

## Tanintharyi Conservation Programme (TCP)



# ASSESSMENT OF COMMUNITY FORESTRY IN TANINTHARYI AND RECOMMENDATIONS FOR IMPROVEMENT IN FINANCIAL, INSTITUTIONAL AND ENVIRONMENTAL SUSTAINABILITY

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<b>Cover images</b>	Front: Fisher family in front of CF mangrove forest. Credit: Bjoern Wode/FFI (2016).  Rear: <i>Madhuca lobbii</i> forest, Boke Pyin township. Credit: Bjoern Wode/FFI (2016).
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## ACRONYMS AND ABBREVIATIONS

ACFO	Assistant to CFO
AF	Agro-forestry
CCTT	Community Conservation Tracking Tool
CF	Community Forestry
CFI	Community Forestry Instruction
CFO	Community Forestry Officer
CSO	Civil Society Organization
dbh	Diameter at breast height (1.3 m)
DFMP	District Forest Management Plan
DRA	Dawei Research Association
EcoDev	Economic and Development Association
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organisation
FD	Forest Department
FFI	Fauna and Flora International
FUG	Forest User Group
GPS	Global Positioning System
KNU	Karen National Union
MAI	Mean Annual increment
MC	CF Management Committee
MNK	Myanmar national currency (MNR)
MP	Management Plan
NTFP	Non-Timber Forest Products
PES	Payment for Environmental Services
RCA	Rakhine Coastal Region Conservation Association
SEAFDEC	Southeast Asian Fisheries Development Center
SFM	Sustainable Forest Management
TNRP	Tanintharyi Nature Reserve Project
Units	
1 viss	3.6 pounds=1.637 kg
1 ha	2.471 acres
1 acre	0.405 ha

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Finally the consultant would like to thank the people in the project villages for their trust and support during the field interviews.

## EXECUTIVE SUMMARY

Project implementation in Tanintharyi Division under the Community Forestry (CF) component is working on natural and planted forest resources, which at the same time provide the unique opportunity to link ecosystem integrity with livelihood improvement of the forest dependent population and to demonstrate effective biodiversity protection through engagement of Forest User Groups.

A total of seven project supported villages have been visited and interviews as well as field visits to nurseries and afforestation sites conducted in mangrove and coastal semi-evergreen rainforests.

Findings were presented and discussed during a stakeholder workshop in Myeik attended by Forest User Groups, township forest department officers and related CSOs.

Site specific observations and recommendations are provided in village fact sheets.

In the following paragraphs main findings and recommendations are discussed.

**CF site selection** was based on rather extensive baseline data collection of which however only few criteria were applied for a final selection of villages. A present a comprehensive Community Conservation Tracking Tool (CCTT) is used as effective project impact monitoring tool and requires only ~ 3 hours per village to complete. It is therefore proposed to reduce data collection to few but relevant criteria only and to use the CCTT as main monitoring tool.

**Availability of project documents** is in some cases limited to few project staff only. It is proposed to reconsider whether an online library (e.g. dropbox) should be introduced to ensure that updated guidelines and consultant reports will be available for each project staff. At Forest User Group level provided project documents are generally well kept and bookkeeping is maintained.

**Afforestation** is well progressing regarding area targets. However, tree selection is not yet based on a comprehensive threat assessment to ensure that selected species can have a direct impact on the observed natural forest threat. Afforestation is often perceived as a compulsory step towards reaching a CF certificate only.

Seedling quality still varies to a great extent and in some cases unqualified seedlings have been used during afforestation only to ensure annual project progress and payments.

Afforestation design should only permit tree species mixtures in groups to ensure an effective silvicultural management in the future.

It is therefore recommended to adjust project payments towards business contracts with fewer nursery owners and payments based on number of qualified seedlings with an attached cost norm for each seedling. Final appraisal by project staff would be required to ensure that only qualified seedlings will be paid for and will be used in the afforestation. All afforestation has to be based on a comprehensive threat assessment to be clearly documented in the 30 year community forest management plan.

In **mangrove forests** single use options focussing on timber harvest should be avoided because they sub-optimize the multiple-use potential of such ecosystems and because most visited mangrove sites revealed some level of degradation and significant loss of mature timber trees.

At present, local people conduct a quality-based selective logging system that in fact can have lower ecological impacts compared to a felling cycle management as a

permanent forest cover is ensured at any time. Selective tree felling is in fact mimicking the natural process of a mature tree dying inside the stand. Gaps of the size of one mature tree can effectively be closed by means of natural regeneration alone.

It is therefore recommended to support capacity building on selective logging systems and to define – in consultation with FUG and Forest Department representatives – simple sustainability criteria and monitoring procedures that can be followed by the FUG and monitored and enforced by the Forest Department.

FUGs tend to avoid timber utilisation in their own CF sites but to shift their demand to other areas. At a subsistence level this leakage is hard to avoid by the project but utilisation impacts should be minimised through silvicultural best practises.

Especially **poorer communities** solely depend on wild-caught seafood and report a decline in populations. So far no aquaculture, beekeeping or vegetable production has yet been promoted and interviewed households articulated a great interest to test small-scale income generating activities inside their mangrove forest area. Good awareness on environmental issues was again observed as all people agreed that no tree felling or land clearing, and no use of fertilizer or drugs should be permitted under any aquaculture systems. Potential options to be tested include, small-scale aquaculture, beekeeping, vertical vegetable gardens as already piloted in Rakhine state and promotion of alternative charcoal materials such as coconut shells.

In **richer communities** firewood is often obtained from household owned rubber plantations and people show more diversified income sources. Project support was mainly requested in terms of support during mangrove rehabilitation measures even outside their own CF area and support during law enforcement and land grabbing by influential companies.

Pure stands of *Madhuca lobbii* offer a unique opportunity to pilot Payment for Environmental Services (PES) as a sustainable financing system for the operation and patrolling efforts of a FUG. To the knowledge of the consultant this would be the first pilot of such kind for Myanmar.

The proposed concept however would require a strong backing and field presence from FD side at least during its introduction period to ensure that arising conflicts with unwilling outsiders can be settled immediately.

**Charcoal production** on a commercial scale with huge permanent ovens was still observed during the field survey and is mainly conducted by poorer community members. Charcoal production is posing a higher threat to mangrove forest compared to construction timber harvest as many mangrove species are considered suitable and lower diameters can be used as well.

During the CF workshop in Myeik Mr U Tun Than Do (Palaw township Forest Department) stated that charcoal production in mangroves is declared illegal and that only in other coastal rainforests a permit for charcoal production could be obtained.

In order to deal with the charcoal problematic project support should be linked to a number of conditions on forest utilisation and protection that the FUG has to observe regardless whether they conduct tree felling inside or outside their CF area.

As charcoal ovens are massive and permanent structures they are easy to spot by local people and reporting these locations should be part of the commitment an FUG has towards the project. The project side would then forward these reports to the Forest Department to jointly deal with reported violation cases.

**Established FUGs** show a good awareness and high motivation to protect and develop their CF forests and even become advocates of their individual members in terms of dealing with external threats to the mangrove ecosystem such as land

grabbing by influential companies (in Ka de ka dut village the FUG members participated in a meeting with the prime minister of Tanintharyi to stop a proposed shrimp pond construction inside their CF area).

The establishment of effective FUG networks is clearly promoting this aspect to the next level as previously observed in Kachin state under two existing networks.

During this initial phase the project has provided rather **unconditional support** to communities but should be adjusted towards more **performance-based** monitoring and payments (nursery and afforestation) as well as conservation agreements that cover areas inside and outside the actual CF sites.

In view of an **institutionalisation**, township forest officers have to be encouraged to participate in project activities. FUGs stated that most of them have never or only once met a forest officer inside their village to support them with their CF duties.

As part of the project exit strategy sufficient capacities among township forest officers finally have to be available to provide support to FUGs on technical issues as well as during law enforcement.

It is therefore proposed to encourage the participation of township Forest Department staff into (i) capacity building events at FUG level as well as during (ii) project monitoring and reporting field trips. Especially the elaboration of the CF management plan should be attended by a representative from the respective township Forest Department to ease later approval procedures.

The **size of CF areas** is partly determined by rules provided by the administration (e.g. Forest Department regulations require that a gap of several hundred yards be kept between two FUG sites). However, traditional village boundaries would normally provide for a continuous forest block that could be shared among a number of FUGs.

It is strongly proposed wherever possible to apply a landscape approach for CF site selection and try to place a continuous forest area under the management of several FUGs, rather than to scatter project support along fragmented forest islands. Continuity would increase watershed and habitat functions, reduce leakage effects and would sharply reduce monitoring costs.

## 1. INTRODUCTION

The report at hand summarises the main activities and outcomes of the mission by the International Silviculture and Forest Management consultant for FFI TCP.

The consultant was fielded from 08/11/2016 until 28/11/2016 and conducted field visits in Tanintharyi Division.

The consultancy was designed to embark on the below mentioned activities:

- Interview project Community Forestry (CF) team and review documentation of their work to date
- Critically review the above and discuss strengths and weaknesses with the team
- Visit selected project field sites to conduct field spot checks and interview Forest User Groups
- Hold stakeholder consultations on how to support legal timber harvesting, CFUG networks, wood-based industries
- Present results to stakeholders at a workshop planned for during the field visit
- Design a monitoring system (including methodology for baseline establishment, data management, analysis and presentation, and re-assessment) for firewood production to show the impact of the woodlots/CF

## 2. NATIONAL CF POLICY DEVELOPMENT

### 2.1 CFI instruction

A revised CF Instruction (CFI) was passed in August 2016 as a result of a one year consultation process by the CF national Working Group (CFWG) and its 24 members. FFI is a member of the CFWG and has provided substantial contributions to the revised CFI.

This CFI is, according to the understanding of the consultant, one of the most progressive national pieces of legislation on CF in the entire Asian region and provides an extremely supportive framework for a continued CSO support to the long-term aim of sustainable forest management in the Union of Myanmar.

The instruction is providing strong and clear rights for FUGs to organise as enterprises or associations and to engage in national and even international forest product trade.

Furthermore a clear grievance mechanism is provided to protect FUG rights.

Main novelties are summarised as follows:

- Definitions: community forestry is mentioned as to involve local communities in SFM and utilization...managing existing forest to create income...from subsistence level to commercial purpose.
- Areas permitted: includes buffer zones of protected areas, and natural forests which should be managed by the local community for various reasons.
- Forest Department (FD) shall assist in formation of national level networks and associations of community forestry enterprises.
- FUGs may apply for forest certification and benefit from environmental services.
- Establishment of CF enterprise through which FUGs can produce value added forest products on a commercial scale and trade freely.
- A clear grievance mechanism is provided under which FUGs can file an appeal to the Director General in case they do not agree with a decision taken by District or State forest officers.
- FD shall encourage participation and assistance of local and international organisations.
- FUG rights: develop a CF product-based enterprise following a market-led approach to commercialise their products.
- For domestic use forest product utilisation does not require a permit and no tax shall be levied. Only a completion report one week after has to be prepared.
- FUG can transport and sell forest products at national and international markets.
- Field presence of township and district forest officers is encouraged with inspection visits to be scheduled once in three months.

However, the CFI shows clear shortcomings under the CF Management Plan format as described in Annex 2 of the CFI:

- The provided Table of Content is only describing silvicultural interventions under afforestation and thus reflect the Government's understanding of CF as a tool to achieve national reforestation targets and to ensure fuelwood sufficiency. No details on natural forest management are prescribed.

