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THESIS

COMMUNITY BASED FOREST REHABILITATION – A LESSON LEARNT FROM PETROLEUM AUTHORITY OF THAILAND (PTT)

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A Thesis Submitted in Partial Fulfillment of
the Requirements for the Degree of
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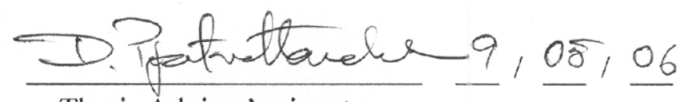
The present study was conducted at the 2 rehabilitation sites of the Petroleum Public Authority of Thailand Company Limited (PTT) under the Royal Golden Jubilee Forest Rehabilitation Project (RGJFRP) in Sakaeo (FPT9) and Chachoengsao (FPT53) Provinces. The diversity of tree, stand structure, diversity index were studied. In addition, the study about the attitude of forester and PTT staff towards the rehabilitation project of PTT were also investigated.

Based on the results it found that FPT 9 comprised of trees 97 species, sapling 14 species, and seedling 7species. The density of trees, sapling and seedling were 609, 13438 and 140,000 trees per ha respectively. The FPT 53 comprised of trees 217 species, sapling 6 species, and seedling 3 species respectively. The density of tree, sapling and seedling in FPT 53 were 218, 250,000 and 75,000 trees per ha respectively. The value of species diversity of trees calculated by Fisher's Index, Shannon Winner Index, Simpson's Index formula, Richness Index and evenness Index. The diameter of trees in each permanent sample plot was demonstrated in the inverse J-shape or L-shape pattern. Regarding to trees in FPT-9 and FPT-53 demonstrated that *Pterocarpus macrocarpus, Peltophorum dasyrachis, Nephelium hypoleucum*, and *Shorea roxburghii*, *Parinari anamense, Dipterocarpus obtusifolius* was the highest IVI, relative density, relative frequency and relative dominance. Vertical stratification of trees in FPT-9 and in FPT-53, in both places was found one or two layers /stratum.

Regarding the attitude of the Thai people motivated to plant tree and taking care of planted seedling, This was a good idea to collaborate with the people, the state enterprises and private organization for RGJFRP. The study proved that, foresters, PTT staffs and villagers around the FPT area worked for The King. Success of this project was initiated for Royal Golden Jubilee and then development of community, which already done by PTT in target villages by implemented different types of supplementary activities to ensure the sustainability of the forest areas. Result of hypothesis testing revealed that appropriate management practices for rehabilitation program, respondents involved in RGJFRP, Community people self reliant, Respondent's age were significantly related with performance of PTT in forest rehabilitation project.

Student's signature



Thesis Advisor's signature

9 / 05 / 06

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Ali Ashrafi Sultana
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COMMUNITY BASED FOREST REHABILITATION – A LESSON LEARNT FROM PETROLEUM AUTHORITY OF THAILAND (PTT)

INTRODUCTION

Community based forest rehabilitation is bottom-up (or grass-root) activities that bring individuals and organizations together to work towards achieving desired environmental goals. These initiatives are fueled by a community force that is exerting pressure on government agencies in many parts of the world. Commonly referred to as localization or subsidiary this force reflects peoples' desire for a greater say in issues that affect them. While government agencies may set strategies and prepare plans and policies, their ultimate success depends on the support of a wide spectrum of society, so this desire for involvement needs to be acknowledged and acted upon. Collaborative governance (defined as collaboration between spheres of government, stakeholders in society, and working in closer cooperation with citizens, not simply representing them) is argued to be the appropriate mode of governance as mankind enters the new millennium (Clark and Reddy 1999). People are usually proactive in protecting things of value to them, and it is in this context that biodiversity conservation initiatives have to be understood. Community-based conservation seems compelling because it starts from the most fundamental principle: individuals will take care of those things in which they have a long run, sustained interest (Bromley 1994, p. 428). Land managers, resource users; government agencies and individuals are constantly making resource management decisions that affect biodiversity (New Zealand's Biodiversity Strategy; DOC and MfE 2000, p. 11). These desired outcomes have led to increased acknowledgement of participatory activities as a means of achieving environmental and sustainability goals. While these concepts are not new, their application has increased dramatically in the last 10 years. For conservation purposes a community can be defined as a number of people who have a goal and decide to work together to do something about it. While groups can contain mutual, overlapping and divergent interests and perspectives, the goal binds people together, giving them a common identity despite individual differences. The minimal trappings of community according to Daly and Cobb (1994, p. 175) are: allowing all citizens to participate; accepting citizens' responsibility, respecting the diversity of citizens. Community-based forest rehabilitation tends to be voluntary, people-centered and participatory, with community members making management decisions (Murphree 1994, p. 419). Expertise may be provided by outside agencies but management responsibility remains with the community group. Community-based conservation reverses top-down, center-driven conservation by focusing on the people who bear the costs of conservation. In the broadest sense, then, community-based conservation includes natural resource or biodiversity protection by, for, and with local communities (Western & Wright 1994, p. 7). Because genetic diversity may be enhanced or reduced depending on the systems of management and the degree of understanding of forest dynamics. A lack of active management, for example by completely excluding human intervention, may reduce genetic diversity, although in other circumstances it may be necessary for conserving specific genetic resources. We might hypothesize that the most species rich areas are likely to be those including reclamation and restoration. Reforestation or rehabilitation is a difficult task.

However, preserving the reforested areas is even more difficult. The core activities alone cannot help the reforested areas to survive. Sharing responsibility for land management is fundamental for successful ecosystem management. Ecosystems cross boundaries, making the need for co-operation, co-ordination, and partnerships essential for managing ecosystems. Allowing people to be involved in all aspects of natural resource decision-making so that managers and political decision-makers will know their needs and views. People want more direct involvement in the process of making decisions about natural resources. Participation in natural resource management planning should be complemented by mechanisms, which empower community to share the responsibility of managing the ecosystems of which they are a part (Forgie, *et al* 2001).

In Bangladesh 2.52 million hectare forestland and 1.52 million hectare, which are natural forest and these are maintained by reserved and protected, mangrove forest, hill forest and sal (*shorea robusta*) forest. In Bangladesh hill forest and forest of sal forests are mainly rehabilitated with people participation by agroforestry implies. That practicing system for decades together on a participatory approach to replant the barren forestland and after harvest, a share will go to the participating members. This is a multipurpose approach to replant degraded land or barren land with the help of participants and protect it by them to build up forest resources. At the end of the rotation, the shares of the harvested forest produces are distributed to the participants in accordance to an agreement with the participants. This concept is doing well in the 'Sal Forest' of Dhaka, Tangail, Mymensing, Rajshahi, Rangpur and Dinajpur. New programs of agroforestry have been incorporated in the ADB aided Forestry Sector Project launched by the Forest Department. In this project 6450 hectare of new plantations will be raised on the degraded Sal Forest and another 5400 hectare will be raised on the harvested land of old agroforestry plantations (Bangladesh Forest Department, 2005).

The destruction of Thailand's natural forest areas has not only effected the social environment, but the economics and political as well. Deforestation is not an isolated in particular area, but in fact it is a nation wide epidemic. Concern about this problem, Her Majesty the Queen summoned Lady Suprada Gasaemsan, the royal secretary to Her Majesty, to commission the Ministry of Agriculture and Cooperatives to find ways to alleviate the deforestation dilemma. Not until late 1990s when awareness on forest conservation was higher up, reforestation changed to be rehabilitation for restoring of biodiversity and watershed purposes. More diverse species of forest trees were planted on degradable forest wherever it was which make reforestation areas increasing dramatically since 1995. The main impetus for this was the reforestation project, which was part of the Commemoration of the Royal Golden Jubilee of the King's Coronation, initiated in 1992 under which an ambitious 5 million Rai (8,000 square kilometer) of trees were planted. The project have been achieving in term of people participation in reforestation, there were individuals, company, schools, university who had involved in donating money, attending planting activities, or supporting community to safeguard their planted forest. However, due to the economic crisis in 1997 and the vast amount of land needed, achievement of the project at 8,000 square kilometer had been delayed and it is expected to be accomplished later. The Reforestation Campaign Commemoration of the Royal

Golden Jubilee is being led by the Ministry of Agriculture and Cooperatives and the Royal Forest Department which activated the cooperation and aid from the governmental and private groups. The goal of this project is to preserve and reforest the swindling national protected forest areas, amounting to 5 million Rai (2 million acres). PTT Public Company Limited has recognized the nation's policy of environmental protection and had volunteered to reforest one million Rai or about 20% of the total project. At the end of the program efficient management of PTT and one million thirty tree thousand one hundred forty four Rai (1,033,148 Rai) of the project's area was the excellent out come. They believed that every tree that is planted is representative of the loyalty and nationalism that each individual has towards Thailand and His Majesty the King. The PTT regarded first and foremost and needs to continue everlastingly. This introduction success in which PTT has taken part present, should serve as a good example for future generation to follow, this land could soon see lush green forest again (PTT Report 2004).

The purpose of rehabilitation are proposed in many degrade landscapes the primary purpose of intervention is to provide functional benefits (such as soil and water conservation) rather than to restore biodiversity. In such cases, rehabilitation might be target riparian strips to stabilize streamside or target steep hillsides and areas with eroding soils. Rehabilitation in the form of small farm woodlots or the protection of re growth areas near to homes or villages of the rural communities might be the best option. Rehabilitation will established to conserve significant areas of biodiversity, are obvious targets, and will restore the integrity of the whole protected area and prevent it from being a source of weeds or pests. Rehabilitation might also be carried out to facilitate the movement of plants animals across a landscape. A crucial element for the success of any rehabilitation program is whether the local community is involved in its development and desires its success (Lamb *et al*. 2003). The extent to which the community continues to be actively involved in a project is thus an important indicator of its likelihood of success. Public knowledge about ecological issues and the ability this provides the community to respond to changes in the forest condition is another aspect of community involvement. This study has learned the criteria of success of two selected (FPT-9 and FPT-53) rehabilitated areas conducted by PTT.

Objectives

The objectives of the present study were as follows

1. To study the biodiversity of some selected rehabilitated area, operate by PTT.

2. To study the stand characteristics of some select rehabilitated areas operated by PTT.

3. To study about the attitude of various stakeholders toward the performance of PTT and the success of forest rehabilitation.

LITERATURE REVIEWS

Forestry in Thailand

For more than a century Thai forestry operated in the form of a partnership aimed at producing commercial timber. The first partnership was between the feudal chiefs and logging concessionaires in the 1880s. However, it soon became evident that exploitation was not well controlled, and King Rama V established the Royal Forest Department in 1892 to exercise some control. This started the second partnership, between the State and logging concessionaires. The RFD was mandated to oversee timber harvesting and regularize tax revenues. Perhaps the most far-reaching change was the vesting of all forestland in the King. During more recent times the Department has been involved in establishing a regulatory framework to define forest management procedures and practices, with the aim of ensuring that the forest was managed sustainably. However, in reality, the industry maintained the major control over forest operations, with the result that the forests were rapidly over cut and degraded (Gilmour and Jantakad 1999).

A key reason for the exploitation of forests in Thailand is that teaks have been a major source of foreign exchange and government revenue for many years. In many situations, people in middle to high socio-economic positions, living far from the forests, through direct cutting or by encouraging farmers to clear lands, carried out the original destruction. Rerkasem (1995) noted that there were both internal and external forces causing rapid changes in the mountainous areas of northern Thailand. These can be summarized as: Internal factors are increased population; farmers felt the need to increase productivity and to improve the stability of their production. External factors (related to government policy) are the effect of nationalization and integration policy implemented by the Department of Local Administration; enforcement of forest and watershed conservation and afforestation schemes by the RFD; Strict law enforcement on illicit opium cultivation by the ONCB and Improved access and transportation (Jantakad and Gilmour 1999).

The most obvious consequence of forest loss and degradation is the loss of biodiversity. Thailand's rich reserves of biodiversity have been severely degraded, particularly during recent decades. However, the extent of the loss is not clear. Also of importance is the loss of environmental services, such as watershed functions and carbon sequestration. Quantification of these services is even more difficult to determine. As well as the direct and indirect impacts of deforestation on the ecosystem, forest degradation also degrades the life of people living in and adjacent to forests. This gives added emphasis to the sentiments expressed in the proposed community forestry legislation that effectively managed community forests will contribute to the national interest by improving the quality of life of forest dwellers (Jantakad and Gilmour 1999).

Forest conservation became a more explicit part of management in the 1960s with the establishment of the first National Park. This marked the beginning of an era where conservation and protective functions of the forests began to assume greater

significance. This era culminated in some respects with the issuance of a Royal Decree in January 1989 terminating timber concessions in the uplands. This was in response to severe flooding and consequent loss of life that presumed to be linked to industrial timber harvesting. Strong public pressure played a significant role in influencing these official actions, and demonstrated the increasingly powerful role being played by civil society in national resource management decision-making (Gilmour and Jantakad 1999).

A fundamental problem with both the partnerships described above, was that the large number of people who lived in and around the forests, and who depended on the forests for subsistence and other purposes, were largely excluded from participation. Local people were alienated from the process and were considered to be illegal encroachers. During the past 20 years the relationship between the RFD and the citizens of Thailand could be characterized as divisive - "…strong links to an authoritative establishment and arbitrary enforcement of laws have resulted in alienation of the populace and NGOs by RFD" (IUCN 1996: 15). The Government has embarked on a series of initiatives to encourage protection of the remaining forests and to encourage private sector involvement in the development of plantations. Several groups have become involved in establishing fast growing species, generally eucalypts, to meet pulpwood demands. However, results to date seem to be qualified. Natural forests have declined dramatically in both area and quality throughout this century, and it has become clear that other forms of partnership will be necessary if forest degradation is to be halted and reversed. At the present time there is vigorous debate within the bureaucracy and civil society about the nature of the partnership needed to ensure that Thailand's forests are managed in a sustainable and equitable fashion. Kaosa and Mingsarn *et al*. (1995) reported that the perception of environmental degradation by many of the Thai conservation NGOs (generally urban based) is similar to that of the government and academics. Deforestation, water use, urban and industrial pollution are all priority issues for these NGOs as they are for government agencies. However, the two groups have different views on the possible causes of these problems and on the approaches needed to solve them. Conservation NGOs have focused on forest conservation as one of their major concerns. They also attempt to draw the government's attention to the negative impacts of infrastructure development such as dam construction on forest and watershed ecology as well as on the forced eviction of rural communities from forest reserves. Meanwhile, development NGOs tend to emphasize community forestry as a potential answer to forest conservation problems and as an important tool to achieve sustainable land use and rural development (Kaosa and Mingsarn *et al.* 1995). Some NGOs have strongly resisted commercial plantation schemes while the government sees commercial plantations as part of the solution to address the shortage of industrial wood products caused by deforestation and forest degradation.

Rehabilitation of Degraded Forest Land in Thailand

The first reforestation trial of teak in Thailand was initiated in 1916 in Phrae Province by using direct seeding, although there seem to be small scale of performances. Larger scale efforts date from the 1960s and have been concentrated on

degraded forestland both inside and outside conservation forests. The major objective of activities outside conservation forests has been to produce an industrial crop for the wood processing industry. Activities inside conservation forests have aimed primarily at rehabilitating the protective function of the forest. Table 1 indicates the increasing emphasis on reforestation activities in the RFD after the 1960s.

Table 1 Area of land reforested during different periods of the National, Economic and Social Development Plan (NESDP)

NESDP	Period	Area Planted (Rai)
Before NESDP		8,754
1st NESDP	1961-65	116,000
2nd NESDP	1966-1970	155,750
3rd NESDP	1971-1975	232,364
4th NESDP	1976-1980	1,199,983
5th NESDP	1981-1985	776,752
6th NESDP	1986-1990	819,279
7th NESDP	1991-1995	826,230
8th NESDP	1996-2000	152,462.9
9th NESDP	2001-2005	122,707.2
Total		4,401,528.1

The emphasis in many of the reforestation programs of RFD has been to create "protective" forest cover for watershed protection. However, because of the view of RFD staffs about the legitimacy of people residing inside forest reserves, local people's needs are not considered in most of these programs, regardless of how important the forest is to supporting local livelihoods. Consequently, many activities (particularly in the past) tended to be very top down in planning and implementation and excluded local people from any meaningful role. In addition, most reforestation projects use monocultures, particularly pines, in watershed areas, and these have limited value for local people. Eucalypts have also been promoted throughout the country for industrial plantations and in some cases as agro forestry crops. These also have limited value to local people (Gilmour and Jantakad 1999). In 1996, the Northern Farmer Network in the eight provinces of upper northern Thailand made plans to initiate forest rehabilitation and forest protection, which they called the "50 million tree ordination". About 100 community forests have been selected as sites for planting 50 million trees under this program, covering an area of 25,600 ha. It is too early to judge the effectiveness of this initiative.

In 1994 a major reforestation program was activated in recognition of the Royal Golden Jubilee. Targets set for reforestation in each region were: North, 531,286 ha (65.4%); North east, 159,838 ha (19.7%); Central, 83,704 ha (10.30%) and South, 38,036 ha (4.7%). As with many other similar programs, the major emphasis was directed to the Northern region (Gilmour and Jantakad 1999). Promising approaches have been developed by the Forest Restoration Research Unit at Chiang Mai University to rehabilitate degraded forest ecosystems by using strategic plantings of natural species (Elliott *et al.* 1998). Emphasis is given to careful

matching of species to the site, producing robust seedlings and working in partnership with local communities. Examples are given of using low density "framework" plantings to minimize costs while maximizing impact. The approach is useful in degraded watersheds and protected areas where increasing biodiversity and improving environmental services are important considerations.

King Bhumipol Adulyadej And The Royal Golden Jubilee Project And The Forest Rehabilitation Project

The Royal Project Thailand has been elected to receive the 1988 Ramon Magsayay Award for International Understanding. The Royal Project is recognized for demonstration through concerted national and international efforts in northern Thailand pirate-climate cash crops offer hill tribes a viable alternative to opium poppy growing. By the late 1960s northern Thailand alone produced 150 tons of opium a year. In 1969, Thailand's King Bhumibol Adulyadej Maharaja hearkened to the crisis.

After completion of his education in Switzerland in the early 1950s, His Majesty returned home to Thailand. In the years following, he began what has become his way of life - traveling throughout the year to the provinces and rural areas of the kingdom to visit his people, talk to them and, perhaps even more important, listen to them. He learns first hand of their needs and their problems and then sets about trying to find a way of giving immediate help; later these problems are studied in depth to find a permanent solution or way of assistance. He sat in motion a program to bring worthy livelihoods to Thailand's hill tribesmen, and to arrest the destruction of precious forests and watersheds. This became the Royal Project. His Majesty appointed Prince Bhisatej Rajani to supervise the Project. For research and essential administrative services he called upon Kasetsart University. Volunteers from universities and government agencies then introduced. Nearly 300 upland villages benefit directly from the Royal Project, which is also introducing schools, cooperatives, rice banks and primary medical services.

The Royal Project has four major objectives,

1. Offer a helping hand to all humankind;
2. Ensure natural resources for conserving a sustainable future;
3. Eradicate opium poppy cultivation and derived addiction problems;
4. Encourage a wise and proper balance in utilizing and conserving land and forest resources.

Her Majesty the Queen Sirikit wants all model farms to function as sources for quality food production and employment generation. She has emphasized that the best help is to provide jobs for people and give them a chance to stand on their own feet and take pride in being able to feed their families with their knowledge and ability. This kind of help would provide a way for the people to find dignity through their own effort. The working Queen is not concerned about profits and losses in conducting projects for the people, as she once said, "My loss is the gain of the nation."

Research and development were priorities for the Project's first decade. When meaningful extension work began gradually, but dramatically, to see significant results. From the beginning, many agencies have co-operated with the Royal Project to establish the work on strong foundation. These agencies include: universities, the Ministry of Agriculture and Cooperatives, Ministry of Science and Technology, the Ministry of Interior, State Owned Enterprises, the private sector, international organizations and foreign governments. The work of the Royal Project has evolved into four major endeavors: research, agricultural extension, development, and socioeconomic activities. The Royal Project, under the directorship of H.S.H. Prince Bhisatej Rajani was intended as as seminal project which would help fund-from His Majesty The King's own private funds-much needed highland agricultural research, development and experimentation work, prior to and parallel with the intensive efforts of state agencies to build up their capability in these newly recognized areas of national concern. The Royal Project activities would, it was planned, be flexible and responsive to developing situations, would operate under a minimum of rules and regulations, and would thus be in a good position to assist the various government works (Kanchanapisek1996).

The destruction of Thailand's natural forest areas has not only effected the social environment, but the economics and political as well. Concern about this problem, Her Majesty the Queen summoned Lady Suprada Gasaemsan, the royal secretary to Her Majesty, to commission the Ministry of Agriculture and Cooperatives to find ways to alleviate the deforestation dilemma. Furthermore, Her Majesty the Queen has requested that the Ministry of Agriculture and Cooperative focus on the limited water supply that has resulted due to deforestation. In the acknowledgement of His and Her Majesties' continuing efforts to improve the environmental condition in Thailand, the Ministry of Agriculture and Cooperative has developed the Reforestation Campaign in Commemoration of the Royal Golden Jubilee. This project has been introduced on the Occasion of the celebration of His Majesty's, King Bhumipol Adulyadej, Jubilee anniversary of his reign. The project was submitted by the Royal Forest Policy Department of Thailand to the cabinet party for approval and was approved on February 1, 1992. In accordance with the decision, the cabinet set up a committee to foresee the implementation of this project. The goal of this project is to preserve and reforest the swindling national protected forest areas, amounting to 5 million Rai (2 million acres). PTT Public Company Limited has recognized the nation's policy of environmental protection and had volunteered to reforest one million thirty tree thousand one hundred forty four Rai (1,033,148 Rai) of the project's area. PTT reforestation project followed the master plan of forest plantation target in 410 FPT areas at 48 Provinces, designated by the Royal Forest Department with the approval of district and provincial authorities. PTT regarded first and foremost and needs to continue everlastingly.

Role of Public Company Limited (PTT) in Greening Thailand

Through out the years, PTT's remarkable achievements have reflected the success as one of the leading companies in the Thai kingdom. Yet from this solid base, PTT today still commits to move forward. Their endeavor to improve

potentiality in all aspects i.e. business, technology, personnel and management to excel in the business arena is never ending. PTT is Thailand's only fully-integrated gas company while having a leading position in the marketing and trading of various crude oil, refined petroleum products. In addition, through interests in associated companies, PTT has invested in Thailand's petrochemicals and refining industries. Primary business activities include: exploration, development and production of natural gas, condensate and crude oil through a subsidiary, PTT Exploration and Production Public Company Limited (PTTEP) procurement, transmission, processing, marketing and distribution of natural gas and gas products marketing of refined products through various distribution channels including commercial, retail, reseller and international markets as well as international trading i.e. import and export of crude oil, condensate, petroleum feedstock and petrochemical products.

PTT Board lead by Dr. Sibbhanonda Kedutaj decided to start the reforestation project under the management of Mr. Luen krisnakri, PTT governor. Dr. Charan Achalabhuti, Director of PTT Reforestation Project and Dr. Suree Bhumibhaman as project consultant. It has been 10 years already since PTT first started Reforestation Project to honor of His Majesty the King, an attempt to restore the health to Thailand's forests in 1994. Under this project, PTT had pledged to replant one million Rai (400,000 acres). Though, the project started with doubts, skepticisms filled with the questions from various agents if the project would be successful and the trees would survive since reforestation is such a hard labor and involved with abundant obstacles caused by various reasons e.g. famine in the remote areas and even deforestation by man. Today, all Thai have witnessed a pleasant answer as the reforestation covering 1 million Rai area have now completed as previously promised by PTT, a result of concerted effort of all Thais nationwide. Successfully, original forest conditions have returned in a number of areas, as is evident in the return of local plants species, e.g. wild mushrooms, herbs, and *Leprironta mucronata* grass, which brings additional income to villagers. Also, native animals, e.g. wild elephants, barking deer, roebucks, boars, wild fowls, and wild birds, have returned to feed in places once considered deteriorated forests, with clear traces of their return in the reforested areas. What brings more pride apart from a plantation of 150 million saplings in the country is a creation of forest lover and community. Various blessing signs of transformation are that hunters have now become forest guards and an increasing number of volunteers in the wildfire prevention corps and participants in the PTT forest preservation youth groups, some of the supplementary projects initiated by PTT in order to have sustainable forest in the future. All of the programs aim to instill forest love in the local people and improve their living standards. It is this critical mass of committed Thais that will grow with the saplings and serve as sentinels for the forests (PTT report, 2004).

The PTT reforestation project follows the master plan of FPT areas designated by the Royal Forest Department with the approval of district and provincial authorities. These target areas must cover headwater sources of major waterways, including swamp and mangrove forests. Several areas are biologically diversified but are presently deteriorated or denuded. Here areas are within the compounds of national reserved forests national parks or wildlife sanctuaries. PTT has set up a

specific project unit office particularly for this mission. From its initiation in 1994 to 1999, this project has replanted and restores 319 forest areas in 43 provinces, covering approximately 774,000 Rai (about 310,000 acres) Table 2. PTT's general scheme of operation is for one year of rehabilitation plus two years of silviculture improvement before the FPTs are presented to the Royal Forest Department for future management. PTT targets to complete the reforestation of these one million Rai by the year 2004. PTT employs co-operative measures to include both governmental and private sectors in the project with special focus on the participation of communities around each FPT area. Apart from physical rehabilitation of forest areas, it is crucial to campaign for local participation by raising people's awareness and concerns for forest areas which are their livelihood. Villagers around FPT areas must be convinced that their communities are to be responsible for long-term maintenance of their forests. Some supporting programs, such as PTT Forest Youth Guards, Forest Fire Prevention Volunteers, and Forest Protection Patrols, have been launched to enhance the inter-related ness between local people and their forests. In addition to reforestation projects, PTT has also sponsored several projects related to the rehabilitation campaign.

Table 2 The area of PTT plantation in different planted area during 1994-2002.

Planted Area	Area (Rai)	Number of sapling/Rai
Inland forest	945,008 Rais or approx	150
Mangrove forest	63,854 Rais or approx	700
Swamp	24,286 Rais or approx	700'
Total	approx. 200 million saplings	

Source: PTT report (2006)

FPT (Forest Plantation Target) 29 at Pranburi , Prachuap Khiri Khan , is where the ceremony of bestowal 1 million Rai of reforestation project in honor of His Majesty the King took place. Back in 1983, the mangrove forests here were destroyed by shrimp field's expansion. After the invasion, the forests once served as natural windbreaks along the shorelines and acted as filters for residual sediment before reaching the Gulf of Thailand, were finally abandoned, PTT then took over and turned these degraded lands into FPT 29. Every forest worker has worked doubly hard trying to understand whatever there is to know about forests and their sustainable management, such as plant selection for different seawater levels. Before replanting in the FPTs, the seedlings need to be nursed until they can stand above the water level, for a high rate of survival. After hard labor in their attempt, the denuded land has turned green once again. The forests are growing and the natural marine species are returning.

The PTT project has many targets including:

- Increasing the awareness amongst schools and local communities, on the importance of forests. The project also hopes to create a solid understanding of the sustainable roles communities can adopt regarding forest procreation and protection.

- Income generation initiatives are another key project target aimed specifically at supporting local community groups. By initiating positive supplementary occupational alternatives and by providing solutions to community problems a reduction in deforestation is targeted.

- Community development through the participation of local people and local organizations it is hoped will enhance community potential and provide the skills necessary for communities to take charge of the project directives in the future.

At present income generation has been targeted by the project, and occupation groups have been set up in a number of areas. These include the breeding of livestock such as chickens and ducks and pesticide free vegetable garden. The art of hat and artificial flower making from Sa paper has been taught. The latter has been very successful, with the assistance provided launching the Sa products into the market, already bringing in orders for the product. Accounting Training for the 'Saving Group' has also started and further to this, the project has also set up the "Income Generation and Environment Support Fund", which has already provided 19 communities across Ubon Ratchathani, Nakhon Ratchasima, Nakhon Sawan and Phetchabun Provinces with funds. At the same time the project is also providing assistance in arranging the "community forestry" in all of the project area communities For greening nation, PTT's strategy to make strengthen the community people (TFWN, 1999). Moreover, PTT has initiated "PTT Developing Village" or Moo Ban PTT Patana Project with the primary objective of raising the quality of life and income of the rural communities around PTT's Reforestation Areas and in the neighborhood of the Thai-Myanmar gas pipeline. As a result, up until present, more than 200 villages have been stronger and more self-dependent. PTT together with Village Foundation, Bank of Agriculture and Agricultural Cooperatives (BAAC) and National Science and Technology Development Agency (NSTDA) have jointly set up Community Enterprise Institute (CEI), a new entity to help strengthen community economic under a concept of self-reliance. PTT mentioned that they realized the importance and benefit of strengthening a community and fully supported the community enterprise. To enable CEI to initiate their works to achieve established objectives, a fund of Baht 10 million is delivered to CEI. Aside from the fund, PTT will provide marketing and promotion supports by distributing the community products to be available at PTT service stations nationwide as well as promote Human Resource Development to create an in-depth understanding on community relations to leading state enterprise, business sectors and PTT itself (Reforestation Project 1994).

Biodiversity Conservation and Forest Management

According to the World Conservation Strategy (WCS), in1980, the three objective emphasized are; 1) Essential ecological processes and life-support system must be maintained; 2) Genetic diversity must be preserved; 3) Any use of species or ecosystem must be sustainable. Thailand lies at the crossroads of South East Asia and the Pacific, and thus, relative to the size of the country, has a particularly rich biodiversity derived from both mainland's Asia and the Sundaic region to the south. There are suggestions that the country contains approximately six vascular plants in

the world (McQuistan 1999). In response to the threats to this biological heritage, the RFD established the first protected area (Khao Yai) in 1960. Since then, expansion of the protected area system has continued and today, almost eight million ha (16% of the country's land area) is included in the protected area system. Thailand now has a substantial area of its forest included in a protected area system, with 54 wildlife sanctuaries, 86 national parks and 45 non-hunting areas. However, recent analyses suggest that substantial gaps in coverage still exist (A. Ingles, pers. com.) In addition, effective management of the reserves is problematic because of the pressure on the resources by various groups including forest dwellers (often considered to be "illegal encroachers") and illegal loggers.

Many people live inside reserve boundaries (and in some cases have done so for many generations). This technically puts them into the category of illegal encroachers, and they are subject to eviction. Consequently there are very tense relations between local people and RFD staff. Many development NGOs and local religious figures have taken up the cause of the local people and promoted the idea that protected areas are anti-people. In extreme cases whole villagers have been forcibly removed from protected areas by the military and resettled elsewhere. However, this action has been strongly resisted by the people directly affected and various supporters among the NGO communities. Little attention has been paid to the question of biodiversity conservation in land use categories outside protected areas, but this is becoming an increasingly important topic for both policy debate and practical consideration (Jantakad and Gilmour 1999).

Stand Structure

Stand structure is the distribution of species and tree sizes on a forest area. The structure of a stand is the result of the species' growth habits and of the environmental conditions and management practices under which the stand originated and developed. There are two typical stands structures- even-aged and uneven-aged- although under natural forest conditions there are gradations between the two. An even age stand is a group of trees that has originated within a short period of time. The trees in an even-aged stand thus belong to a single age class. The limits of the age class may vary, depending on the length of time during which the stand the age class may vary, depending on the length of time during which the stand formed. A natural stand may seed-in over a period of several years. Rarely will an age class be only 1 year, except in plantations. More commonly, the age class for an even-aged stand will extend to 10or 20 years. In some cases, a stand may appear even-aged because the trees show size uniformity. Even-aged stands arise out of, or are perpetuated by, environmental conditions that allow trees to become established within a comparatively short, definable period. An even-aged forest may consist of several even-aged stands belonging to different age classes. The trees in an uneven-aged stand are fairly consistent in height, with variations depending on their crown position as dominant, co dominant, intermediate, or suppressed. The diameters in an even-aged stand show wider variation, although following a typical pattern. Most trees are closer near the average diameter, with decreasing frequencies at larger and smaller diameters. As even-aged stands grow older, the diameter class changes (Husch M.,

1982). A stand consisting of trees of many ages and corresponding sizes is said to be uneven-aged. The trees in an uneven-aged forest originate more or less continuously, in contrast to the single reproductive period characterizing an even-aged forest. This continuing source of new trees produces, in an undisturbed stand, trees of ages varying from germinating seedling to over mature veterans. In an uneven-aged forest, the trees in the crown canopy are of many heights, resulting in an irregular stand profile as viewed from a vertical cross section. The more shade-tolerant species tend to form uneven-aged stands (Husch, 1982).

Species Diversity

The word "Biodiversity" was coined by Prof E.O.Wilson to express total variation of life as a contraction of biological diversity (Prance, 1993, cited by Ogino, (1995). There are three levels of appearance of a single biological principle. Firstly, the diversity of habitat is an expression of degree of complexity of interactive organisms living as an ecosystem at present. Secondly, the diversity of species refers to the variety of organic lives, which have taken place through the evolution history from the past to the present. Finally, the genetic variation is the potential feature of variability of organisms or possibility to adopt to environmental changes to survive, which may be occurring in the near future (Ogino, 1995) Species diversity is a product of richness and evenness; it is species richness weighted by species evenness, and formulae are available which permit estimation of the diversity (Barbour et al., 1980). Species diversity may be thought of as being made up of two components. The first is the number of species in the community, which ecologists often refer to as species richness. The second component is species evenness or equitability. Evenness refers to how the species abundance (e.g. the number of individuals, biomass, cover, etc.) is distributed among the species as in a community composed of ten species, if 90% of the individuals belong to a single species and the remaining 10% are distributed among the nine other species, evenness would be considered low. On the other hand, if each of the ten species accounted for 10% of the total number of individuals, evenness would be considered maximum (Ludwig and Reynolds, 1988).

Over the years, a number of indices have been proposed for characterizing species richness and evenness. Such indices are termed richness indices and evenness indices. Indices that attempt to combine both species richness and evenness into a single value are as diversity indices The major criticism of al1 diversity indices is that they attempt to combine and, hence, confound a number of variables that characterize community structures such as: (l) the number of species, (2) relative species abundance (evenness), and (3) the homogeneity and size of the area sampled (James and Rathbun, 1981, cited by Ludwig and Reynolds, 1988)

Density

Density refers to the quantity of plants per unit area (Spurr and Barnes, 1973). This parameter relates to the counting of individuals per unit area (Mueller-Dombois and Ellenberg, 1974). It is usual to count the number of individuals within a series of randomly distributed quadrates, calculating the average number of individuals relative

to the size of quadrate used, from the total sample (Kershaw, 1973). It is equal to the number of square units of the total area divided by the individuals (Braun-Blanquet et al, 1932). The relative density is the density of one species as percent of total plant density (Barbour et a!., 1980) diameters of trunks noted. The total height, height to first living branch, lower limit of crown and width of crown are measured. From the measurements obtained an accurate scaled profile diagram can be obtained showing the spatial relation of the different species to each other both in a horizontal senses as well as a vertical sense (Kershaw, 1973).

Profile diagram can be used to illustrate details vertical spacing of species (Mueller- Dombois and Ellenberg, 1974) and has found particular application in illustrating the complexity of tropical rain forest (Spurr and Barnes, 1973). Moreover, profile diagram can also be usefully employed in vegetation of lower stature to illustrate the relationship between topography and the distribution of individuals of a species (Kershaw, 1973).

Soil Characteristics

Relief, parent materials, climate, timing and organism directly control soil characteristics. Soil texture is an important factor for tree growth due to the effect on available water, drainage, soil moisture content and aeration, although fine particles serve as the major source of nutrients. These effects are frequently reflected in the composition and the rate of growth of forest vegetation. This was supported by Carmean (1965), Grany and Ferguson (1971, 1973), Willet (l978), and Norris et a1.(1980).

Depth of surface soil also is an important factor for tree growth as it determines the soil volume available for root growth. Under normal conditions soil depth is not a factor of critical importance in forest growth but in mountains and hilly land the soil depth is often reduced by continuous denudation (Wilde, 1958). Surface soil is the A-horizon, where organic matter decomposes, so is fertile soil. For planting on a deep Ahorizon, the tree growth is increased. This was reported for teak (Yarwudhi, 1967; Bhumibhamon, 1967; Thaiutsa, 1967; Kaitpraneet, 1974), yellow poplar (Munn & Vimmerstedt, 1980), shortleaf pine (Grany & Ferguson, 1971) and white pine (Beck, 1971).

Soil chemical properties are particularly important in regard to tree growth. Many properties such as soil reaction (pH), organic matters, total nitrogen, etc, are recognized as essential for plant development (Rujireck, 1991).

The relationships between soil reaction value and tree growth were reported to differ. The effect of soil reaction is often drastically modified by the climatic conditions of the area, content of soil colloids, supply of nutrients and other conditions. Normally, plants cannot grow well on acidic soil and base saturated soil. Strongly alkaline soil exceeds pH 8.0 while a highly acidic soil is below pH 4.0. Soil suitable for trees has a reaction between pH 5.0 - 7.0 (Rujireck, 1991).

Organic matter is important. for improving physical properties, increasing water holding capacity, soil nutrients and reducing susceptibility to erosion in sandy soil Greenland and Dart (1972) found that water holding capacity decreased from 57 - 37 per cent when the soil organic matter decreased from 5 to 3 per cent. In traditional shifting cultivation systems, the soil is depleted of organic matter. Organic matter in soil supplies most of the nitrogen, maintains sulfur, and cation exchange capacity, blocks phosphorus fixation sites, improves structure in poorly aggregated soils and forms complexes with micronutrients. This is supported by Willet (1978), Brown and Loewenstein (1978), and Norris et a1.(1980).

