Validation Report:
Myanmar mangrove rehabilitation project at Schwethaungyan

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- Dr. Cameron Richards, Raintrust Sustainable Ventures

Preamble

This report summarises the outcomes of a validation procedure to evaluate the current achievements and future sustainability of Worldview International Foundation’s (Worldview’s) mangrove rehabilitation project in an 1800 acre (or 728.5 hectare) park within the Schwethaungyan area of the Ayerwaddy Delta, Myanmar. On the 21st of November, 2015, the Raintrust Sustainable Ventures team (comprising David Plattner, Bremley Lyngdoh and myself) visited the climate park at Schwethaungyan. We spent several days examining the park and surrounding areas, interacting with the local community, accessing local university reports on the area and the project directly, and other relevant items of information and consultation. This included the use of Drones to videotape and map out the surrounds from above.

The local area we inspected was part of a wider key case study (No. 9) in the United Nations Environment Programme’s (UNEP’s) 2014 landmark report *The importance of mangroves to people: A call for action* – a landmark publication because of how it was able to much better detail and also link both the costed benefits of mangrove rehabilitation and related (i.e. magnified) costs of degradation and loss. Just as it conservatively estimated the cost of ongoing damage to mangroves at US$42 billion annually, so UNEP (together with Centre for International Forestry Research or CIFOR) also came up with an estimation of the value of effective ‘mangrove ecosystem services’ at up to US$57,000 per hectare annually [if accepted – and increasingly many would - this might potentially translate into a value of US$40 million annually for ‘mangrove ecosystem services’ that are at work in the restoration of Thor Heyerdahl Climate Park]. Related estimations of value are now being provided for other indirect roles such as support for fisheries and storm protection/flood control – suggesting further millions of dollars of lost or recovered value annually are at stake. This is also in light of related new projections of the exceptional value of mangrove forests as an exemplary ‘blue carbon’ strategy to mitigate the effects and process of climate change (e.g. Pendleton et al, 2012 – who estimated the social value of blue carbon at US$41 per ton).

But even if current projections about the value of ‘mangrove ecosystem services’ were regarded as somewhat optimistic or exaggerated (there are increasing numbers of knowledgeable people who would not say that), this perhaps still does not do justice to the greater value of projects like this one [as we have come to appreciate in our study here, and will touch on further below]. This is at least in terms of how such a project (a) exemplifies locally as well as globally the challenges and opportunities of trying to better find a long-term balance between sustainable development and mangrove rehabilitation as well as protection, and (b) the ‘added-value’ elements of much improved local capacity which can be transferred to other areas and future projects in Myanmar especially as well as around the region.
Reinforced by recent NASA maps that dramatically depict the full situation, there are reliable estimations that Myanmar has lost more than 80% of its mangroves in just a few decades – especially in the Ayerwaddy Delta. Although the new government in Myanmar will be associated with new opportunities for national development, along with the new United Nations framework of ‘sustainable development goals’ (and in light of the productive ‘turn’ at the recent Paris Climate Summit) this change also offers genuine hope that a more integrated, sustainable and transferable approach to protecting and restoring local interests may be more feasible now in Myanmar. This is reinforced by growing awareness also at the local level in the Ayerwaddy Delta area that mangrove degradation and removal have great ‘value-added’ costs (such as the decimation of fish stocks and the exacerbation of the ‘death and destruction’ caused by Cyclone Nargis and similar tidal surge threats - which mangroves have been proven both in formal studies and in anecdotal evidence to significantly ameliorate) that can still be significantly protected and even reversed. It is in light of all these changes and new information available that we have in this investigation report applied an integrated methodology which links the key critical factors of sustainable development across related environmental, social, and economic as well as cultural domains. In this way we aimed to provide a better overall evaluation (than some existing validation models and methodologies) of the project’s current effectiveness and future sustainability both locally and as a transferable model.