- Under point 8a - 8o silvicultural techniques are prescribed which however will be nearly the same for each FUG and would be better described in a technical guideline or SOP attached to the CFMP.
- No threat assessment is further described that would provide justification to the afforestation design and the long-term objective of the FUG forest management.
- Natural forest management is missing but should become one important separate chapter describing the long-term forest management goal for the 30 year period and planned silvicultural interventions to reach this goal. A long-term management goal is commonly described by species composition, expected products and their desired dimensions and proposed harvesting cycle.
- Of special importance would be one sub-chapter on timber and NTFP harvest divided for subsistence and commercial utilisation. This sections should mention on how FUGs will define a sustainable harvest level to avoid any forest degradation. Commercial timber utilisation should always be based on a forest inventory conducted by FUG under supervision of a township forest officer.

In this context it was mentioned that REOFTC is supporting national level consultations on a revised CF Management Plan format (a 4<sup>th</sup> meeting was recently conducted). It would be of crucial importance that FFI experiences and ideas will be provided to this working group as contribution to national level policy development.

## 2.2 National CFM implementation progress

It was stated that roughly 1.8 million acres in the Union of Myanmar are already under CF management which is translating into ~80% of the national target of 2.2 million acres.

As such FUGs start to become a recognisable player in the forestry sector in the Union of Myanmar.

At present a clear focus remains on afforestation targets only, however in the coming years forest management under plantations and natural forests will become increasingly important to support a sustainable and economic viable operation of FUGs.

As at present no functioning forestry extension system is available in the Union of Myanmar only township forest officers can take over this role. However, at present they remain with rather limited experience to fulfil this new task.

In view of a sustainability of project achievements after the project end and an institutionalisation of the project outputs the participation of township officers during all capacity building measures and field implementation should be encouraged.

As for Tanintharyi project region it was mentioned that a cooperation with FD remains difficult as they tend to focus on their own 10 year CF targets which often do not overlap with project areas.

For 2017 it is therefore recommended to closely coordinate with FD regarding new CF areas to ensure a common implementation areas and strengthened cooperation.

### 3. TANINTHARYI SURVEY

#### 3.1 FUG consultation meetings in Tanintharyi township

A total of seven FUGs have been visited and group interviews as well as field visits to the afforestation sites conducted by the mission. The specific observations for each FUG are recorded in the village fact sheets below.

##### Village fact sheet no. 1

Village name	Chaung nauk pyan
Date of field visit	11.11.2016 morning
FFI support since	08/2015 awareness raising meeting, followed by monthly meetings
Objective	Preserve natural forest for water conservation, rehabilitate degraded areas through plantation
Training topics	Forest time line was only conducted in ToT training not yet in each village, in 2016 training on zoning and nursery management provided
FUG	FUG established (~60% of village households)
Socio-economic survey	May 2014 including village mapping; old chairman remembered the exercise however sketch map information proved difficult to interpret for FUG members
Available documents	All documents lost in October 2016 and are not yet replaced CF application and zoning map submitted to FD
Management Plan	Not yet
CF certificate	FUG stated that after receiving the certificate they will be permitted to conduct commercial timber sale and avoid land grabbing by companies. Hope to complete certificate by end of 2017
Mapping information	Village boundary map completed and submitted to FD Land use planning map not yet
Border demarcation	Once FD permission is obtained, border demarcation in the field will commence
Threat assessment	Not yet conducted despite 1 <sup>st</sup> afforestation completed in 2016 At present firewood is collected from private forests near the village that are currently converted into oil palm plantations. In 4-5 year firewood has to be collected from CF area or from woodlots yet to be established No outsiders are reported to enter the forest for hunting or logging
Afforestation design	20 acre in 2016 completed (species selection based on seed availability, and site matching criteria) <ul style="list-style-type: none"> <li>▪ Pyinkado (<i>Xylia dolabriformis</i>)</li> <li>▪ Red Pyinma (<i>Lagerstroemia flos-reginae</i>)</li> <li>▪ Kangin (<i>Dipterocarpus turbinatus</i>)</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Mahogany (Swietenia macrophylla)</li> </ul> <p>Following planting will focus on firewood species (~ 180 acre)</p> <ul style="list-style-type: none"> <li>▪ White Pyinma (Lagerstroemia sp.)</li> <li>▪ Cassia siamea</li> <li>▪ Eucalypt</li> </ul> <p>Establish nursery for 2017 in January, planting season in June; business contract concept for nursery management discussed and received positive feedback from FUG</p>
Nursery	<p>Managed by entire FUG, no clear criteria for seedling quality, technical guideline on nursery management from project available</p> <p>Current payment 60% for nursery management and site preparation; 40% for planting and weeding; payment already received for 2016 planting</p>
Monitoring	<p>FUG bookkeeping is submitted to FFI semi-annually for checking;</p> <p>Nobody in the village has a bank account (~ 90 miles away); payments are conducted in cash</p>
Requested support	<p>Technical training on planting, forest management and management plan elaboration</p>
Field visit	<p>Due to heavy rain on the previous day no site visit to the afforestation was possible</p>

### **3.2 FUG consultation meetings in Pyigyimandaing township**

#### **Village fact sheet no. 2**

Village name	Nan Taung (Mu Kwa in Karen language)
Date of field visit	11.11.2016 afternoon
FFI support since	November 2015
Objective	Preserve natural forest for water conservation, plantation with commercial timber species for sale
Training topics	Awareness raising, FUG establishment, zoning, nursery management, planting
FUG	FUG established and active during its operation
Socio-economic survey	May 2014 including village mapping
Available documents	Bookkeeping documents, minutes of meetings, CF border map AO vinyl, KNU CF certificate
Management Plan	Not yet, no MP required under KNU certificate, only simple application (4 pages) required; FFI will support MP for all areas
CF certificate	Natural forest area under KNU certificate for 20 year period (prior to project support) under this certificate only subsistence timber use is allowed, every harvest requires a permit, utilization above

	250 cubic feet (5 tons) requires a levy to KNU, average house requires ~ 10 tons. Afforestation area not yet under any certificate.
Mapping information	Village boundary map completed submitted to forest department
Border demarcation	CF area under KNU certificate already demarcated with yellow oil paint in the field
Threat assessment	Not yet conducted despite 1 <sup>st</sup> afforestation completed in 2016 At present firewood is collected from secondary forests close to the village center, only small diameters (clearly below 20 cm) are used, no shortage of firewood recorded No outsiders are reported to enter the forest for hunting or logging
Afforestation design (Agroforestry)	10 acre in 2016 completed Mixed plantation (8x8 feet spacing) Teak (5000 seedlings) Pyin Ka Ro (15000 seedlings) replaced by Mahogany Ginger (10.000 seedlings) All trees intended for commercial sale Nursery planning as hand written document without following standard format as provided in MP
Nursery	Managed by entire FUG, no clear criteria for seedling quality, technical guideline on nursery management from project available Current payment 60% for nursery management and site preparation; 40% for planting and weeding; payment already received
Monitoring	FUG bookkeeping is submitted to FFI semi-annually for checking
Requested support	Technical training on planting and forest management
Field visit	Field visit to agroforestry site; ginger showed high mortality; teak seedlings too small, betel good survival rate; 1 <sup>st</sup> weeding completed; remaining tree vegetation well protected; some seedlings planted too close to existing trees or near path (requires more flexible spacing); Potting mixture with insufficient humus

### **3.3 FUG consultation meetings in Boke Pyin township**

#### **Village fact sheet no. 3**

Village name	Setain chaung pyar
Date of field visit	12.11.2016
FFI support since	November 2015
Objective	Preserve Kan Zaw village forest for seed collection and oil production
Training topics	Awareness raising, FUG establishment, zoning, nursery management, planting

FUG	FUG established and active during its operation
Socio-economic survey	No baseline survey, Community Conservation Tracking Tool (CCTT) ongoing
Available documents	Bookkeeping documents, CF border map A4 paper
Management Plan	Not yet
CF certificate	<p>Not yet, will apply for Myanmar government CF certificate, KNU certificate not considered relevant by FUG.</p> <p>The FUG considers the CF certificate important for effective law enforcement and forest protection by the community.</p> <p>They consider to collect a levy for each seed collector from outside communities. This would be a unique opportunity to introduce the concept of Payments for Environmental Services (PES) in Myanmar and to ensure a sustainable financing of the FUG.</p>
Mapping information	Village boundary map completed, submitted to FD
Border demarcation	CF area already demarcated in the field with red oil paint, part of the CF area fenced to protect against illegal logging
Threat assessment	<p>Not yet conducted despite 1<sup>st</sup> afforestation completed in 2016</p> <p>The village is located closest to the CF area and consider the forest as inside their traditional village boundary. However 8 additional villages also have claims for this area. Land use conflicts remain.</p> <p>Forest threats include cutting mature trees for boat building (one village with Muslim population) however since 2015 after awareness raising no more cutting.</p> <p>Cows are passing through the forest causing some trampling damage to the natural regeneration.</p> <p>Medium and small trees are cut during seed collection (May, June).</p> <p>People from up to 40 villages collect Kan Zaw seeds with up to 600 people per day entering the forest.</p> <p>Seed collection is mainly conducted during the night when most of the seeds fall to the ground.</p> <p>Since recent years only every 2<sup>nd</sup> year is seed bearing with reasons unknown. 2017 is expected to be a seed year.</p>
Afforestation design	<p>Scattered small gap plantings have been conducted in 2016.</p> <p>Madhuca lobbii (Kan Zaw trees) have been planted, however one visited planting site is around 1 m above the swamp level and is solid relatively dry land. It is expected that trees despite good survival rate so far might not survive in the long run due to the very different site conditions compared to its natural habitat of a swamp land.</p> <p>Planting was mainly conducted as it is a compulsory steps towards reaching an CF certificate only, but is not responding to any actual forest threat.</p>

	<p>Natural regeneration inside the forest is good, however young trees are frequently cut during seed collection resulting in an understocked under- and middle storey.</p> <p>Mature trees are reported to die from the top of the crown. In addition previous felling resulted in smaller gaps.</p> <p>No documentation of the nursery planning is available at the FUG.</p> <p>It is recommended not to continue afforestation efforts but to focus on assisting the existing natural regeneration through protection. Following a rough spacing of 15 x 15 feet vital wildlings should be protected by placing bamboo sticks around each side to act as protective cage against cutting and trampling damage.</p> <p>Trees are reported to start producing seeds at ~10 years of age responding to a diameter of &gt; 15 cm dbh.</p>
Nursery	<p>Managed by entire FUG, no clear criteria for seedling quality, technical guideline on nursery management from project available.</p> <p>Nursery efforts including the transplanting of wildlings have only resulted in modest survival rates and should be discontinued.</p>
Monitoring	<p>Bookkeeping records and collected receipts by the MC were made available at the meeting.</p>
Requested support	<p>Support during the elaboration of the management plan. An early approval is considered important to ensure that the coming seed collection season in May/June can be conducted under supervision of the FUG.</p> <p>FUG members intend to design regulations – to be added into the management plan – that forbid knives to be carried into the forest during seed collection.</p> <p>If approved by the FD and under an issued CF certificate these regulations would become a legal binding document that can be enforced with support from FD.</p>
Field visit	<p>Field visit into the swamp area was conducted to verify the status of the natural regeneration.</p> <p>Previous climber cutting was stated to have contributed to increased crown vitality and is expected to result in increased seed yields in 2017.</p> <p>The stand clearly revealed the lack of a middle and understorey due to regular cutting. At present the forest has a vertical structure of a gallery forest with one dominant crown layer only.</p> <p>It is strongly required to build up a strong middle layer to be prepared for replacing dead trees in the dominant tree layer.</p>

