ASEAN-Korea Environmental

Cooperation Project

Annual Report

June 2014

Contents

I. Research title and period

Regeneration of Dalbergia cochinchinensis Pierre in degraded forest area in Cambodia

(July 2012 to June 2014)

II. Summary

The study established 3 research plots in Kantourt Kna Krav Forestry Administration Triage located in Khun Ream commune, Banteay Srey District in Siem Reap measuring one hectare. The plots were set up on an open, slashed and burned forest land, which was encroached by farmers and used for agricultural corps in 2010. Each plot has 2 subplots. One among these two subplots was treated with assisted natural regeneration practices. The remaining plots were left with their natural condition. Remeasurements were made of the research plots in 2014. Since November 2012 to April 2013, the research team from the institute of Forest and Wildlife Research and Development conducted periodic measurements in the research plots. The measurements include diameter, canopy and height of the young Dalbergia trees in each sub-plot. An analysis of the preliminary data was made to determine the effect of the treatments. The preliminary results still showed that there is still no significant difference between the treatment and control. This could be due to the slow growth of the species and it may take some time to come up with the expected results.

III. Objectives

The overall objective of this project is to improve understanding of the regeneration of Dalbergia Cochinchinensis Pierre in degraded forest area.

The specific objectives of this proposal are:

❑ To set up the plot and measure the growth rate of regenerated Dalbergia Cochinchinensis Pierre

❑ To make comparison on the growth rates regenerated Dalbergia trees on the control plots and treatment plots

❑ To document lesson learnt and experiences of different enhancement techniques for research purpose and future application to other areas

IV. Expected output

▪ Documentation of the growth rate of Dalbergia Cochinchinensis Pierre in degraded forest area

▪ Improved knowledge on conservation of endangered tree species especially Dalbergia Cochinchinensis Pierre

V. Major activities and achievements

1. Design: The project site has a total area of one hectare. The site is located in Kantourt Kna

Krav Forestry Administration Triage located in Khun Ream
commune, Banteay Srey District in Siem Reap province. A total of six experimental sub plots
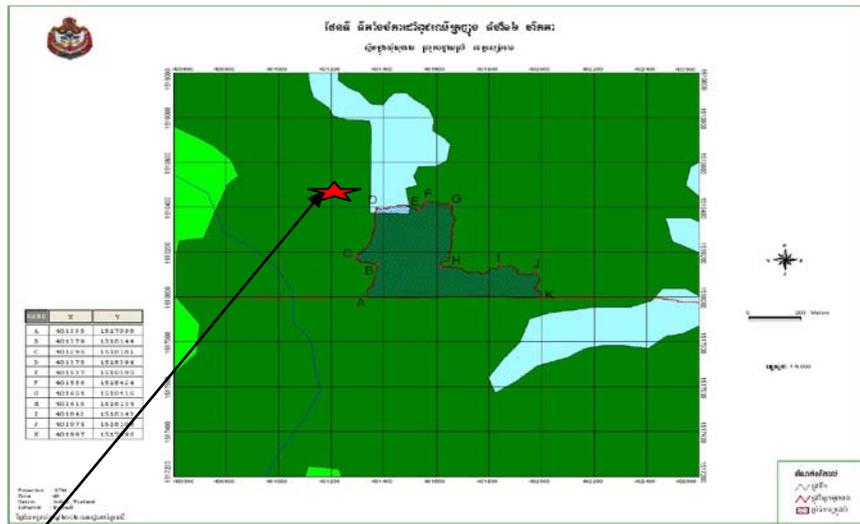were established. Each has a size of 20m x 20m.