This report was guided by the typical methodologies used in voluntary carbon markets for estimating carbon offset standards (e.g. Carbon Neutral, n.d.). In relation to the carbon accounting projections made below in the first section in particular, it was especially guided by the Verified Carbon Standards (VCS) methodology. This informed the framework used based on related baseline and outcome estimations to account for the project’s performance benchmarks. Although the VCS methodology is focused primarily on the carbon accounting aspects of sustainable development projects with greenhouse gas reduction implications, it nonetheless recognizes the in-principle importance of additionality and related ‘intervention factors’ which are often the primary focus rather of context-specific methodologies of project validation. This report uses an overall integrated methodology as not only a more substantial (or deep-level interpretative) basis for considering key additional and also related factors of sustainability, but also for linking this with the related carbon accounting estimations. In this way it also represents the kind of convergent methodology needed to strengthen reliability by effectively linking both methodological domains.

Introduction

The Worldview-sponsored project to rehabilitate an area of largely degraded mangrove forest at Shwethaungyan got underway in July, 2012 (WIF, 2015). As further indicated in related literature provided to us, its stated aim was to restore the 1800 acre area in question to a healthy state (calculated at a figure of 2 million new and rescued trees). The park represents an effective partnership with several key local agencies. This especially includes the Pathein University Department of Marine Sciences which had previously maintained a study center in the local area and has remained involved in aspects of the project such as the carbon testing of soil samples in the Park. The project is also working in close cooperation with Ministry of Environmental Conservation and Forestry and local communities.

As will be outlined further below, the project has also linked the mangrove rehabilitation side of the project with a related focus on the need for assisting with sustainable local livelihoods.
This has been crucial since, as has been commonly the case along the coast in adjoining areas also, the relatively poor members of the local community (average local family incomes estimated at US$60-80 – Maung, 2015b) have typically been dependent on the mangrove forest for food, building and energy sources (and related livelihoods). So, as the great depletion of local mangroves also affected local livelihoods either directly (e.g. wood for buildings) or indirectly (fish, honey, nypa natural sweeteners, and related products/activities – with the cost of damage alone to fish numbers and habitat projected at up to 75% losses), the local forests simultaneously came under increasing attack from the rise in number of local and outside charcoal collectors and sellers. In effect this was a ‘double whammy’ which needed an integrated approach to devise sustainable solutions.

The discussion below will entail two distinct but interdependent sections. The first aims to provide a clearer foundational framework for evaluating the project as a past-present-future development as well as in terms of wider sustainability factors. In other words, such a framework also needed to assist as a basis for applying basic ‘carbon accounting’ to the Park and the project of aiming to rehabilitate it. Such projections also needed to include both (a) biomass C02 sequestration figures linked to the growth of new and rescued trees, and also (b) soil C02 as a baseline also for calculating present and future avoided emissions. The second section will focus on a summary report of an integrated appraisal or ‘validation’ of the overall effectiveness of the project. Many conventional studies recognize but tend to treat as ‘add-ons’ a range of additional critical factors – especially those linked to notions of sustainable development and local livelihoods (i.e. the real keys to future sustainability). Our approach is to link all the elements (especially the crucial role of external-local partnerships) as part of a more reliable and constructive integrated methodology.

A summary of the project framework for initial ‘carbon accounting’ projections

The project focus to undertake an effective restoration of the 1800 acre was basically conceived as a five year plan. Worldview has reported that so far 530,000 new trees (50,000 in 2013, 80,000 in 2014, and 400,000 in 2015) have been planted since early 2013 - of which 490,000 are in healthy growth according to latest count. This has been linked together with calculations that 570,000 existing healthy trees (the project’s baseline scenario) have been rescued from their apparent fate to give a projection that there is currently about 1,060,000 healthy mangrove trees in the park of assorted sizes. There are actually more trees that have not been included in these numbers because they are not in good shape or have been severely damaged and will be removed as part of the re-planting exercise. Also, there are 200,000 new trees in the Park’s large nursery ready to be planted soon (like the other figures above, which reasonably accord with our direct efforts of inspection and first-hand verification). Therefore the project’s five year plan to restore the park to 2 million trees (the project’s outcomes-based scenario) is clearly on target to be achieved by 2017. So it is reasonable to assume that currently there is also at least a million tons of biomass C02 being mitigated on average in the next 20 years growth period (at an average of 50,000 tons per year) which will double after the re-planting is completed in the next two years.

