

Evaluation Report

Name of the project

Re-colonization and Mass Propagation of Civit (*Swintonia floribunda*)

Implementing entity

**Institute of Forestry and Environmental Sciences,
University of Chittagong**



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January, 2012

Executive Summary

Civit (*Swintonia floribunda*) has traditionally been used in plywood manufacture. It is an extinct wood species now. Therefore, Arannayk Foundation sponsored a research project on recolonization and mass propagation of the species for implementation by the Institute of Forestry and Environmental Sciences at Chittagong University (IFESCU). There are four objectives of the project. However, the main objective centers around conservation of the species from the threat of extinction. The project personnel made an exhaustive field study to assess the status of the species. The findings show that the stocking of civit in its traditional growing areas is very miserable. Although very important industrially, it is now on the threshold of extinction. There are many forces responsible for such disappointing situation, collectively and individually, and the trends of these forces are very complex. The major causes include over-extraction of the wood resource, population growth, deforestation, settlement, urbanization and wrong management practices.

With a view to conservation of the species, the silvicultural practices have been thoroughly studied. About 1.60 ha of seedling seed orchard has been established in Chittagong University campus to serve as future seed reserve. A total of 13,662 seedlings were distributed to 33 different organizations and seven individuals for plantation in their territories. In addition to accomplishment of the original objectives, a mixed seed orchard of 32 endangered species has been set up in the campus. The weaknesses of recolonization of the species have been identified. Finally, it is recommended to continue such kind of research activities with 10-15 endangered species under one project. Meanwhile, interim fund should be available for maintenance of existing plantation already established in Chittagong University campus.

Introduction (including methodology of the Evaluation exercise)

There is an indiscriminate damage of forest all over the world. The cruelty has seriously touched the tropical forest that holds tremendous significance, because it has the highest diversity of flora and fauna comprising two-thirds of the world's biodiversity. As a result, there is an imminent danger of losing the valuable biodiversity. Arannayk Foundation, also known as the Bangladesh Tropical Forest Conservation Foundation, aims at improved management, conservation and restoration of natural forest and biodiversity in the country. It is created with bilateral agreement between the Government of the United States of America and the Government of the People's Republic of Bangladesh.

With this aim in view, Arannayk Foundation provides grants to promote interventions on conservation, protection, restoration and sustainable use and management of tropical forests in Bangladesh. The grant is available to a wide range of public, NGO and private sector organizations working in creating enabling environment by improved management, conservation and restoration of tropical forest and biodiversity in the country. The grant size is Tk 3,500,000 – 5,000,000/- for a period of 4 - 8 years. On completion of the project Arannayk Foundation seeks external support to review the activities of the projects. At present the Foundation has undertaken an initiative to appraise the activities of 20 projects on their completion. Recolonization and Mass Propagation of Civit (*Swintonia floribunda*) implemented by Institute of Forestry and Environmental Sciences of the University of Chittagong (IFESCU) is one of such projects.

This evaluation assignment was carried out through consultation of relevant documents in connection of the project, discussion with the project personnel, group discussion with the faculty members of IFESCU, and site visit in Chittagong University campus.

Context and Objectives of the Project

Civit (*Swintonia floribunda*) is a light hard wood tree species. It occurs naturally in the hill forests of Cox'sBazar, Chittagong and Chittagong Hill Tracts. Pablakhali of Bagaichari was once was famous natural habitat civit. Except the Rajghat and Bhomorioghona beat of Cox'sBazar Forest division, civit is now found scattered in single to a few individuals in other forest areas. The species is thus regarded as a critically endangered species.

Civit wood is very important industrially in Bangladesh. It is a preferred species in manufacture of plywood, match stick, paper-pulp, etc. Over exploitation to meet the large demand has resulted in the severe depletion of the wood stock in the forest. The species has also has great ecological significance. This species supports a very rare bird in Bangladesh namely "**White Wing Wood Duck**" for making its nests. The destruction of the natural habitat of civit, this bird is also threatened. This study by the University of Chittagong is time warranted to assist in restoration of the well known species of the country.

