

Final Evaluation Report

Your Details	
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Project Title	Mwache Mangrove Forest Regeneration: Integrated Approach to Restore Mangrove Habitat
Application ID	27777-2
Grant Amount	5,000 Sterling Pounds
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Date of this Report	14 th April 2021

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Continuous monitoring and evaluation of the phase one work of first Rufford Grant.				<p>Success of project requires learning the success and failures that you encounter for improvement of project work.</p> <p>To realise this the project adopted a citizen science approach where motivated local community volunteers were trained. The volunteers were trained on how to measure and record the height of seedlings on selected permanent plots, counting of the leaves sprouting, and seedlings that survive vs death.</p> <p>The use of this approach was to enable continuous monitoring of project progress as the community are near reach to provide the requisite data.</p> <p>Validation of the citizen scientist data was done by impromptu survey by our team from Kenya Marine and Fisheries Research Institute.</p> <p>This approach also served creating local conservation stewards for sustainability of Mwache forest conservation.</p> <p>We hope to expound on this in our future activities.</p>
Maintenance of the already constructed 800 m Mwache mangroves groyne structures with further extension by 400 m of the groyne structure to widen the restoration coverage area.				<p>This second round of Rufford grant conservation was to build an extended 400 m groyne structure, after the first structure was found to be efficient in wave attenuation based on success rate of mangrove seedling growth.</p> <p>The extension was done to areas that were initially hard to erect the structure (i.e., areas that were with a lot of sedimentation hence making putting up the extension in the first</p>

				<p>phase of the project unviable). In this phase the community was mobilised to remove the sediments to enable normal tidal follow of sea water. This is necessary for creating enabling environment for seedlings growth. Subsequently The 400 m groyne structure was constructed to attenuate the wave stressor to mangrove seedlings.</p> <p>Moving forward the community have been well prepared to maintain the structure from wear and tear in order to continue providing the service of wave attenuation (i.e., to reinforce weaker parts of the structure, and remove debris stuck on the structures periodically which might hamper normal water flow in and out of mangroves).</p>
Extension of Mangrove seedlings planting on the restoration site was done be done, this was to complement natural regeneration from the creation of enabling natural growth environment.				<p>This was done to boost restoration in areas that were not able to self-regenerate (observation from the team continuous monitoring and evaluation of restoration site). However, the Covid-19 pandemic hindered the continuous flow of seedlings availability from nursery. This was due to slow down of activities on nursery preparation during this period for provision of seedling for replanting. We circumvented this by outsourcing mangrove seedlings from other areas.</p>
Clean up initiatives by community to remove mangrove debris which might affect mangrove growth through smothering/suffocation the mangrove seedlings thus hindering their growth.				<p>This was to be done by use of local youth/ conservation groups. However, with Covid-19 pandemic there was fear of people getting out to participate in the clean-up initiatives.</p> <p>As the situation eased, a small group was formed and trained on how to collect mangrove debris while observing the Ministry of Health protocols. This was accompanied by provision of sanitisers, hand washing soap, face masks, and gloves to be used by the debris collection group.</p>
Awareness creation to wider Mwache				<p>Initially this was to be done through visits to primary and secondary</p>

community members on importance conservation of mangrove forests while restoring the degraded sites			schools in Mwache Community. However, due to closure of schools we were forced to innovatively change tack. A small musical group was therefore formed to compose conservation songs that were sung to local communities. This was to motivate local community participate in conservation efforts of Mwache mangroves.
Training of local community on adoption of alternative source of livelihood			<p>This was to train the community to adopt source of livelihoods that will ease pressure on mangrove degradation while earning a living at the same time. This included enhancing mangrove nursery planting to sale to other conservation, and government urgency to use for their own conservation efforts/events. Covid-19 slowed down this effort, however, we managed to carry out two training workshops during this period.</p> <p>It is important to note that since women bear the most when mangroves are degraded as they lack essential goods and services such as fuelwood from for cooking. A gender balance was key in this training. Hence, we strategically achieved a 40% women attendance. However, in future we strive to put more measures in place in order to achieve a 50:50 gender balance.</p>

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

The Covid-19 pandemic slowed down delivery of the project.

- 1) The observation of Ministry of Health measures including lockdown affected the Mwache mangrove restoration rate through planting. This was due to slowed down preparation of nurseries by local community/conservation groups which led to lack of seedlings for expansion. This was however, countered through outsourcing seedlings form conservation institutions such as Kenya forestry, and other communities which had seedlings that they were not using.

- 2) Awareness creation of Mwache mangrove was to be done in primary and secondary schools to create young environment stewards of Mwache mangrove conservation. This was not the case as schools were closed during lockdown. To circumvent this, a small musical group was formed to compose conservation songs that were sung to small pockets of local community members at designated places on rotational basis. This was very successful as it attracted both the young and old generation.
- 3) Clean-up of mangrove debris with Covid-19 pandemic brought about fear of infection and people were not willing to participate in the initiative. To counter this, a small motivated local group was formed, and trained on how to continue with mangroves debris clean-up efforts while observing the Covid-19 Ministry of Health protocol. Moreover, the project funds were readjusted to buy sanitisers, soaps, faces masks, and gloves to be used by small group.

