Workshop report:

Training of Tanzanian mangrove stakeholders for improved mangrove conservation & restoration

Tanga Hotel Beach Resort and Spa
Tanga, Tanzania, from 17 – 24 February 2020

Partners

About Save Our Mangroves Now!

"Save Our Mangroves Now!" is an international initiative that mobilizes political decision makers and supports other actors towards halting and reversing the loss of mangroves, both globally and with a specific focus on the Western Indian Ocean. Mangroves matter to each and every one of us. They help our climate, protect our coastlines, provide us with food and support livelihoods for people living by the sea.

The initiative is led by the German Federal Ministry for Economic Cooperation and Development (BMZ), World Wide Fund for Nature (WWF) and the International Union for Conservation of Nature (IUCN).

We join forces with other mangrove conservation stakeholders to connect the needs of nature and people by giving voice and showing solutions to the current environmental challenges.

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Content list

1. Background and Introduction

A scoping workshop of mangrove best practice gaps in the Western Indian Ocean (WIO) region in 2018 brought to light that many field-based forestry officials receive limited training on mangroves within their national training curriculums. As a consequence, general terrestrial forestry management approaches are inappropriately applied to mangroves and the communities living around mangroves.

In order to address this, Save our Mangroves Now! (SOMN) decided to conduct a coaching workshop for the Tanzanian Forest Service Agency (TFS) instructors from the Forestry Training Institute (FTI) Olmotonyi based in Arusha and field staff. This was to be followed by an in-depth mangrove restoration training using the Community-Based Ecological Mangrove Restoration (CBEMR) approach for the field staff, local community associations and local NGOs. The list of all participants can be found in Annex 1.

SOMN consulted a number of partners including the Tanzanian Forestry Conservation Group (TFCG) (the lead logistical partner), A Rocha International (effective training and communication) and Marine Research Institute (managers of the mangrove training center in Rufiji). These partners have stellar reputations and links into government ministries and conservation department heads. Mangrove Action Project (MAP) was engaged to provide mangrove technical trainings to the target group. TFCG's role in this coaching was to conduct a training needs assessment, undertake all local logistical issues related to the workshop and coach the trainees on community engagement and conflict management with respect to mangrove management in Tanzania.

The coaching workshop covered a holistic range of skills used by forestry instructors and mangrove managers such as communication methods and tips (updating what instructors have already), mangrove management and community engagement. The CBEMR training focused on best practices in mangrove management and restoration.

1.1. Goals and objectives

- Update the current skills and increase the mangrove knowledge base of TFS staff, both instructors and field staff in mangrove management as well as effective communication and community engagement skills.
- Provide an opportunity for sharing knowledge and ideas as well as improving internal networks.
- Train TFS field staff, local NGOs and community associations in the CBEMR approach to mangrove rehabilitation and management.

2. Outcomes

The detailed agenda can be found in Annex 2.

2.1. Coaching Day 1

By Sarah French, A Rocha International

The communication sessions strengthened capacity in effective communication skills for coaching/training by building on the participants' existing knowledge and updating skills using best practice techniques. PowerPoints, handouts and group activities were used in the sessions and further resource materials in electronic format were given. The ADDIE[1] model was introduced as a generic process for effective training design, delivery and management for adult students/learners. This instructional design methodology was seen to be useful as the stages are clearly defined, practical, relevant and it related to the group's own work and learning experiences. This was followed by technical knowledge and facilitation techniques for trainers to teach and communicate effectively. The sessions included:

1. Understanding of the multiple roles of the trainer, the balance of the trainer's dynamic and receptive qualities and the benefits of different training styles - sellers, coaches, teachers, entertainers;
2. Understanding the learner approach of learner-centred training including applying participatory training methodology and;
3. The 8 principles of adult learning. A group activity of ranking of the 8 principles resulted in learning by doing, experience and practice were valued most but there was a variety of opinion regarding the other principle's rankings;
4. Understanding the dynamics of effective communication - evidence that the retention of knowledge varies enormously depending on the manner it is received such as by lecture 5%, reading 10%, audio-visual 20%, demonstration 30%, discussion group 50%, practice/by doing 75%, and teaching others/immediate use of learning 90%. From this it was evident that for effective communication, a learning-centred approach is required using a variety of communication tools. The practical activities on group discussion techniques: carousel and blue sky thinking (brainstorming) were new, practical and enjoyed. A session on how to do PowerPoint presentations was also given (individual tutoring out of session followed);
5. Essential communication skills: oral, visual and non-verbal. The exploration of active listening being a skill that, like other communication skills, must be developed and does not come naturally to most people was reinforced by fun activities of Chinese whispers and selective listening.

Effective communication is an enormous topic and to cover this in one day was a challenge. To have been more effective, it would have been better to have several days to add more reflection, depth and practice. However, the team felt that it was beneficial and enabled participants to review their understanding, own practice and skillsets, and brush up on existing skills and learn some new techniques. The session also gave them new areas to explore in the future/ ask for more tutoring input. For a summary of participants' feedback, see Annex 3.

1 Analysis, Design, Development, Implementation, and Evaluation

2.2. Coaching Days 2-4

By Jim Enright and Dominic Wodehouse. Mangrove Action Project

Community-Based Ecological Mangrove Restoration (CBEMR) is an alternative mangrove restoration technique developed to overcome the high rate of planting failure (for details of the process see Annex 4). CBEMR is a holistic rehabilitation technique which combines decades of field experience and published science to encourage project teams to work with local people to facilitate the natural regeneration of mangroves by restoring and improving the local hydrology and topography, and removing or reducing stressors to mangroves. This avoids the time and expense of building a nursery and planting nursery-raised seedlings or propagules, increases site biodiversity and helps bring back the full complement of mangrove ecosystem services. Key to the process is getting the participation of local people from the outset and resolving the issues which caused the initial mangrove loss. The phrase 'community-based' emphasizes the importance of local stakeholder participation but does not mean that the community owns the mangrove. All stakeholders must be involved including government, NGOs, CBOs, community members and private businesses if adjacent to the site. Gender balanced participation is also key to ensure long-term success.