Of course, as discussed in section 2 below, this is only the foundation of what was needed to declare the park generally a sustainable success. Worldview estimates that if these biomass or mangrove tree figures can be maintained in the future for the park (as we believe from our evaluation procedure here they can and should be), then this will directly facilitate the mitigation of 2 million tons of CO2 over the twenty year growth period average for each tree
(i.e. in terms of how each mangrove tree roughly has a twenty year cycle of growth or maturation). This is also in the context that many mangrove trees are relatively fast-growing (e.g. new trees from the Sonorata species are said to typically grow four feet high after the first two to three years). A Pathein university scientific study of the park (Maung, 2015a) based on 89 different sample plots across the whole park reported that the average number of mangrove trees in the natural forest areas of the park (about 30% at the outset) was calculated at 1053 trees per acre. On average each acre of these areas typically involved 17 different species of mangrove – with the four main species Bruguiera Gymnorhiza (275), Criops Targal (213), Rhizophora Apiculata (200), and Ceriops Decanda (186). In addition to the ‘clean up’(the operation they call Regeneration Improvement Felling) and selective replanting of severely degraded areas (about 50% of the park at outset), the project’s restoration efforts (involving the most suitable mangroves – which mainly include the four main species indicated) also focus on bare land areas (about 20% of the part at outset) where trees have been significantly cut for charcoal burning and ‘full replanting’ required at the rate of about 1500 trees each acre.

The declaration in Worldview documentation that “mangroves have the ability to mitigate up to five times more CO2 than rainforest trees and represents a substantial cooling effect with more than 60,000 BTU units per tree” would seem to be reasonably substantiated by related new and ongoing scientific studies such as those included in the 2014 UNEP report on the ‘carbon blue’ capacities of mangroves. Indeed, the respected head of the climate change cluster at UTS (and scientific member of the International Blue Carbon Initiative) Professor Peter Ralph was quoted in a November 17, 2015 Sydney Morning Herald article (Frew, 2015) as saying that ‘seagrass, mangroves and salt marsh capture carbon up to 40 times faster than forests and [unlike tree carbon which can dissipate quickly] store it for thousands of years’ [our parenthesis]. The conservative projections that each mature tree will have mitigated roughly a ton of CO2 involves the related estimate that about 24% of this is captured by the tree and the rest in the soil. Worldview further projects a ‘conservative estimate’ also of over 2 million tons of CO2 stored in the ground (based on document analyses by Pathein University and Yangon University of 1 meter deep soil tests in the park). Added to the related projection that 2 million maintained trees in the Park will at least generate 2 millions tons of CO2 from the growth of trees, this explains their reasonable projection that the planting of new trees as part of the sustainable rehabilitation project is a process well underway and on schedule to result in an overall figure of 4.3 million tons ‘saved’ by the Park as either mitigated CO2 or avoided emissions.

The related projections of soil carbon (i.e. the Park’s facility as a ‘carbon sink’) have been formally confirmed by a formal study of the Climate Park undertaken by a team of researchers from Panthein University led by the author of the resulting report Dr. Aung (27th April, 2015). His report was based on the reliable testing of 440 averaged samples of the top soil layer (1 metre depth – although soil carbon can, of course, go much deeper) from across the park at the credentialed laboratories of Yangon University. Allowing for some variation ranging from silt to more ‘sandy’ soils, Dr. Aung concluded that the average organic soil carbon in the top soil layer of the 440 samples taken from around the park was 3277 mg/ha. Applied to the Park’s overall area (3277 X 720 ha), this should mean that the Park represents in its top soil layer at least a projected 2,359,440 tons.

