



**RUFFORD SMALL GRANT FOR NATURE CONSERVATION
(RSG)**

Final Report

**Management of Nypa Forest (*Nypa fruticans*) and Provision of Livelihood
Alternatives for Rural People in Chau Thanh District,
Tra Vinh Province, Vietnam**

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1. Introduction

Extraction and utilization of Nypa palms (*Nypa fruticans*) have been known to provide livelihood alternative to coastal communities, especially poor people in many Asian countries such as Thailand, Philippines, Sri Lanka, and India. In Vietnam, people in the Mekong delta and some other coastal regions have extracted mainly nypa leaves for their subsistent uses, particularly for house roofing and thatching for many years. However, use of nypa ecosystem is under real values of the resource. Nypas have been known to provide not only direct use values such as leaves and sap but also functions for coastal erosion prevention, aquatic resource provision and other social and cultural heritage.

In the frame work of the project “*Management of Nypa Forest (Nypa fruticans) and Provision of Livelihood Alternatives for Rural People in Chau Thanh District, Tra Vinh Province, Vietnam*” sponsored by *The Rufford Small Grant for Nature Conservation*, a first field trip was carried out in May 2006. During this survey, current situation of nypa palm ecosystem and its economic values were estimated. The results showed that nypa forests are in endangered in the study areas. Recently, nypa area is reduced rapidly and leaves yield seemed less than before. It was estimated that, each household could earn about 3-4 million VND per year (200-250 USD/year/household) from selling leaves for house thatching. This value was 8-10 times less than the value of nypa palms that Thai people achieved in the same area and the same natural conditions. In addition to the direct benefit from nypa leaf and trunk, local people in Chau Thanh district also catch fishes, crabs and cockles in nypa forest areas. The number showed average value from fish catching per year per household was 1.9 million/year/household (124 USD/year/household) or about 3 million/year/ha/household (200USD/year/ha/household).

Another part the first survey in Chau Thanh district was to evaluate current social and economic situation of farmers. The data analysis showed most of local people in Con Co and Long Hoa islands are poor with low monthly income (approximately 90USD/month/household). The main economic activities are either agriculture (up to 74% of total people in Con Co island) or aquaculture (about 47% of total people in Long Hoa island). Just 13% of farmers have nypa based economic income. At the end of the survey, people were asked to participate into a pilot project of new livelihood alternative from sustainable utilization of *nypa fruticans*.

2. Related Documents and Methodology

2.1 Related documents

Jane Havemann, 2002 presented a community resource management of *Nypa fruticans* in Loboc, Philippines. In this report, the importance of the nypa economy to local people's livelihood was identified. Nypa swamps in the Loboc estuary are classified as ‘Alienable and Disposable’ land which means they can be privately owned and developed. Lack of space in which development could occur while the nypa swamps made up a significant amount of flat land (over 25 percent). As the consequence, the nypa swamps have been identified by the municipal government as an appropriate area for development. The removal of nypa would be a radical land use change with

ramifications for a number of people. Nypa owners and growers were particularly vulnerable due to their lack of security of tenure, as they did not possess titles to the land. This is an example of unequal power relations in developing countries and their potential to cause environmental problems.

Narit (1996) estimated that nypa palm sugar production in Pak Phanang was the main source of income for the villagers. One family earned about 70,930 baht per annum, which is higher than the average income of the people in the agricultural sector in that area. A rai ⁽¹⁾ of nypa palms normally yields from 3772.80 to 4954.80 liters of sap per rai per season.

Le Thi Thu Ha, Master Thesis (2004) showed an example in assessment of economic and environmental values of nypa mangrove as well as integrated management of the resource in Pak Phanang River Basin, Southern Thailand. In this research, economic tools including Total Economic Value, Changes in Production, Cost Replacement Technique and Costs-Benefits Analysis were used to estimate direct and indirect values of nypa forests. Results of the research indicated that a rai of nypa normally yields about 2,147 liters of sap. Income from nypa cultivation contributed 70% in total income of local people. One family was estimated to earn about 15,475 baht/rai/year (around 400 USD). There are 48% of respondents who are living near coastal areas or river banks have exploited nypa for both direct and indirect values. For such people, a rai of nypa brought them an extra income of 803 baht per annum from fish catching and 1,200 baht for river bank protection.