In order to fully understand the CBEMR process and be able to apply it, participants need to understand the basics of mangrove biology and ecology. Therefore, having introduced MAP and the services the NGO can provide (at www.mangroveactionproject.org), the training started with the MAP team discussing numerous **planting failures** from all over the world. Participants worked in small groups to study photocards documenting mangrove planting failures, to work out what had happened and why the planting had failed. This exercise emphasized that restoration was difficult, and that many planting projects fail. The exercise was used to test and strengthen the participants' observation skills and what could be learned from closely observing nature.

This was followed by the importance of **mangrove conservation over planting** and restoration. Planting constitutes a risk as many projects fail, but only mature mangrove provides many of the ecosystem goods and services that are essential to sustainable coastal living. As such the team suggested several methods to reduce wood extraction from mangroves, including community harvesting rules; reduction of mangrove use with fuel-efficient cookstoves, bottled gas or biogas; and more efficient fish smoking. In summary, the priority is to preserve existing mangroves, before rehabilitating new areas.

Some basic **mangrove biology** was discussed to reveal the differences between terrestrial forests and mangroves, and explain the biophysical adaptations mangroves possess to cope with salt, waterlogged soils and living within the intertidal zone. Samples from **specific species** were handed around to illustrate various features of the mangroves. It was explained that in saline conditions mangroves have to expend energy to actively draw water in from the surrounding soils (against the osmotic gradient) and again to expel salt, which diverts energy from other activities. A discussion about the reasons why attempting to afforest **mudflats** rarely works (due to anoxic, acid soils, undiluted seawater, wave energy, reduced or absent mycorrhizal fungi, an inappropriate balance of bacteria and impact

damage from debris and fishing gear) revealed to some participants why their own previous attempts had failed.

Before the field trip briefing there were further discussions about **mangrove ecology**. The group discussed what a normal mangrove should look like including features such as multiple-age class flora (juveniles, seedlings, samplings, seed-bearing trees and mature trees), biodiverse floral line-up, significant tidal flushing and hydrological patterns, a variety of light intensities, tree densities, and species zoning.

The **field trip** briefing for the next morning encouraged everyone to be on time, bring suitable shoes and gear, divided participants into groups and informed participants about objectives.

2.3. Coaching Day 3

The next day the group left the hotel at 8.30am to **visit mangroves** north of Mombasa Rd (Lat –5.065, Long 39.073), just outside Tanga town. This site, previously identified during reconnaissance visits by MAP, TFS and TFCG on the weekend before training started, exhibited very clear species zoning from south (back/high mangrove near the road) to north (lower/mid mangrove near the river). The participants were divided into three groups which were led by Jim Enright, Emmanuel Japhet and Dominic Wodehouse. The team leaders conducted a 'walk-and-talk' through the mangroves pointing out various features discussed during the previous day's teaching and other mangrove characteristics, particularly those that differed from terrestrial forests.

After a clean-up and lunch, a randomly selected group ran a **Review of MAP's 1st Teaching Day**. Another group led a discussion about what had been learned from the field trip and features identified, such as adaptations to waterlogged soils and species zonation changes.

This led into a more detailed discussion about **species zoning** in relation to changes in soil quality and elevation, the different preferences various species have for a variety of different gradients that can affect where mangroves live (salinity, pH, soil texture, wave energy, radiation, herbivory pressure etc.) and in particular to inundation (depth, duration and frequency of flooding). Flooding and soil saturation can have a significant impact on soil quality.

Participants where then **introduced to the CBEMR process**, using a case from Florida documented by time-lapse photography, which emphasized the facilitation of natural regeneration by improving a degraded site's hydrology and re-grading the soil to an appropriate elevation for mangrove growth. This process was carefully linked to elements previously presented to aide participants' ability to interpret a potential restoration site.

The importance of mangrove **hydrology** was noted, building on the CBEMR case from Florida, and how good hydrology was crucial for delivering mangrove ecosystem benefits, as well as maintaining reasonable salinity levels and distributing seeds/propagules. Effective hydrology can keep pH in balance, bring in useful bacterial and nutrients and connects mangroves with other ecosystems, such as

seagrasses and coral. Therefore, road building was identified as particularly problematic for mangroves as this infrastructure tends to cut off hydrology.

The final section of teaching covered the **importance of biodiversity**. As the effects of climate change are uncertain, it is wise to have a full complement of mangrove species present, to ensure that if conditions such as sea level, CO_2, average temperature or rainfall patterns change, the species best adapted to these new conditions can thrive. This might not be the species most commonly planted at present. Biodiversity also increases community resilience. Examples were discussed of where limited biodiversity had led to collapses of populations included mono-culture shrimp aquaculture and boreal forests.

The day ended with a briefing for the 2nd Field trip.

2.4. Coaching Day 4

The **second field trip** took the group south of the hotel to the 'Fish Market' site (Lat –5.085 Long 39.1293). At the fish market the team met up with local conservation group members for a briefing on local mangrove issues. Again, the participants divided up into groups and with a local leader, walked from the back of the mangrove, down and out of the front fringe *Sonneratia* (pioneer, low) zone. Here they had to note zone transitions, soil changes and estimate the drop in elevation. Coastal erosion was also visible with few large old scattered trees remaining at the seaward edge and no natural seedlings able to establish in this fringing zone due to the high wave energy and saturated soils.

After lunch a different group **reviewed the previous day's teaching**. Then the participants discussed what had been learned from the second field trip, and in particular, linking to the features already described in the training. Species zoning was emphasized, particularly in relation to changes in elevation and inundation and that mangroves grow in the top half or third of the inter-tidal zone.

The fieldtrip review was followed by a brief discussion about **restoration project objectives**. These need to be discussed and agreed with all stakeholders, including NGOs, the Tanzania Forest Service and villagers, before projects can develop. Community forestry experience from Myanmar has shown that projects can be derailed if there are conflicting objectives, therefore agreement must be reached at inception. A range of valid objectives were discussed, from protection for villagers from storms, to wood & timber production to crab fattening. The default objective of CBEMR of full ecosystem rehabilitation was made explicit, with the expected result that if all possible flora species returned to a site, with appropriate hydrology there should be a return of corresponding fauna and a complete set of mangrove ecosystem goods and services.