The activities of the project started from December 2006 according to the scheduled plans and activities and continued till November, 2011. The implementation was done according to the scheduled plan of activities. However, tissue culture programme for micro- proliferation of propagules was discarded on approval of Arannayk Foundation. Sanctuary and establishment of germplasm repository in CU campus were included

The broad objectives of the project are:

1. Conservation of the species from the threat of extinction
2. Restoration of the habitat of White Wing Wood Duck
3. Increase supply of industrial soft wood to meet the demand of plywood and match factories
4. Enhance scenic beauty and enrich the ecosystem of the country

In addition to the above objectives, survey of floral diversity of Dudphukuria-Dupachari Wildlife Sanctuary and establishment of germplasm repository in CU campus were included with the approval of Arannayk Foundation. Of course, the latter one, i.e., establishment of germplasm repository falls as a part main the main objectives noted above.

Project activities and outcomes

Objective 1: *Conservation of the species from the threat of extinction*

Accomplishment of the objective involved addressing the following sub-objectives:

- Exploration of the status of civit in its natural and plantation habitats,
- Identify the PPT for collection of seeds and cuttings for vegetative propagules,
- Develop a hedge bed/ stock plant management system to allow continuous supply of juvenile shoots,
- Optimization of the clonal methods for obtaining maximum number of planting materials,
- Finalize the nursery establishment Manual for Civit, training on propagation techniques to the relevant stakeholders and awareness generation activities through training, workshop and other promotional approaches,
- Establishment of Block Plantation / Seed Orchard for future collection of seeds/ planting materials and
- Repository of germplasm of native threatened tree species in Chittagong University campus.

All the main objectives in this project center on accomplishment of objective #1.

The activities and of the sub-objectives are noted below.

Exploration of the status of civit in its natural and plantation habitats:

The first step in the conservation point of view is to acquire knowledge on the present status of the species. In the global context the civit was found in South and South-East Asia, particularly in the lowland and hill forests of Myanmar, Bangladesh, Andaman and Nicobar Islands, Thailand, Vietnam, Peninsular Malaysia and Sumatra.

In Bangladesh civit used to grow naturally in the hill forests of Cox,sBazar, Chittagong and Chittagong Hill Tracts. In Cox's Bazar South Forest Division, Silkjali, Whykheong and Ukhiya ranges were rich with civit Unfortunately at present a few scattered civit trees are now available in this Forest Division, some of which are in a vulnerable situation.. There are now about 30 Provisional Plus Trees (PPTs) of civit in Ukhiya range maintained by Bangladesh Forest Research Institute (BFRI).

In Cox' Bazar North Forest Division, no civit tree was found in Medakachhapia National Park. Only 4 natural civit trees were available in Bangabhandu Safari Park at Dulahazara. However

some civit trees were naturally found in Fulchari and Fasiakhali Range of this Division. Most of the trees are mature to over-mature and scattered in the whole area. It was observed that encroachment and participatory forest management initiatives with fast growing species threatened the existence of the native tree species. It is shocking to find that in Rajghat beat of Fulchari Range under Cox'sBazar North Forest Division, 122 ha natural forest area was already converted to participatory plantation forests from 1998-1999 with *Acacia auriculiformis* and *Acacia* hybrid. This initiative completely wiped out civit in the area. In Bhomorioghona beat of Eidgaon Range under the Forest Division, few mature to over-mature civit are available. But natural regeneration of the species is not able to establish due illegal extraction by the fuel wood collectors.

In Chittagong North Forest Division, only 17 civit trees, including 3 were found in Tonkabati beat, Padua Range. It is heartening to find that in Chunati Wildlife Sanctuary with an area of 7,764 ha distributed in 7 beats, at present there was not a single civit tree. The species was neither seen in Banskhal Eco-park. Once, these areas were abundant with this species. In Kurusia Range, but only some civit trees were found there in combination with other naturally grown species. But these are threatened as a result of plantation with agar, akashmoni, chapalish, chikrassy, garjan, jarul, sal, teak, acacia, etc. In Dudh-pukuria – Dhopachari Wildlife Sanctuary civit was found sparsely. The scattered jhum and tobacco cultivation is becoming a threat to the species.