Figure 1. Location of the Site

Project site

One subplot of each plot was used as control plot. So there are totally three of them. The
remaining three were treated with some silvicultural work (assisted natural regeneration) such as
slashing of other less valuable trees and plants within the subplot and clearing the weeds around
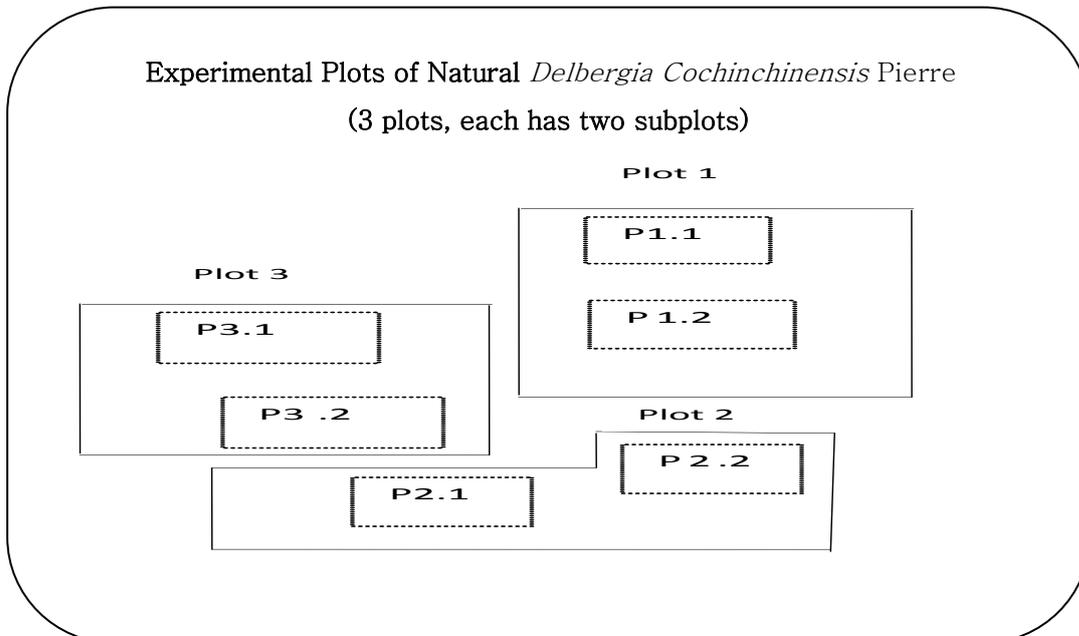the stamps of each young Dalberia cochinchinencis.