As inundation and therefore elevation relative to sea level is the key factor that controls mangrove distribution, various **methods to measure ground elevation relative to sea level were described**, to ensure the appropriate species were being considered for a potential restoration site. This included use of a tide table and an auto-level as well as using the surface of the water itself at high ebb tide with a measuring stick to measure spot heights over a site.

Continuing to work through the CBEMR process, the next skill presented was **mapping** and planning of a restoration site. This included a live demonstration of Google Earth Pro's polygon tool for measuring site area and perimeter. Mapping's inclusive, non-verbal nature was emphasized, allowing everyone to understand the planned work. Printing of a saved image from Google Earth of a village's territory and mangroves onto a 6' by 4' vinyl poster was encouraged as previous experience has shown this to be very well received by villagers as a useful tool to aid discussion of village issues.

Following MAP's CBEMR process the **implementation** section stressed that action would be site-specific and might involve varied solutions and activities including hydrological improvements, negotiating social agreements, community leadership training, fencing to exclude grazing animals, environmental education, setting up village patrols and conservation groups and clearing mangroves out of hydrological channels where mangrove plants should not be growing. Implementation should be sensitive to local needs.

Following coffee/tea break three short videos were shown to illustrate how a video of just 2 min. can raise a lot of issues and increase mangrove conservation awareness. Videos shared through social media are very popular amongst youth and it was suggested that a short video in Swahili should be considered to target youth and the general population. Simple mobile phone apps can be used to produce short videos. Also a WI video on the CBEMR training of 2019 in the Rufiji Delta was shown as a review of the CBEMR process. These videos can be found on MAP's youtube channel https://www.youtube.com/channel/UCKyF_x7Zre-vsLHXTVDK5QQ

Finally, the need for and importance of **monitoring** was presented. Monitoring should start before any fieldwork commences, to produce baseline data, and be more intensive in the first year to ensure any intervention was effective, or reveal that further work was necessary. Then after 1-2 years, monitoring could be annual. What was measured and monitored was related to project objectives, and could be as diverse as biodiversity, hydrological function and drainage speeds, social commitments, soil pH change, plant internodal distance as a proxy of growth, encroachment cessation and so on. Monitoring difficulties that were discussed included its long-term nature and therefore the long-term budgets needed. Of the range of possible monitoring techniques available, time-lapse photography, transects, quadrats, and measurement or monitoring of other features were discussed. **Time-lapse photography** was emphasized as it is surprisingly difficult to execute well, but very effective as a communication tool, and something that local people can continue to do after a project has finished.

2.5. Coaching Day 5

By TFCG

TFCG coached the participants on i) threats and conflicts in mangrove conservation in Tanzania and ii) community engagement in mangrove conservation. The coaching started by presenting TFCG's vision, mission and thematic areas, including participatory forest management (PFM), communication engagement and advocacy, environmental education, community development and partnership enhancement. TFCG's priority geographical areas are the Eastern Arc Mountains and coastal forests.

The TFCG facilitator asked the participants to brainstorm, discuss and write down in their notebooks the major threats to mangroves in Tanzania, the most significant of which is agriculture especially rice farming. Other threats discussed include charcoal, aquaculture, salt-making, livestock grazing, fire, urbanization and logging for timber & poles. Then participants were led through a discussion of the main sources of conflicts in mangrove management in Tanzania. It was observed that the main sources of conflict in mangrove management were the failure of existing forest policy to define clear legal mechanisms for engaging communities living within mangrove ecosystems such as those in the Rufiji Delta; government's eviction and relocation policies due to the Ujamaa Villagization policy and relocation of people from hazardous places and uncontrolled grazing by pastoralists' annual migration of their cattle to the Rufiji Delta. Other sources of conflicts discussed included municipalization and splitting of villages, land resource scarcity due to recent influx of pastoralists, shifting cultivation, soil salinity, large-scale investment and impacts of climate change.

Again, the TFCG facilitator presented the approaches used by the organization for conflict management through community engagement and livelihood integration. The facilitator described the community engagement principles use by TFCG including, *free prior and informed consent, human rights-based approach, gender sensitivity and partnership.* Furthermore, the facilitator explained about the existing policies that support community engagement. The facilitator then described how the National Forest Policy (1998), the National Forest Act number 14, (2002), and Forest Regulations (2004), and respective community-based forest management (CBFM) guidelines and related government notices were applied in TFCG's village models.

In Tanzania there are two types of community engagement protocol: *Joint Forest Management (JFM) and Community Based Forest Management (CBFM).* Further, the facilitator gave a brief outline of the steps for establishing CBFM which includes development of a village land use plan and forest boundary marking, followed by participatory forest resource assessment (PFRA), dividing the forest into management units in order to integrate sustainable charcoal and timber production.

Moreover, the facilitator described the ecological and livelihood achievements through PFM which are

- Supporting 61 village forest reserves in the country, covering 2,064 km^2
- 13 communities involved in sustainable charcoal and timber production have earned US$357,000

- The funds gained were used to construct water delivery points, support community health funds, construction of 60 village offices, land registration and provision of community certificates of customary rights of occupancy.
- At least 3,265,600 trees were planted in 138 villages
- Approximately US$150 p.a. increase earned per household from conservation agriculture;
- 6,507 people have gained access to micro-finance;
- 311 teachers were trained how to integrate environmental education in their teaching;
- Ecological monitoring and deforestation analysis have been conducted to observe the status of regeneration on charcoal harvested plots.

At the end of session, TFCG came up with the following general comments and recommendations.