### **3.4 FUG consultation meetings in Kyunsu township**

#### **Village fact sheet no. 4**

Village name	Shaw tau maw
--------------	--------------

Date of field visit	14.11.2016 morning
FFI support since	December 2015 (previously supported by Green network), met with project 3 times since then.
Objective	Preserve forest and stop illegal logging, increase livelihood through fishing. After 5 years of protection want to use timber for subsistence only.
Training topics	5 trainings conducted (2 FFI, 3 Green network)
FUG	FUG established and active during its operation
Socio-economic survey	CCTT newly completed. One village member collects forest honey (3-4.000 MNK/1 liter) Average income stated as 1 lakh/month/family
Available documents	Large collection of documents from both organizations. Mostly training handouts and nursery guidelines. A GPS manual from Green network.
Management Plan	Not yet
CF certificate	Not yet
Mapping information	A4 paper map with outer CF boundary and village location available. When asking for the reasoning of the total area for CF (313 acre) it was stated that area < 500 ha are easier to be approved by FD.
Border demarcation	Area measurement with GPS conducted by FUG. Located inside Auckland Bay Reserved Forest.
Threat assessment	Before project started insider and outsider were logging in the CF area, after participating in the project only outsider continue. Villagers now go to different areas (max. distance one night by boat).  Mature trees are long gone (over 10 years ago), smaller diameters are used for drying fishmeal and charcoal production.  Charcoal production contributes to only 5% of village income > 90% from fishing and migrating labour. Some 5% households have upland rice. No see weed cultivation nor other forms of aquaculture. Charcoal production is conducted from inside the community but outside the FUG. Need FD support for effective law enforcement.  Shortage of fresh water, 2 wells for drinking water, usage water transported from other island.  Last year started patrolling, mainly MC and village administration. This year include FUG members. October/November is most serious illegal logging.
Afforestation design	15.000 seedlings produced. 4 species were planted. Good natural regeneration was reported.
Nursery	Not visited
Monitoring	Detailed cost proposal for plantation planning in English.

	Bookkeeping and financial documents available at MC including minutes of meeting.
Requested support	Technical training on alternative livelihood options. No technical extension available from government. It was stated that FD never visited the village nor the FUG. Interested in fuel efficient stoves.

**Village fact sheet no. 5**

Village name	U yin gyi
Date of field visit	14.11.2016 afternoon
FFI support since	Started in 2015, already 10 meetings with FFI + Green network
Objective	Forest quality significantly reduced, want to receive technical advice on forest restoration. In the past trees with 1 m diameter. After 5 years of protection FUG want to continue using timber with a minimum harvest diameter ≥ 20 cm.
Training topics	See above
FUG	FUG established and active during its operation
Socio-economic survey	Average income stated as 1.5 lakh/month/family mostly from crab collection. One person can catch up to 3 kg/day, normally 20 days per month. 1 viss is sold 5.000 MNK.
Available documents	Minutes of meetings and handouts from previous trainings available
Management Plan	Not yet
CF certificate	Not yet. Unclassed forest to be classified as PPF with 376 acres.
Mapping information	Not yet available at FUG
Border demarcation	Conducted by use of GPS
Threat assessment	Charcoal production normally done by poorer community members (80.000 – 1 lakh income/month/family) FUG articulated commitment to reduce charcoal once FFI livelihood support start. Sonneratia griffithii, Heritiera fomes, Xylocarpus granatum before mature trees now only small dimensions left. As evidence construction timber for roofing is ~ 8 cm diameter. Timber is used for (1) charcoal, (2) fishmeal production, (3) brick production and Nypa palm sugar, and finally (4) cooking. Last year 20-30% village income from charcoal. This year after project 5-10% only because 20 households have left the village to travel around for charcoal production. 50% village income from betel production underplanted with pine apple and lemon trees. Good water supply from nearby mountain (some logging from outsiders reported), further provides water for other communities.

	No upland rice nor paddy. Clams are sold to Myeik. No aquaculture. Wild honey sold for max. 5000 MNK/liter.
Afforestation design	7 species produced in nursery. So far 80% survival rate stated. Overachieved their nursery target. Local people differentiate 3 different site types for planting. FUG wants to plant for 4 years more, inside and outside CF area. Stated that natural regeneration is available but afforestation would speed up the development.
Nursery	Not visited
Monitoring	Bookkeeping records available
Requested support	Law enforcement need support from FD. Fuel efficient stove as wood is very rare. Afraid to get stung by bees if would start beekeeping.
Field visit	Charcoal ovens and home garden visited

**Village fact sheet no. 6**

Village name	Ka de ka dut
Date of field visit	15.11.2016 morning
FFI support since	May 2015 Green network, Nov. 2015 FFI
Objective	Disaster protection, increase livelihood. After 4 years protection want to use timber for subsistence housing.
Training topics	See above
FUG	FUG established and active during its operation
Socio-economic survey	Average income stated as 1.5 - 2 lakh/month/family. Mostly from (1) rubber, (2) home garden and (3) labour
Available documents	No documents available during field visit, did not enter the settlement area
Management Plan	Not yet
CF certificate	CF certificate will provide legal ownership to avoid land grabbing and conversion into shrimp ponds.
Mapping information	Not yet available
Border demarcation	FUG members marked boundary with GPS and set-up signboards
Threat assessment	Many outsiders conduct logging. Big trees long gone. Require FD support for effective law enforcement. Upland rice stopped 2010 following FD request. No more charcoal production inside village. Ongoing land conflict with an investor who wants to convert the mangrove sites into shrimp ponds. Households have rubber plantation and home garden (min. 1, average 3, max. 7 acres/household). Total 700 acres. Only very few people catch crabs. FUG started patrolling inside CF area 2 times a month.

Afforestation design	Last year 16.000 seedlings produced, reforest gap sites. Low survival rate of only 65% explained by wrong site matching. No additional sites for planting.
Nursery	Not visited
Monitoring	No documents available during field visit as met only inside the boat at the site
Requested support	Interested in aquaculture and beekeeping (honey is sold in Myeik for 6.000 MNK/liter as offering during annual religious festivals). Some households already started simple beekeeping in hollow logs.
Field visit	No site visit

**Village fact sheet no. 7**

Village name	Ta ra mel
Date of field visit	15.11.2016 afternoon
FFI support since	Dec. 2015, monthly meetings with FFI
Objective	Rebuild CF Mangroves for subsistence timber use and livelihood development (fishing)
Training topics	See fact sheet above
FUG	FUG established and active during its operation
Socio-economic survey	Average income stated as 2.5 lakh/month/family. Paddy, home garden including vegetable growing.
Available documents	Interview conducted inside the mangrove forest, no documents could be reviewed.
Management Plan	Not yet
CF certificate	Not yet, is considered an important document for effective law enforcement.
Mapping information	Not yet available at FUG
Border demarcation	FUG members marked boundary with GPS and set-up signboards
Threat assessment	Use only branches for firewood from rubber plantations. Illegal logging by outsiders can only be stopped with support from FD. House construction timber obtained from home garden or bought outside. No charcoal production. No honey found in the forest.
Afforestation design	Objective is to enrich the forest with valuable tree species that do not occur in the natural regeneration. Remaining standing timber considered not valuable by FUG. Target is to replant 30% of the CF area. Too strict spacing observed, did not consider existing vegetation and natural regeneration into afforestation design.

Nursery	Nursery contains remaining trees for beating-up, nursery had to be fenced against crabs. Seedling quality considered satisfactory
Monitoring	Interview conducted inside the mangrove forest, no documents could be reviewed.
Requested support	Aquaculture
Field visit	Plantation and nursery visited

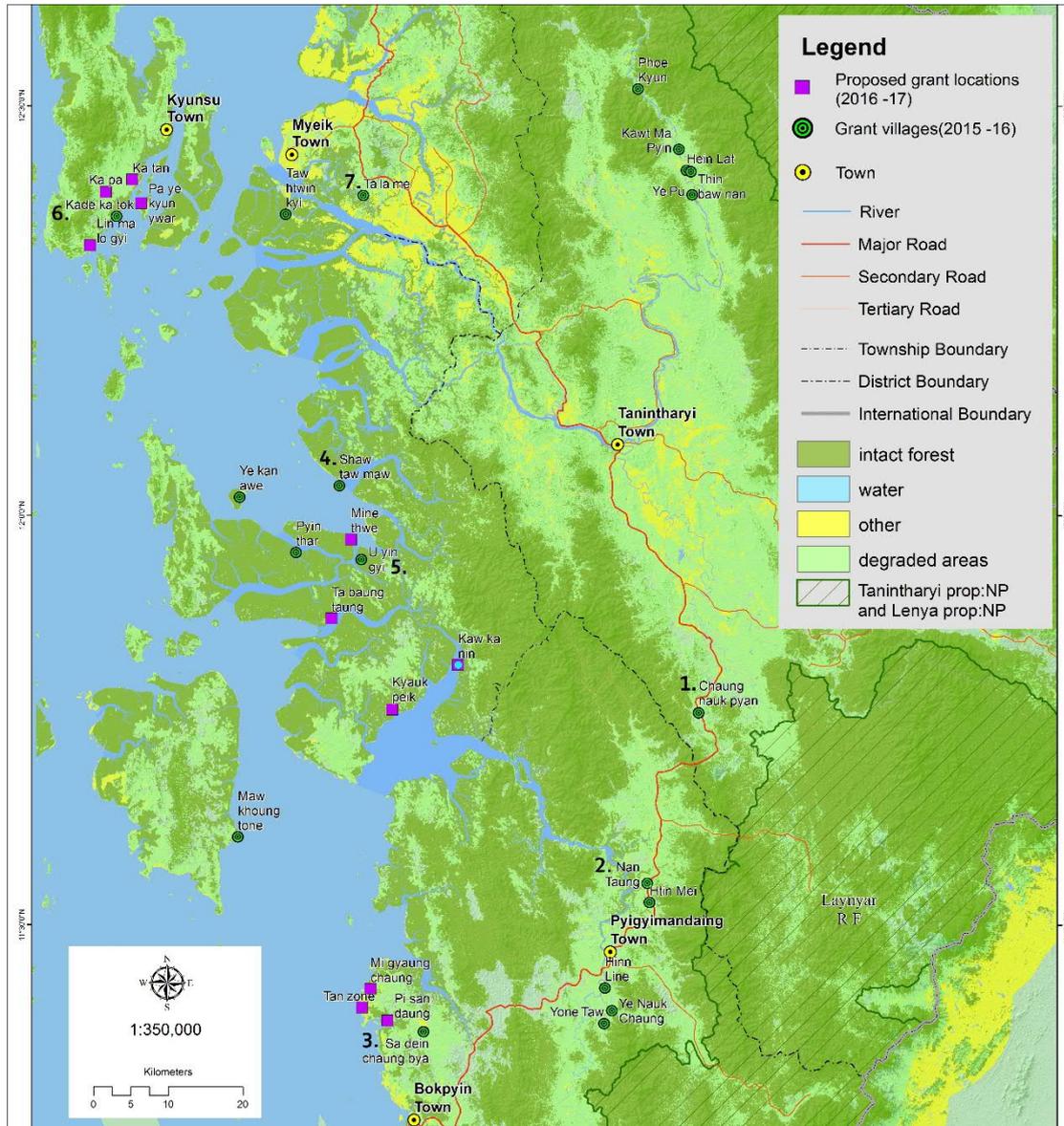


Figure 1: Proposed Grant Location Map (2016 – 2017) of Tanintharyi Region

**Data sources:**

Tanintharyi and Lenya Proposed national park boundaries FFI (draft)  
 Landcover from EcoDev 2014, Road and town location from MIMU  
 GCS WGS 1984. Layout: Myo Myint Aung (2016), FFI