Nitrogen has a niche in growth stimulation, strength, and leaf and stem growth extension. FAO 0971) indicated that only 13 per cent of the Worlds total nitrogen production is consumed in the Tropics. In 1971, 2.6, 1.3 and 0.2 million tonnes of nitrogen were used in tropical Asia, Tropical America and Tropical Africa respectively for irrigated rice, sugarcane, other plantation crops and some pastures. Sahunalu (1970) found that organic matter and nitrogen can be used to indicate quality class index.

Phosphorus is important for tree growth, root and root hair development, and increasing absorption of potassium. Deficiency of phosphorus is revealed by a degeneration of lateral buds, restricted branching and bronzing of foliage. (Blyth and MacLeod 0981) found that the quantity of nitrogen, phosphorus and organic matter was especially related to the growth of Sitka spruce.

Potassium is important in the transformation of carbohydrates, synthesis of proteins and cell division. A deficiency of potassium hinders the growth of roots and inhibits the normal development of foliage. In time, the leaves may become bronzed and scorched; they age prematurely and die at the tips or along the edges. The addition of potassium increases both the growth and vigour of trees. If sufficient, it enables plants to tolerate the dry season (Suwannapinunt, 1978).

MATERIALS AND METHODS

The present study was carried out at forest plantation target (FPT) Nos. 9 and 53 which located in Chachoengsao and Sakaeo provinces, respectively. Information of the study sites are described below.

Study Area

1. Amphoe Tha Takiap, Chachoengsao Province, (FPT 9)

Chachoensao is 82 km from Bangkok. The province has 11 districts, including Ta Takiab District. The study was conducted in three villages nearby the FPT 9, namely Nong Prue Kan Yang Village, Ang Toey Village, and Klong Mahaad Village (Figure 1). The PTT forest manager has encouraged people in these three villages out of 20 villages to participate in tree planting activities. People have produced silk and cotton for the OTOP (One Tambol One Product) program. The province has tropical monsoon with the annual rainfall of 1140-3562 mm. The numbers of rainy days were 119-122 days but varied from years to years. The mean temperature was 28.04 and relative humidity was 71.83 %. The metrological data was present in Table3.

The tracts reforested in honor of his Majesty the King in the Bang Pakong river basin are located in the Amphoe Tha Takiap, Chachoengsao Province in the Khwae Rabom-Siyat reserve forest and closed to the Khao Ang Rue Nai wildlife sanctuary. This area is part of the head water area of the Bang Pakong River, coming from the Huai Rong Nam Sap and flow on to Khlong Tha Lat, a smaller basin of the Bang Pakong, irrigating fields, supplying water for farms and people and supporting the fishery.

The reforested tracts near the reserve forests of Khawae Rabom-Siyat are on scattered hills. The mountains are rather long and steep slope. The plains are covered with farm fields, and are marked by scattered hills, which look like eggs fried sunny side up. Logging, farming and fires have damaged the forests. Natural woodlands remain only on the mountaintops, in valleys and along streams. Mostly, the forests are dry evergreen and mixed deciduous, with many *Lagerstroemia calyculata, L. floribunda, Irvingia malayana, Peltoforum dasyrachis, Pterocarpus macrocarpus*. The reforested tracts in Khao Ang Rue Nai are among rolling plains surrounded by mountains with green summits. There are some healthy dry evergreen forests on the mountains, but the plains' woodlands have been wiped out.

FPT 9 is located at Khwae Rabom-Siyat National Reserved Forest. Forest type is Dry Evergreen Forest with the total area of 1,005 Rai (approx. 402 acres). Enrichment planting was established in 1996 with indigenous species including *Pterocarpus macrocarpus*, *Afzelia xylocarpa, Peltophorum pterocarpum, Largerstroemia balansae, Irvingia malayana, Shorea henryana*, etc.

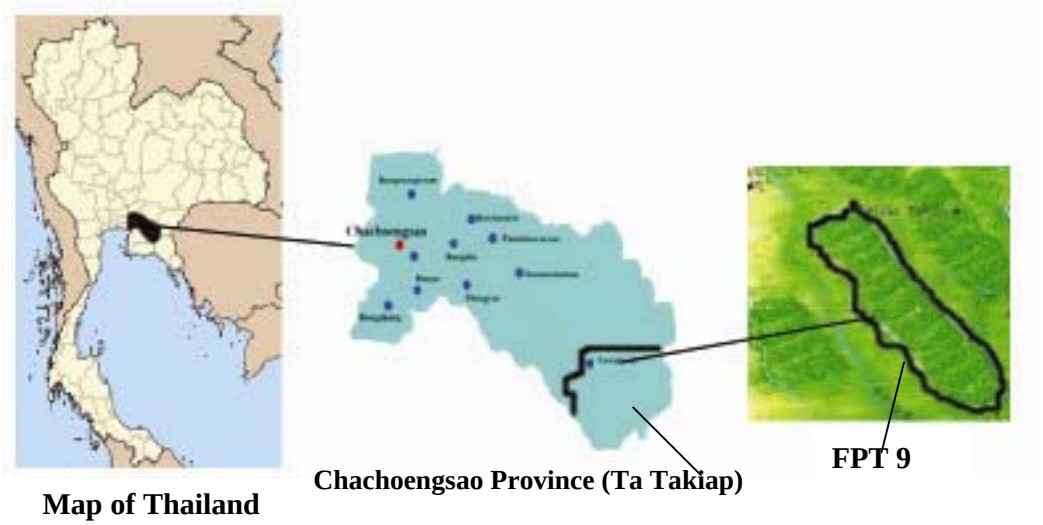

Figure 1 Map of FPT 9 at Amphoe Tha Takiap, Chachoengsao Province.

Table 3 Average of rainfall, air temperature and relative humidity at Chachoengsao Meteorological Station (1995-2004)

	Average climatic condition			
Month	Rainfall (mm)	Rainy day	Temperature (Celsius)	Relative humidity (%)
Jan	44.9	1.4	26.44	63.50
Feb	220.5	3.5	27.56	64.00
Mar	182.4	7.6	29.18	69.33
Apr	417.6	9.7	29.82	71.83
May	419.8	14.9	29.42	76.00
Jun	426.2	14.8	28.93	76.17
Jul	271.4	15.6	28.59	77.00
Aug	371.7	17.1	28.46	77.50
Sep	549.4	18.8	28.01	78.00
Oct	428.6	13.6	27.73	76.33
Nov	203.7	4.4	26.71	68.67
Dec	26	1.1	25.49	64.50
Total	3562.2	122.5	28.04	71.83

Source: The Meteorological Department, Ministry of Transport and communications (2006)

Since early 1995, the mountain forests have been restorated. More streams water the farm fields and feed .The pumps at the Khwae-Rabom and Siyat reservoirs and the La Lak dam. The valleys once a gain provides water for local people. Surrounding has three villages. Nong Prue Kan Yang Village is at the north, Klong Ma Haad Village is at the south and Ang Sue Dam Village at the west. The wild life,

too, when they can find food, water and habitat safe from poachers, will venture down from the highlands.

Local folks have joined PTT in raising awareness and improving their own quality of life. They joined fire prevention and PTT Forest Youth Guards, start community forests, put up signs forbidding hunting, tree, cutting and fires, and co-operate in conservation activities with local monks. Even so, they admitted that if PTT had not come to do the project, the land would certainly have been cleared for each crop growing. Some of them estimated that 90 percent of the woods are reforested. The PTT teams moved ahead in their task to help restorate the forests and to win the co-operation of local villagers. Figure-1

2. Amphoe Aranyaprathet, Sakaeo Province (FPT 53)

Sakaeo (256 kms from Bangkok) has the total area of 4.49 m Rai. The province consists of 9 districts, including Aranyaprathet district.

Sakaeo is the archeological site, about 4000 years ago. Sakaeo is the province offshoot from Prachin Buri. The name was originated from the pond where Chao Phraya Maha Kasat Suek (early name of King Rama the First) went to swim on his way to fight with Cambodian. Originally, it was the name of the village and upgraded to district in 1909 and province in 1993.

The tracts reforested in honor of His Majesty the King by PTT in the Ton Le Sap river basin include recovered woodlands in Ta Phraya and Khlong Hat of Changwat Sakaeo. These forests are the headwater regions of many streams and watercourses, including the Huai lai Noi, the Huai Yang, Huai Si-O, Huai Sap Ma Krot, Huai Khrai. Khlong Phrom Hot, Khlong Nam Sai, Khlong Wah and Khlong Sa Ton, which together create the Ton Le Sap river valley. Though it is a relatively small basin, these many rivers and streams provide irrigation in many farming areas such as Amphoe Pong Nam Ron in Changwat Chanthaburi and in Amphoe Ta Phraya, Khlong Hat, Watlhana Nakhon and Mueang of Changwat Sakaeo, before they finally flow into Cambodia's Lake Ton Le Sap. The areas, which had been reforested, had been encroached upon and devastated. Surrounding the FPT 53 has three villages. Nong Hua Chang, Chong Kum Village is at the north, Han Sai Village is at the south. Located among plains and gently rolling hills, these woodlands were badly deteriorated. These tracts, in which the soil is poor, loose and gravelly, are located along the Thai - Cambodian border. Figure 2.

FPT 53 is located at North of Khao Chakan National Reserved Forest; Forest type is Mixed Deciduous Forest with the total area of about 1,428 acres. Enrichment planting was established in 1994 with indigenous species including indigenous species: *Pterocarpus macrocarpus, Xylia xylocarpa var.kerrii, Shorea obtusa, Dipterocarpus tuberculatus, Azadirachta indica var.siamensis, Dipterocarpus alatus, Mangifera caloneura, Barringlonia coccinea Kostel, Shorea roxburghii, Peltophorum pterocarpum, Albizia procera, Dalbergia cochinchinensis,* etc. All of planted species

were the indigenous and some were pioneer species such as, *Eugenia pachyphylta*, *Dipterocarpus obtusitolius, Sindora siamensis, Acacia catechu,* etc.

The annual rainfall ranged between 1225.5 mm to 1373.80mm. The number of rainy days was 126 days. The temperature ranged between 27.60-29.8 Degree Celsius (Table 4). The study was conducted in four villages nearby the FPT 53. These four villages are of Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9 (Figure 2).

Table 4 Average of rainfall, air temperature and relative air moisture at Aranyaprathet (Sakaeo) metrological station (during 1999-2004)

Month	Average climatic condition			
	Rainfall (mm)	No of rainy day	Average Temp.(Celsius)	Relative humidity (%)
Jan	10.90	1.60	25.967	69.00
Feb	45.34	3.20	27.367	67.83
Mar	48.13	6.20	28.750	73.33
Apr	101.09	10.10	29.567	76.00
May	158.97	15.60	28.433	83.33
Jun	188.62	15.90	27.867	84.50
Jul	166.64	17.50	27.700	85.17
Aug	195.04	18.10	27.550	85.83
Sep	271.72	19.80	27.167	86.67
Oct	155.28	13.50	27.000	83.83
Nov	32.59	4.40	25.783	75.50
Dec	3.04	0.90	25.683	69.83
Total	1373.80	126.80	27.403	78.40

Source: The Meteorological Department, Ministry of Transport and communications (2006)

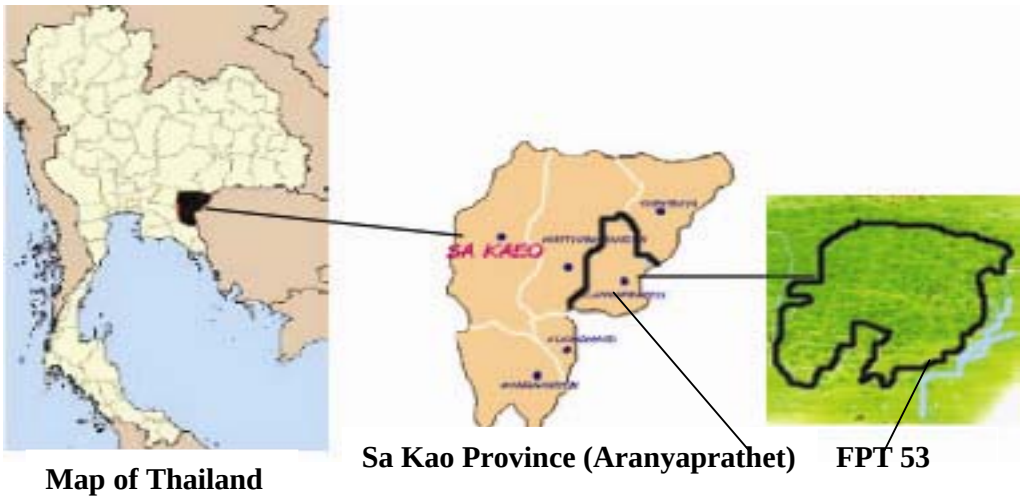

Figure 2 Map of FPT 53 Amphoe Aranyaprathet, Sakaeo Province

Methods

1. Plant Diversity

The study sites in FPT-9 and FPT-53 areas were selected based on areas least disturbed by human activities and represent the topography, environmental factors, and forest types found in the area. The two permanent sample plots with a size of 40 X 40 m^2 (or 1 Rai) were established in each study sites.

Permanent sample plots (size 40 X 40 m^2) were studied by applying Relative method of Muller – Domois and Ellenburg (1974) which are categorized as follows:

Each permanent sample plot was divided into 16 quadrates (10 X 10 m^2) to study all trees. In each quadrates, every tree having a diameter at breast height (DBH, 1.30 m above ground level) greater than 4.5 cm was measured and recorded its local name. Plastic numbering labels were tagged onto the trees at DBH level. Total height (H) of trees was measured by using Sunto. DBH of trees were measured with the diameter tape.

Plots sized 4 X 4 m^2 were established on the four corners of each permanent plot. Plastic numbering labels were tagged on each sapling that is over 1.30 m high but fewer than 4.5 cm DBH and recorded local name and total height of saplings.

Plots sized 1 X 1 m^2 were established on the four corners of each permanent plot. Plastic numbering labels were tagged on each seedling.

Plots sized 10 X 40 m^2 were established in each of permanent plot study the profile diagram of plant community. The crown cover, crown shape and tree position were sketched for crown projection diagram and profile diagram along the belt transect of 10 X 40 m^2 plot in each permanent sample plot.

In this study, some quantitative ecological methods will be used such as the Important Value Index (IVI) to show the number dominant species of the forest rehabilitation area.

The Important Value Index (IVI) (Cottam, 1949) of a plot was determined as:

$$IVI = \text{Relative density} + \text{Relative frequency} + \text{Relative dominance}$$

Where,

$$\text{Relative density} = \frac{\text{Density of species i}}{\text{Total plant density}} \times 100$$

$$\text{Density} = \frac{\text{Number of all individual of species}}{\text{Quadrate size}}$$

$$\text{Relative frequency} = \frac{\text{Frequency of species i}}{\text{Total frequency of all species}} \times 100$$

Frequency = $\frac{\text{Number of quadrate that species i occurred}}{\text{Number of all quadrate}}$

Relative dominance = $\frac{\text{Total basal area of species i}}{\text{Total basal area of all species}} \times 100$

Relative density was determined from all standing trees with DBH (D) larger than 4.5 cm in all the 40 x 40 m^2 plots. Relative frequency was determined for sixteen 10 x l0 m^2 subplots set by regularly subdividing the 40 x 40 m^2 plot. Relative dominance was obtained from the basal area at breast height, computed as $\pi D^2/4$, of each tree in the whole plot.

Fisher's Index of Diversity, (α) (Fisher et at., 1943; Shinozaki, 1983)

$$S = \alpha \ln^{(1+n/a)}$$

Where,

S = Number of species in a sample area
n = Number of individuals in the same area
α = Fisher's Index of Diversity

Shannon-Wiener Index of Diversity, H (Shannon and Weaver, 1949)

$$H = -\sum_{i=1}^{N} (p_i \log_2 pi))$$

Where,

P_i = Proportion of the number of species i^{th} to the total number of individuals of all species

N = Total number of species in the sample area

Simpson's Index, (D) (Simpson, 1949)

$$D = 1 - \frac{\sum_{i=1}^{N} n_i(n_i - 1)}{N(N-1)}$$

Where,

n_i = Total number of each species
N = Total number of individuals of all species

Richness Index (R_1) or Margalef's Index (Margalef, 1958) and Richness Index^2 (R_2) or Menhinick's Index (Menhinick, 1964).

$$R_1 = \frac{S-1}{\ln(n)}$$

$$R_2 = \frac{S}{\sqrt{n}}$$

Where,

S = Total number of all species

N = Total number of individuals of all species

Diversity Index (Hill, 1973; Ludwig and Reynolds, 1988)

N_o = S

N_1 = e^H

N_2 = $\frac{1}{\lambda}$

Where,

S = Total number of all species in sample plot (No)

N_1 = Number of abundance species in the same area

N_2 = Number of very abundance species in the same area which normally $N_2 < N_1 < N_o$

H' = Shannon's Index

H = $-\sum\left[\left(\frac{n_1}{n}\right)\ln\left(\frac{n_i}{n}\right)\right]$

Where,

n_1 = The number of individuals belonging to the ith of S species in the sample

N = The total number of individuals in the sample

λ = Simpson's Index (adjusted by Hill, 1973)

λ = $\frac{\sum_{i=1}^{N} n_1(n_1-1)}{N(N-1)}$

Where,

n_i = Total number of each species

N = Total number of individuals of all species

Evenness Index (Hill, 1973)

E_1 = $\frac{H'}{\ln(s)}$ = $\frac{\ln(N_1)}{\ln(N_0)}$

E_2 = $\frac{e^H}{S}$ = $\frac{(N_1)}{(N_0)}$

E_3 = $\frac{e^H-1}{S-1}$ = $\frac{(N_1)-1}{(N_0)-1}$

$$E_4 = \frac{1/\lambda}{e^{H}} = \frac{N_2}{N_1}$$

$$E_5 = \frac{(1/\lambda)-1}{e^{H}-1} = \frac{N_2-1}{N_1-1}$$

Where,

S	=	Total number of all species in sample plot (N_o)
N_1	=	Number of abundance species in the same area
N_2	=	Number of very abundance species in the same area, which normally N2<N1<No
H’	=	Shannon's Index
λ	=	Simpson's Index (adjusted by Hill, 1973)

2. Soil Sample Collection

The pits were approximately 1.5 m by 2.5 and 2.0 m deep or to lithic and paralithic layers. The soil profile face was cut vertically, cleaned, describe morphologically. In each pits the soil was taken from four corner and middle of a plots. Bulk samples of the various horizons were placed in plastic bags for transport to the laboratory at Faculty of Forestry, Kasetsart University. The lower horizons were collected first in order to avoid contamination from overlying horizons. These samples were used for soil physical and chemical properties analysis.

3. Data Collection Instrument

In this research, participant observation method and field study is essential for data analyzing. In the field study, structured interview schedule was used as research instrument to elicit appropriate responses from the respondents. The interview consists of three points, including like socio-economic and demographic characteristics of the respondents, their socio-psychological characteristics, type of participation, daily activities clock etc. The interview schedule and questionnaires will be prepared in English and translated into Thai language to collect more accurate data during actual interview. An in-depth interview will be also conducted with the village committee and women committee.

4. Secondary Data Collection procedure

Secondary data will be collected from different documents, reports and records of different department like Provincial Forest Department Office, Petroleum Public Company of Thailand, Department of Agriculture, and Land Development Department etc. Thailand National Forest Policy and other literatures related to forest resources management are the sources of secondary data of the research which will be collected from Internet searching and library.

5. Population and Sampling Techniques

Population of the study about the attitude of the stakeholders toward the rehabilitation project were Forester of RFD, PTT staffs, and Villagers who were the local villagers of the villages, near the FPT 9(Chachoengsao) and FPT 53(Sakaeo), Thailand. The three sets of interview schedule were formulated to facilitate the study about the attitude of villagers (set1), Forester (set 2), and PTT staffs (set 3) in Appendix (E, F, and G).

The unit of the respondents for the interview schedule set 1 was household (HH) of the villages and samples were selected from the representative of the household. Multi stage sampling technique was used to analysis. The stages of sampling were as follows:

1. Samples were selected randomly from populations where populations were the villages near the FPT 9 and FPT 53. In the study area there were 3 and 4 villages at near the FPT 9 and FPT 53.

2. In this stage samples were selected randomly from populations where populations were the total households in selected 3 sample villages in FPT 9 and 4 sample villages in FPT 53. Total 118 (FPT 9) and 120 (FPT 53) households were selected randomly as samples. The household was unit of analysis. The representative from the selected households (samples) was considered for interview as interviewee. Sketch map of FPT 9(Chachoengsao) and FPT 53(Sakaeo) indicating villages near the rehabilitated area, Figure 2 and 3.

3. The unit of the respondents for the interview schedule set 2 and set 3 were individual of the respondents and samples were randomly from the Forest District Office and PTT Head Quarter. Interview took from 17 Foresters of Government Agencies and 20 PTT staffs. In this stage samples were selected randomly, who worked in FPT areas and questionnaires were send by post.

5.1 Data Analysis

Both qualitative and quantitative data will be collected and analyzed in this study. After getting both qualitative and quantitative data from the household survey, data will be analyzed by using SPSS/windows, which offered statistical tools applied to social sciences. The data will be combined and summarized in tabular form using Excel. Some statistical test will be applied to test the hypothesis.

Conceptual Frame Work

From the literature review, related research and the background information of rehabilitation forest in FPT 9 (Chaochoengsao) and FPT 53 (Sakaeo) and in this study the 3rd objective (To study about the attitude of various stakeholders on the performance of PTT and the success of forest rehabilitation) could be achieved based on the conceptual frame work presented in the Figure 3.

Participation and performance of State enterprise (PTT) was the key to success of rehabilitation manage mental development project in FPT 9 (Chaochoengsao) and FPT 53 (Sakaeo), with the active involvement of local people, making the project sustainable. PTT's viewed that urging native people (who live near the forest) whose life quality is considerably low to strongly and continually take care the reforest land seem to be a paradox. So for this reason PTT established supplementary project wishing to improve the people's quality of life and to have income and appropriate occupation. Therefore participation of State enterprise (PTT) in the rehabilitation forest had been considered as a main focus of study.

The review of studied revealed that PTT's participation in a Royal Golden Jubilee Rehabilitation Project was a successful project in Thailand. Behind of this success different types of PTT's strategies were involved. In this studied it was hypothesized that State enterprise (PTT) participated and in conservation activities and that performance is related to the factors such as appropriate management practices of PTT, reforestation campaigns aware for people, peoples involved in Royal Golden Jubilee Rehabilitation Project, Community self reliant and respondents age. Also got conceptual thinking of government agencies' officer and PTT staff about the participation and performance of State enterprise (PTT) success of rehabilitation manage mental development project. Here the relationship of the independent variables and dependent variables were shown below.

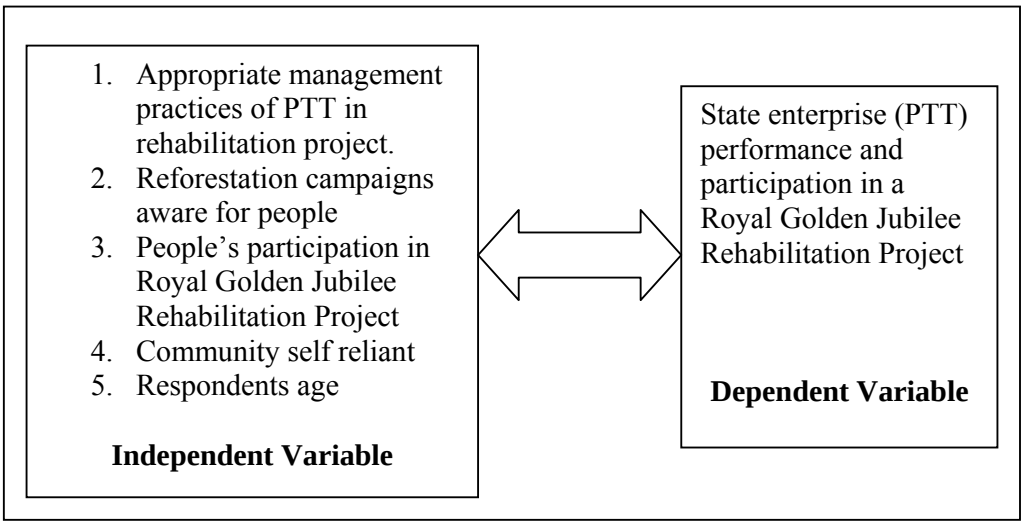

Figure 3 Conceptual Frame Work.

Hypothesis

1. Correlation between State enterprise (PTT) and PTT gave appropriate management practices for rehabilitation Project at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo).

2. Correlation between State enterprise (PTT) and PTT Reforestation Campaign for aware, occurred in village for rehabilitation Project at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo).

3. Correlation between State enterprise (PTT) and Peoples Involved in Royal Golden Jubilee Rehabilitation Project, occurred in village for rehabilitation Project at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo)

4. Correlation between State enterprise (PTT) and Community self reliant, at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo)

5. Correlation between State enterprise (PTT) and respondent's age, at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo)

RESULTS AND DISCUSSION

The results of the study on community based forest rehabilitation – a lesson learnt from Petroleum Public Company (PTT) were showed and discussed in the two sections. In first section, based on obtained forest assessment data, the plant diversity and soil characteristics of rehabilitated area at FPT 9 (Chachoengsao) and FPT-53 (Sakaeo) were described. Second section, describes about the attitude of stakeholders towards rehabilitation project based on data obtained from interview schedule.

First Section: Plant Diversity

1. Plant Diversity

1.1 Structural Characteristics

The data were collected from permanent sample plots I and II established in FPT9, and FPT 53, the quantitative characteristics of trees with DBH larger than 4.5 cm, saplings with DBH smaller than 4.5 cm and higher than 1.3 m, and seedlings with height lower than 1.3 m in height were illustrated in Tables 5, 6, 7, 8, 9, 10 and 11 respectively.

1.2 Plant Composition

FPT 9: A total of 195 tree species and were found in 3,200 m^2 of the study area and these were presented in Table11, 12, and 13. There were 21 and 30 tree species in Plot I and Plot II, respectively, and 31 tree species were common to both plots.

FPT 53: A total of 435 tree species and were found in 3,200 m^2 of the study area and these were presented in Table14, 15, and 16. There were 22 and 20 tree species in Plot I and Plot II, respectively, and 34 tree species were common to both plots.

In these two areas FPT 53 is more trees than FPT 9. But the number of tree species more or less same. But the species of the two places are different. After degraded the area these tree are planted in 1994 at FPT 53 and 1996 at FPT 9.

FPT 9: Table 17 shows a total of 43 saplings species in the four 4 x 4 m^2 plots while there are 21 and 22 sapling species, no of species 7 and 12respectively, in Plots I and II (summarized in Table 6).

FPT 53: Table 18 shows a total of 50 saplings species in the four 4 x 4 m^2 plots while there are 39 and 11 sapling species, no of species 6 and 5, respectively, in Plots I and II FPT 9:)

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Table 5 Quantitative characteristics of Trees in FPT 9 (Chachoengsao)

Quantitative characteristics	Plots		FPT 9
	I	II	
Number of trees(per sample plot area)	73	122	97.5
Number of Species(per sample plot area)	21	30	25.5
Density of trees	456.25	762.5	609.375
Percent of basal area per plot area	0.074	0.067	0.071
Basal area(per sample plot area)	1.188	1.077	1.133
Average Height	8.082	6.513	7.297
Basal area(per ha)		6.736	

Table 6 Quantitative characteristics of trees in Sakaeo

Quantitative characteristics	Plots		FPT53
	I	II	
Number of trees(per sample plot area)	227	208	217.5
Number of Species(per sample plot area)	22	21	21.5
Density of trees	1418.75	1300	1359.375
Percent of basal area per plot area	0.111	0.160	0.136
Basal area(per sample plot area)	1.784	2.553	2.168
Average Height	6.095	6.066	6.080
Basal area(per ha)	11.147		

Table 7 Quantitative characteristics of Saplings in Chachoengsao

Quantitative characteristics	Plots		FPT-9
	I	II	
Number species (per sample plot area)	13	15	14
Number of saplings (per sample plot area)	21	22	21.5
Density of saplings (per ha)	13125	13750	13437.5
Average height (m)	1.07	1.44	1.255
Shannon's Index	22.839	45.513	34.176

Table 8 Quantitative characteristics of saplings in Sakaeo

Quantitative characteristics	Plots		FPT-53
	I	II	
Number species (per sample plot area)	7	5	6
Number of saplings (per sample plot area)	39	11	25
Density of saplings (per ha)	390000	11000	25000
Average height (m)	1.59	3.49	2.54
Shannon's Index	27.216	14.489	20.853

Table 9 Quantitative characteristics of seedlings in Chachoengsao

Quantitative characteristics	Plots		FPT 9
	1	II	
Number species (per sample plot area)	6	7	6.5
Number of seedlings(per sample plot area)	13	15	14
Density of seedlings (per ha)	130000	15000	14000
Average height (m)	0.11	0.71	0.41
Shannon's Index	17.617	22.955	20.286

Table 10 Quantitative characteristics of seedlings in Sakaeo

Quantitative characteristics	Plots		FPT-53
	1	II	
Number species (per sample plot area)	2	4	3
Number of seedlings (per sample plot area)	10	5	7.5
Density of seedlings(per ha)	100000	50000	75000
Average height (m)	0.16	0.32	0.24
Shannon's Index	3.473	2.321	2.897

Table 11 Total basal area (BA) and number (No.) of individual tree species in FPT 9 (Chachoengsao). Plots I and Plot II

Tree No.	Scientific names	Local names	BA(m^2)	Number of .sp.
1	*Peltophorum dasyrachis*	A rang	0.008	1
2	*Dollichandrone spathacea*	Khae pa	0.126	14
3	*Artocarpus rigiclus*	Khanoon pan	0.452	3
4	*Vitex glabrata*	Khao nao	0.038	1
5	*Senna siamea*	Khelek	0.038	19
6	*Zollingeria dongnaiensis*	Khenon	0.025	5
7	*Makhamia stipula*	Khe Hang kang	0.017	3
8	*Xrospermum noronhianum*	Kholaen	0.016	5
9	*Cassia fistula*	Koon	0.016	2
10	*Irvingia malayana*	Krabak	0.008	2
11	*Careya sphaerica*	Kradon	0.004	1
12	*Suregada multiflorum*	Kraduk	0.003	1
13	*Artocarpus lacoocha*	Mahat	0.032	1
14	*Afzelia xylocarpa*	Makha mong	0.023	6
15	*Phyllanthyus embrica*	Makhamo pom	0.006	2
16	*Diospyros mollis*	Maklua	0.003	1
17	*Wrightia arborea*	Mok man	0.018	5
18	*Azadirachta indica*	Neem(Sadao)	0.099	11
19	*Peltophorum dasyrachis*	Non see pa	0.004	1
20	*Lasia spinosa*	Phak nam	0.006	1
21	*Microcos tomentosa*	Phlab phla	0.080	13
22	*Pterocymbium macranthum*	Po-e-keng	0.033	3
23	*Pterocarpus macrocarpus*	Pradupa	0.110	41
24	Unknown	Sakam	0.014	2
25	*Lagerstoemia loudonii*	Salao	0.002	1
26	*Acacia catechu*	Sesiat kaen	0.144	20
27	*Hymenodictyon orixense*	Somkop	0.069	11
28	*Lagerstroemia floribunda*	Tabaek	0.017	5
29	*Garuga pinnata*	Takhram	0.064	9
30	*Albezia procera*	Thonmui	0.045	4
31	*Cratoxylum formosum*	Tiu	0.007	1
	Total		1.541	195

Table 12 Basal area and number of individual tree species in FPT 9 (Chachoengsao) Plot.I

Tree No.	Scientific names	Local names	BA(m^2)	Number of Sp.
1	*Dollichandrone spathacea*	Khae pa	0.014	2
2	*Artocarpus rigidus*	Khanoon pan	0.452	3
3	*Vitex glabrata*	Khao nao	0.038	1
4	*Senna siamea*	Khelek	0.212	16
5	*Zollingeria dongnaiensis*	Khenon	0.025	2
6	*Makhamia stipula*	Khi khao	0.017	1
7	*Xerospermum noronhianum*	Kholaen	0.003	1
8	*Careya sphaerica*	Kradon	0.004	1
9	*Suregada multiforum*	Kraduk	0.003	1
10	*Artocarpus lacucha*	Mahat	0.032	1
11	*Afzelia xylocarpa*	Makha mong	0.023	5
12	*Phyllanthxus embrica*	Makham pom	0.006	2
13	*Diospyros mollis*	Makluea	0.003	1
14	*Wrightia arborea*	Mok man	0.011	3
15	*Peltophorum dasyrachis*	Non see pa	0.004	1
16	*Microcos tomentosa*	Phlab phla	0.006	2
17	*Pterocymbium macranthum*	Po-e-keng	0.033	3
18	*Pterocarpus macrocarpus*	Pradupa	0.11	13
19	*Acacia catechu*	Sesiat kaen	0.132	9
20	*Hymenodictyon orixense*	Somkop	0.006	1
21	*Albizia procera*	Thon	0.045	4
	Total		1.188	73

Table 13 Basal area and number of individual tree species in FPT-9 (Chachoengsao) Plot.II

Tree No.	Scientific names	Local names	BA(m^2)	Number of individual tree species
1	*Peltophorum dasyrachis*	A rang	0.008	1
3	*Irvingia malayana*	Krabok	0.008	2
4	*Dollichandrone spathacea*	Khae pa	0.126	12
5	*Senna siamea*	Khelek	0.038	3
6	*Zollingeria dngnaiensis*	Khenon	0.015	3
7	*Makhamia stipula*	Khi khao	0.004	2
8	*Xerospermum noronhianum*	Kholaen	0.016	4
9	*Cassia fistula*	Khoon	0.016	2
10	*Afzelia xylocarpa*	Makha mong	0.002	1
11	*Wrightia arborea*	Mok man	0.018	2
12	*Azadirachta indica siamensis*	Neem(Sadao)	0.099	11
13	*Lasia spinosa*	Phak nam	0.006	1
14	*Microcos tomentosa*	Phlab phla	0.080	11
15	*Pterocarpus macrocarpus*	Pradu pa	0.314	28
16	Unknown	Sakam	0.014	2
17	*Lagerstoemia loudonii*	Salao	0.002	1
18	*Acacia catechu*	Sesiat kaen	0.144	11
19	*Hymenodictyon orixense*	Somkop	0.069	10
20	*Lagerstroemia floribunda*	Tabaek	0.017	5
21	*Garuga pinnata*	Takhram	0.064	9
22	*Cratoxylum formosum*	Tiu	0.007	1
	Total		1.077	122

Table 14 Total basal area (BA) and number of individual tree species in FPT-53 Sakaeo

Tree No.	Scientific Names	Local name	BA (m^2)	Number of individual tree species		
				Plot I	Plot II	Total
1	*Dalbergia nigrescens*	Cha nuan	0.242	27		27
2	*Diospyrus decandra*	Chan	0.055	6		6
3	*Tristaniopsis burmanica*	Kao	0.011	1	1	2
4	*Stereospermum colias*	Khae hin	0.005	2		2
5	*Suregada multiflorum*	Khan thong phyabat	0.014		4	4
6	*Cotylelobium lanceolatum*	Khiam	0.829		4	4
7	*Haldina cordifolia*	Khwao	0.007		2	2
8	*Lithocarpus polystachyus*	ko nok	0.027	7		7
9	*Anisoptera costata*	Krabok	0.040	5		5
10	*Catunaregam tomentosa*	Ma khet	0.001	1		1
11	*Parinari anamense*	Ma phok	0.660	45	38	83
12	*Arthocarpus lacucha*	Mahat	0.008		3	3
13	*Lepisanthes rubiginosa*	Mahuat	0.089		19	19
14	*Spondias pinnata*	Makokpa	0.010		2	2
15	*Mangifera indica*	Mamuang	0.055	1	2	3
16	*Litsea glutinosa*	Mi men	0.004	1		1
17	*Memecylon plebejum*	Mueat chi dong	0.048		2	2
18	*Azadirachta indica*	Neem(Sadao)	0.007		1	1
19	*Peltophorum dasyrachis*	Non see pa	0.078		13	13
20	*Pterocarpus macrocarpus*	Padu	0.075		9	9
21	*Calophyllum polyanthum*	Pha ong	0.007	2		2
22	*Shorea siamensis*	Phayom	0.787	87	2	89
23	*Microcos tomentosa*	Phlab phla	0.201	2	19	21
24	*Diospyros undulata*	Phlap Khao	0.079		8	8
25	*Rhodamnia dumetorum*	Phlong kaemon	0.010	5		5
26	*Ziziphus mauritiana*	Phutsa	0.049	1	4	5
27	*Millingtonia hortensis*	Pip	0.018	1		1
28	*Cratoxylum cochinchinse*	Tio kliang	0.008	1	1	2
29	*Cratoxylum formosum*	Tiu	0.245	10	26	36
30	*Dipterocarpus obtusifolius*	Yang hiang	0.030	4	3	7
	Total		4.336	227	208	435

Table 15 Basal area and number of individual tree species in FPT53 (Sakaeo) Plot-I

Scientific Names	Local Name	BA(m^2)	Number of individual tree species
Dallbergia nigrescens	Cha nuan	0.242	27
Diospyrus decandra	Chan	0.056	6
Tristaniopsis burmanica	Kao	0.009	1
Stereospermum colias	Khae hin	0.006	2
Lithocarpus polystachyus	ko nok	0.028	7
Anisoptera costata	Krabok	0.040	5
Catunaregam tomentosa	Ma khet	0.002	1
Paninari anamensis	Ma phok	0.369	45
Mangifera indica	Mamuang	0.050	1
Litsea glutinosa	Mi men	0.005	1
Calophyllum polyanthum	Pha ong	0.007	2
Shorea siamensis	Phayom	0.771	87
Microcos tomentosa	Phlab phla	0.005	2
Rhodamnia dumetorum	Phlong kaemon	0.011	5
Ziziphus mauritiana	Phutsa	0.002	1
Millingtonia hortensis	Pip	0.018	1
	Pok	0.019	2
Ptercarpus macrocarpus	Pradu	0.102	16
Cratoxylum cochinchinse	Tio kliang	0.005	1
Cratoxylum formosum	Tiu	0.025	10
Dipterocarpus obtusifolius	Yang hiang	0.014	4
Total		1.784	227

Table 16 Total basal area (BA) and number of individual tree species in Sakaeo Plot-II

Scientific Names	Local Name	BA(m^2)	Number of individual tree species
Tristaniopsis burmanica	Kao	0.002	1
Suregada multiflorum	Khanthong phyabat	0.015	4
Cotylelobium lanceolatum	Khiam	0.830	4
Haldina cordifolia	Khwao	0.007	2
Parinari anamense	Ma phok	0.291	38
Arthocarpus lacucha	Mahat	0.008	3
Lepisanthes rubiginosa	Mahuat	0.090	19
Spondias pinnata	Makokpa	0.011	2
Mangifera indica	Mamuang	0.006	2
Memecylon plebejum	Mueat chi dong	0.049	2
Azadirachta indica siamensis	Neem(Sadao)	0.008	1
Peltophorum dasyrachis	Non see pa	0.079	13
Shorea siamensis	Phayom	0.017	2
Microcos tomentosa	Phlab phla	0.196	19
Diospyras undulata	Phlap Khao	0.080	8
Ziziphus mauritiana	Phutsa	0.048	4
Ptercarpus macrocarpus	Pradu	0.575	54
Cratoxylum cochinchinense	Tio kliang	0.004	1
Cratoxylum formosum	Tiu	0.221	26
Dipterocarpus obtusifolius	Yang hiang	0.017	3
Total		2.553	208

Table 17 Number of individual saplings species in FPT-9 (Chachoengsao)

Scientific name	Local names	Number of individual Sapling species
Makhamia stipula	Khi khao	1
Xerospermum	Kholaen	4
Cassia fistula	khoon	2
Lepisanthes rubiginosa	Mahuat	4
Antidesma ghaesembilla	Mamao	8
Wrightia arborea	Mok	1
Oroxylum indicum	Pheka	1
Microcos tomentosa	Phlab phlae	1
Croton robustus	Plao	2
Pterocymbium macranthum	Po-e-keng	5
Broussonetia papyrifera	Po krasa	1
Pterocarpus macrocarpus	Pradu pa	3
Unknown	Sa thit	1
Acacia catechu	Sesiat kaen	2
Sindora siamensis	Ma Kha Tae	1
Hymenodictyon orixense	Somkop	2
Vitex pinnata	Teen nok	4
Total		43

Table 18 Number of individual saplings species in FPT- 53 (Sakaeo)

Scientific name	Local name	Number of individual Sapling species
Antiaris toxicaria	Nong	1
Cratoxylum sp.	Tew	7
Cratoxylum sp.	Tew	10
Dielinia obovata	San	1
Memecylon myrsinoides	Pholong Khaem on	2
Nauclea orientalis	Krathum num	1
Pterocarpus macrocarpus	Padu	22
Pterocarpus macrocarpus	Pradu	1
Shorea roxburghii	Payom	2
Tristaniopsis burmanica	Tam sao nu	2
Tristaniopsis burmanica	Kao	1
Total		50

Table 19 Number of individual seedlings species in FPT-9 (Chachoengsao)

Scientific name	Local name	Number of individual Seedling species
Micromelum mimutum	Hu sakum	1
Zollingeria dongnaiensis	Khenon	1
Xerospermum laevigatum	Kholaen	3
Harrisonia perforata	Khonta	2
Suregada multiflorum	Kraduk	1
Diospyros mollis	Makluea	1
Antidesma ghaesembilla	Mamao	1
Syzizium granade	Mao	1
Oroxylum indicum	Pheka	3
Pterocarpus macrocarpus	Pradupa	1
Acacia catechu	Sesiat kaen	11
Total		28

Table 20 Number of individual seedlings species in FPT-53 (Sakaeo)

Scientific name	Local name	Number of Seedling
Ptercarpus macrocarpus	Pradu	9
Rhodamnia dumetorum	Phlong kaem on	1
Peltoforum dasyrachis	A-rang	2
Diospyros variegata	Phaya Rakdum	1
Pavetta indica	Khempa	1
Micromelum mimutum	Husakhun	1
Total		15

In this two study areas FPT 53 has more number of saplings than FPT-9. But the species of the two places are different. All of these species are naturally grown up in both places.