In sum, then, we can reasonably verify that the figures provided to us seemed to match what we directly observed on our visit to the park, to be conservative estimates, to be generally consistent with established standards on mangrove forests, and to also translate into the ‘carbon
accounting’ terms outlined above. That is, the projected figure of 2 million trees in the park within the next couple of years linked to the similarly sound projection of 2.3 million tons of CO2 in the soil may be reasonably assumed to represent an overall 4.3 million tons of CO2 within a twenty year lifecycle of the current trees and additional trees to be planted in the project. The current total of mitigated CO2 and emissions avoided on an average annual basis can be reasonably assumed to be currently 160,000 tons per year which will rise to 210,000 per year when re-planting is completed in the next two years. [It perhaps should go without saying, that the current carbon credit market values (i.e. US$4 per ton) are grossly undervalued, and almost certain to rise and very substantially so in the not-to-distant future]

Applying an integrated ‘sustainability evaluation’ methodology to Worldview’s climate park project at Schwethaungyan

Just as a mangrove area is a complex ecosystem, future sustainability requires the kind of natural systems thinking (for complex problem-solving in terms of evaluation as well as design and development) which humans have generally not been good at in the past – but now need to become much better at very quickly (e.g. Richards, 2012, 2014, 2015, in press). The kind of carbon accounting process outlined above might be a necessary foundation but it is not sufficient for any general project or sustainability validation. In other words, as reflected by the often confusing alternation between methodologies of carbon accounting and project validation (e.g. UNEP, 2014), what is actually the most important and critical element of future sustainability (all the various aspects of ‘human development’) tends to be acknowledged as ‘add-ons’ in the forms of additional aspects or itemized lists. This is exemplified by the ever-present possibility (which has been long recognized, but still not adequately accounted for) that projects initiated by external aid agencies will not be sustained unless without sufficient local involvement or ‘buy-in’ and enduring capacity-building (e.g. Easterly, 2007). As the ‘external-local’ partnership at the Thor Heyerdahl Climate Park is substantial as well as exemplary, this is an important key factor of the project which any adequate evaluation needs to explore and not just treat as a taken-for-granted add-on.

The main advantage of an integrated methodology of either evaluation or problem-solving is that it is able to consider the significance of a reasonable central outcome in terms of the most critical factors at play – that is, factors which also traverse distinct but interdependent environmental, social, economic and cultural domains (Richards, 2015). In this way a dual focus might be sustained on how: (a) supporting solutions are discretely needed for each key factors but (b) the real key (i.e. ‘secret’ of genuine sustainability) lies in how they can and should be linked together around a convergent ‘outcomes-based’ strategy or formula. In the case of the Thor Heyerdahl Climate Park, there are a number of distinct critical elements at play (community livelihoods, the threat of charcoal cutters, external ‘land-grabbers’, the local/national/global governmentality links, changing economic and social conditions, new knowledge about the importance and possible benefits of mangroves, etc.) which reinforce how it was never enough for Worldview to simply plan to ‘drop-in’ and just oversee the replanting of mangroves - and then on this basis make some wishful carbon accounting projections and/or plan to move on to the next project.

Or to put this another way, since Worldview has in fact done a very good job also with a range of related factors to try and give the Climate Park the best chance of future sustainability, an appropriate framework (not just a list) was needed to better and more adequately recognize and
evaluate this. This is especially so as an overall process of convergent environmental and community resilience-building (or what Berkes, Colding & Folke, 2003, refer to as ‘social-ecological adaptive learning’) also incorporating changing economic and cultural factors. The overview will summarize the evaluation made on the basis of the integrated framework of analysis applied to the overall project in its local context.