**Table 1: Summary of Small Grant progress in Tanintaryi Conservation Program (TCP)**

No.	Site	Township	Village Name	Civil Society Organization	FUG Households	Agro-forestry	Plantation	Natural Regeneration	Protection	Management Committee	Seedling	Management Committee
1	Leyna	Boke Pyin	Hin Line	FFI	20	4,000	1,000	0		20	2,000	5
2	Leyna	Boke Pyin	Yae Naunk Chaung	FFI	31	6,200	1,550			31	3,100	5
3	Leyna	Boke Pyin	Yone Taw	FFI	7	4,000	1,000			20	2,000	5
4	Leyna	Boke Pyin	Satein Chaung Pyar	FFI	31		7,260		22	28	7,260	11
5	Mangrove	Myeik	Taw Htwyn Gyi	Myeik Education	34		45,000	60	10	100	45,000	6
6	Leyna	Boke Pyin	Kayin Nantaung	FFI	21		30,000		462	482	30,000	7
7	Leyna	Boke Pyin	Kayin Nantaung	Church	10	2,100	6,500	7		14	6,500	5
8	Tanintaryi	Tanintayin	Phoe Kyun	FFI	27	7,750	1,500			49	3,000	9
9	Tanintaryi	Tanintayin	Kaw Ma Pyin	FFI	20	11,000	1,500			80	2,200	5
10	Tanintaryi	Tanintayin	Hein Latt	FFI	31	8,000	1,600			64	1,600	5
11	Tanintaryi	Tanintayin	Yae Pu	FFI	20	8,000	1,000			58	1,000	9
12	Tanintaryi	Tanintayin	Thin Baw Nan	FFI	20	8,000	1,600			64	1,600	5
13	Mangrove	Kyunsu	Ka de ka dut	Green network	50		20,000	20	180	250	20,000	5
14	Mangrove	Kyunsu	Ta ra mel	Green network	110		20,000	10	100	112	20,000	10
15	Mangrove	Kyunsu	Yae Kan Awl	Green network	67		20,000	320	400	800	20,000	7
16	Mangrove	Kyunsu	Maw Khaung Ton	Green network	160		15,000	350	550	1,000	15,000	5
17	Mangrove	Kyunsu	Shaw taw maw	Green network	167		15,000	350	550	1,000	15,000	7

18	Mangrove	Kyunsu	Phin Tar	Green network	148		15,000	350	550	1,000	15,000	5
19	Mangrove	Kyunsu	U Yin kyi	Green network	60		15,000	350	551	1,000	15,000	5
20		Kyunsu	Network group	Green network	18							6
21	Lenya	Tanintaryi	Chaung Nauk Pyan	FFI	19		8,600			20	8,600	6
22	Tanintaryi	Boke Pyin	Htin Mel	FFI	11		8,600			20	8,600	5
23	Myeik Univ.	Myeik	Zoology (1)	FFI								
24	Myeik Univ.	Myeik	Zoology (2)	FFI								
25	Myeik Univ.	Myeik	Botany	FFI								
25		4		4	1,082	901	1,378	1,817	3,375	2,216	1,251	138

### 3.5 CF Stakeholder Workshop

On the 17<sup>th</sup> November a CF stakeholder workshop for the Tanintharyi project region was organised.

61 participants including five township FD officers, Green network, EcoDev, Dawei Research Association (DRA) and representatives from 42 FUGs attended the workshop.

The workshop was designed to provide opportunities for FUGs to engage into a direct dialogue with township and district FD representatives on CF issues under CF networking, SME as well as mangrove management and livelihood development.

During the workshop the consultant further presented preliminary findings from the field mission. See **Annex 2** for the provided presentation.

Three working groups each comprising of FD and FUG representatives were formed and the discussion structured along guiding questions for each group topic as shown in Box 1 below.

#### **Box 1: Guiding questions provided for group work session**

##### *Working group 1 (CF network formation and management)*

- Formation of networks (who would coordinate, how to register, what costs are involved)
- What benefits would a network bring to its members?
- How to encourage more FUGs and networks to form?
- Role of Forest Department in establishment and coordinating network FUGs?

##### *Working group 2 (SME development under CF)*

- Options and constrains for a timber-based business by FUGs (SMEs)
- NTFP development (products, constrains, markets, processing etc.)
- Legal issues for commercial forest product trade (inside and outside township)
- Can Forest Department provide technical support to FUGs?

##### *Working group 3 (Mangrove management and livelihood development)*

- Options for sustainable harvest of mangrove timber? How to define sustainable harvest amount? What costs and profits?
- Options for small-scale aquaculture inside Mangrove area? (no tree cutting permitted)
- How to improve agro-forestry and vegetable production (potential and constrains)?

**Working group 1** elaborated some general regulations on how to operate a potential CF network including monthly meetings at township level while every 2<sup>nd</sup> month one district level meeting in cooperation with the FD would be held.

Main coordination function was assigned to Government authorities, FD, SLRD, local and international NGOs. An application for registration would be submitted to township and approved at district level.

Exchange of technical knowledge, support among FUGs to solve major problems and better coordination was mentioned as benefits provided by an effective network.

The role of the FD was described as to participate in network awareness raising meetings, to support some budget under reforestation and to support communication with other authorities.

**Working group 2** clearly preferred NTFP management as most feasible option for SME development considering the limited availability of mature high value timber in their CF forest and the accompanied procedures under obtaining a harvest permit and removal pass by FD if sold outside township boundaries. Timber will be managed to mainly satisfy the subsistence demand of the FUG (for poles and firewood) with only marginal surplus to be considered for commercial sale.

Proposed NTFP development comprised of chilli, coconuts, honey, bamboo and rattan. Interestingly hydropower production was further mentioned. As main constraints distance to markets, lack of technical know how and required investment was mentioned.

Discussions about the supporting role of the FD revealed that main support is expected in obtaining a CF certificate, and under supervision of harvesting procedures and marketing. Technical extension was not considered a main task of FD.

Results under **working group 3** revealed that at present no standards for sustainable harvest levels for mangrove forests are available nor applied in reality.

FUG participants proposed a felling cycle of 10 years with a harvest intensity of 30-40% during each harvest coupe. Individual tree felling would be limited to mature trees following harvesting lines. After harvesting, replanting would be supported by the FUG.

Patrolling and control of illegal charcoal production was further mentioned as integrated part of mangrove management.

However, in terms of sustainable livelihood development aquaculture, and ecotourism was mentioned as most suitable option. More detailed discussions on aquaculture revealed a similar situation with only very fragmented knowledge available at present.

Participants stated that production would be limited to smaller waterways only. No production inside mangrove stands was considered feasible. It was further mentioned that only areas without strong tidal water fluctuation could be used. All participants agreed on main management principles including prohibition of tree cutting, site clearing and use of chemicals or drugs for fish production.

Beekeeping was confirmed as potential source of income for some mangrove areas.

Under agro-forestry production it was clarified that land availability for island communities would be the major limitation for home gardens with e.g. coconut, cashew, chilli, eggplant, star fruit and mango.

A strong interest in vertical gardening was observed after the consultant introduced the concept to participants.

### **3.6 FFI Documentation**

Socio-economic surveys for 38 villages have been conducted between March to May 2014.

Three survey reports have been produced and village profiles documented including village resource map sketches as follows:

- 1<sup>st</sup> part socio-economic survey (March – April 2014) Tanintharyi site
- 2<sup>nd</sup> part socio-economic survey (6 May – 13 May 2014) Tanintharyi and Lenya sites
- 3<sup>rd</sup> part socio-economic survey (16 May – 22 May 2014) Lenya site

Apart from the 2<sup>nd</sup> report, all documents and mapping information were available as softcopy by the CFO.

The Community Conservation Tracking Tool (CCTT) was completed in six villages (Shaw tau maw, U yin gyi, Ka de ka dut, Ta ra mel, Phin tar, Taw Htwin Gyi) and will replace the socio-economic surveys. Survey time in one village was estimated with ~ 3 hours.

Progress reports of previous assignments conducted by the consultant are only available as hardcopy in the project library, no softcopies are available at either CFO, ACFO nor project office computer in Myeik.

Documentation at FUG level comprised bookkeeping documents, handwritten minutes of meetings, nursery manual and handouts, village border maps (partly as A4 copy or as A0 vinyl print). In the case of Chaung nauk pyan village, all documents have been lost during a visit at the local bank (October 2016) and have not yet been replaced.

No village has yet elaborated a management plan despite first afforestation already completed. Afforestation design documents or financing plans were not available at FUG level in nearly all cases.

Both ACFOs attended government examination in the capital to reach the rank of range forest officers and could therefore not be consulted during the field mission. It is understood that both will return to the FD within the coming year.

### **3.7 Recommendations on improved financial, institutional and environmental sustainability**

#### **Baseline and monitoring surveys**

Previous socio-economic surveys have been completed in a rather schematic fashion to serve as project baseline with a wide range of criteria obtained. Aggregated data is provided in form of village profiles and village resource sketch maps with attached reports.

Surveys in target areas were designed to provide background and baseline information for project planning including guiding village and intervention selection.

The 1<sup>st</sup> survey report was elaborated by an international consultant, concludes with findings and a detailed ranking list of target villages for project support. The 3<sup>rd</sup> report has been prepared by local project staff and is largely missing this analytical part and remain with a descriptive summary for each surveyed village only.

In general, from the large amount of village based data obtained from the survey only a fraction of this information is actually used during following project work. The CCTT is following a much more streamlined process and largely avoids collection of general village data and is seen as a consequent improvement of the previous survey.

It has to be emphasised that, the survey is not designed nor suitable to substitute the threat assessment as designed under the CF management plan elaboration.

### **FFI Documentation**

Hardcopies of all progress and survey reports are available at the TN office, however ACFO and even the office manager do not have softcopies to ensure that consultancy outputs will be applied during daily work.

Availability of updated project documents could be improved by use of e.g. dropbox or google storage with passwords provided to FFI staff.

At village level FUG Management Committees (MC) presented a large amount of documents from various training courses provided by Green network and FFI. But the majority of the documents kept at the FUG are not required for FUG operation.

The time line exercise was only conducted in the site level training but not applied during village trainings.

The most important management tool, the CF management plan, has not yet been elaborated, but should have been completed step by step from the start of the FUG establishment.

### **CF site selection**

Site selection criteria are not clearly defined in any project guideline but are mainly based on personal assessment by project staff and based on proximity to the proposed protected areas.

Sites are commonly kept well below 500 acres as it was stated that above this benchmark procedures to reach a CF certificate are by far more complicated.

Site selection is furthermore following customary village boundaries to a great extent to avoid land use conflicts with neighbouring communities.

In areas controlled by the Karen National Union (KNU) a CF certificate can be issued by the KNU following a simplified procedures compared to a certificate issued by Myanmar Government.

The KNU CF certificate is only valid for a period of 20 years and does not permit any commercial timber utilisation. Every harvest requires a KNU permit with utilization above 250 cubic feet (~5 tons) subject to a natural resource tax to be paid to KNU. As stated by the FUG an average sized house requires ~ 10 tons.

