

INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT DOCUMENT

TITLE	PROMOTION OF SUSTAINABLE UTILIZATION OF RATTAN FROM PLANTATION IN THAILAND
SERIAL NUMBER	PD 24/00 REV.1 (I)
COMMITTEE	FOREST INDUSTRY
SUBMITTED BY	GOVERNMENT OF THAILAND
ORIGINAL	ENGLISH

SUMMARY

The objectives of this project are to develop and disseminate appropriate technologies on management of rattan plantation in Thailand to gain sustainable productivity. The project will also seek for efficient and diversified utilization and proper marketing of rattan products. Knowledge and technologies achieved through this project will be transferred to the public, especially rural communities, to promote establishment of small and medium community-owned enterprises for rattan products. The contribution of this project will not only help in improving of socio-economic development but also conserving rattan diversity and tropical rain forests in Thailand.

EXECUTING AGENCY	FOREST RESEARCH OFFICE THE ROYAL FOREST DEPARTMENT	
DURATION	36 MONTHS	
APPROXIMATE STARTING DATE	UPON APPROVAL	
PROPOSED BUDGET AND OTHER FUNDING SOURCES	Source	Contribution in (US\$)
	ITTO	292,457
	Gov't of Thailand	337,500 (In kind)
	TOTAL	629,957

Table of Contents

PART I. CONTEXT.....	1
1. Origin.....	1
2. Sectoral Policies.....	2
3. Programmes and Operational Activities.....	2
PART II. THE PROJECT.....	3
1. Project Objectives.....	3
1.1 Development Objective.....	3
1.2 Specific Objectives.....	3
2. Project Justification.....	3
2.1 Problems to be addressed.....	3
Other relevant aspects of "project situation".....	5
2.2 Intended situation after project completion.....	6
2.3 Project strategy.....	6
2.4 Target beneficiaries.....	7
2.5 Technical and scientific aspects.....	7
2.6 Economic aspects.....	7
2.7 Environmental aspects.....	8
2.8 Social aspects.....	8
2.9 Risks.....	8
3. Outputs.....	9
3.1 Specific Objective 1.....	9
3.2 Specific Objective 2.....	10
4. Activities and Inputs.....	11
5. Logical Framework Worksheets.....	14
6. Work Plan.....	17
7. Budget.....	20
7.1 Overall Project Budget by Activities.....	21
7.2 Consolidated Yearly Project Budget by Source.....	27
PART III. OPERATIONAL ARRANGEMENT.....	28
1. Management Structure.....	28
2. Monitoring, Reporting and Evaluation.....	29
3. Future Operation and Maintenance.....	29
PART IV. TROPICAL TIMBER FRAMEWORK.....	30
1. Compliance with ITTA 1994 Objectives.....	30
2. Compliance with ITTO Action Plan.....	30
ANNEX I. CURRICULUM VITAE.....	32
ANNEX II. TERMS OF REFERENCE.....	38
ANNEX III. LIST OF CAPITAL ITEM.....	41
ANNEX IV. A MAP OF THE PROJECT SITES.....	42
ANNEX V. CONFERENCE PROGRAMME (DRAFT).....	43
ANNEX VI. TRAINING SCHEDULE (DRAFT).....	44
ANNEX VII. SUMMARY OF THE MODIFICATIONS MADE IN PD 24/00 (I)	45

PART I. CONTEXT

1. Origin

As Thailand has banned logging since 1989, the products of the forest at present are mainly NWFPs. These products include rattan that has been traditionally utilized as materials for weaving, furniture, carpet, blind and many others. Rattans generate employment, extra income subsistence for people, particularly those who live in the rural areas. Rattan resources that used to be adequate in the past is currently being shortage due to deforestation and over harvesting. The lack of rattan raw materials causes Thailand spending a great amount of money for cane importation. From 1995-1997, Thailand had spent approximately US\$ 2.5 million yearly for importing rattan cane. At present, banning of the exportation of raw rattan canes from neighboring countries cause a great difficulty for Thai rattan industries. As there is still extensive demands on rattan raw materials in Thailand, promotion for establishment of commercial as well as small-scale rattan plantations needs to be taking into an urgent consideration. Pilot scale plantation of rattans should, therefore, be established and developed for sustainable high yield. There is also a need to develop high quality rattan products to help increasing income of the farmers, to provide a more benefit mean of utilizing rattan as well as to increase value of rattan trade of the country.

This project proposal is based on the recommendations derived from pre-project PPD 4/98 Rev. 1 (I) : Promotion of Tropical Non-Wood Forest Products (NWFPs) in Thailand, which financed by ITTO and implemented by the Royal Forest Department (RFD) during the fourth quarter of 1998 and the first quarter of 1999.

As part of the pre-project activities, the pre-project team with a local consultant carried out a field survey over four community forest areas in the northern, northeastern, western and southern parts in cooperation of the local forest authorities. The team interviewed local community members, technicians and authorities and carried out a preliminary assessment of the utilization of tropical NWFPs. As in the results, rattan had been extensively utilized in the past by almost every single family in the northern and northeastern regions. It used to be a symbol of prosperity of the forest and the community. Rattan product becomes popular because of its beauty and endurance. At present, although the products are still in great demands the activities of weaving and utilizing rattan canes have almost completely disappeared from the communities. The main problem is the lack of raw materials. People used to harvest rattan cane in the forest nearby their houses but now they have to spend a day or longer to find rattan in the deep forest. Promotion on research and development of rattan plantation is, therefore, needed to help conserving of the rattan species, its diversity and the tropical rain forests. Experts from various private sectors and farmers in the regions also considered great potential in the utilization of rattan to enhance rural incomes through small-scale industry development.

The experts recommended follow-up of the pre-project activities, taking into account that the information and knowledge available on rattan plantation and utilization is limited and that the rural communities are not aware of appropriate technologies for the efficient and diversified utilization of rattan which can lead to the creation of new job opportunities for the communities and complement to the conservation of tropical forests.

2. Sectoral Policies

2.1 National Policy

Forest conservation is a national policy currently implemented vigorously by the government. There were a number of measures adopted in recent year designed to address the issue. Among them are following:

- (a) The logging were banned since 1989 until present.
- (b) The banning of export of logs and lumber.
- (c) The launching of the national forestation program.
- (d) 15% of the country shall be design as protected forest.
- (e) Generate income for the urban area.

This project also conforms with current national policies of the Thai Government which relate to:-

The 8th National Economic and Social Development Plan (NESDP VIII: 1997 - 2001): Objectives of the Plan (3) & (4) to enhance about sustainable use and development of the remained natural resources, economy, high-potential and better life quality.

The Thai Forest Sector Master Plan: Forestry sector policy objectives (1.3) & (1.4) to meet the national need from domestic sources and to help to increase the income of the local communities and strengthen the national economy.

2.2 NESDP VIII

Support the NESDP VIII in increasing extra income for the rural people by interpolating NWFPs source in forest plantation, in farm and in community forest or in Tree Farming program which was launched in 1996.

3. Programmes and Operational Activities

Studies on the basis properties of selected rattan species will be conducted at the Forest Products Research Division of the Royal Forest Department located in Bangkok. There are laboratories that can facilitate the project. The numbers of individuals including staff are 100 persons.

Two demonstration plots for studying management of rattan plantation on a sustainable basis. Set up of a demonstration plot on sustainable management practices for shoot production of two edible rattan species in Sakon Nakhon province. Experimental plots on sustainable management and harvesting for cane production of three rattan species will be on trial in old rattan plantations in Krabi province.

Technology transfer to support socio-economic development and establishment of community-owned enterprises should be implemented to the right target groups. Therefore, a National Conference on Plantation Management and Utilization of Rattan will organize a 3 days national conference on plantation management and utilization of rattan in Sakon Nakhon province, 80 participants from private persons, government Sectors, university instructor and community leaders. A Training Course on Rattan Furniture and Weaving will organize a 30-day training

course on rattan furniture and weaving in Sakon Nakhon province, 20 participants from rural people. A Training Course on Processing and Packaging of Rattan Shoot Techniques will organize a 7-day training course on processing and packaging of rattan shoot techniques in Sakon Nakhon province, 20 participants from rural people.

The Project Leader and Assistant Project Leader will manage the implementation of the Project. The Project Leader will manage and administer all activities and set objectives. He shall coordinate with relevant government and private offices/organizations to insure the efficient implementation of the project. He shall prepare and submit pertinent reports/documents to ITTO. The Assistant Project Leader shall coordinate the activities and see to it that such activities are implemented based on established time frame and standards. He shall maintain records of data and information gathered by the project. He shall assist the Project Leader in the preparation of the project report and other relevant documents. RFD shall appoint the Project Leader, Assistant Project Leader, and support personnel to ITTO. Based from the estimated duration of the activities, the project implementation will have a duration of 36 months.

PART II. THE PROJECT

1. Project Objectives

1.1 Development objectives:

To develop and disseminate appropriate technologies on management of rattan plantation in Thailand to gain sustainable productivity as well as to seek for efficient and diversified utilization and proper marketing of rattan products in order to contribute to the socio-economic development of the rural communities and the conservation of the rattan diversity and the tropical forest resources in Thailand.

1.2 Specific objectives:

Specific objectives 1:

To study and develop techniques for managing rattan plantations for sustainable production with a view to developing and disseminating guidelines and technologies on plantation management and harvesting of rattan

Specific objectives 2:

To promote the efficient utilization of rattan shoots and canes for value-added products by developing guidelines for utilization of rattan and transferring technologies to support socio-economic development as well as establishment of community-owned enterprises.

2. Justification

2.1 Problems to be addressed

2.1.1 Rattan canes

- Shortage of rattan canes
- Lack of knowledge on managing rattan plantation for sustainable cane production

- Lack of knowledge on producing value-added rattan products
- Need of basic properties of important rattan species

In Thailand, most of the rattan canes have been harvested from natural tropical forests. Being one of the most important trade commodities for forest dwellers, the rattan has been severely over-exploited to the extent that is now in very short supply. Deforestation, traditional harvesting of rattan shoots and fruits for food as well as the lack of suitable harvesting method have also emphasized its diminishing rate. Many rattan trades are trend to breakdown because they lack of sustainable raw materials. Some rattan species are disappearing since people use up every part of their life cycle, breaking their ability in propagation. Sustainable utilization of natural rattan will never be employed unless cultivation is extended to meet the demand. In the last decade, there is an increasing substantial number of public and private enterprises interesting in establishment of rattan plantations on their own land. However, a wide variety of farmers are non-technical people and lack of knowledge on cultivating and managing rattan farms. They also lack of methodology to develop means to produce rattan products in a value-added way.

Information on the basic properties of important Thai rattans particularly in relation to their industrial application is also limited. There are difficulties faced by the users in processing and mechanically fabricating rattans due to its physical characteristics. These are the variation in dimensions, crookedness of the culms, non-uniformity of internodes and unevenness of taper. Since many rattan species has been inefficiently utilized, and some of them remain unutilized, research effort is needed to determine the properties of such species and develop their appropriate utilization technology.