The natural starting point or foundation for the evaluation process is the foundational five year plan formulated by Worldview starting in July, 2012, to rehabilitate and eventually restore the Thor Heyerdahl Climate Park. The basic or central focus of the project, then, was that Worldview would hope to achieve the future sustainability of the Climate Park within five years. After that time the plan seems to be to leave most of the ongoing maintenance of the Park in the hands of Pathein University and the local communities to utilize its capacity development support provided by Worldview for this purpose, with continuous support by Ministry of Environmental Conservation and Forestry in following up Pathein University’s long term responsibility as custodian of the land, and presumably allowing Worldview to transfer its focus and also the local capacity developed to other projects. Perhaps the most neutral of partnerships between the four macro stakeholders (government, business, community and neutral knowledge agencies) (Richards, 2015), the partnership (i.e. NGO-university collaboration) with Pathein University Marine Sciences Department represents several related points of an exemplary model for such external-local project collaborations.

This is especially so in terms of how all such projects should ideally have or rather balance both: (a) an (internal) management strategic commitment to the foundational concerns of restoring and maintaining the Park itself – in this case the main or ultimate responsibility of Pathein University to also represent local interests especially (but also wider national interests as well), and (b) an (external) policy/strategic focus on how, in this case, Worldview has organized and funded a range of activities linked to a central need and concern with sustainable livelihoods/local sustainable development. Firstly, then, the partnership with Pathein University became the key to connecting with the local community. Secondly, it was a boon that Pathein University has become the custodian of the land area involved in the Park and thus project (a model which might be replicated elsewhere). Thirdly, as the partnership developed, a further agreement was made between Pathein University and Worldview for Worldview to hold the marketing rights of carbon sales with 50% of sales surplus to be shared with Pathein University over twenty years of any resulting carbon credit investment. This would allow Worldview to enhance and transfer its capacity to other projects, whilst also ensuring that Pathein University would continue to both benefit from and have further incentive to take responsibility for the ongoing maintenance of the Park and related project outcomes.

The most pressing and central critical factor which threatened the future sustainability of the project was the constant threat of mainly local charcoal gathers and burners. As indicated earlier, the loss of sustainable livelihoods associated with the ongoing devastation of the local mangroves (a negative self-fulfilling prophecy or ‘policy vacuum’ cycle) created a further related negative feedback loop of local people (and some from outside) growing in numbers and determination to cut down the remaining mangroves just to survive. Despite efforts of prescription and despite the increasingly effective initial efforts to engage and ‘educate’ the local community about how their future might be better attached to protecting the mangroves, this was not satisfactorily resolved (we are assured) until an agreement of community-based consultation was achieved in early 2015. This agreement was the key then to overcoming or removing the key obstacle to the project development.
The agreement also represented a breakthrough in efforts to convince the local community that a restored park could become a self-evident basis for direct or immediately sustainable community livelihoods. In this project, this also involved becoming re-familiarised with (or re-learning) the direct commercial opportunities of mangroves for sustainable products (honey, natural sweeteners, medicinal plants, recovered fisheries, and so on) as well as the opportunities for new services (paid work assisting in the park, out-sourced services with growing and planting new mangrove plants, and other roles assisting with ‘secondary’ project benefits such as the Park nursery, day care center, and funded research). With the growing interest in natural sweeteners sold in health stores around the world, for example, we saw how the nypa palm sweetener seems to be currently an underestimated opportunity (this and how it is reported to yield 50% more sugar per hectare than sugar cane). Additionally, Worldview have assisted local communities to wean themselves off charcoal by helping to make available solar lamps and fuel saving stoves.

Viewed in these terms, the Thor Heyerdahl Climate Park might be better appreciated as an instance and also model of how to transform a negative self-fulfilling prophecy of seeming inevitable environmental devastation and community despair into a positive cycle with real hope for positive change and transferable outcomes. There is every chance that local members who have learning new skills and capacities to assist with mangrove rehabilitation in nearby areas and related projects can continue to directly make a livelihood from this. This is epitomized by a trial project in the nearby Kan Su village where in one year villagers produced 36,000 seedlings in their own nursery – sharing 50% of these for local re-planting with the next village. Worldview have reported on how the average costs in re-planting mangroves has been brought down to less than one US dollar per tree (including cost of livelihood and other support to local communities) – with 1500 trees per acre in the replanting of empty areas equating to not more than US$1500 per acre. This local capacity development involving the local community and collaboratively coordinated by Worldview and Pathein University’s Marine Science Department should be recognized as a potentially valuable resource in any additional future mangrove restoration projects across Myanmar as well as the surrounding local areas.