FPT 9: The number of seedlings in eight 1x1 m^2 plots, there were 28 species with 13 and 15 seedling species found, in Plots I and II respectively (Table 19).

FPT53: The number of seedlings in eight 1x1 m^2 plots, there were 15 species with 10 and 5 seedling species, in Plot I and Plot II respectively (Table 20).

In these two areas FPT 9 has more number of seedlings than FPT 53. All of these species are naturally grown up in both places. However, the seedlings of these areas are not match with trees of these areas. Actually these seedlings are grown by the dispersal through birds or other animals.

1.3 Density of Trees

The density of trees in FPT 9 and FPT 53 was 609.375and 1359.375 trees per ha. In FPT 9 there were 762.5 and 456.25 trees per ha in Plots I and II and was 1418.75 and 1300 trees per ha in Plots I and II, of FPT 53 respectively.

Density of trees of FPT 53 is more than FPT 9. The previous studies showed differences in density of trees in various sites. The density of trees in Ban Thung Soong Community Forest was 1,638 trees per ha (Sawatdee, 2002), in the Tropical rain Forest in Khao Chong Nature and Wildlife Study Centre, Trang and Khao Pra Taew Wildlife Park, Phuket, altitude 50, 250 and 450m above 818, 1, 1034, 1,546, 1,059 and 834 trees per ha, respectively (Kiratiprayoon, 1986) and Khao Sok 1,350 trees per ha (Bunnasopits, 1989).

The density of saplings in FPT 9 Community- based Rehabilitated Forest, there was 13437.5 trees per ha with 13125 and 13750 trees per ha in plots I and Plot II, respectively. The density of saplings in FPT 53 Community- based Rehabilitated Forest, there was 250000 trees per ha with 39000 and 110000 trees per ha in plots I and Plot II, respectively.

Therefore, the Density of saplings of FPT 53 is more than FPT 9. The differences are densities of seedlings were previously reported in other investigation. The density of saplings in Ban Thung Soong Community Forest was 18,906 per ha (Sawatdee, 2002), in the Tropical rain Forest in Khao Chong Nature and Wildlife Study Centre, Trang and Khao Pra Taew Wildlife Park, Phuket, altitude 50, 250 and 450m above 8,457, 5,722, 9,082, 9414 and 10,175 trees per ha, respectively (Kiratiprayoon, 1986) and Khao Sok 1,350 trees per ha (Bunnasopits, 1989).

Furthermore, the density of seedlings in FPT 9 Community- based Rehabilitated Forest, there was 140000 trees per ha with 130000 and 150000 trees per ha in plots I and Plot II, respectively. The density of saplings in FPT 53 rehabilitated forest, there were 75000 trees per ha with 100000 and 50000 trees per ha in plots Plot II, and I respectively.

In FPT 9 (Chachoengsao) there were more seedlings per ha than FPT 53 (Sakaeo). Other previous studies also reported different amount of seedlings in other part of the country. Such as the density of saplings in Ban Thung Soong Community Forest was 141,250 trees per ha (Sawatdee, 2002), in the Tropical rain Forest in Khao Chong Nature and Wildlife Study Centre, Trang and Khao Pra Taew Wildlife Park, Phuket, altitude 50, 250 and 450m above 7,093, 7,062, 10,875, 5,092, 5,406 and 6,937 trees per ha, respectively (Kiratiprayoon, 1986) and Khao Sok 1,350 trees per ha (Bunnasopits, 1989).

1.4 Percentage of Basal Area

The basal area coverage in FPT 9 Community- based Rehabilitated Forest was 0.71 percent. The basal area coverage in FPT 53 rehabilitated forest was 0.135 percent. In FPT 9 trees were little bigger than FPT 53 trees. In both places size of the trees were small and thus lower percent of basal area.

1.5 Diameter Distribution

The diameter of trees in each permanent sample of FPT 9 and FPT 53 (Figures 5, 6 and Figure 4 and 5 and Tables 21, 22 23 and 24) was demonstrated in the inverse J-shape or L-shape distribution pattern.

These indicated that the community forest was in a stationary stage or regenerating well, as same as in the Ban Thoong Soong Community forest (Sawatdee, 2002), Tropical Rain Forest in Khao Chong Nature and Wildlife Study Center, Trang and Khao Pra Taew Wildlife Park, Phuket (Kiratiprayoon, 1986), and Kao Sok.

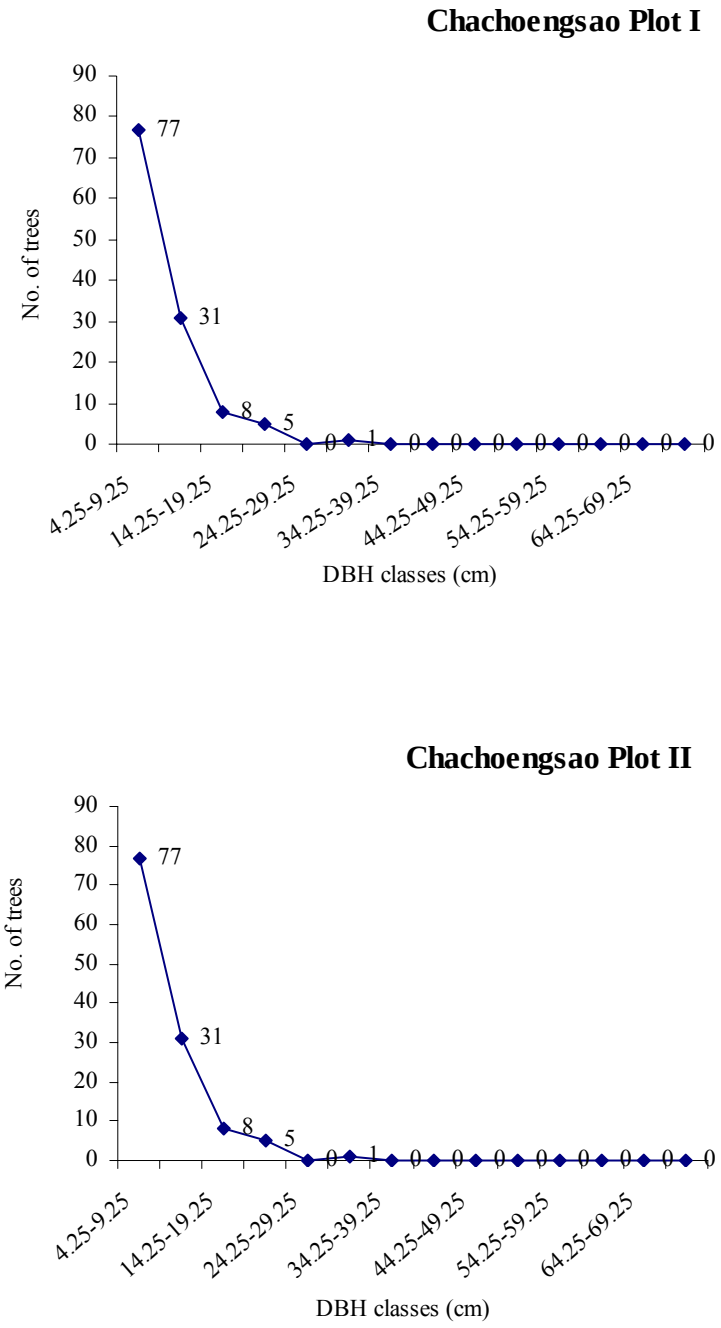
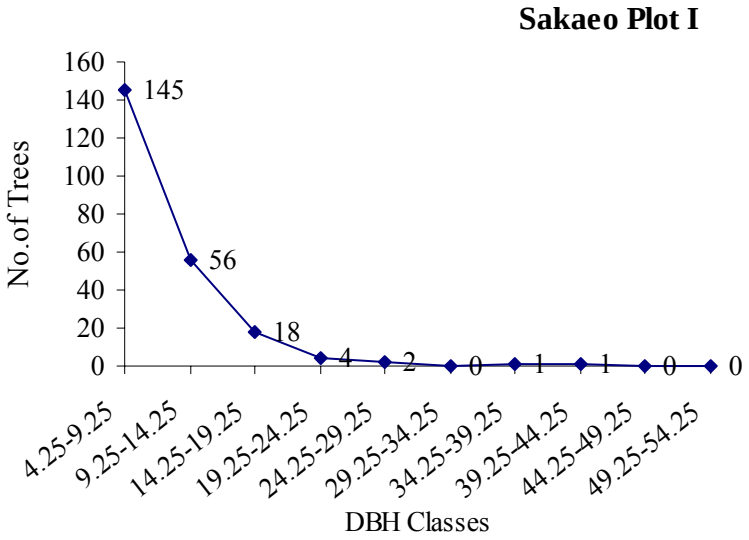


Figure 4 DBH distribution of trees with DBH larger than 4.5 cm (class interval 5 cm) in FPT 9, Plot I and II.



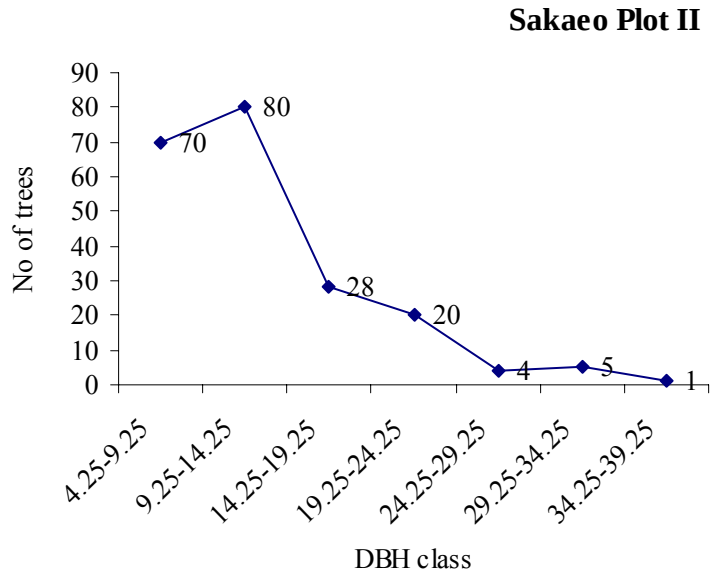


Figure 5 DBH distribution of trees with DBH larger than 4.5 cm (class interval 5 cm) in FPT 53, Plot I and II.

Table 21 DBH class distribution of trees in Plot I in FPT9

Scientific names	Local names	DBH class (cm)				
		4.25-9.25	9.25-14.25	14.25-9.25	19.25-4.25	24.25-9.25
Dollichandrone spathacea	Khae na1	1			2	
Dollichandrone spathacea	Khae pa					
Artocarpus rigidus	Khanoon pan	3				
Vitex glabrata	Khao nao				1	
Cassia siamea	Khelek	1	11		3	
Zollingeria dongnaiensis	Khenon	2				
Makhamia stipula	Khi khao	1				
Xerospermumnoronhianum	Kho Laen	1				
Careya sphaerica	Kradon	1				
Suregada multiforum	Kraduk	1				
Artocarpus lacoocha	Mahat	1				
Afzelia xylocarpa	Makha mong	3		2		
Phyllanthus embrica	makham pom	1	1			
Diospyros mollis	Makluea	1				
Wrightia arborea	Mok man	3				
Peltophorum dasyrachis	Non see pa	1				
Microcos tomentosa	Phlab phla	2				
Pterocymbium macranthum	Po-e-keng	3				
Pterocarpus macrocarpus	Pradupa	8	2	1	2	
Acacia catechu	Sesiat kaen		4	5		
Hymenodictyon orixense	Somkop	1				
Albizia procera	Thon	4				
Total		39	18	8	8	0

Table 22 DBH class distribution of trees in Plot II in FPT9

Scientific names	Local names	DBH classes (cm)						
		4.25-9.25	9.25-14.25	14.25-9.25	19.25-4.25	24.25-9.25	29.25-4.25	Total
Peltophorum dasyrachis	A rang		1					1
Irvingia malayana	Krabok	2						2
Dollichandrone spathacea	Khae pa	5	5	1	1			12
Senna siamea	Khelek	1		2				3
Zollingeria dngnaiensis	Khenon	2	1					3
Makhamia stipula	Khi khao	2						2
Xerospermum noronhianum	Kholaen	4						4
Cassia fistula	khun	1	1					2
Afzelia xylocarpa	Makha mong	1						1
Wrightia arborea	Mok	1	1					2
Azadirachta indicasiamensis	Neem(Sadao)	7	3		1			11
Lasia spinosa	Phak nam	1						1
Microcos tomentosa	Phlab phla	8	2	1				11
Pterocarpus macrocarpus	Pradu pa	18	4	4	1		1	28
	Sakam	1	1					2
Lagerstoemia loudonii	Salao	1						1
Acacia catechu	Sesiat kaen	5	4		2			11
Hymenodictyon orixense	Somkop	6	4					10
Lagerstroemia floribunda	Tabaek	5						5
Garuga pinnata	Takhram	5	4					9
Cratoxylum formosum	Tiu	1						1
Total		77	31	8	5	0	1	122

Table 23 DBH class distribution of trees in Plot I in Sakaeo

Scientific Names	Local Name	DBH class (cm)							
		4.25-9.25	9.25-14.25	14.25-9.25	19.25-4.25	24.25-9.25	29.25-4.25	34.25-9.25	Total
Dalbergia nigrescens	Cha nuan	14	6	6	1				27
Diospyrus decandra	Chan			1					1
Carallia brachiata	Chiang phra nang ae	4	1						5
Tristaniopsis burmanica	Kao		1						1
Stereospermum colias	Khae hin	2							2
Lithocarpus polystachyus	Ko nok	6	1						7
Anisoptera costata	Krabok	3	1	1					5
Catunaregam tomentosa	Ma khet	1							1
Paninari anamensis	Ma phok	29	10	3	3				45
Mangifera indica	Mamuang					1			1
Litsea glutinosa	Mi men	1							1
Calophyllum polyanthum	Pha ong	2							2
Shorea siamensis	Phayom	49	30	5		1		1	86
Microcos tomentosa	Phlab phla	2							2
Rhodamnia dumetorum	Phlong kaemon	4	1						5
Ziziphus mauritiana	Phutsa	1							1
Millingtonia hortensis	Pip			1					1
	Pok	1	1						2
Ptercarpus macrocarpus	Pradu	11	4	1					16
Cratoxylum cochinchinse	Tio kliang	1							1
Cratoxylum formosum	Tiu	10							10
Dipterocarpusobtusifolius	Yang hiang	4							4
Total		145	56	18	4	2	0	1	227

Table 24 DBH class distribution of trees in Plot II in Sakaeo

Scientific Names	Local Name	DBH class (cm)							
		4.25-9.25	9.25-14.25	14.25-9.25	19.25-4.25	24.25-9.25	29.25-4.25	34.25-9.25	Total
Tristaniopsis burmanica	Kao	1							1
Suregada multiflorum	Khan thong phyabat	2	2						4
Cotylelobium lanceolatum	Khiam	1	2	1					4
Haldina cordifolia	Kwao			1				1	2
Paninari anamensis	Ma phok	9	15	6	5	1	2		38
Arthocarpus lacucha	Mahat	2	1						3
Lepisanthes rubiginosa	Mahuat	15	3	1					19
Spondias pinnata	Makokpa	2							2
Mangifera indica	Mamuang	1			1				2
Memecylon plebejum	Mueat chi dong	1	1						2
Azadirachta indica siamensis	Neem(Sadao)	1							1
Peltophorum dasyrachis	Non see pa	4	9	5			2		21
Shorea siamensis	Phayom	1		1					2
Microcos tomentosa	Phlab phla	12	6	1					19
Diospyras undulata	Phlap Khao	3	5						8
Ziziphus mauritiana	Phutsa	1	3						4
Ptercarpus macrocarpus	Pradu	7	16	11	9	3	1		47
Cratoxylm cochinchinense	Tio kliang		1						1
Cratoxylum formosum	Tiu	7	13	1	5				26
Dipterocarpus obtusifolius	Yang hiang		3						3
Total		70	80	28	20	4	5	1	208

1.6 Important Value Index

As present in Tables 25 and 26, the tree species that had the highest relative density in Plots I and II of FPT 9. Community - based Rehabilitated Forest was *Peltophorum dasyrachis* and *Pterocarpus macrocarpus*. The tree species that showed the highest relative frequency of species in Plots I and II was *Nephelium hypoleucum*, and *Pterocarpus macrocarpus*, respectively. The tree species with the highest relative dominance in Plots I and II was *Peltophorum dasyrachi*, and *Pterocarpus macrocarpus,* respectively. Because of the relative density, relative frequency and relative dominant, therefore, *Peltophorum dasyrachis* and *Pterocarpus macrocarpus* was the highest importance value index (IVI) in Plots I and Plots II of FPT 9.

In Tables 27 and 28, the tree species that had the highest relative density in Plots I and II of FPT 53 Community- based Rehabilitated Forest was *Pterocarpus macrocarpus* .The tree species that showed the highest relative frequency of species in Plots I and II was *Shorea roxburghii, Pterocarpus macrocarpus, Parinari anamense, Dipterocarpus obtusifolius* and *Parinari anamense*, *Pterocarpus macrocarpus,* respectively. The tree species with the highest relative dominance in Plots I and II was *Cratoxylum sp.* and *Pterocarpus macrocarpus*, respectively. Because of the relative density, relative frequency and relative dominant, therefore, *Shorea roxburghii* and *Pterocarpus macrocarpus* was the highest importance value index (IVI) in Plots I and II of FPT 53.

Regarding to trees in FPT 9 and FPT 53 results demonstrated that *Pterocarpus macrocarpus, Peltophorum dasyrachis, Nephelium hypoleucum*, and *Shorea roxburghii*, *Parinari anamense, Dipterocarpus obtusifolius* was the highest IVI, relative density, relative frequency and relative dominance in Community- based Rehabilitated Forest.

It seems that the FPT 9 and FPT 53 are still dominated by secondary species as seen by *Pterocarpus macrocarpus,* and *Peltophorum dasyrachis.*

Following the Tables 29 and 30, the sapling species that had the highest relative density in Plots I and II in FPT 9 were *Cratoxylum sp* respictevely. The highest relative frequency of sapling species in Plot I were *Pterocarpus macrocarpus* and in plot II *Cratoxylum sp*. Following the Tables 31 and 32 the sapling species that had the highest relative density in Plots I and II were *Antidesma ghaesembilla* and *Vitex pinnata, Lepisanthes rubiginosa,* respectively. The highest relative frequency of sapling species in FPT 53 Plot I were *Xerospermum noronhianum* and in plot II *Lepisanthes rubiginosa.*

The relative density, relative frequency and IVI of seedling species in Plot I and II of FPT 9 Community- based Rehabilitated Forest were shown in Tables 33 *Acacia catechu,* respectively, revealed that the seedling species with the highest relative density in Plots I and II were *Acacia catechu,* and *Xerospermum noronhianum* respectively. The highest relative frequency of seedling species in Plot I were *Acacia catechu* and in Plot II also same species.

Table 25 Relative density (RD), relative frequency (RF), relative dominance (Rdo) and importance value index (IVI) of Trees of the top ten highest values of IVI in Plot I FPT 9

Scientific names	Local name	RD=D/ SUM OF D*100	RF=F/ SUM OF F*100	RBA=BA/ SUM OF BA*100	IVI=RD+RF+RBA
Peltophorum dasyrachis	A rang	26.67	11.11	31.47	69.24
Pavetta indica	Khem pa	10.00	5.56	10.17	25.73
Senna siammea	Khi lek ban	10.00	16.67	34.09	60.76
Mollotuh peltatus	Khithao	3.33	5.56	0.94	9.83
Haldina cordifolia	khoao	3.33	5.56	0.51	9.40
Xerospermum noronhianum	Kholen	10.00	11.11	0.76	21.87
Melia azadarach	Lian	3.33	5.56	0.54	9.43
Afzelia xylocarpa	Makha mong	10.00	5.56	13.11	28.67
Pterocarpus macrocarpus	Pradu pa	16.67	22.22	6.76	45.65
Hymenodictyon orixense	Samkop	6.67	11.11	1.64	19.42

Table 26 Relative density (RD), relative frequency (RF), relative dominance (Rdo) and importance value index (IVI) of trees of the top ten highest values of IVI in Plot II FPT 9

Scientific names	Local name	RD=D/ SUM OF D*100	RF=F/ SUM OF F*100	RBA=BA/ SUM OF BA*100	IVI=RD+RF+RBA
Homalium tomentosum	Kha nang	3.44	5.55	3.66	12.66
Nephelium hypoleucum	Kho laen	10.34	16.66	2.68	29.69
Lepisanthes rubiginosa	Mahuat	3.44	5.55	5.03	14.03
Oroxylum indicum	Pheka	3.44	5.55	6.92	15.93
Microcos sp.	Phlapphla	3.44	5.55	4.38	13.38
Pterocarpus macrocarpus	Pradu pa	20.68	16.66	10.97	48.33
Azadirachta indica siamensis	Sadao india	3.44	5.55	22.67	31.67
Acacia catechu	Sisiat kaen	17.24	11.11	17.81	46.16
Hymenodictyon excelsum	Som kop,	10.34	11.11	1.46	22.92
Lagerstroemia sp.	Ta beak	6.89	11.11	1.36	19.37
Garuga pinnata	Ta khram	17.24	5.55	23.01	45.81

Table 27 Relative density (RD), relative frequency (RF), relative dominance (Rdo) and importance value index (IVI) of trees of the top ten highest values of IVI in Plot I FPT 53

Scientific Names	RD=D/SUM OF D*100	RF=F/SUM OF F*100	RBA=BA/SUM OF BA*100	IVI=RD+RF+RBA
Chionanthus microstigma	1.51	4.34	1.14	7.01
Cratoxylum sp.	9.09	13.04	3.77	25.91
Dalbergia cochinchinensis	1.51	4.34	6.84	12.70
Dipterocarpus obtusifolius	6.06	13.04	7.05	26.16
Parinari anamense	15.15	13.04	18.16	46.35
Pterocarpus macrocarpus	7.57	13.04	7.40	28.02
Shorea roxburghii	50	13.04	46.69	109.73
Spondias pinnata	1.51	4.34	0.59	6.46
Tristaniopsis burmanica	1.51	4.34	0.26	6.12
Millingtonia hortensis	1.51	4.34	0.45	6.31
Stereospermum colias	1.51	4.34	0.63	6.50
Vitex pinnata	1.51	4.34	0.50	6.36
Ziziphus mauritiana	1.51	4.34	6.46	12.32

Table 28 Relative density (RD), relative frequency (RF), relative dominance (Rdo) and importance value index (IVI) of trees of the top ten highest values of IVI in Plot II FPT 53

Scientific Names	Local Name	RD=D/SUM OF D*100	RF=F/SUM OF F*100	RBA=BA/SUM OF BA*100	IVI=RD+RF+RBA
Peltophorum dasyrachis	A rang	11.84	15.00	8.66	35.50
Haldina cordifolia	Khwao	1.31	5.00	0.36	6.67
Parinari anamense	Ma phok	21.05	20.00	30.44	71.49
Spondias pinnata	Makok	1.31	5.00	0.34	6.65
Microcos tomentosa	Phlap phla	1.31	5.00	0.53	6.84
Pterocarpus macrocarpus	Pradu pa	38.15	20.00	50.76	108.91
Cratoxylum sp.	Tio	21.05	15.00	7.68	43.73
Diterocarpus obtusifolius	Yang hiang	2.63	10.00	0.82	13.45
Shorea siamensis	Phayom	1.31	5.00	0.39	6.71

Table 29 Relative density(RD), relative frequency(RF), relative dominance (Rdo) and importance value index (IVI) of saplings of the top ten highest values of IVI in Plot I FPT-9

		RD=D/SUM OF D*100	RF=F/SUM OF F*100	IVI=RD+RF+RBA
Xerospermum	Kholaen	19.048	28.571	47.619
Antidesma ghaesembilla	Mamao	38.095	14.286	52.381
Pterocymbium macranthum	Po-e-keng	23.810	14.286	38.095
Pterocarpus macrocarpus	Pradupa	4.762	14.286	19.048
Acacia catechu	Sesiat	9.524	14.286	23.810
Sindom siamensis	Ma Khatae	4.762	14.286	19.048

Table 30 Relative density(RD), relative frequency(RF), relative dominance (Rdo) and importance value index (IVI) of saplings of the top ten highest values of IVI in Plot II FPT-9

Scientific Name	Local names	RD=D/SUM OF D*100	RF=F/SUM OF F*100	IVI=RD+RF+RBA
Cassia fistula	khun	9.090909	11.76470588	20.85561497
Makhamia stipula	Khi khao	4.545455	5.882352941	10.42780749
Lepisanthes rubiginosa	Mahuat	18.18182	17.64705882	35.82887701
Wrightia arborea	Mok	4.545455	5.882352941	10.42780749
Pterocarpus macrocarpus	Pradu pa	9.090909	11.76470588	20.85561497
Croton robustus	Plao	9.090909	5.882352941	14.97326203
Oroxylum indicum	Pheka	4.545455	5.882352941	10.42780749
Microcos tomentosa	Phlab phla	4.545455	5.882352941	10.42780749
Unknown	Pok rasa	4.545455	5.882352941	10.42780749
Unknown	Sa thit	4.545455	5.882352941	10.42780749
Hymenodictyon orixense	Somkop	9.090909	5.882352941	14.97326203
Vitex pinnata	Tee nok	18.18182	11.76470588	29.94652406

Table 31 Relative density (RD), relative frequency (RF), relative dominance (Rdo) and importance value index (IVI) of saplings of the top ten highest values of IVI in Plot I FPT 53

Scientific name	Local name	RD=D/SUM OF D*100	RF=F/SUM OF F*100	IVI=RD+RF+RBA
Tristaniopsis burmanica	Kao	2.564	6.667	9.952
Antiaris toxicaria	Nong	2.564	13.333	16.098
Pterocarpus macrocarpus	Pradu	56.410	26.667	119.127
Shorea roxburghii	Payom	5.128	13.333	24.557
Memecylon myrsinoides	Pholong Khaemon	5.128	13.333	25.416
Dielinia obovata	San	2.564	6.667	9.636
Cratoxylum sp.	Tew	25.641	20.000	95.214

Table 32 Relative density (RD), relative frequency (RF), relative dominance (Rdo) and importance value index (IVI) of saplings of the top ten highest values of IVI in Plot II FPT 53

Scientific name	Local name	RD=D/SUM OF D*100	RF=F/SUM OF F*100	IVI=RD+RF+RBA
Tristaniopsis burmanica	Kao	9.091	14.286	26.650
Unknown	Krathmu	9.091	14.286	28.908
Pterocarpus macrocarpus	Pradu	9.091	14.286	24.195
Zizipus mauritiana	Phutsa	9.091	14.286	24.831
Cratoxylum sp.	Tew	63.636	42.857	195.416

Table 33 Relative density (RD), relative frequency (RF), relative dominance (RDo) and Importance Value Index (IVI) of seedlings of the top ten highest values of IVI in Plot I and II FPT9

Scientific name	Local names	RD=D/SUM OF D*100	RF=F/SUM OF F*100	IVI=RD+RF+RBA
Acacia catechu	Sesiat kaen	53.846	66.667	120.513
Suregada multiforum	Kraduk	7.692	5.556	13.248
Xerospermum noronhianum	Kholaen	7.692	5.556	13.248
Zollingeria dngnaiensis	Khenon	7.692	5.556	13.248
Antidesma ghaesembilla	Mamao	7.692	5.556	13.248
Syzygium granade	Mao	7.692	5.556	13.248
Oroxylum indicum	Pheka	7.692	5.556	13.248

Table 34 Relative density (RD), relative frequency (RF), relative dominance (Rdo) and importance value index (IVI) of seedlings of the top ten highest values of IVI in Plot I and Plot II FPT 53

Scientific name	Local names	RD=D/SUM OF D*100	RF=F/SUM OF F*100	IVI=RD+RF+ RBA
Ptercarpus macrocarpus	Pradu	60.000	0.028	60.028
Rhodamnia dumetorum	Phlong kaem on	6.667	16.667	23.333
Peltophorum dasyrachis	A rang	13.333	16.667	30.000
Diospyros variegata	Phaya rak dam	6.667	16.667	23.333
Pavetta indica	Khempa	6.667	16.667	23.333
Micromelum mimutum	Huasa khun	6.667	16.667	23.333

Table 35 Height class distribution of trees in Chachaengsao Plot 1

Scientific names	Local name	Total height (m)	Number of trees in H classes(m)			
			<8	(8-12)m	(12-18)m	Total
Peltophorum dasyrachis	A rang	14		6	2	
Pavetta indica	Khem pa	6	3			
Senna siamnea	Khi lek ban	9		3		
Mollotuh peltatus	Khithao	7	1			
Haldina cordifolia	khoao	6	1			
Xerospermum noronhianum	Kholen	7.5	3			
Melia azedarch	Lien	9.5		1		
Afzelia xylocarpa	Ma kha mong	6	1			
Afzelia xylocarpa	Ma kha mong	9.5		2		
Pterocarpus macrocarpus	Pradu pa	13	2	2	1	
Hymenodictyon orixense	Samkop	6.5	2			
Total			13	14	3	30

Table 36 Height class distribution of trees in Chachaengsao Plot II

Scientific names	Local name	Total height (m)	Number of trees in H classes(m)			
			<8	(8-12)m	(12-18)m	Total
Homalium tomentosum	Kha nang	5.5	1			
Nephelium hypoleucum	Kho laen	8	2	1		
Lepisanthes rubiginosa	Mahuat	8		1		
Oroxylum indicum	Pheka,	5	1			
Microcos sp.	Phlapphla	7	1			
Pterocarpus macrocarpus	Pradu pa	11	2	4		
Azadirachta indica simensis	Sadao	6	1			
Acacia catechu	Sisiat	9	2	3		
Hymenodictyon excelsum	Som kop,	7	3			
Lagerstroemia calyculata	Ta beak	7	2			
Garuga pinnata	Ta khram	8.5	1	4		
Total			16	13	0	29

Table 37 Height class distribution of trees in Sakaeo Plot I

Scientific names	Local name	Total height (m)	Number of trees in H classes(m) <8
Tristaniopsis burmanica	Kao	5	1
Stereospermum colias	Khae hin	9	
Chionanthus microstigma	Kra dong daeng	6.7	1
Parinari anamense	Ma phok	12	3
Spondias pinnata	Makok	6	1
Dalbergia cochinchinensis	Pha yung	8	
Shorea roxburghii	Phayom	11	12
Ziziphus mauritiana	Phutsa	4.5	1
Millingtonia hortensis	Pip	7	1
Pterocarpus macrocarpus	Pradu pa	9	3
Vitex pinnata	Tin nok	6.5	1
Cratoxylum sp.	Tio	11	4
Diterocarpus obtusifolius	Yang hiang	11	1
Total			29

Table 38 Height class distribution of trees in Sakaeo Plot II

Scientific names	Local name	Total height (m)	Number of trees in H classes(m)		
			<8	(8-12)m	(12-18)m
Peltophorum dasyrachis	A rang	11	1	8	
Haldina cordifolia	Khwao	5.5	1		
Parinari anamense	Ma phok	11.5	5	11	
Spondias pinnata	Makok	6	1		
Microcos tomentosa	Phlapphla	4.5	1		
Pterocarpus macrocarpus	Pradu pa	11.5	5	24	
Cratoxylum sp.	Tio	10	8	9	
Diterocarpus obtusifolius	Yang hiang	7	2		
Total			24	52	0

The relative density, relative frequency and IVI of seedling species in Plots I and Plot II of FPT 53 Community-based Rehabilitated Forest were shown in Table 34 respectively. Results revealed that the seedling species with the highest relative density in Plots I and II was *Pterocarpus macrocarpus,* respectively. The highest relative frequencies of seedling species in Plots I and II were *Peltophorum dasyrachis, Rhodamnia dumetorum, Diospyros variegata, Pavetta indica and Micromelum mimutum.*

1.7 Vertical Stratification

Structural diversity of vegetation of FPT 9 and FPT 53 Community-based Rehabilitated Forests can be characterized by vertical stratification.

In two permanent sample plots of each area, Plots I and II, there were different in vertical arrangement displayed by profile diagram of 10 x 40 m^2 in Figure 6, 7, 8 and 9 respectively.

FPT 9: Plot I was composed of 30 species and 3 stratum/ canopy layer as illustrated in Table 35, the top canopy (H= 12-18 m) was continuous canopy of *Peltophorum dasyrachis*, *Pterocarpus macrocarpus*. The second layer (H= 8-12 m) was occupied with *Peltophorum dasyrachis*, *Senna siammea etc, Melia azedarch, Afzelia xylocarpa, Hymenodictyon orixense, and Pterocarpus macrocarpus*. The third layer or lower layer was stratified in H ≤ 8 m including *Pavetta indica, Mollotuh peltatus, Xerospermum noronhianum, Afzelia xylocarpa* etc.

