

## Final Project Evaluation Report

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| Your Details        |                                                                                                                                                              |
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| Full Name           | Christopher Kiprotich Chesire                                                                                                                                |
| Project Title       | Regeneration potential of Kenya's Afromontane forests, their resilience amid high anthropogenic pressure and possible options for silvicultural intervention |
| Application ID      | 24368-1                                                                                                                                                      |
| Grant Amount        | £3314                                                                                                                                                        |
| Email Address       | chesire.chris@yahoo.com                                                                                                                                      |
| Date of this Report | 07/01/2019                                                                                                                                                   |

**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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Evaluate structural characteristics and regeneration patterns displayed by various tree species in four forests                                                                           |              |                    |                | Five forests (one additional) were evaluated. A total of 132 tree species belonging to 55 families and 107 genera were evaluated for their significance in the various forests.                                                                                                                                                                                                                                                                                                                 |
| Describe/ expose regeneration status and gauge the resilience of the most valuable trees that are widely exploited to understand whether they can overcome existing utilization pressure. |              |                    |                | Using an ecological indicator known as importance value index (IVI), all trees were ranked based on their role in shaping the forest formation. Additionally, value categorisation of trees was done based on ready information and observed usage in the field thereafter checked if among the most important trees of the ecosystem. Their population distribution, regeneration status and transition patterns were used to tell of their resilience.                                        |
| To analyse and compare floristic and structural attributes on four forests                                                                                                                |              |                    |                | Five forests were analysed and various descriptive parameters were documented, including diversity, inter and intra site similarities, density, spatial distribution of species, basal areas, height and canopy description and population structures among others.                                                                                                                                                                                                                             |
| To suggest on the possible silvicultural interventions necessary to promote conservation especially of the most vulnerable species                                                        |              |                    |                | Following various analysis and field observations, some species were noted to be facing threats that may alter future structural composition of the forests and that may also cause population reduction or worse, local extermination of some species. Several recommendations were written for management action. However, at the moment, one on one discussion or feedback of these recommendations with the forest authorities has not taken place. It would be nice to know their position |

|                                                           |  |  |  |                                                                                                                                                                          |
|-----------------------------------------------------------|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           |  |  |  | on these issues so that all inclusive implementation, further clarifications, modification of action plans, budgetary implications among other issues can be dealt with. |
| To generate species checklist of the four forests         |  |  |  | Species lists of higher plants of five forests was generated for the purpose of common knowledge, future reference in research and for management actions.               |
| To utilize the project for completion of a masters course |  |  |  | Data acquired in the project was used to write a thesis which was successfully defended for the award of M.Sc. in Tropical Forestry                                      |

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

The fieldwork duration coincided with the annual rainfall peak. This caused major disruption of field schedules since strong thunderstorm events occurred almost every afternoon of the entire sampling period. To tackle this difficulty, my team had to start work very early in the morning, which is rather uncomfortable, especially when a team member needed to first attend to household matters. Even so, sampling had to be quickly done and extra care had to be ensured to avoid compromise to the quality of data.

Being a rainy season, some forest roads were impassable due to mud or landslides. This was dealt with by either abandoning the vehicle to walk more or choosing alternative routes which were in most cases longer.

Due to limited funding, the fieldwork activity of this project only worked with single community forest association (CFA) member per day (or in each forest). This was a challenge in two ways. Firstly, this in itself was a limitation to learning experience for more CFA members on forest inventory and monitoring techniques. This hindered to a large extent the intended capacity building. At times, I encouraged community members to volunteer but only a handful agreed. Even in such cases, the available allowance for the day was shared. Secondly, it created a state of mistrust in a small section of the community members who thought that the project would employ more field assistants. In this case I had to constantly explain the scale of project and its limited funds, especially that it was a for a studentship research. This engagement was time consuming though.

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

- a) Valuable data on the regeneration status and population structures of trees was generated and will be very useful in management decisions on conservation approaches for the individual forests, especially for the most important trees that have high economical value attached but face serious

anthropogenic threats. The data will be useful reference when updating the Kenya Forest Service (KFS) forest management plan.

- b) Early detections of some improper trends in regeneration and transitional growth that are attributed to past and existing harvesting regimes. Accompanying recommendations are vital for restoration of affected species and habitats. One example is the finding that among the most important tree species, various species face selective harvesting that target individuals of young to mid-size diameter trees. The recommendations here include sensitisation that discourage consumptive utilisation of younger stems, species-targeted protection, assisted regeneration and enrichment planting, among others. The second example is the realisation of catastrophic decline in population of Kenya's lone indigenous bamboo in their native ranges in three sampled forests and particularly in Kaptagat and Lembus forests. The recommendation here is immediate assisted regeneration and protection. The third example is the realisation that there is poor progression of seedlings in to saplings due to high level of grazing. In this case so as to prevent future imbalances, it was recommended that grazing management be implemented through various suggested ways such as zonation, etc.
- c) Built an important working relationship with the Kenya Forest Service (KFS), in whose jurisdiction lie the five forests sampled. This partnership extends to the local community forest associations (CFAs), whereby a number of its members had the opportunity to participate in the project as assistants. In the process, the CFA members learnt some important forest evaluation and monitoring techniques as well as important multi-directional learning regarding general conservation and forest utilisation. This partnership and capacity building are key in forest conservation and promote ease in future collaboration.