In Chittagong North Forest Division, two civit trees were found in the office compound of Hyanko Rubber Estate in Hyanko and 3 more on way to Ramgarh from Hyanko. Three trees were found very close to Hazaikhil forest office. In Sitakunda Botanical Garden and Eco-park there was no natural civit tree, but 8 civit trees was planted in 2001.

Once, the dominant species in Bandarban Forest Division were garjan, civit, chapalish, champa, chundul, etc. A large tract of this Division is devoid of natural forests. No natural forests were observed during the field visit in Milonchari, Laimi para, Betchari range area in the Division. So there is no civit in those areas.. This species was also not seen in Boga Lake (a natural lake on the top of the hill) either. Some civit trees: 3 in eastern side of Pinechara, 1 in Barabetir chara, and a few around Kalarmarchara.were found in Matamuhuri Reserve Forests. Some civit trees were however found in Kalarmarchara jiri Mro para habitation.

In Pablakhali Range under Chittagong Hill Tracts (North) Forest Division, there are some good natural forests of civit in association with chapalish, garjan, civit, chundul, champa etc. It may be due inaccessibility of the area. Civit is also available in Pablakhali Wildlife Sanctuary. Some scattered civit trees were found in Sitapahar block, Rampahar and Kaptai mukh beat areas in Kaptai National park and Faruah Range. Though civit is a good pulp wood, this species was not found in Kaptai Pulp wood Division, probably due plantation of gamar, akashmoni and hybrid *Acacia*, teak, etc. Surprisely no civit was found in Khagrachari Forest Division. The species was neither found in natural patches of Lawachara National Park, Satchari National Park, Satchari National Park or in plantations areas of the Silvicultural Research Station of BFRI.

The above findings show that the stocking of civit in its traditional growing areas is very miserable. Although very important industrially, it is now on the threshold of extinction. There are many forces responsible for such disappointing situation, collectively and individually and the trends of these forces are very complex. The major causes include over-extraction of the wood resource, population growth, deforestation, settlement, urbanization and wrong management practices.

Civit was never a popular species in the plantation programs of Bangladesh. However, a small plantation of civit was found in Satgaon Tea Estates of Sri Mongal Upa-zila of Moulavi Bazar district. Similarly few individuals of civit was found in Mirpur National Botanical Garden, Sitakunda Eco-Park, Chittagong University Botanical Garden, Botanical Garden of Bangladesh Agricultural University Mymensingh, Hyanko Rubber Estate Office compound and Padua Rest House compound of Padua range, Chittagong.

On consideration of the importance of civit wood, particularly plywood manufacture., the forest management plan should include to grow the species at least from economic point of view. Already the country has become dependent from importing plywood mainly from Malaysia and Indonesia due shrinking of plywood production for scarcity of civit.

Identification of PPT for collection of seeds and cuttings for vegetative propagules

Collection of seeds is the next step in conservation activities. In this regard collaboration was established with Seed Orchard Division of BFRI. Civit seeds were then collected from the selected Provisional Plus Trees (PPT) at Dulhazra and Ukhya, maintained by Seed Orchard Division of BFRI. Subsequent to this, systematic seed biology experiments on different aspects of germination percentage, viability of seeds, seed growth performance, etc., were conducted in IFESCU campus. A seedling seed orchard of civit was established in the Chittagong University campus to serve as seed source. It was observed that the seeds of civit are recalcitrant with poor viability, the germination rate is very poor after the 2nd week of collection and a plant survival rate of 60%. An adult tree with a well developed canopy may produce 15-17 kg of seeds. One kg of fresh fruit (approximately 900 - 1200 fruits) is estimated to produce 870 seedlings, if sown within 2 weeks time of seed collection.

