5.2 Is there a charge for the use or requisition of your data?

☐ No   ☐ Yes, please specify cost in USD: _____

6. DATABASE USERS AND MAINTENANCE

6.1 Who are your main user groups? (Please rank in order of frequency of use: 1= most frequent.)

6.1.1 User Groups   6.1.2 Rank of Frequency of Use

☐ Researchers   _____

☐ University Staff & Students   _____

☐ Field Project Managers   _____

☐ Public Administrators   _____

☐ Private Enterprises   _____

☐ Others (specify): _____   _____

6.2.1 How frequent is your database being used?

☐ at least once a day   ☐ at least once a week

☐ at least once a month   ☐ less than once a month

6.2.2 Please **estimate** the average number of users per month: _____

6.2.3 What is the maximum user capacity for your database per month?____

6.3 Your database can be accessed

☐ at the database centre with assistance from database personnel

☐ at the database centre requiring no assistance from database personnel

☐ through interaction with database personnel via letter, fax, email, phone

☐ through computers at work stations located outside the database centre

☐ Others (specify): _____

6.4 How many staff do you have working on your database? Please specify in terms of full time person/month per year: _____

7. **DATABASE INTEGRATION**

7.1 Is your database linked to a network of databases and/or organizations?

☐ No   ☐ Yes (specify) _____

7.2 Would you be willing to link your database to a network/other networks?

☐ No   ☐ Yes

....

Thank you for answering this questionnaire. We welcome further comments and suggestions. **Please remember to enclose a sample of a record from your database**.

Signature:_____ Date: _____

Please return questionnaire and sample of record to Ms. Lay-Cheng Tan or Dr. Manuel Ruiz Perez, CIFOR, P.O. Box 6596, JKPWB, Jakarta 10065, INDONESIA, Fax: +62 (251) 34-6433; Tel: +62 (251) 34-3652

SUMMARY

A number of databases on non-timber forest products (NTFP) have been produced but any information available is mostly scattered and poorly advertised. It is necessary to survey the existence of such databases to provide information to interested and potential actors on what is available on NTFP, to co-ordinate future work and to avoid duplication.

The Center for International Forestry Research conducted a survey on NTFP databases principally to gather information and to assess such databases and their users. A workshop was held in December 1995 and this publication incorporates results of the survey, brief reports of some of the databases and conclusions from the workshop.