- ***Economic Values of Nypa Palms***

Total economic value (TEV) of an environmental resource consists of its *use value* (UV) and *non-use value* (NUV). A use value is much as it sounds - a value arising from an actual use made of a given resource. This might be the use of a forest for timber, or of a wetland for recreation or fishing, and for nypa palms it might be nypa fruit for producing sugar, vinegar; nypa leaves for thatching house roof. Use values are further divided into *direct use values* (DUV), which refer to actual uses such as fishing, timber extraction etc; *indirect use values* (IUV), which refer to the benefits deriving from ecosystem functions such as a forest's function in protecting the watershed; and *option values* (OV), which is a value approximating an individual's *willingness to pay* to safeguard an asset for the option of using it at a future date (Pearce, 1992).

Use values are grouped according to whether they are *direct* or *indirect*. The direct use value approaches of natural resources look at techniques which attempt to elicit preferences directly by the design of survey and experimental techniques, such as the contingent valuation and contingent ranking methods. People are asked directly to state or reveal their strength of preferences for proposed changes. In contrast, indirect approaches are those techniques which seek to elicit preferences from actual, observed market based information. Preferences for the environmental goods are revealed indirectly when an individual purchases a marketed good to which the environmental

⁽¹⁾ a traditional unit of land area in Thailand. One rai is equal to 1600 square meters or 0.16 hectare or approximately 0.3954 acre

good is related in some way (Pearce & Moran, 1994). A special category of value is *option value*, which arises because an individual may be uncertain about his or her future demand for a resource and/or its availability in the wetland in the future (Barbier, 1997). Preservation has option value – it gives us time to learn about the possible services that are provided to people by the resource.

Existence values reflect value that people assign to aspects of the natural environment that they care about even when there is no direct use. This is commonly invoked for wild-lands habitat. Existence values reflect spiritual, moral and ethical values associated with environmental preservation. In a similar manner people may value the environment as a bequest to their children or for future generations to enjoy. Economic has nothing to say about which of these values is better than the other; they are simply a part of the diverse society background affected by a given public policies (Hackett, 1998).

Direct uses of nypa might involve both commercial and non-commercial activities. For non-commercial values, subsistence value is the most important for local populations in developing countries or for sport and recreation in developed countries. Commercial uses may be important for both domestic and international markets. In general, the value of marketed products and services from nypa is much easier to measure than the value of non-commercial and subsistence direct uses. As noted above, this is one reason why policy makers often fail to consider these non-marketed subsistence and informal uses of wetlands in many development decisions. Use values and non-use value of nypa can be listed in the following table:

Table 1: Classification of total economic value for nypa palm (*Nypa fruticans*)

Use Values			Non-Use Values
Direct Use Value	Indirect Use Value	Option and Quasi-Option Value	Existence Value
Leaves, fruits, trunk, fiber, etc.	Storm protection	Potential future (direct and indirect) uses	-
Swamp nypa areas	Flood control	Future value of information	Biodiversity
Recreation	Groundwater recharge	-	-
Wildlife harvesting	External ecosystem support	-	-
Entire palm	Micro-climatic stabilizations	-	-
	Coastline stabilizations, etc.	-	Culture heritage

Source: Adapted from Barbier, 1997

2.2 Methodologies

2.2.1 Selection of Study Area

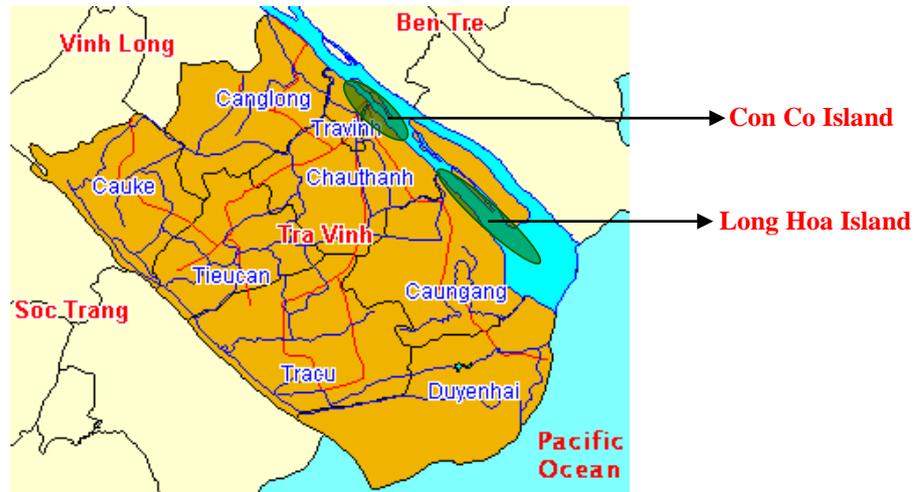


Figure 1: Map of the study area

Cau Ngang district was selected as a study area when the proposal was writing. However, after a meeting with provincial officers at Department of Natural Resources and Environment in Tra Vinh province, we decided to select Chau Thanh district as the study area of the project. The reasons for the change were due to higher density of *Nypa fruticans* in Chau Thanh and better utilization of this resource by local community in comparison with Cau Ngang district.