Development of a hedge bed/ stock plant management system to allow continuous supply of juvenile shoots

Hedge bed of 8 separate genetic resources were established in the Institute nursery for collection of clonal planting materials. These are:

- Mixed stands of 25 individuals;
- 45 seedlings from Coxsbazar;
- 24 from Tonkawati,
- 24 from Hazarikhil,
- 24 from Coxsbazar,
- 20 from Bangabandhu Safari park at Dulhazara,
- 20 from Ukhiya and
- 20 from Satgaon Tea State of Sri Mongal

Optimization of the clonal methods for obtaining maximum number of planting materials

Cuttings were collected from both hedgebeds of IFESCU nursery and natural forests of Rajghat Beat (mature tree) and cuttings were set in the propagator house for rooting experiments. Shoots were collected from stock plants and grading as soft, semi hard and hard based on hardness of the young shoot. Experiments on rooting percentage, development of root, variation of rooting intensity from different provenances, survival of the rooted stock, sprout production, etc., from the cuttings were thoroughly studied. It was found that the growth performance of civit was better with saplings than that with the stecklings (cuttings) as shown in Table 1.

Table 1. Mean height (cm) of seedling and steckling (seedling) in the experimental plot of IFESCU nursery

Types	Height (cm) at					dbh (cm)
	3 months	6 months	9 months	12 months	36 months	
Seedlings	41.8	49.5	86.9	143.9	415	3.4
Stecklings	14.2	21.8	27.8	52.5	223	2.0

Finalization of nursery establishment manual for civit, training on propagation techniques to the relevant stakeholders and awareness generation activities through training, workshop and other promotional approaches

The following activities and achievements were made:

- Prepared and printed a leaflet on civit (in Bangla) and distributed to the relevant stakeholders and nurserymen
- Published a manual on the findings of the project and distributed to different stakeholders and nurseries
- Monograph on civit is under preparation
- A daylong workshop was organized. A total of 27 participants from IFESCU, BFRI, Forest Department, BCSIR, AF Nursery, UNDP, SUST, Forest Academy, Botany Department participated at the workshop. A brief recommendation of the workshop is as follows:
 - Threatened species should be included in the mainstream plantation programs of FD and must have a minimum quota for plantation of the native threatened species
 - Grass-root level nurserymen should be involved in raising seedlings of native tree species
 - Explore the Inclusion of civit in homesteads plantation programs should be explored
 - Possibility of planting the species in Nisorgo Support Protected Area Programs may be explored
 - Detailed silviculture of the species must be documented
 - Feasibility study of civit planting by private companies/ entrepreneurs should be investigated
 - Community Reserve in CHTs, e.g. Empupara, Jeminipara may be involved in planting some civit trees,
 - Nurserymen may be given the incentives for raising the seedlings of threatened tree species

Establishment of block plantation / seed orchard for future collection of seeds/ planting materials

Two seedling seed orchards of civit plantation (1.0 ha and 0.6 ha) were established in the University campus. Silvicultural management of the orchards is being done regularly. The

growth and yield data of civit is very scarce. However, if the plantations are managed properly, the growth is promising particularly in the early stage of the plantations. The growth data of civit seedling seed orchards is shown in Table 2.

Table 2 growth data of civit seedling seed orchards in the University campus

Year of establishment	Height (m)	Height (m) up to 1 st branch
2009 (2 yrs)	4.12	1.58
2008 (3 yrs)	5.85	2.04
2007 (4 yrs)	6.48	1.77

The seed orchard established in the University campus will be an authentic source of the supply of quality seeds for raising plantation of this rare species.

Repository of germplasm of native threatened tree species in Chittagong University campus

In implementing the project and field visit, it was established that the disappearance of native tree species in Bangladesh was more severe than the expectation. The project personnel reported that the Encyclopedia of Flora & Fauna of Bangladesh (2009) noted the number of threatened plant species in Bangladesh is 486, which is increasing with time (Table 3).

Table 3. Estimated number of threatened species in Bangladesh

Plant Groups	No. of species	Critically Endangered	Endangered	Vulnerable	Threatened species
Pteridophytes	195	0	0	36	36
Gymnosperms	7	0	1	0	1
Dicotyledons	2623	8	80	179	267
Monocotyledons	988	22	46	114	182
Total	3,813	30	127	329	486 (12.75%)

Considering the situation and experiences from field, the Research Team collected the fruits and seeds of some threatened native tree species and raised the seedlings in the nursery. About 1,370 seedlings of 32 threatened tree species were planted in the Conservation Plot of Chittagong University Campus in May-June 2011. A view of the mixed plantation of the species is shown in Fig.1.