- Deforestation is driven by agriculture, which similarly applies to mangrove forest. By encouraging forest-based enterprises, communities will see the benefit of retaining the forest.
  When local communities are empowered to manage their natural forests and receive benefits, they receive increased income which is used for community development, but if they lose those benefits, the incentive to manage CBFM areas will be undermined
- More support is given to income generating activities for forest adjacent communities such as forest-based enterprises e.g. charcoal production, timber production, beekeeping, ecotourism etc.
- TFCG and other stakeholders continue to advocate for a more supportive institutional environment and policies, and for greater community involvement.
- Continue to empower and build the capacity of government authorities to support communities. Increase and support research, learning and communication that will contribute to improving understanding around community involvement and sustainable utilization of resources.

Finally, the TFCG facilitator concluded by asking the participants if the TFCG approach can be applied to mangrove conservation, which the NGO believed it could. It was also suggested if the resource assessments are conducted in mangrove forests it is possible to apply sustainable harvesting practices to some species which can coppice such as *Avicennia marina*.

It was also suggested if a village has both terrestrial and mangrove forests, it can be encouraged to implement sustainable utilization of the terrestrial forest while conserving the mangrove forest. TFCG has huge experience of community engagement and sustainable utilization of forest products, which can be shared with other stakeholder to improve the livelihoods of the forest dwelling communities.

At the end of this first phase, participants were asked to fill out an evaluation form and were awarded their training certificates.

2.6. Restoration Training. Session 2. Days 6-8

By Jim Enright and Dominic Wodehouse. Mangrove Action Project

The second session, 22nd - 24th February, included seven TFS staff from the same group of participants from the first session, and was supplemented by an additional seven local NGO participants and community conservation group members. (For a complete list of attendees, see Annex 2). For this training everything was translated between English and Swahili which doubled the presentation time as well as for question and answer sessions. The three-day training covered the CBEMR process but with a more practical focus, again with two field trips. While the context was similar, this second session took a simpler approach to ecology and biology, spending more time explaining potentially unfamiliar concepts such as biodiversity, hydrology and soil properties.

The order was altered slightly to accommodate this change of focus. The sessions covered:

- Planting failures and observing nature
- Project objectives and the need for early agreement, clarity & honesty
- Mangrove biology including salinity, waterlogged soils and seed dispersal
- The importance of hydrology and the benefits good hydrological connectivity provide
- Mangrove ecology and what a normal mangrove should look like
- An introduction to CBEMR using Robin Lewis' Florida case study

At the end of the first day there was a briefing for day 2's field trip.

Day 2 started with a return to the Mombasa Rd site. Following the advice from the communication training, the attendees of the first session were encouraged to lead the 'walk-and-talk' exercise and teach the new participants who had joined only for the second session. The route taken was similar, walking from high/back mangrove down to mid/lower mangrove near the river to take advantage of the many mangrove characteristics present.

After lunch the teaching restarted with

- A review of the second session's first day of teaching
- A review of the day's field trip and linking that to the classroom teaching

Then the session progressed with

- Species zoning, using the first field trip as an example, the gradients that control species zoning and the importance of the inundation regime
- Hence the importance of site elevation relative to sea level and techniques to measure elevation heights
- An introduction to the CBEMR process using the Florida example
- Stage 1 of the CBEMR process – thorough research of the proposed rehabilitation site including social and biophysical factors, mangrove stressors, the important indicators such as natural regeneration etc.
- A table top demonstration of how to use a salinity refractometer, pH paper and a compass.
- Mapping of a restoration site using Google Earth Pro and other sources

The session concluded with a second field trip briefing for the next morning.

The final day started with another field trip, back to the Fish Market site, leaving the hotel at 8:30am. Again, TFCG kindly arranged for members of the local conservation group to meet us at these mangroves to discuss with the participants the mangrove-related challenges they face, including digging under young mangroves to find bait worms for fishing, destroying the trees in the process. Divided again into three groups, the participants then started at the front of the mangrove, walking up through the *Sonneratia* low zone, through the mid zone to the back/high zone. Within the high/back mangrove zone, each team was allocated an area and told to investigate it as though it was a potential restoration site. This included interviewing the local conservation group member allocated to their team about the site history, sketching the site, observing site features such as species present, natural regeneration, biophysical parameters including salinity and other salient factors.

Back at the hotel after lunch and a review of the previous day's teaching, the restoration plans were discussed and details linked to the CBEMR process. Other topics covered on the final afternoon included

- Implementation of mangrove activity, stressing the site-specific nature of potential activity needed and that much of it might be social, rather than biophysical
- The need for monitoring, monitoring techniques, timing and monitoring's relationship with project objectives.

After the teaching was completed, participants were asked for **feedback** on pre-printed evaluation forms (Annex 2).
Previous discussions had revealed that four or five participants had live projects they were starting to work on. Therefore, after completing the evaluation forms, the other participants were divided into groups to discuss these projects, joining the group most relevant to their own situation.

Finally, they were presented their certificates by Anna Lawuo of TFS for completing the training.

3. Conclusions

- Part of the vision behind this activity was to use this event as a trial to test if it would be in the interest of SOMN objectives to replicate this format of coaching and training to compliment the policy influencing SOMN 2.0 will undertake.
- The two activities were designed to have a high impact for relatively low investment since it follows the model of Training the Trainers. Through the TFS instructors, the coaching has improved teaching skills and increased the knowledge base of one of the two government-run training institutes (Forestry Training Institute (FTI), Olmotonyi) for all TFS staff in Tanzania. Each of the 8 FTI tutors who attended has a class of between 100-800 students. This should also increase the level of institutional and student interest in mangroves to encourage changes in curriculums and more students focusing on mangroves for further education.
- For the latter Dr. Mangora, Executive Secretary of the West Indian Ocean (WIO) mangrove network and deputy head of the Institute of Marine Science at the University of Dar es Salaam is keen to help with follow-ups to build on this initial activity.
- Additionally, participants mentioned that they would be interested in adding a mangrove module to the FTI's forestry curriculum, something Dr Mangora is also interested in.
- Between the TFS field staff and locally based stakeholders, this coaching and training also reached the majority of established government professionals working on mangroves as well as three very active NGOs in the country. Participants included the TFS heads of two of the three mangrove zones in Tanzania and representatives from the third block. When TFS rangers are sent to work in mangroves (a few every year max) they are trained in mangrove-specific management by these established staff members. As a consequence of this training, there is a good chance that any new mangrove field staff will be trained using the CBEMR approach.
- Outside of the large international NGOs, much of the rest of the mangrove management is done by community associations and a few local NGOs such as those invited. SOMN was only able to invite community members from the Tanga and Pangani areas meaning the reach here has been limited. However, the comments and reactions of those invited indicated a high level of interest and receptivity to learn, and they appreciated the opportunity. Their feedback comments often focused on the parts of the training that explained why their previous attempts to plant mangroves had failed.