In Chau Thanh district, two communes including Hung My and Long Hoa were selected as the study areas of the project. In Hung My, Con Co island was selected to carry out the survey.

- **Con Co island:**

Con Co is a small estuarine island that has total natural area of 315 ha in which about 249.42 ha have been using for agriculture cultivation (including perennial plants and short-day crops). There are only 686 people living into 119 households in the island. Main economic activities of local people in Con Co are agriculture and small-scale fishery. People also depend on coastal ecosystems such as nypa palms for their livelihood. As the consequences, most of people are poor and their economy is mainly subsistent or family-based with low marketable exchange. Low infrastructure is one of big obstacles for the economic development of the island. In addition, low knowledge and limited skills of local people are challenges for the application of new production methods. On the other hand, high population is causing many pressures on natural resource exploitation and economic development planning as well.

- ***Long Hoa island:***

Long Hoa and Hoa Minh commune are located on the same island that called Long Hoa and Hoa Minh Island. However, Long Hoa is near by Cung Hau-Co Chien estuary in the downstream which characterized by wetlands and mangrove ecosystem and Hoa Minh is in the upstream where freshwater is dominated for agricultural operations. Natural land area of Long Hoa is 4526.54 ha in which 2308.02 ha is agricultural land. There are 958.56 ha of wetland (tide is up and down every day) where local people can culture some species such as cockles and mussels. Population in Long Hoa commune is 9679 people in which 6872 are women. Different from Con Co, main economic activities of Long Hoa are aquaculture and small-scale fishery. In addition, Long Hoa's residents have higher educational levels than those in Con Co. As the result, average income per household in Long Hoa is much higher than in Con Co.

2.2.2 Data Collection

Primary data on utilization and management of nypa forest was selected based on a direct interview with local people using detailed household questionnaires. 45 households participated in the survey as key informants in communes of Long Hoa and Hung My (Questionnaire is in Appendix). During the first survey, group discussion was carried out among local people in order to find out key issues in appropriate utilization and management of nypa palms in the study areas particularly and in Tra Vinh generally.

There is no secondary data of situation as well as management of nypa palm forest available at local authorities in any level of village, commune or province even though it is considered as an important resource for livelihood maintenance local people.

2.2.3 Data Analysis

When the field survey was finished, all the questionnaires were checked and completed correctly. Coding and the codebook were then prepared. The data was analyzed by using the Statistical Package for Social Sciences (SPSS). Descriptive, frequency, mean, and other common statistics were used in integrated with the economic statistic methods. *Market Price* was the main method that was used in this report to achieve direct use values of Nypa resource.

3. Results

3.1 Utilization of Nypa Forest in Chau Thanh District and Tra Vinh province

Tra Vinh is a coastal province where is located in the Mekong Delta of Southern Vietnam. The province has 65km of coastline. The forest land area in Tra Vinh was estimated about 13,080 ha in which 742 ha of *Rhizophora species*, 640 ha of *Sonneratia species* and 4,159 ha of *Nypa fruticans* can be found along rivers, estuaries and wetland areas. The statistics in 1994 showed a reduction in mangrove area in Tra Vinh to only 580 ha of *Rhizophora species*, 640 ha of *Sonneratia species*, 400 ha of *Avicennia marina* and about 4,400 ha of *Nypa fruticans*. Mangrove area has continued to reduce currently due to the rapid development of brackish water aquaculture,

especially shrimp farming. To 1997, forest land area in Tra Vinh remained 9,004 ha (Source: Official website of Tra Vinh Province, accessed on 14/6/2006 at <http://www.travinh.gov.vn/introTainguyen.asp>).