2.1.2 Rattan shoots

- Demand for rattan shoots
- Lack of knowledge on cultivating and managing rattan for sustainable shoot production
- Lack of knowledge on processing of rattan shoots

Consumption of rattan shoot is the best alternative utilization of rattan in Thailand. Edible rattan shoot increases farmers' incentive to establish rattan plantation. In stead of waiting for cane production for over 6-7 years, farmers can manage for early utilization of rattan shoots within the second year of cultivation. Rattan shoot has now become popular dishes in Thailand, especially in the North and Northeast, as well as in Thai neighboring countries, Lao and Vietnam. The processing of rattan shoots has not yet been performed in any countries. As rattan shoots being needed more and more, it has a very good sale potential in both the national and international markets. A suitable method to produce caned rattan shoots should, therefore, be developed.

There is a need to provide a short-term training in the production of commercial rattan products. The treatment of rattans is an example. The procedures are relatively labor intensive on traditional devices, which are of low technology and production capacities. Usage of jigs and efficient mechanism are still limited and most of local manufacturers have to rely on existing ethnic designs or copying from other sources. Extension services of the current technology should be provided via workshops, dialogue or demonstrations. These should be periodically be upgraded to improve existing skills with a view to promoting both the quality and traditional identify of the products and diversified utilization of rattan.

Given the fact that rattan has proven to be a vital resource in terms of its contribution to particularly the rural economies and ecological stability of Thailand, its utilization must be sustainably reached because the socio-economic and environmental conditions of the people with the forest lands are weak and unsustainable. Further improvement of sustainable management of rattan and the production of rattan products in both quality and quantity can be obtained by immediate attention, solutions and practical suggestions to the several problems associated to the sustainable utilization of rattan.

Other relevant aspects of “project situation”

(a) Deforestation:

Despite Thailand’s long history of forest management, deforestation remains a serious problem. At the beginning of the twentieth century over 75 percent of Thailand was covered in forest. By the time of the First Plan, 53 percent of the country had forest cover. Since then the forest cover has shrunk at an annual average rate of roughly 2.5 percent, with higher rates in the decade of the 1970s. RFD calculations derived from LANDSAT images indicate that only 26.02% of the country remains as forest (RFD, 1994), with many independent estimates suggesting the actual figure is realistically only 19%. In the past 30 years, over 130,000 square kilometers have been lost, with government intervention failing to produce significant reforestation. In 1989 the forest area remaining, 143,417 square kilometers, was roughly equivalent to the total area lost in the last 30 years.

(b) Thailand’s reliance upon the tropical timber industry:

In the past, Thailand was one of the world’s major tropical timber exporters. Data from the FAO for 1989 has Thailand as the fifth largest exporter of round logs in the Asia-Pacific region. Even after the logging ban, according to the Tropical Timber Trends Report 1995, produced by ITTO, Thailand was the fourth largest log importer and the largest tropical sawn wood importer (ITTO, 1995). According to 1996 data the country is still the fourth largest importer of tropical logs (ITTO, 1996). Thailand therefore has a large tropical timber industry which since the logging ban has had to utilize imported timber. A situation that will continue until Thailand can efficiently produce Timber from forests or plantations. Output from this project could indicate to the RFD that sustainable local production of NWFPs is feasible, and this can be achieved without destroying important forest areas, reserved for watershed protection, erosion control or bio-diversity conservation.

(c) Rural poverty:

Thailand is an agricultural based society with over 70% of the population, with the crops produced being rice, sugarcane, maize, fruit and cassava. Thirty years of agricultural development chiefly based around diversification into production of export crops such as cassava and sugarcane, and intensification of production through the use of modern inputs, have resulted in only limited inroads into poverty. In many cases, it has actually left farmers with less than before. Unstable markets for export crops, the dramatic fall in agricultural commodity prices, and the rising costs of inputs such as fertilizer and pesticides all add to the problem. Debt is reaching epidemic proportions in many villages with many farmers having little chance to pay it off through current forms of agriculture. Therefore villagers in close proximity to forested areas have relied excessively eliminating this traditional food and natural resource supply. Therefore there is an urgent need to move towards sustainable agricultural practices combined with reforestation and community forestry implementation particularly in the buffer areas of the few remaining natural forests.

(d) Resource depletion, degradation, conflict of interest and bio-diversity loss:

Every protected area in the country suffers from natural resources depletion, whether it be conversion of forested land to agriculture, selective logging or poaching of animals. Most protected area managers view their roles as protectors of their designated areas, and the

villagers as the primary cause of natural resources degradation. Often there is a high level of antipathy between the two groups, leading to conflict and occasionally loss of life.

(e) Lack of knowledge:

The baseline assessment of the current situation in Thailand regarding reforestation techniques, and utilization technology suggested that there is an almost total lack of knowledge of what techniques should be used. The majority of available information is for exotic species and is the result of research undertaken in other countries. Almost all nursery techniques utilized in Thailand are copied directly from tree nurseries in developed temperate countries or get utilization technology only from some species. This is especially true of germination methods, nursery procedure, sapling planting and forest restoration techniques. Thailand has a predicted tree flora of around 3,000 species, current data for phonology, germination requirements and growth statistics is available for less than 20 native species. Therefore the country urgently needs to implement reforestation and utilization technology projects which not only plant trees but also evaluate these planting in a systematic way and utilized its efficiently so that future plantings can be made effectively and efficiently.

2.2 Intended situation after project completion

The project will demonstrate the sustainable management practices of some economically important rattan species. It will provide guidelines on how the selected rattan species can be sustainable harvested. It will also provide information on rattan shoots production and the silvicultural treatments necessary in order to produce shoots suitable for processing purposes.

The project will also study the properties of some important rattan species. It will provide information on how rattan raw materials can be processed into high quality products suitable in making furniture, weaving and other useful things. The project will transfer technology to the rural communities that will have an opportunity to improve their income generation through rattan production and utilization. It will also demonstrate a feasibility of the establishment of a rattan shoot factory in Sakon Nakhon province.

2.3 Project Strategy

(a) Reason for selection:

The essential reason for the project design is based on the need to develop and disseminate appropriate technologies of management and utilization of rattan in order to facilitate the sustainable management and utilization practices and including conservation of rattan resources.

This need was identified by pre-project PPD 4/98. Experts from the various private sectors and farmers in the regions saw great potential in the utilization of rattan to enhance rural incomes through the development of a small-scale rattan industry. Their views were that rattan resources in Thailand should be better utilized for value-added production of rattan furniture and weaving for the rural communities. Appropriate technology on the rattan shoot products should also be introduced to the project through a feasibility study on the establishment of a rattan shoot small factory.

From the past evaluation of pre-project, it revealed that four community forests in the north, northeast, west and south regions have different kinds of economic rattan species. Moreover, people of the regions have utilized rattan in difference styles. In order to reach the proposed objectives, two small-scale demonstration plots in the northeastern and

southern regions of Thailand will be established for studying sustainable management practices of rattan.

(b) Lessons drawn from past evaluation:

This project was developed after carrying out an analysis and evaluation of the selected comminute forests, taking into account the misutilization of rattan resources at various stages such as harvesting, extraction, handling and processing of rattan, the possibility of utilizing the resources and the need of the rural communities to have an economic alternative that will help them to improve their living standard.

Available studies on rattan in Thailand do not provide concrete recommendations in sustainable management practices and utilization of rattan resources which could be taken up by the regional or central government and all who are concerned with sustainable utilization of the resources.

2.4 Target Beneficiaries

The direct beneficiaries of the project will be the rural community engaged in collection, processing, storage and sale of rattan products in Thailand. The rural communities will benefit with better income opportunities through rattan product and utilization. Also the forest department authorities will have practical guidelines for sustainable management and utilization of rattan. The project will generate greater awareness among the planners, policy makers and especially among the rattan workers and their organizations. Besides, rattan being and industry spread out in the country as whole, the finding arrived at in the eastern region are likely have wider applications in other parts of the country as well. The attainment of the project objective will ease the pressure on the forest resources thereby benefiting the whole country. Furthermore, other member countries of ITTO, facing similar problems, will be benefited from the outputs of this project.

2.5 Technical and scientific aspect:

Practical guidelines for improving management of rattan shall be developed. These guidelines will include prescriptions on plantation, silviculture and harvesting for commercially important rattan species.

The laboratory work will focus on the basic properties on physical properties, preservation and drying of commercial rattan species for commercialization of furniture parts and weaving. A study of physical and chemical treatment of selected rattan species for strength and durability will also be conducted. Further, utilization and processing techniques of rattan shoots shall be studied. No study of this kind has been conducted in Thailand.

2.6 Economic aspects

The benefits will be got after completion of the project. The rural communities will be significantly developed knowledge and technologies to increase quality of rattan products. They will be aware of appropriate technologies for the efficient and diversified utilization of rattan which can lead to the creating of new job for the communities and complement to the conservation of tropical forests. It can upgrade the living standard and increase the income of the rural people. The expected benefits will be directed to the farmer, forest dwellers, traders, employment generation and foreign exchange for the country.

2.7 Environmental aspects

With the realization of the project objectives, less timber is expected to be extracted from the forest. In addition, the communities close to the forest resources will have better economic opportunities through rattan farming and rattan utilization. Since these local communities depend so much on the forest resources for their livelihood, the pressure on the forest will be considerably eased. All of these will have positive environmental impact.

2.8 Social aspects

The rattan is economically important for living and income generation of households in community forest. It is utilized by the community in various ways. For example, rattan culms are used as weaving utensils as well as production of basketries and furnitures. Moreover rattan shoots are used as food. In the Northeast of Thailand, people in some provinces know rattan as an edible plant for consuming its fruit and shoot. Normally they collect the rattan from the wild, but there is an increasing of the depletion of natural forest. So the rattan in natural forest is very scarce. Now a day the farmers start to plant rattan for their own uses and for the market. But the knowledge of the productivity of rattan is very limited. The Non-Wood Forest Products Research of the Royal Forest Department felt it is necessary to get the general informations on the cultivation, propagation, investment and income in order to increase rattan canes and rattan shoots production and to provide greater job opportunity to the people in rural area. It can upgrade the living standard of the farmer and create income for the rural population. Besides this, rattan plantation will not only reduce the pressure of forest invading but also create the forest area.

The population in Sakon Nakhon province located northeastern part of Thailand is about 900,000 persons. About 80 % of the populations are engaged in agriculture

The population in Krabi province located southern part of Thailand is about 330,000 persons, and most of them are engaged in agriculture such as Palm tree and Rubber tree.

The local communities will be major participants in the realization of the Project objectives. They shall be taught the practical methods of rattan farming and utilization. They are expected to be the main suppliers of rattan culms, the rattan industry (furniture weaving products and handicrafts), a women dominate industry. This traditional industry has an important role in terms of overall employment as well as of the larger proportion of women employment in the rural communities. The project will assist the establishment of a rattan village through a rattan village cooperative in Sakon Nakhon for the production of rattan furniture parts and weaving products.

2.9 Risks

There will only be some minimal risks that could hamper the success of the project. One is the possible non-cooperation of rattan farmers in the introduction of sustainable management in their plantations and the technology of processing rattan products. This can be handled by explaining to the farmers the likely outcome of the project and the possible benefits that they can get.

The other risk is lack of information and skills to manage rattan plantation and to develop appropriate technologies for efficient and diversified utilization of rattan raw materials. This can be solved by adopting the technologies developed by other countries through well-prepared study tours to Malaysia and Philippines.

3. Outputs

3.1 Specific Objectives 1 :

Output 1.1 : To establish two demonstration plots for studying management of rattan plantation on a sustainable basis.