Fig.1. View of mixed plantation of 32 endangered species in Chittagong University campus

Table 4. lists particulars of 28 species (out of 32) that have been planted in the campus as an endeavor of conservation .

Table 4. Seedlings of some threatened species planted in CU campus

Local and Scientific Name	Average ht of seedlings(cm)	Conservation Status
Khair(<i>Acacia catechu</i>)	64.5	Localized conservation is proposed
Boilam (<i>Anisoptera scaphula</i>)	46.5	Immediate <i>ex-situ</i> & <i>in-situ</i> conservation
Agar (<i>Aquilaria agallocha</i>)	114.4	Least concern
Barta (<i>Artocarpus lacucha</i>)	42.6	Least concern
Kainjal (<i>Bischofia javanica</i>)	54.1	Least concern
Ponnal(<i>Calophyllum inophyllum</i>)	17.9	Least concern
Kumbi (<i>Careya arborea</i>)	51.2	Vulnerable, in-situ conservation needed
Batna (<i>Castanopsis indica</i>)	35.0	Not evaluated but vulnerable
Naglingom (<i>Courouptia guianensis</i>)	76.6	Botanical garden/ Educational institution
Tamal (<i>Diospyros Montana</i>)	22.8	Least concern
Dholi garjan(<i>Dipterocarpus alatus</i>)	24.0	<i>in-situ</i> conservation needed
Telly Garjan (<i>Dipterocarpus turbinatus</i>)	54.7	<i>in-situ</i> conservation needed
Baitta garjan (<i>Dipterocarpus costatus</i>)	46.7	<i>in-situ</i> conservation needed
Bandarhuala (<i>Duabanga grandiflora</i>)	64.2	Least concern
Kannyari (<i>Gardenia coronaria</i>)	51.2	Vulnerable
Telsur (<i>Hopea odorata</i>)	47.8	Plantation/ <i>in-situ</i> conservation
Menda (<i>Litsea monopetala</i>)	55.4	Not evaluated
Raktan (<i>Lophopetalum fimbriatum</i>)	45.4	Near threatened
Mahua (<i>Maduuca longifoli</i>)	21.4	Not evaluated
Kerong (<i>Pongamia pinnata</i>)	73.8	Least concern

Gutguitta (<i>Protium serratum</i>)	50.6	Vulnerable
Moos (<i>Pterospermum acerifolium</i>)	48.1	<i>in-situ</i> conservation needed
Sal (<i>Shorea robusta</i>)	58.8	<i>in-situ</i> conservation needed
Parul (<i>Stereospermum suaveolens</i>)	25.8	Vulnerable
Dhaki Jam (<i>Syzygium grandis</i>)	61.1	<i>in-situ</i> & <i>ex-situ</i> conservation needed
Bahera (<i>Terminalia bellirica</i>)	33.6	Least concern
Toon (<i>Toona ciliata</i>)	54.0	Least concern
Lohakat (<i>Xylia kerrii</i>)	49.8	<i>in-situ</i> & <i>ex-situ</i> conservation needed

Objective 2: Restoration of the habitat of White Wing Wood Duck

Implementation of the objective is embedded to the accomplishment of objectives 1 and 3 that are aimed to conservation and recolonization of the species. The detailed study of silvicultural practices, establishment of seed orchard for future collection of seeds and distribution of planting materials have been done successfully through the project (objectives 1 and 3). This will enable the planters to have greater opportunities for plantation of the species and enrich the habitat. Then, the bird will get larger access to its nests in the forest and the habitat of White Wing Wood Duck will be restored.