The collaborations on a gene bank (for the local 65 of the total 68 known species of mangrove plants) and local Park nursery for new mangrove plants also exemplify the value of such capacities. That is, capacities to support sustainable livelihoods in terms of the very possible and even increasingly likely further mangrove projects along the coastline of Myanmar – especially in the coastal areas of Rakhine state to the North-East of the local Ayerwaddy Delta areas. This will then reinforce the related importance of knowledge about endangered birds (and other wildlife), local biodiversity, and especially the disappearing medicinal plants which may prove to have important and valuable benefits. Perhaps most importantly for the area, local communities are having to re-learn not just the importance but also specific techniques to re-establish mangrove areas as protection for local communities against the growing threats of severe storms and tidal surges.

An important but typically underestimated aspect of this project is that it is helping with capacity development for the Pathein University in particular, but also some other local universities. This is in the context that under the previous regime Universities not only received little funding but were somewhat closed off from international networks of knowledge-sharing and research collaboration. The projected future funding benefits to Pathein University (which could prove to be substantial) were indicated. A more immediate direct benefit is that Worldview has sponsored the funding of 47 academic and postgraduate university researchers.
We have been informed that this has already resulted in over 32 published papers on flora and fauna, water, and soil either directly or indirectly related to the activities of mangrove rehabilitation. Again, this is productive capacity-building which might assist with more and better opportunities at every level for project collaboration and knowledge-sharing in the future. Universities also exemplify the wider local capacities for social learning with and for improved knowledge (i.e. positive and constructive change) which ultimately is linked to the convergent resilience-building of the environment and community or wider society (i.e. social-ecological adaptive learning). Indeed, Worldview have emphasized the importance of public education from the start in their planning and development.

Constructive capacity-building in terms of partnerships with and between local communities and knowledge agencies such as Pathein University can also not be under-estimated as a critical force in terms of more ‘macro’ (i.e. economic/commercial and political) and domains of future development (Richards & Yeo, 2014). This might apply across local, regional, national, and also international levels – all of which will inevitably impinge on the future of this or any other similar project. Around the Schwethaungyan area there are miles of beautiful empty beaches which ‘well-connected’ business figures under the old regime have already laid claim to with a view to new tourist centres with large resort, hotel and related infrastructural development – with at least some of these claims examples of the ‘land-grabbing’ referred to by Maung (2015a,b). In the near future there is likely to be some ongoing contention and uncertainty about general claims to land ‘ownership’ in this and other areas of Myanmar where many local communities with traditional claims to land ownership are concerned. However, what can be reasonably assumed in this and surrounding regions involving mangroves is that those local communities who seek to take control of their own future and ‘self-sufficiency economy’ (as it is called in Thailand) will be much more likely to protect their own future as well as that of the local mangrove forests. Beyond this, a related solution (which the new government will need to look at and hopefully embrace) is the establishment of protected national parks along the most appropriate sections of its coastline – initiatives which, of course, will still require the kind of local partnerships and modes of sustainable livelihoods applied in the Worldview project. The government might benefit from consultation with and even direct assistance from not just NGOs such as Worldview but the emerging global networks supported by UNEP, CIFOR and others – for instance, the new International Partnership for Blue Carbon formed in the backdrop of the Paris Climate Summit (http://www.landscapes.org/australia-indonesia-costa-rica-establish-international-partnership-blue-carbon-2015-global-landscapes-forum/).