Establishment of a demonstration plot of edible rattan species for studying on silvicultural practices including propagation, nursery, planting techniques and harvesting to gain sustainable shoot production

Areas: 2 ha / 2 species /1 plot

Location: Northeast (in Sakon Nakhon province)

The rattan species which will plant at Sakon Nakhon province are Calamus siamensis (bitter taste) and Calamus sp. (sweet taste) ; shoots are used as food.

The most popular rattan which is cultivated for shoot production in Sakon Nakhon province is Calamus siamensis or locally called "Vaidong". This species have mediumed stem, diameter about 2-2.5 cm. The compound leaves are composed of 75-90 leaflets, and the climbing organs with spiny thorns acted as flagellum originate from the upper part of stem sheath. The plants begin flowering after 2 years old. The fruits are round diameter 0.8-1 cm, and there is only one seed inside.

Calamus sp. or Wai Wan grows naturally in Semi-evergreen forests in Kanchanaburi province. It has been named "Wan" which means "Sweet" because its fresh shoot is rather sweet than bitter. Fresh shoot of Wai Wan can be eaten right after harvesting and it is less bitter than the popular "Wai Dong". It has been recently found by a group of local people. The staffs of the Royal Foest Department were able to collect an amount of seeds this year (year 2000). Seedlings of Wai Wan are now raising under good conditions at Sakon Nakhon NWFPs Research Station. They have been prepared for transplanting under this project. Scientific name of Wai Wan has not been identified yet. Complete specimens of Wai Wan will be collected and classified during the project implementation.

Establishment of experimental plots in 5- and 10- year-old rattan plantations for studying on management and harvesting of rattan cane for furniture and weaving materials.

Areas: 2.2 ha / 3 species /1 plot

Location: South (in Krabi province)

The experimental plot will be established at old rattan plantations in Krabi province, Southern Thailand. Studies on silvicultural management will be focused on three rattan species: Calamus longisetus (Wai Kumpulan), C. latifolius (Wai Pong) and C. caesius(Wai Tha kha thong). In Thailand, these three rattans are the most popular for cane production. For C. caecius, the world well-known rattan, its distribute range may be limited only in the southern peninsula. Most of the rattan plantations in the south, however, emphasized on the species. For C. longisetus and C. latifolius, their distributed ranges are found throughout the country. Knowledge and application learnt for cultivation and utilisation of C. longisetus, C. latifolius and C. caesius will, certainly, be applied for rattan plantations in every area.

We chose to study management and harvesting of rattan canes in old rattan plantations in order to get results within three years during project implementation. Thailand has developed many rattan plantations since 1968. All plantations locate in the southern peninsula, from Suratthani southwards. Most plantations, however, has not been managed in proper ways to gain sustainable cane production because they were established in protected areas. The aims to grow rattans might be to conserve rather than to utilize. Until now, we have no data on production of rattan canes in plantations. The data is needed for sucessful prometion of rattan plantations in Thailand. Rattan plantations in Krabi are suitable for this study since the plantations are outside protected areas. The species we selected have approximately 8 to 10 years old.

Calamus longisetus (Wai Kumpuan) is a very vigorous clustering erect rattan with stems taller than 5 m. Stem without sheaths to 5 cm in diameter, with sheaths to 8 cm in diameter. Internodes are about 10 cm long. Canes are suitable for furniture industry.

C. latifolius (Wai Pong) is a vigorous clustering erect rattan. Stems are more than 10 m long. Stem without sheaths to 3.5-4 cm in diameter, with sheaths to 7 cm in diameter. It grows in Evergreen and Dry Evergreen forests in the north and northeast regions. Canes are suitable for furniture industry. This species can grow in most areas in Thailand. The RFD has already established a number of plantations of this species. Proper management is needed for sustainable production practices.

Calamus caesius (Wai Tha kha thong) is a clustering medium-sized rattan. Stem without sheaths variable but 7-12 cm in diameter, with sheaths to 20 cm. Internodes are up to 50 cm long. It is usually climbing high into the canopy, with stem ultimately to 100 m. *C. caesius* is the very best cane of medium diameter. It is widely used in the finest basket ware and for all types of binding and weaving in the furniture industry.

Long-term management of the plots (Please see Future Operation and Maintenance, page 27)

At Sakon Nakhon: The area of the plantation is 2 ha, planting two edible rattan species. Treatments on spacing, fertiliser applications and harvesting methods will be investigated with 3-4 replications. After 3 years of the project implementation, the best results for fertiliser application and harvesting method will be applied for the whole plantation. The data on shoot production under different spacing will be collected continuously. Clumps that are given more shoots than the others will be selected and will be managed for seed collection. The plantation will be used as rattan demonstration plots for sustainable shoot production.

At Krabi: The area of the experimental plots is 2.2 ha. Treatments on fertiliser applications and number of canes harvested each year will be investigated with 3-4 replications. After three years of the project implementation, the plantations will be maintained for seed production areas.

Output 1.2 : To develop guidelines for sustainable management of rattan including plantation silviculture and harvesting to obtain good quality and quantity of rattan shoots.

Output 1.3 : To develop guidelines on management and harvesting for sustainable productivity of rattan canes.

Output 1.4 : To organize a 3 days national conference on plantation management and utilization of rattan in Sakon Nakhon province, to conduct a national conference on plantation management and utilization of rattan on a sustainable basis. (80 persons from private persons, government section, university instructor and community leader)

3.2 Specific Objectives 2 :

Output 2.1 : Study on physical and wood working properties of selected rattan species.

Output 2.2 : To develop techniques for primary preservation and processing including bending and bleaching of rattan canes after harvesting.

Output 2.3 : To develop rattan shoot processing techniques and establishment of a cottage scale industry to small cooperatives for the production of rattan shoot in Sakon Nakhon province.

Output 2.4 : To organize a short training course on processing and packaging of rattan shoot products in Sakon Nakhon province.

Output 2.5: To establish a cottage scale industry in Sakon Nakhon province for the production of rattan furniture parts and weaving to develop value-added rattan products.

Output 2.6: To organize a 30-day training courses on rattan furniture and weaving including primary preservation in Sakon Nakhon province

4. Activities and Inputs

Output 1.1: To establish two demonstration plots for studying management of rattan plantation on a sustainable basis.

Activities	Description	Inputs
A 1.1.1	Identification of two project sites in the northeastern and southern part of Thailand.	Project Staff RFD
A 1.1.2	Establishment of a demonstration plot for edible rattans in Sakon Nakhon province and conduct experimental plots in 5-and10-year-old rattan plantations in Krabi province to study sustainable management for shoots and canes, respectively.	Project Staff RFD Labour, Water pump
A 1.1.3	Selection of 2 suitable rattan species in the northeast for harvesting and utilization of shoot and 3 suitable rattan species in the south for cane production: by surveying of markets to find out local and national (as well as international) needs for basic consumption, production and marketing	Project Staff RFD

Output 1.2: To develop guidelines for sustainable management of rattan including plantation silviculture and harvesting to obtain good quality and quantity of rattan shoots.

Activities	Description	Inputs
A 1.2.1	To conduct a literature survey.	Project Staff RFD
A 1.2.2	Conduct research on sustainable management of rattan shoots (plantation, management, silviculture, harvesting) - to identify suitable spacing for each selected rattan species - to demonstrate suitable silvicultural practices that are basically needed for planting rattan for shoot production - to find out suitable ratio of shoot and culm cutting to gain sustainable high yield - to develop techniques to improve yield of the plantation	Project Staff RFD National consultant Labour Eluminant meter Consumable items
A 1.2.3	Publication of guidelines on management of rattan plantation for sustainable shoot production (in Thai, English abstract)	Project Staff RFD, National consultant, Publication of result

Output 1.3: To develop guidelines on management and harvesting for sustainable productivity of rattan canes.

Activities	Description	Inputs
A 1.3.1	A literature review on sustainable management of rattan plantation from publications produced by INBAR, IPGRI, FAO and other sources	Project Staff
A 1.3.2	Study tour to Malaysia on management of rattan plantation, harvesting and processing of rattan products (4 people), in corporation with INBAR, IPGRI and Forestry Research Institute Malaysia.	Project Staff Fellowship for study tour
A 1.3.3	Conduct research on silvicultural practices to find out suitable ratio of culm harvesting for sustainable production.	Project Staff RFD Labour, Consumable items International consultant National consultant Eluminant meter
A 1.3.4	Publication of guidelines on sustainable management of rattan.	International consultant, National consultant, Report

Output 1.4 : To organize a 3 days national conference on plantation management and utilization of rattan in Sakon Nakhon province, to conduct a national conference on plantation management and utilization of rattan on a sustainable basis. (80 persons from private persons, government section, university instructor and community leader)

Activities	Description	Inputs
A 1.4.1	Preparation of conference program.	Project Staff RFD National consultant
A 1.4.2	Identification and contracting of resource persons.	Project Staff RFD National consultant
A 1.4.3	Preparation of conference material and equipment	Project Staff RFD Training equipment (No. 7-10)
Activities	Description	Inputs
A 1.4.4	Organization and evaluation of conference	Project Staff RFD National consultant

Output 2.1: Study on physical and wood working properties of selected rattan species.

Activities	Description	Inputs
A 2.1.1	Literature survey on basic properties of rattan from INBAR and other sources	Project Staff
A 2.1.2	To collect sample specimen for potential rattan species for commercialization	Project Staff Labour, sample shipment
A 2.1.3	To conduct research on physical and mechanical properties in terms of moisture content and specific gravity and report	Project Staff, Technician National consultant Laboratory equipment, Oven

Output 2.2: To develop techniques for primary preservation and processing including bending and bleaching of rattan canes after harvesting.

Activities	Description	Inputs
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A 2.2.1	Literature survey on basic properties of rattan from INBAR and other sources	Project Staff
A 2.2.2	Study tour to the Philippines on rattan management, preservation and utilization (4 people)	Project Staff Fellowship for study tour
A 2.2.3	To develop techniques for primary preservation (against stain fungi and powder post beetle) and bleaching of rattan canes	Project Staff, Technician, National consultant, International consultant, Preservation tank, Consumable items
A 2.2.4	To prepare a report on rattan canes processing	National consultant Consumable items

Output 2.3: To develop rattan shoot processing techniques and establishment of a cottage scale industry to small cooperatives for the production of rattan shoot in Sakon Nakhon province.

Activities	Description	Inputs
A 2.3.1	To conduct a literature survey	Project Staff RFD
A 2.3.2	To develop techniques for processing, packaging and chemical properties of rattan shoot products	Project Staff RFD, Technician, National consultant, Chemicals, Laboratory equipment
A 2.3.3	Data processing	National consultant, Report
A 2.3.4	Establishment of a home industry for rattan shoots in Sakon Nakhon province	Project Staff RFD National consultant Rattan shoot processing and canning machine

Output 2.4: To organize a short training course on processing and packaging of rattan shoot products in Sakon Nakhon province.

Activities	Description	Inputs
A 2.4.1	Preparation of training program. (20 persons/7 days)	Project Staff RFD National consultant
A 2.4.2	Identification and selection of participant (rural people)	Project Staff RFD National consultant
A 2.4.3	Preparation of training material	Project Staff RFD, Technician. Consumable item
A 2.4.4	Evaluation of training course	Project Staff RFD, Technician National consultant, Report

Output 2.5: To establish a cottage scale industry in Sakon Nakhon province for the production of rattan furniture parts and weaving to develop value-added rattan products.