KNU issued CF certificates therefore do not provide any incentive for a timber-based business concept as actually permitted under the revised CFI. It is therefore strongly requested wherever possible to opt for a certificate issued by the Myanmar Government.

For future CF site selection, the size of CF forests should be somehow related to the size of the FUG in an attempt to balance supply and demand towards a sustainable and economic viable forest utilisation. Rough estimated could be based on average firewood and construction timber demand at household level. As a conservative estimate for the supply side an average of 2m<sup>3</sup>/ha for standing timber increment could be used in the absence of reliable growth and yield data.

### **Institutionalisation**

According to the revised CFI, the FD has the duty to provide material inputs for forest establishment, technical assistance on forest management and supervision on forest harvesting and assist FUGs in forest protection issues (see CFI Article 20, point a, b, c, d, e).

Field inspections by district and township forest officers should be conducted once per quarter (see CFI Article 46).

Despite these legal provisions all visited FUGs stated that FD staff has never or only once met with the FUG inside their village. The lack of a forestry extension system was further mentioned as a clear challenge for a FUG to engage in Sustainable Forest Management (SFM).

It is therefore proposed to encourage the participation of township FD staff into (i) capacity building events at FUG level as well as during (ii) project monitoring and reporting field trips. Especially the elaboration of the CF management plan should be attended by a representative from the respective township FD to ease later approval procedures.

### **Nursery management**

Current nursery management is designed as joint FUG effort with main tasks shared among members under supervision of the MC. Two distinct project payments are foreseen and are paid to the MC in the name of the respective FUG.

Initial implementation of nursery management in 2016 has revealed a number of organisational and financial issues which are summarized in the following.

A joint nursery implementation by the entire FUG requires increased training efforts as each member has to participate in training courses organised and financed through the project.

FUGs are held responsible for fund usage and bookkeeping. Project finance is provided for material and labour compensation of FUG members. Financial contribution is therefore provided against expenditures but not against the final amount of qualified seedlings. Under this payment scheme it could actually happen that a FUGs having actually used up their financial sources but were only able to produce e.g.40% of the planned amount of qualified seedlings.

Poor FUG members can only spare limited time for CF work as they are required to work as daily labour to support their family and in some cases resulted in a number of poor households resigning from the CF model during seedling production. Often the FUG agreed to provide only limited food subsidies for nursery work conducted by FUG members which however are not designed nor sufficient to cover opportunity costs of poor daily labourers.

In view of above mentioned challenges it is therefore proposed to re-design the nursery management and finance towards a business contract with individual households who will be paid against number of qualified seedlings produced. The concept envisions that a limited number of households (max. 2-3 households per village) agree to engage in a business contract for the production of high quality seedlings. A limited number of nursery managers is envisioned to increase commitment, qualification and can result in a real income source especially for poorer community members. Instead of spreading project finance over a larger amount of FUG members and by this reducing its significance to a daily food allowance.

Especially weak and elder community members can effectively be engaged into this rather light physical labour. At present, labour compensation is divided among too many FUG members to result in a significant incentive for reaching planned production targets.

A clear focus on a few households will furthermore reduce training and monitoring costs for the projects. Positive project experiences in the Asian region have revealed that a single household can produce up to 150.000 qualified seedlings per season.

Under upcoming financial cooperation projects, especially with larger funding, nursery production has to be based on cost per qualified seedling as part of investment packages under CF.

Revised payment mechanisms would foresee an advanced payment and final payment to ensure that poor village members would be provided sufficient finance to advance material and labour cost before the final payment.

Existing total project payments are therefore to be converted into feasible cost norms per seedling. Distinct payments for different tree species need to be prepared depending on availability of seeds, typical germination and survival rate and duration in the nursery as far as the current knowledge allows.

It has to be emphasised that nursery production is only one single step in the entire CF concept, and that all remaining implementation steps will remain unchanged under the joint FUG responsibility.

If considered feasible by the project management, seedling quality standards defined by vitality, stem height, root collar diameter and root development are to be developed for planting season 2017. At present, no technical standards are available in the Union of Myanmar to be applied by the project.

### Mangrove management

Single use options focussing on timber harvest should be avoided because they sub-optimize the multiple-use potential of mangrove ecosystems and because most visited mangrove sites revealed some level of degradation and significant loss of mature timber trees.

### Timber utilisation

Existing mangrove vegetation is showing clear long-term logging impacts with an obvious lack of mature trees (FUG members stated that 10 years ago trees with up to 1m diameter could still be found within proximity to their settlement) and changes in the species composition due to selective logging of high-value timber species (e.g. *Sonneratia griffithii*, *Heritiera fomes*, *Xylocarpus granatum*). Visited sites are in various successional stages of recovery and will require effective protection for several years before a sustainable harvest cycle could be initiated.

In theory, mangrove forests can be managed for timber production on a **30 year felling cycle** with rather good responds to silvicultural interventions due to:

- Mature stands reaching yields over 200 m<sup>3</sup>/ha within 30 years and on best sites can reach a Mean Annual increment (MAI) of 9-10 m<sup>3</sup>/ha. (Based on FAO information<sup>1</sup> the MAI for *Phizophora apiculata* in Thailand ["Payone" in Myanmar] ranges from 1,6 – 5,7m<sup>3</sup>/acre/year compared to high-yielding *Eucalyptus globulus* with MAI of 8-12m<sup>3</sup>/acre/year or low-yielding but high valued *Tectona grandis* with around 1m<sup>3</sup>/acre/year)<sup>2</sup>
- Mangrove stands can recover rapidly from natural or man-made disturbances as most mangrove species flower and fruit regularly and the propagules are dispersed by tides.

<sup>1</sup> FAO (1994) Mangrove forest management guidelines; FAO Forestry Paper 117

<sup>2</sup> FAO (2001) Mean annual volume increment of selected industrial forest plantation species. Forest Plantation Thematic Papers, Working Paper 1

- Commonly mangroves have a tendency to form rather homogenous/even-aged stands.
- Natural stands can provide a wide range of products including smaller thinning products to be used as firewood.

However, most timber-based mangrove management is designed for larger timber concessions only. A large concession management will ensure a sufficient size of annual harvest coupes (following area control approach<sup>3</sup>) to ensure an economic viable cut and can further guarantee effective protection during two felling cycles.

Commonly, felling under this system is conducted as clear felling with one or two intermediate thinning and subsequent replanting.

When assuming a forest area of 300 acres and a total village population of 60 households this system could provide up to 10m<sup>3</sup> of timber per household/year. See box 2 below for reference.

**Box 2: Estimated timber yield for a 30 year Mangrove rotation**

*Calculation base:*

330 acre total CF mangrove area

10% protected zones that are excluded from harvest

Commercial standing timber volume at age 30 is 60m<sup>3</sup>/acre (good quality stand)

60 households village population

Annual harvest area 10 acre

Annual total harvested timber volume 600m<sup>3</sup>

Annual timber supply 10m<sup>3</sup>/household

Note: Cost for site clearing, nursery management, reforestation and protection have to be further priced in to estimate the economic viability of this silvicultural system

At present, local people conduct a quality-based **selective logging system** that in fact can have lower ecological impacts compared to a felling cycle management as a permanent forest cover is ensured at any time. Selective tree felling is in fact mimicking the natural process of a mature tree dying inside the stand. Gaps of the size of one mature tree can effectively be closed by means of natural regeneration alone.

However, this management system is by far more demanding in terms of required silvicultural knowledge and associated with higher monitoring and labour costs. At present no sustainable harvest levels are yet available apart from some initial ideas piloted in few projects e.g. in 2015 the Rakhine Coastal Region Conservation Association (RCA) assisted 48 FUGs to elaborate their CF management plans which stipulate that at least 150 mature trees per acre (~ 16 feet distance) must be left inside the CF area at any time).

It is therefore recommended to support capacity building on selective logging systems and to define – in consultation with FUG and FD representatives – simple sustainability criteria and monitoring procedures that can be followed by the FUG and monitored and enforced by the FD.

<sup>3</sup> Example: If a uniform forest is managed under a 30 years rotation, then annually 1/30 of the total forest area reaches the rotation age and will be harvested and regenerated

**Madhuca lobbii forests (Kan Zaw oil production)**

In the project area pure stands of *Madhuca lobbii* (Kan Zaw tree) offer a unique opportunity to pilot Payment for Environmental Services (PES) in the Union of Myanmar as a sustainable financing system for the operation and patrolling efforts of a FUG.

**Box 3: Payment for Environmental Services**

Payment for Environmental Services (PES) is understood as the practice of offering incentives to landowners in exchange for managing their land to provide some sort of ecological service. They comprise of a transparent system for the additional provision of environmental services through conditional payments to voluntary providers, and thus promote the conservation of natural resources in the marketplace.

Main principles stipulate:

- Voluntary payment from service consumers. This includes a free decision-making process between provider and consumer on the total amount and payment modalities.
- A direct, private contract between two parties. Payments are agreed and directly channelled between two parties without interference of a governmental entity.
- Payment levels to be defined by free market forces. Thus, payment norms are to be freely decided in each location by both contract parties.

Kan zaw oil is produced from seeds of *Madhuca lobbii* with major fructifications observed each 1-2 years. According to locals a tree starts producing seeds at the age of 10 (diameter ~ 15 cm).

The seeds are collected on the ground and sold fresh or processed into oil. A small commercial oil press (originally designed for peanut oil production) was visited during the field trip and is locally available for a purchase price of ~ 5 lakh MNK (equivalent to one Chinese motorbike).

FUG members stated that a family can collect between 8-10 liter of oil per year.

Fruiting period last from May – June. During this period collectors from up to 40 surrounding villages (600-1000 people per day) flock into the Kan Zaw forest of the FUG. 2017 is expected to see a major fructification.

Apart from seed collection severe damage to natural regeneration and smaller trees are observed. Forest threats further include logging of mature trees for boat building however since 2015 due to continued awareness raising no more logging was observed.

Following a discussion with Setain chaung pyar FUG it is proposed to initiate a new model for the Union of Myanmar in which consumers from other villages will be charged a permission fee for seed collection by the FUG.

In return, the fee will be used to sustainably finance protection efforts of the FUG throughout the entire year. With an estimate 600 people entering the forest during peak seed collection season already a marginal fee of 1000 MNK per day could result in a substantial income for the FUG.

The proposed concept however would require a strong backing and field presence from FD side at least during its introduction period to ensure that arising conflicts with unwilling outsiders can be settled immediately.

It is proposed that tickets would be approved by FD and in that sense legalised while the FUG would use their stamp to validate the ticket for a specific day.

Attached to the ticket (best printed on the backside) a code of harvest would be attached detailing permitted harvest practises and illegal activities. These regulations would specifically include that no knives are allowed to be carried into the forest and that the natural regeneration has to be strictly protected.

## Charcoal

Charcoal production on a commercial scale with huge permanent ovens was still observed during the field survey. Today, charcoal production is mainly conducted by poorer community members and it was reported that one household could earn up to 80.000 MNK per month from charcoal production alone.

Charcoal production is posing a higher threat to mangrove forest compared to construction timber harvest as many mangrove species are considered suitable and lower diameters can be used as well.

During the CF workshop Mr U Tun Than Do (Palaw township FD) presented that charcoal production in mangroves is declared illegal and that only in other coastal forests a permit for charcoal production could be obtained.