3.1.1 Historical Development of *Nypa* Ecosystem and People's Extraction

Local people who are living in coastal regions of Tra Vinh have started exploiting nypa palm's products (mainly leaves for thatching and roofing house) since 1970s. During the Independence War, thousands hectares of nypa palms have been destructed by heavy bombing and by the spraying of toxic defoliant in Tra Vinh (United Nation, 1991). After the war, local people have rehabilitated nypa forests for their subsistent using (house making). As the result, *Nypa fruticans* can be found almost everywhere in association with *Cryptocoryne ciliate*, which is an indicator of brackish water in Tra Vinh (United Nation, 1991).

GAMBAS project ⁽²⁾ (2000-2004) indicated about 15-20% of nypa among mangrove forest in Tra Vinh. In 1995, total area of mangrove in this province was estimated 7,241 ha of which 1,391 ha were in the high density. However, only 3,122 ha of mangrove have been recognized in 2001 and just 162 ha were in high density condition (Yves Auda et al., 2003; Phan Minh Thu, 2002).

Local people in Chau Thanh district have started extracting nypa leaves at earliest years of 1970s. However, the surveyed data showed up to 50% of people used nypa leaves since 1980s. During the rapid development of shrimp aquaculture in Tra Vinh (around 1997 to 1999), many farmers cleared mangrove forests for constructing shrimp ponds. As the result, nypa palm area was reduced to 0.3 to 0.5 ha each household in this period of time. Although many people cut down nypa forest for other utilization purposes, some other farmers extended their area to get more leaves as their source of income recently. From 1999 to 2002, 10% of people in the study areas exploited and extended more their natural nypa by planting to diversify their income. In the comparison with 1980s, nypa forest area is reduced. It is estimated 0.43 ha of nypa has been changed for other purposes in study areas (table 2).

Table 2: Area of *Nypa* forest (in ha) at different period of time

	N	Minimum	Maximum	Mean	Std. Deviation
1. Started year of extraction	45	1973	2002	1986	8.168
2. <i>Nypa</i> area at started year (ha)	45	0.40	2.00	0.944	0.41481
3. Total area of <i>Nypa</i> now (ha)	45	0.15	1.50	0.514	0.34684
Natural area of <i>Nypa</i> (ha)	45	0.10	1.50	0.402	0.29895
Planted area (ha)	45	-	0.80	0.148	0.18737

⁽²⁾ Project on "Sustainable Environment for Brackishwater Aquaculture in Mekong delta" funded by EC and implemented by IFREMER, France and the Institute of Oceanography, Vietnam.

3.1.2 Status of Nypa Forest Utilization

Almost 100% of people in Con Co Island and up to 90% of people in Long Hoa commune use nypa resource as an alternative income source besides agriculture or aquaculture. The main product of nypa palms is leaf for thatching and roofing houses. Most of households use this material for their house making. Nypa leaves have been used for long time in coastal regions of Vietnam, especially in the Mekong delta. Currently, many restaurants and resorts in the region choose and use this natural product instead of cement tiles or corrugate irons for their construction.

Local people use nypa trunks as a main fuel source for family cooking. The figure showed up to 80% of farmers use trunks in both Con Co and Long Hoa as family's fuel source. However, 89.3% people in Con Co exploit trunks while only 64.7% of people in Long Hoa use this direct product. Contrarily, all (100%) people in the two study areas exploit nypa leaves for either family uses or selling to other local users in the case of the production is more than family's demand.

In some Asian countries such as Thailand or Philippines, nypa young leaves were used for wrapping local cigarettes and fruits are used for special desserts. In Tra Vinh, just some people use young leaves of nypa to wrap a southern special kind of cake "rice-coconut cake" while some others cut fruits and sell them to the town for some money.

Currently, each household has owned and exploited average number of 0.56 ha nypa palms in the study areas in which 0.4 ha is natural and just about 0.16 ha is of planted nypas. In Con Co Island, average area per household is estimated 0.49 ha while the number in Long Hoa is 0.68 ha/household. Nypa area that was cleared for shrimp farming in Long Hoa is considered much higher than in Con Co. In the comparison with started years of the extraction (1980s), 0.53 ha nypa has been lost recently in Long Hoa and 0.29 ha of this resource lost in Con Co island (table 3). This is resulted from the conversion of land use purposes spontaneously by farmers without the adequate management of local government.