Objective 3: Increase supply of industrial soft wood to meet the demand of plywood and match factories

This objective is intended to promote recolonization and restoration of degraded habitats through plantation in public and private sectors. To this aim in view civit seedling raised in the University campus were distributed to different organizations as follows:

Civit seedlings distributed to the following organizations for domestication and popularization in plantation programme (2008):

- Sitakunda EcoPark and Botanical Garden : 50
- BCSIR Laboratories, Chittagong : 50
- CODEC, Chittagong (Chandanaish) : 1500

Total	1600
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Civit seedlings distributed to the following organizations for domestication and popularization in plantation programme (2009):

- Mirpur National Botanical Garden : 08
- DFO, Chittagong Hill Tracts (N) : 100
- Bangabandhu Safari park, Dulhazara : 50
- CoxsBazar Forest Division (S), CoxsBazar : 250
- CODEC, Chandanaish : 3000
- Mr. Farid Ahmed, Fatehpur, Hathazari : 20
- Md. Jamal, Fatehpur, Hathazari : 20
- Chittagong Forest Division (N), Hathazari beat : 500
- Mondakini beat : 500
- Mirsoroi Range : 1000

• Protyashi (HAIMP), Sitakunda	: 200
• PHP, Chittagong	: 300
• BIRAM, Khagrachari	: 200
• Mr. Debashis Babu, Alir Dargah, Hathazari	: 200
• Mr. Ali Ahmed, Jangal para, Hathazari	: 10
• CF, Chittagong Circle	: 10
• Sitakunda Eco-Park and Botanical Garden	: 50
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Total	6,418

Civit seedlings distributed in 2010:

• Jahangir Nagar University -----	20
• Mirpur National Botanical Garden -----	08
• Baldah Garden -----	02
• Bangladesh National Herbarium -----	02
• Botany Department, Dhaka University	04
• DFO Office compound Moulavibazar	05
• Shahjalal Sci. & Technology University	05
• Murari Chand College, Sylhet	03
• Tila garh Ecopark Sylhet	02
• Banskhal Eco-Park, Chittagong	200
• Chandpur Belgao Tea Est. Banskhal	500
• Finlays Baraora Tea Estate, Sri Mongal	1000
• Protyashi, Mirer soroi	200
• Hajee Danesh Sci. & Tec. University	05
• Ramsagar National Park	03
• Damurhat Beat Office cmpus	03
• Forestry Sci. & Tec. Institute, Rajshahi	02
• Mr. Nuru, Fatehpur, Hathazari	20
• Mr. Siraj, Fatehpur, Hathazari	30
• SUS, Sunamgonj (AFIE)	05
• Protyashi (Participant)	1000
• Humanitarian, Bandarbon	600
• Botanical Garden, BAU, Mymensingh	05
• Hathazari beat, Chittagong (N) Forest Div.	600

Total : 4224

Civit seedlings distributed in 2011:

• SHED (Inani PA in Ukhiya and Inani)	800
• Concord (Foy's Lake)	600
• Seven Star Group Ltd.	20

Total 1420

About 13,662 civit seedlings were distributed to 7 individuals and 33 institutes or organizations for domestication of the species during 2008 – 2011.

Available information indicate that most of the seedlings distributed to different organizations are growing well, e.g. 801 civit seedlings were distributed to Inani and Ukhiya for recolonization and restoration of the species in their native habitat through SHED and the survival rate of the seedlings are shown in Table 23.

Table 5. Restoration of Critically endangered Civit and Banshpatsa at Inani and Ukhiya RF and PF through Community GPC establishment

Name & Address of Owner	Civit planted	Civit survived	
		No.	%
Abdul Kader, tutur bil village, Ukhiya	130	50	38
Sona Mia, Inani (Nidania) village, Ukhiya	100	45	45
Nurul Islam, Chota Inani village, Ukhiya	95	35	37
Mohammed hossain, horin Mara village, Ukhiya	150	47	31
Mohammed Ishaq, Painnasia village, Ukhiya	133	40	30
Kader Hossain, Khairatipara village, Ukhiya	133	125	94
Mohammed Rafique, Dochari village, Ukhiya	50	30	60
Mohammed Osman, Khairatipara village, Ukhiya	10	05	05
Total	801	377	47

Similarly, seedlings distributed to other institutes or organizations are performing well. It is necessary to have a survey and monitoring of the status of the seedlings in diverse ecosystems.

Objective 4. Enhance scenic beauty and enrich the ecosystem of the country

Accomplishment of the activities in objectives 1, 2, 3, and additional objective 5 will simultaneously contribute to enhancement scenic beauty and enrich the ecosystem of the country.