Plot II was composed of 29 species and 2 stratum/ canopy layer as illustrated in Table 36 The top canopy (H= 8-12 m) was continuous canopy of *Garuga pinnata, Nephelium hypoleucum, Lepisanthes rubiginosa, Acacia catechu*

etc. The second layer (H ≤ 8 m) was occupied with *Oroxylum indicum, Azadirachta indica siamensis, Lagerstroemia sp., Nephelium hypoleucum*, etc.

FPT-53: Plot I was composed of 29 species and 1 stratum/ canopy layer as illustrated in Tablec37 the top canopy (≤ 8 m) was continuous canopy of *Ziziphus mauritiana, Pterocarpus macrocarpus, Vitex pinnata*, *Millingtonia hortensis,* etc.

Plot II was composed of 52 species and 2 stratum/ canopy layer as illustrated in Table 38 The top canopy (H> 18 m) was continuous canopy of *Peltophorum dasyrachis*, *Pterocarpus macrocarpus, Cratoxylum, Parinari anamense, Dipterocarpus obtusifolius sp* etc. The second layer (H ≤ 8 m) was occupied with *Microcos tomentosa, Spondias pinnata, Haldina cordifolia, Peltophorum dasyrachis, Pterocarpus macrocarpus,* etc.

Vertical stratification of trees in FPT9 and in FPT53 were not good, in both places were found two or one layer /stratum. Only FPT 9, Plot I have three stratums of trees. Because, these forest are restorated, only eight to ten years old.

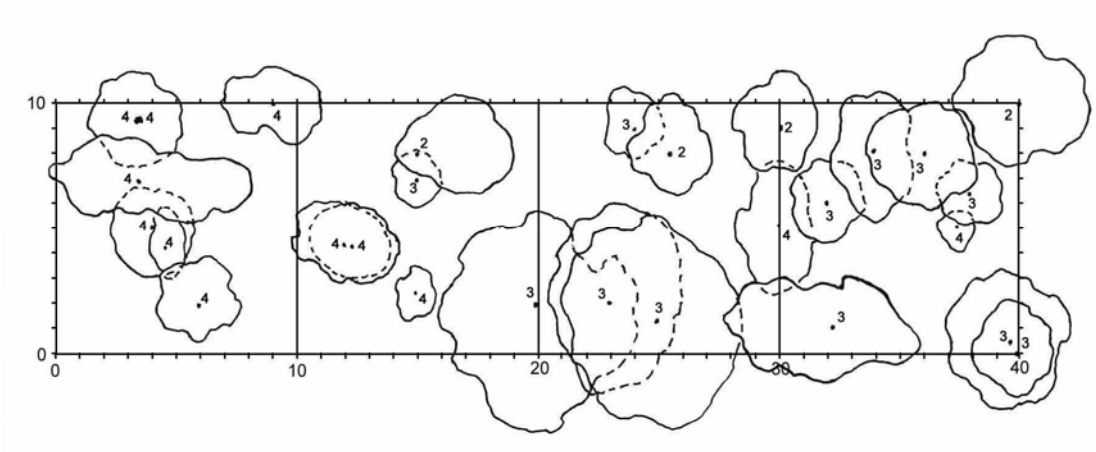


Figure 6 Profile diagram of trees with DBH larger than 4.5 cm along 10 x 40m^2 of Plot I in FPT 9 (Chachoengsao).

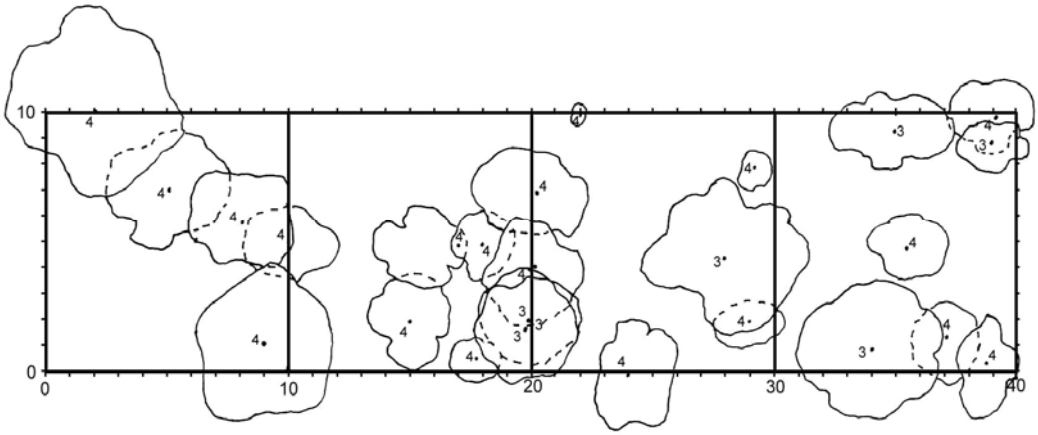


Figure 7 Profile diagram of trees with DBH larger than 4.5 cm along 10 x 40m^2 of Plot II In FPT 9 (Chachoengsao).

Remark: Height class trees
1 = >18
2 = 12-18
3 = 8-12
4 = < 8

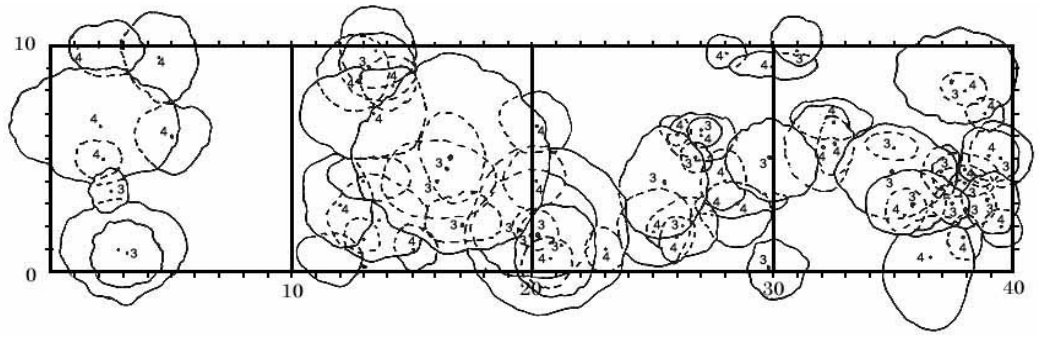


Figure 8 Profile diagram of trees with DBH larger than 4.5 cm along 10 x 40m^2 of Plot I in FPT 53 (Sakaeo).

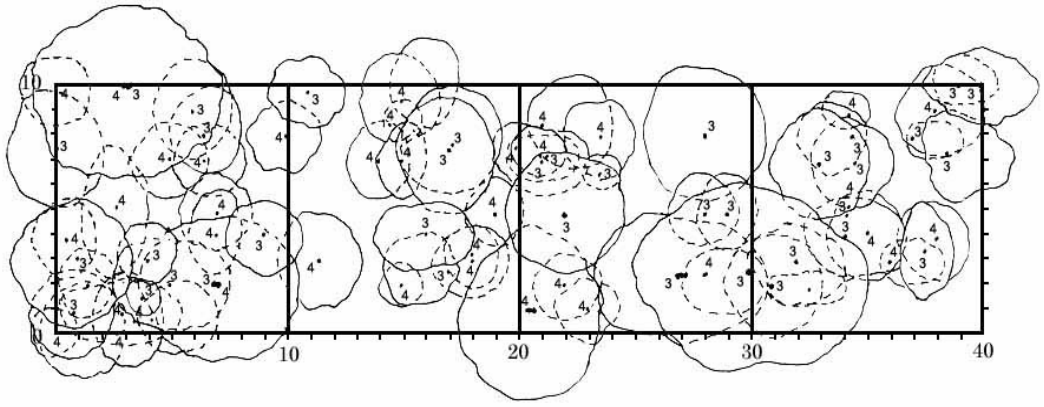


Figure 9 Profile diagram of trees with DBH larger than 4.5 cm along 10 x 40m^2 of Plot II in FPT 53 (Sakaeo).

Remark: Height class trees

1 = >18
2 = 12-18
3 = 8-12
4 = < 8

1.8 Plant Diversity in FPT-9 and FPT-53 Community-based Rehabilitated Forest

1.8.1 Diversity Indices

As showed in Table 39, it revealed that, in FPT 9 Community-based Rehabilitated Forest, the Fisher's Index (α), Shannon-Wiener's Index (H) and Simpson's Index (D) of trees were 10.387, 3.2492, 0.083 respectively. While, Hills diversity number of trees, N_1 and N_2 were 9.509 and 12.048, respectively.

In Table 39, result showed that, in FPT 53 Community-based Rehabilitated Forest, the Fisher's Index (α), Shannon-Wiener's Index (H) and Simpson's Index (D) of trees were 10.883, 3.738, and 0.1143, respectively. While, Hills diversity number of trees, N_1 and N_2 were 13.34, and 8.748, respectively.

The Fisher's Index is a constant proportion of number of species to number of individuals, if it is high; it means that there is high diversity.

The Shannon-Wiener's Index is based on information theory and is a measure of average degree of "uncertainty" in predicting to what species an individual is chosen at random from collection of *S* species and *N* individuals will belong. This average uncertainty increases as the species becomes even. Thus, *H'* has two properties that have made it a popular measure of species diversity: (1) *H'*=0 if and only if there is one species in the sample, and (2) *H'* is maximum only when all *S* species are represented by the same number of individuals, that is, a perfectly even distribution of abundance, if the Shannon-Wiener's Index show high value, it means that there is high diversity.

When comparing with other forest types by the Shannon-Wiener's Index, the FPT 9 and FPT 53 Community-based rehabilitated forest diversity was more or less the same. But in both places was less diversity of trees than the Tropical Rain Forest in Ban Thung Soong Community Forest 4.700, Sawatdee, 2002, Khao Chong Nature Wildlife Study Centre, Trang and Khao Pra Taew Wildlife Park, Phuket, 5.80, 6.15, 6.13, 5.01, 5.98 and 5.39 Kratiprayoon, 1986. Result also indicated that forest rehabilitation require more time to develop into normal natural condition.

The Shannon's Index of Diversity of sapling and seedling in FPT 9 were 34.176 and 20.286 As showed in Tables 38 respectively, and in FPT-53 20.85 and2.897 while the Shannon's Index of Diversity of Tropical Rain Forest in Khao Sok were 4.0696 and 4.2780 (Bunnasopits, 1989) and in Ban Thung Soong community forest were 4.059 and 4.013, respectively (Sawatdee, 2002).

Simpson's Index, which varies from 0 to 1, given the probability that two individuals drawn at random from a population belong to the same species. If the probability is low that both individuals belong to the same species, then the

diversity of the community sample is low. Therefore, in FPT 9 and FPT 53 Community-based rehabilitated forest was high diversity.

These diversity numbers, which are in units of number of species, measure while Hill's call effective number of species present in a sample. This effective number of species is a measure of the degree to which proportional abundances are distributed among the species. Explicitly, N_0 is the number of all species in the sample (regardless of their abundance), N_2 is the number of very abundant species, and N_1 measures the number of abundant species in the sample. In FPT 9 there estimated that, from 31 Tree species, the twelve tree species were very abundance and nine tree species were abundance. In FPT 53 there estimated that, from 32 Tree species, the eight tree species were very abundance and thirteen tree species were abundance.

1.8.2 Richness Indices

By calculated the richness indices of trees, the Margalef (1958) Index (R_1) and Menhinick (1964) Index (R_2), it was found that the Richness Index of R_1 and R_2 of trees in FPT 9 were 5.689 and 2.220, and FPT 53 were 5.103 and 1.534 respectively.

1.8.3 Evenness Indices

The present study showed the evenness indices which was classified into five: E1, E2, E3, E4, and E5 in Table 38 were 0.656, 0.307, 0.84, 1.267 and 1.298 in FPT 9 and in FPT 9 was 0,748, 0.417, 0.398, 0.655 and 0.625, respectively in Table 39.

Diversity indices incorporate both species richness and evenness into a single value. Because of this, Peet (1974) termed these heterogeneity indices. Probably the biggest obstacle to overcome in using diversity indices is interpreting what this single statistic actually means. In some cases a given value of a diversity index may result from various combinations of species richness and evenness. In other words, the same diversity index value can be obtained for a community with low richness and high evenness as for a community with high richness and low evenness (Ludwig and Reynolds, 1988). Thus, when compared the diversity index between two sample areas, there should refers to species richness and evenness. In case of FPT 9 and FPT 53 Community-based rehabilitated forest was high Diversity Index because of there was high in species richness and moderate in species evenness. FPT 53 was higher than FPT 9 in Diversity indices.

Table 39 Indices of diversity of trees in FPT 9 (Chachoengsao) and FPT 53 (Sakaeo)

Index	FPT 9 (Chachoengsao)	FPT 53 (Sakaeo)
Fisher's index, α	10.38	10.88
Shannon-Wiener's index, H	3.24	3.73
Simpson's index, D or 1-λ	0.08	0.11
Shannon's index, H	2.25	2.59
N_0	31.0	32.00
N_1	9.50	13.34
N_2	12.04	8.74
Richness index		
R_1	5.68	5.10
R_2	2.22	1.53
Evenness index		
E_1	0.65	0.74
E_2	0.30	0.41
E_3	0.28	0.39
E_4	1.26	0.65
E_5	1.29	0.62

2. Soil Analysis

2.1 Soil texture

The major morphological characteristics of the eight-sample plot's soil profiles are shown in abbreviated form in Tables 40, 41 and 42. Surface textures were predominantly in the clay loam in FPT 9_1A, FPT 9_1B, and FPT 9_2A, but in FPT 9_2B, depth layer soil were sandy clay loam, and loamy sand in FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B. FPT 9_1A from the table 19. FPT 9_1A, FPT 9_1B, FPT 9_2A sand and silt content decrease in the A horizon as compared to the B horizon but clay contents decreased except in profiles FPT 9_2B which are litho logic discontinuities. Profile FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B sand silt and clay contents are constant except FPT 53_2A. It is important to recognize that a subsurface horizon may have a fine texture than overlying horizons; this may be the result of stratification in the parent material and clay from the upper horizon moving down (soil Survey Staff, 1975). Kanghae (1982) reported that the influence of erosion has affects on the fine particles, which are more easily transported than the larger particles. The bulk density values of soils in every eco-floristic zone are given in Appendix A, Appendix B and Appendix C. The values show that there are no major differences and these increase with depth. EGAT (1980) reported that the bulk density of soils varies according to the forest types at 0-15 cm depth from the surface. The amount of organic matter has affects on the bulk density values. If the soils have much organic matter, its value is low. In general, the virgin soil or uncultivated soil ranges from 1.0 to 1.6 g/cc (Soil Science Department, 1980). Parmananthan (1977) reported that soils with an argillic horizon and high clay contents have a higher bulk density and lower porosity than soils with an oxic horizon.

Table 40 Initial information on the site characteristics at Chachoengsao (FPT 9) and Sakaeo (FPT53).

Profile Symbol	Location	Physiographic Position	Forest Type
FPT 9_1A	Chachoengsao (FPT 9) rehabilitated area. Amphoe Ta Takiap. Size of the plot is one hector in each plot.0-15 cm layer	Hillside slope	Dry Evergreen
FPT 9_1B	Chachoengsao (FPT 9) rehabilitated area. Amphoe Ta Takiap. Size of the plot is one hector in each plot.15-25 cm layer	Hillside slope	Dry Evergreen
FPT 9_2A	Chachoengsao (FPT 9) rehabilitated area. Amphoe Ta Takiap. Size of the plot is one hector in each plot.0-15 cm layer	Hillside slope	Dry Evergreen
FPT 9_2B	Chachoengsao (FPT 9) rehabilitated area. Amphoe Ta Takiap. Size of the plot is one hector in each plot.15-25 cm layer	Hillside slope	Dry Evergreen
FPT 53_1A	Sa kaeo (FPT53) rehabilitated area. Amphoe Aranyaprathet. Size of the plot is one hector in each plot.0-15 cm layer	Plain land	Mixed Deciduous
FPT 53_1B	Sa kaeo (FPT53) rehabilitated area. Amphoe Aranyaprathet. Size of the plot is one hector in each plot. 15-25 cm layer	Plain land	Mixed Deciduous
FPT 53_2A	Sa kaeo (FPT53) rehabilitated area. Amphoe Aranyaprathet. Size of the plot is one hector in each plot.0-15 cm layer	Plain land	Mixed Deciduous
FPT 53_2B	Sa kaeo (FPT53) rehabilitated area. Amphoe Aranyaprathet. Size of the plot is one hector in each plot. 15-25 cm layer	Plain land	Mixed Deciduous

Remarks: A is soil sample from upper layer. B is soil sample from lower layer.

2.2 Chemical properties

Soil pH values determined in 1:1 water suspension are higher than pH value in KCL of all profiles. This showed that the soils carried a net negative charge (Van Raij and Peech, 1972). The pH value (pHin KCL-pH in H_2O) is an indicator of the net charge of soil collids that are highly weathered with a high sesquioxide content which normally has small negative or positive pH values (Mekary and Uehara, 1972).

Table 41 Morphologic descriptions in abbreviated form of the eight soil profiles at Chachoengsao (FPT 9) and Sakaeo (FPT53).

Sample Name	Soil Composition (%)			Soil Texture
	Sand	Silt	Clay	
FPT 9_1 A	38	28	34	Clay loam
FPT 9_1 B	40	26	34	Clay loam
FPT 9_2 A	41	25	34	Clay loam
FPT 9_2 B	48	23	29	Sandy clay loam
FPT 53_1A	82	9	9	Loamy sand
FPT 53_1B	82	9	9	Loamy sand
FPT 53_2A	82	8	10	Loamy sand
FPT 53_2B	82	9	9	Loamy sand

Remarks: A is soil sample from upper layer. B is soil sample from lower layer.

Table 42 Chemical properties of the eight soil profiles at Chachoengsao (FPT 9) and Sakaeo (FPT53).

Sample Name	pH	Organic Matter %	Total Carbon %	Total Nitrogen %	Phosphorus (mg/kg)	Potassium (mg/kg)	Calcium (mg/kg)	Magnesium (mg/kg)
FPT 9_1 A	4.52	5.31	2.51	0.22	4	81	533	151
FPT 9_1 B	4.75	3.27	1.65	0.17	3	36	526	97
FPT 9_2 A	4.48	4.09	2.71	0.24	3	108	395	168
FPT 9_2 B	4.15	1.85	1.59	0.17	2	50	350	91
FPT 53_1A	3.74	1.28	0.63	0.07	1	9	87	24
FPT 53_1B	3.28	0.47	0.38	0.05	1	4	15	6
FPT 53_2A	3.22	1.24	0.75	0.08	1	9	54	19
FPT 53_2B	3.07	0.61	0.45	0.06	1	5	11	10
FPT 53_1B	3.28	0.47	0.38	0.05	1	4	15	6

Remarks: A is soil sample from upper layer. B is soil sample from lower layer.

Soil pH values determined in 1:1 water suspension are higher than pH value in KCL of all profiles. This showed that the soils carried a net negative charge (Van Raij and Peech, 1972). The pH value (pHin KCL-pH in H_2O) is an indicator of the net charge of soil collids that are highly weathered with a high sesquioxide content which normally has small negative or positive pH values (Mekary and Uehara, 1972). The negative or lower pH values of all soil in this study did not differ greatly as given in Appendix A, Appendix B, Appendix C, Table 20 pH value of these soil were lower but Profile FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B than Profile samples FPT 9_1A, FPT 9_1B, FPT 9_2A, FPT 9_2B. The net charge varies from -0.3, -0.5, -0.2, -0.1 and -0.1, -0.7,-0.8, -0.7. Soils that have a pH below 5.5 generally have a low availability of calcium, magnesium, and phosphorus. At these low pH's, the solubility of aluminum, iron, and boron is high; and low for molybdenum (USDA 1998). Since S.W. Pennsylvania receives considerable rainfall every year, and since rain is H2O, soils tend to revert back to an "acid condition." When the soil pH is too "acid" (low pH) or "alkaline" (high pH), nutrients present in the soil become locked-up or unavailable (Donnan, 2006).

Soil organic carbon varies with depth. Levels are usually highest in the topsoil and generally decrease rapidly with depth. Organic carbon concentrations in

the soil commonly range between 0% and 15% as a percentage by weight but most Australian soils contain levels of less than 5% SOC and 75% of Australian soils contain less than 1% SOC (Chartres et al. 1992, from NRM, Australia 2004). The chemical analysis of these two samples area show (Table 20) low carbon contents ranging 2.51, 1.65, 2.71, 1.59 in FPT 9 and 0.63, 0.38, 0.75, 0.45 in FPT 53. The high amounts of organic carbon were found in FPT 9_1A, FPT 9_1B, FPT 9_2A, FPT 9_2B than Profile FPT 53_1A, FPT 53_1B, and FPT 53_2A but similar with Appendix A, Appendix B, Appendix C. In many situations the level of organic carbon does not appear to be strongly related to soil types although some soil landscapes are defined by having high organic carbon. Typically it varies as a function of climate and land use. It is usually higher in forest and pasture areas than in cultivated areas. It generally follows continental rainfall and temperature patterns (carbon accumulation increases with increasing rainfall; carbon decomposition increases with increasing temperature – these factors are then influenced by the annual input of carbon to the soil system) (NRM, Australia 2004).

Changes in soil C after afforestation will depend upon the amount and nature of the C in the pre plantation phase. Declines in soil C with tillage are thought to be attributable to four main factors. First, annual tillage accelerates mineralisation rates of soil C by mixing the soil, disrupting aggregates and increasing soil aeration and moisture (Prince *et al.* 1938; Rovira and Greacen 1957; Dalal and Mayer 1986b; Mann 1986; Chan *et al.*1992; Moody 1994; Tiessen *et al.* 1994; Alriksson and Olsson 1995; Post and Kwon 2000). Second, tillage may decrease surface soil C content due to its redistribution by soil inversion (Mead and Chan 1988; Chan *et al.* 1992). Third, tillage may increase soil C loss due to incorporation of stubble into the upper subsoil resulting in better contact and moisture conditions and more favorable conditions for decomposition. Fourth, soil C may be lost by wind and water erosion once the soil is tilled. In various reviews (Post and Mann 1990; Johnson 1992; Davidson and Ackerman 1993), it has been reported that the loss of soil C (20% - 40%) occurs within the first few years following initial cultivation. The fractional loss of soil C following cultivation is positively correlated to the amount of C initially present (Post and Mann 1990), but this relationship does not appear to hold when changes in soil bulk density are taken into account (Davidson and Ackerman 1993). Reduced tillage systems and direct drilling practices have been reported to maintain or increase C compared to conventional cultivation (Doran and Smith 1987; Campbell *et al.* 1989; Prove *et al.* 1990; Carter and Mele 1992). Additionally, stubble incorporation with conventional cultivation results in a more uniform distribution of soil C throughout the surface 15 cm layer than direct drilling and minimum tillage treatments (Chan *et al.* 1992; Gupta *et al.* 1994). Therefore, cropped land that has been continually tilled is expected to have low amounts and poor quality of soil C, whereas sites with no tillage can have high amount of initial soil C, particularly within the surface 5 cm of soil.

The available phosphorus of FPT 9_1A, FPT 9_1B, FPT 9_2A, FPT 9_2B soil samples were slightly high at the surface and low in the subsoil horizons and Profile FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B soil samples were stable at the surface and sub soil horizons. Organic P compounds range from readily available un

decomposed plant residues and microbes within the soil to stable compounds that have become part of soil organic matter. Biological processes in the soil, such as microbial activity, tend to control the mineralization and immobilization of organic P. Mineralization, the breakdown or conversion of readily available organic P to inorganic solution P, occurs in most soils, but it is usually too slow to provide enough P for crop growth. Immobilization is the formation of more stable organic P, which is resistant to breakdown.. In most soils, the P content of surface horizons is greater than subsoil. Except in special situations, added P tends to be fixed by the soil where it is applied, allowing for little movement down through the soil (LESSON 34). Sample result shows that, FPT9 (Table 20) phosphorus value is higher than FPT 53. The high content of the available phosphorus value was due to the process of translocation under the influence of the hydrogen organic compounds of phosphorus from the upper part of the mineral solum to the lower part (Buol et al. 1973). Franzmeir and Whiteside (1963) studied on podzol sands and described that the accumulation of available phosphorus occurs during eluviations. Vijarnson (1972) reported the higher content of available phosphorus might occur from the decomposition of plant residues and by stronger retention of the phosphorus against leaching in the surface soil. FPT 53 sample profile results were lower phosphorus; Daryl and Brown (2003) reported that the effect of pH, phosphorus availability also depends on the forms present in the soil. Appetite, a soil mineral that contains phosphorus, is very insoluble and very slowly available to plants. Weathered iron and aluminum phosphates and stable organic phosphates are also very slowly available.

Most soils in the study area high in the available potassium content at the surface and low values in the sub soil horizon but very high values throughout in profile (Table 20) FPT 9_2A and lower values throughout in profile FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B. Foth (1978) reported that potassium is leached from soils in humid regions. Long-time loss of potassium by leaching result in gradual decreases in the potassium content of soils and development of soils and development of soils in humid (udic moisture regime). An available potassium reserve in soil ensures the best opportunity for crops to achieve their optimum economic yield. Adding large amounts of potassium fertilizer to soil with little readily available potassium will not always increase yields to equal those in enriched soil. This is because in enriched soil, the potassium reserves are uniformly distributed throughout the layer of soil in which most of the roots grow (Jhonston 1997).

The available calcium content all samples soil at the surface label high and low values in the sub soil horizon but Profile samples FPT 9_1A, FPT 9_1B, FPT 9_2A, FPT 9_2B were calcium vales were higher than profile FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B. Soils of FPT 53, calcium values were very much lower. Soils low in calcium often have deficiency of pH and lime, although repeated high potassium addition on sands may result in neutral soils relatively low in calcium (K.A.Kelling and E.E. Schulte, 2004). In the 1970's prompted concern that deposition of acids could increase leaching of calcium, and other neutralizing cations, such as magnesium, sodium, and potassium (referred to as base cations) from forest soils. Acid deposition provides (1) hydrogen ions, which displace cations adsorbed to soil surfaces, and (2) sulfate and nitrate ions, which tend to keep these cations dissolved in soil water that eventually drains into streams and lakes. Results of preliminary

research in the 1970's suggested that elevated leaching might deplete soil calcium, decrease forest growth, and acidify surface-waters (Cowling and Dochinger, 1980). Related studies have also suggested that forest harvesting could reduce calcium availability through the removal of calcium stored in trees, which could lower the growth rates of the regenerating stand (Federer *et al*. 1989; Hornbeck *et al*. 1990).

The available magnesium content all samples soil at the surface label high and low values in the sub soil horizon but Profile (Table 20) samples FPT 9_1A, FPT 9_1B, FPT 9_2A, FPT 9_2B were magnesium vales were higher than profile FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B. Soils of FPT 53, magnesium values were very much lower. Sandy soils are most likely to lack magnesium. This deficiency is also seen when there is plenty of magnesium in the soil, but the roots cannot take it up because of poor soil structure, drought or water logging. When the underlying problems are resolved the magnesium deficiency disappears (Soil Fact 2005).

The reserve soil N is not immediately available for plant uptake as it is predominantly in an organic form (>95% in most soils). The quantities of organic N in top soils (0-10 cm) range from 0.5 t/ha in sandier soils in dry regions to 2 t/ha in clay soils. The range of 1-1.5 t/ha is common in local soils. In the Red Earths, as much N again occurs in the next 20 cm of soil. This conversion occurs as a result of microorganisms decomposing organic matter in soil to get energy for their growth. Where the organic matter is high in N, the N in excess of their needs is released into the soil in available forms (Black, 1998). The result of these studies were nitrogen of soil is lower in all profiles, but profile (Table 20) FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B were lower nitrogen contents than FPT 9_1A, FPT 9_1B, FPT 9_2A, FPT 9_2B. With sandy-textured soils, there is a serious problem with nitrate leaching. Since these soils are not capable of holding large amounts of water, heavy rains can move nitrate out of the crop-rooting zone. Silty to clay soils can hold considerable water and are therefore not subject to as much loss from nitrate leaching (Daryl and Buchholz.1993).

Organic matter enhances water and nutrient holding capacity and improves soil structure, managing for soil carbon can enhance productivity and environmental quality, and can reduce the severity and costs of natural phenomena, such as drought, flood, and disease. In addition, increasing soil organic matter levels can reduce atmospheric CO2 levels that contribute to climate change (NRCS, 2005 and L. Cooperband, 2002. Mitchell and Everest 1995). The organic matter of soils of sample plots were high at the surface label and low values in the sub soil horizon but Profile (Table 20) samples FPT 9_1A, FPT 9_1B, FPT 9_2A, FPT 9_2B were organic matter were higher than profile FPT 53_1A, FPT 53_1B, FPT 53_2A, FPT 53_2B. The degree of surface soil aggregation will determine how tightly the soil particles are held during rain or windstorms. Stable soil aggregates resist movement by wind or water because they are larger than primary particles of silt or clay. Soil pores created by aggregation also promote water infiltration; thereby reducing runoff and the likelihood that soil particles will be transported with the water (Cooperband, *et al*. 2002).

Second Section: Management Strategy of Rehabilitation Forest in Thailand

Second section based on data collection by using questionnaire survey, the result and discussion of this section, one parts was questionnaire for Foresters (of RFD/ DNWPC) and PTT staffs and other part was the questionnaire of villagers who lived near the studied areas, to find out the attitude of various stakeholders towards the performance of Royal Golden Jubilee Forest Rehabilitation Project and PTT rehabilitation project.

1. Royal Golden Jubilee Forest Rehabilitation Project in Thailand

1.1 Conceptual thinking of the Foresters and PTT staffs about the Royal Golden Jubilee Forest Rehabilitation Project

From these studied (Table 43), all respondents (100%) were agreed with the government policy on the Royal Golden Jubilee Forest Rehabilitation Project, by this project Thai people motivated to plant trees and taking care of planted seedling. It is good idea to collaborate with the private organization for forest rehabilitations project. It provided opportunity for Foresters to work with personnel's from other agencies. They all agreed that this activity, needed to be continued to rehabilitate degraded land. Most of respondents were not agreed that, RFD and PTT cannot do this work alone. Ecosystem management is holistic and therefore requires the input of many different disciplines, sectors and interest groups to build up and analyze all the information available and to make decisions. Ecosystem managers must ensure the appropriate collaboration of these different sectors and actors (Vicky Forgie, 2001). When they actively participated in the changes taking place around them instead of merely being targets of that changes. Based on unique Technology of Participation (TOP) methods, Private organization seeks to integrate the methods of human consciousness and organizational transformation to maximize the participation of grassroots people in taking responsibility for their own lives and for their community as a whole (ICA, Japan 2003.).

Table 43 Conceptual Thinking of Foresters and PTT staffs about Government. Policy and the Royal Golden Jubilee Forest Rehabilitation Project

Conceptual Thinking Govt. About Policy and Golden Jubilee	Foresters (N = 17)		PTT staffs (N = 20)	
	Agree %	Not Agree %	Agree %	Not Agree %
Good idea and Thai people plant tree	100	0	100	0
Good idea to give other agencies	100	0	95	5
Govt. support to continuation with FPT work	100	0	95	5
Forestry agencies are ready for continuation this work	100	0	95	5
Forestry agencies work well without others	0	100	-	-
Govt. activate Thais to love trees & more forest	100	0	100	0
PTT ready for the continuation of this project	-	-	90	10
PTT work well without support of govt. agencies	-	-	15	85

1.2 Conceptual thinking of the villagers about the Royal Golden Jubilee Forest Rehabilitation Project in the FPT Areas (FPT 9 and FPT 53)

Conceptual thinking about Royal Golden Jubilee Forest Rehabilitation Project from respondents who lived adjacent to the studied area were shown in Tables 44 and 45. The average mean of each question in each village were 1.725 ± 0.942 Klong Mahad, 1.682 ± 0.336 Nong Prue Kan Yang, 1.700 ± 0.404 Ang Toey and 1.753 ± 0.346 Hansay Mu-1, 1.758 ± 0.356 Hansay Mu-2, 1.667 ± 0.368 Hansay Mu-5 and 1.779 ± 0.307 Hansay Mu-9). More or less every village's respondents gave same level of thinking and possessed positive attitude toward Royal Golden Jubilee Forest Rehabilitation Project in the FPT 9 and FPT 53 Areas. This referred that "…. in their Noble King, the Thai people trust" (Kraivixien, 1982).

Table 44 Conceptual thinking of the Community Peoples about the Royal Golden Jubilee Forest Rehabilitation Project (RGJFHP) in the FPT 9

Conceptual Thinking of Community Peoples about RGJFHP	Ang Toey Village		Klong Mahad Village		Nong Prue Kan Yang Village	
	$\overline{X}$ ± SD	%	$\overline{X}$ ± SD	%	$\overline{X}$ ± SD	%
Thais have to help greening to salute H.M the King	1.80±0.40	80	1.902±1.90	90.19	1.83±0.37	83.78
PTT has top performance on RGJRP	1.80±0.40	80	1.922±1.92	92.19	1.91±0.27	91.89
Completing RGJRP project villagers are committed	1.86±0.34	86.66	1.902±0.30	90.19	1.86±0.34	86.49
Involve in Royal Golden Jubilee Project	1.16±0.37	83.33	1.059±0.23	94	1.18±0.39	81.08
Villagers are helping conserve the FPT area	1.80±0.40	80	1.706±1.41	50.98	1.18±0.31	89.19
Community self reliant	1.80±0.40	80	1.784±0.41	21.56	1.88±0.31	88.89
Interested to plant tree	1.66±0.47	90	1.804±0.40	80.39	1.88±0.32	88.57
Average	1.70±0.40	82.85	1.725±0.94	74.21	1.68±0.33	87.68
	N=30		N=51		N=37	

Table 45 Conceptual thinking of the Community Peoples about the Royal Golden Jubilee rehabilitation project in The FPT 53

Conceptual Thinking of Community Peoples About of Royal Golden Jubilee	Han Say, Mu-1, Village		Han Say, Mu-2, Village		Han Say, Mu-5, Village		Han Say, Mu-9, village	
	$\overline{X}$ ± SD	%	$\overline{X}$ ± SD	%	$\overline{X}$ ± SD	%	$\overline{X}$ ± SD	%
Thais have to help greening to salute H.M the King	1.92±0.27	92.30	1.79±0.40	92.11	1.85±0.35	90.48	1.90±0.30	90
PTT has top performance on RGJRP	1.92±0.27	92.31	1.87±0.33	87.18	1.90±0.30	90.48	1.95±0.22	95
Completing RGJRP project villagers are committed	1.82±0.38	82.5	1.84±0.36	84.62	1.85±0.35	85.71	1.95±0.22	95
Involve in Royal Golden Jubilee Project	1.15±0.36	85	1.17±0.38	92.11	1.14±0.35	85.71	1.10±0.30	90
Villagers are helping conserve the FPT area	1.87±0.33	87.5	1.92±0.27	92.11	1.85±0.35	85.71	1.85±0.36	85
Community self reliant	1.87±0.33	87.5	1.79±0.40	90.11	1.23±0.43	85.71	1.80±0.41	80
Interested to plant tree	1.70±0.46	70	1.89±0.30	89.74	1.81±0.40	80.95	1.90±0.30	90
Average	1.75±0.34	85.30	1.75±0.35	89.711	1.66±0.36	86.39	1.77±0.30	89.28
	N=40		N=39		N=21		N=20	

2. Collaborative with Petroleum Public Company Limited (PTT) and Government Agencies For Forest Rehabilitation Project in Thailand

The discussion in this part have consists of eight heading, in the first heading gives the background of the officers of RFD/DNPWC and PTT; second, conceptual thinking about administration of both agencies (RFD/ DNPWC and PTT); third, conceptual thinking about supporting agencies in FPT rehabilitation work; forth, conceptual thinking about the Foresters performance in FPT rehabilitation work; fifth, conceptual thinking about the PTT staffs performance in FPT rehabilitation work; sixth, conceptual thinking about the performance of villagers living closed to FPT areas; seventh conceptual thinking about the community's development by the rehabilitation works in target villages bordering of FPT areas and lastly takes opinion on future perspective of rehabilitation work at different sector. In this study, twenty set questionnaire send to different protected area regional office and reforestation section of PTT head office in Thailand and under this studies seventeen participated of forest officer of different regional office and twenty participated from PTT of different district offices of PTT.

2.1 Background of the officers of RFD/DNPWC and PTT staffs

The number of respondent samples was 17 from RFD/ DNPWC and 20 from PTT. Table 46. Age of respondent's shows that the largest group in the samples were in the 40-50-age bracket (41.17% and 60%) followed by those ages within 50-60 (29.41% and 20%). The majority (70.58%) are over 40 years old, indicating most members have gone through the senior officer of RFD/ DNPWC and PTT. From these studied (Table 47), that the working period of respondents was higher than ten years (94.11% and 75%) at RFD/ DNPWC and PTT. Table 48, showed about the respondent's of RFD/ DNPWC work experience 4-18 years and PTT 3-12 years working period in FPT area, A positive sign of this member group is that there were young officer 20% of PTT staffs not had works experience in FPT area.