Wood density largely determines charcoal yield, consequently a given volume of wood will result in different yields of charcoal (measured on a weight basis ) dependent on the species. Mangrove species combine high timber density and relatively low moist content when felled and charcoal is sold locally and even across the international boundary to Thailand. Alternative firewood sources with equal or even superior quality could be promoted by use of coconut shells however visited FUGs stated that coconut trees are not very common around their settlements. A detailed comparison between mangrove and coconut shell charcoal specifications is provided in Box 4.

### **Box 4: Charcoal specifications**

Mangrove charcoal is produced from branches and logs.

- Heat content: 6500-7200 Kcal / kg
- Moisture: 3-6%
- Fixed carbon content: 60-70%
- Ash content: 0.5 to 1.5%
- Volatile matter content: 30-40%
- Sulphur (S): from 0.01 to 0.07%ggdsg
- Smokeless and odourless, do sparks, explosions when fired
- Burning time: 3 – 4 hours

Coconut shell charcoal has several characteristics superior to conventional charcoal including sharply reduced toxic emissions and environment friendly.

- Heat content: 7000 kcal/kg

- Moisture: max 5%
- Fixed carbon content: 75%
- Ash content: (%) 2-3%
- Volatile matter: 20 -25%
- Sulphur (S): below 0.01% ggds
- Smokeless and odourless, do sparks, explosions when fired
- Burning time: 3 – 4 hours

In order to deal with the charcoal problematic project support should be linked to a number of conditions on forest utilisation and protection that the FUG has to observe regardless whether they conduct tree felling inside or outside their CF area.

As charcoal ovens are massive and permanent structures they are easy to spot by local people and reporting these locations should be part of the commitment an FUG has towards the project. The project side would then forward these reports to the FD to jointly deal with reported violation cases.

### Apiculture

In Asia, honey collection is a long established income source for local communities, however apiculture in many areas has only recently been introduced to local communities under project/program support. At least three honeybees are native to Asia and all are exploited by man. Two of these, *Apis florea*, and *Apis dorsata*, cannot be kept in hives as they nest in the open, on a single comb. The former builds its small comb (about 25 cm diameter) hanging from branches within bushes, while the latter suspends its much larger combs (around 1 m in diameter) from tree branches, rocky ledges and buildings. Only the Asian hive bee (*Apis cerana*) and can be kept in hives.

Honey production depends on the availability of pollen and nectar, prevailing wind, temperature, salinity, contaminants, availability of freshwater and other factors. Beekeeping therefore might be possible in some FUG sites only. FUG interviews revealed that some FUGs already started basic beekeeping while some FUGs reported that no bees are observed in their village forest area at all.

Honey is sold locally ranging from 3.000 to maximum 6.0000 MNK per liter and is used as medicine and offering during annual festivals as in kind donation. Honey sale could further target international tourists including labelling and promotion of sale in main hotels in Myeik town.

As honey does not require any processing nor preservation it could be easily stored and distributed by FUGs.

### Aquaculture

Aquaculture at household level is not yet practised anywhere in the surveyed project area and the entire household-based fishery is depending on wild catch only despite its potential to give small-scale fishers a chance to diversify their income source and to reduce pressure from the wild stock.

At present, fishery products from inside the mangrove forest are limited mud crabs (*Scylla* spp.) and cockles as main cash crop.

Destructive shrimp farming is one reason of land conflicts between rich influential companies and local communities but was only observed in the case of Ka de ka dut village. Shrimp farming is leading to destruction of forest cover, changes to tidal system and contamination with chemicals, drugs and other residuals and is therefore not permitted under the project. Interestingly, no FUG member mentioned shrimp farming as an option for livelihood development due to rather good environmental awareness.

Seaweed (*Eucheuma cottonii*) is locally sold in the market and an old awareness raising poster with technical guidance was found in one village during the field trip. Seaweed farming is also practised in the Philippines with good financial results and the local potential in Tanintharyi has to be surveyed.

Key fisheries legislation of the Union of Myanmar should be studied prior to any piloting and include:

- The Freshwater Fisheries Law;
- Law Relating to the Fishing Rights of Foreign Fishing Vessels;
- Law Amending the Law Relating to the Fishing Rights of Foreign Fishing Vessels;
- Myanmar Marine Fisheries Law;
- Law Amending the Myanmar Marine Fisheries Law.

The following preliminary inputs were provided by the country representative for the preparation of the regional guidelines on the Responsible Use of Mangroves for Aquaculture and might be used to elaborate project specific guidelines for the context of CF in Tanintharyi as follows:

1. 30-40% of total mangrove areas may be allowed for aquaculture purposes;
2. Countries exceeding this limit may have to reduce their areas and conform with the provisions in the guidelines;
3. Countries that have not yet reached the limit would be provided the necessary guidance in order that further development should be sustainable;
4. 100 m from the shoreline should be conserved or rehabilitated as green belt;
5. In order to mitigate the mangroves, environment-friendly aquaculture should be practiced;
6. Environmental Impact Assessment (EIA) should be established in aquaculture to be assessed in a regional workshop organized every two years;
7. Public awareness should be regularly conducted through on-site training;
8. Socio-economic status of the rural people should be evaluated after which efforts should be made to improve standard of living by providing the rural people with appropriate technologies and related incentives;
9. The land use policy of each country should be made clear to its people especially from the technology point of view;
10. The impact of effluents from shrimp farms on the environment should be reduced (e.g., coastal water quality, hydrology, aquatic organism, mangrove and terrestrial vegetation);
11. The production cost of mangrove-friendly aquaculture should be made economical;

12. Information on any technology developed should be published and disseminated to the region.

Potential aquaculture systems to be screened for their suitability within Tanintharyi could include:

- Oyster and mussel rafts in mangrove waterways
- Seaweed longlines in mangrove waterways
- Mud crab fattening in pens and cages in the mangrove forest
- Mud crab grow-out in pens and cages in the mangrove forest
- Mud crab - fish polyculture in mangrove pens
- Small-scale fish cages in mangrove estuaries and lagoons
- Cockle beds in mangrove tidal flats
- Production of soft-shell crabs in floating cages in mangrove estuaries
- Mudskipper breeding

### **3.8 Proposed monitoring system on firewood usage**

A proposal for a monitoring system on the impact of project woodlots is discussed in this chapter and is designed to be conducted by the FUG with support of the village facilitators and supervised and aggregated by the ACFO.

Measurements would be required on an annual basis to document the growth and yield of the plantations and for each respective species.

Data collection would be limited to measurements at diameter at breast height (dbh) and tree height estimates for each tree species. No plot layout would be required instead around 10-20 trees per planted species would be randomly selected for measurements (even-aged plantations are normally fairly homogenous in terms of growth and yield per individual tree and no systematic sampling would be required based on equally spaced sample plots as recommended for natural forests). Selected trees should include biggest, medium and smallest trees observed to represent the entire spectrum of the stand.

Extrapolating these figures with the applied spacing of 9 x 9 feet (~ 540 trees per acre) would provide a reasonable precise estimate for the entire stand.

A baseline for the demand side would be established through the current firewood consumption per FUG/village. It is important to provide estimates for rich and poor households as their firewood demand can differ significantly. By conducting a simple wealth ranking per FUG a sufficient baseline for subsistence firewood demand could be established. As a rule of thumb ~ 1 acre of afforestation can sustainably supply one family a year.

Field measurements would be recorded in the tally sheet as provided in table 2. No calculations are required to complete the form.

**Table 2: Tally sheet for data collection**

FUG name	Chaung nauk pyan	Location	CF map plot no. 1	Date of visit	25.11.2016
Age (year)	4 (2012)	Area (acre)	20	Recorder	Bjoern
Spacing (feet)	9 x 9	Canopy coverage	Open	Crowns touch 	Crowns overlap
Tree species	Girth (cm)	Height (m)	Survival/ species (%)	Mixture (%)	Notes and expected harvest year
Tamar	51, 41, 48, 42, 50, 51, 41, 48, 42, 51, 47, 48, 43, 49, 51, 48, 45, 52, 41, 48	12, 10, 11, 12, 12, 12, 11, 12, 10, 11, 11, 12, 11, 11, 12, 12, 11, 11, 10, 12	90%	70%	Harvest in 2018 (firewood)
Pyinkado	34, 37, 29, 30, 34, 36, 31, 30, 31, 33, 29, 32, 32, 33, 29, 31, 34, 37, 28, 30	11, 12, 10, 11, 11, 12, 10, 12, 10, 11, 11, 12, 10, 11, 11, 12, 10, 11, 11, 12	80%	30%	Some storm damage in 2015 Harvest in 40 years (timber)
...					
...					

Once all species for one site are recorded, the completed form is handed over to the ACFO. Data sheets are then summarized and entered into a summary sheet as provided in table 3. This database (preferably in MS EXCEL) could then be used to monitor and predict harvest amounts per species/product (firewood or construction timber) per year and could even be used to provide harvest estimates to the district FD to be entered into their annual action plans.

**Table 3: Forest monitoring summary format**

tree species	age	area (acre)	FUG	survival rate (%)	Mixture (%)	average diameter (cm)	average height (m)	standing volume per average tree (cubic foot)	standing volume per acre (cubic feet)	Harvest (year)
Tamar	4	20	Chaung nauk pyan	90	70	15	11	3,4	1149	2018
Pyinkado	4	20	Chaung nauk pyan	80	30	10	11	1,6	209	2052
...										
...										

Volume in cubic meter =  $\frac{\pi}{4} \times (0,01 \times \text{dbh in cm})^2 \times (\text{height in m}) \times 0,5$

Volume in cubic foot =  $\frac{\pi}{4} \times (0,01 \times \text{dbh in cm})^2 \times (\text{height in m}) \times 0,5 \times 35,31467$

9 x 9 foot spacing = 538 trees/acre

Standing volume per acre = standing volume per tree \* 538 \* survival rate \* mixture

### 3.9 Proposed FUG management and benefit monitoring system

As requested by project management during the mission, a draft questionnaire on FUG management and benefit monitoring has been elaborated and is attached as Annex 3 as draft for discussion.