Figre 2. Layout of the experimental plot

2. Activities

Main activities include:
- ❑ Clearing of weeds and bushes have been regularly done twice a year
- ❑ Measurement of the growth of young regenerated trees in each plot was conducted once for every 3 months. This includes recording of data on the height, the diameter and canopy. Survival rate was also recorded. Figure 3 shows the results of the measurements of Dalbergia in the experiential sites.   The comparative analysis of the growth increment to that of the control was made using pooled t-test.
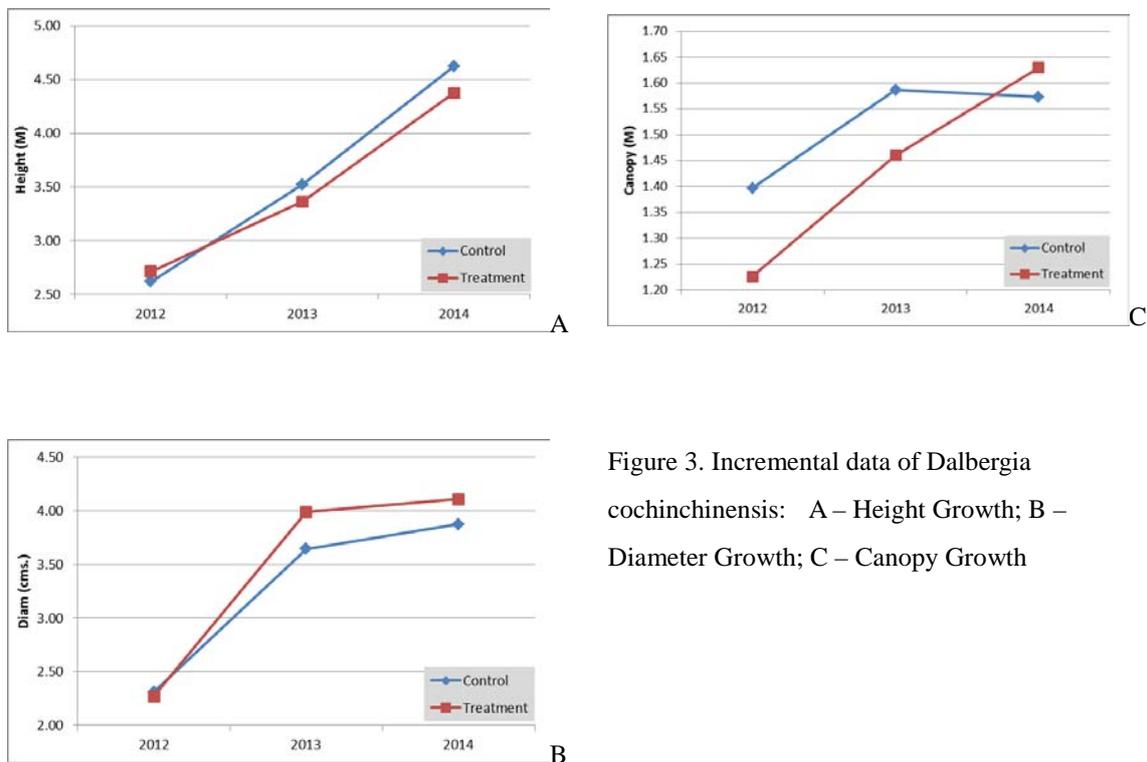

A

C

B

Figure 3. Incremental data of Dalbergia cochinchinensis: A – Height Growth; B – Diameter Growth; C – Canopy Growth

3. Analysis of the Data

The collected data were analyzed to determine the effects. The analysis focus on comparing between control and the treatments in terms of the final height, diameter and canopy growth increment. Figure 4 shows the comparative results of the measured parameters. The difference in the changes in height, diameter and canopy of the treatment and control groups is not significantly different (as indicated by the Confidence Interval bars). The measurement of the canopy is observed to have greater variation among the plants as indicated by its confidence interval. It can be noticed that the measurement variability in the control group is   high (as indicated by the error or CI bar in Figure 4B).   This could be the possible causes of the statistically insignificant result of comparison between the control and treatment groups. The

control group is expected to have higher variations since the
plants that are considered are naturally growing and there are limited chances of keeping the
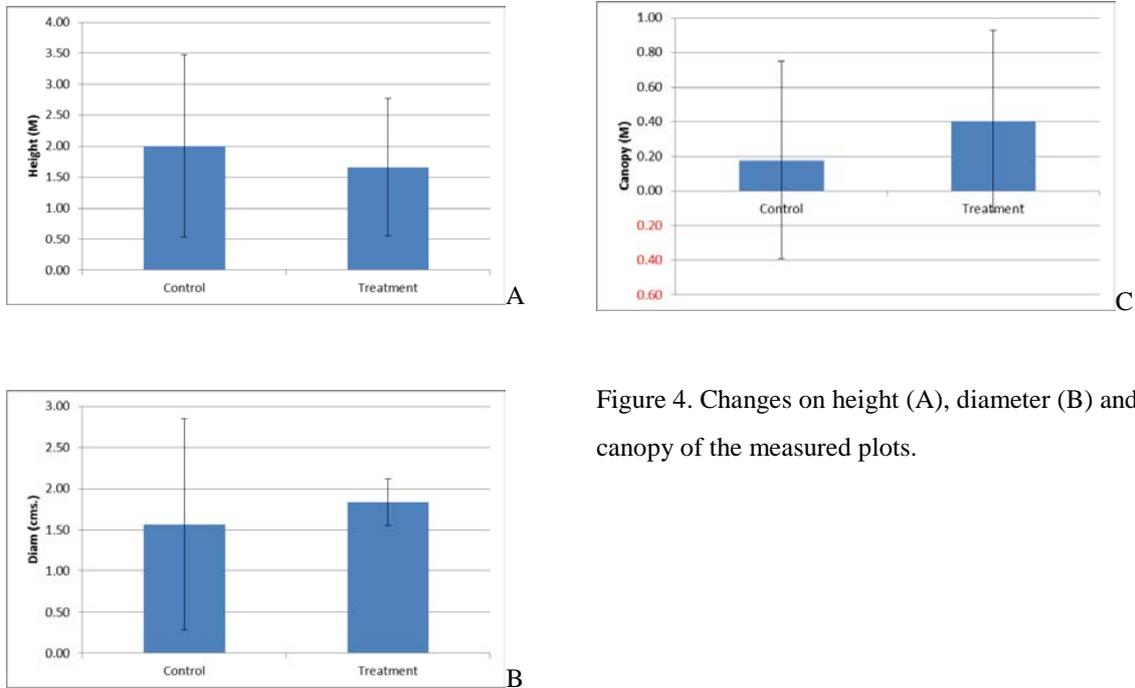response plants comparable to the treatment plants.