Table 3: Area of nypa forest (in ha) at study areas

	Con Co		Long Hoa		Total	
	Mean	SD	Mean	SD	Mean	SD
Total area (ha)	0.49	0.359	0.68	0.249	0.56	0.33
Natural area (ha)	0.33	0.345	0.51	0.178	0.4	0.30
Planted area (ha)	0.16	0.218	0.17	0.116	0.16	0.18
Started area (ha)	0.78	0.385	1.21	0.318	0.94	0.41
Started year of extraction	1985	8.642	1986	7.579	1986	8.17

There are two crops annually for exploiting nypa leaves in Tra Vinh generally and in Con Co and Long Hoa islands particularly. The first crop usually starts from February

to April and the second crop is from September to November. However, the length of a crop depends much on how many area of nypa per household as well as the consumable possibility of nypa leaves in local market.

Fishery resource is one of benefits that local people have found in nypa ecosystem. It was estimated that each household could harvest about 1 to 4 kg of fish everyday within nypa forest or along the canals where nypa palms located. In addition to the direct uses as mentioned above, nypa palms provide local people with indirect benefits including functions for preventing erosion and reducing storm impacts into coastal zones. Questions on the contribution of nypa in protecting coastlines and river banks have been raised to local people. Most of them realize about these functions of nypa. As stated by farmers, nypa forest can reduce up to 47.29 % of impacts of natural disasters such as coastal erosion and storms.

3.2 Social economic characteristics of rural community in the study areas

Most of local people in Chau Thanh district, Tra Vinh province are poor and their livelihood is much dependent on agriculture and small scale fishery for many years. Aquaculture, especially shrimp farming was introduced to the district since 1997 with extensive and improved-extensive methods. The most rapid development of shrimp culture was from 1999 and 2000 (researched results from project sponsored by SAREC, 2005).

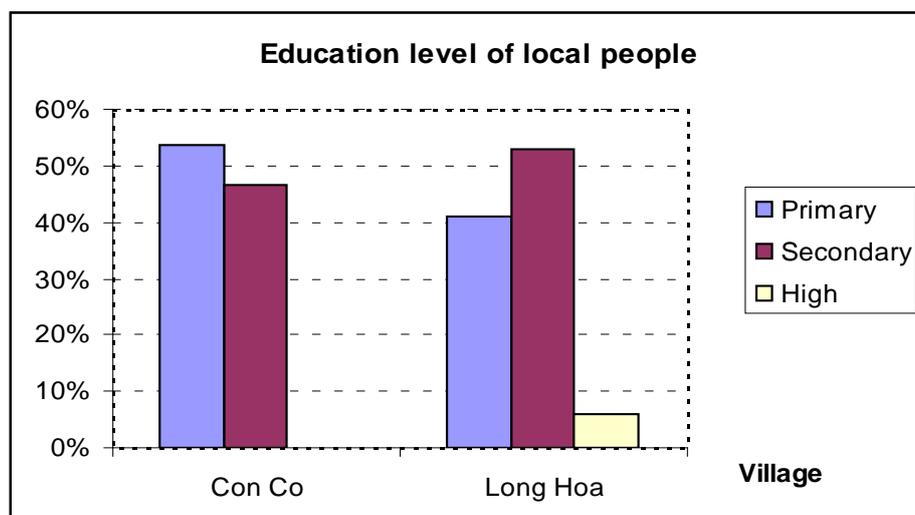


Figure 2: Educational levels of local people

From the figure, there is only one person among 45 key informants in the study areas completed high school. Up to 54% of farmers in Con Co just have primary education and about 46% have been educated at secondary level (usually grade 6 to 7). The educational situation of farmers in Long Hoa is a little better compared with Con Co. There are 53% of informants have secondary education level in this island.

- *Family size*

The average size of families in the study areas is around 5 to 6 people/household. Number of family labours per household was estimated about 3 to 4 people in both Con Co and Long Hoa islands. In fact, big family size is popular in all rural areas of Vietnam. While family size in the urban region is just from 4-5 members per household, each family living in rural places have 6-7 people.

- *Main economic activity and income*

There are two main income sources for local people in Chau Thanh district. While agriculture is the first priority of people in Con Co (75% local people are agriculture farmers), aquaculture and small-scale fishery seem to be considered as main economic activities in Long Hoa Island (the former draws 47.1% and the latter attract 29.4% of local people as well for these operations). Even though nypa palms provide high income from their leaves to farmers in some cases, not many households depend only on nypa production (table 4).

