ABSTRACT

The program "The study of pine for economic plantation and conservation at Wat Chan Royal Project" aimed to study the potential of the site as well as the pine status, i.e. productivity, increment, utilization, and timber consumption, for both indigenous and exotic pines. The study sites are located in Wat Chan Royal Project Development Center (Huai Ngoo substation), Galyani Vadhana district, Chiang Mai province, and pine genetic improvement experimental plots in Chiang Mai. The total study period is 5 years, starting from 2016 to 2020. The results below are of those studied in the 1st year.

The results from 33 inventory sample plots showed that tree species with the highest IVI in this study area were *Pinus. merkusii, Dipterocarpus obtusifolius, Melanorrhoea usitata, Lithocarpus elegans* and *Anneslea fragrans*. The top five saplings were *D. obtusifolius, P. merkusii, Quercus kerrii, Glochidion daltonii, and L. elegans, and the top five seedlings* were *Q. kerrii, P. merkusii, Tristania rufescens, D. obtusifolius* and *M. usitata* The results from the 33 sample plots showed that there was 507 individuals of *P. merkusii,* which their dbh ranged from 4.5 to 98.4 cm and their height ranged between 2.3 to 40.5 m. Tree, sapling and seeding density of *P. merkusii* were 24.6, 17 and 7.2 individual/rai, respectively. Total volume and aboveground biomass of *P. merkusii* were 16.217 m^3/rai and 14.542 tons/rai.

The study area was stratified into two compartments based on physical attributes, including road and reservoir areas, for purposes of sustainable utilization. We found that pine trees, saplings, seedings and firewood were collected from Compartment 2 more than those in Compartment 1. This suggests that the timber harvesting by the communities should consider the number of trees based on tree diameter distributions and volume table, and trees that are most vulnerable to destruction from fire be selected first.

A study of soil properties in this area found that the soil was sandy loam and strong to moderately acid. Organic matter levels were high but primary macronutrients, including potassium and phosphorus were not much. However, secondary macronutrients, including calcium and magnesium were high. The soil in the area is incoherent and deep.

The results from the questionnaires interviewed 315 respondents in the study of dependence on forest resources of community found that the majority of respondents are male aged 20-39 years with a high school diploma. Their family

members usually have 3-4 people and most of them are farmers with an average of 5.5 rais of agricultural area per household. These areas are the hometown for most of them and they have settled in the range of 31-60 years. Their average annual household income and expenditure was 67,148. 20 baht/ year and 62,899. 67 baht/ year, respectively. About 58. 1 percent of the respondents have a good knowledge of forest resources conservation. Most of them (99.4%) depended on forest resources including using construction wood, woodlot, fuel wood and non-wood forest products. However, dependence of wildlife is very little. For the use of pine trees in a year round, it showed that the rate of pine use in housing or house repairing was quite high with an average of 5.5 pine trees per household. Especially, the wooden clogs were collected with an average of 65.5 kg per household.

The study of pine timber utilization was considered from various wood properties. The purpose of this study was to investigate the guideline of proper pine use for sustained yield management. The five indigenous and exotic pine was used; *P. merkusii*, *P. kesiya*, *P. caribaea*, *P. oocarpa*, and *P. tecunumanii*. From the results, all pines in this study were low- to medium-density species. The exotic pines had more strength and stiffness than the indigenous pines. However, comparing properties within indigenous pines, the *P. kesiya* had more strength and stiffness than *P. merkusii*. For exotic pines, the *P. caribaea* had more strength and stiffnesss than others. In summary, the exotic pines were suitable for use as structural purposes such as roof framing, beam, column, wall framing and truss. When considering other minor properties, the exotic pines and *P. kesiya* can be used as joist or connector, floor framing and furniture.

For pine seedling preparation, seeds from two provenance of five species of pine; *P. kesiya*, *P. merkusii*, *P. caribaea P. oocarpa* and *P. tecunumanii* were collected and propagated by using forest nursery at Ban Wat Chan Plantation, FIO. Seedling will remain in the nursery for 6 months after that will transplant in the trial on May 2017.

Experimental site was selected with 4 blocks, edge of each replication was mark with a cements pole. Each replication consists of 10 experimental unit and each unit plant 36 trees with spacing 3 x 3 m. and will use 2 rows of pine as a buffer. Site preparation will start on March to April 2017 by remove all vegetation except big pine.