A

C

B

Figure 4. Changes on height (A), diameter (B) and
canopy of the measured plots.

4. Results

The analysis indicate that the there is no significant difference between control and treatment for
the three parameters. All the measured growth parameters (changes in height, diameter and
canopy) of D. cochinchinensis is not statistically different compared to the control group (i.e.
probability value is greater than the cut-off   p value of 0.05). These could be due to the slow
growing nature of the plant. While the fertilizer treatment may offer a potential for improving the
growth of the plants, the plant's ability (being a legume) to fix nitrogen may enable them to grow
properly even without being fertilized.

While thinning may have a potential of increasing the diameter increment, the study shows it has
minimal effect. This could indicate that the control group (without thinning) has not suffered
intense competition (i.e. they receive sufficient light). Thus,   in plots where thinning has been
conducted, the diameter and canopy growths are still comparable.

There is a need to further observe the difference in canopy due to thinning. The two year
observation may be too short. In the treatment group, the change in canopy is 0.44 M while in the
control group is 0.177 m. The difference could be due to the random error expected to a very

small sample (replication) size. If we look at the confidence

interval of the changes in canopy of the plants (Figure 4C), it can be noticed that there is large variability of the site.

Table 1. Comparison of the average change of the heights, diameter and canopy of
***D. cochinchinensis* between 2012 and 2014 measurements**

Growth Parameters	Changes		one-tailed test using unequal variance
	Control	Treatment	
Change in Height (M)	2.007 (sd = 0.590)	1.668 (sd = 0.446)	2.132^{ns} (p=0.236>0.05)
Change in Diameter (cm.)	1.563 (sd = 0.517)	1.835 (sd = 0.115)	2.920^{ns} (p=0.236 >0.05)
Change in Canopy (M)	0.177 (sd = 0.230)	0.404 (sd = 0.211)	2.132^{ns} (p=0.1378 > 0.05)

^{ns} = Not significantly different

VII. Constraints

The maintenance activities of the research plots need a larger budget. With limited budget of the project, it is difficult to mobilize local communities and forest staff to maintain the plots and involve in the project activities.

VIII. Future plan

The team will continue to record the data on growth rate in all subplots in the coming phase and then make analysis again.

IX. List of principal investigator and researcher/s

Project Coordinator:
- Dr. Sokh Heng, Director, Institute of Forest and Wildlife Research and Development

Participating researchers:
- Mr. Ros Tharoth, Researcher, Institute of Forest and Wildlife Research and Development

Some pictures of research team

Measuring the height

Thinning the young Dalbergia