Worldview’s main local partner Pathein University is also in an ideal position to extend its local custodian role at Schwethaungyan to take an exemplary leadership role in reconciling the imperatives and interests of both local communities and national governments (who in turn will be keen for ‘win-win’ models of how best to balance the competing interests of local conservation and commercial development). With the first of the nearby hotel resorts currently under construction (and a new road on the way as well) Schwethaungyan is an ideal location and facility for an ecotourism promotion of the benefits of mangrove preservation. Frew (2015) has summarized how the pioneering mangrove rehabilitation initiative of Worldview has a good chance in the near future of making it much easier for local, regional and national governments to go for the ‘win-win’ option (not the non-sustainable option): “Blue carbon accounting could, for example, help a developing nation weigh up the value of ”selling” its restored mangrove habitats to a voluntary carbon market versus clearing them to establish shrimp farms or palm oil plantations.” This, then, may well be the most valuable outcome of all of the Thor Heyerdahl Climate Park project.
But things may even turn out to be better than that. A 2011 Intergovernmental Panel on Climate Change group estimated that Myanmar still has the opportunity to restore around 50% of the roughly million hectares of mangroves lost since 1980. The potential to rehabilitate and restore 500,000 hectares of mangrove forests represents a related opportunity to potentially mitigate 500 million tons of CO2. With the new understanding of the exemplary role and great value of blue carbon at an opportune time, there is every chance that potential investors from OECD countries (whether through the REDD+ mechanism or beyond this to voluntary carbon markets) especially will not stop at merely looking at an investment opportunity to preserve existing mangrove areas in Myanmar (and elsewhere) but seek to make use of the local capacity as well as model developed at Schwethaungyan.

Conclusion

This report has summarized the validation investigation conducted in relation to the immediate project outcomes and future sustainability of Worldview’s first Climate Park in Myanmar. We hereby verify that per November 2015 the figures below reasonably accord with our direct efforts of first-hand inspection:

1. Worldview has planted 530,000 new trees since 2013 (average age 1.3 years), of which 490,000 are in healthy growth according to latest count,
2. 570,000 existing trees in healthy growth (the project’s baseline scenario) rescued from their apparent fate (average age with new growth 3.4 years).
3. 1,060 mangrove trees in healthy growth in the park of assorted sizes.
4. 200,000 new mangrove plants in the nursery ready for planting early 2016.
5. 2,359,440 tons in the ground (3277 tons average per Ha x 720 ha), based on 1 meter deep soil tests by Yangon University and Pathein University to be saved with new plants on top of the soil to avoid oxidation (preventing/avoiding emission of CO2).
6. Currently biomass mitigation plus emissions avoided can be reasonably assumed over the next 20 years to be currently an average annual 160,000 rising to 210,000 tons of CO2 when the current re-planting program is completed.

The first section investigated and found to be very reasonably a conservative estimate of the foundational carbon accounting projections of an overall four million tons of CO2 value to be maintained and also achieved in the project up to its final planting stage by 2017 – that is, 2 million existing and new trees within the next couple of years (representing 2 million tons of sequestered CO2) plus an additional conservative estimate of at least 2 million tons of CO2 in the soil which the project (if maintained) will be preserved as avoided emissions.

The second section used an integrated methodology to more systematically recognise the achievement of Worldview and its local partners to ground the project in sustainable local capacity development as well as sustainable livelihoods. In particular this involved the exemplary and noteworthy achievement of assisting the local community to change from a negative relationship towards its mangroves (guaranteed to destroy the remaining mangroves as well as release substantial carbon emissions and simultaneously condemn the future of the community as well) towards a more positive and hopeful new relationship which has every chance of success because of the local partnerships and capacity-building. In sum, then, the project is so far proving to be a substantial success with more than adequate reason for any observer or potential investor to have confidence in both (a) the Thor Heyerdahl Climate Park
itself, and (b) in the transfer of this capacity to other efforts in surrounding areas of Myanmar to continue the important work of further preservation and rehabilitation of the blue carbon possibilities of other similar mangrove areas in the future.

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