Activities	Description	Inputs
A 2.5.1	Preparation of equipment machinery for rattan processing.	Project Staff Equipment rattan processing (No. 1-4)
A 2.5.2	To promote the small cooperatives for rattan cane productions in Sakon Nakhon.	Weaving machinery National consultant

Output 2.6: To organize a 30-day training courses on rattan furniture and weaving including primary preservation in Sakon Nakhon province. (See Annex VI).

Activities	Description	Inputs
A 2.6.1	Preparation of training program. (20 persons/30 days)	Project Staff RFD National consultant
A 2.6.2	Identification and selection of participant (rural people)	Project Staff RFD
A 2.6.3	Preparation of training material and equipment	Project Staff RFD National consultant Consumable item
A 2.6.4	Implementation and evaluation of a training course.	Project Staff RFD National consultant Consumable item

5. Logical Framework Worksheets

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>DEVELOPMENT OBJECTIVE</p> <p>To develop and disseminate appropriate technologies on management of rattan plantation in Thailand to gain sustainable productivity as well as to seek for efficient and diversified utilization and proper marketing of rattan products in order to contribute to the socio-economic development of the rural communities and the conservation of the rattan diversity and the tropical forest resources in Thailand.</p>	<p>Increase people's understanding of sustainable management and utilization of important rattan species as well as conservation practices of rattan natural resources.</p> <p>Set up cottage scale industries and small cooperatives for value-added rattan products.</p> <p>Increase socio-economic situations of the project sites concerned and improve people's life quality</p>	<p>Technical reports.</p> <p>Efficient and diversified utilization of rattan.</p> <p>Evaluation report of project activities and outputs.</p> <p>Samples of valued-added rattan products.</p>	<p>Government willingness to conserve, manage and utilize rattan.</p> <p>The communities' need and willingness to have alternative income generating sources.</p> <p>International support.</p>
<p>Specific objectives 1:</p> <p>To study and develop techniques for managing rattan plantations for sustainable production with a view to developing and disseminating guidelines and technologies on plantation management and harvesting of rattan.</p> <p>Specific objectives 2:</p> <p>To promote the efficient utilization of rattan shoots and canes for value-added products by developing guidelines for utilization of rattan and transferring technologies to support socio-economic development as well as establishment of community-owned enterprises</p>	<p>Information on sustainable management techniques (plantation, silviculture and harvesting) of some economically important rattan species in Thailand will be available.</p> <p>Information on basic properties of the selected rattan species.</p> <p>Information on the efficient uses of rattan in weaving and furniture.</p> <p>Information on the manufacturing techniques of rattan shoot products.</p>	<p>Guidelines for cultivation management and harvesting of rattan, one for shoot and one for cane production.</p> <p>Proceedings of a national conference on plantation, management and utilization of rattan on a sustainable basis.</p> <p>Technical report on basic properties, primary preservation and processing of rattan canes.</p> <p>Technical report relating to development of value-added rattan products, both furniture and weaving.</p> <p>Technical report on rattan shoot utilization, processing and packaging.</p>	<p>Effective implementation of all project components.</p> <p>Skilled technical personnel.</p> <p>Effective use of study results in the utilization of rattan, both shoots and canes.</p>

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Output 1.1 : To establish two demonstration plots for studying management of rattan plantation on a sustainable basis.	Set up of a demonstration plot on sustainable management practices for shoot production of two edible rattan species. Experimental plots on sustainable management and harvesting for cane production of three rattan species will be on trial in old rattan plantations.	Defined commercially important rattans in Thailand, proper management, harvesting methods and areas suitable for plantation.	Availability of rattan species for experimental harvesting and management practices
Output 1.2: To develop guidelines for sustainable management of rattan including plantation silviculture and harvesting to obtain good quality and quantity of rattan shoots.	Guidelines on management of rattan plantation for sustainable shoot production.	Publication of guidelines on management of rattan plantation for sustainable shoot production.	Wise use of guidelines developed by the project to be effective.
Output 1.3 : To develop guidelines on management and harvesting for sustainable productivity of rattan canes..	Guidelines on management and harvesting for sustainable productivity of rattan Promotion of activities on management and utilization of rattan from plantation.	Publication of guidelines on management and harvesting for sustainable productivity of rattan canes. A study tour to Forest and Forest Research Institute in Malaysia	Wise use of guidelines developed by the project to be effective. Development skill of project personnel
Output 1.4: To organize a 3 days national conference on plantation management and utilization of rattan in Sakon Nakhon province, to conduct a national conference on plantation management and utilization of rattan on a sustainable basis. (80 persons from private persons, government section, university instructor and community leader)	A national conference on plantation, sustainable management and utilization of rattan.	Conference materials. Proceedings on plantation, sustainable management and utilization of rattan.	Technology transfer. Participants willingness to adopt appropriate techniques on rattan plantation, management and utilization. Effective information, education and communication programmes
Output 2.1: Study on physical and wood working properties of selected rattan species..	Available information on the properties of rattans needed in the production of furniture and handicraft.	Technical reports on the basic properties of some commercially important rattan species in Thailand.	Skilled manpower. Effective implementation of all proposed research activities.
Output 2.2 : To develop techniques for primary preservation and processing including bending and bleaching of rattan canes after harvesting..	Available information on techniques for primary preservation and processing including bending and bleaching of rattan canes.	Technical reports on techniques for primary preservation and processing including bending and bleaching of rattan canes. A study tour to the Philippines on management, preservation and utilization of rattans.	Increased effectiveness of using rattan raw materials for cottage scale industry. Development skill of project personnel
Output 2.3: To develop rattan shoot processing techniques and establishment of a cottage scale industry to small cooperatives for the production of rattan shoot in Sakon Nakhon province.	Available information on the efficient processing techniques for rattan shoots Establishment of an appropriate cottage scale industry for rattan shoots in Sakon Nakhon province.	Rattan shoot products. Technical reports on the processing and packaging techniques of rattan shoots Survey results on the communities need for a cottage rattan industry.	There is a demand for rattan shoots. The communities' need to develop a cottage scale industry to get higher income.

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Output 2.4: To organize a short training course on processing and packaging of rattan shoot products in Sakon Nakhon province.</p>	<p>A short training course on processing and packaging of rattan shoot products.</p> <p>Availability of techniques.</p>	<p>Training materials reported by participants</p> <p>Report of the training course.</p>	<p>Participants willingness to adopt appropriate techniques on rattan shoot processing.</p> <p>Effective information, education and communication programmes.</p>
<p>Output 2.5: To establish a cottage scale industry in Sakon Nakhon province for the production of rattan furniture parts and weaving to develop value-added rattan products.</p>	<p>Availability of information on production of value-added rattan products.</p> <p>Establishment of an appropriate cottage scale industry for rattan furniture parts and weaving in Sakon Nakhon province.</p>	<p>Value-added rattan products.</p> <p>Technical reports on the production of rattan furniture parts and weaving.</p> <p>Survey results on the communities need for a cottage rattan industry.</p>	<p>There is a demand, both national and international scales, for value-added rattan products.</p> <p>The communities' need to develop a cottage scale industry to get higher income.</p>
<p>Output 2.6: To organize a 30-day training courses on rattan furniture and weaving including primary preservation in Sakon Nakhon province..</p>	<p>Availability of information on the efficient processing techniques for rattan furniture parts, including handicraft. <i>This courses can upgrade the living standard and create income for the local people.</i></p> <p>A training course on production of rattan furniture, furniture parts, weaving including handicraft.</p>	<p>Value-added rattan products.</p> <p>Technical reports on the production of rattan furniture parts and handicraft.</p>	<p>Skilled manpower</p> <p>Effective implementation of all proposed research activities.</p>

6. Work Plan (continue)

Output/Activities	Responsible Party	Schedule (in quarter) 3 years											
		1	2	3	4	5	6	7	8	9	10	11	12
Activity 1.3.2: Study tour to Malaysia on management of rattan plantation, harvesting and processing of rattan products (4 people), in corporation with INBAR, IPGRI and Forestry Research Institute Malaysia.			■										
Activity 1.3.3: Conduct research on silvicultural practices to find out suitable ratio of culm harvesting for sustainable production.		■											
Activity 1.3.4 : Publication of guidelines on sustainable management of rattan.												■	■
Output 1.4													
Activity 1.4.1: Preparation of conference program	NWFPs Utilization Research									■	■		
Activity 1.4.2: Identification and contracting of resource persons.											■	■	
Activity 1.4.3: Preparation of conference material and equipment											■	■	
Activity 1.4.4: Organization and evaluation of conference												■	■
Specific objectives 2	RFD												
Activity 2.1.1: Literature survey on basic properties of rattan from INBAR and other sources													
Activity 2.1.2: To collect sample specimen for potential rattan species for commercialization	NWFPs Utilization Research	■	■	■	■								
Activity 2.1.3: To conduct research on physical and mechanical properties in terms of moisture content and specific gravity and report		■											
Output 2.2													
Activity 2.2.1: Literature survey on basic properties of rattan from INBAR and other sources	NWFPs Utilization Research				■	■							
Activity 2.2.2: Study tour to the Philippines on rattan management, preservation and utilization (4 people)					■	■							
Activity 2.2.3 To develop techniques for primary preservation (against stain fungi and powder post beetle) and bleaching of rattan canes					■	■	■	■	■				
Activity 2.2.4: To prepare a report on rattan canes processing									■	■			

6. Work Plan (continue)

Output/Activities	Responsible Party	Schedule (in quarter) 3 years											
		1	2	3	4	5	6	7	8	9	10	11	12
Output 2.3	NWFPs Utilization Research												
Activity 2.3.1: To conduct a literature survey					■	■							
Activity 2.3.2: To develop techniques for processing, packaging and chemical properties of rattan shoot products					■	■	■	■	■				
Activity 2.3.3: Data processing									■	■			
Activity 2.3.4: Establishment of a home industry for rattan shoots in Sakon Nakhon province								■	■				
Output 2.4	NWFPs Utilization Research												
Activity 2.4.1: Preparation of training program.. (20 persons/ 7 days)								■	■				
Activity 2.4.2: Identification and selection of participant (rural people)								■	■	■			
Activity 2.4.3: Preparation of training material								■	■				
Activity 2.4.4: Evaluation of training course										■	■		
Output 2.5	NWFPs Utilization Research												
Activity 2.5.1: Preparation of equipment machinery for rattan processing.					■	■	■	■	■				
Activity 2.5.2: To promote the small cooperatives for rattan cane productions in Sakon Nakhon.								■	■	■	■	■	■
Output 2.6	NWFPs Utilization Research												
Activity 2.6.1: Preparation of training program. (20 persons/ 30 days)					■	■	■	■					
Activity 2.6.2: Identification and selection of participant (rural people)								■	■				
Activity 2.6.3: Preparation of training material and equipment									■	■			
Activity 2.6.4: Implementation and evaluation of a training course										■	■		

7. Budget

The project's annual budget by component requested from ITTO is presented.