Table 4: Percentage of local people (%) working in different economic activities

Main economic activity	Village		Total
	Con Co (N=28)	Long Hoa (N=17)	
Nypa extraction	14.3	11.8	13.3
Fishing	0	29.4	11.1
Aquaculture	10.7	47.1	24.4
Agriculture	75.0	11.8	51.1
Total	100	100	100

It seems that different economic activities have decided to the differences of average income per household in Con Co and Long Hoa islands. Average income per household was estimated about 1.37 million VND/month/household (86 USD/month). However, people who work in aquaculture and fishery activities usually have higher monthly income in the comparison with those who work in agriculture. Each family in Long Hoa earns 1.6 million VND/month (101 USD/month/household). Contrary, people in Con Co can have just 1.22 million VND/month/household (77 USD/month/household). The survey showed the contribution in total monthly income of nypa products. In Con Co Island, nypa production contributes up to 30% in total monthly income of each household. The number also indicated about 19% of total monthly household income is come from nypa extraction (table 5).

Table 5: Contribution of nypa in total monthly income (in VND)

Village	Total monthly income/household	Nypa income/month	Contribution of Nypa in total income (%)
Con Co			
Mean	1,220,370	313,704	28.19
Std. Deviation	509,951	232,348	16.548
Long Hoa			
Mean	1,600,000	289,706	19.12
Std. Deviation	487,339	129,427	8.462
Total			
Mean	1,367,045	304,432	24.60
Std. Deviation	529,693	197,523	14.506

Key: 1 USD is approximately 15,990 VND

3.3 Economic values of Nypa ecosystem to local people

Economic values of nypa ecosystem in the study were described based on its direct values as well as functions and services such as fishery linkages, habitat provision, flood control, river bank erosion prevention etc. However, the most useful functions of nypa forest in the Tra Vinh known mainly are flood control and erosion prevention. The usefulness of these functions was identified through the indirect values the resource generated. Use values of nypa forest are illustrated clearly in table 6. In some other countries, mangrove palms functionate as aesthetic sites or cultural heritage. However, these functions are hardly found in Tra Vinh province. Nypa forest used to be pure natural resource and has been developed more or less like agricultural sector. So, for the local people, yield and economic benefits of nypa are more important for their livelihood.

Table 6: Characteristics on use values of nypa palms

Economic values	Direct	Indirect	Non-use
Components/assets			
1. Roofing leaves	●●●●		
2. Trunks	●●●		
3. Fruits	●		
Functions/services			
1. Flood control		●●●●	
2. Shoreline/river bank erosion control		●●●●	
3. Fishing support		●●●	
4. Nursing function		●●	
5. Nutrient retention		●	

6. Aesthetic function			●
Diversity/Attributes			
1. Biological diversity	●	●●	●●
2. Cultural heritage			●

Key: ●●●● = very high ●●● = high ●● = moderate ● = low

(Source: Adapted from Barbier, 1997; Le Thi Thu Ha, 2004)

3.3.1 Local Direct Use Values of Nypa Palms

During the survey, local people were asked to state about the important levels of nypa direct uses as well as indirect uses to their community. There are five levels including “5 = very important”; “4 = important”; “3 = moderate”; “2 = low important”; “1 = very low” and “0 = No value/not important”. The results are in table 7 below.

Table 7: Ranking the importance of nypa direct uses

Uses	N	Mean	Rank	Std. Dev
Roofing/old leaves	45	4.89	4	0.61
Young leaves	45	0.27	2	0.65
Trunks	45	3.33	3	0.88
Fruits	45	1.04	1	0.73

Nypa leaves are usually sold into two ways. Local people either sell “right of cutting leaves” in their area to buyers or cut and weave leaves into sets then sell them to the buyers. It was estimated that selling sets of leaves provided local people with better value than selling “right of cutting leaves”. In case of weaving nypa leaves into sets, 0.1 hectare usually generates from 1 to 1.3 million VND per year per household. Contrarily, with selling “right of cutting leaves”, 0.1 ha can only provide 0.7 to 0.8 million per household per year. Absolute values generated from nypa are shown in the table 8.