Objective 5 (Additional objective): Access the floral diversity of Dudpukuria and Dupachari WS

Extensive field visit was jointly with the project on Restoration of banspata to assess the floral diversity of this newly declared Protected Areas. The findings include:

- More than 338 plant specimen were collected, identified and preserved in the herbarium of the Institute. About 80 herbarium specimen need to be identified by taxonomists.
- Identification and mounting is going on.

The number of identified plant species with their categories is shown in Table 6. The photographs of some of the interesting species are available in the Institute.

Table 6 The number of species identified from Dud-pukuria Dopachari WS

Category	No. of Family	No. of Species	Total
Trees	31	136	Species = 338 Family = 74 Monocots = 56 Dicots = 265
Shrubs	19	56	
Herbs	26	82	
Climbers and lianas	14	40	

Orchids	1	3	Plant specimen need to be identify >80 species
Ferns	10	17	
Palm	1	4	

Impacts

Awareness and capacity development: The awareness has been development through distribution of brochure, manual and holding of a workshop. The details of such activities have been discussed in sub-objective on 'Finalization of nursery establishment manual for civit, training on propagation techniques to the relevant stakeholders and awareness generation activities through training, workshop and other promotional approaches'. As a result of this outcome 33 different organizations and 7 individuals have taken 13,662 civit seedlings for domestication of the species during 2008 – 2011. Mass awareness on conservation programmes of native tree species in Chittagong University campus has been published by different dailies of the country. Some TV channels also broadcast the findings on different occasions.

The capacity building was achieved through pursuit of research by the students at the B.Sc and M.Sc. levels. Three B.Sc. students and three M.Sc. students conducted thesis on different aspects in conservation of the species. The faculty members also have a thorough insight on the biodiversity of the country. This will help them to conduct problem-led research.

Livelihood: The project activities is not directly linked to livelihood.

Institutional Development: The following institutional facilities were set up as a joint effort with restoration of banspata:

- A propagator for raising seedlings/stecklings was established jointly with the project on banspata. This facilitates to conduct research in raising propagules
- A mini tissue culture laboratory was set up jointly with the project on banspata. This will enable to render practical training to the students on micro propagation technique.

Forest and biodiversity conservation: Establishment of seed orchard in the University campus is a great effort from point of view in proliferation and conservation of the species. The knowledge gathered on dwindling condition of the species will create caution among the planners and the policy makers for its conservation. The awareness created on the issue will also attract the field workers for its conservation in the forest.

Sustainability Potential

Establishment of 1.6 ha of seed stands in Chittagong University campus has created an opportunity in collected seeds of this threatened species. This will enable to collect quality planting materials for large scale plantation. So, the achievements will greatly influence on sustainability.

Weaknesses

- Since civit is a light hardwood and moderately slow growing species, it is not economically demanding to the individuals and institutes for plantation programmes. This discourages the large scale planting programs of the species
- Some of the PPT (Provisional Plus Tree) are over-mature and located scattered and

isolated in the forest areas of Ukhiya, Wheikhong, Fasia khali and Fulchari ranges.

These over mature trees might not be promising seed trees

- Natural regeneration was observed in remnant forests, but regeneration is not successful. since the young seedlings are palatable to grazing animals
- Fire and fuel wood collection is another problem for the failure of the natural regeneration.
- Prolonged drought in the month of March April is responsible for the severe mortality of the civit seedlings
- There is lack of monitoring to the present status on the seedlings already supplied from the 3rd year of the project.

Recommendations

Two separate projects for scientific study for recolonization and mass propagation of civit and banspata appears too ambitious. There are so many species that are threatened. It is recommended to take up a single project to conduct study on 10-15 threatened species. The species can be selected through feedback from Forest Department, Bangladesh Forest Research Institute, Timber Merchants Association and the relevant NGOs.

IFESCU have established orchards of civit and some threatened species in Chittagong University campus. Many of the valuable plants established through the efforts during the last five years may even loose their existence if silvicultural practices are not done properly for want of fund. Thus, it is also recommended to make available of critical fund for this purpose till a follow up programme is launched.