Feedback, from participants

- Participants universally gave feedback stating enthusiasm to share their new skills and knowledge with students and colleagues as well as adding to the curriculum at FTI, Olmotonyi.
- Field staff came out of the coaching with specific plans to implement what they had learned, once they were back in the field.
- Our representative from TFS's head office suggested that we do this course for the government decision makers while other participants requested multiple sessions for additional training for their colleagues who had not been able to attend this time.
- More details in the evaluation forms.

Improvements

Through the evaluation forms shared at the end of the two sessions there were a few areas of improvement to take note of.

- Nearly all participants would have liked more than a week to spend learning the material we had developed. The schedule was intensive and a request was made for more free time in the afternoons between sessions. In most cases this suggestion came out of enthusiasm to learn more in depth and more slowly.
- Participants (universally) also requested more field trips. Only two fieldtrips were possible in this session due to the limited amount of time available for the training.
- One area where SOMN is constrained and which the participants would have liked more flexibility was regarding the accommodation arrangements and per diem situation. Both accommodation and conference venue were in the same location with half-board offered, meaning that SOMN could offer only a cash per diem for the dinner most nights. Normally government employees get a set amount of about $59 USD per day to sort out their own arrangements - this is expected and the norm in Tanzania. In future the alternative would be to find a) a cheaper hotel meeting all our needs and still accommodating the participants together. The cheaper option might reduce the feeling of contrast between what participants are used to and what they are offered. If Tanga is used again, this would not be an option as The Tanga Beach Resort and Spa was the only hotel meeting all our needs. b) Accommodating participants in another (cheaper) hotel separate to the conference venue would rely on participants' punctuality c) providing a per diem of BMZ regulation €30 for free choice. Organisers would need to make sure this covers the government standards added to the BMZ standard food allowance.

- **Preparations** were challenging because of the number of players (SOMN, TFCG, Rocha International, MAP, TFS, Forestry College, Dr. Mangora) many of whom had never worked together before, had different expectations, time constrains, time zone differences and some had poor internet connections for SKYPE / Zoom meetings.
- **Needs Assessment:** The conference in Kenya (April 2018) provided a useful initial insight that TFS staff receive only very limited training about mangrove ecology, biology and rehabilitation best practice. Ideally, this insight should have been followed-up with more **ground-level training needs assessment** before developing the training concept and the selecting the training target group(s).
- **Printed Resources**: The very late review of CBEMR documents meant that the Swahili versions of existing documents could not distributed during the workshop in an electronic or printed format, which reduced the training's effectiveness. Being distributed at a later date presents the problem that they may not be read due to having lost the momentum, and day-to-day time constraints. Lesson: Early material preparations should be insisted upon. Printing should be done well in advance and to ensure quality printing. Printing extra species ID sheets would have been useful as a giveaway to community and other contacts during the workshop as they are popular and useful.
- **Field Clothes:** Despite providing information very early on for the need for field clothes, appropriate shoes & water bottle, the message didn't get through to all participants. Part of the problem was that participants were selected very late and some had never been into the mangrove so were not familiar with what was appropriate footwear. Lesson: Need to ensure there is direct communication with

participants regarding field clothes by a local contact. Photo examples may be needed.

- **Environmental Measures**: We were only partially successful regarding reducing the training workshops' environmental impact. The one water filling station in the meeting room was well used but outside meetings times the room was locked. This resulted in participants using the small plastic water bottles in the hotel rooms. Having a filling station in the restaurant could have solved this problem but the manger didn't agree to this idea. Drinking water requested during meals was brought to the table in plastic water bottles with plastic straws. Unfortunately, the hotel had no environmental policy on towel and sheet washing so it's uncertain how well "there is no need for daily washing" got through to participants and then to housekeeping. Lesson: Providing reusable water bottles with donor logos in places where it's not the norm to refill a personal bottle may be the best solution, even refillable plastic bottles are quite inexpensive. When a venue is being booked these requests can be demanded as part of hotel getting the contract for the training. MAP does this often for even small bookings, requesting that no plastics or disposables will be used, and hotel usually agrees. Therefore, when we book again the hotel is already familiar with our requirements.
- **Tanga Hotel venue** was very comfortable and there are a number of important logistic advantages having all participants stay at the same hotel. The **training room** was of an appropriate size, seating was comfortable and the AC was effective. It was good to be able to have coffee / tea breaks just outside to get fresh air. Not having to use a microphone was an advantage & saved time. Also having mangrove field sites within 30 min. was a great asset.

Training Length, Delivery and Participants

- **Gender Balance**: The first workshop had fair gender balance with 6 of 18 participants being female, mostly tutors from the Forestry Training Institute Olmotonyi. In the second workshop there were only 3 women out of the 16, with two being TFS staff from the first training. Lesson: More attention needs to be paid to gender when selecting participants. The fact that the head of the TFS Mangrove Conservation Section was a female was a good role model and was present at both trainings.
- The **first 3 day training** in English for instructors and participants who already had a forestry background went smoothly. For a general introduction to mangroves this is the absolute minimum in terms of length for such an audience. There was very limited time for field work or to explain enough of the CBEMR rehabilitation technique.
- The **second 3 day training** session was far too short as with translation time required, it was more like 1.5 days for Swahili-only speakers. For this training of NGOs & community groups it's important to go slower as there is a need for basic explanations, because concepts like pH and Google Earth are completely foreign. Therefore, a different teaching approach is needed with more question and answer sessions, small group discussions, demonstrations and field work etc... Lesson: The **training effectiveness** of this second training would have worked better if the new NGO and community people who joined on 22nd Feb were on their own, and not mixed with some who had taken part in the first 3 day session. All participants would be on similar level of baseline information. Having some of the TFS staff in the second session was a waste since they had already been through much of the training

already. Meanwhile there were other possible training participants from Tanzanian NGOs and community groups who would have benefited from the course but could not join due to a lack of places and funds. The second training could have had a much greater and wider impact with all NGO and community participates.