Table 8: Local direct use values of nypa palms

Direct Benefits	% HHs	Value/yr (VND)	Value/ha/yr (VND)
Old leaf	100%	3,846,136	7,665,944
Trunk	80%	165,555	432,385
Fishing benefit	69%	1,939,722	3,200,166
Total value	-	5,951,413	11,298,495

Nypa leaves usually generate approximately 3.85 million VND per household per year to local people in Chau Thanh district. Trunks are not exchanged with any price in the local market. However, price of replaced products of fuel was used to estimate value of nypa trunks in this study. As the result, trunks contribute about 165,555 thousand

VND annually to each household in the study area. Fishery resource contributes significantly to monthly income of farmers. This is obviously considered as economical indirect benefit nypa palms supply local people. The survey determined up to 69% of farmers in Tra Vinh catch fishes within nypa forests for either subsistent consumption or local market exchange. Annually, small scale fishing activity supports local people with 1,93 million VND/household or 3.2 million VND/ha/household. There were 71% of people in the study areas found this function as an important service of nypa palm forests. The research also showed the direct benefit nypa forest generated to local people in Tra Vinh was up to 8 million/ha/year/household.

3.3.2 Indirect Use Values of Nypa Palms

Indirect use values of nypa ecosystem were evaluated as indirect support and protection possibility providing to local economic activity and property by the natural functions of the resource, or regulatory environmental services. In the study, these services found as functions to control floods, prevent coastal erosion and providing fishing yield. Actually, mangrove palm is an important coastal resource that helps to prevent flood in rainy season (usually from August to November every year) in Mekong delta. The forest might protect downstream agricultural production, infrastructure, properties, land values and even human lives. Nypa palms occupy a significant part among mangrove forests which are located along rivers' or canals' banks in the Mekong delta. The results from the survey showed that erosion prevention of nypa palms is the most important function while aesthetic value occupies a least important level to local people in Tra Vinh.

Table 9: Ranking the importance of nypa indirect uses

Indirect use values	N	Mean	Rank	Std. Deviation
Erosion prevention	45	4.96	5	0.208
Storm control	45	4.89	4	0.318
Provision of nursing/habitats	45	3.71	3	0.589
Provision of fish resource	45	3.62	2	0.716
Aesthetic values	45	2.13	1	0.588

It was estimated by local people that nypa forest helps to prevent up to 49% of natural hazards such as storms, floods as well as coastal erosion. Therefore, many farmers, especially who are living along the rivers or canals keep their nypa area for these indirect functions.

3.4. People perception in improving household's income by alternative use of nypa forest

There is no doubt about the significant contribution of nypa resource to livelihood alternatives of local people especially poor farmers in Tra Vinh recently years. During the survey, farmers were showed some pictures in which Thai people have succeeded in utilizing and producing nypa palms' products such as nypa leaves, sugar and

alcohol. Introduction about the production process was explained in detailed to local people so that they could understand well. Informants were asked to learn about nypa palm production like Thai people if they would be guided how to run this process. The results showed 82.2% local people would like to learn and follow the way Thailand have been doing to diversify their livelihood alternatives.

Each family will spend more than a half of their nypa area (0.32 ha/household) to try with the new method. The questions on how much farmers could spend to promote nypa palm production were mentioned during the talks. However, as local people who are depended on nypa forest extraction are very poor farmers, they have almost nothing except manual labouring ability. As the consequence, local people could not invest much to facilitate their new method of nypa extraction. A small financial support that has been extracted from the project budget was introduced to 10 households in order to collect them for participating into a pilot program of sustainable extraction and production of *Nypa fruticans*.

In the first survey, local people were required to keep their nypa area in a “good condition”. It meant that, nypa palms should be sustainable used in terms of leaves cutting (should be one crop/year if people would like to collect nypa sap). In fact, farmers cut nypa leaves every two to three times per year. As the consequence, nypa resource seems to be over-exploited and exhausted and no longer provided sap or even good leaves to farmers.

4. Guideline to harvest and process sugar and alcohol from nypa sap

The second field trip was implemented in October 2006 to guide local people in Con Co Island for sustainable using and extracting nypa resource. In the first day of the trip, a meeting with Chau Thanh district’s delegates was carried out to disseminate the results of the project to the leader levels. According to the local leaders, this project was a significant approach to natural resources management and local people livelihood improvement. The success of the project would provide local people in Chau Thanh District particularly and Tra Vinh Province generally with new livelihood alternatives. Chau Thanh district’s leaders promised to give best conditions to the project team in disseminating results as well as guiding local farmers in sustainable harvesting and conserving nypa resources.

At Con Co Island, 50 farmers were invited to gather at the village’s head office. Most of the farmers were contacted since the first survey. There are different social backgrounds among those 50 farmers including head of the village, head of village’s police office, head of women’s association and head of farmer’s association as well as other island’s residents.