Government of the Thailand Contribution in Kind (US\$)

Components	Year 1	Year 2	Year 3	Total
Project Personnel				
1. Salaries				
- Project Leader	6,000	6,500	7,000	19,500
- Asst. Project Leader (2)	11,000	12,000	13,000	36,000
- Staff (8)	50,000	55,000	60,000	165,000
- Admin. Support (4)	8,000	8,200	8,400	24,600
- Assistant Research(3)	10,800	10,800	10,800	32,400
Sub-total	85,800	92,500	99,200	277,500
2. Laboratory Equipment and Facilities				
- Laboratory Equipment machinery	15,000	15,000	15,000	45,000
- Plantation Equipment	5,000	5,000	5,000	15,000
Sub-total	20,000	20,000	20,000	60,000
GRAND TOTAL	105,800	112,500	119,200	337,500

7.1 Overall Project Budget by Activities

Output & Activities	Budget component (US\$)							
	Project Personnel	Sub Contracts	Duty Travel	Capital items	Consumable Items	Misc.and Contingency	ITTO Monitoring & Evaluation & Administration	Grand total
Specific objectives 1: To study and develop techniques for managing rattan plantations for sustainable production with a view to developing and disseminating guidelines and technologies on plantation management and harvesting of rattan.								
Output 1.1			1,950	-	-	150		2,100
Activity 1.1.1: Identification of two project sites in the northeastern and southern part of Thailand.								
Activity 1.1.2: Establishment of a demonstration plot for edible rattans in Sakon Nakhon province and conduct experimental plots in 5-and 10-year-old rattan plantations in Krabi province to study sustainable management for shoots and canes, respectively.	6,000		5,340	800	2,160	150		14,450
Activity 1.1.3: Selection of 2 suitable rattan species in the northeast for harvesting and utilization of shoot and 3 suitable rattan species in the south for cane production: by surveying of markets to find out local and national (as well as international) needs for basic consumption, production and marketing			3,915		300	150		4,365
Output 1.1 sub-total	6,000	-	11,205	800	2,460	450		20,915

7.1 Overall Project Budget by Activities (continue)

Output & Activities	Budget component (US\$)								Grand total
	Project Personnel	Sub Contracts	Duty Travel	Capital items	Consumable Items	Misc. and Contingency	ITTO Monitoring & Evaluation & Administration		
Output 1.2	-	-	-	-	-	150			150
Activity 1.2.1: To conduct a literature survey									
activity 1.2.2: Conduct research on sustainable management of rattan shoots (plantation, management, silviculture, harvesting) -to identify suitable spacing for each selected rattan species -to demonstrate suitable silvicultural practices that are basically needed for planting rattan for shoot production -to find out suitable ratio of shoot and culm cutting to gain sustainable high yield -to develop techniques to improve yield of the plantation	11,400	-	6,540	1,050	6,140	-			25,130
Activity 1.2.3: Publication of guidelines on management of rattan plantation for sustainable shoot production (in Thai, English abstract)	-	2,500	-	-	-	1,000			3,500
Output 1.2 sub-total	11,400	2,500	6,540	1,050	6,140	1,150			28,780

7.1 Overall Project Budget by Activities (continue)

Output & Activities	Budget component (US\$)									
	Project Personnel	Sub Contracts	Duty Travel	Capital items	Consumable Items	Misc. and Contingency	ITTO Monitoring & Evaluation & Administration	Grand total		
Output 1.3										
Activity 1.3.1: A literature review on sustainable management of rattan plantation from publications produced by INBAR, IPGRI, FAO and other sources									150	150
Activity 1.3.2: Study tour to Malaysia on management of rattan plantation, harvesting and processing of rattan products (4 people), in corporation with INBAR, IPGRI and Forestry Research Institute Malaysia.	10,000									10,000
Activity 1.3.3: : Conduct research on silvicultural practices to find out suitable ratio of culm harvesting for sustainable production..	22,600		5,190	1,050	2,600					31,440
Activity 1.3.4: Publication of guidelines on sustainable management of rattan.		2,500				1,000				3,500
Output 1.3 sub-total	32,600	2,500	5,190	1,050	2,600	1,150				45,090
Output 1.4										
Activity 1.4.1: Preparation of conference program	6,000				100					6,100
Activity 1.4.2: Identification and contracting of resource persons.			975		100					1,075
Activity 1.4.3: Preparation of conference material and equipment				15,200		500				15,700
Activity 1.4.4: Organization and evaluation of conference		11,200	3,370		700	1,000				16,270
Output 1.4 sub-total	6,000	11,200	4,345	15,200	900	1,500				39,145

7.1 Overall Project Budget by Activities (continue)

Output & Activities	Budget component (US\$)								Grand total	
	Project Personnel	Sub Contracts	Duty Travel	Capital items	Consumable Items	Misc. and Contingency	ITTO Monitoring & Evaluation & Administration			
Specific objectives 2: To promote the efficient utilization of rattan shoots and canes for value-added products by to developing guidelines for utilization of rattan and transferring technologies to support socio-economic development as well as establishment of community-owned enterprises										
Output 2.1										150
Activity 2.1.1: Literature survey on basic properties of rattan from INBAR and other sources	-	-	-	-	-	-	-	-	-	150
Activity 2.1.2: To collect sample specimen for potential rattan species for commercialization	-	-	3,075	-	300	-	-	-	-	3,375
Activity 2.1.3: To conduct research on physical and mechanical properties in terms of moisture content and specific gravity and report	2,000	-	-	2,600	500	-	-	-	-	5,100
Output 2.1 sub-total	2,000	-	3,075	2,600	800	150	-	-	-	8,625
Output 2.2										150
Activity 2.2.1: Literature survey on basic properties of rattan from INBAR and other sources	-	-	-	-	-	-	-	-	-	150
Activity 2.2.2: Study tour to the Philippines on rattan management, preservation and utilization (4 people)	10,000	-	-	-	-	-	-	-	-	10,000
Activity 2.2.3: To develop techniques for primary preservation (against stain fungi and powder post beetle) and bleaching of rattan canes	10,500	-	2,430	1,000	1,200	-	-	-	-	15,130

7.1 Overall Project Budget by Activities (continue)

Output & Activities	Budget component (US\$)										Grand total
	Project Personnel	Sub Contracts	Duty Travel	Capital items	Consumable Items	Misc. and Contingency	ITTO Monitoring Evaluation & Administration				
Activity 2.2.4: To prepare a report on rattan canes processing	-	2,500	-	-	-	-	1,000	-	1,000	-	3,500
Output 2.2 sub-total	20,500	2,500	2,430	1,000	1,200	1,150					28,780
Output 2.3											
Activity 2.3.1: To conduct a literature survey	-	-	-	-	-	150	-	-	-	-	150
Activity 2.3.2: To develop techniques for processing, packaging and chemical properties of rattan shoot products	2,000	-	1,780	-	1,500	-	-	-	-	-	5,280
Activity 2.3.3: Data processing	-	2,500	-	-	-	-	-	-	1,000	-	3,500
Activity 2.3.4: Establishment of a home industry for rattan shoots in Sakon Nakhon province	1,500	-	3,030	17,000	700	-	-	-	-	-	22,230
Output 2.3 sub-total	3,500	2,500	4,810	17,000	2,200	1,150					31,160
Output 2.4											
Activity 2.4.1: Preparation of training program (20 persons/7 days)	1,500	-	-	-	-	-	-	-	100	-	1,600
Activity 2.4.2: Identification and selection of participant (rural people)	-	-	-	-	100	-	-	-	-	-	100
Activity 2.4.3: Preparation of training material	6,000	-	-	-	1,100	-	-	-	500	-	7,600
Activity 2.4.4: Evaluation of training course	-	4,000	2,680	-	-	-	-	-	500	-	7,180
Output 2.4 sub-total	7,500	4,000	2,680	-	1,200	1,100			1,100		16,480

7.2 Consolidated Yearly Project Budgets by Source (in US\$)

Item	Budget components	Total	Year 1	Year 2	Year 3
10	Project Personnel				
12	National consultants				
	1 Rattan management and processing consultant 3 months @ 1,500 US\$	4,500	-	3,000	1,500
	1 Shoot processing consultant 2 months @ 1,500 US\$	3,000	-	3,000	-
	1 Rattan marketing and business consultant 1 month @ 1,500 US\$	1,500	-	1,500	-
	1 Furniture consultant 1.5 months @ 1,500 US\$	2,250	-	-	2,250
	1 Weaving consultant 1.5 months @ 1,500 US\$	2,250	-	-	2,250
	Other				
	1 Project secretary 24 months @ 500 US\$	12,000	-	6,000	6,000
	1 Technician 6 months @ 250 US\$	1,500	-	1,500	-
13	International consultants:				
	1 Management consultant 1 month @ 10,000US\$	10,000	-	10,000	-
	1 Rattan cane processing consultant 1 month @ 10,000 US\$	10,000	-	10,000	-
14	Fellowship for study tour 2 groups, 5 persons/ group (Philippines, Malaysia)	20,000	10,000	10,000	-
15	Other Labours :				
	unskilled person for demonstration management plots	27,000	9,000	9,000	9,000
	-Sakon Nakhon Station (2 men x 36 months x 150 US\$)				
	-Krabi Station (3 men x 36 months x 150 US\$)				
19	Component Total	94,000	19,000	54,000	21,000
20	Sub-contracts				
21	Publication of Technical report	12,000	-	5,000	7,000
22	National conference and training organization and proceedings	28,400	-	4,000	24,400
29	Component Total	40,400	-	9,000	31,400
30	Duty Travel				
31	DSA for surveying, conduct conference and training, and collecting data and sample.	26,300	8,780	13,375	4,145
32	Transport cost :				
	-Vehicle, daily travel, air ticket, staff, participants	17,160	5,940	8,700	2,520
	-Air ticketed for 2 international consultants to Thailand.	1,000	-	1,000	-
39	Component Total	44,460	14,720	23,075	6,665
40	Capital Items				
42	Machinery and laboratory equipment	11,500	2,900	3,600	5,000
43	Training equipment	42,200	-	32,000	10,200
49	Component Total	53,700	2,900	35,600	15,200
50	Consumable items				
51	Office supplies	2,450	-	1,400	1,050
52	Sample specimens	5,100	2,000	3,100	-
53	Chemical reagent, fertilizer, soil, ect.	7,930	1,940	3,970	2,020
54	Stationary	500	-	100	400
55	Fuel and utilities	6,570	1,740	2,740	2,090
59	Component Total	22,550	5,680	11,310	5,560
60	Miscellaneous				
61	Sundry	6,750	1,050	2,700	3,000
62	Technical Support (Editor)	2,150	-	650	1,500
69	Component Total	8,900	1,050	3,350	4,500
	SUBTOTAL	264,010	43,350	136,335	84,325
80	ITTO Monitoringand, Evaluation & Admin.				
81	Monitoring & Evaluation (5%)	13,200			
82	Administration (5.5%)	15,247			
89	Component Total	28,447			
90	Refund of Pre-project Costs	-			
	GRAND TOTAL	292,457			