3. Briefly describe the three most important outcomes of your project.

- 1) An extra 400m bush wood groyne extension structure totalling to 1200 m (i.e., sum of construction from both the 1st and 2nd Rufford grant). This structure is important in wave attenuation during tidal flow of water into and out of mangroves. To add the community was very much involved in removal of sediments from the extended structure to maintain the tidal regime flow of water into and out of the mangroves. The positive results of mangrove natural regeneration were observed. The results point 82 % survival rate of mangrove seedlings, which is a clear indication that an enabling environment is being created.
- 2) Awareness creation was successful despite the Covid-19 pandemic. This was made possible by small musical group formed. The group composed conservation songs that were sung to the Mwache community in small, organised group. This brought together both young and old generation in awareness creation efforts.
- 3) Mangrove debris clean-up was done with help of small organised local group. The group was able to observe Covid-19 rules while observing social distance, and other set out Ministry of Health protocols. To make this a success the group was first trained on how to observe the Covid-19 protocols while carrying out mangrove debris clean-up. A clean-up roster was created, and funds readjusted to buy the sanitisers, soaps, faces masks, and gloves to protect against Covid-19 during the clean-up process.

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

The success of this phase of project was realised with community involvement from the onset. Here a pro-social approach was applied, where to successfully curb antisocial behaviour and foster unity in community participation in the project, the community had to agree and show willingness to act on roadmap/work plan

agreed upon holistically by community. Here, rather than applying the common top-down approach where we scientist take charge on everything from agenda setting, to execution. The Mwache community was rather given a platform to find common ground on agenda setting, all the way to project execution. The community was motivated to have a shared vision and common agenda in Mwache mangroves conservation. Below is a pro-social framework that guided the community set common agenda.

Table 1: A prosocial analysis tool to get mangrove stakeholders work together to achieve the shared vision.

<p>What are the local communities doing or not doing now that will work against their commitment?</p> <ol style="list-style-type: none"> 1) Cutting of mangrove trees for firewood and construction. 2) Human encroachment of mangrove forest for settlement. 3) Conversion of mangrove forest for aquaculture without proper feasibility studies. 4) Lack of motivation by community to report destruction of mangrove forest by commercial enterprise. 5) Lack of clear coordination in utilization of the shared mangrove resources. 	<p>Towards a shared vision for all stakeholders:</p> <p>Commitment to stay focused to restore Mwache mangrove forest for sustainable fisheries</p>
<p>Local community experience: What is the community worry?</p> <ol style="list-style-type: none"> 1) They will be denied opportunity to do mangrove fishing hence loss on income for their family support. 2) They will not get firewood and construction materials for the houses if involve in mangrove conservation. 3) They will be chased away from their settlements to give way for mangrove restoration hence against the idea. 4) Mangrove is their ancestral inherited resource, and they fear losing it if they engage in restoration efforts. 5) They fear also being denied visiting their scared mangrove sites for their traditional worship. <p>At last, the community agreed to be committed to work on their worries to</p>	<p>Shared values:</p> <p>Commitment of all stakeholders to the above goal matters in the long-term because:</p> <ol style="list-style-type: none"> 1) It will lead to sustainable fisheries in the communities with improved economy and living standards and nutrition. 2) It will lead to increase in biodiversity of mangrove ecosystem hence increase in provision of ecosystem services such as storm surge protection of community, herbal medicine provision, and cultural value. 3) Mangrove being one of leading carbon sinks after the ocean, its restoration will lead to climate change mitigation. To add in order for community to see value of mangrove

<p>achieve the goal:</p> <ol style="list-style-type: none"> 1) To look for alternative source of livelihood so that they do not depend solely on fisheries, this will do with help of other stakeholders such as state. 2) They also embrace other form of fuel utilization indigenous species for utilization to avoid pressure of utilization of firewood from mangroves (i.e., these require planting more of indigenous trees species which grow with a short spurn of time in relation to mangroves). <p>They will also learn how to co-exist with mangroves for them to reap on its benefits including their future generations.</p>	<p>restoration, once project is complete it will lead to payment for ecosystem services for those benefiting from the restored mangroves in terms of fishing, climate mitigation (i.e., through carbon credits) and money raised used in societal development.</p> <p>It will also bring the community to the center of world stage as one of success story of community efforts in mangrove restoration hence attract more funding from conservation organizations and government.</p>
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Out of this initiative the community have been able to set up alternative source of livelihood. Such as, communal set up of mangrove nursery development where seedlings to restore Mwache degraded sites are sourced, and the excess sold to outside groups. As the community pulled up efforts it was able to bargain for better price for their mangrove's seedlings. And up to now they have managed to sell 15850 seedlings, generating an income of \$1585.

To add Mwache dam which was to be constructed upstream of the Mwache river was put on hold after the community teamed up in one voice to oppose the construction. The project which was to be funded by World Bank is now on hold waiting for impact assessment on its effects downstream.