- **The Effect of Short Training length**: Lesson: Due to the short training period there was not enough time for participants to make presentations about their own mangrove restoration projects and experience which was unfortunate and reduced the trainers' ability to understand local challenges and failures. It also reduced the cross-learning opportunity between participants. It takes time for participants to make presentations which is a valuable exercise. There was also not sufficient time for the groups to produce simulated restoration plans after the second field trip, present them back and have the other groups critique the ideas and ask questions. This is an effective learning exercise for putting the whole CBEMR process together. There was insufficient time to actually practice time-lapse photography monitoring in the field. The training only allowed the theory to be presented and be reinforced by fieldtrips. To get a solid understanding of CBEMR, more practical field work is critical. The trainers did amazingly well to put on a condensed CBEMR training but we advise against any future 3 day trainings.

Advised follow-up

- As an immediate follow-up to the coaching and training we were requested to set up a What'sApp group with the participants to motivate the participants, encourage a continued exchange of ideas and provide access to the coaches.
- It's also advised that participants are contacted directly again after some months to assess how much of the course content has been used and what continues to be of use (and the contrary). This would allow us to measure the longer-term impact and see what improvements are needed.
- The WIO Mangrove Network might have a role to play here as Dr. Mangora has mentioned he has long-held ambitions to increase the mangrove content in sections of the national TFS curriculum.

Longer term follow-up

- We were not able to invite all the FTI instructors given the limit to numbers and neither could we invite participants from another training college; Sokoine University of Agriculture –College of Forestry Wildlife and Tourism with potential to add participants from other less relevant colleges. If this workshop is scaled up, it would be advisable to reach out to these other participants through TFS head office staff so that impact is widened. Additionally, there would be an option to set up a regular short course for interested TFS staff, that is embedded into the TFS educational system. For mangrove training, staff currently need to travel outside the country.
- There were a few policy related and terminology considerations that should be kept in mind for any upscaling of this activity. For example, terminology such as 'community-based' implied community controlled to some in Tanzania, rather than the community participation as it is commonly understood by non-Tanzanian partners.

4. Annexes

4.1. Annex 1: Participant list

Coaching session Day 1-5

	Title	First name	Surname	Institution	Role
1	Mr	Jim	Enright	MAP	coach
2	Dr	Dominic	Wodehouse	MAP	coach
3	Mrs.	Sarah	French	A Rocha	coach
4	Mr	Simon	Lugazo	TFCG	Coach, host and logistics
5	Dr	Mwita	Mangora	IMS	Advisor
6	Mr	Aklei	Albert	TFCG	Coach, host and logistics
7	Ms	Anouk	Neuhaus	WWF Germany/ SOMN	Host
8	Ms	Raphaelle	Flint	IUCN/ SOMN	Host
9	Mrs.	Anna	Lawuo	TFS	Host/advisor
10	Mr	Bruno	Malya	TFS	participant from Lindi
11	Mr	Ezra	Chomola	TFS	participant from Tanga
12	Mr	Shaban	Mbwana	TFS	participant from Mafia
13	Mrs.	Christina	Mohamed	TFS	participant from Kibaha
14	Ms	Amwene	Chanai	Olmotonyi	participant/Tutor
15	Mr	Selestine	Mafuru	Olmotonyi	participant/Tutor
16	Ms.	Grace	Buchukundi	Olmotonyi	participant/Tutor
17	Ms	Philipina F.	Shayo	Olmotonyi	participant/Tutor
18	Ms	Grace	Nchimbi	Olmotonyi	participant/Tutor
19	Mr	Emmanuel	Japhet	Wetlands international	participant
20	Mr	Azaria	Kilimba	WWF Tanzania	participant
21	Mr	Twahiir	Mkongo	TFS	participant from Pangani
22	Mr	Pamba	Bissecko	TFS	participant
23	Mr	Nelson	Mdogo	TFS	participant Tanz. Marine Unit
24	Mr.	Stephen	Chiba Malima	TFS	participant from Rufiji
25	Mr.	Tumaini	Kivuyo	Olomotoniy	participant
26	Mr.	Chamba	Pamba	Olomotoniy	participant

CBEMR training Days 6-8

	Title	First name	Surname	Organisation/ institution	Role
1	Mr	Jim	Enright	MAP	Trainer
2	Dr	Dominic	Wodehouse	MAP	Trainer
3	Mr	Simon	Lugazo	TFCG	Coach, host and logistics
4	Mr	Aklei	Albert	TFCG	Logistics and participant
5	Ms	Anouk	Neuhaus	WWF Germany	Host
6	Ms	Raphaelle	Flint	IUCN	Host
7	Mr	Bruno	Mallya	TFS	participant from Lindi
8	Mr	Ezra	Chomola	TFS	participant from Tanga
9	Mr	Shaban	Mbwana	TFS	participant from Mafia
10	Mrs.	Christina	Mohamed	TFS	participant from Kibaha
11	Mrs.	Anna	Lawuo	TFS Head office	Host/advisor
12	Mr	Twahiir	Mkongo	TFS	participant from Pangani
13	Mr	Nelson	Mdogo	Marine Warden, Tanga Marine Reserve System	participant from Tanga area
14	Mr	Ally	Hamza	Community member, Ndumbani village	participant from Mkinga District
15	Mr	Gumbo	Majubwa	Director of Ambakofi Organization	participant from Bagamoyo
16	Mr	Salim	Mbaruku	Mmbakofi Organization focal person in Ushongo village	participant from Pangani District
17	Mr	Jabiri Zumo	Mwinyihija	Member of BMU in Bweni village	participant from Pangani District
18	Mrs	Hariri	Hossein	Seasense Community Officer at Sange Village	participant from Pangani District
19	Mr	Hassan	Ahmad	Seasense Community Officer at Kwale Village	participant from Mkinga District
20	Mr	Azaria	Kilimba	WWF Tanzania	NGO participant
21	Mr	Emmanuel	Japhet	Wetlands international	NGO participant
22	Mr	Stephan	Malima	TSF - Rufiji	participant from Rufiji