PART III. OPERATION ARRANGEMENTS

1. Management structures

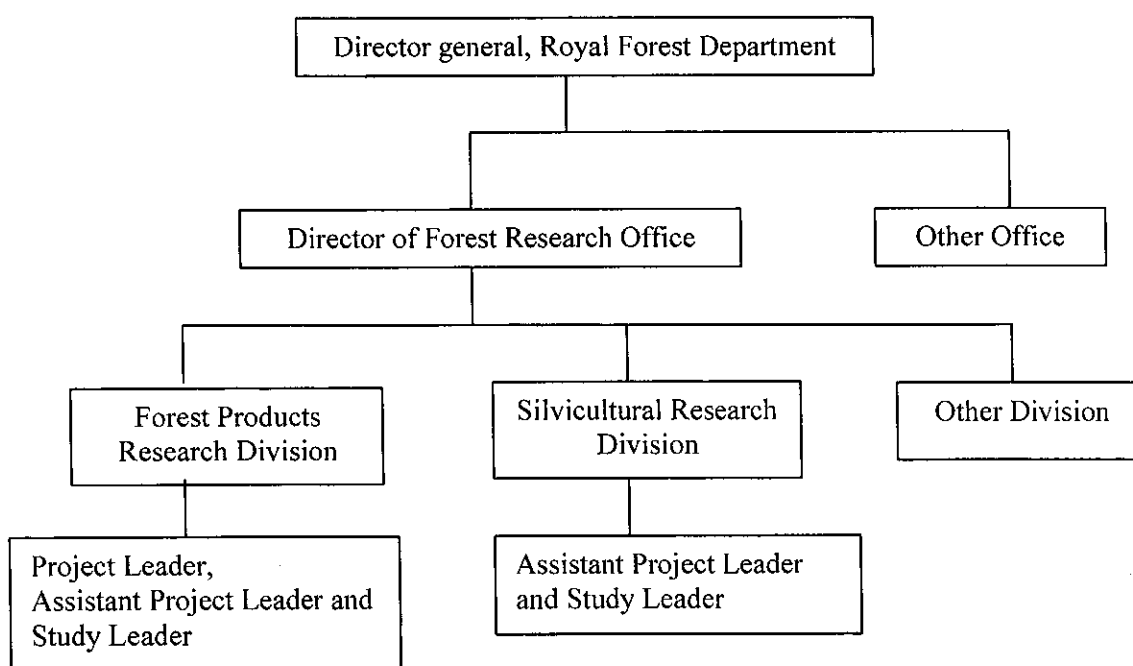
RFD, as executing agency of the project, shall appoint a Project leader, Assistant Project Leaders, study leaders, hire the consultants, and support personnel in consultation with ITTO. The management, implementation, evaluation and reporting of project will be under the responsibility of the Project Leader and Assistant Project Leaders. The staff members, who will be the implementers of different studies, will assist them.

The Project Leader shall administer and manage the disbursement of funds, supervise the procurement of supplies, materials and equipment. He shall program the activities of the project implementers.

The key staffs who will implement the project are given below. Their respective curriculum vitae are given in the Annex I.

Project Leader:	Ms. Pannee Denrungruang
Assistant Project Leader:	Ms. Nuchanart Nilkamhaeng Dr. Rungnapar Pattanavibool
Study Leader:	Mr. Suchart Thaipet Mr. Yanyong Kangkarn Mr. Prachoen Sroithongkam Mr. Chanatip Kuldelok

Organization chart



2. Monitoring, Reporting and Evaluation

Annual progress reports on the project activities and output will be submitted to ITTO every after six months after the start of the project and a terminal report will be prepared and submitted to ITTO not later than three months after the completion of the project.

The project steering committee can visit the project for monitoring and review purposes at least once every year. The project steering committee can be subjected to mid-term evaluation if necessary. The date of such evaluation shall be agreed upon between ITTO and the Project Leader.

3. Future Operation and Maintenance

After the project, there will be two plots of rattan plantation left to be maintained. The RFD is willing to keep the plots as the first demonstration plots for sustainable rattan plantation in Thailand.

1. 2 ha, plantation of 2 species of edible rattans at Sakon Nakhon province, northeastern Thailand
2. 2.2 ha ,plantations of 3 species of cane producing rattans at Krabi province, southern Thailand

Plantation at Sakon Nakhon:

After the project, the plantation will be 3 years old. It is expected that 3 to 10 year old rattans can produce high quality and quantity of shoot production. This hypothesis should have further investigation. Therefore, data on shoot productivity will be recorded continuously under the same management practices done during the project. Part of the plantation will be maintained for seed production area.

Plantations at Krabi:

After the project, rattan clumps in the experimental plots at Krabi will be 8 and 13 years old. Maintenance of the plantations for sustainable cane production under recommended silvicultural practices (following the findings and results of the project) should be continued. The plantations will possibly be developed for seed production area serving for people who want to plant rattans as well as RFD's future research.

Other activities:

- Publications from the project will be distributed to Research Station of the RFD.
- Project staffs still continue working on rattan research.
- Project staffs are willing to support rattan plantation in Thailand and ready to apply findings and results from the project to other rattan species.
- Promotion further studies on value-added rattan products.
- Continue support, provide assistance and will create collaboration work with the small cooperatives and communities-owned enterprises founded by the project.

PART IV. TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTA 1994 Objectives

The project is consistent with the objectives, established in Article 1 of the ITTA 1994: To promote and support research and development with a view to improving forest management and efficiency of wood utilization as well as increasing capacity to conserve and enhance NWFPs* values in timber producing tropical forest. It will also have peripheral beneficial effects on the attainment of other objectives listed in the ITTO as the project will promote the collection, processing, utilization and marketing of NWFPs on a sustainable basis and therefore become an integral part of sustainable forest management in Thailand.

- (a) To provide an effective framework for consultation, international cooperation and policy development among all members with regard to all relevant aspects of the world timber economy.
- (c) To contribute to the process of sustainable development;
- (f) To promote and support research and development with a view to improving forest management and efficiency of wood utilization as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests;
- (g) To develop and contribute towards mechanisms for the provision of new and additional financial resources and expertise needed to enhance the capacity of producing members to attain the objectives of this agreement; and
- (i) To promote increased and further processing of tropical timber from sustainable sources in producing member countries with a view to promoting their industrialization and thereby increasing their employment opportunities and export earnings.

2. Compliance with ITTO Action Plan

The project is consistent with the Organization's priorities in the field of Reforestation and Forest Management in the ITTO Libreville Action Plan.

Goal 1: Support activities to secure the tropical timber resource base by establishing two demonstration plots of management of rattan and developing guidelines for plantation management and harvesting of rattan.

- 2. Review current and potential productivity of major, tropical forest types;
- 7. Encourage and assist Members, as appropriate, to :
 - Establish and manage forests for multiple-use in close cooperation with local forest owners and communities living in forest areas.

Goal 2: Improve the tropical timber resource base by study environmental factors, silvicultural practices including propagation, planting techniques and harvesting to gain sustainable rattan products.

- 1. Develop the concept of forest biological health and sustainable production potential, particularly at forest stand and landscape levels, and incorporate this in guidelines for forest management plans.

*NWFPs mean the products from the forest except wood. These products are rattan, rattan, gum and resins, medicinal plant, spices, edible products, industrial insects, agar wood and bark including fuel wood and charcoal.

The project is also consistent with the Organization's priorities in the field of Forest Industry in the ITTO Libreville Action Plan.

Goal 1: Promote increased and further processing of tropical timber from sustainable sources by organization 2 training courses on processing and packaging of rattan shoot products, and furniture and weaving of rattan canes. To conduct a national conference on plantation management and utilization of rattan. Set up cottage scale industries and small cooperatives for value-added rattan products.

1. Assist the promotion and transfer of new and /or improved techniques and technologies;
2. Assist human resource development and institutional strengthening by designing and consulting national and international events such as specialist workshops and seminars and by the provision of fellowships; and
3. Encourage and assist Members , as appropriate, to :
 - Formulate research and development proposals which assist with the piloting and commercialization of new processing and manufacturing technologies;
 - Organize workshops/seminars on the use of new and/or improved techniques, technology and the development, testing and adoption of guidelines.

Goal 3 : Improve efficiency of processing of tropical timber from sustainable sources by publishing proceedings of a national conference, Guidelines for cultivation management and harvesting of rattan, one for shoot and one for cane products. Report on basic properties of the selected rattan species, the efficient uses for rattan in weaving and furniture, the manufacturing techniques of rattan shoot products.

3. Commission and publish analytical studies that identify critical knowledge and information gaps as a precursor to research and development activities on improved efficiency at all stages;
4. Assist in the promotion, transfer and adoption of new and/or improved techniques and technologies through publication and other media, workshops, seminars and fellowship.

ANNEX I. CURRICULUM VITAE

Personal Particulars 1.

Family Name DENRUNGRUANG
First Name PANNEE
Date of Birth 14 June 1957, Bangkok, Thailand.
Sex Female **Nationality** Thai
Marital Status Single **Region** Buddhism
Education B.Sc. (Chemistry), 1981, Ramkhamhaeng University, Bangkok, Thailand
 M.Sc. (Organic Chemistry), 1988, Kasetsart University, Bangkok, Thailand

Other training

Chemical Processing and Utilization of *Acacia catechu*, India, 1989.
 Statistics in Forest Research, Royal Forest Department, Thailand, 1989.
 Forestry and Forest Products Research, Japan, 1991
 Chemistry of Natural Products and their Biological Activity, Japan, 1994.
 Marketing of Non-timber Tree and Forest Products, RECOFTC, Kasetsart University, Bangkok, Thailand, 1996.
 Chemistry of Natural Products Research, Japan, 1998

Languages Thai/ English**Membership of Organization**

Member of National Research Council of Thailand.
 Member of South East Asia Sustainable Forest Management Network.
Present Scientist, Chief of Utilization of Non-Wood Forest Products Section,
 Non-Wood Forest Products Development Sub-Division
 Forest Products Research Division, Royal Forest Department, Bangkok, Thailand.

Previous Experience

1988 to 1989 Co-ordinator on Chemical Processing and Utilization of *Acacia catechu* Willd.,
 FAO Project.
 1994 to present Co-ordinator on RETROF Project.
 1996 Member of Organizing Committee in The International Conference on
 Forest Products, Royal Forest Department, Bangkok, Thailand.
 1998 to present Lecturer on Organic Chemistry in Kasetsart University, Bangkok, Thailand.
 1998-1999 Key Staff of PPD 4/98 Rev. 1(I) : Promotion of Tropical Non-Wood Forest
 Products (NWFPs) in Thailand

Publications

Properties of Benzoin. 1997
 Germination and Growth-Regulation Effects on Seed of Plants from Sa-dao-thiam
 Extractives. 1997
 Lignans From the Bark of *Persea Kurzii* Kosterm. 1996
 The Composition of Fatty Acid from *Azadirachta excelsa* Seed. 1995
 Gum and Resin in Thailand, 1995
 The Composition of *Pinus merkusii* Jungh. Leaf Oil. 1993.
 Chemical Processing and Utilization of *Acacia catechu* Willd. 1992.
 Analysis of Olearesin in *Pinus merkusii* Jungh. 1990.

Personal Particulars 2.