Table 46 Age of respondents (Foresters and PTT staffs)

(N = 17)			(N = 20)		
Foresters			PTT staffs		
Age (Year)	Number	%	Age (Year)	Number	%
30-40	5	29.41	20-30	2	10
40-50	7	41.17	30-40	2	10
50-60	5	29.41	40-50	12	60
-	-	-	50-60	4	20

Table 47 Working period of respondents (Foresters and PTT staffs) in the organization.

(N = 17) (N = 20)

Working period	Foresters		PTT staffs	
	Number	%	Number	%
<5	0	0	0	0
1-5	0	0	2	10
6-10	1	5.88	3	15
>10	16	94.11	15	75

Table 48 Working period of respondents (Foresters and PTT staffs) in FPT area

(N = 17) (N = 20)

Foresters			PTT staffs		
Number	%	Years	Number	%	Years
1	5.88	4	4	20	0
2	11.76	5	3	15	3
1	5.88	6	2	10	4
1	5.88	8	1	5	5
3	17.64	9	1	5	7
2	11.76	10	1	5	8
4	23.52	11	1	5	9
1	5.88	12	4	20	10
1	5.88	13	2	10	11
1	5.88	18	1	5	12
Total 17	100		20		100

2.2 Conceptual thinking about administration of both agencies (RFD/DNPWC and PTT)

From these studied (Table 49), that the administration of Forestry agency tried their best (64% and 60%), The supreme symbol of the Nation and the repository of the Nation's sacred trust become humanized in the person of His Majesty and the Constitutional King does not become a mere Seal or Signature. His views, instead, become of great importance and the Government of the day has come to place great value on the King's advices. High officials are known always to acquaint themselves thoroughly with the subjects at hand whenever they have to go into audience with the King in order to be prepared to answer some very searching questions, which may be put to them by His Majesty, and people in all walks of life eagerly seek Royal opinions on matters of vital concern (Royal Project 2003). So it is impossible administration to give low interest in FPT area (70.5% and 50%).

Govt. budget provisions do not cover all necessary activities and leave constraints for the implementers (RFD, Workshop report 1999), agree with 65.4% and 45%. Therefore is need for a large budget to take care of all operations to be performed for creating forests with higher biodiversity. There should be programs to better inform private sectors and villagers to help them better understand the issue of rehabilitating forest and biodiversity and to encourage private sector to be more involve, (RFD, Workshop report 1999), agree with Foresters 100% and PTT staffs 75%.

Chantanparb and Wood(1986) summarized the problems and constraints encountered by the RFD in reforestation activities as , the policy for natural resource management, especially land resource conveys a mixed image, the establishment of plantation and their subsequent management require a large budget and a lot of time to get a return on the money, so it is necessary to have a budget commitment on a long – term basis rather than the traditional one year basis, the procedure and process for planting is quite cumbersome. In many cases the delay in processing makes it impossible to carryout planting in the correct season.

The lacks of know –how in planting some species, insufficient seeds for the planting season and lack of knowledge in producing seedling. The sites normally available tend to have poor soil fertility, existing weed problems and "illegal" forest dwellers (the last is the most critical problem). This is an increasing problem in some areas because many people have their own occupations that pay better than getting daily wages from working in plantations. The private sector has little confidence that investing in forest plantation will provide a sound financial return. So need to be setting series training for PTT responsible staff, responsible Forest officers and community leaders, agree with (85% and 100%). Also set up information unit, to ease follow up program, agree with 100% and 95%.

From these studied realized that Government Agencies and PTT administration is strong, and officers were acquainting themselves on the honor of His Majesty the King. But Government officer need appropriated budget in proper time. Both agencies officers needed training more and they were interested to involve other supporting agencies for forest Rehabilitation works.

Table 49 Conceptual thinking of Foresters and PTT staffs about their Administration office

(N = 17) (N = 20)

Conceptual Thinking About the Administration of RFD and PTT	Foresters		PTT staffs	
	Agree %	Not Agree %	Agree %	Not Agree %
Forestry agencies have tied their best	64.70	35.29	60	40
Forestry agency give low interest in FPT area	29.7	70.5	-	-
PTT administration give less attention	-	-	50	50
Administration of Foresters agencies gave low attention	23.5	76.4	-	-
Govt. budget little for project	65.4	35.29	45	55
Forest agency need more partners for loin	100	0	-	-
PTT admin should seek other partners	-	-	65	35
Forestry agency revise the responsible agencies	76.47	23.529		
Set up more training for officers	100	0	85	15
Set up more training for community leader & People	100	0	95	5
Set up information unit, to ease follow up program	100	0	95	5
Supporting agency important for rehabilitation work	100	0	-	-

2.3 Conceptual thinking of Foresters and PTT staffs about supporting agencies in FPT rehabilitation work

From these studied (Table 50), that the concept of RFD/ DNPWC and PTT officers about there administration. Majority of respondents (64.70% and 70%) not agree with the state enterprise perform well but state enterprise have good budget, agree (70.58% and 80%). Foresters support that PTT is the best enterprise for supporting Royal

Golden Jubilee Project. The Royal Golden Jubilee Project firstly intended by His Majesty The King's own private funds for highland agricultural research, development and experimentation work, prior to and parallel with the intensive efforts of state agencies to built up their capability in these newly recognized areas of national concern (Kanchanapisek Network 1996).

From the beginning, many agencies have co-operated with the Royal Project to establish the work on strong foundations. These agencies include: universities, the Ministries of Agriculture and Cooperatives, Ministry of Science and Technology, the Ministry of Interior, State Owned Enterprises, the private sector, international organizations and foreign governments (Kanchanapisek Network 1996). For rehabilitation work need to be supporting agencies agree with 100% and 95%.

An almost irreversible process of forest destruction and site degradation started in 1968, when the area became a strong hold for rebels attempting to overthrow the Royal Thai Government. Khao Kho was the site of 12 major battles between the rebels and the Royal Thai army between 1968 and 1982. At the beginning of the 1970s, in a new strategy to end the insurgency , the Royal Thai Army began to build roads, to clear forests and to encourage local families to settle and to practice agriculture on assigned land, opening up the densely forest area. In 1990, the United Nations Development Programmed (UNDP) funded FAO project "Reforestation of Denuded Forest Lands in Khao Kho" was initiated, in cooperation with the Royal Thai Army and the Royal Thai Forest Department, to identify environmentally suitable land use options; to rehabilitate denuded forest lands through reforestation: to provide the setting for farmers to practice sustainable agriculture; and to create employment opportunities needed to avoid future deforestation. A search for "Khao Kho" on the Internet leads to several a sites advertising Khao Kho as the "Switzerland of Thailand" (Marghescu, 1996). The rehabilited forests have become an asset for tourism, bringing further benefits to the local population. Samoeng District of Chiang Mai Province, The Mae Tung Ting model farm project started on 5 March 1997, when Her Majesty the Queen visited villagers in Mae Tung Ting Village. She told the Third Army Area Command and other agencies joining the Samoeng reforestation program in Mae Tung Ting to establish a model farm and a SUPPORT center in Mae Tung Ting. ("SUPPORT" stands for the Foundation for the Promotion of Supplementary Occupations and Related Techniques, established in 1976 by Her Majesty the Queen.). So Foresters and PTT staffs also agree (88.23% and 90%) that, Army participated more in Royal Golden Jubilee Project.

From these studied realized that, Forest Rehabilitation Project to established the work on strong foundation need to be included various agencies.

Table 50 Conceptual thinking of Foresters and PTT staffs about the supporting agencies in FPT works

Conceptual thinking about the supporting agencies in FPT works	Foresters (N = 17)		PTT staffs (N = 20)	
	Agree %	Not Agree %	Agree %	Not Agree%
State enterprise can perform well in rehabilitation work	35.29	64.70	70	30
State enterprise have sufficient budget	70.58	29.41	80	20
PTT is best enterprise for supporting RGJRP	52.94	47.05	-	
RFD is the best govt. agency to RGJR project	-	-	70	30
Army should participate more in RGJRP	88.23	11.76	90	10
Officers in the provenance should participant more in FPT work	94.11	5.88	100	0
Community leader participate more in FPT work	100	0	95	5

2.4. Conceptual Thinking of Foresters and PTT staffs about the Foresters' performance in the FPT areas.

In Thailand the eighth National Economic and Social Development Plan (NESD) encouraged the people to participate in the process, initiated community organizations, strengthened the community, campaigned for the understanding of government officials towards the community roles, and promoted peoples participation. Adjusting attitude and capabilities of government agencies towards the cooperation with and support for local communities (Somsak 1999). RFD officers should change their attitude towards forest conservation and try to encourage the active participation of local people (Jantakad and Gilmour 1999). So from these studied (Table 51), the attitude of Foresters and their performance responsibility on FPT works, Foresters said their own performance and got opinion from the PTT staffs (who worked in FPT area) about Foresters in Table50 showed, more said 41% and most says 35% and PTT staffs said 40% and fair 50% Foresters done their best in FPT works.

The Director General of RFD gave an interview in the Bangkok Post, and mentioned that, “the challenge is to find a way to mingle the two (people and forest) with minimum impact on the forest.” This makes clear that the RFD intends to make a cultural shift. RFD officers should change their attitude towards forest conservation and encourage the participants of local people (Gilmore, 1999). But Table 51 showed that Foresters were efficient skill in coordinate with other partner, more 64% and 45% Foresters and PTT staffs said. RFD need more support from other agencies, RFD need more support from PTT, and RFD need more support from NGO’s, Foresters said (fair 41%, most 52%, most 41%) and PTT staffs said (fair 40%, most 45%, more 35%).

To allow the community and public to participate in management, such as participation in planning, decision making and the evaluating process that can be achieved by a public hearing, including support for the rights of the local community, which is recognized by law, and the backing for the NGO’s budget to launch the Community Forestry Bill (Somsak 1999).

In Thailand’s Constitution also said in Clause No.79: The state shall promote and encourage public participation in the preservation, maintenance and balanced exploitation of natural resources and biological diversity, and in the promotion, maintenance and protection of the quality of the environment in accordance with development principles. NGO’s will provide the budget and the environment; for example, PTT, Bangchak Refinery and Cement Thai Co. have implemented private reforestation projects (Somsak 1999). Forestry agency is strong to continue this work, in Table 50. Foresters said most 47% but PTT said fair 50%.

Forestry agency are strong to continue this work, because the RFD’s additional strategies for forest rehabilitation were, protection plan by strict law enforcement; protection from fires that are totally caused by human activities; forest rehabilitation and promotion of reforestation; Institutional arrangements of communities under the forest area only; and administration research development for biodiversity and the ecosystem (Polpanpua P. 1999). So without facing problem they play active role in rehabilitation work, Foresters said most 52.94% but PTT staffs said fair 55%.

Budget of seedling raising of forest agencies is limited most 64% Foresters said. Only natural seedling needed, Foresters were said most 23%, because in forestation programmed in recognition of the Royal Golden Jubilee, operated by 2 categories, either planting by themselves or financing the reforestation of local communities. Mean while RFD has been responsible for the seedling supply and technological advice (Polpanpua, 1999), so need to be raising seedling.

From these studied Foresters of RFD were efficient skill in co-ordinate with other partner and they also change their attitude towards forest conservation and encourage participants of local people. So Foresters of forestry agency wanted to continue this work with help/support of Non Government Organization.

Table 51 Conceptual thinking of Foresters and PTT staffs about the performance of Foresters responsible in FPT area

Conceptual thinking about the performance of Foresters responsible on FPT work	Foresters (N = 17)					PTT staffs (N = 20)				
	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)
Foresters done their best in FPT works	0	1(5.9)	2(11.7)	7(41)	6(35)		1(5)	9(45)	9(45)	1(5)
Foresters have efficient skill in coordinate with other partners	0	1(5.9)	4(23.5)	11(64.70)	1(5.9)	0	1(5)	9(45)	9(45)	1(5)
RFD have sufficient budget	2(11.7)	3(17.6)	8(47.05)	4(23.52)	0	2(10)	2(10)	5(25)	5(25)	6(30)
RFD need more support from other private agencies	0	0	4(23.52)	7(41.17)	6(35.29)	0	1(5)	8(40)	4(20)	7(35)
RFD need more support from PTT	0	1(5.9)	4(23.52)	3(17.64)	9(52.94)	2(10)		5(25)	4(20)	9(45)
RFD need more support from NGO's	0	1(5.9)	5(29.41)	4(23.52)	7(41.17)	1(5)	3(15)	4(20)	7(35)	5(25)
Forestry agency are strong to continue this work	0	2(11.7)	2(11.7)	5(29.41)	8(47.05)	0	0	10(50)	5(25)	5(25)
RFD strong enough to do this work	2(11.7)	0	7(41.17)	3(17.64)	5(29.41)	-	-	-	-	-
Without facing problem Foresters play active role	1(5.9)	0	3(17.64)	4(23.52)	9(52.94)	0	4(20)	11(55)	2(10)	3(15)
Budget for seedling raising of forest agencies is limited	1(5.9)	0	0	5(29.41)	11(64.70)	1(5)	0	6(30)	7(35)	6(30)

Table 51 (Continued)

Conceptual thinking about the performance of Foresters responsible on FPT work	Foresters					PTT staffs				
	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)
Only natural seedling are needed	0	2(11.7)	7(41.17)	4(23.52)	4(23.52)	0	1(5)	2(10)	3(15)	8(40)
It is suitable that forest agencies prepared seedling	-	-		-	-	0	1(5)		10(50)	7(35)
Private nurseries can provide job related to seedling production	1(5.9)	3(17.64)	6(35.29)	5(29.41)	2(11.7)	0	0	4(20)	9(45)	7(35)
Community can contract the job related to seed production	1(5.9)	1(5.9)	6(35.29)	5(29.41)	3(17.64)	0	0	3(15)	7(35)	10(50)
Community participate to managing FPT area	0	3(17.64)	2(11.7)	3(17.64)	9(52.94)	0	0	0	4(20)	16(80)
Foresters have lack of knowledge in restoration & successive capacity	0	6(35.29)	8(47.05)	2(11.7)	1(5.9)	1(5)	1(5)	8(40)	6(30)	4(20)
Sufficient budget for administration and management of FPT work	2(11.7)	5(29.41)	7(41.17)	3(17.64)	0	0	1(5)	5(25)	8(40)	6(30)
FPT received public interest and budget is used efficiently	1(5.9)	2(11.7)	5(29.41)	9(52.94)	0	0	1(5)	8(40)	6(30)	5(25)
Foresters are efficient skill in cooperating with other partner	0	1(5.9)	2(11.7)	9(52.94)	5(29.41)	0	0	5(25)	13(65)	2(10)

2.5 Conceptual thinking of Foresters and PTT staffs about the performance of PTT staffs responsible in FPT area

PTT Public Company limited has recognized the nation's policy of environmental protection and has volunteered to reforest one million Rai (400 thousand acres) of the project area. This is in the belief that every tree that is planted is representative of the loyalty and nationalism that each individual has towards Thailand and His Majesty the King (Report of Royal Golden Jubilee Reforestation Project 1999). So from these studied (Table 30), find out the attitude of PTT staffs and their performance responsibility on FPT works. PTT staffs said their own performance and got opinion from the Foresters (who worked in FPT area) about PTT staffs in (Table 52) showed, that PTT staffs worked their full capacity in FPT area, Foresters said (more 58%, most 17.64%) and PTT staffs said (more 59%, most 40%).

PTT staffs have strong intention their work and well basic idea and they are efficient in managing system in FPT area (Foresters said 82.34% and PTT staffs 95%). Because, the PTT reforestation project is normally divided into phases, First of all PTT enters the designated areas for a thorough survey with co-operation and suggestions from locals and forestry officials. The next step is the staking of FPT plots so that definite project areas and the original species of area vegetation can be determined. After that, fire lines around the plots were made, not only for fire prevention but also for seedling transportation and fire patrolling. The weeding phase, which followed, was executed with ultimate care in order to preserved natural seedling in the area (Report of Royal Golden Jubilee Reforestation Project 1999).

PTT staffs' co-operative measures to include both governmental and private sectors in the project with special focus on the participation of communities around each FPT area (Report of Royal Golden Jubilee Reforestation Project 1999). From these studied Foresters and PTT staffs also said that, PTT staffs cooperation and support in development activities (more and most 58.81% and 95%). PTT staffs show their cooperation and support in development activities (more and most 76.46%, 90%).

Under PTT's credo, the mission to contribute to the society as well as environment protection has always been company's priority apart from commercial goal and competitiveness increase as well as good corporate governance practices. Therefore, a range of activities have been carefully designed and continuously undertaken, all of those specifically spell out our social and environmental ethics (PTT 2005). When launched the reforestation campaign, PTT became aware in fire prevention problem. Therefore, Prevention Training Program for local villagers has been initialed in certain target areas (Report of Royal Golden Jubilee Reforestation Project 1999). So PTT staffs considered the importance of fire control, Foresters and PTT staffs said (more and most 88.23%, 100%).

The PTT Forest Youth Guards Program began in 1995 with selected schools in a 10- km. Radius of FPT areas. Each program had about 100-120 student participants the main lessons were about the significance and rehabilitation of forest resources and environment. This was a training camp for environmental concerns with trees planting and maintenance in FPT plots once every two months for 2 consecutive years. As a part of this project, PTT also supports vocational training in agriculture such as live stock raising, vegetable firming, etc. (Report of Royal Golden Jubilee Reforestation Project 1999). PTT staffs realized the youth in planting and maintaining FPT area, Foresters and PTT staff said (more and most 94.11%, 95%).

PTT provide children opportunities to learn about crucial aspects of their livelihood and environment so that they can grow up and become the strength of our nation (Report of Royal Golden Jubilee Reforestation Project 1999). Various activities are implemented to build youths' awareness of the forest and its wild habitat. Programs such as working in assigned sapling fields and visiting reforested areas are designed to encourage the children's awareness of the importance forest conservation (Report of Royal Golden Jubilee Reforestation Project 1999). PTT staffs had sufficient knowledge Foresters (fair and more 76.47%, 17.64%) and PTT staffs said (more and most 35%, 65%). PTT staffs regularly followed up FPT activities Foresters and PTT staffs said (more and most 88.22%, 90%). PTT staffs had no conflict with community leaders Foresters and PTT staffs said (more and most 88.22%, 80%).

From these studied realize that PTT staffs were responsible for rehabilitation work in FPT areas and their wise manage mental practices in rehabilitation work and they were co-operated with village people.

Table 52 Conceptual thinking Foresters and PTT staffs about the performance of PTT staffs responsible in FPT area

Conceptual thinking about the performance of PTT staffs responsible on FPT work	Foresters N=17					PTT staffs N=20				
	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)
PTT staffs worked their full capacity	0	0	4(23.5)	10(58.8)	3(17.6)	0	1(5)	1(5)	10(50)	8(40)
PTT staffs have strong intention their work and well basic idea	0	0	3(17.6)	11(64.7)	3(17.6)	0	0	1(5)	4(20)	15(75)
PTT staffs has efficient managing system	0	0	5(29.4)	11(64.7)	1(5.9)	0	0	1(5)	6(30)	13(65)
PTT staffs are honest at work Royal Golden Jubilee Forest Rehabilitation Project (RGFJRP)	0	1(5.9)	4(23.5)	11(64.7)	1(5.9)	0	0	1(5)	8(40)	11(55)
PTT staffs shows their cooperation and support in develop activities	0	0	4(23.5)	10(58.8)	3(17.6)	0	0	2(10)	10(50)	8(40)
PTT staffs cooperate with govt. officer	0	0	7(41.2)	8(47.1)	2(11.8)	0	1(5)	0	7(35)	12(60)
PTT have sufficient equipments	0	0	6(35.3)	6(35.3)	3(17.6)	0	0	3(15)	8(40)	9(45)
PTT staffs have sufficient knowledge	0	1(5.9)	13(76.5)	3(17.6)	0	0	0	5(25)	10(50)	5(25)

Table 52 (continued)

Conceptual thinking about the performance of PTT staffs responsible on FPT work	Foresters					PTT staffs				
	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)
PTT staffs emphasized the importance of socio-economic development	0	0	2(11.8)	12(70.6)	3(17.6)	0	0	0	7(35)	13(65)
PTT staffs considered the importance of fire control	0	0	2(11.8)	13(76.5)	2(11.8)				6(30)	14(70)
PTT staffs have conflict with community leaders	0	1(5.9)	1(5.9)	12(70.6)	3(17.6)	10	0	10	8(40)	8(40)
PTT staffs realized the youth in planting and maintaining FPT area	0	0	1(5.9)	11(64.7)	5(29.4)	0	0	1(5)	5(25)	14(70)
PTT staffs regularly followed up FPT activities	0	0	2(11.8)	11(64.7)	4(23.5)	0	0	10	12(60)	6(30)

2.6 Conceptual thinking of Foresters and PTT staffs about the performance of village leaders and villagers living closed to FPT areas

From this study Foresters and PTT staffs gave their opinion (Table 53) about the performance of village leaders near the FPT areas. This study found that village leaders work at their full capacity, Foresters and PTT staffs said (fare, 70.58%, 25%, more 23.52%, 60% and most 5.88%, 15%). Village leaders paid interest to planting and managing rehabilitant area, Foresters and PTT staffs said (fare, 70.52%, 25%, more 23.52%, 55% and most 5.88%, 20%). Village leader worked with forest authorities, Foresters and PTT staffs said (fare, 52.94%, 25%, more 41.17%, 55% and most 5.88%, 20%). Village leader worked well with people, Foresters and PTT staffs said (fare, 47.05%, 40%, more 41.17%, 40% and most 11%, 20%). One of the leading persons in convincing the villagers to preserve their forest was the former headman of the village. His concern for forest conservation spread from his observation of sinking water levels, of small streams falling dry and of information he obtained through his contact with officials and outside experts in seminars. Together with other village leaders, he convinced the villagers to stop selling wood outside the village in order to preserve the forest for the villagers and their children. Ecological forest functions such as watershed protection and climate regulation were other important arguments. The structure of the 'self defense village' with its various committees supported the forest protection. Village leaders could use the already existing committee structure to organize villagers for conservation. When asked for reasons to protect the forest, most villagers now emphasize the importance of forest as watershed along with the need to conserve nature in general. To provide a steady supply of wood for the villagers and to stop outsiders logging is important reasons for establishing the community forest rules. Local leaders have strong influence on village politics and strongly supported the idea of community forestry. The idea of managing forest on village level derived out of conflicts with other users, it was not brought into the village by outside agencies (Christi 1998).

They were paid more attention on youth on the managing rehabilitant area, Foresters and PTT staffs said (fare, 58.82%, 25%, more 29.41%, 50% and most 25%). Village leader control forest destruction, Foresters and PTT staffs said (fare, 35.29%, 25%, more 35.29%, 40% and most 15%). From these realize that performances of village leaders in the FPT areas were medium and they plays moderate role in different activities in FPT rehabilitation works. Village leaders have strong influence on village politics and strongly supported the idea of community forestry. The idea of managing forest on village level derived out of conflicts with other users, it was not brought into the village by outside agencies (Christi 1998).

From this study Foresters and PTTs staff gave their opinion about the performance of village leaders near the FPT areas. This study found that village leader work at their full capacity, Foresters and PTT staffs said (fare, 70.58%, 25%, more 23.52%, 60% and most 5.88%, 15%).

Village leader paid interest to planting and managing rehabilitant area, Foresters and PTT staffs said (fare, 70.52%, 25%, more 23.52%, 55% and most 5.88%, 20%). Village leaders worked well with forest authorities, Foresters and PTT staffs said (fare, 52.94%, 25%, more 41.17%, 55% and most 5.88%, 20%).

Village leader worked well with people, Foresters and PTT staffs said (fare, 47.05%, 40%, more 41.17%, 40% and most 11%, 20%).

They were paid more attention on youth on the managing rehabilitant area, Foresters and PTT staffs said (fare, 58.82%, 25%, more 29.41%, 50% and most 25%). Village leader control forest destruction, Foresters and PTT staffs said (fare, 35.29%, 25%, more 35.29%, 40% and most 15%).

From these realize that performances of village leaders in the FPT areas were medium and they plays moderate role in different activities in FPT rehabilitation works.

Table 53 Conceptual thinking Foresters and PTT staffs about the performance village leaders and villagers living closed to FPT areas.

Conceptual thinking about the performance village leaders and villagers living closed to FPT areas	Foresters (N = 17)					PTT staffs (N = 20)				
	Least No.(%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)
Village leader work at their full capacity	0	0	12(70.5)	4(23.5)	1(5.9)	0	0	5(25)	12(60)	3(15)
Village leader paid interest to planting and managing FPT area	0	0	12(70.5)	4(23.5)	1(5.9)	0	0	5(25)	11(55)	4(20)
VL work well with forest authorities	0	0	9(52.9)	7(41.2)	1(5.9)	0	0	5(25)	11(55)	4(20)
VL worked well with people	0	0	8(47.1)	7(41.2)	2(11.8)	0	0	8(40)	8(40)	4(20)
VL control forest destruction	1(5.9)	4(23.5)	6(35.3)	6(35.3)	0	0	1(5)	8(40)	8(40)	3(15)
VL paid more attention on youth on the managing rehabilitant area	0	2(11.8)	10(58.8)	5(29.4)	0	0	0	5(25)	10(50)	5(25)

2.7 Conceptual thinking of Foresters and PTT staffs about the Communities development by the Rehabilitation works in target villages

The Developing PTT Village for Forest Protection project is a continuation of the Reforestation Project in honors of the Golden Jubilee of His Majesty the King of Thailand. It began on April 16th 1999 and has a primary objective of encouraging and supporting the 26 villages categorized as "Forest Plantation Targets" (FPTs), in there efforts towards sustainable forest management for community welfare and rehabilitation of forest resources. It is funded by the Petroleum Authority of Thailand (PTT) with a budget of 25 4000 000 Baht and would run until April 15th 2002(TFWN 2005). Now from these studied (Table 54) Foresters and PTT staffs said that people who lived near the FPT area were participated in this project for loyalty of the King (more and most 94.1%, 82%), people aware after participation of the Royal Golden Jubilee Reforestation Project (more and most 64.7%, 85%), People understood more about sustainable forest management (more and most 64.69%, 80%) and Royal Golden Jubilee Reforestation Project provide more income to the people (more and most 64.69%, 80%).

Though, the project started with doubts, skepticisms filled with the questions from various agents if the project would be successful and the trees would survive since reforestation is such a hard labor and involved with abundant obstacles caused by various reasons e.g. famine in the remote areas and even deforestation by man. Today, all Thai have witnessed a pleasant answer as the reforestation covering 1 million Rai area have now completed as previously promised by PTT, a result of concerted effort of all Thais nationwide. Successfully, original forest conditions have returned in a number of areas, as is evident in the return of local plants species, e.g. wild mushrooms, herbs, and *leprironta mucronata* grass, which brings additional income to villagers. Also, native animals, e.g. wild elephants, barking deer, roebucks, boars, wild fowls, and wild birds, have returned to feed in places once considered deteriorated forests, with clear traces of their return in the reforested areas (PTT news report 2005). So Royal Golden Jubilee Reforestation Project improved the role of villager in managing the forest resources, the opinion of Foresters and PTT staffs (more and most 70.58%, 90%).

A nation’s youth is its hope for future. Being aware of this fact, PTT had launched a project to instill in the youths concern and love of trees, forest and wild animals through various activities. Students in schools bordering FPT areas were educated in methods to manage forest resources and environment. They also participated in planting and maintenance activities as well (Report of Royal Golden Jubilee Reforestation Project 1999). So youth are activated for long-term forest resources management the opinion of Foresters and PTT staffs (more and most 58.18%, 95%).

PTT provide scholarship in school (more and most 52.87%, 75%), and PTT give sport equipments and other for youth, opinion of Foresters and PTT staffs (more and most 58.82%, 85%). PTT financially supports area schools such as funding library construction, initializing school lunch programs to provide more educational

opportunities for students. They provide children opportunities to learn about crucial aspects of their livelihood and environment so that they can grow up and become the strength of our nation (Report of Royal Golden Jubilee Reforestation Project 1999).

The fund is granted for PTT Development Villages that have successfully maintained their forest for three years. Villagers in these areas can apply for a loan. The interest from this initial capital will be spent in three distinctive ways:1. To increase the original funds; 2. To improve the community, such as providing them with basic utilities in addition to these provided initially by PTT. 3. To support other forest protection activities such as to set up forest patrols for the prevention afforest fires and forest invasion, as well as other occasional activities related to forest maintenance. In order that villagers learn to be self-reliant, a trustee of local villagers is to manage the funds by themselves. These funds will help to continually generate jobs and income for them (Report of Royal Golden Jubilee Reforestation Project 1999). So PTT supported the village fund for lifting up the living and income earning, opinion of Foresters and PTT staffs (more and most 46.93%, 90%).

PTT give marketing facilities to the community people who lived near the FPT areas, opinion of Foresters and PTT staffs (more and most 41.17%, 60%). The PTT project provides them with funding and needed marketing knowledge in order to form a working group and to find solutions to their problems. In addition to supporting suitable career-promotion for villagers around FPT areas, PTT also help them through the network of franchise convenience stores (Report of Royal Golden Jubilee Reforestation Project 1999).

To provide support and recognize to those who have rendered their service to the community and society by preserving the country's natural resource and environment, PTT reforestation project organized Award program (Report of Royal Golden Jubilee Reforestation Project 1999), opinion of Foresters and PTT staffs (more and most 58.82%, 70%).

From these studied to got the support of Foresters and PTT staffs and then realize that, for rehabilitation of forest, firstly initiated by royal Golden Jubilee and then development of community, which already done by PTT in target villages by implemented different type supplementary activities, to ensure the survival of the forest areas. Rehabilitation project in Honor of the Golden Jubilee of His Majesty's Reign and then PTT pledge to follow the royal initiatives of their Majesties the King's and the Queen's initiatives regarding the natural resources and environmental conservation and PTT gave supplementary projects aimed at Raising awareness of local communities to join hands in forest preservation (Report of Royal Golden Jubilee Reforestation Project 1999).

Table 54 Conceptual thinking of Foresters and PTT staffs about the communities development by the rehabilitation works in target village.

Conceptual thinking about the communities development by the rehabilitation works in target village	Foresters (N = 17)					PTT staffs (N = 20)				
	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)	Least No (%)	Less No (%)	Fare No (%)	More No (%)	Most No (%)
People participation locality to the king	0	0	1(5.9)	12(70.6)	4(23.5)	1(5)	0	1(5)	14(70)	16(80)
People understood more about sustainable forest management	0	0	4(23.5)	7(41.2)	4(23.5)	0	1(5)	3(15)	10(50)	6(30)
RGJRP provide improvement income generation	0	1(5.9)	5(29.4)	8(47.1)	3(17.6)	0	0	3(15)	11(55)	5(25)
People more aware after participation of the RGJRP	0	4(23.5)	2(11.8)	9(52.9)	2(11.8)	0	0	2(10)	13(65)	4(20)
RGJRP improved the role of villager in managing the forest resources	0	0	5(29.4)	7(41.2)	5(29.4)	0	0	2(10)	10(50)	8(40)
Youth are activated for long term forest resource management	0	0	7(41.2)	7(41.2)	3(17.6)	0	0	1(5)	11(55)	8(40)
PTT supported the village fund for lifting up the living & income earning	0	2(11.8)	7(41.2)	4(23.5)	3(17.6)	0	0	2(10)	10(50)	8(40)
PTT helped in improving school library for learning	0	0	8(47.1)	4(23.5)	3(17.6)	0	1(5)	3(15)	14(70)	2(10)
PTT provide scholarship in school	0	1(5.9)	7(41.2)	7(41.2)	2(11.8)	1(5)	1(5)	3(15)	11(55)	4(20)
PTT give the sport equipments and others for youth	0	1(5.9)	4(23.5)	9(52.9)	1(5.9)	0	1(5)	2(10)	12(60)	5(25)
PTT give marketing facilities through the net work of franchise store	1(5.9)	4(23.5)	5(29.4)	4(23.5)	1(5.9)	0	0	8(40)	11(55)	1(5)
PTT has different awards	0	1(5.9)	4(23.5)	9(52.9)	1(5.9)	1(5)	1(5)	4(20)	10(50)	4(20)

2.8. Opinion of Foresters and PTT staffs about Responsibilities of Agencies on Future Perspective of Rehabilitation works

Opinion of Foresters and PTT staffs about Responsibilities of Agencies on Future Perspective of Rehabilitation works results are summarized in Table 55. Forest protection, fire control, harvesting of log in FPT area, environmental management, new target areas of rehabilitated areas responsible agencies (firstly RFD/DNPWC 94.11%, 82.35%, 94.11%, 76.47%, 64% and then villagers 5.9%,17.64%, 5.88%,0%, 41.17%, 41.17%, 11.76%), opinion of Foresters because, Royal Forest Department, originally attached to Ministry of Agriculture and Cooperatives (MoAC) now transferred to MoNRE (Ministry of Natural Resource Environment), is responsible for management of economic forest and forest product utilization. Department of National Park, Wildlife and Plant Conservation (DNPWC) has its duties on forest conservation and protected areas management (UNNF 2005).

PTT staffs gave opinion in the Table 55 that, Forest protection, fire control, harvesting of log in FPT area, environmental management, of rehabilitated areas responsible agencies were (firstly villagers, 60%, 70%, 65%, 45%, 75%, and then RFD 30%, 15%, 35%, 50%,20%), because Thailand got its latest Constitution in 1997, which emphasizes on participation and equity right for people in natural resources, forest management regime have reoriented to promote and support people participation. However, there are some limitations, such as current laws and regulations are not coherent with, and capacity and attitude of government staff and its stakeholders toward participations for sustainable resources management are limited and new. Ministry of Natural Resources and Environment (MoNRE) has been emphasized management of natural resources by and with people participation (UNNF 2005).

From these studied Table 55, opinion of Foresters, in Environmental management, establishing of local industry center, new target areas responsible agencies (firstly PTT 23.52%, 41.17%, 23.52% and then villagers 0%, 47.05 %, 11.76%) because Continuous campaigns on forest and nature conservation, and lesson learn from the natural disasters have resulted in high level of conservation awareness in Thailand. Programs campaigning on conservation have been conducted through not only the national mass media, such as radio station and television, but the locals. Sponsorships into those campaigns have come from all sectors, in particular the private, who have supports for not only in cash but also investing to host several forest rehabilitation programs and awarding individual or community who are good doers in forest conservations. This is in 1(RFD, Forestry Statistic of Thailand 2003) particularly the Petroleum Authority of Thailand (PTT) who has been working on its program call Green Globe Award for more than 12 years(UNNF 2005).

From this studied realized that, RFD/ DNPWC is responsible for protection and conservation of rehabilitated forest but for sustainable forest management peoples are responsible for emphasizes on participation and equity right for people in natural

resources and Private organization had responsible to support for not only in cash but also investing to host several forest rehabilitation programs and awarding individual or community who are good doers in forest conservations.

Table 55 Opinion of Foresters and PTT staffs about Responsibilities of Agencies on Future Perspective of Rehabilitation works

Responsibilities of Agencies on Future Perspective of Rehabilitation work	Foresters (N = 17)			PTT staffs (N = 20)		
	Future Responsible Agencies			Future Responsible Agencies		
	RFD/DNPWP No (%)	PTT No (%)	Villagers No (%)	RFD/DNPWP No (%)	PTT No (%)	Villagers No (%)
Opinion of future perspective of forest protection	16(94.11)	0	1(5.88)	6(30)	2(10)	12(60)
Opinion Fire control	14(82.35)	0	3(17.64)	3(15)	3(15)	14(70)
Harvesting of log in FPT area	16(94.11)	0	1(5.88)	7(35)	0	13(65)
Environmental management	13(76.47)	4(23.52)	0	10(50)	1(5)	9(45)
Collection of non wood forest	10(58.82)	0	7(41.17)	4(20)	1(5)	15(75)
Networking FPT activities	10(58.82)	0	7(41.17)	7(35)	6(30)	7(35)
Establishing of local industry center	2(11.76)	7(41.17)	8(47.058)	4(20)	5(25)	11(55)
Collection of fuel wood in FPT areas	-	-	-	3(15)	0	17(85)
Development of environmental education in school	-	-	-	18(90)	1(5)	1(5)
New target areas	11(64.47)	4(23.52)	2(11.76)	14(70)	2(10)	4(20)

3. Community People's Participation in The Forest Rehabilitation Project

In this part collected data by using questionnaire survey from villages, which were near about the area of FPT 9 and FPT 53. Near about FPT 9 had 3(three) villages Discussion in this part consist of 6 heading, first heading gave the background of the respondents, second socio economics condition of the study area, third focus on community people's attitude in the forest conservation and plantation establishment, fourth focus on PTT promotes influencing factors awareness for people's participation in Forest Rehabilitation work, fifth conceptual thinking of the community people's about Non Government Organization (PTT) and sixth community people's suggestion for Rehabilitation Forest in future. In this study, 30.36% of Klong Mahad, 72.55% of Nong Prue Kan Yang, 17.86% of Ang Toey and 27.21% of Hansay Mu-1, 21.79% of Hansay Mu-2, 21% of Hansay Mu-5 and 19.45% of Hansay Mu-9 community who participated in the groups were under studied.

3.1 Social Background of Respondents of The Study Area

3.1.1 Status of household

The number of respondent sample was 51of Klong Mahad, 37 of Nong Prue Kan Yang, 30 of Angtoey and 40 of Hansay Mu-1, 39 of Hansay Mu-2, 21 of Hansay Mu-5 and 20 of Hansay Mu-9.

Table 34, showed that the largest group of the samples were in the head of household in (52.94%, 54.05%, and 66.66%) and spouse (41.5%, 37.83%, and 33.33%) in Klong Mahad, Nong Prue Kan Yang and Ang Toey villages.