## 4. PHOTO DOCUMENTATION



Figure top:  
**FUG consultation meeting in Nan Taung village**  
**Discussion on the CF boundary map**

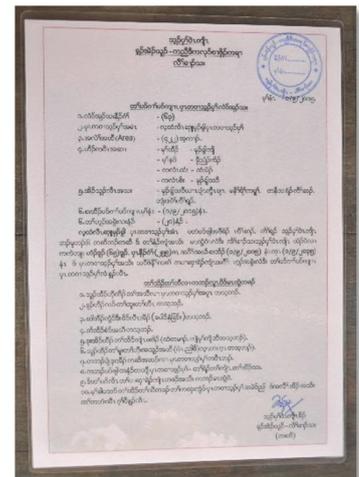


Figure right:  
**CF certificate issued by the Karen National Union**  
**Under this certificate no commercial timber harvest is permitted by the FUG and subsistence use above 5 tons is subject to a natural resource tax to the KNU**



Figure left:  
**Afforestation site in Na Taung village.**  
**10 acre have been completed in 2016.**  
**Planted Teak seedlings remain too small due to insufficient time in project nursery.**  
**For upcoming plantations clear quality standards for seedling production have to be elaborated and applied.**



Figure left:

***Signboard and border tree with red oil paint mark at the entrance to the CF area in Setain chaung pyar village.***

Figure right:

***Madhuca lobbii is forming a pure natural forest stand with mature timber trees protected by the local community.***

***Fruits are used to produce high value Kan Zaw oil which is sold for up to 70 Euro per liter.***



Figure left:

***Canopy gaps in the dominant tree layer and lack of a strong middle and understory threaten the sustainability of the forest stand and require effective protection of the natural regeneration during fruit collection seasons.***

***A fruit collection fee for people from outside the FUG would provide a unique opportunity to introduce the concept of Payments for Environmental Services (PES) in Myanmar and to ensure a sustainable financing of the FUG for their protection efforts.***



Figure left:

*Mangrove species are often distributed in small groups and not mixed at an individual tree level.*

*Project gap planting should mimic these patterns.*

*Local knowledge on site conditions for each tree species is available and should be documented and applied.*

Figure right:

*Ta ra mel village afforestation site with Mangrove seedling showing good growth.*

*However, too strict spacing was observed and FUGs did not sufficiently consider existing trees and natural regeneration as part of the afforestation design. In some cases new seedlings were planted within one feet distance to an existing older tree.*

*Protection against mud crabs remains an issue during nursery management and plantation.*



Figure top:

*Consultation meeting with Shaw tau maw FUG. implementation is jointly supported together with Green network.*



Figure left:

*Mangrove timber is transported to charcoal production areas.*

*Charcoal production was reported to be the income source of poorer community members with an average income of around 80,000 MNK/month.*



Figure left:

*Commercial charcoal production site visited near U yin gyi village site.*

*As a result of overlogging, timber scarcity is even observed in house building with small diameters of around 8 cm used for roof construction.*



Figure left:

*Tree stumps as logging evidence at the waterfront.*

*FUG members reported that 10 years ago mangrove trees could reach up to 1 m in diameter.*

*Today only secondary overlogged mangrove forests remain.*



Figure left:

***Project workshop in Tanintharyi.***

***Township officer is presenting on the Forest Department orientation towards mangrove protection and involvement of FUGs.***

Figure right:

***Group work during the Tanintharyi workshop.***

***FUG members together with township forest officers discuss about criteria for sustainable timber harvest in mangrove forests and on alternative livelihood options from aquaculture and agroforestry.***



Figure above:

***FUG members taking screen shots of an example for a vertical vegetable garden.***

***Island communities typically lack arable land and have to import vegetables for high price from the mainland.***

## 5. REFERENCES

### *Further readings chapter 3.7:*

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<http://www.fao.org/3/contents/cc376c9c-954f-5009-bb07-15150f974f26/AB730E00.htm>

## ANNEX 1: WORKSHOP AGENDA, MYEIK

Time	Topic	Presenter
09:00	Workshop opening ceremony	District General Administration or Parliament representative
09:10	Presentation of revised CFM instruction	District Forest Department Myeik
09:30	FFI CF implementation progress and future support for Tanintharyi	U Myint Soe Oo
09:50	National and District Forestry objectives towards CF	Forest Department Kaw taung district
10:10	Coffee break	
10:20	Mission findings and recommendations (11-16.11)	Bjoern
11:00	Experiences, difficulties and solutions on CF establishment (1 group 10 minutes presentation)	Setain Chaung Pyar, Ta ra mel, Nant Taung and ECODEV village
11:40	Prepare for afternoon group work (discussion topics, group consisting of Department and FUG representatives)	4 groups
12:00	Lunch	
13:00	Group work on selected topics	4 groups, U Myint Soe Oo and Bjoern facilitate
13:45	Presentation of group outcomes	Group leader 4 groups
14:25	Coffee break	
14:40	Plenary discussion on options for CF network among FUGs (interest, opportunities, challenges, costs...)	U Myint Soe Oo
15:00	Wrap-up and proposed support for 2017 (activity plan; network formation)	
15:15	Local residents comments	
15:30	CSOs comments	ECODEV, Green network, Southern youth
15:50	concluding remarks, Forest Department	District Forest Department Myeik

## ANNEX 2: WORKSHOP PRESENTATION MYEIK



# Tanintharyi Conservation Programme (TCP)

## Review CF implementation and recommendations

Björn Wode  
Myeik 17.11.2016

### TANINTHARYI PROGRAM OBJECTIVES

- **Conserve natural forests and its biodiversity**
- **Empower communities to conduct CFM under the CF Instruction (amended 2016)**
- **Promote sustainable forest management and livelihood development of FUGs**

## WORK PROGRESS

- Awareness raising, FUG, CF zoning, application to Forest Department
- 1<sup>st</sup> nurseries and plantation in 2016
- Start forest management (climber cutting in Kan Zaw forest)
- FUG and MC very active and motivated

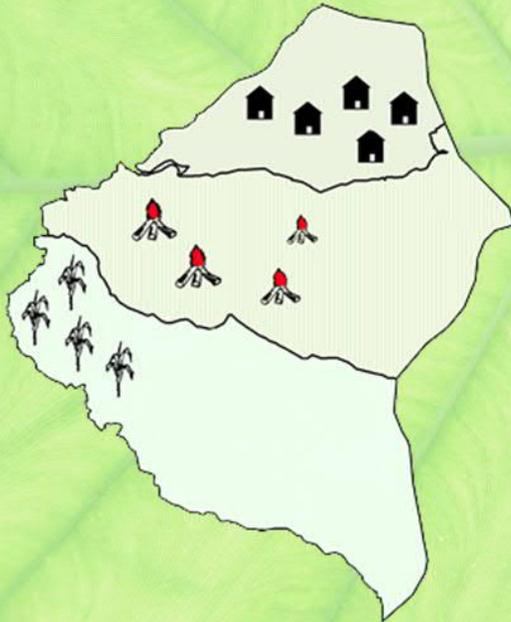
## PLANTATION REVIEW

- Plantations help to overcome problems in the CF forest (e.g. firewood or NTFP shortage, reforest burned site...)
- Each FUG will have different objective

**PROBLEM ⇒ SOLUTION ⇒ NURSERY PLANNING**

## PLANTATION DESIGN

### 1. THREAT ASSESSMENT



**Firewood collection**



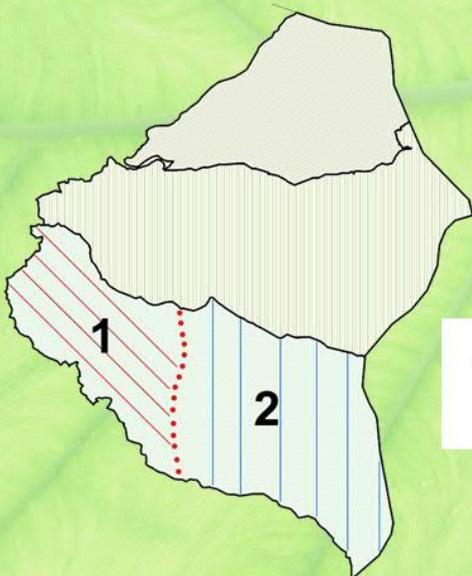
**Taungya**



**Timber logging**

## PLANTATION DESIGN

### 2. NURSERY & AFFORESTATION PLAN



**1. *Cassia siamea***  
(20 acres)  
10.000 seedlings  
nursery 2017



**2. *Xylia dolabriformis***  
(30 acres)  
15.000 seedlings  
nursery 2018

## CURRENT NURSERY MANAGEMENT

- Mostly high-value hardwood species selected by FUG
- Nursery managed by entire FUG
- Project paid for material and labour days
- Gap planting follows very strict spacing
- Seedling quality varies (e.g. seedling height or stem form)

## GOOD SEEDLING - GOOD PLANTATION

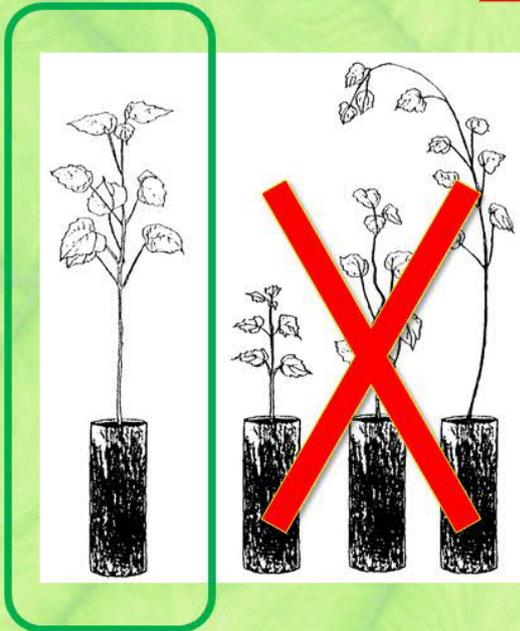


**Root development**



**Seedling height**

## SEEDLING QUALITY CRITERIA



- **Height**
- **Stem form**
- **Vitality**
- **Stem diameter**

## BUSINESS CONTRACT - ADVANTAGES

- **Clear responsibilities and monitoring**
- **Create income for poor households**
- **Only qualified seedlings used for afforestation**
- **Improved quality of plantation**

➡ **Whole FUG benefit**

## **PROPOSED NURSERY MANAGEMENT**

- **Only one or some households per FUG**
- **Contract over no. of qualified seedlings**
- **Payments only for good seedlings**
- **Project monitor seedling quality before payment**

## **CF MANAGEMENT PLAN**

- **CF certificate requires 30 year CF Management Plan (CFMP)**
- **CF Instruction states under Prohibitions Article 23: (a) Other activities not prescribed in the CFMP**

**What is not in the plan cannot be implemented!**

## CF MANAGEMENT PLAN

- Often misunderstood as last step before obtain CF certificate “submit and forget”
- Legal basis for future timber harvest
- Helps FD to understand what FUG wants to achieve and where FD can support
- A good CFMP result in a faster issuance of CF certificate

## PROPOSED MANAGEMENT PLAN

- Start writing MP from 1st FUG meeting, continue every meeting
- Describe all topics (nursery, plantation, FUG regulations, maps)
- Nursery design based on a threat assessment before planting
- Encourage township forest officer to participate
- One standard format will ease approval work for FD

## LIVELIHOOD DEVELOPMENT

- Timber utilisation requires good forest and large areas to be sustainable, will only work in some remoter CF
- Kan Zaw FUGs could charge user fee for seed collection. FUG provide service for protection and planting.
- Mangrove forests revealed unexplored potential on small-scale aquaculture, beekeeping, vertical gardening...

