PROJECTS ONGOING DURING THE YEAR 2008 – 2009

PLAN PROJECTS

Project 1: Investigation on propagation and cultivation of selected Rattan species (RFRI/EE/10/2006-2009)

Status: An area of 0.25 ha of *Calamus flagellum* and 2.0 ha of *Calamus tenuis* were planted and growth data recorded.

Project-2: Improvement of Degraded Shifting Cultivation lands through introduction of *Thysanolaena maxima* (Broom Grass) along with *Cajanas cajan* as N_2 fixing plant. (RFRI/ SC/09/2006-2009).

Status: The experimental plots situated at Deohari Rongpi Village (Silonjan) and Raising Rongpi village (Kohora) Karbi Anglong, Assam were maintained. Growth (Plant height, basal diameter, No. of culms/tussock, No. of panicles and length of panicles) and yield data of *Thysanolaena maxima* (Broom Grass) were recorded. No significant difference in growth was observed between 2m and 2.5m spacing trial and least growth was recorded in 1m spacing. The yield obtained from selected individuals planted with *Cajanas cajan* in a spacing of 2m was recorded maximum. Soil samples collected at different stages of growth showed high NPK content in planting stage in comparison to harvesting stage. Significantly high value was recorded in plots where *Thysanolaena maxima* were planted along with *Cajanas cajan*.

Project 3: Improvement of agar/agar wood production in *Aquilaria malaccensis* (RFRI/BG/20/2007-2010)

Sub-project-I: *In-vitro* induction of essential oil components of *Aquilaria malaccensis* [RFRI/BG-20-I]

Status: Friable callus developed under *in- vitro* condition were transferred to liquid medium for suspension culture. Various elicitor molecules are being used in order to induce essential oil components in the medium.

Sub-project-II: Survey and Selection of Desirable Genotypes of *Aquilaria malaccensis* and Establishment of their Field Gene Bank. [RFRI/BG/20-II]

Status: Air layering was done in agar trees (Aquilaria malaccensis) of approximately 10-14 years old plantation at Nahorani Experimental Station, Nahorani, Golaghat district. The maximum number of roots recorded with treatment of IBA after 45 days.

Air layering in agar
(Aquilaria malaccensis)

Rooting in air layered branches of agar
(Aquilaria malaccensis)

Sub-project-III: Clonal multiplication of *Aquilaria malaccensis* through *in- vitro* culture including hardening and out planting (RFRI/BG/20 – III)

Status: Optimum shoots regeneration media has been standardized. Five fold multiplications achieved from regenerated shoots of auxillary bud explants.

Sub-project-IV: Evaluation of insectidal properties of some plant extracts against *Heortia vitessoides* Moore (Lep. Pyralidae), a major pest of *Aquilaria malaccensis* Lamk. (RFRI/ BG/20-IV)

Status: Population dynamics studies of the defoliator *Heortia vitessoides* was carried out at three different districts of upper Assam (Golaghat, Jorhat and Sivasagar district). The extracts from five botanicals (*Azadirachta indica, Acorus calamus, Melia azedirach, Adhatoda vesica, Clerodendron viscosum*) were bioassayed against the *H. vitessoides* in laboratory and the maximum 97% antifeedant activity was shown by the extracts of *Azadirachta indica,* followed by 94% in case of *Acorus calamus*.

Project 4: Documentation of baseline information and restoration of selected stress sites under shifting cultivation through agroforestry in NE India (RFRI/ SC/11/2007-2010)

Sub project – I – Documentation of baseline information on shifting cultivation in NE India.

Sub project – II– Restoration of jhum land through intercropping *Rhizobium* inoculated legume trees with agricultural crops in Assam.

Status:

Sub-project-I- The analysis of data revealed that area under shifting cultivation has reduced from 73410 sq km in the year 1975 to 5476 sq km in 2001-2003 in NE region. Major transformations observed in shifting cultivation is changes in land use pattern like establishment

of cashewnut, arecanut, bamboo, orange, gamari, teak, tea plantations on fallow lands. Analysis of field data collected on shifting cultivation practices from eleven sites shows that shifting cultivation practices varies mainly with altitudinal gradient and social, cultural and economic status of jhumia tribes.

Sub-project-II- Experimental field trials were laid out on degraded Jhum fallow land at Bey Killing and Phumen Ingti villages, Karbi Anglong, Assam through participatory approach. Control and *Rhizobium* inoculated seedlings of *Albizzia lucida* and *Indigofera zollingeriana* planted at 3m x 3m spacing with 3 replications in RBD design were intercropped with hill paddy, maize and mixed crops. Composite soil samples were collected randomly at the time of sowing of crops and after harvesting and analysed for pysico-chemical properties.