Family Name NILKAMHAENG
First Name NUCHANART
Date of Birth 18 July 1959
Sex Female **Nationality** Thai
Marital Status Married **Region** Buddhism

1987	Member of Organizing Committee in The International Rattan Conference, Chiang Mai, Thailand.
1988	Member of Organizing Committee in The International IUFRO Workshop on Pests and Diseases of Forest Plantation in Asia-Pacific Region, Bangkok, Thailand.
1988-1989	Study on Natural Succession of Forest Trees Along the New Roadsides to Kaoyai National Park, Nakornrachsima and Prachinburi Provinces, Thailand.
1989	Member of Organizing Committee in The International IUFRO Conference on Breeding Tropical Trees Population Structure and Genetic Improvement Strategies in Clonal and Seedling Forestry, Pattaya, Thailand.
1991	Member of Organizing Committee in The IV International Bamboo Conference, Chiang Mai, Thailand.
1998	Member of Organizing Committee in The International IUFRO Conference on Pest Management in Tropical Forest Plantations, Chantaburi, Thailand.
1998-present	Research Advisor, Faculty of Graduate Studies, Kasetsart University, Bangkok, Thailand

Publications

1. Traditional Vegetative Propagation and Tissue Culture of Some Thai Bamboos. 1990. Proceedings of the International Bamboo Workshop, 14-18 November 1988. Cochin, India.
2. Propagation of Waai Ta Khaa Thong (*Calamus caesius* Bl.) via young stem culture. 1990. M.Sc. Thesis. (English Abstract)
3. Micropropagation of *Dendrocalamus asper* Back. 1991. Research Paper. Silvicultural Research Division, Royal Forest Department. (in Thai)
4. Diploidization in megagametophyte-derived cultures of the gymnosperm *Larix decidua*. 1995. Theoretical and Applied Genetics 90(5):671-674.
5. Somatic Cell Genetics in Larches (*Larix* spp.). 1996. Ph.D. Thesis.
6. *In vitro* micropropagation of young buds of Pai Liang (*Bambusa* sp.). 1997. Research Paper. Silvicultural Research Division, Royal Forest Department. (English Abstract)
7. Tissue culture Technique for Propagation of *Calamus* sp. 1997. Research Paper. Silvicultural Research Division, Royal Forest Department. (English Abstract)
8. Bamboo. Research paper. 1997. Silvicultural Research Division, Royal Forest Department. (in Thai)
9. Interspecies protoplast fusion in *Larix*: comparison of electric and chemical methods. 1998. In Vitro Cellular and Developmental Biology 32:212-217.
10. A survey of bamboo and rattan resources in Thailand. 1999. IPGRI Publication.

Personal Particulars 4.

Family Name	THAIPETCH
First Name	SUCHART
Date of Birth	3 July 1947
Sex	Male
Nationality	Thai
Marital Status	Married
Region	Buddhism
Education	1970 : B.Sc. (Forestry) Kasetsart University, Bangkok. Thailand.
Languages	Thai/ English
Present	The Senior Forest Officer at Forest Products Research and Development Division.

Previous Experience

1970 : The Forest Technical Officer joined in Forest Products Research Division,
Royal Forest Department

1974 : Worked as the Officer in Phare regional forest Office.

1985 : Representative from RFD as the National Project Deputy Director of FAO
project on Coconutwood Training Programme Up to present :

Work experience :

Testing on mechanical properties and durability of rubberwood.

Present the paper on Rubberwood Production and Utilization in Thailand on The
International Forum on Investment Opportunities in the Rubberwood Industry.
Kuala Lumpur, Malaysia.

Personal Particulars 5.

Family Name KANGKARN
First Name YANYONG
Date of Birth 9 August 1961, Chaiyaphum , Thailand
Sex Male **Nationality** Thai
Marital Status Married **Religion** Buddhism
Education B.Sc. in Forestry (Silviculture).
Kasetsart University, Bangkok, Thailand

Other training

Minor Forest Product (Resin Tapping), Forest Product Research and Development,
Philippines, 1990

Wood-Based Material Application Technology, Regional Forest Office, Nagoya, Japan,
1991

Languages Present

Thai/ English

Technical Forest Officer, Chief of Sakon Nakhon Non-Wood Forest Products
Experiment Station, Non-Wood Forest Products Development Sub-Division,
Forest Products Research Division, Royal Forest Department

Previous Experience

1996 Lecturer and Trainer on Non Wood Forest Products Management, Thai-
German Highland Developing Programme
1988 to date Lecturer on Forest Product and Forest Conservation, Forest Fire
Control Project, Sakon Nakhon Province
(4 times per year, 280 Farmers)
1984-1985 Chief Assistant, Royal King's Project
Pangmapa Subdistrict, Maehongson Province
1998-1999 Key Staff of PPD 4/98 Rev. 1(I) : Promotion of Tropical Non-Wood Forest
Products (NWFPs) in Thailand

Consultancies

National Forest Products and Marketing Consultant in Ecodevelopment and Bufferzone
Management Planning, Consultancies (TCP/THA/4453) Assisted the report on "potential
for Non-Wood Forest Products in Buffer Zone Management"
Consultant for FAO. Project TCP/LAO/6611 "Improved Benzoin Production." in Laos.

Publications

The Growth and Resin Tapping of Lacquer Tree (*Melanorrhœa usitata*).
Yield and Tapping on Yang-Oil (*Dipterocarpus alatus*).
Yield and Bark Collecting of *Persea* sp.
Gum and Resin in Thailand
Case study "Rattan for Edible Shoot in Sakon Nakhon"
Growth and Products of Rattan's Shoot, Planted in Various Intense of Light

Personal Particulars 6.

Family Name SROITHONGKHAM
First Name PRACHOEN
Date of Birth 7 July 1960, Pathum Thani, Thailand
Sex Male **Nationality** Thai
Marital Status Married **Region** Buddhism
Education B.Sc. (Forest Products) 1983, Kasetsart University, Bangkok, Thailand
 M.Sc. (Forest Products) 1987, Kasetsart University, Bangkok, Thailand

Training Experiences

Minor Forest Product Forest Products Research and Development, Philippine, 1990
 Statistics in Forest Research Royal Forest Department, Thailand, 1992
 Special Areas of Forestry and Wood Research (Tannin Extraction and Utilization) The
 German Foundation for international Development (DSE), Germany, 1993

Languages

Thai/ English/ Deutsch

Present

Technical Forest Officer, Chief of Nakhorn Ratchasima Non-Wood Forest Products
 Experiment Station, Non-Wood Forest Products Development Sub-Division,
 Forest products Research Division, Royal Forest Department

Previous Experience

1988 to 1992 Lecturer and Trainer on Multipurpose Tree Project in the Programme on
 Development of Northern-East Thailand
 (once a year, 600-900 students/farmers)
 1994 Participated and organized in Regional Expert Consultation on "Non-
 Wood
 Forest Products, Social, Economic and Cultural Dimensions," FAO
 Regional Office for Asia and the Pacific
 1996 June Lecturer and Trainer on Non Wood Forest Products management, Thai-
 German Highland Development Programme
 1996 - 1997 Participated in Surveying on Natural Dyestuff in garment industry,
 Extended Research institute
 1998-1999 Key Staff of PPD 4/98 Rev. 1(I) : Promotion of Tropical Non-Wood Forest
 Products (NWFPs) in Thailand

Consultancies

Consultant for FAO. Project TCP/LAO/6611 "Improved Benzoin Production." in Laos.

Publications

Study on the Use of Non-Wood Forest Products and Potential for Development in Northern
 Thailand, 1995. Internal Paper No. 190, Thai-German Highland Development
 Programme
 Oil and Resin, 1993. Royal Forest Department
 Mai Luang Propagation with Root, 1992. Non Wood Forest Products Research Annual
 Report, Royal Forest Department
 Chemical Processing and Utilization of *Acacia Catechu* Willd. 1992. Regional office for
 Asia and the Pacific. F.A.O. Bangkok RAPA Publication 1992/19
 Utilization of potential Economic Wild Plant in Doi Tung, 1991 Royal Forest Department

Personal Particulars 7.

Family Name KULDELOK
First Name CHANATIP
Date of Birth 24 Oct. 1953, Nakornphathom, Thailand
Sex Male **Nationality** Thai
Marital Status Married **Region** Buddhism
Education - B.Sc. (Forestry), 1978, Kasetsart University

Bangkok , Thailand
 - M.Sc. (Watershed Management), 1983, Kasetsart
 University Bangkok, Thailand

Other training

Planting of *Calamus manan* in rubber plantation in Malaysia, 1995
 Seed Orchard and Seed Production management, Indonesia, 1997.

Languages

Thai/English

Present

Head, Rattan Research-Development Station, Suratthani

Publications

1. Effect of sowing and covering media on germination of seeds of *Calamus latifolius* Roxb. and *Calamus longisetus* Griff. 1997.
2. Growth of *Calamus Longisetus* under the Shad of *Azadirachta excelsa* plantation and in natural forest. 1997.

ANNEX II. TERMS OF REFERENCE

International Consultants

Management consultant

Management consultant is requested as consultants for developing of rattan products, such as development of the guidelines for sustainable management of rattan (plantation, management, silviculture, harvesting). Under the overall supervision of the project leader and in close cooperation with the other member of the project's team. The consultant will:

1. Review of rattan sustainable management based on existing literature consultations and field visits.
2. Carry out the analysis method of the rattan products obtained from local traders and the pilot plant of the project to obtain necessary data for development on production method.
3. Review the existing commercial grading system in national or international market and propose possible new grading system to be introduced in the country.
4. Design a research method on silvicultural practices to find out suitable ratio of culm cutting on sustainable management and number of stems weight and total stem length per ha. and train the project staff by actually carrying out.
5. Prepare the technical report and guidelines on sustainable management of rattan at the end of each mission including finding and recommendations and submit it to the project leader.

Rattan cane processing consultant

Rattan cane processing consultant is requested as processing consultants for developing of rattan protection and utilization, such as develop techniques for preservation (against stain fungi and powder post beetle), bending and bleaching of rattan canes. Under the overall supervision of the project leader and in close cooperation with the other member of the project's team. The consultant will:

1. Review of rattan protection and utilization based on existing literature consultations and field visits.
2. Carry out the analysis method of the rattan products obtained from local traders and the pilot plant of the project to obtain necessary data for development on production method.
3. Review the existing commercial grading system in national or international market and propose possible new grading system to be introduced in the country.
4. Design a research method to develop the sustainable utilization of rattan and train the project staff by actually carrying out.
5. Design practical procedures on 1) storage; 2) post-harvesting treatment and 3) production processing
6. Prepare the technical report at the end of each mission including finding and recommendations and submit it to the project leader.

Qualification

1. At least B.Sc. in related field.
2. Both oral and written communication in English.
3. Experience in forest management for management consultant and rattan technology for rattan cane processing consultant at least 5 years.

National Consultant

Rattan management and processing consultant

Rattan management and processing consultant is requested as processing and management consultant. The consultants conduct in term of development of rattan plantation, silvicultural method, sustainable harvesting system and developing of rattan preservation. Under the overall supervision of the project leader and in close cooperation with the other member of the project's team. The consultant will:

1. Review of rattan ecosystem, silvicultural management based on existing literature consultations and field visits.
2. Upon the International Consultants (Management consultant and Rattan cane processing consultant) arrival in Thailand he will, in collaboration with them, design a research method to develop practical procedures on 1) silvicultural method 2) weeding management 3) agroforestry model 4) harvesting rotation 5) storage 6) post-harvesting treatment and 7) production processing and train the project staff by actually carrying out.
3. Establish a research trial plot in the field to test different silvicultural method to obtain the sustainable management for quick return and long-term utilization and for demonstration.
4. Review the progress and problems encountered in the maintenance of the rattan plantation in the project and provide advice on problem solving.
5. Design assist in the development and implementation of a training program for the rural communities.
6. Prepare the technical report at the end of each mission including finding and recommendations and submit it to the project leader.

Qualification

1. At least B.Sc. in related field.
2. Both oral and written communication in English.
3. Thai Nationality
4. Experience in forest management or forest technology at least 5 years.