4.2. Annex 2: Agenda

Agenda: TFS forestry instructor, mangrove coaching and restoration (CBEMR) training

Arrival 16th February 2020

All day Arrival and settling in of participants at Tanga Beach Hotel Resort and Spa (see logistics information document for details)
1600-1800 Workshop registration desk open at hotel lobby with welcome drink
1800 Opening and welcome dinner hosted by SOMN

TFS Forestry instructor coaching

Coaches:
- Sarah French from A Rocha International
- Jim Enright and Dominic Wodehouse from Mangrove Action Project (MAP)
- Simon Lugazo and Aklei Albert from Tanzanian Forestry Conservation Group (TFCG)

Tide table https://www.tide-forecast.com/locations/Tanga/tides/latest

Date	Morning	Afternoon	Lead
17th Mon 0830-1730	○ Objectives, introduction to mangroves and mangroves in Tanzania ○ Introduction to communication **Morning break** ○ Understanding the roles of the Trainer ○ The learning approach of learner-centred training **Lunch**	○ The 8 principles of Adult Learning ○ Understanding the dynamics of effective communication **Afternoon break** ○ Activity ○ Essential Communication skills for trainers/presenters/instructors	Emmanuel Japhet, and Sarah French
High tide	10.22am, 2.11m		
18th Tues 0830-1730	○ Introduction to MAP ○ Mangrove trends - losses and planting failures **Morning break** ○ Conserve vs rehabilitate ○ Mangrove benefits **Lunch**	○ Mangrove biology and types ○ Activity: Species characteristics **Afternoon break** ○ Activity ○ Mangrove ecology ○ Field trip briefing	MAP and Sarah French
High tide	12.27pm, 2.01m		
19th Wed 0830-1730	**Field trip.** Walk-and-talk through restored mangroves **Lunch**	○ Review of previous day and field trip ○ Mangrove species zonation ○ Brief intro to CBEMR **Afternoon break** ○ Importance of hydrology and biodiversity	MAP

High tide	14:06, 2.18m		
20th Thurs 0830-1730	**Field trip.** to a natural mangrove **Lunch**	○ Review of previous day and the morning's field trip ○ Potential rehabilitation and community forestry objectives **Afternoon break** ○ Measuring spot heights and mapping ○ Implementation and monitoring ○ Identification of possible stakeholders ○ Activity ○ Common community issues and problems with rehabilitation projects	MAP
High tide	15:01, 2:43m		
21st Fri 0830-1730	○ Drivers of mangrove threats from local communities **Morning break** ○ Conflicts and solutions in livelihood integration with mangrove conservation **Lunch**	○ Last words on community engagement **Afternoon break** ○ Evaluation of training ○ Closing and certificates ceremony	TFCG
High tide	15:39, 2.66m		

Mangrove restoration training (CBEMR approach)

Trainers:
- Jim Enright and Dominic Wodehouse from Mangrove Action Project

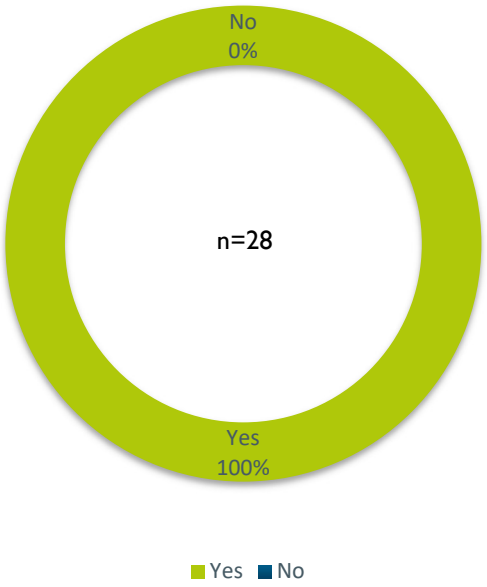
High Spring Tide at Tanga is on Tue 11 Feb (height: 3.74m)

Date	Morning	Afternoon	Lead
22nd Sat 0830-1730	○ Planting failures ○ Rehabilitation objectives **Morning break** ○ Mangrove Biology **Lunch**	○ Importance of hydrology **Afternoon Break** ○ Mangrove ecology ○ Brief intro to CBEMR ○ Field trip briefing	MAP
High tide	16:11, 2.87m		
23rd Sun 0830-1730	**Field trip.** Walk & talk through restored mangroves **Lunch**	○ Review of previous day and field trip ○ Species Zoning ○ Measuring spot heights ○ Review of CBEMR process **Afternoon break** ○ Site research	MAP