Table 35, showed that the largest group of the samples were in the head of household in (67.5%, 66.66%, 71.42%, and 50%) and spouse (67.5%, 12.8%, 12.82% and 35%) Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9.

More or less all of respondents were head of household.

3.1.2 Age

From these studied (Table 56), that those ages within 40-60 (58.82%) Klong Mahad,(62.13%) Nong Prue Kan Yang, (63.32%) Angtoey, respectively.

From these studied (Table 57), that those ages within 40-70 (65%) Hansay Mu-1, (64.07%) Hansay Mu-2, (70%) Mu-9. Those ages were within 30-40 (42.85%) and 60-70 (28.57%) in Hansay Mu-5, respectively.

Most of the two places (FPT 9 and FPT 53) respondent's ages were 40-70 years.

3.1.3 Gender, marital status and religions

Among the respondents most of all are married (88.23%) Klong Mahad, (91.89%) Nong Prue Kan Yang, (83.33%)Ang Toey and (80%) Hansay Mu-1, (79%) Hansay Mu-2, (85.7%) Hansay Mu-5, (75%) Hansay Mu-9 in Table 55 and 56.

Among them (43.13%) male, (56%) female in Klong Mahad, (52.35%) male, (48.56%) female in Nong Prue Kan Yang, (50%) male, female in Ang Toey in Table 55.

Among them (57.5%) male, (42.5%) female in Hansay Mu-1, (56.41%) male, (43.58%) female in Hansay Mu-2, (66.66%) male, (33.33%) female in Hansay Mu-5 and (45%) male, female in Hansay Mu-9.100%. in Table 56.

All respondents of both areas were Buddhist.

3.1.4 Education, family member and living period in the area

In Table 56, results showed that one third of respondents of both areas were (37.25%, 32.43%, 40%) illiterate and (45.09%, 56.75%, 53.33%) primary level in Klong Mahad, Nong Prue Kan Yang, Ang Toey .

In Table 57, results showed that most of all are (80%, 79.48%, 47.61%, 65%) primary level in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9.

Most of all respondents of this study were not educated.

In Klong Mahad, Nong Prue Kan Yang, Ang Toe villages' respondents were 2-4 persons (35.29%, 40.54%, and 43.33%), 5-6 persons (37.25%, 40.54%, and 36.66%) and more than 7 persons (21.56%, 16.21%, and 16.66%) in their family.

In Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9 villages' respondents were 2-4 persons (40%, 41, 02%, 80.95%, and 65%), 5-6 persons (35%, 33.33%, 9.5%, and 20%) and more than 7 persons (22.5%, 23.07%, 4.76%, and 15%) in their family.

Most of all respondents of both areas were each respondent had more than two people in their family.

Among all respondents were lived in their places more than 10 years (82.35%, 89.18%, and 93.33%) in Klong Mahad, Nong Prue Kan Yang, Ang Toey and (95%, 94%, 100%, 90 %) in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9. Most of all respondents of this study were permanents of their places.

Table 56 Social Background of the villages of FPT 9 in Chachoengsao Province (2006)

Social status of the village	Klong Mahad Village (N= 51)		Nong Prue Kan Yang Village (N= 37)		Ang Toey Village (N=30)	
	Number	%	Number	%	Number	%
Status in household						
Head of house hold	27	52.94	20	54.05	20	66.66
Spouse	21	41.5	14	37.83	10	33.33
Parents	3	5.88	3	8.10		
Total	51	100	37	100	30	100
Respondent's gender						
Male	22	43.13	19	51.35	15	50
Female	29	56	18	48.64	15	50
	51	100	37	100		100
Respondent's age						
30-40	16	31.37	11	29.72	8	20
40-50	16	31.37	12	32.43	9	36.66
51-60	14	27.45	11	29.72	8	26.66
61-70	5	9.80	3	8.10	5	16.66
Respondent's marital Status						
Single	3	5.88	1	2.70	1	3.33
Married	45	88.23	34	91.89	25	83.33
Widow	3	5.88	2	5.40	4	13.33
Respondent's education						
Illiterate	19	37.25	12	32.43	12	40
Primary	23	45.09	21	56.75	16	53.33
Secondary	4	7.84	1	2.70	2	6.66
Any certificate or technical training	3	5.88	2	5.40	-	-
Bachelor or above	1	1.96	-	-	-	-
	50	98.03	36	97.29	30	100
Missing	1	1.96	1	2.70		
Respondent's religion						
Buddhist	51	100	37	100	30	100

Table 56 (Continued)

Social status of the village	(N= 51) Klong Mahad Village		(N= 37) Nong Prue Kan Yang Village		(N=30) Ang Toey Village	
	Number	%	Number	%	Number	%
Family member						
Less than two person	3	5.88	1	2.7	1	3.33
2-4 person	18	35.29	15	40.54	13	43.33
5-6 person	19	37.25	15	40.54	11	36.66
More than 7	11	21.56	6	16.21	5	16.66
Living period in the area						
2-5 years	6	11.76	2	5.40	1	3.33
5-10 years	3	5.88	2	5.40	1	3.33
More than 10 years	42	82.35	33	89.18	28	93.33

Table 57 Social Background of the villages of FPT 53 in Sakaeo Province (2006)

Social status of the village	(N= 40) Han Say, Mu-1, Village		(N=39) Han Say, Mu-2, Village		(N=21) Han Say, Mu-5, Village		(N= 20) Han Say, Mu-9,village	
	Number	%	Number	%	Number	%	Number	%
Status in household								
Head of house hold	27	67.5	26	66.66	15	71.42	10	50
Spouse	5	12.8	5	12.82	1	4.76	7	35
Parents	3	7.8	3	7.69	4	19.04	-	-
Son/daughter	5	12.8	5	12.82	1	4.76	2	10
Total			39	100	21	100	19	95
Missing							1	5
Respondent's gender								
Male	23	57.5	22	56.41	14	66.66	9	45
Female	17	42.5	17	43.58	7	33.33	9	45

Table 57 (Continued)

Social status of the village	(N= 40) Han Say, Mu-1, Village		(N=39) Han Say, Mu-2, Village		(N=21) Han Say, Mu-5, Village		(N= 20) Han Say, Mu-9, village	
	Number	%	Number	%	Number	%	Number	%
Respondent's age								
20-30	5	12.5	5	12.8	2	9.52	2	10
30-40	9	22.5	9	23.07	9	42.85	4	20
40-50	9	22.5	9	23.07	-	-	7	35
50-60	11	27.5	11	28.20	4	19.04	2	10
60-70	6	15	5	12.8	6	28.57	5	25
Respondent's marital Status								
Single	8	20	8	20.5	1	4.76	2	10
Married	32	80	31	79	18	85.7	15	75
Widow	-	-	-	-	-	-	2	10
Divorce					2	9.5	1	5
Respondent's education								
Illiterate	0	0	0	0	10	47.61	1	13
Primary	32	80	31	79.48	10	47.61	13	65
Secondary	5	12.5	5	12.82	-	-	2	10
Any certificate or technical training	1	2.5	1	2.56	-	-	1	5
Bachelor or above	1	2.5	1	2.56	1	4.76	3	15
	39	97.5	38	97.43	21		20	100
Missing	1	100	1	2.56				
Respondent's religion								
Buddhist	40	100	39	100	21	100	20	100

Table 57 (Continued)

Social status of the village	(N= 40) Han Say, Mu-1, Village		(N=39) Han Say, Mu-2, Village		(N=21) Han Say, Mu-5, Village		(N= 20) Han Say, Mu-9, village	
	Number	%	Number	%	Number	%	Number	%
Family member								
Less than two person	1	2.5	1	2.56	1	4.76		
2-4 person	16	40	16	41.02	17	80.95	13	65
5-6 person	14	35	13	33.33	2	9.5	4	20
More than 7	9	22.5	9	23.07	1	4.76	3	15
Living period in the area								
Less than 2 years	1	2.5	1		-	-		
2-5 years	1	2.5	-	-	-	-	2	10
5-10 years	-	-	1	2.5	-	-		
More than 10 years	38	95	37	94	21	100	18	90

3.2 Socio Economics Condition of the Study Area

3.2.1 Living Amenities of respondents

From these studied (Table58 and 59), living place of respondents were enough and more or less equal (66.66%, 62.16%, 90%) of three villages of FPT 9 and (100%) of four villages of FPT 53.

Road of Klong Mahad (37.25%), Nong Prue Kan Yang (24.32%) was not enough but Ang Toey (46.66%) enough than other two village of FPT 9 and (100%) in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and (70%) in Hansay Mu-9 in Table57 and 58.

Water supply (68.62%, 64.86%, 100%), Drinking water (49.01%, 43.24%,70%), Health sanitation (47.05%, 51.35%, 53.33%), School (86.27%, 72.97, 90%), Health center (84%, 81.0%, 56.66%), Temple (78%, 70.27%, 100%), Community (62.74%, 75%, 86.66%), Public Forest (15%, 27.02%, 23.33%), Bus communication (1.96%, 5.55%, 100%), Car services (35.29%, 37.83%, 56.66%), Graveyard (31.37%, 37.3%, 86.66%), Information center (56.86%, 37.83%, 56.66%), Public library (21.56%, 13.51%, 13.33%), Data Base Center (19.60%, 18.81%, 50%) in Klong Mahad, Nong

Prue Kan Yang, Ang Toey villages. Table 57 shows that water supply, drinking water, health center, temple, community, was well in Klong Mahad, Nong Prue Kan Yang, Ang Toey villages. Car services, graveyard, information center, data base center was medium position in Klong Mahad, Nong Prue Kan Yang, Ang Toey. But very poor in bus communication, public forest, public library in Klong Mahad, Nong Prue Kan Yang, Ang Toey villages. From these three villages of FPT 9, Klong Mahad's respondent living amenity were poor but well was Ang Toey village in Table58.

Water supply, Drinking water, Health center, Community, Graveyard, Information center was fully developed in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9(Table 58). Near about (100%)Public Forest, Health sanitation, School, Public library, Car services and Data Base center in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 but Health sanitation (50%), School (65%), Public Forest (30%), Car services (45.5%), Public library (5%), Data Base center (15.8%) in Hansay Mu-9. Bus communication was very poor (0%) in Hansay Mu-1, (66.7%, 45.0%) in Hansay Mu-5 and Hansay Mu-9 but Bus services is good (100%) at Hansay Mu-2 in Table 59.

3.2.2 Land holding of respondent's household

From these studied (Table 60), most respondents (in the context of their families) own their land (average3.3 Rai, 3.25 Rai, 3.36 Rai) in Klong Mahad, Nong Prue Kan Yang, Ang Toey. Very few respondents had no land; more or less evry body had land holding of respondents household. Near about 44% respondents of Klong Mahad, Nong Prue Kan Yang, Ang Toey had no upper land and other land, those who have 10-16 Rai more land they had only the upper land (average 2.77, 2.66,2.36 Rai) and others (average 2.74, 2.92, 2.36 Rai). The size of land owned by individual respondents varies from 1-to 5-Rai total lands, up land and others. Worth-mentioned that, respondent's land of every village had more or less same (Table 60 and 61) position. The national average house holds size in 2000 was 4.1 (NSO; Demographic Characteristics Projection for Thailand 1990-2015). The average of household size of the respondents was lower than national average at FPT 9.

From these studied (Table 61), 90% respondents (in the context of their families) own their land (average 4.41 Rai, 4.39 Rai, 4.5, 3.35 Rai) in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9. Near about 10% respondents have no land. Respondents of these studied, the majority (64%) had the more than 16 Rai of total lands in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5, and in Hansay Mu-9 repondent's had (45%) but majority (40%) of respondents had 1to 4 Rai. Most of Respondent's (96.2%) of Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 had no land in Upland and Others. But in Hansay Mu-9 (70%) respondents had 10 to 16 Rai more lands in Up Land and 1 to 4 Rai (70%) lands in Others Land. The size of land owned by individual respondents varies from 1-to 5-Rai total lands, up land and others in Hansay Mu-1, Hansay Mu-2, and Hansay Mu-9, but Hansay Mu-5 vareies from 3 to 5 Rai. Worth-mentioned that,

respondent's land of every village had more or less same (Table 60 and 61) position. The average of household size of the respondents was higher than national average at FPT 53.

So, from these studied, FPT 53 area's respondents land holding status were more than respondents of FPT 9.

3.2.3 Main occupation and supplementary occupation

The two third of the respondents were agriculturists(Table 62), from them (48.57%, 52%) cultivated paddy in Klong Mahad and Ang Toey villages. cassava planting (11.42%, 16%, 8%) in Klong Mahad, Nong Prue Kan Yang, Ang Toey. But in Nong Prue Kan Yang village respondents had firm land of Eucalyptus (52%) and Rubber plantation (12%). Employee (14.28%, 12%, 4%) and Small shop (11.4%, 4%, 20%) in Klong Mahad, Nong Prue Kan Yang, Ang Toey. Varieties of minor income did in each respondent's which results are summarized in Table 61, 62, 63, and 64.

From these studied (Table 63), most of all respondents' major income were cultivated paddy (95%, 86%, 90% and 77.8%) in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9 villages. Some respondents major income were employee (10%, 10.3%, 22.2%) in Hansay Mu-1, Hansay Mu-2, and Hansay Mu-9, but Hansay Mu-5 some of respondents major income Company employee (5%) and Eucalyptus plantation (5%). Their minor income were eucalyptus plantation (42%, 28%) in Hansay Mu-1, Hansay Mu-2 village, Paddy cultivation (50%, 33.3%) in Hansay Mu-1and Hansay Mu-9. Hansay Mu-5 respondents minor occupation were different than others, they were mainly Company employee (75%) and Charcoal making (25%). In Hansay Mu-9 Fruits garden, minor forest products gathering (10%), Employee (11.1%), small shop (11%) and Fruits garden (22.2%).

3.2.4 Supplementary occupation

Supplementary occupation of respondents were chilly pastes (14.89%, 8.10%, 20%), Broom production (19%, 15.5%, 36.6%), and Different types of handicrafts Production (6%, 6%, 20%) in Klong Mahad, Nong Prue Kan Yang, Ang Toey (Table 64).

Most of all respondents (Table 65) of Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9 villages were doing different types of handicrafts/silk production (35%, 35.9%, 57.1% and 84.2%) and chilly pastes (15.38%, 13.2%, 5%).

From these studied showed that most of all respondents were not depended on supplementary income. If needed respondents were depended on agriculture and company employee.

3.2.5 Monthly income and expenditure

From these studied (Table 66) near about half of respondents (46%, 48.97%, 43.33%) earned 2500-7500 baht per month and (32%, 30.55%, 30%) earn 7501-12500 baht per month, very few were earned (8%, 11.1%, 13.13%) below 2500 baht per month in Klong Mahad, Nong Prue Kan Yang, Ang Toey villages. In Thailand average monthly income 12,185 baht of each household (2001 Household Socio-economic Survey, National Statistical office). So 30% respondents were in the same level of earning and 30% middle level and near about 10% under the national level of earning in Klong Mahad, Nong Prue Kan Yang, Ang Toey. Income and Expenditure of respondents were similar pattern (Table 66 and 67). Average poverty line in Thailand in 2003/2004 was 1,363 Bahts per month. The poverty line is obtained by specifying a consumption bundle considered adequate for basic consumption needs and then by estimating the costs of these basic needs. In the other words, the poverty line is conceptualized as a minimum standard required by an individual to fulfill his or her basic food and no-food needs (World Bank).

Most of all respondents (72.22%, 71.4%, and 52.6%) earned 2500-7500 baht per month in Hansay Mu-1, Hansay Mu-2, and Hansay Mu-9 but in Hansay Mu-5, respondents (52.4%) earned 7501-12500 baht per month. Hansay Mu-2, Hansay Mu-5 respondents (47.6%, 52.4%) earned 7501-12500 baht and (5%, 4.8%) earned 20501->30501 baht per month. Few were earned (19.44%, 20%, 4.8%, and 36.8) below 2500 baht per month in Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9. Income and Expenditure of respondents were similar pattern with (Table 66). That means about 70% of the respondents households gross annual income were higher level of national average.

Respondents of FPT 53 areas income and expenditure were well than FPT 9 areas.

The majority of the respondents recognized that their household annual income is sufficient with some savings in Table 66 and 67. Whereas some of respondents recognized do not sufficient and sufficient but no saving respectively. Findings show that majority recognized their household income sufficient with some savings though average household income of respondent is far below the national average household income. The national gross annual household expenses were 120,300 Bahts (National Statistics Office, 2002). That means the respondents average household gross annual income and gross annual expenses both are below the national level.

3.3 Community People's Attitude on The Forest Utilization and Enthusiastic in Plantation in their village

From these studied at first need to know how they utilize their land (Table.68, 69), second how they utilized their natural forest (Table 70, 71) and third enthusiastic in plantation in (Table 72, 73).

3.3.1 Utilization of respondent's land

These studied shown in Table 68, all of respondents land was productive land (100%) in every studied village. Firstly they utilized their land by cultivated paddy (basis of highest ± Std value ±500 to ± 507), then live stock firming, then homestead garden, same scenarios of three villages of near FPT 9 area. The respondents of Klong Mahad, Nong Prue Kan Yang, Ang Toey were animated to planted tree because they utilize third land by homestead garden (Std value ± 407 to ± 370).

Respondents of Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9, Table 69, they utilized their land mainly by cultivated paddy (basis of highest ± Std value). All of respondents land was productive land (99%) in every studied village.

3.3.2 The Utilization of Natural Rehabilitated Forest

The respondents of Klong Mahad utilized their forest Table 70,1stly by food collection ± Std value (1.23 ± 0.42), 2ndly herbal medicine (1.23 ± 0.42), 3rdly logging for homestead consumption (1.40 ± 0.49), 4thly, herbal medicine (1.25 ± 0.44), 5thly fuel wood harvesting (1.75 ± 2.93) and then animal grazing (1.42 ± 0.50). In Nong Prue Kan Yang utilized their forest 1stly logging for homestead consumption ± Std value (1.24 ± 0.44), 2ndly herbal medicine (1.35 ± 0.48) and fuel wood harvesting (1.35± 0.48), then animal grazing and food processing. In Ang Toey village 1rstly herbal medicine collection (1.3 ± 0.466), 2ndly food collection (1.31 ± 0.47), 3rdly logging for homestead consumption (1.36 ± 0.49), and then fuel wood harvesting (1.4 ± 0.498).

Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 villages respondents were mainly collected food, fuel wood, herbal medicine (more or less 1.200 ± 0.40 to 1.0 ± 0). But respondents of Hansay Mu-9 collected forest products very few (1.90 ± 0.31) Table 71. So from these result summarized that, different village utilized forest in different way and they used for their household used / consumption only. In both places is very common was animal grazing in the forest and fodder collection.

3.3.3 Respondents were enthusiastic to plant trees in their village

The findings of the study show in Table 72 and 73 that all of the respondents enthusiastic planted tree in their villages. They were planted tree (100%) in school, Temple and homestead garden. They interested the species for planting and choose of tree species were different of each village, which show in Table 71 and 72.

Table 58 Respondents living amenities at Chacheongsao Province, Ta Takiap District (2006).

Living Amenities	Klong Mahad (N= 51)				Prue Kan Yang (N= 37)				Ang Toey (N= 30)			
	Enough		Not enough		Enough		Not enough		Enough		Not enough	
	No	%	No	%	No	%	No	%	No	%	No	%
Living Place	34	66.66	16	31.37	23	62.162	12	32.43	27	90	3	10
Road	19	37.25	32	62.74	9	24.32	28	75.67	14	46.66	16	53.33
Electricity	45	90	5	9.80	30	83.33	6	16.21	30	100	0	0
Water supply	35	68.62	16	31.37	24	64.86	13	35.13	30	100	0	0
Drinking water	25	49.01	26	50.98	16	43.24	21	56.75	21	70	9	30
Health sanitation	24	47.05	27	52.94	19	51.35	18	48.64	16	53.33	14	46.66
Garbage management	26	50.98	25	49.01	16	43.24	21	56.75	17	56.66	13	43.33
School	44	86.27	7	13.72	27	72.97	10	27. 02	27	90	3	10
Health center	42	84	8	16	30	81.08	6	16.21	17	56.66	13	43.33
Temple	39	78	11	22	26	70.27	10	72.22	30	100	0	0
Community	32	62.74	19	37.25	27	75	9	24.32	26	86.66	4	13
Public forest	8	15	43	84.31	10	27.02	27	72.97	7	23.33	23	76.66
Bus communication	1	1.96	50	98.03	2	5.55	34	91.84	30	100	0	0
Car services	18	35.29	33	64.70	14	37.83	22	59.45	30	100	0	0
Van	1	1.96	50	98.03	1	2.85	34	97.14	30	100	0	0
Graveyard	16	31.37	35	68.62	14	37.83	23	62.16	17	56.66	13	43.33
Information center	29	56.86	22	43.13	23	62.16	14	37.83	26	86.66	4	13.33
Public library	11	21.56	40	78.43	5	13.51	32	86.48	4	13.33	26	86.66
Data Base center	10	19.60	41	80.39	7	18.81	30	81	15	50	15	50

Table 59 Respondents living amenities at Sakaeo Province, Aranyaprathet District (2006).

Living Amenities	Han Say, Mu-1, Village (N= 40)				Han Say, Mu-2, Village (N=39)				Han Say, Mu-5, Village (N=21)				Han Say, Mu-9, village (N= 20)			
	Enough		Not enough		Enough		Not enough		Enough		Not enough		Enough		Not enough	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Living Place	40	100	0	0	39	100	0	0	21	100	0	0	16	80	3	15.0
Road	38	95	2	5	37	94.9	0	0	21	100	0	0	14	70	6	30
Electricity	38	95	2	5	39	100	0	0	21	100	0	0	20	100	0	0
Water supply	32	80	8	20	32	82	7	17.9	21	100	0	0	20	100	0	0
Drinking water	40	100	0	0	39	100	0	0	21	100	0	0	20	100	0	0
Health sanitation	40	100	0	0	39	100	0	0	21	100	0	0	10	50	8	0
Garbage management	23	57.5	17	42.5	23	59	16	41	21	100	0	0	7	53.8	30	46.2
School	40	100	0	0	39	100	0	0	21	100	0	0	13	65	7	35
Health center	39	97.5	1	2.5	39	100	0	0	21	100	0	0	17	85	3	15
Temple	38	95	2	5	39	100	0	0	21	100	0	0	18	90	2	10
Community	40	100	0	0	39	100	0	0	21	100	0	0	16	80	4	20
Public forest	36	94	2	5.26	35	94.7	2	5.4	21	100	0	0	6	30	14	70
Bus communication	0	0	40	100	39	100	0	0	14	66.7	7	33.3	10	18.2	45.0	81.8
Car services	34	85	6	15	33	84.6	6	15.4	21	100	0	0	5	45.5	6	54.5
Van	1	2.5	39	97.5	1	2.6	38	97.4	21	100	0	0	4	36.4	7	35.0
Graveyard	40	100	0	0	39	100	0	0	21	100	0	0	8	53.3	7	46.7
Information centre.	38	95	0	0	37	94.9	2	5.1	21	100	0	0	17	85	3	15.0
Public library	25	62.5	15	37.5	25	64.1	14	35.9	20	95.2	0	0	1	5.0	19	95.0
Data Base center	24	60	16	40	24	61.5	15	38.5	1	4.8	20	95.2	3	15.8	16	84.2

Table 60 Land holding of respondent's at Chacheongsao Province, Ta Takiap District (2006).

Land holding of respondent's	Klong Mahad Village (N= 51)						Nong Prue Kan Yang Village (N= 37)						Ang Toey Village (N=30)					
	Total Land		Up land		Others		Total Land		Up land		Others		Total Land		Up land		Others	
	No.	%	No	%	No.	%	No.	%	No.	%	No	%	No.	%	No	%	No	%
No land	9	18	20	44.44	19	44.18	6	16.66	13	43.33	8	32	3	10	12	40	13	43.33
1-4 Rai	11	22	4	8.88	3	6.97	9	25	4	13.33	4	16	7	23.33	5	16.66	3	10
5-9 Rai	5	10	4	8.88	3	6.97	3	8.33	3	10	3	12	6	20	4	13.33	3	10
10-15 Rai	6	12	-	-	6	13.93	6	16.66	0	0	2	8	4	13.33	-	-	4	13.33
16 Rai more	19	38	17	37.77	12	27.90			10	33.33	8	32	10	33.33	9	30	7	23.33
Total	51	100	45	100	43	100	37	100	37	100	37	100	30	100	30	100	30	100
Average (Rai)	3.3		2.77		2.74		3.25		2.66		2.92		3.36		2.36		2.36	
Max (Rai)	5		5		5		5		5		5		5		5		5	
Min (Rai)	1		1		1		1		1		1		1		1		1	

Table 61 Land holding of respondent's households at Sakaeo Province, Aranyaprathet District (2006)

Land holding of respondent's	(N= 40) Han Say, Mu-1, Village			(N=39) Han Say, Mu-2, Village			(N=21) Han Say, Mu-5, Village			(N= 20) Han Say, Mu-9, village		
	Total Land No. (%)	Up land No. (%)	Others No. (%)	Total Land No. (%)	Up land No. (%)	Others No. (%)	Total Land No. (%)	Up land No. (%)	Others No. (%)	Total Land No. (%)	Up land No. (%)	Others No. (%)
No land	3 (7.69)	26 (96.29)	2 (100)	3 (7.9)	25 (96.2)	2 (5.1)	0			2 (10)	2 (12.5)	1 (25.0)
1-4 Rai	0	0	0	11 (28,9)	0		2 (10)			8 (40)	2 (12.5)	3 (75)
5-9 Rai	0	0	0	0	0		25 (100)			0	0	0
10-15 Rai	11 (28.20)	1 (3.703)	0	0	1 (2.6)					1 (5)	6 (37.5)	0
16 Rai more	25 (64.10)	0	0	24 (61.5)	0		13 (61.9)			9 (45)	6 (37.5)	0
Average (Rai)	4.41	1.11	1	4.39	1.11	1	4.5	0	0	3.35	3.87	1.75
Max (Rai)	5	4	1	5	4	1	5	0	0	1	1	1
Min (Rai)	1	1	1	1	1	1	3	0	0	5	5	2

Table 62 Respondent's major and minor occupation at Chacheongsao Province, Ta Takiap District (2006).

Occupations	(N= 51) Klong Mahad Village				(N= 37) Nong Prue Kan Yang Village				(N=30) Ang Toey Village			
	Major Income		Minor Income		Major Income		Minor Income		Major Income		Minor Income	
	No	%	No	%	No	%	No	%	No	%	No	%
Employee	5	14.28	2	6.89	3	12	2	9.52	1	4	1	5.88
Cassava planting	4	11.42	2	6.89	4	16	2	9.52	2	8	-	-
Rubber plantation	1	2.85		-	3	12	2	9.52	1	4	-	-
Eucalyptus plantation	2	5.71	2	6.89	13	52	4	19.04	1	4	-	-
Paddy cultivation	17	48.57	3	10.344	1	4	1	4.76	13	52	-	-
Small shop	4	11.42	1	6.89	1	4	-	-	5	20	1	5.88
Fruits garden		-	1	3.44	-	-	-	-	2	8	1	5.88
Charcoal making		-	1	3.44	-	-	1	4.76			1	5.88
Minor forest products gathering		-	2	6.89	-	-	2	9.52			1	5.88
Field crops		-	1	3.44			-	-			1	5.88
Company employee			1	3.44			1	4.76				

Table 63 Respondent's major and minor occupation at Sakaeo Province, Aranyaprathet District (2006).

Occupation	Han Say, Mu-1, Village (N= 40)				Han Say, Mu-2, Village (N=39)				Han Say, Mu-5, Village (N=21)				Han Say, Mu-9, village (N= 20)			
	Major Income		Minor Income		Major Income		Minor Income		Major Income		Minor Income		Major Income		Minor Income	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Employee	4	10	2	14	4	10.3	2	14.3	0	0	0	0	4	22.2	1	11.1
Cassava planting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubber plantation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus	0	0	4	42	0	0	4	28.6	1	5.0	0	0	0	0	0	0
Paddy cultivation	34	95	8	50	33	86	1	2.6	18	90	0	0	14	77.8	3	33.3
Small shop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11.0
Fruits garden	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	22.2
Charcoal making	0	0	0	0	0	0	0	0	0	0	1	25	0	0	0	0
Minor forest products gathering	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	10.0
Field crops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00
Company employee	0	0	0	0	0	0	0	0	1	5	3	75	0	0	0	0

Table 64 Respondents' supplementary sources of income at Chacheongsao Province, Ta Takiap District (2006).

Supplementary sources of income	Klong Mahad Village (N= 51)		Nong Prue Kan Yang Village (N= 37)		Ang Toey Village (N=30)	
	Number	%	Number	%	Number	%
Buttered banana chips	5	10	3	9.37	4	13
Sugar –coated ground nuts	0	0	0	0	1	3.33
Chilly pastes	7	14.89	3	8.10	6	20
Brooms production	9	19	5	15.15	11	36.6
Different types of handicrafts Production	3	6.5	2	6.25	6	20

Table 65 Respondents' supplementary sources of income at Sakaeo Province, Aranyaprathet District (2006).

Supplementary sources of income	Han Say, Mu-1, Village (N= 40)		Han Say, Mu-2, Village (N=39)		Han Say, Mu-5, Village (N=21)		Han Say, Mu-9, village (N= 20)	
	Number	%	Number	%	Number	%	Number	%
Buttered banana chips	2	5	2	5.1	0	0	0	0
Sugar –coated ground nuts	1	2.5	1	2.6	0	0	1	5.0
Chilly pastes	6	15.38	5	13.2	0	0	1	5.0
Brooms production	0	0	0	0	0	0	1	5.0

Table 66 Monthly income and Expenditure of respondents at Chacheongsao Province, Ta Takiap District (2006).

Range(baht)	Klong Mahad Village (N= 51)				Nong Prue Kan Yang Village (N= 37)				Ang Toey Village (N=30)			
	Income		Expenditure		Income		Expenditure		Income		Expenditure	
	No	%	No	%	No	%	No	%	No	%	No	%
<2500	4	8	5	10.20	4	11.11	4	11.11	4	13.33	4	13.33
2500-7500	23	46	24	48.97	14	38.88	14	38.88	13	43.33	13	43.33
7501-12500	16	32	16	32.65	11	30.55	13	36.11	9	30	9	30
12501-20,500	3	6	2	4.08	5	13.88	3	8.33	2	6.66	9	10
20501-30500	4	8	1	2.04	2	5.55	1	2.77	2	6.66	0	0
➢ 30501	-	-	1	2.04			1	2.77				

Table 67 Monthly income and Expenditure of respondents at Sakaeo Province, Aranyaprathet District (2006).

Range(baht)	Han Say, Mu-1, Village (N= 40)				Han Say, Mu-2, Village (N=39)				Han Say, Mu-5, Village (N=21)				Han Say, Mu-9,village (N= 20)			
	Income		Expenditure		Income		Expenditure		Income		Expenditure		Income		Expenditure	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<2500	7	19.44	6	17.6	7	20	6	18.2	1	4.8	1	4.8	7	36.8	4	21.1
2500-7500	26	72.22	24	70.58	25	71.4	23	69.7	6	28.6	6	28.6	10	52.6	14	73.7
7501-12500	1	2.77	2	5.88	1	2.6	2	6.1	10	47.6	11	52.4	1	5.3	1	5.3
12501-20,500	2	5.55	2	5.88	2	5.9	2	6.1	2	9.5	1	4.8	1	5.3	0	0
20501-30500	0	0	0	0	2	5.7	0	0	1	4.8	1	4.8	0	0	0	0
➢ 30501	0	0	0	0			0	0	1	4.8	1	4.8	0	0	0	0

Table 68 Respondents' utilize of lands in village at Chacheongsao Province, Ta Takiap District (2006).

Utilize of Lands	Klong Mahad Village (N= 51)			Nong Prue Kan Yang Village (N= 37)			Ang Toey Village (N=30)		
	No.	%	$\overline{X}$ ± SD.	No.	%	$\overline{X}$ ± SD.	No.	%	$\overline{X}$ ± SD.
Rubber plantation	1	2	1.98 ± 0.14	0	100	2.00 ± 0.00	1	3.33	1.96 ± 0.18
Oil palm	4	8	1.98 ± 0.14	1	2.77	1.97 ± 0.16	0	0	2.00 ± 0.00
Fruit orchard	10	20	1.92 ± 0.27	2	5.55	1.94 ± 0.23	0	0	1.86 ± 0.34
Livestock	8	16	1.80 ± 0.40	6	16.66	1.83 ± 0.37	7	23.3	1.76 ± 0.43
Home stead garden	27	16	1.84 ± 0.37	6	16.66	1.83 ± 0.37	6	20	1.80 ± 0.40
Paddy	5	54	1.46 ± 0.50	21	58.33	1.41 ± 0.50	16	53.3	1.46 ± 0.50
Raising fishes	5	10	1.90 ± 0.30	3	8.33	1.91 ± 0.28	5	16.6	1.83 ± 0.37

Table 69 Respondents' utilize of lands in village at Sakaeo Province, Aranyaprathet District (2006).

Utilize of Lands	(N= 40) Han Say, Mu-1, Village			(N=39) Han Say, Mu-2, Village			(N=21) Han Say, Mu-5, Village			(N= 20) Han Say, Mu-9, village		
	No.	%	$\overline{X}$ ± SD.	No.	%	$\overline{X}$ ± SD.	No.	%	$\overline{X}$ ± SD.	No.	%	$\overline{X}$ ± SD.
Rubber plantation	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00
Oil palm	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	1	5	1.95 ± 0.22
Fruit orchard	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00
Live stock	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00
Home stead garden	0	0	2.00 ± 0.00	0	0	2.00 ± 0.00	1	4.8	1.95 ± 0.21	0	0	2.00 ± 0.00
Paddy	35	87.5	1.12 ± 0.33	34	87.2	1.12 ± 0.33	21	100	1.00 ± 0.00	19	95	1.05 ± 0.22
Raising fishes	11	27.5	1.72 ± 1.72	11	28.2	1.71 ± 0.45	0	0	2.00 ± 0.00	3	15	1.85 ± 0.36
Non productive land	1	2.5	1.97 ± 0.15	1	2.6	1.97 ± 0.16	0	0	2.00 ± 0.00	1	5	1.95 ± 0.22

Table 70 Respondent's activities in Forest FPT 9 at Chacheongsao Province, Ta Takiap District (2006).

Respondent's activities in Forest	Klong Mahad Village (N= 51)			Nong Prue Kan Yang Village (N= 37)			Ang Toey Village (N=30)		
	No.	%	$\overline{X}$ ± SD.	No	%	$\overline{X}$ ± SD.	No	%	$\overline{X}$ ±SD.
Fuel wood collecting	33	64.70	1.74 ± 2.93	24	64.86	1.35 ± 0.48	18	60	1.4 ± 0.49
Herbal medicine collection	38	74.50	1.25 ± 0.44	24	64.86	1.35 ± 0.48	21	70	1.3 ± 0.46
Food collecting	39	76.47	1.23 ± 0.42	22	59.45	1.40 ± 0.49	20	66.66	1.31 ± 0.47
Fodder collecting	25	53.19	1.46 ± 0.50	18	51.42	1.48 ± 0.50	14	46.66	1.53 ± 0.50
Logging for homestead consumption	37	72.54	1.40 ± 0.49	28	75.67	1.24 ± 0.43	19	63.33	1.36 ± 0.49
Animal grazing	28	54.90	1.42 ± 0.50	21	60	1.40 ± 0.49	14	46.66	1.53 ± 0.50
Product processing	13	25.90	1.40 ± 0.49	19	52.77	1.47 ± 0.50	16	53.33	1.46 ± 0.50

Table 71 Respondent's activities in Forest FPT 53 at Sakaeo Province, Aranyaprathet District (2006).

Respondent's activities in Forest	Han Say, Mu-1, Village (N= 40)			Han Say, Mu-2, Village (N=39)			Han Say, Mu-5, Village (N=21)			Han Say, Mu-9, village (N= 20)		
	No	%	$\overline{X}$ ± SD.	No.	%	$\overline{X}$ ± SD.	No.	%	$\overline{X}$ ± SD.	No.	%	$\overline{X}$ ± SD.
Fuel wood collecting	32	80	1.20 ± 0.40	32	82.1	1.17 ± 0.38	18	100	1.00 ± 0.00	4	20	1.80 ± 0.41
Herbal medicine collection	33	82	1.17 ± 0.38	32	82.1	1.17 ± 0.38	12	57.1	1.00 ± 0.00	3	15	1.85 ± 0.37
Food collecting	36	90	1.10 ± 0.30	36	92.3	1.07 ± 0.27	16	100	1.00 ± 0.00	10	50	1.50 ± 0.51
Fodder collecting	27	67.5	1.32 ± 0.47	27	69.2	1.30 ± 0.46	10	100	1.00 ± 0.00	0	0	2.00 ± 0.00
Logging for homestead consumption	19	47.5	1.52 ± 0.50	19	48.7	1.51 ± 0.50	1	77	1.92 ± 0.27	3	15	1.85 ± 0.37
Animal grazing	19	47.5	1.52 ± 0.50	19	48.7	1.51 ± 0.50	17	100	1.00 ± 0.00	2	10	1.90 ± 0.31
Product processing	23	57.5	1.42 ± 0.50	23	59	1.41 ± 0.49	1	20	1.80 ± 0.44	3	15	1.85 ± 0.37

Table 72 Respondents were enthusiastic to plant trees in their village at Chacheongsao Province, Ta Takiap District (2006)

Respondents are interested to plant trees	Klong Mahad Village (N= 51)		Nong Prue Kan Yang Village (N= 37)		Ang Toey Village (N=30)	
	Number	%	Number	%	Number	%
Have you ever been planted tree	51	100	37	100	30	100
Planted tree in school	51	100	37	100	30	100
Children love tree and planted tree	51	96	37	100	29	96
Interested to planting tree species	1st Plapla, 2nd Kao, 3rd Mahat, 4th Tew		1st Neem, 2nd Kao, 3rd Mahat, 4th Pradu, 5th Tew Mahat		1st Plapla, 2nd Neem, 3rd Pradu, 4th Tew, 5th Bamboo	

1st, 2nd, 3rd, 4th, and 5th respectively 1st, 2nd, 3rd, 4th, and 5th choice of respondents.