Color printed guidebooks were prepared. All participants were distributed with guidebooks in good harvesting nypa sap and processing sugar and alcohol from nypa sap. The participants then were instructed in detailed some basic techniques and necessary requirements in taking care, harvesting as well as processing nypa sap (Guidebook is in Appendix). After understanding well these stages, all participants moved to nypa forests and started collecting sap from nypa palms’ peduncles.

As mentioned above, nypa forests have been extracted for several times per year for house making purpose in Tra Vinh. Therefore, nypa palms seemed to be exhausted and no longer produced sap to local people. Under the instruction and explanation of the project implementers (for example: how to keep nypa palms in a good condition in terms of community increasing and fruit bearing possibility); local people seemed to know clearly their nypa forest's situation and what they should do for the next terms better changes of nypa palms.

On the field, farmers tried to collect sap from nypa's peduncles. According to the current situation of nypa forest in Chau Thanh district, just some of nypa trees could produce a little sap. Therefore, the idea to collect sap and then process the sap to become either sugar or alcohol was not fulfilled. However, all guideline books were delivered to farmers so that they can read at any time in the future. On the last page of the guideline book; name, telephone number and working place of the project implementers were included in order to provide farmers with specific address for any contact.

5. Conclusion

The first investigation provided information in economic values as well as current utilization of nypa palms in Chau Thanh district, Tra Vinh province. After the first survey, an assessment of direct use values of nypa forest was prepared. Values of nypa were mainly from nypa's leaves (7.67million VND/ha/year or 500USD/ha/year), trunks (only 432 thousand VND/ha/year or 30USD/ha/year). Moreover, in terms of providing fishes, farmers earn about 3.2 million VND/ha/year or about 220USD/ha/year). Since 1986, people in Chau Thanh district started extracting nypa palms, until now nypa area has being reduced sharply from 0.94ha/household to 0.56ha/household. Nypa palms in Tra Vinh province generally and Chau Thanh district particularly are in endangered by local people' activities. In many cases, nypa palms were main income source of many households. So, farmers cut nypa leaves almost everyday without any consideration about the resource's rehabilitation for the future terms.

The second field trip was conducted at the end of October 2006 to disseminate project's results and guide farmers in Chau Thanh for a better management and utilization of nypa forest. Guideline books were delivered to farmers. In the guidelines, methods and tools to collect and maintain nypa sap as well as to process sugar and alcohol from nypa sap were introduced to local people. For this dissemination, we contacted officers of People's Committee in Chau Thanh district, local government's representatives of the two studied islands and farmers. The collaboration among different stakeholders helped to find out an adequate planning for a better management and utilization of nypa resource in the study areas.

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Appendix

A2. First field trip (14/5 – 25/5/2006)

a. Objectives

- Collect information and data on current situation of nypa resource utilization.
- Collect social and economic data of households who are operating aquaculture or small-scale fishery while extracting nypa palms.

b. Schedule

- 14/5: Departure from Nha Trang – HCM City
- 15/5: HCMC – Tra Vinh
- 16/5: Working with Dept. of Natural Resources and Environment, Tra Vinh Province.
- 17/5: Working with People Committee of Chau Thanh District
- 18/5-27: Investigate and Interview with local people at Con Co and Long Hoa Islands of Chau Thanh District (including Village heads and groups of people).
- 28/5: Tra Vinh - HCMC
- 29/5: HCMC - Nha Trang

c. Costs

No.	Items	In GBP	In VND
1	Travel from Nha Trang-Tra Vinh (air plane and bus)	200	5,400,000
2	Local travel	150	4,050,000
3	Investigators' payment	400	10,800,000
4	Local officers' payment	100	2,700,000
5	Payment to farmers for information	100	2,700,000
6	Payment to future farmers for joining a pilot project	200	5,400,000
7	Accommodation	200	5,400,000
8	Food	150	4,050,000
9	Photocopy, print, communication	100	2,700,000
10	Data analysis and progress report writing	400	10,800,000
	Total	2000	54,000,000

A3. Second survey and dissemination of results:

Costs

No.	Items	In GBP	In VND
1	Compile and edit guideline book	600	16,200,000
2	Color print and bind	530	14,310,000
3	Travel from Nha Trang-Tra Vinh (air plane and bus)	200	5,400,000
4	Local travel	200	5,400,000
5	Investigators' payment	500	13,500,000
6	Local officers' payment	200	5,400,000
7	Payment to farmers	300	8,100,000
9	Accommodation	250	6,750,000
10	Food	200	5,400,000
	Total	2,980	80,460,000