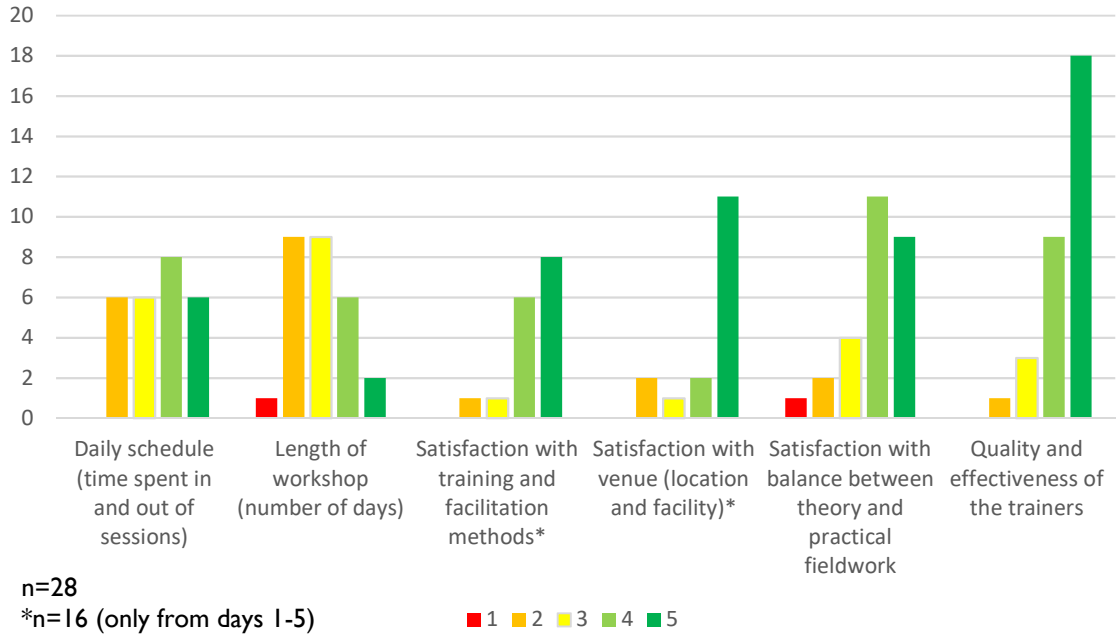
		○ Tabletop demonstrations pH, salinity etc. ○ Mapping and Planning ○ Field trip briefing	
High tide	16:40, 3.04m		
24th Mon. 0830-1730	**Field trip**. To natural mangrove area- Objective to produce a rehabilitation plan **Lunch**	○ Review of previous day and second field trip ○ Implementation: technical & social **Afternoon break** ○ Monitoring: What, How, Why **Closing** ○ Evaluation of training ○ Training certificates	MAP
High tide	17:07, 3.16m		

4.3. Annex 3: Evaluation feedback

Has this workshop achieved your expectations?



Please rate the following aspects of this workshop from 1 to 5
1 = poor; 2 = needs some improvement; 3 = OK; 4 = good; 5 = excellent



n=28
*n=16 (only from days 1-5)

Quotes of note

- Well done to you all and the partners it was a huge honour experiencing a new adventure of mangrove awareness
- You don't need to raise seedlings but natural regeneration is the best method
- This is the right time to put management strategies to our mangrove because of their importance to improved forest conservation, livelihood and governance
- I will integrate this into my work. This is the best way I have ever seen before on any natural resource restoration and rehabilitation. It works!
- The training was so wonderful than expected so there is a need to extend to other parties
- I recommend this training to others, to study mangrove is so good as improves community livelihood
- I did not expect that I could get so much training!
- Very good / Excellent training
- I would recommend this training: We need to give the mangrove ecosystem the same value as the terrestrial forest ecosystem
- I would like to congratulate IUCN, WWF, TFCG and TFS for organising this very important workshop
- I will recommend this training by saying: this training if you want to have a conserved mangrove ecosystem then you should attend such a workshop
- The best part is mangrove biology
- Conservation is better than restoration
- I will integrate this into my work. I will go to the field area with local communities who surround the mangrove reserve and teach them the importance of mangrove and how we will conserve it. Teach them how they can generate money through mangrove ecosystem.
- My expectations was to learn only about how to teach community to conserve the mangrove. But the experience went beyond that as we have learned many important things which I hadn't understood before, e.g. hydrology, monitoring stressors and to avoid planting in mudflat.
- The best part of the training was hydrology, because it is where the particular importance of mangroves is witnessed as you compare to the terrestrial plants. Such as hydrology improve aeration, supply seeds, decrease salts, reduce pollution, absorb heavy metals hence help marine mammals and corals from suffering
- It is better to involve the communities' local knowledge in the implementation

4.4. Annex 4: The Stages of Community-based ecological mangrove restoration

The principle stages of the CBEMR process are:

With the local people, develop an understanding of the species that are living or should live on the proposed site, their ecology, preferences, tolerances, method of reproduction etc. The team should also understand the site's relevant features, salinity and hydrology (depth, duration and frequency of inundation), and collect data on site history, previous use, seed/propagule availability, and what is currently preventing natural regeneration. There should be a clear understanding of what has changed on the site or the site's context, and therefore, what needs to be remedied, as well as social issues that affect site restoration. To aid this research a concurrent study of a benchmark natural reference mangrove is encouraged of similar topography and salinity, to gain a better understanding of species abundance, tolerances, species elevation relative to sea level, soil types, and other site features.

Assuming the restoration site chosen is appropriate, the next stage is to develop a restoration plan with the local community, including maps and diagrams, paying particular attention to removing natural regeneration inhibitors and restoring or improving the hydrology, within the restrictions of budget, local labour skills and availability, and other issues identified during the research. Then execute the plan and implement the activities necessary, if possible, to facilitate natural regeneration. Activities could include social agreements about changes in behaviour, restrictions on cutting or livestock movements. Activity might also include alternative livelihoods and capacity building.

Monitor the project and intervention from the start for at least 5 years after the work is completed. Correct faults and amend intervention as necessary, such as channels and hydrology and fencing which might require maintenance. Unless the objective is something other than full ecosystem restoration, planting is normally not necessary unless the site is 'propagule-limited'. If this is the case, other methods can be used to introduce more propagules, for example, by broadcasting propagules onto an incoming neap tide.

CBEMR's assumed **objective** is full ecosystem restoration. This means that all possible species of flora are expected to naturally regenerate over time, if conditions and elevation are suitable. It is hoped that with (improved) hydrology and a full complement of flora, all the expected fauna would also return as well as the expected ecosystem goods and services. CBEMR's default rehabilitation objective is explicitly stated here because this might be at odds with projects initiated by the Tanzania Forest Service, where the communities' priority is fuelwood for cooking, for example. This change in priority might alter techniques used during the CBEMR process