

The second year of the Laidlaw scholarship programme sees students funded to undertake a summer placement abroad, working with local communities and organisations to advance sustainable development, with a particular focus on the United Nations' seventeen Sustainable Development Goals (SDGs). For my project, I spent six weeks with the Madagascar Research and Conservation Institute (MRCI), an NGO located in Nosy Komba, Madagascar, assisting with their marine conservation programme. This report details my experiences, with the aim of analysing the societal impact of my work with MRCI, as well to evaluate the extent to which I developed and deployed ethical leadership skills.

Nosy Komba, which translates to 'Island of Lemurs', is a small volcanic island within the Diana region of Northern Madagascar. The island is heavily forested and exceptionally biodiverse, especially known for its range of birds, reptiles, amphibians, and lemurs. It is also known for its neighbouring coral reefs, the most biodiverse to be found anywhere outside of Indonesia, which are home to a wide array of tropical reef fish, but are especially important habitats for threatened and endangered sea turtles, most notably leatherbacks and hawksbill sea turtles. This biodiversity is also crucial to the lives and livelihoods of Nosy Komba's ~6000 inhabitants, who depend on the reefs directly for subsistence fishing, as well as indirectly in the form of tourism. Indeed, the economy of the island is entirely dependent on tourists (mostly on day trips from the neighbouring island of Nosy Be) money in hotels, bars, restaurants, and handicraft souvenir shops. However, these reefs are under threat from such fishing and dive tourism activities, not to mention rising sea temperatures as a result of global warming. While many of the reefs around Nosy Komba are at present in remarkably good health, this should encourage us to act swiftly to protect them, before they suffer the same catastrophic damage from global warming, over-fishing, and over-tourism as many reefs in Oceania and Southeast Asia.

Since its establishment in 2013, MRCI has undertaken a range of ongoing projects which aim to advance a broad range of sustainable development goals, including marine and turtle conservation, terrestrial wildlife conservation, English teaching, and community infrastructure projects such as schools, roads, and a community basketball court. MRCI is a small organisation (approx. 30 permanent staff) with very limited resources – local funding for non-profit sustainable development projects is virtually non-existent – as a result, MRCI is entirely funded by volunteers (fees for volunteers start at USD\$720 per week). While much of this money is needed for overheads (food, accommodation, and the salaries of the permanent staff), a significant portion is dedicated to the projects themselves: diving equipment, research equipment, education materials, and building supplies for use by volunteers, as well as funding for projects with no direct volunteer involvement, such as schools and medical centres further afield in mainland Madagascar. While the paying-volunteer model is successful in generating a supply of both income and manpower (both of which can be hard to come by in the third sector), it does have some inherent limitations, chiefly that MRCI and similar organisations are incentivised to maintain their income stream

and labour force by providing a 'volunteer experience' that can be advertised to new volunteers. This can easily compromise the value of the work done by volunteers, and can unfortunately even result in decisions being made which are actively harmful to the local environment – such incentives can (and often do) cause an organisation to slide into 'voluntourism', where the enjoyment of the 'customer-volunteer' is prioritised to such an extent that the programme ceases to contribute to sustainable development in any meaningful way. While I would not go nearly so far as to place MRCI in that category, the tension between volunteering-as-sustainable-development and volunteering-as-product did generate obstacles to positive impact. Fortunately, during my six weeks there, I initiated and supported numerous efforts to address this tension and ensure that the organisation's focus remained on positive local impact, some of which are detailed further in this report.

With the necessary background complete, my LiA project in marine conservation can be put into context. The primary aim of MRCI's marine conservation programme, of which I was part, is to monitor and improve the health of the coral reef on the North coast of Nosy Komba. There were several different kinds of biodiversity survey carried out:

1. Fish identification survey. A 50-metre transect tape is laid out on the reef, and a pair of divers traverse its length and record how many fish they can identify, from a list of families which are considered to be indicative to reef health.
2. Butterflyfish identification survey. Identical to the general Fish ID survey, except only butterflyfish species are recorded. However, species-level data is recorded.
3. Substrate survey. The same 50m transect is used; at one-metre increments, the makeup of the sea floor (sand, coral, seagrass, turf algae, etc.) is recorded. If the substrate is a hard coral, its growth form and degree of bleaching is recorded also.
4. Coral Watch survey. No transect is used, instead a roving diver counts fin kicks, and records the colour of coral at regular intervals for five minutes.