## LIVELIHOOD DEVELOPMENT

Livelihood support should first priorities poorer communities

- higher dependency on timber ⇒ **higher threat to forest**
- Main income charcoal and fishing only ⇒ **higher livelihood impact by project support**
- More free time to work on **alternative livelihood** measures with project



# Tanintharyi Conservation Programme (TCP)



**Thank you**



## ANNEX 3: QUESTIONNAIRE ON FUG MANAGEMENT AND BENEFIT SHARING

Date: \_\_\_\_\_ No.: \_\_\_\_\_ Recorder: \_\_\_\_\_

FUG ID:	Year of FUG establishment:
District:	CF certificate <b>No:</b> <input type="checkbox"/> <b>Yes:</b> <input type="checkbox"/> (Year: _____) Don't know <input type="checkbox"/>
Township:	MP submitted <b>No:</b> <input type="checkbox"/> <b>Yes:</b> <input type="checkbox"/> (Year: _____) Don't know <input type="checkbox"/>
Village tract:	Plantation <b>No:</b> <input type="checkbox"/> <b>Yes:</b> <input type="checkbox"/> (acre _____) Don't know <input type="checkbox"/>
Village:	Natural forest <b>No:</b> <input type="checkbox"/> <b>Yes:</b> <input type="checkbox"/> (acre _____) Don't know <input type="checkbox"/>
Management regime: Collectively managed <input type="checkbox"/> Allocated to individual hhs. <input type="checkbox"/> Mixed <input type="checkbox"/>	
Interviewee name:	M/F _____ Telephone no: _____
Position in FUG: member / treasurer / secretary / other: _____ Years in FUG: _____	
Copy of Management Plan <input type="checkbox"/>	Copy of last annual report <input type="checkbox"/> Copy of CF certificate <input type="checkbox"/>
Other documents <input type="checkbox"/> _____	

1.	Number of FUG members at: Beginning _____ Current number _____ (households) Reason for reduction: lack of technical support <input type="checkbox"/> no economic benefits <input type="checkbox"/> conflicts among members <input type="checkbox"/> Notes _____																				
2.	Where is your firewood coming from? (please estimate percentage) Woodlot ___% Living fence ___% Natural forest ___% Outside CF forest area ___%																				
3.	How and from what source do you get your construction timber? <table border="0"> <tr> <td></td> <td>CF forest</td> <td>private land</td> <td>other forest</td> <td>don't know</td> </tr> <tr> <td>Purchased inside village</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Purchased outside village</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Harvest myself from</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>		CF forest	private land	other forest	don't know	Purchased inside village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Purchased outside village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Harvest myself from	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	CF forest	private land	other forest	don't know																	
Purchased inside village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																	
Purchased outside village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																	
Harvest myself from	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																	
4.	What are the two most important benefits for the FUG? Timber sale <input type="checkbox"/> NTFP sale <input type="checkbox"/> Timber subsistence <input type="checkbox"/> Watershed <input type="checkbox"/> Landscape beauty <input type="checkbox"/>																				
5.	Timber harvested in last 3 years? annually <input type="checkbox"/> 2 times <input type="checkbox"/> 1 time <input type="checkbox"/> never <input type="checkbox"/>																				
6.	What was the harvested timber used for? Firewood <input type="checkbox"/> Construction timber <input type="checkbox"/> Fencing <input type="checkbox"/>																				
7.	Who was using the timber? Individual households <input type="checkbox"/> Community purpose <input type="checkbox"/>																				
8.	Was any timber sold? Inside village <input type="checkbox"/> Outside village <input type="checkbox"/> Outside township <input type="checkbox"/> No commercial sale <input type="checkbox"/>																				
9.	Do you have specialised logging teams in your FUG? Only few people do <input type="checkbox"/> Everybody can do <input type="checkbox"/> Have to hire from outside <input type="checkbox"/>																				

	No logging so far inside CF <input type="checkbox"/>
10.	How do you decide which household can use timber from the CF? MC decide <input type="checkbox"/> Poor households first <input type="checkbox"/> FUG sell all timber and share money <input type="checkbox"/> Each household harvest timber from his own plot <input type="checkbox"/> Don't know yet <input type="checkbox"/>
11.	How high are costs for timber harvesting by FUG members? Small <input type="checkbox"/> High, but paid from timber revenue <input type="checkbox"/> Cost exceed timber revenues <input type="checkbox"/>
12.	Do you sell NTFP from your CF forest? No <input type="checkbox"/> Yes <input type="checkbox"/> Describe _____
13.	Is your actual afforestation following the design in the CF management plan? Yes, mostly <input type="checkbox"/> Not much <input type="checkbox"/> Completely different <input type="checkbox"/> Don't know plan details <input type="checkbox"/>
14.	Will you replant plantation forest after final clearcut? Yes <input type="checkbox"/> No <input type="checkbox"/> Not decided <input type="checkbox"/> Don't know <input type="checkbox"/> If no, why: Lack of finance <input type="checkbox"/> Lack of technical knowledge <input type="checkbox"/> Lack of interest <input type="checkbox"/> Other: _____
15.	How often do you patrol the natural CF forest? no. of people in patrol team _____ no. of patrols per month _____
16.	On what terms are MC members working? Voluntary <input type="checkbox"/> Receiving compensation for their work <input type="checkbox"/> Notes: _____
17.	How are FUG running costs covered? Profits <input type="checkbox"/> Annual member fee <input type="checkbox"/> Donor/NGO <input type="checkbox"/> Don't know <input type="checkbox"/> Other: _____
18.	Do you think the FUG has sufficient capacity to support timber harvest, monitoring, reporting and sale? Yes <input type="checkbox"/> No, need CSO support <input type="checkbox"/> No, need township FD support <input type="checkbox"/>
19.	Do you submit annual reports to township Forest Department? [Ask for copy of latest annual report.] Yes <input type="checkbox"/> Sometimes <input type="checkbox"/> Only one time <input type="checkbox"/> Never <input type="checkbox"/>
20.	Does the annual report include your annual amount of timber you harvested from your CF? Yes <input type="checkbox"/> No <input type="checkbox"/> Only describes afforestation plan <input type="checkbox"/>
21.	Have any FUG members started a small business based on the CF products? Yes <input type="checkbox"/> No <input type="checkbox"/> Notes: _____
22.	Does the FUG maintain a fund to support CF activities and/or FUG members? Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <input type="checkbox"/> Notes: _____
23.	What are benefits from participation in the network? Information sharing <input type="checkbox"/> Better protect FUG use rights <input type="checkbox"/> Cooperation during timber sale <input type="checkbox"/>

## ANNEX 4: HANDOUT ON AFFORESTATION TECHNIQUES

### Correct

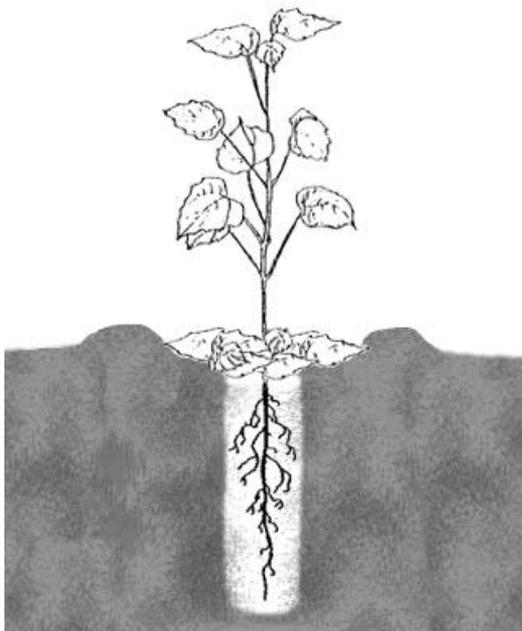
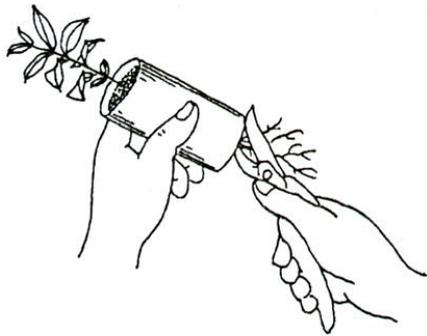


- ✓ Use poly bags with holes in the bottom and conduct root pruning in the nursery to develop a straight root.
- ✓ Only use high quality seedlings that are vital, not diseased, not forked (seedling height < 2 ft).
- ✓ Higher seedling density in vine infested sites can be applied to reach an early canopy coverage to shade out the vine and weeds (e.g. 4x4 ft).
- ✓ Place organic material directly around seedling stem to shade the soil and by this protect soil humidity.
- ✓ Apply flexible spacing and avoid planting seedlings in proximity to an existing natural tree or under too dense bamboo canopies or on compacted trails from grazing animals.
- ✓ Protect planting sites from grazing animals, and conduct village meetings to explain that damaged seedlings have to be compensated by the animal owner.
- ✓ Full site clearing and weeding is required only in vine infested sites, on Chromolena or grass infested areas only spot clearing is required.
- ✓ Protect seedlings from bark damage and do not apply pruning as lower branches naturally fall of during later years.

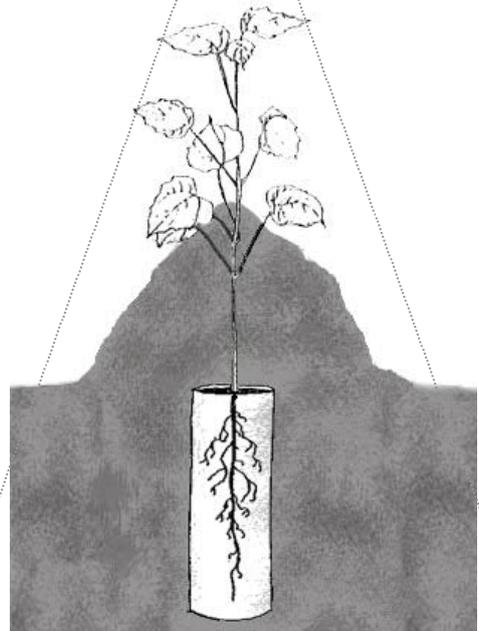
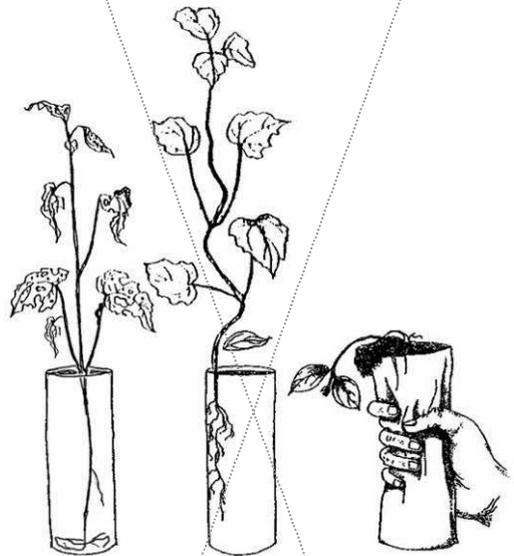
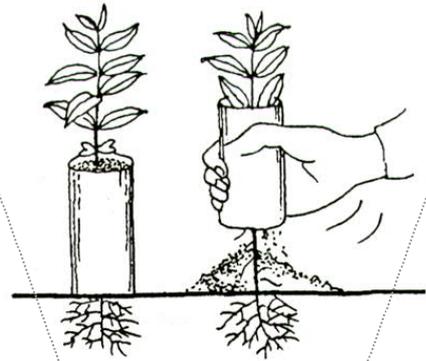
### Wrong

- Seedling roots start curling on the poly bag bottom and with result in poor tree growth and higher mortality on sites with limited water supply.
- Diseased or poor quality seedlings will never develop into a string growing tree.
- Lower seedling density require many years of weeding before tree crowns are touching, if only a few seedlings die back replacement planting would be required.
- Seedlings have only a very small root system and in areas with strong sunshine can easily die back during dry season.
- Too strict spacing does not improve the forest quality and will only result in higher mortality due to insufficient water, sunlight, grazing damage or too compacted soil.
- Grazing animals can destroy an entire afforestation site within a single day, if no regulations are discussed before hand conflicts between livestock owners and FUG members will occur.
- Too much weeding is increasing soil erosion, reducing soil humidity and are an entry point for grazing animals. Seedlings can furthermore be damaged during weeding operations.
- Pruning on planted and natural trees can easily lead to infection and result in lower timber quality, reduced growth or even mortality of the tree.

# Correct



# Wrong



IF YOU HAVE ANY QUESTIONS OR  
WOULD LIKE MORE INFORMATION,  
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