Rattan marketing and business consultant

The rattan marketing and business consultants conduct in term of rattan business and marketing to provide necessary advice on the establishment and management of rattan cottage industry. The consultant will:

1. *Review of rattan marketing and management based on existing literature consultations and field visits.*
2. *The consultant will be upward trend in raw material requirement in the field of marketing and business practice and train the project staff by actually carrying out.*
3. *To establish and manage rattan cottage industry in the project site.*
4. *Design assist in the development and methodology for sustainable utilization for rattan products*
5. *Prepare the technical report at the end of each mission including finding and recommendations and submit it to the project leader.*

Qualification

1. *At least B.Sc. in related field.*
2. *Both oral and written communication in English.*
3. *Thai Nationality*
4. *Experience in marketing and management at least 5 years.*

Shoot processing consultant

Shoot processing consultant is requested as processing consultants. The consultant conduct in term of development techniques for processing, packaging and chemical properties of rattan shoot. Under the overall supervision of the project leader and in close cooperation with the other member of the project's team. The consultant will:

1. Review of shoot production in present situation based on existing literature consultations and field visits.
2. Design and develop methodology for sustainable utilization both on many derivation of rattan products and cottage machinery for a short training course on processing and packaging of rattan shoot products .
3. Establish a rattan shoot home industry in the project site of demonstration and training activity.
4. Review the progress and problems encountered in the maintenance and development of the pilot plant and provide advice on problem solving.
5. Assist in the development and implementation of a training program for the rural communities.
6. Prepare the technical report at the end of each mission including finding and recommendations and submit it to the project leader.

Qualification

1. At least B.Sc. in related field.
2. Both oral and written communication in English.
3. Thai Nationality
4. Experience in shoot processing or food processing at least 5 years.

Furniture and weaving consultant

Furniture consultant is requested as furniture expert and weaving consultant is requested as weaving expert. The consultants conduct for developing of rattan furniture and weaving. Under the overall supervision of the project leader and in close cooperation with the other member of the project's team. The consultant will:

1. Review of rattan utilization in term of furniture and weaving in present situation based on existing literature consultations and field visits.
2. Design cottage machinery and train the project staff by actually carrying out.
3. Establish a pilot plant in the project site of demonstration and training activity.
4. Review the progress and problems encountered in the maintenance and development of the pilot plant and provide advice on problem solving.
5. Assist in the development and implementation of a training program for the rural communities.
6. Prepare the technical report at the end of each mission including finding and recommendations and submit it to the project leader.

Qualification

1. At least B.Sc. in related field or experience in furniture and weaving at least 5 years.
2. Both oral and written communication in Thai.
3. Thai Nationality

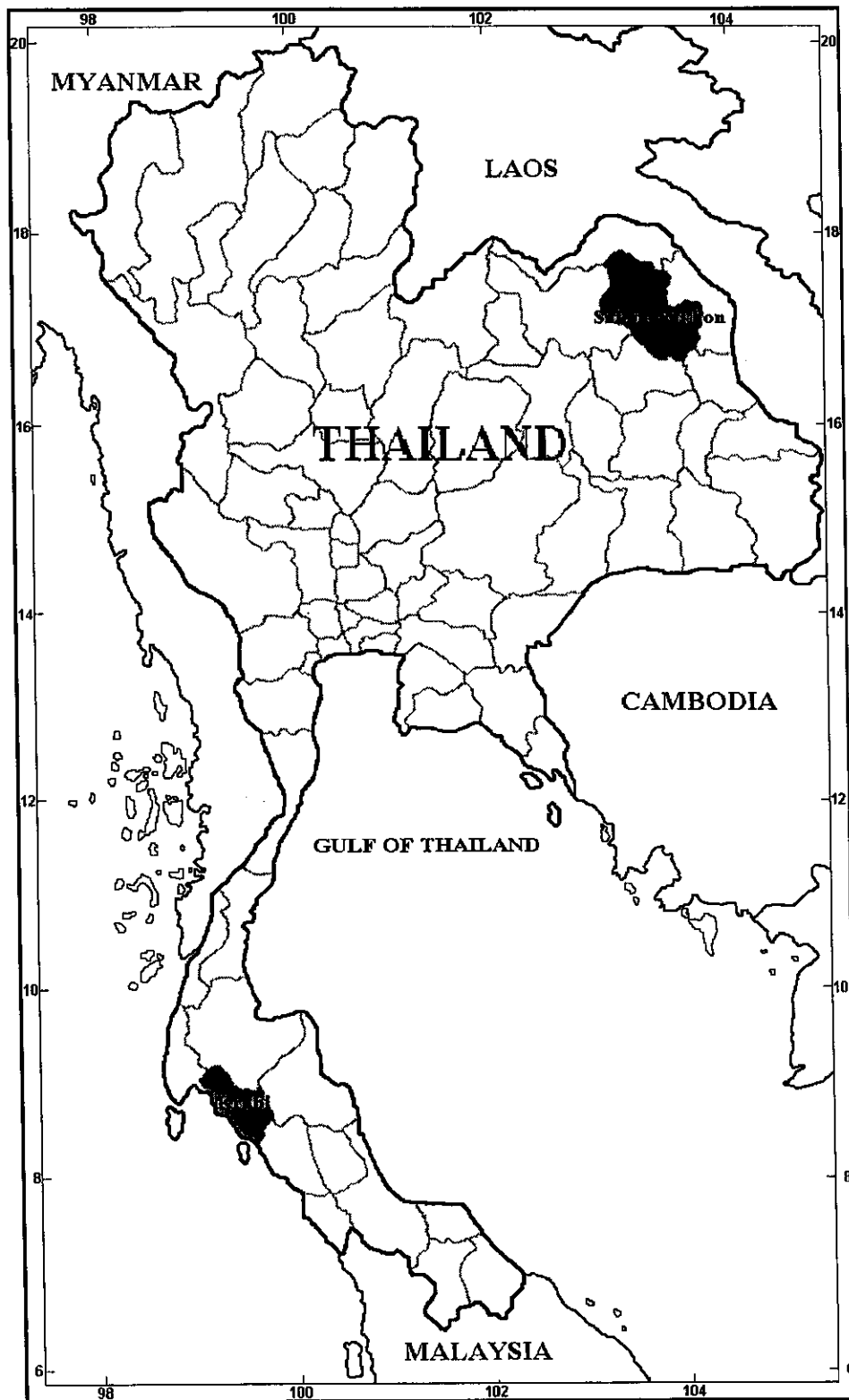
ANNEX III. LIST OF CAPITAL ITEMS (US\$)

No.	ITEM	*	QUANTITY	UNIT COST	TOTAL
1	Rattan Slicing & inside knot removing Machine	M	1	3,000	3,000
2	Rattan Stick Making Machine	M	1	3,000	3,000
3	Rattan Sander Machine	M	1	2,000	2,000
4	Rattan Laminating Machine	M	1	7,000	7,000
5	Rattan Shoot Processing and Canning Machine	M	1	17,000	17,000
6	Eluminant meter	M	2	1,050	2,100
7	Computer notebook	T	1	3,200	3,200
8	LCD projector	T	1	5,500	5,500
9	Photograph Overhead Projector	T	1	1,500	1,500
10	Digital VDO Camera	T	1	5,000	5,000
11	Water Pump (Gasoline Engine)	M	1	800	800
12	Oven	M	1	2,600	2,600
13	Preservation tank	M	1	1,000	1,000
				TOTAL	53,700

Note: * M = Machinery and Laboratory Equipment

T = Training Equipment

ANNEX IV. A MAP OF THE PROJECT SITES



ANNEX V. CONFERENCE PROGRAMME (DRAFF)

National Conference on Plantation Management and Utilization of Rattan in Sakon Nakhon province (80 persons/3 days)

Day 1	Time
Registration	08:00-09:00
Opening Ceremony	09:00-10:00
Keynote Lecture and Invited Lectures	10:00-12:00
Lunch	12:00-13:00
Invited Lectures	13:00-16:30
Reception	Evening
Day 2	
Invited Lectures	09:00-12:00
Lunch	12:00-13:00
Visit to Sakon Nakhon Non-Wood Forest Products Experiment Station, Forest Products Research Division, Royal Forest Department. And a home industry of rattan products in Sakon Nakhon province	13:00-17:00
Day 3	
Invited Lectures	09:00-12:00
Lunch	12:00-13:00
Invited Lectures	13:00-16:00
Farewell Party	Evening

Poster presentations are displayed throughout the conference

ANNEX VI. TRAINING SCHEDULE (DRAFF)

1. A Training Course on Rattan Furniture

To organize a 30 days training courses on rattan furniture in Sakon Nakhon province, 10 participants from rural and local people to be attended.

Day 1

Opening Ceremony

Lecture on harvesting, grading and preservation of rattan canes.

Reception

Day 2

Lecture on harvesting, grading and preservation of rattan canes. (continue)

Day 3-29

Training on designing of rattan furniture and techniques for making rattan furniture including preservation

Day 30

Final Evaluation and Closing Ceremony

2. A Training Course on Rattan Weaving

To organize a 30 days training courses on rattan furniture in Sakon Nakhon province, 10 participants from rural and local people to be attended.

Day 1

Opening Ceremony

Lecture on harvesting, grading and preservation of rattan canes

Reception

Day 2

Lecture on harvesting, grading and preservation of rattan canes (continue)

Day 3-29

Training on designing of rattan weaving ,techniques for weaving including preparing of materials, preservation and finishing.

Day 30

Final Evaluation and Closing Ceremony

3. A Training Course on Processing and Packaging of Rattan Shoot in Sakon Nakhon province (20 persons/7 days)

Day 1

Opening Ceremony.

Lecture on collection of rattan shoots.

Visit and collect rattan shoots sample at the rattan plantation in Sakon Nakhon Non-Wood Forest Products Experiment Station

Reception

Day 2

Lecture on processing of rattan shoots

Training on techniques for processing and packaging of rattan shoots

Day 3-6

Training on techniques for processing and packaging of rattan shoots (continue)

Day 7

Final Evaluation and Closing Ceremony

ANNEX VII. SUMMARY OF THE MODIFICATIONS MADE IN PD 24/00 (I)

Recommendations of the 20th Panel	Modifications
i. Provide more justification on Output 1.1 : Establishment of two demonstration plots for management of rattan plantation along with detailed information on rattan species to be promoted.	The details are provided more in Output 1.1 (page 9, 10)
ii. Consider hiring a consultant in the field of rattan business to provide necessary advice on the establishment and management of a rattan cottage industry.	<p>The responsibility and qualification are provided in National consultant (page 39)</p> <p>-Grand Total of ITTO budget will be changed from US\$ 288,968 to 292,457 (page 1)</p> <p>-Increase amount of US\$ 1,500 for hiring National consultant in the field of rattan marketing and business consultant.</p> <p>- Increase amount of US\$ 1,650 in the Duty travel</p> <p>(Table 7.1, page 25-26; Table 7.2, page 27)</p>
iii. Further elaborate Section 2.8 "Social Aspects" by providing social information on the local communities in the project sites.	The social information is provided in Section 2.8 "Social Aspects" (page 8)
iv. Provide more detailed information on the 30 days training courses on rattan furniture and weaving.	The details are provided more in Section 5, Output 2.6 (page 16) and in Annex VI Training schedule (page 44)
v. Elaborate the expected contribution of the project to the achievement of the ITTO Libreville Action Plan.	See page 30 and 31
vi. Ensure collaboration with INBAR in project implementation.	The Royal Forest Department and INBAR are preparing a Memorandum of Understandings (MOU) on technical cooperation that will be signed soon. The MOU will accelerate collaboration between INBAR and the RFD's staffs for future activities on bamboo and rattan research.