When executed successfully, these four surveys should provide a wealth of biodiversity data to track reef health. However, this was difficult in practice due to the complexity of the five different methods to be learnt – the substrate, fish, and butterfly fish tests are require substantial training, taking the average volunteer two weeks to become sufficiently familiar with native fish families, butterflyfish species, and coral growth forms, and a further week of practicing survey techniques *in situ* on the reef, before their data is of a useable quality. As most diving volunteers stayed for four weeks, this means that each diver could reasonably expect to collect one week's worth of useable data. While inefficient, this would not be disastrous on its own, however the data that was collected was often recorded to databases haphazardly or not at all, with inconsistencies in data presentation making it difficult to compare on survey to the next. In fact, this problem is shared between all the conservation programmes at MRCI: it is apparent that biodiversity data was often collected for its own sake, or because *that is what volunteers have paid to come and do*, rather than as part of any specific experiment or scientific test, causing the rapid accumulation of un-publishable

data. While this paints a bleak picture, I was fortunate enough that during my time there, MRCI hired its first full-time biodiversity research and data handling specialist, as well as a separate full-time coral reef restoration and reef monitoring specialist. I had the privilege of being part of the handover between the previous marine manager (who had the unenviable task of leading reef restoration, surveying, on top of full-time diver training) and the new marine team, and was able to help identify some of the key areas for improvement going forward, especially simplifying the survey process to reduce training time and allow for the collection of consistent, high quality biodiversity data from which to create an informative profile of the reef over time.

Unfortunately, while undertaking my own dive training, I suffered an ankle injury which meant I could not participate meaningfully in the marine conservation programme for two of my six weeks and was bound to remain at the MRCI camp. It was at this time that I became aware of the 'ecobricks' initiative, often carried out by the forest conservation volunteers in-between surveys. These 'bricks' are constructed by the compaction of polymer waste (typically collected from beach cleans or plastic waste generated by volunteers) within PET drinks bottles, which are then intended to be used as building materials as a plastic sequestration strategy. However, these eco-bricks have poor mechanical properties and do not bond well to concrete and as a result find little use in Nosy Komba. In fact, I was dismayed to learn that these unused ecobricks accumulated so quickly that MRCI staff would burn them for disposal, as they would accumulate pests. At that point, I resolved to apply my materials science studies to create better ecobricks which can be used in the building of permanent structures.– they would have to be strong, to stack efficiently, and to sequester as much plastic waste as possible. The prototype bricks I developed are concrete-based, using shredded PET plastic bottles as a crack-bridging reinforcement aggregate. I was able to produce five proof-of-concept concrete-polymer bricks which could survive a vertical drop of four feet (similar to red clay bricks in the UK). I was also able to recycle old PVC scuba snorkels with concrete to form underwater weights which could be tied to transect lines. I was struck by how keen to help so many of the other volunteers were, how they too were feeling frustrated at the thought that their efforts at data collection and polymer recycling may have been futile, and how eager they were for me to continue my prototyping even after I have left Nosy Komba.

Although I arrived at MRCI expecting to be able to include many 'quick wins' for coral reef conservation in this report, I feel I have gained a valuable insight into the organisational challenges of sustainable development in one of the most deprived areas of the world, and a better understanding of the ways in which incentives which run counter to the aims of sustainable development can be identified and worked against. Most importantly, I have learnt that even organisations with the best of intentions can fall prey to such incentives, and in order to effect positive change, it is necessary to continuously interrogate our own methods and the reasons behind them, lest we confuse *the appearance* of sustainability with the genuine article.

This experience has developed my understanding of ethical leadership in many ways. For one, it has highlighted the importance of taking time to understand and question established practices within an organisation – not from a place of cynicism or disdain, but to foster a community which is continuously seeking to improve itself, coming closer to a sustainable future every day. It is especially important that the decision-making process is transparent and accountable, to prevent the spread of cynicism and mutual distrust. It is also valuable to ensure that all members of a team or project are made to feel invested in the outcome, and that their contribution matters – for instance, if volunteers are made to feel like tourists, they will become dissuaded of the potential significance their efforts could have. It is cliché by now for those writing about leadership to emphasise that every team member has an opportunity to feel ‘valued’ or ‘heard’. However, the importance cannot truly be overstated: an organisation which does not secure the confidence of its rank-and-file will instead breed apathy or even despair, and undermine the desire to effect positive change that brought them to you in the beginning.