Table 73 Respondents were enthusiastic to plant trees in their village Sakaeo Province, Ta Aranyaprathet District (2006)

Respondents are interested to plant trees	Han Say, Mu-1, Village (N= 40)		Han Say, Mu-2, Village (N=39)		Han Say, Mu-5,Village (N=21)		Han Say, Mu-9, village (N= 20)	
	No.	%	No.	%	No.	%	No.	%
Have you ever been planted tree	39	97.5	38	97.4	21	100	18	90
Planted tree in school	39	97.5	38	97.4	20	95.2	18	90
Children love tree and planted tree	40	100	39	100	19	90.5	20	100
Planted tree in Temple	40	100	39	100	21	100	20	100
Interested to planting tree species	1st Kao, 2nd Mahat, 3rd Mahuat,		1st Kao, 2nd Neem, 3rd Mahat, 4th Pradu, 5th Mahuat		1st Kao, 2nd Neem, 3rd Payom		1st Kao, 2nd Neem, 3rd Mahuat	

1st, 2nd, 3rd, 4th, and 5th respectively 1st, 2nd, 3rd, 4th, and 5th choice of respondents.

3.4 PTT Promotes Influencing Factors Awareness for Peoples Participation in Forest Rehabilitation

3.4.1 PTT reforestation campaign aware for natural forest conservation

Reforestation is a difficult task. However, preserving the forest-rehabilitated areas is even more difficult. The core activities alone cannot help the reforested areas to survive. Thus, effective supplementary are implemented to ensure the survival of forest areas (Report of PTT 2000). These studied observed in Table 74 and Table 75. Result of Table74 realized that respondent of Klong Mahad, Nong Prue Kan Yang had no knowledge about PTT reforestation campaign. But respondents of village Ang Toey had no only the Fire Protection Training Program (70%), Forest Protection volunteers Program (60%), PTT Forest Youth Guards Program (50%).

The respondents (Table75) of Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9 had occurred Fire Protection Training Program (97.5%, 97.4%, 100%, 90%), Forest Protection volunteers Program (97.5%, 97.4%, 95.2%, 90%), PTT Forest Youth Guards Program (100%, 100%, 90.5%, 100%), PTT Development Village Program (100%, 100%, 100%, 100%), PTT long term forest protection fund Program (97.5%, 100%, 100%, 100%). Research for sustainable forest management program occurred in Hansay Mu-2 (97.4%), and Hansay Mu-5 (90.5%). Public relation campaign, 50% occurred in villages Hansay Mu-1 and Hansay Mu-2 but in Hansay Mu-5 (90.5%) occurred. Luang Pho Khun Coin Project, Green heart project and Green Globe Award project, were not known well by respondents. Children get scholarship from the school in Hansay Mu-1 and Hansay Mu-2 (60%, 61.5%), but respondents of village Hansay Mu-5 and Hansay Mu-9 Children not get any scholarship from the school given by PTT. Respondents of Ang Toey and Hansay Mu-1, Hansay Mu-2, Hansay Mu-5 and Hansay Mu-9, they were joined discussion with PTT staffs and with other villagers about rehab program (70%, 71.8%, 95.5%, 65%), they make decisions concerned for their own communities, and PTT create channeling of marketing (70%, 71.8%, 100%, 30%) for respondents different types of products.

From these result summarized that PTT's all of reforestation campaigns were not distributed in all villages near the FPT areas in same way. But these factors were awarded them to conserve the forest. Moreover, PTT views that urging native people whose life quality is considerably low to strongly and continually take care of the reforested land seem to be a paradox. With this reason, the PTT established supplementary projects wishing to improve their quality of life and to have income and appropriate occupation under the ideology that. "Men can live, forest can survive; men and forests are relate and harmoniously dependent" (Report of PTT 2000).

3.4.2 PTT gave appropriate management practices of villager's for rehabilitation project

PTT gave appropriate management practices of villager's for rehabilitation project, such as to improve quality of life style, strengthen local communities with dedication, decision making system, restoration of the ecosystem, convinced the villager to forest protection and preservation, forest management practices, promote more people participation in forest management (Table 76 and 77). These all appreciated by the respondents of studied areas (more or less90%). If individual realized the importance of the forest's natural resources and the value of self- sufficient income, they would develop and environmental protection awareness. In turn, our homeland would be less threatened by droughts and deforestation (Report of PTT 2000).

Table 74 PTT Reforestation Campaign occurred in village at Chacheongsao Province, Ta Takiap District (2006).

PTT Reforestation Campaign occurred in village	Klong Mahad Village (N= 51)		Nong Prue Kan Yang Village (N= 30)		Ang Toey Village (N=37)	
	Number	%	Number	%	Number	%
Fire Protection Training Program	13	25.49	11	30.55	21	70
Forest Protection volunteers Program	13	25.49	8	21.62	18	60
PTT Forest Youth Guards Program	4	7.84	12	32.43	15	50
PTT Development Village Program	2	3.92	5	13.51	0	0
PTT long term forest protection fund Program	3	5.88	4	10.81	1	3.33
Research for sustainable forest management program	3	5.88	4	10.81	2	6.66
Public relation campaign	1	1.96	5	13.88	1	3.33
Luang Pho Khun Coin Project	4	7.84	2	5.55	0	0
Green heart project	2	3.92	4	10.81	2	6.66
Green Globe Award project	0	0	2	5.40	1	3.33

Table 74 (Continued)

PTT Reforestation Campaign occurred in village	Klong Mahad Village		Nong Prue Kan Yang Village		Ang Toey Village	
	Number	%	Number	%	Number	%
Children get any scholarship from the school	4	7.8	3	8.10	1	3.33
You joined discussion with PTT staffs and with other villagers about rehab program	4	7.84	4	10.81	4	13.33
You make any decisions concerned for your own communities	2	3.92	4	11.42	4	13.33
PTT create any channeling of marketing	1	2	1	2.77	1	3.33

Table 75 PTT Reforestation Campaign Occurred in Village at Sakaeo Province, Aranyaprathet District (2006).

PTT Reforestation Campaign occurred in village	Han Say, Mu-1, Village (N= 40)		Han Say, Mu-2, Village (N=39)		Han Say, Mu-5, Village (N=21)		Han Say, Mu-9, village (N= 20)	
	No	%	No	%	No	%	No	%
Fire Protection Training Program	39	97.5	38	97.4	21	100	18	90
Forest Protection volunteers Program	39	97.5	38	97.4	20	95.2	18	90
PTT Forest Youth Guards Program	40	100	39	100	19	90.5	20	100
PTT Development Village Program	40	100	39	100	21	100	20	100
PTT long term forest protection fund Program	39	97.5	39	100	21	100	20	100
Research for sustainable forest management program	16	40	38	97.4	19	90.5	5	25
Public relation campaign	20	50	20	51.3	19	90.5	4	20
Luang Pho Khun Coin Project	19	47.5	19	48.7	0	0	5	25
Green heart project	19	47.5	19	48.7	0	0	2	10
Green Globe Award project	22	55	22	56.4	0	0	1	5
Children get any scholarship from the school	24	60	24	61.5	0	0	5	25
You joined discussion with PTT staffs and with other villagers about rehab program	28	70	28	71.8	19	95.5	13	65
You make any decisions concerned for your own communities	29	72	29	74.4	20	100	11	55
PTT create any channeling of marketing	28	70	28	71.8	19	100	6	30

Table 76 PTT gave appropriate management practices for rehabilitation Program at Chacheongsao Province, Ta Takiap District (2006).

PTT gave appropriate management practices of rehabilitation Program	Klong Mahad Village (N= 51)		Nong Prue Kan Yang Village (N= 30)		Ang Toey Village (N=37)	
	Number	%	Number	%	Number	%
To improve quality of life style	47	94	35	97.22	27	90
Strengthen local communities with dedication	46	92	33	91.66	27	90
Decision making system	49	98	32	88.88	26	86.66
Restoration of the ecosystem	49	98	33	91.66	27	90
Convinced the villager to forest protection and preservation	48	96	35	97.22	28	93
Forest management practices	49	98	34	94.44	28	93
Promote more people participation in forest management	49	98	35	97.22	28	93

Table 77 PTT gave appropriate management practices for rehabilitation Program at Sa Kao Province, Aranyaprathet District (2006).

PTT gave appropriate management practices of rehabilitation Program	Han Say, Mu-1, Village (N= 40)		Han Say, Mu-2, Village (N=39)		Han Say, Mu-5, Village (N=21)		Han Say, Mu-9, village (N= 20)	
	No.	%	No.	%	No.	%	No.	%
To improve quality of life style	38	95	38	97.4	21	100	20	100
Strengthen local communities with dedication	37	92.5	37	94.9	21	100	19	95
Decision making system	37	94.87	38	97.4	21	100	19	95
Restoration of the ecosystem			39	100	21	100	19	95
Convinced the villager to forest protection and preservation	40	100	39	100	21	100	19	95
Forest management practices	40	100	39	100	21	100	19	95
Promote more people participation in forest management	39	97.5	39	100	21	100	20	100

3.5 Conceptual Thinking of the Community People's about (PTT)

Respondents of every villages of studied area in FPT 9 and FPT 53 gave same conceptual thinking (more or less 90%) in Table 78 and 79. Result of these studied proved that respondents of studied areas were appreciated the role of state enterprise in rehabilitation project and PTT also manage the community peoples successfully because PTT believes that "Crucial to the success of the reforestation/rehabilitation project is the creation of the love of nature for the people since forest can survive by forest-mined people only" (Report of PTT 2000).

3.6 Respondent's suggestions for Rehabilitation Work in future

The Study found that according to respondents' opinion the main suggestions that need more trees planting and managing training program (lowest 90% to highest 100%) in each village of respondents. Need more active participation of Foresters (lowest 85.71% to highest100%), Need more support from other NGO's (lowest 9.9% to highest100%), Youth participated need more in learning of forest and forest ecosystem for future generations to promote tree planting (100%) in Table 80 and 81.

Table 78 Respondents opinion about PTT's performance at RGJRP at Chacheongsao Province, Ta Takiap District (2006).

Respondents opinion about PTT's performance at RGJRP	Klong Mahad Village (N= 51)		Nong Prue Kan Yang Village (N= 30)		Ang Toey Village (N=37)	
	Number	%	Number	%	Number	%
Thais have to help greening to salute H.M the King	48	97.95	35	97.22	28	100
PTT has top performance on RGJRP	49	100	37	100	28	100
PTT works can be applicable to other areas	48	97.95	35	97.22	28	100
PTT have good management system in planting and managing the planted area	48	97.95	35	97.22	28	100
PTT has transparency and sincere at work	49	100	37	100	28	100
PTT staffs have good relations to responsible Foresters and people nearby the FPT area	48	97.95	34	94.44	26	86.66
PTT gave more emphasis on indigenous species than exotic species	49	100	36	100	28	100
PTT's staff was good knowledge for planting	48	97.95	36	100	27	96.42
Villagers satisfied about the PTT's forest rehabilitation project	48	97.95	34	94.44	28	100
PTT project is providing greening area for the village	49	100	36	100	28	100
Completing RGJRP project villagers are committed	48	97.95	36	100	28	100
PTT rehabilitation project was created awareness among the villagers about environmental project	48	97.95	34	94.44	28	100
PTT staffs manage financial matter in proper way	51	100	37	100	30	100

Table 79 Respondent's opinion about PTT's performance at RGJRP at Sakaeo Province, Aranyaprathet District (2006).

PTT Performance about RGJP	Han Say, Mu-1, Village (N= 40)		Han Say, Mu-2, Village (N=39)		Han Say, Mu-5, Village (N=21)		Han Say, Mu-9, village (N= 20)	
	No.	%	No.	%	No.	%	No.	%
Thais have to help greening to salute H.M the King	38	100	37	100	21	100	19	100
PTT has top performance on RGJRP	39	100	38	100	21	100	19	100
PTT works can be applicable to other areas	39	100	39	100	21	100	19	100
PTT have good management system in planting and managing the planted area	37	94.87	36	94.7	21	100	17	89.5
PTT has transparency and sincere at work	35	89.74	35	92.1	21	100	17	89.5
PTT staffs have good relations to responsible Foresters and people nearby the FPT area	37	94.87	33	84.6	21	100	19	100
PTT gave more emphasis on indigenous species than exotic species	39	100	39	100	21	100	17	89.5
PTT's staff was good knowledge for planting	34	87.18	39	100	21	100	19	100
Villagers satisfied about the PTT's forest rehabilitation project	34	87.18	34	89.5	21	100	19	100
PTT project is providing greening area for the village	35	87.5	34	89.5	21	100	20	100
Completing RGJRP project villagers are committed	33	82.5	33	84.6	21	100	20	100
PTT rehabilitation project was created awareness among the villagers about environmental project.	35	87.5	35	89.7	21	100	20	100
PTT staffs manage financial matter in proper way	35	87.5	34	89.5	21	100	17	89.5

Table 80 Respondent's Suggestions for Rehabilitation Work in future at Chacheongsao Province, Ta Takiap District (2006).

Respondent's suggestions for Rehabilitation Work in Future	(N= 51) Klong Mahad Village		(N= 30) Nong Prue Kan Yang Village		(N=37) Ang Toey Village	
	Number	%	Number	%	Number	%
Need more tree planting in village	47	95.91	32	94.11	28	100
Need more tree planting and managing training Program	48	97.95	33	97.05	28	100
Need more financial support program for forest rehabilitation	41	83.67	33	91.66	22	78.57
Need more active participation of Foresters	45	91.83	34	94.44	24	85.71
No need for PTT's support in the future	4	8.16	5	13.88	6	21
Need more support from other NGO's	40	88.88	3	9.09	22	73.33
More training of youth on forest and forest ecosystem	41	100	37	100	28	100

Table 81 Respondent's Suggestions for Rehabilitation Work in future at Sakaeo Province, Aranyaprathet District (2006).

Respondent's suggestions for Rehabilitation Work in future	Han Say, Mu-1, Village (N= 40)		Han Say, Mu-2, Village (N=39)		Han Say, Mu-5, Village (N=21)		Han Say, Mu-9, village (N= 20)	
	No.	%	No.	%	No.	%	No.	%
Need more tree planting in village	40	100	39	100	21	100	18	90
Need more tree planting and managing training Program	39	100	39	100	21	100	20	100
Need more financial support program for forest rehabilitation	39	100	39	100	21	100	20	100
Need more active participation of Foresters	40	100	39	100	21	100	20	100
No need for PTT's support in the future	20	50	20	51	20	95.2	18	90
Need more support from other NGO's	39	100	39	100	21	100	20	100
More training of youth on forest and forest ecosystem	40	100	39	100	21	100	20	100

4. Hypothesis Testing

This part showed that performance of success of PTT's was significant in the villages near the FPT area.

4.1 Correlation between PTT Organization and PTT gave appropriate management practices for rehabilitation Project at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo).

Table 82 and 83, that performance of success of PTT Organization was dependent variable, while these study correlated with PTT gave appropriate management practices, the result (0.267**) from FPT 9 villages and (0.423**) from FPT 53 villages

significant at 0.05 level. So there were positive correlations between independent variables. These results proved that, in these villages PTT gave the appropriated management practices for forest rehabilitation program. PTT aim at long long-term upkeep of the forests in order that the rehabilitated forests can sustain themselves and stand as climax for a very long time. Their most important approach to achieved sustainable forest management, to establish community forestry in related areas, by including communities around FPT areas into the project, increasing their role in forest protection, and educating them plan succession cultivation. In order that forest management in each area leads to its ecological diversity, and developed socio-economic characteristics of the related communities (Report of Royal Golden Jubilee Reforestation Project 1999).

4.2 Correlation between State enterprise (PTT) and PTT Reforestation Campaign for aware, occurred in village for rehabilitation Project at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo)

Table 82 and 83, that performance of success of State enterprise was dependent variable, while these study correlated with PTT gave PTT Reforestation Campaign for aware, occurred in village, the result (0.234*) from FPT 9 villages and (0.187*) from FPT 53 villages significant at 0.05 level. So there were positive correlations between independent variables. These results proved that, in these villages PTT's different types of campaign program were significant for forest rehabilitation program. PTT has launched several activities and projects to encourage reforestation and to raise social awareness in order to lay a solid foundation and to strengthen desirable attitudes towards forest preservation in communities around the FPT areas (Report of Royal Golden Jubilee Reforestation Project 1999).

4.3 Correlation between State enterprise (PTT) and Peoples Involved in Royal Golden Jubilee Rehabilitation Project, occurred in village for rehabilitation Project at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo)

Table 82 and 83, that performance of success of State enterprise was dependent variable, while these study correlated with Peoples Involved in Royal Golden Jubilee Rehabilitation Project, the result (0.221*) from FPT 9 villages and (0.373*) from FPT 53 villages significant at 0.05 levels. So there were positive correlations between independent variables. From this result proved that Royal Golden Jubilee Rehabilitation Project was more significant and people were involved in this project for honors of their Noble King.. The main impetus for this was the reforestation project, which was part of the Commemoration of the Royal Golden Jubilee of the King's Coronation, initiated in 1992 under which an ambitious 8,000 square kilometer of trees were planted. The project have been achieving in term of people participation in reforestation, there were individuals, company, schools, university who had involved in donating money, attending planting activities, or supporting community to safeguard there planted forest (UNFF5, 2005).

Table 82 Correlation between State enterprise (PTT) and respondent's judgments/answered in FPT 9

Independent variable	Dependent Variable
	State enterprise PTT's performance at RGJRP
PTT gave appropriate management practices for rehabilitation Program at FPT 9 (Chachoengsao)	0.267**
PTT Reforestation Campaign for aware, occurred in village	0.234*
Involve in Royal Golden Jubilee Project	0.221*
Community self reliant	0.187*
Respondent's age	0.245**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
Pearson Correlation, method.

Table 83 Correlation between State enterprise (PTT) and respondent's judgments/answered in FPT 53

Independent variable	Dependent Variable
	State enterprise PTT's performance at RGJRP
PTT gave appropriate management practices for rehabilitation Program at FPT 9 (Sakaeo)	0.423**
PTT Reforestation Campaign for aware, occurred in village	0.187*
Involve in Royal Golden Jubilee Project	0.373*
Community self reliant	0.195*
Respondent's age correlated with management	0.321*

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
Pearson Correlation, method.

4.4 Correlation between State enterprise (PTT) and Community self reliant, at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo)

Table 82 and 83, that performance of success of State enterprise was dependent variable, while these study correlated with Community self reliant, the result (-0.187**) from FPT 9 villages and (0.195*) from FPT 53 villages, significant at 0.05 level. So there were positive correlations between independent variables. Community self-

dependency was one the main factor for success of forest rehabilitation project. “If individuals realized the importance of the forest’s natural resources and the value of self-sufficient income, they would develop and protection awareness. In turn, our homeland would be less threatened by droughts and deforestation” (Report of Royal Golden Jubilee Reforestation Project 1999). It is one of the strategies to make success of PTT’s rehabilitation project.

4.5 Correlation between State enterprise (PTT) and respondents age, at FPT 9 (Chachoengsao) and FPT 53 (Sakaeo)

Table 82 and 83, that performance of success of State enterprise was dependent variable, while these study correlated with age, the result (0.245**) from FPT 9 villages and (0.321*) from FPT 53 villages significant at 0.05 level. So there were positive correlations between independent variables. Respondents of these studied all are aged, so it is one of way to gave the realistic judgment about the PTT’s performance in rehabilitation project. Aged peoples were more experienced and they can influence, encourage and assist societies; they can realize the important of forest’s natural resources and the values and aware about environmental protection. So they appreciated the PTT’s performances in forest rehabilitation project.

5. A Lesson Learnt from This Study

Concerning lesson learnt from this study, the main impetus was His Majesty The King, Her Majesty The Queen, Princess Mother and Royal family of Thailand, who did various activities for greening nation. Such as, in Doi Thung Foundation King’s mother’s speech, “Built the forest, built the people.” Another successful story also occurred in Jordan, The Queen and in Bhutan, Princes mother who paid much attention to greening their nations. Former Prime Minister of India, Mrs. Indra Gandhi was recognized from her excellent work in Greening India. So if leader of nations played the activated role in greening the country, people will find the harmonized ecology which lead to the peaceful and plentiful of resources.

Restoration of nature is an extremely most difficult to bring the back normal natural condition. Lessons in many tropical countries revealed that forest destruction is easy to conduct but it is extremely difficult to restorate the nature under the short time frame. So any tropical countries should protect the remaining natural forest. As regards non wood forest products and fuel wood needed. It would be better to produce wood and NWFP outside the forest, such as in marginal lands, remnants forests, tree farms, industrial plantation, agroforestry and homestead.

PTT developed the management systems for all responsible FPTs. The contract system and efficient followed up program gave the success to the FPT projects. PTT authorities have emphasized the important of the project and PTT staffs are proudly did

their activities. This is the success strong of excellent management system which forestry institutions can find appropriate way to strengthen their works while paradigm shift are on the way.

A series of capacity building and self sufficiency of villagers need to be supplementary activities implemented. Government agency alone cannot do this work; need additional supports from other organizations and NGO's to support, not only in cash but also investing to host several forest rehabilitation programs and awarding individual or community who are good doers in forest.

PTT has developed the activities for various stakeholders like youth and woman groups, at least to make clear about the environmental ethics and improve their livelihood. Sustainable forest management can be visible through active people participation. Follow up programs should be conducted in series directly or indirectly related to the FPT.

From this study, seek that for sustainable natural forest management need to be integrated forest management practices and for these need to be help of supporting agencies. Because government agencies alone cannot achieving desired environmental goals. So for forest conservation need to be joined effort of community people, supporting agencies or organizations and government agencies. Successful of this program's other main strategies is to motivate people of communities, PTT gave supplementary activities in the villages which were near the forest. It proved that if supporting agency play active role and proper utilize of investment that projects achieves must be success. These strategies provides a stage for new ideas and practices regarding the creation and preservation of natural resources and environment, so that should be applied to other places and nations. Because greening nation is one of the important agenda for government of any nations in the tropical zone.

CONCLUSION

The study on Community based forest rehabilitation- a lesson learnt from PTT focused in FPT 9 at Chaochoengsao Province, and FPT 53 at Sakaeo Province. The objectives of this study were to study the biodiversity of selected rehabilitated areas, operated by PTT and to study the stand characteristics of some selected rehabilitated areas operated by PTT. For this purpose study can be concluded as follows:

The biodiversity of plants of FPT 9 and FPT 53 rehabilitated areas

Rehabilitation forest at FPT 9 comprised with 97, 14, and 6 species of trees, saplings and seedlings. FPT 53 comprised with 217, 6, and 3 species of trees, saplings and seedlings, respectively. The density of trees, sapling and seedling were 609, 13,437.5and 140,000 trees per ha, in FPT 9 and 217, 250000 and 75000 trees per ha, in FPT 53, respectively. The percentage of basal area of trees was 0.071 and 0.136 in FPT 9 and FPT 53. The value of species diversity of trees calculated by Fisher's Index, Shannon Index, Simpson's Index formula, Hill diversity Index were 10.387, 2.252, 0.083, 9.509 and 12.048 in FPT 9 and 10.883, 2.59132, 0.114, 13.347, 8.748 in FPT 53, respectively. The Richness Index of R_1 and R_2 were 5.689 and 2.220 in FPT 9 and 5.103 and 1.534 FPT 53, respectively and the evenness Index as E_1, E_2, E_3, E_4, and E_5 were 0.656, 0.307, 0.284, 1.267 and 1.298 in FPT 9 and 0.748, 0.417, 0.398, 0.655, 0.627 in FPT 53, respectively. The Shannon Index of Diversity of saplings and seedlings was 34.176 and 20.28 in FPT 9 and 20.85, 2.89 in FPT 53, respectively. The diameter of trees in each permanent sample plot was demonstrated in the inverse J-shape or L-shape patterns.

The stand characteristics of FPT 9 and FPT 53 rehabilitated areas

Regarding to trees in FPT-9 and FPT-53, results demonstrated that *Pterocarpus macrocarpus, Peltophorum dasyrachis, Nephelium hypoleucum* , and *Shorea roxburghii* , *Parinari anamense, Dipterocarpus obtusifolius* were the highest IVI, relative density, relative frequency and relative dominance in Community- based Rehabilitated Forest. It seems that the FPT-9 and FPT 53 are still dominated by secondary species as seen by *Pterocarpus macrocarpus,* and *Peltophorum dasyrachis*. The sapling species that had the highest relative density in FPT-9 were *Cratoxylum* sp respectively. The highest relative frequencies of sapling species were *Pterocarpus macrocarpus* and *Cratoxylum* sp. in FPT9 and highest relative density were *Vitex pinnata*, *Lepisanthes rubiginosa* and *Antidesma ghaesembilla*,in FPT 53 respectively. The highest relative frequencies of sapling species in FPT 53 were *Xerospermum noronhianum* and *Lepisanthes rubiginosa*. The relative density, relative frequency and IVI of seedling species in FPT-9 Community- based Rehabilitated Forest were *Acacia catechu*, respectively, revealed that the seedling species with the highest relative density in *Acacia catechu*, and *Xerospermum noronhianum* respectively. The highest relative frequencies of seedling species were Acacia catechu. The relative density, relative frequency and IVI of seedling species FPT-53 Community- based Rehabilitated Forest, revealed that the seedling

species with the highest relative density were *Pterocarpus macrocarpus*, respectively. The highest relative frequencies of seedling species were *Peltophorum dasyrachis, Rhodamnia dumetorum*, *Diospyros variegata*, *Pavetta indica,* and *Micromelum mimutum*. For Vertical Stratification in FPT 9 Plot I was composed of 30 species and 3-stratum/ canopy layers as (H= 12-18 m, H= 8-12 m, H ≤ 8). Plot II was composed of 29 species and 2-stratum/-canopy layer as (H= 8-12 m, H ≤ 8 m). Plot I was composed of 29 species and 1 stratum/ canopy layer as (≤ 8 m). Plot II was composed of 52 species and 2-stratum/-canopy layer as (H> 18 m, H ≤ 8 m). Vertical stratification of trees in FPT-9 and in FPT-53 were not good, in both places were found two or one layer /stratum. Only FPT-9, Plot I have three stratums of trees. Because, the age of these forest are not so long, only eight to ten years old.

Soil characteristics of FPT 9 and FPT 53 rehabilitated areas

The study of the present situation of soil texture and chemical properties of the study area FPT 9 and FPT 53 can be concluded that, from the data analysis of soil texture and soil chemical properties was no significant and same with the soil survey report (1988) of Phagnga series (Appendix C) for FPT 9 and Langu series (Appendix B), Khlong Khut (Appendix C) series for FPT 53, which based on data obtained from Department of Land Development, Ministry of Agriculture and Cooperatives, Thailand. The major morphological characteristics of the soil sample, surface textures were predominantly in the clay loam and depth layer soil were sandy clay loam in FPT 9 and loamy sand and depth layer also same in FPT 53. pH value of soil were lower in FPT 9 and FPT 53. Soils that have a pH below 5.5 generally have a low availability of calcium, magnesium, and phosphorus. The available phosphorus of FPT 9 soil samples was slightly high at the surface and low in the subsoil horizons but stable in soil of FPT 53. The chemical analysis of organic carbon of these two samples area showed low carbon contents at upper layer of soil. Soil organic carbon varies with depth. Levels are usually highest in the topsoil and generally decrease rapidly along the soil depth. Most soils in the study area high in the available potassium content at the surface and low values in the sub soil horizon but very high values throughout in profile FPT 9 and lower values throughout in profile FPT 53. Long-time loss of potassium by leaching result in gradual decreases in the potassium content of soils. The available calcium, magnesium content all samples soil at the surface label high and low values in the sub soil horizon but Profile samples FPT 9 and FPT 53, calcium values were very much lower. Soils low in calcium, magnesium often has deficiency of pH and lime, although repeated high potassium addition on sands. The results of these studies were nitrogen of soil is lower in all profiles, but sample FPT 53 was lower nitrogen contents than FPT 9. With sandy-textured soils, there is a serious problem with nitrate leaching. Since these soils are not capable of holding large amounts of water, heavy rains can move nitrate out of the crop-rooting zone. The organic matter of soils of sample plots were high at the surface label and low values in the sub soil horizon but Profile samples FPT 9 were organic matter were higher than profile FPT 53. The age of these forests were not so long, only eight to ten years old, so

biological processes in the soil, such as microbial activity, decomposition occurs slowly and tend to control the mineralization and immobilization of organic compound.

The attitude of various stakeholders on the performance of PTT and the success of forest rehabilitation

Base on the attitude of multi stakeholders toward the Royal Golden Jubilee Forest Rehabilitation Project and PTT's performance in rehabilitation project, it can be conclude that Thai people were motivated to plant tree and taking care of planted seedlings by His Majesty The King. It is good idea to collaborate with the private organization for forest rehabilitation project. It provides opportunity for Foresters to work with personnel's from other agencies. Most important of all, His Majesty the King does stimulate nationwide participation in reforestation effort. Villagers, Foresters and PTT staffs feel honored to join in this program. From these studies it proved that, Government officer (Foresters), PTT staffs and villager around the FPT area; they were worked for their King. The strategy to the success of this project, firstly initiated by Royal Golden Jubilee celebration and then secondly the development of community, which already done by PTT in target villages by implemented different types of supplementary activities, to ensure the survival of the forest areas. From this study it confirmed that, the positive attitude occur because of trees in their King, inspiration, and because in their King they trust. It is impossible to conceive that any other individual could attract the sort of personal devotion and loyalty shown to His Majesty the King (Kraivixien T. 1982).

RFD/ DNPWC were responsible for protection and conservation of rehabilitated forest. But for sustainable forest management peoples are responsible for emphasizes on participation and equity right for people in natural resources. And Private organization had responsible to support for not only in cash but also investing to host several forest rehabilitation programs and awarding individual or community who are good doers in forest conservations. From these studied realized that Government Agencies and PTT administration is strong, and officers were acquainting themselves on the honor of His Majesty the King. But Government officer need appropriated budget in proper time. Both agencies officer needed training more and they were interested to involve other supporting agencies for forest Rehabilitation works. Forest Rehabilitation Project to establish the work on strong foundation need to be included various agencies. PTT staffs were responsible for rehabilitation work in FPT areas and their wise manage mental practices in rehabilitation work and they were co-operated with village people.

The average of household size of the respondents was lower than national average of household size at FPT 9 and FPT 53respectively. From these studies, FPT 53 area's respondents land holding statuses were more than respondents at FPT 9. The two third of the respondents in both studied area were farmers. Half of respondents depended on supplementary income. If extra income was needed, respondents would work on agriculture and company in the area. Respondents of FPT 53 areas income and expenditure were better than FPT 9 areas. The majority of the respondents recognized

that their household annual income was sufficient with some savings whereas some of respondents did not care about saving though average household income was far below the national average household income. All of respondents land was productive land (99%) in every studied village. Each village of the study, utilized forest in different way and they used for their household uses / consumption only. The very common things in both places were animal grazing, fodder collection, herbal medicine, food collection and fuel wood collection in the forest. All of the respondents were enthusiastic to plant tree in their villages. They were also planted trees (100%) in school, temple and homestead garden. They chose tree species differently in each studied villages.

PTT's reforestation campaigns were not equally distributed in 7 studied villages. But PTT's reforestation campaigns were awarded to the outstanding villagers to conserve the forest. Moreover, PTT viewed that urging local people whose life quality were considerably low to strongly and continually took care of the rehabilitated area. With this reason, the PTT established supplementary projects wishing to improve their quality of life and to have income and appropriate occupation under the ideology that "Men can live, forest can survive; men and forests are related and harmoniously dependent" (Report of PTT 2000). PTT gave appropriate management practices to villager's for rehabilitation project, such as to improve quality of life style, strengthen local communities with dedication, decision making system, restoration of the ecosystem, convinced the villager to forest protection and preservation, forest management practices, promote more people participation in forest management. Result of the villager's attitude proved that they appreciated the role of PTT as a state enterprise in rehabilitation project and also appreciated the PTT supplementary projects.

Respondent suggested that more tree planting and managing training program (lowest 90% to highest 100%) in each village of respondents should be promoted. The participation of Foresters (lowest 85.71% to highest100%) should be geared up. Additional supports from other NGO's (lowest 9.9% to highest100%) were needed. The capacity building for youth in learning of forest and forest ecosystem for future generations to promote tree planting (100%) in FPT 9 and FPT 53 were suggested.

Result of hypothesis testing revealed that PTT gave appropriate management practices for rehabilitation program, respondents involve in Royal Golden Jubilee Forest Rehabilitation Project, community people self reliant, respondent's age were significantly related with performance of PTT forest rehabilitation project. So performances of state enterprise (PTT) in the villages were very appreciable and their vision and mission were successful.

RECOMMENDATIONS

1. All of the completed FPT areas were handed to RFD/DNWPC. Now RFD and other agencies should develop their capacity buildings and should make some uses of FPT areas as the rehabilitation center for environmental education in various parts of the country.

2. PTT has created the Green Globe Award and still now gives an individual and community every year. They emphasis the recognized award to a person's creative and continual contribution related to forest conservation for not less than 5 years or more. The contribution must have been a desirably exemplary work to the public, and it must have rendered effective results in the conservation of forest resources. For a community award, the emphasis was on a strong, self-reliant and unified community which had empowered its members to participate in forest protection by implementing local folk wisdom and traditional ways of life; and thus constituted sustainable interdependency between humans and the forest The committee had put a particular emphasis on those contribution with inspirational power to arouse public interest and enthusiasm in forest protection and preservation, their strategies in dealing with obstacles and their application of local folk wisdom and culture which lent themselves to forest protection. Now turn to government agencies should support PTT and should maintain these facilities. Other wise
Continuation of this management will be eliminated.

3. For research work, it is recommended that permanent plots in rehabilitated area can be established for long term ecosystem study, plant biodiversity and diversity of other living organisms for instances. It is advisable to suggest more study on carbon sink in the rehabilitated area. In order to mitigating greenhouse gas emissions and contributing to sustainable development as well as to carbon emission offsets by using natural forest regeneration. Because most developing countries will require policy action to establish the enabling conditions for forest carbon projects to contribute on a large scale to local livelihoods, integrate CDM projects within national development frameworks, attract investors, establish social criteria, secure local rights and promote support services for local people.

4. To improving the RFD's manage mental program RFD should acknowledge and endorse traditional rules and regulations framed by local communities to conserve village areas near forest. So activities should focus on strengthening the capacity of local communities to manage their own natural resources. RFD officers should change their attitude towards forest conservation and try to encourage the active participation of local people. There is need for a larger budget to take care of all operations to be performed for creating forests with higher biodiversity. Needs to be a clear priority of objectives for land use and identification of areas for raising biodiversity. Survey should be existing rehabilitated areas to evaluate the levels of biodiversity present and communities' situation, to prepare guidelines for future rehabilitation (commercial plantation and others).

5. In this study by proving the hypothesis testing it should be recommended that when in future new organization work for rehabilitation project at new areas, must be emphasize on peoples participation, different types of reforestation campaign to aware people near the rehabilitated area and should made the people self reliant by giving various implementation works. Because when people aware and self reliant they should not depend on forest and also not utilize forest as an only the earning sources of their daily life.