Project 5: Establishment of GIS laboratory for systematic creation, management and up-gradation of GIS based forest-database of North-east India (RFRI/EE/13/2007-2010)

Status: Geometric corrections of 135 nos. of SOI Topographic Sheets (1:50, 000 scale) done. Edge matching of the geo-referenced SOI topographic sheets done using proper projection parameters. Digitization of vector layers of Reserve forest boundaries from the SOI topographic sheets completed for Assam. Geometric correction of geological zone map, agro-ecological zone map and physiographic map of Assam done. Digitization of vector layer of geological zones, agro-ecological zones and physiographic zones for Assam has been completed. Hyper linking of the created vector layers and geo-referenced SOI Topographic sheets done with the respective states. Forest cover data of North East India (digital format) has been procured from Forest Survey of India, Dehradun. Bringing all this spatial and non spatial information in an integrated common GIS platform was done successfully.

Project 6: Genetic improvement of *Acacia mangium* for growth characteristics, pulp and timber quality [RFRI/BG-15/2007-2010]

Status: Seeds collected from selected plus trees have been sown in nursery to raise the stock for assessment. A progeny-cum-demo trial of *Acacia mangium* has been laid out to study parent's offspring relation. Similarly a vegetative multiplication garden has been established to get explants for standardization of vegetative propagation technique for the species. In a rooting trial 10% success has been achieved.

Project 7: Development of an efficient technique for *in-vitro* clonal propagation of superior clone of *Bambusa tulda* [RFRI/BG-17/2007-2010]

Status: Multiple shoots developed in the shoot multiplication medium were transferred to various rooting medium for inducing roots *in-vitro*. For inducing roots, treatments with various root inducing hormones, polyamines, carbohydrates are being used.

Project 8: Macro and micro propagation of selected germplasm (clones) of *Dipterocarpus retusus* Bl. Syn *D. macrocarpus* (RFRI/BG/21/2007-2010)

Status: Rooting in shoot cuttings of eighteen selected genotypes of *Dipterocarpus retusus* have been established in the green house condition. Auxillary bud and shoot tip regeneration was achieved in-vitro. Basal and optimal regeneration media has been standardized.

Project 9: Assessment of rattan diversity and conservation strategy with reference to Assam [RFRI/EE/12/2007-2010]

Status: Six cane species were identified in Dihing Patkai Wild life Sanctuary (DPWLS), five in Kaziranga National Park (KNP), and four in Dibru-Saikhowa Biosphere Reserve (DSBR).

Calamus tenuis, C. floribundus, C. flagellum were found to be common species in all three study sites and *C. latifolius* was common in KNP and DPWLS only. *C. erectus* and *C. guruba* were found in KNP and *C. leptospadix* in DPWLS. The species *Calamus tenuis* in Kaziranga National Park and *C. flagellum* in Dihing Patkai Wildlife Sanctuary were found to occur in clustered form. In Kaziranga National Park 940-1195 individuals of *C. tenuis* per hectare were recorded while in Dihing Patkai Wildlife Sanctuary, the total individuals were 490-600 per hectare.

Calamus flagellum in Dihing Patkai Wild life Sanctuary

Project 10: Study of Reproductive Biology and Seed Production in Clonal Seed Orchard of *Gmelina arborea* [RFRI/BG/22/2007-2010]

Status: Periodical observations were made on the recurring seasonal vegetative and reproductive events. The number of flowers per inflorescence and inflorescence per branch was counted from randomly

Flowering and fruit initiation in *Gmelina arborea*

selected branches. Maximum of 23 number of flower buds per inflorescence were recorded in the clone.

Pollen production was estimated. Diameter of fresh pollen grains was measured. Pollen fertility was assessed by staining them in 2% acetocarmine. The mode of pollination (wind and insect) was studied. Maximum activity of the active foragers like bumble bees (*Bombux haemorrhoidalis)* and *Apis dorsata* (Asian honey bee) and *Apis sarana* var. *indica* (Indian honey bee) was observed during the full light between 11.30 am and 2.00 pm. During the foraging activity, a large number of pollen grains were transferred to the body parts of the bees.

Bumble bee (*Bombux aemorrhoidalis*) foraging nectar from Gamari flower