5. Are there any plans to continue this work?

Yes, there are plans to continue with the project. The project implementation has so far picked up very well with community now showing great interest in Mwache mangrove conservation. To avoid reverse on gains made, we therefore hope to reinforce this in our subsequent activities.

In subsequent, work we hope to apply citizen science in Mwache mangrove conservation. Here, we will utilise citizen scientists (i.e., motivated local volunteers) to be champions of mangrove conservation. We will therefore look forward to creating friendlier tools to make this possible. This will be instrumental in creating a pathway for community takeover of the project for sustainability.

6. How do you plan to share the results of your work with others?

The results from this project will be shared through Internal and external seminars organised in Kenya Marine and Fisheries Research Institute. To add, the application of groynes structures to create enabling environment for mangrove restoration will be

showcased in outreach activities organized by the National Government of Kenya (i.e., Agricultural Society of Kenya which showcases public-private activities and how they are answering to societal needs).

Additionally, we hope to put across this work in local newsletters. And make a documentary on the same.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The grant was used from 1st August 2019 to 28th February 2021 Despite the Covid-19 pandemic, we innovatively came up with strategies as highlighted in this report to execute project objectives. It is important to note that the project extended by 6 months out of the expected delivery time due to covid-19 pandemic.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Transport Cost (Fuel)	350	300	-50	Despite Covid-19 travel restrictions we were still able to visit the restoration site. However, each site visit was to be accompanied by clearance permit Ministry of Health.
Training of community (Alternative source of livelihoods). Arrangement logistics.	400	465	+65	Subsequent trainings were held ins strict adherence to Covid-19 Ministry of Health Guidelines. Therefore, some expenditure was directed to buying face masks, sanitisers, and hand washing soap.
Field allowance (Community Volunteers)	450	450		Some of project activities were offered in kind by volunteers.
Field allowance (team)	1600	1600		This was managed in such a way that the team went to field on rotational basis for monitoring and evaluation (i.e., mostly two members, and mostly at a time when their input is mostly needed).

Awareness creation on Mwache conservation activities	600	556	-44	Apart from two organized workshops, conservation songs were composed and sung to the local community to create awareness. This was adopted because It was difficult to create awareness in schools as they were closed in better part of last year.
400 m Brushwood Groyne structure extension/maintenance of the existing 800 m	600	673	+73	Excavation on the 400 m extension was done to remove accumulated sediments prior to construction. To add the old 800 m brushwood groyne was reinforced.
Mangrove replanting/nursery development	300	281	-19	This was slowed down due to lockdown during the pandemic.
Monitoring and Evaluation materials & applicable logistics	700	688	-12	This was done with local community participation.
Total	5000	5013	+13	The extra amount was derived from Kenya Marine and Fisheries Research Institute Project General account to cover the deficit.

9. Looking ahead, what do you feel are the important next steps?

- 1) Monitoring and evaluation should continue to improve the success of the project. This is very important as we cannot afford to relax and risk reverse on the gains made.
- 2) Continual maintaining of the wave attenuation structures (i.e., brushwood groyne structures) to continue creating an enabling environment for self-regeneration of Mwache mangroves to complement the replanting by local community.
- 3) From this project we realised mangrove debris including plastics will hinder seedling growth. It is therefore important to form a volunteer group that will work on mangroves clean-up to remove the debris, while providing information to inform best strategies to reduce//eradicate this debris. A mobile app to be used for the same has been developed from another project and will be used for the same with local trained volunteers.
- 4) Generally, all the above objectives will be realised by forging ahead to select local volunteers who will be trained as citizen scientists. The citizen scientists should know all the steps necessary to manage the project, from site preparation, baseline data collection, monitoring, and data analysis to inform restoration choices. This will be instrumental as the local community is prepared on how to manage the project for sustainability.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes, The Rufford log was used during the awareness creation campaign, and workshops organised.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Gilbert Nyabochwa Atuga:

Principal Investigator, project coordinator, guide in brushwood groynes construction, and Monitoring and evaluation of project progress

Rashid Anam:

He is a research scientist with Kenya Marine and Fisheries Research Institute (KMFRI). Rashid has vast of experience in fish biology and taxonomy. He helped in fish species identification for determination of reemergence of fish diversity in the regenerated mangroves sites overtime.

Kilonzo Joseph:

He is KMFRI Lab technologist experienced in crab species biology and taxonomy. He provided valuable knowledge in identification of crab species diversity in regenerated and healthy mangrove sites overtime.

Faith Kimanga:

She is KMFRI experienced Socio-economist. She was handy in determining ways to secure acceptability of project, including sustainable and cost-effective approach to mangrove conservation. She was also able to determine the benefits derived from mangrove conservation. And coordinate the training processes.

Mwache local community:

They provided assistance in coastal structures construction (Bush wood groynes). The community was also in-charge of daily maintenance of the structures. They also participated in planting mangrove seedlings and routine monitoring of the field progress on training. To add they were involved in mangrove debris clean-up.

12. Any other comments?

The project is at a stage where community need to be at the centre stage of Mwache mangrove conservation.

I also thank the Rufford Foundation for their flexibility in project deliverables during this Covid-19 pandemic. Your timely communication on how to forge ahead during this time was highly welcome.