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APPENDICES

Appendix A
Chachoengsao, Soil Series of Phangna (Pga)

ANALYSIS RESULTS

PROFILE CODE No S-60/27

SOIL SERIES Phangnga (Pga)

DEPT (cm)	HORISON	PARTICLE SIZE ANALYSIS (PERCENTAGES) USDA GRADING SAND	SILT	CLAY	SAND FRACTION GRADING VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	USDA TEXTURAL CLASSIFICATION	ENGINEERING CLASSIFICATION UNIFIED	AASHO	pH 1:1 WATER	1:1 KCl	CONDUCTIVITY 1:5 Ec x10^6	$CaCO_3$ %
0-12	A	81.5	15.5	3.0						LS	SM	A-2-4	5.5	4.2	44.4	0.9
12-21	BA1	77.5	16.5	6.0						LS	SM	A-2-4	5.3	4.2	38.0	0.6
21-44	BA2	64.0	18.0	18.0						SL	SM	A-2-4	5.3	4.2	22.4	1.2
44-75	Bt1	52.5	4.0	43.5						SC	SC	A-7-5	5.7	4.0	26.0	0.3
75-110	Bt2	51.5	7.5	41.0						SC	SC	A-7-5	5.6	4.0	18.8	1.2

DEPT (cm)	MOISTURE AIR TO OVEN DRY %	C %	N %	EXCHANGE CAPACITY AND CATIONS (milli equiv./100g) Ca	Mg	K	Na	SUM (Ca+Mg K+Na) (B)	Extract Acidity (A)	SUM (B + A)	CEC SOIL (C)	CEC 100g CLAY	BASE SATURATION B x 100 / C	B x 100 / B + A	P ppm (BRAY NO.2)	K ppm AMMON ACETATE
0-12	0.6	1.40		0.9	0.6	0.1	0.2	1.8	4.4	6.2	3.0	100.0	60	29	4.2	44
12-21	0.6	1.01		0.8	0.9	0.1	0.2	2.0	4.3	6.3	3.7	61.7	54	32	3.4	59
12-44	3.4	0.76		0.2	0.5	0.2	0.1	1.0	6.5	7.5	3.4	18.9	26	13	9.7	96
44-75	6.2	0.61		0.2	0.2	1.1	0.2	1.7	6.6	8.3	5.6	12.9	30	20	14.4	287
75-110	6.3	0..46		0.2	0.1	0.9	0.2	1.4	7.0	8.4	5.8	14.1	24	17	9.1	251

Appendix B
Sakaeo, Soil Series of Klong Khut (Kut)

ANALYSIS RESULTS

PROFILE CODE No S-67/60

SOIL SERIES Khlong Khut (Kut)

DEPT (cm)	HORIZON	PARTICLE SIZE ANALYSIS (PERCENTAGES) USDA GRADING SAND	SILT	CLAY	SAND FRACTION GRADING VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	USDA TEXTURAL CLASSIFICATION	ENGINEERING CLASSIFICATION UNIFIED	AASHO	pH 1:1 WATER	1:1 KCl	CONDUCTIVITY 1:5 Ec x10^6	$CaCO_3$ %
0-14	Ap1	52.2	44.0	3.5						SL	SM	A-2-4	5.1	4.0	26.4	0.57
14-26	Ap2	52.0	42.5	5.5						SL-L	SM	A-2-4	4.6	3.8	40.0	0.28
26-44	Btg	27.5	16.5	56.0						C	CL	A-7-5	4.8	3.7	13.5	0.57
44-140	Btgv	15.0	29.5	55.5						C	CL	A-7-5	5.2	3.9	9.1	0.57

DEPT (cm)	MOISTURE AIR TO OVEN DRY %	C %	N %	EXCHANGE CAPACITY AND CATIONS (milli equiv./100g) Ca	Mg	K	Na	SUM (Ca+Mg K+Na) (B)	Extract Acidity (A)	SUM (B + A)	CEC SOIL (C)	CEC 100g CLAY	BASE SATURATION B x 100 / C	B x 100 / B + A	P ppm (BRAY NO.2)	K ppm AMMON ACETATE
0-14	0.3	2.31		0.50	0.10	0.03	0.30	0.9	7.9	8.8	4.1	117.1	22	10	10.5	15
14-26	0.2	2.54		0.20	0.06	0.04	0.30	0.6	7.6	8.2	2.9	52.7	21	7	2.6	18
26-44	0.3	0.63		0.15	0.06	0.05	0.26	0.5	7.9	8.4	7.1	12.7	7	6	1.2	15
44-140	2.9	0.89		0.25	0.10	0.06	0.30	0.7	9.1	9.8	8.9	16.0	8	7	1.4	21

Appendix C
Sakaeo, Soil Series of Langu (Lgu)

ANALYSIS RESULTS

PROFILE CODE No S-67/13

SOIL SERIES Langu (Lgu)

DEPT (cm)	HORIZON	PARTICLE SIZE ANALYSIS (PERCENTAGES) USDA GRADING SAND	SILT	CLAY	SAND FRACTION GRADING VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	USDA TEXTURAL CLASSIFICATION	ENGINEERING CLASSIFICATION UNIFIED	AASHO	pH 1:1 WATER	1:1 KCl	CONDUCTIVITY 1:5 Ec x10^6	$CaCO_3$ %
0-13	Ap	38.5	36.0	25.5						L	CL	A-6	5.0	3.9	140	0.91
13-18/26	Btg1	30.0	29.5	40.5						C	CL	A-6	5.5	4.0	192	0.91
18/26-40/5	Btg2	17.0	20.0	63.0						C	CL	A-6	6.3	5.2	500	1.14
40/52-60/82	Btg3	32.5	21.0	46.5						C	CL	A-6	8.0	7.0	1,160	0.91
60/82+	Btg4	24.0	16.5	59.5						C	CL	A-6	7.4	6.2	640	1.14

DEPT (cm)	MOISTURE AIR TO OVEN DRY %	C %	N %	EXCHANGE CAPACITY AND CATIONS (milli equiv./100g) Ca	Mg	K	Na	SUM (Ca+Mg K+Na) (B)	Extract Acidity (A)	SUM (B + A)	CEC SOIL (C)	CEC 100g CLAY	BASE SATURATION B x 100 / C	B x 100 / B + A	P ppm (BRAY NO.2)	K ppm AMMON ACETATE
0-13	1.2	2.07		2.4	1.1	0.2	0.3	4.0	9.1	13.1	7.4	29.0	54	30	4.4	88
13-18/26	1.9	0.87		2.9	2.3	0.1	0.5	5.8	7.3	13.1	9.2	22.7	63	44	2.2	56
18/26-40/5	3.0	1.67		7.4	6.5	0.2	1.7	15.8	5.8	21.6	16.0	25.4	99	73	1.9	88
40/52-60/82	2.3	0.49		20.0	7.5	0.2	2.6	30.3	0.6	30.9	13.0	28.9	233	98	1.3	102
60/82+	2.3	0.83		8.0	7.3	0.2	2.0	17.5	3.0	20.5	16.9	28.4	103	85	2.5	120

Appendix D

Interview schedule for Villager (Set 1)

Respondent No……

Study on Concept of Community on Forest and Royal Golden Jubilee Rehabilitation Program

As a Part of the Master Degree Thesis Under the Title
Community Based Forest Rehabilitation Program: A Lesson Learned from PTT (Petroleum Authority of Thailand)

Conducted by
Ali Ashrafi Sultana
M.S. Student in Tropical Forestry
Faculty of Forestry
Kasetsart University
Thailand

Mark respective column with ticks (✓).

Name of the Interviewee …….
Status in Household –

- ❍ **Head of household**
- ❍ **Spouse**
- ❍ **Parents**
- ❍ **Son/daughter**
- ❍ **Other**

Address……
……..
Name of Village……..
Date:……..

Socio-Demographic Characteristics.

1. (Gender) ❍ (Male) ❍ (Female)

2. (Age) _____ (years)

3. (Origin) _____

4. (Religion)

❍ 1. (Buddhism) ❍ 2. (Christian) ❍ 3. (Muslim) ❍ 4. (Others)

5. (Marital status)

❍ 1. (Single) ❍ 2. (Married)
❍ 3. (Divorce). ❍ 4. (Widows)

6. (Educational background)

❍ 1. (Literate)
❍ 2. (Primary)
❍ 3. (Secondary)
❍ 4. (Any certificate or technical training)
❍ 5. (Bachelor or above)

7. The number of family members.

❍ 1. >2 (Less than two person)
❍ 2. 2-4 (person)
❍ 3. 5-6 (person)
❍ 4. (more than 7 persons)

8. How long you have been living in this area?

1. ❍ >2 (Less than 2years)
2. ❍2-5 years
3. ❍5-10 years
4. ❍10 (More than 10 years)

9 Living Ammennities

	Facilities	Not enough	Enough
1.	(Living place)	❍	❍
2.	(Road)	❍	❍
3.	(Electricity)	❍	❍
4.	(Water supply)	❍	❍
5.	(Drinking Water)	❍	❍
6.	Health sanitation	❍	❍
7.	Garbage management	❍	❍
8.	School	❍	❍
9.	Health center	❍	❍
10.	Temple	❍	❍
11.	Community Forest	❍	❍
12.	Public forest	❍	❍
13.	Bus	❍	❍
14.	Car service	❍	❍
15.	Van	❍	❍
16.	Graveyard	❍	❍
17.	Information Center	❍	❍
18.	Public library	❍	❍
19.	Data base Center	❍	❍
20.	Others.....	❍	❍

Economic -Characteristics

10. Major and minor income

(Major income)	**(Minor income)**
❍ 1. (Salary)	❍ 1. (Salary)
❍ 2. (Cassava planting)	❍ 2. Cassava plantation
❍ 3. (Rubber plantation)	❍ 3. (Rubber plantation)
❍ 4. (Eucalyptus)	❍ 4. (Eucalyptus)
❍ 5. (Paddy)	❍ 5. (Paddy)
❍ 6. (Field crop)	❍ 6. (Field crop)
❍ 7. (Small shop)	❍ 7. (Small shop)
❍ 8.(Employee)	❍ 8. (Employee)
❍ 9.(Company employee)	❍ 9. (Company employee)
❍ 10. (Fruits garden)	❍ 10. (Fruits garden)
❍ 11. (Medicinal plants)	❍ 11. (Medicinal plants)
❍ 12. (Charcoal making)	❍ 12. (Charcoal making)
❍ 13. (Minor forest products gathering)	❍ 13. (Minor forest products gathering)
❍ 14. (Others) ……..	❍ 14. (Others)

11. Do you have any supplementary occupation? Such as,

Buttered banana chips	❍ 1. (No)	❍ 2. (yes)
Sugar-coated ground nuts	❍ 1. (No)	❍ 2. (yes)
Chilly pastes	❍ 1. (No)	❍ 2. (yes)
Brooms production	❍ 1. (No)	❍ 2. (yes)
Different types of handicrafts production	❍ 1. (No)	❍ 2 (yes)
If other, please specify		

12. Monthly Income and Expenditure summary:

Range(bath)	Income	Expenditure
<2500	❍	❍
2,500-7,500	❍	❍
7,501-12,500	❍	❍
12,501-20,500	❍	❍
20501-30,500	❍	❍
>30,501	❍	❍

13. (How many members are involved in your family economic activities?)

- ❍ 1 - 2 (Persons)
- ❍ 3 - 4 (Persons)
- ❍ 5 - 6 (Persons)
- ❍ 7 (More than 7 persons)

3. Natural Resource Utilization

14. Area of your farmland

	0	1-4	5-9	10-15	16
(Total land)	❍	❍	❍	❍	❍
(Upland)	❍	❍	❍	❍	❍
(Others)	❍	❍	❍	❍	❍

15. How is it being utilized now?

Rubber plantation	❍	Paddy	❍
Oil palm plantation	❍	Raise Fish	❍
Fruit Orchard	❍	Fallow (Non productive land)	❍
Livestock	❍		
Homestead	❍		

If other, please specify ----------

16. Do you agree that your community has self-reliant in accordance with the King's new agriculture theory of self-sufficiency?

❍ 1. Not agree ❍ 2. Agree

17. Have you interested to plant tree for environment protection**?**

❍ 1. No ❍ 2. yes

18. Which tree species are you interested to planting?

1.	❍ Kao	6.	❍ Mahuat
2.	❍ Payom	7.	❍ Neem
3.	❍ Kuaow	8.	❍ Pradu
4.	❍ Mayat	9.	❍ Tew
5.	❍ Mapok	10.	❍ Papla
11.	❍Others……..		

19. Have you ever been planted tree in temple?

❍ 1. (No) ❍ 2. (Yes)

20. Have you ever been planted tree in school?

❍ 1. (No) ❍ 2. (Yes)

21. Are your children loved the tree and interest to planting tree?

❍ 1. (No) ❍ 2. (Yes)

22. Do you engage the following activities in your natural forests?

1 (Fuel wood harvesting)	❍ Yes	❍ No
2 (Herbal medicine collecting)	❍ Yes	❍ No
3 (Food collecting)	❍ Yes	❍ No
.4 (Fodder collecting)	❍ Yes	❍ No
5 (Logging for homestead consumption)	❍ Yes	❍ No
6 (Animal grazing)	❍ Yes	❍ No
7 (Product processing)	❍ Yes	❍ No
8 (Other, please specify)	❍ Yes	❍ No

4. General Information about PTT Rehabilitation Program:

23. Did you involve in PTT Royal Golden Jubilee Rehabilitation Program?

❍ Yes ❍ No

24. What types of land are used for rehabilitation Program
- ❍ Reserved Forest land
- ❍ Community land
- ❍ Others (Please state)

25. Who managed the PTT Royal Golden Jubilee Rehabilitation land?
You can answer more than one.
- ❍ 1. (PTT)
- ❍ 2. (Forest Officer)
- ❍ 3. (Local people)

26. Do you think, the villagers are helping to conserve the FPT area?
❍ 1. No ❍ 2.Yes

27. What types of campaigns program PTT did for your village?

PTT has launched different type of reforestation campaign, in following, which types of program occurred in your village.	yes	No
1. Fire Protection Training Program	❍	❍
2. Forest Protection Volunteers Program	❍	❍
3. PTT Forest Youth Guards Program	❍	❍
4. PTT Development Village Program	❍	❍
5. Long-Term Forest Protection Fund Program	❍	❍
6. Research for Sustainable Forest Management Program	❍	❍

PTT has launched different type of reforestation campaign, in following, which types of program occurred in your village.	yes	No
7. Public Relation Campaign	❍	❍
8. Luang Pho Khun Coin Project	❍	❍
9. Green Heart Project	❍	❍
10. Green Globe Award Project.	❍	❍
11. Did your children get any scholarship for study from their school, which sponsored by PTT?	❍	❍
12. During rehabilitation work did you join any forest rehabilitation discussion with PTT staffs and with other villagers?	❍	❍
13. If yes, did you make any decisions concerned for your own communities	❍	❍
14. For marketing of different types of products, PTT create any channeling of marketing, near your village or else where?	❍	❍

28. Did you think that, PTT gave appropriate management practices of rehabilitation program, that's are-

Appropriate Management	Disagree	Agree
1.To improve quality of life style to local community	❍	❍
2. Strengthen local communities with dedication	❍	❍
3. Decision making system	❍	❍
4. Restoration of the ecosystem	❍	❍
5.Convinced the villager to forest protection and preservation.	❍	❍
6. Forest management practices	❍	❍
7. Promote more people participation in forest management	❍	❍

29. What is your opinion about PTT performances on the Royal Golden Jubilee Rehabilitation Project?

Concepts	Disagree	Agree
1. Do you think that all Thais have to help greening to salute H.M. the King	❍	❍
2. Do you think that PTT has top performance on The Royal Golden Jubilee Rehabilitation project	❍	❍
3. Do you think that PTT works can be applicable to other areas?	❍	❍
4. PTT have good management system in planting and managing the planted area	❍	❍
5.Do you think that PTT has transparency and sincere at work	❍	❍
6. PTT staffs have good relations to responsible foresters and people near by the FPT.	❍	❍
7. PTT gave more emphasis on indigenous species than exotic species?	❍	❍
8. PTT's staff was good knowledge for planting.	❍	❍
9.Villagers satisfied about the PTT's forest rehabilitation project	❍	❍
10. PTT project is providing greening area for the village.	❍	❍
11. Completing the PTT the Royal Golden Jubilee Rehabilitation project, villager are committed for growing more trees and participating forest protection	❍	❍
12. PTT rehabilitation project was created awareness among the villagers about environmental protection	❍	❍
13. PTT staffs manage financial matter in proper way so there was no constrained on the work.	❍	❍

30. What's your suggestion Rehabilitation work in the future,?

Concepts	Yes	No
1. Need more Tree plantinging your village	❍	❍
2. Need more Tree planting and managing training program.	❍	❍
3. Need more financial support program for forest rehabilitation.	❍	❍
4. Need more active participation of Forester.	❍	❍
5. No need for PTT's sport in the future.	❍	❍
6. Need more support from other Ngo's.	❍	❍
7. Let the youth participated more in learning of forest and forest ecosystem.		

Appendix E
Interview schedule for Forester (Set 2)

Study on concept of Forester of DNWPC on forest and Royal Jubilee Rehabilitation Program

As a part of the Master Degree thesis under the title
Community based forest rehabilitation program: A lesson learned from PTT (Petroleum Authority of Thailand)

Conducted by
Ali Ashrafi Sultana
M.S. student in tropical Forestry
Faculty of Forestry
Kasetsart University
Thailand

Name of the Interviewee …….

Address……
……..
…….

Date:……..

Section 1. Personal Question

1. Age…….Year

2. How long have you been working at RFD? And/or DNPWPC?

1-5 years
6-10 years
10

3. Have you ever been work at FPT area?
( ) เคย Yes ( ) ไม่เคย No
4. f yes, how many year you had been work there?
……. years.

Section 2 Conceptual thinking about the government policy on the Royal Jubilee Rehabilitation Project

Please mark (/) in the space if you agree

Concept	Your idea	
	Agree	Not agree
1. Do your agree with the government policy on the Royal Jubilee Rehabilitation Project?	❍	❍
2. Your opinion about the PM Chuan Leekpai government's proposed plan for the Royal Jubilee Rehabilitation Project	❍	❍
3.You think that it is a very good idea because The Thais can participate in planting and taking care Planted seedlings and trees in the forest	❍	❍
4. You think that it is a good idea as it provides opportunity for foresters to work with personnel from other agencies	❍	❍
5. You agree that all governments should support the continuation to this project	❍	❍
6. You think that forestry agencies are ready for the Continuation of this project	❍	❍
7.You think that the forestry agencies can work well without support from other agencies	❍	❍
8.You think that the government policy activate Thais to care trees and love forests more.	❍	❍

3. Conceptual thinking about administration of forest agencies (RFD/ DNPWP)

Please mark (/) in the space if you agree

Concept	Your idea	
	Agree	Not agree
7. Your opinion about the administration of forestry agencies		
a) You think that the forestry agencies have tried their best at work	❍	❍
b).You think that forestry agencies gave low importance to the project as many activities are already on the ground	❍	❍
c). You think that the administrators of forestry agencies Paid less attention to the project	❍	❍

Concept	Your idea	
	Agree	Not agree
d) You think that government support too little budget and Have some effected to the management of this project	❍	❍
e) You think that the administrators of forestry agencies should seek more partners to loin the rehabilitation project	❍	❍
f) You think that Forestry agencies should revise the responsible agencies so as to efficient manage the Rehabilitation Project?	❍	❍
g) You think that the forestry agencies should set up a series of training for responsible officers	❍	❍
h). You think that forest agencies should develop the training services to community leaders and people in different aspects	❍	❍
i).You think that forestry agencies should set up the information unit to ease the follow up program	❍	❍

4. Conceptual thinking about supporting agencies for forest rehabilitation work (RFD/ DNPWP)

Please mark (/) in the space if you agree

Concept	Your idea	
	Agree	Not agree
8.What is your opinion about the supporting agencies?	❍	❍
a) Do you think that the supporting agencies are Important to rehabilitation works?		
b) Do you think that state enterprises can perform the rehabilitation works well as they have long experiences in managing the organization ?	❍	❍
c) Do you think that the state enterprises have sufficient Budget to manage FPT?	❍	❍
d). Do you think that PTT is the best state enterprise in the Royal Golden Jubilee Rehabilitation Project?	❍	❍
e).Do you think that the army should participate more in the Royal Golden Jubilee Rehabilitation Project	❍	❍

Concept	Your idea	
	Agree	Not agree
f).Do you think that the officers in the province should participate more in FPT ?	❍	❍
g).Do you think that the community leader should participate More in FPT works?	❍	❍

Section. 5. Conceptual thinking about the foresters' performance in FPT areas.

Please give score: Most =5; More =4; Fare = 3; Less = 2, Least = 1

Concepts	Level of performance				
	5	4	3	2	1
5. What is your opinion about the performance of foresters?					
a) Do you think that responsible foresters have done their best in FPT works?	❍	❍	❍	❍	❍
b. Do you think that forester in charge of FPT area have efficient skills in coordinating with other partners?	❍	❍	❍	❍	❍
C. Do you think that the budgets of RFD/DNPWPC have sufficient for rehabilitation work?	❍	❍	❍	❍	❍
d. For rehabilitation work, forest agencies need more support from private sector or agencies?	❍	❍	❍	❍	❍
e. For rehabilitation work forestry agencies is still need more support from PTT?	❍	❍	❍	❍	❍
f. For rehabilitation work, forest agencies are still need more support from NGOs?	❍	❍	❍	❍	❍
g. Forest agencies are strong enough to continue the rehabilitation work?	❍	❍	❍	❍	❍
h. In monitoring the FPT areas , foresters can play the active role in managing the rehabilitation sites without facing any serious problems	❍	❍	❍	❍	❍
i.Budget for seedling raising of forest agencies is limited	❍	❍	❍	❍	❍
j. Do you think that it is suitable that forest agencies have prepared seedlings for FPT works?	❍	❍	❍	❍	❍
k. Do you think that only natural seedlings are needed?	❍	❍	❍	❍	❍
l. Do you think that the private nurseries can contract the job related to seedling production if technical know how was given ?	❍	❍	❍	❍	❍
m. Do you think that community can contract the job related to seedling production in temporary nursery if technical know how was given?	❍	❍	❍	❍	❍

Concepts	Level of performance				
	5	4	3	2	1
n. Do you think that community should participate in caring and maintenance the rehabilitated areas so that they can help in managing FPT areas?	❍	❍	❍	❍	❍
o). Do you think that foresters still lack of proper knowledge in forest restoration and successive carrying capacity is still required?	❍	❍	❍	❍	❍
p. Do you think that budget provided for FPT works is sufficient to the administration and management of FPT works?	❍	❍	❍	❍	❍
q. Do you think that FPT received the public interest? The budget is used efficiently. ?	❍	❍	❍	❍	❍
r. Do you think that forester in charge of FPT have efficient skill in cooperating with other partners?	❍	❍	❍	❍	❍

Section 6. Conceptual thinking about the performance of PTT staffs responsible on FPT areas.

Please give score: Most =5; More =4; Fair = 3; Less = 2, Least = 1)

Concepts	Satisfaction level				
	5	4	3	2	1
6. Your opinion on the performance of PTT staffs					
a. PTT staffs has worked at their full capacity	❍	❍	❍	❍	❍
b. PTT staffs have strong intention in their work and confirming well with PTT basic idea.	❍	❍	❍	❍	❍
c. PTT staffs has efficient managing system	❍	❍	❍	❍	❍
d. PTT staffs are honest at work related to the Royal Golden Jubilee Rehabilitation Project	❍	❍	❍	❍	❍
e. PTT staffs showed their cooperation and supporting each others in developing project activities	❍	❍	❍	❍	❍
f. PTT staffs cooperated well with the government officers.	❍	❍	❍	❍	❍
g. PTT staffs have sufficient equipments to operate their works in the field	❍	❍	❍	❍	❍
h. PTT staffs have sufficient knowledge about forest rehabilitation works	❍	❍	❍	❍	❍
i. PTT staffs have emphasized the importance of socio-economic development of the community nearby the FPT areas	❍	❍	❍	❍	❍
j. PTT staffs considered the importance of forest	❍	❍	❍	❍	❍

Concepts	Satisfaction level				
	5	4	3	2	1
fire control in FPT areas					
k. PTT staffs have no conflict with community leaders	❍	❍	❍	❍	❍
l. PTT staffs have realized the importance of youth in planting and maintaining the FPT areas	❍	❍	❍	❍	❍
m. PTT staff have regularly followed up FPT activities	❍	❍	❍	❍	❍

Section 7. Conceptual thinking about the performance of village leaders and villagers living closed to FPT areas

Please give score: Most =5; More =4; Fair = 3; Less = 2, Least = 1)

Concepts	Satisfaction level				
	5	4	3	2	1
7. Your opinion about the performance of village leader and villagers					
a. Village leaders have worked at their full capacity	❍	❍	❍	❍	❍
b. Villager leader paid interest to the planting and managing FPT	❍	❍	❍	❍	❍
c. Village leader worked well with the forest authorities responsible for FPT	❍	❍	❍	❍	❍
d. Village leader worked well with people	❍	❍	❍	❍	❍
E. Village leaders could control forest destruction and illegal cutting in FPT areas	❍	❍	❍	❍	❍
f. Village leaders paid more attention to the role of youth on the rehabilitating and managing FPT areas	❍	❍	❍	❍	❍
g. People participation to the Royal Golden Jubilee Rehabilitation Project was caused by their loyalty to the King	❍	❍	❍	❍	❍
h. After participation to the Royal Golden Jubilee Rehabilitation Project, people have more awareness to the forest resources	❍	❍	❍	❍	❍
i. People understood more about sustainable forest management	❍	❍	❍	❍	❍
j. The Royal Golden Jubilee Rehabilitation Project have provided more income to the people	❍	❍	❍	❍	❍

Section 8. Conceptual thinking about the community's development by the rehabilitation works in target villages bordering of FPT areas.

What is the level of development of the communities about PTT's rehabilitation program? Please give your opinion by scoring.

(Most development) 5 (More development) 4 (Development) 3 (Less development) 2 (Least development) 1

Concepts	Development levels				
	5	4	3	2	1
1. People participation to the Royal Golden Jubilee Rehabilitation Project was caused by their loyalty to the King	❍	❍	❍	❍	❍
2. People understood more about sustainable forest management	❍	❍	❍	❍	❍
3. The Royal Golden Jubilee Rehabilitation Project have provided the improvement of income generation	❍	❍	❍	❍	❍
4. After participation to the Royal Golden Jubilee Rehabilitation Project, people have more awareness to the forest resources	❍	❍	❍	❍	❍
5.The Royal Golden Jubilee Rehabilitation Project has improved the role of villager in managing forest resources , particularly forest fire control, by giving them the training packages and fire control equipments	❍	❍	❍	❍	❍
6. After joining the FPT activities, youth in the village have participated in long term forest resources management	❍	❍	❍	❍	❍
7. PTT supported the Village Fund for lifting up the standard of living and promote the income earning through technology transfer	❍	❍	❍	❍	❍
8. PTT helped in improving school library as the source of learning of youth and the people	❍	❍	❍	❍	❍
9. PTT has provided the scholarship program in your village	❍	❍	❍	❍	❍
10. PTT has given the sport equipments for the youth in the village for their practical exercises so that they will have good health	❍	❍	❍	❍	❍
11. PTT also helps the community in marketing their products by channeling them through the network of franchise convenience stores.	❍	❍	❍	❍	❍
12. PTT have different types of Awards in encouraging peoples of target villages bordering FPT areas.	❍	❍	❍	❍	❍

SECTION 9: What's your opinion of future perspective of Rehabilitation work at different sector?

Please give answer by score.
Score 5, 4, 3, 2, and 1

Activities	RFD/ DNPWP	PTT	Villagers
1. Forest Protection of FPT	❍	❍	❍
2. Fire control of FPT	❍	❍	❍
3. Harvesting of FPT for uses	❍	❍	❍
4. Environmental management of FPT	❍	❍	❍
5. Collection of Non Wood Forest Products in FPT	❍	❍	❍
6. Networking of FPT	❍	❍	❍
7. Local Industry modifying in FPT	❍	❍	❍
8. Application of rehabilitation work knowledge for new target area	❍	❍	❍
9. Changing the management strategies	❍	❍	❍

Appendix F
Interview schedule for PTT Staff (Set 3)

Conceptual Thinking of PTT Forest Officer on Forest and Royal Golden Jubilee Rehabilitation Program

As a Part of the Master Degree Thesis under the Title
Community Based Forest Rehabilitation Program: A Lesson Learned from PTT (Petroleum Authority of Thailand)

Conducted by
Mrs. Ali Ashrafi Sultana
M.S. Student in Tropical Forestry
Faculty of Forestry
Kasetsart University
Thailand

Name of the Interviewee …….

Address……
…….
……

Date:……..
Section 1. Personal Information

1. Age…… Year…….
2. How long have you been working at PTT in forest section?
   - ❍ 1-5 years
   - ❍ 6-10 years
   - ❍ 10 > more

3. Have you ever been worked at FPT area?
❍ Yes ❍ No

4. If yes, how many years you have been working there?
……. years.

Section 2 Conceptual thinking about the government policy on the Royal Golden Jubilee Rehabilitation Project

Please mark (✓) in the space if you agree

(Concept)	Your idea	
	Agree	Not agree
Do you agree with the government policy on the Royal Jubilee Rehabilitation Project?		
a.You think that it is a very good idea because the Thais can participate in planting and taking care planted seedlings and trees in the FPT	❍	❍
b. You think that it is a good idea as it provides opportunity for PTT foresters to work with personnel from other agencies	❍	❍
c. You agree that all governments should support the continuation of FPT works	❍	❍
d. You think that Petroleum authority is ready for the continuation of this project	❍	❍
e. You think that the Petroleum authority can work well even without support from Government organigation	❍	❍
f. You think that the government policy activate Thais to care trees and love forests more	❍	❍

Section 3. Conceptual thinking about administration of forest agencies (RFD/ DNPWPC)

Please mark (✓) in the space if you agree

Concepts	Your idea	
	Agree	Not agree
3. Your opinion about the Forestry administration of PTT agencies		
a) You think that the PTT agencies have tried their best at work	❍	❍
b) You think that PTT agencies gave low importance to the FPT project as many activities are already on the ground	❍	❍
c). You think that the administrators of PTT agencies paid less attention to the FPT project	❍	❍
d) You think that government support too little budget and have some effected to the management of this project	❍	❍
e) You think that the administrators of PTT agencies should seek other partners to loin the FPT project	❍	❍
f) You think that the forestry agencies should set up a series of training for responsible officers	❍	❍
h). You think that PTT agencies should develop the training services to community leaders and people in different aspects	❍	❍
i). You think that PTT should set up the information unit to ease the follow up program	❍	❍

Section 4 Conceptual thinking about Government agencies in FPT work

Please mark (✓) in the space if you agree

Concept	Your idea	
	Agree	Not agree
4. Your opinion about the Government agencies?		
a. Do you think that state enterprises can perform the rehabilitation works rather well as they have long experiences in managing the organization ?	❍	❍
c. Do you think that the Government agencies have sufficient budget to manage FPT works?	❍	❍
d. Do you think that a Government agency is the best state enterprise in supporting and managing the Royal Golden Jubilee Rehabilitation Project?	❍	❍
e. Do you think that the army should participate more in the Royal Golden Jubilee Rehabilitation Project	❍	❍
f. Do you think that the Government officers in the province should participate more in FPT works?	❍	❍
g. Do you think that the community leader should participate more in FPT works?	❍	❍

Section. 5. Conceptual thinking about the foresters' performance in FPT areas.

Please give score: Most =5; More =4; Fare = 3; Less = 2, Least = 1

Statements	Level of performance				
	5	4	3	2	1
5. What is your opinion about the performance of foresters?	❍	❍	❍	❍	❍
a. Do you think that responsible foresters have done their best in FPT works?	❍	❍	❍	❍	❍
b. Do you think that forester in charge of FPT area have efficient skills in coordinating with other partners?	❍	❍	❍	❍	❍
C. Do you think that the budgets of RFD/DNPWPC have sufficient for rehabilitation work?	❍	❍	❍	❍	❍
d. For rehabilitation work, forest agencies need more support from private sector or agencies?	❍	❍	❍	❍	❍
e. For rehabilitation work forestry agencies are still need more support from PTT?	❍	❍	❍	❍	❍

Statements	Level of performance				
	5	4	3	2	1
f. For rehabilitation work, forest agencies are still need more support from NGOs?	❍	❍	❍	❍	❍
g. Forest agencies are strong enough to continue the rehabilitation work?	❍	❍	❍	❍	❍
h. In monitoring the FPT areas , foresters can play the active role in managing the rehabilitation sites without facing any serious problems	❍	❍	❍	❍	❍
i. Budget for seedling raising of forest agencies is limited	❍	❍	❍	❍	❍
j. Do you think that it is suitable that forest agencies have prepared seedlings for FPT works?	❍	❍	❍	❍	❍
K. Do you think that only natural seedlings are needed?	❍	❍	❍	❍	❍
l. Do you think that the private nurseries can contract the job related to seedling production if technical know how was given ?	❍	❍	❍	❍	❍
m. Do you think that community can contract the job related to seedling production in temporary nursery if technical know how was given?	❍	❍	❍	❍	❍
n. Do you think that community should participate in caring and maintenance the rehabilitated areas so that they can help in managing FPT areas?	❍	❍	❍	❍	❍
o). Do you think that foresters still lack of proper knowledge in forest restoration and successive carrying capacity is still required?	❍	❍	❍	❍	❍
p. Do you think that budget provided for FPT works is sufficient to the administration and management of FPT works?	❍	❍	❍	❍	❍
q. Do you think that FPT received the public interest. The budget is used efficiently. ?	❍	❍	❍	❍	❍
r. Do you think that forester in charge of FPT have efficient skill in cooperating with other partners?	❍	❍	❍	❍	❍

Section 6. Conceptual thinking about the performance of PTT staffs responsible on FPT areas.

Please give score: Most =5; More =4; Fair = 3; Less = 2, Least = 1

Statements	Satisfaction level				
	5	4	3	2	1
6. Your opinion on the performance of PTT staffs					
a. PTT staffs has worked at their full capacity	❍	❍	❍	❍	❍
b. PTT staffs have strong intention in their work and confirming well with PTT basic idea.	❍	❍	❍	❍	❍
c. PTT staffs has efficient managing system	❍	❍	❍	❍	❍
d. PTT staffs are honest at work related to the Royal Golden Jubilee Rehabilitation Project	❍	❍	❍	❍	❍
e. PTT staffs showed their cooperation and supporting each others in developing project activities	❍	❍	❍	❍	❍
f. PTT staffs cooperated well with the government officers.	❍	❍	❍	❍	❍
g. PTT staffs have sufficient equipments to operate their works in the field	❍	❍	❍	❍	❍
h. PTT staffs have sufficient knowledge about forest rehabilitation works	❍	❍	❍	❍	❍
i. PTT staffs have emphasized the importance of socio-economic development of the community nearby the FPT areas	❍	❍	❍	❍	❍
j. PTT staffs considered the importance of forest fire control in FPT areas	❍	❍	❍	❍	❍
k. PTT staffs have no conflict with community leaders	❍	❍	❍	❍	❍
l. d the importance of youth in planting and maintaining the FPT areas	❍	❍	❍	❍	❍
m. PTT staff have regularly followed up FPT activities	❍	❍	❍	❍	❍

Section 7. Conceptual thinking about the performance of village leaders and villagers living closed to FPT areas

Please give score: Most =5; More =4; Fair = 3; Less = 2, Least = 1)

Statements	Satisfaction level				
	5	4	3	2	1
7. Your opinion about the performance of village leader and villagers					
a. Village leaders have worked at their full capacity	❍	❍	❍	❍	❍
b. Villager leader paid interest to the planting and managing FPT	❍	❍	❍	❍	❍
c. Village leader worked well with the forest authorities responsible for FPT	❍	❍	❍	❍	❍
d. Village leader worked well with people	❍	❍	❍	❍	❍
e. Village leaders could control forest destruction and illegal cutting in FPT areas	❍	❍	❍	❍	❍
f. Village leaders paid more attention to the role of youth on the rehabilitating and managing FPT areas	❍	❍	❍	❍	❍
g. People participation to the Royal Golden Jubilee Rehabilitation Project was caused by their loyalty to the King	❍	❍	❍	❍	❍
h. After participation to the Royal Golden Jubilee Rehabilitation Project, people have more awareness to the forest resources	❍	❍	❍	❍	❍
i. People understood more about sustainable forest management	❍	❍	❍	❍	❍
j. The Royal Golden Jubilee Rehabilitation Project have provided more income to the people	❍	❍	❍	❍	❍

Section 8. Conceptual thinking about the community's development by the rehabilitation works in target villages bordering of FPT areas.

What is the level of development of the communities about PTT's rehabilitation program? Please give your opinion by scoring.

Most development 5 More development 4 Development 3 Less development 2 Least development 1

Concepts	Development levels				
	5	4	3	2	1
1. People participation to the Royal Golden Jubilee Rehabilitation Project was caused by their loyalty to the King	❍	❍	❍	❍	❍
2. People understood more about sustainable forest management	❍	❍	❍	❍	❍
3. The Royal Golden Jubilee Rehabilitation Project have provided the improvement of income generation	❍	❍	❍	❍	❍
4. After participation to the Royal Golden Jubilee Rehabilitation Project, people have more awareness to the forest resources	❍	❍	❍	❍	❍
5.The Royal Golden Jubilee Rehabilitation Project has improved the role of villager in managing forest resources , particularly forest fire control, by giving them the training packages and fire control equipments	❍	❍	❍	❍	❍
6. After joining the FPT activities, youth in the village have participated in long term forest resources management	❍	❍	❍	❍	❍
7. PTT supported the Village Fund for lifting up the standard of living and promote the income earning through technology transfer	❍	❍	❍	❍	❍
8. PTT helped in improving school library as the source of learning of youth and the people	❍	❍	❍	❍	❍
9. PTT has provided the scholarship program in your village	❍	❍	❍	❍	❍
10. PTT has given the sport equipments for the youth in the village for their practical exercises so that they will have good health	❍	❍	❍	❍	❍
11. PTT also helps the community in marketing their products by channeling them through the network of franchise convenience stores.	❍	❍	❍	❍	❍
12. PTT have different types of Awards in encouraging peoples of target villages bordering FPT areas.	❍	❍	❍	❍	❍

SECTION 9. Your opinion on future perspective of rehabilitation work at different sector?

Please give answer by score. Most active =5, More active=4, Active =3, Less active= 2, and Not active=1

Activities	RFD/DNPWP	PTT	Villagers
1. Forest Protection of FPT areas	❍	❍	❍
2. Fire control of FPT areas	❍	❍	❍
3. Harvesting of logs in FPT areas for uses	❍	❍	❍
4. Environmental management of FPT areas	❍	❍	❍
5. Collection of Non Wood Forest Products in FPT areas	❍	❍	❍
6. Networking of FPT activities	❍	❍	❍
7. Establishment of Local Industry Center using materials from FPT areas	❍	❍	❍
8. Application of know-how on rehabilitation work to new target areas	❍	❍	❍
9. Changing the management strategies of FPT areas	❍	❍	❍