#### **4. Briefly describe the involvement of local communities and how they have benefited from the project.**

Community members that live adjacent to the forests are important stakeholders being direct and indirect beneficiaries of the forest. Most members obtain wood and non-wood forest products (NWFP) from the neighbouring forests but in many cases, over-exploitation is resultant. Forest exploitation is majorly due to genuine timber and grazing needs from the community and their involvement is important to manage it. This project involved members of the CFAs to obtain important information on forest utilisation and as assistants during the fieldwork. In the forest, there was mutual learning on the importance of various tree species and conservation in general as well as training of forest assistants drawn from the CFA on forest assessment and monitoring techniques. These members therefore have the capacity to independently make forest evaluation in the future. Important outcomes such as species checklist and their distribution can be utilised at community level, for instance regarding medicinal and culturally important species.

With conservation efforts that may follow the outcomes of this project, the most direct beneficiaries will be the community due to various tangible and intangible

aspects such as watershed protection, increased forest productivity, reduced erosion, ecotourism etc. The project also evaluated the possibility of sustainable forest management (SFM) whose adoption will promote prioritized benefit for the community forest associations (CFAs).

#### **5. Are there any plans to continue this work?**

Following key findings from this project, I am passionate to participate in the implementation of several recommended conservation measures. Key of them all, populations of Kenya's only bamboo species was noted to be declining at an alarming rate, especially in Kaptagat and Lembus forests. The project recommends assisted regeneration and directed protection for enhanced survival of this species. In this regard, there are plans to seek participation in restoration of the indigenous bamboo in these forests. In the near future, stakeholders such as the forest service, county governments, conservation organisations and the community forest associations will be engaged to embark on this course. Where necessary, funding organisations will be approached for needed support. Conservation education is important to ensure maximum protection of the forests. This project engaged a lesser number of community members since it was majorly basic research and capacity building at a low scale. Next activity targets more of tangible activities such as propagation of threatened species as found out in this project and widespread conservation programmes targeted at a larger proportion of the community members. I am also keen to participate in the conservation of key species whose population structures as was found out, predicted future deficiencies that may affect their future survival.

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

A bulk of findings from this project work is documented in a master thesis. Very soon, the thesis will be available online but currently, it has been shared with conservators whose forest stations hosted the research, i.e. Lembus, Kaptagat, Eastern Mau, North Nandi and South Nandi. Additionally, a short report is available online on Rufford Foundation website. A talk about this project was also presented to over 300 delegates at Rufford Small Grants Conference in Nairobi on December 1st 2018. Furthermore, abstracts to present in forthcoming conferences such as IUFRO 2019 in Brazil shall be submitted for consideration. At ground level, posters for public display shall be forwarded to Forest Managers of the respective forest stations.

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

The major part of the project that required funding was the 1<sup>st</sup> month, whereby field sampling was planned. Here, hired transport, car fuel, lodging, consumables, paid assistants and daily meals was needed. The Rufford grant was utilised in the first one and a half months of the project contrary to the proposed 27 days. The period was elongated due to additional sampling done, harsh weather and other logistical challenges that necessitated breaks in between.

**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                                                                                                               |
|-----------------------------------|-----------------|---------------|------------|------------------------------------------------------------------------------------------------------------------------|
| Personnel                         | 1615            | 1714          | -99        | Actual amount higher due to extended sampling to include an extra forest.                                              |
| Small equipment                   |                 |               |            | External funding of 1100 sought. Not successful                                                                        |
| Airfare                           |                 |               |            | External funding of 530 Euros sought. Flight funded for 562 Euros                                                      |
| Sundries                          | 37              | 7             | 30         | Only phone communication was needed as extra item                                                                      |
| Stationery & consumables supply   | 29              | 15            | 14         | Used amount was enough                                                                                                 |
| Fuel and car service              | 324             | 292           | 32         |                                                                                                                        |
| Car hire                          | 800             | 984           | -184       | Cost was higher due to extended sampling duration. Cost was negotiated to avoid further cost                           |
| Subsistence: accommodation & fuel | 509             | 355           | 154        | Cost was affordable than budgeted                                                                                      |
| <b>Total</b>                      | <b>3314</b>     | <b>3367</b>   | <b>-53</b> | Exchange rate on day of funds transfer: <b>£ 1 = KES 134.2</b> . Exchange rate variations minimally affected all items |

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

- Promoting conservation aimed at boosting populations and restoring desirable structures of important tree species that are currently facing threats because of excessive utilisation.
- Restoration of native bamboo habitats especially in Eastern Mau, Lembus and Kaptagat forests, with prioritisation of the latter two. Assisted regeneration and habitat protection is advised.
- All inclusive planning and implementation of actions that would reduce excessive utilisation of the forest resources. This includes minimal overgrazing and avoidance of excessive harvesting of young stems. Others include enrichment planting,

- Encouragement and facilitation that targets establishment of household woodlots (of mainly valuable timber species) to minimise pressure on forests in the future.

**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 Foundation was used in two public presentations- thesis defence at TU Dresden, Germany and at Rufford Small Grants Conference at National Museums of Kenya, Nairobi. The logo was also used in a summarised report about the project. Furthermore, Rufford Foundation is duly acknowledged in my master's thesis.

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

**Christopher Chesire** - Project Coordinator. In charge of planning and execution of project field activities, budgeting, data collection and reporting.

**Prof. Dr. Sven Wagner** – Chair and Professor of forest silviculture, Dresden University of Technology. Advisor on data collection and analytical methods. Academic supervisor.

**Dr. Mary Nyawira** – Head of Ecology section (Botany) and Senior Research Scientist at National Museums of Kenya (NMK). Advisor on fieldwork logistics and procedures. Second supervisor.

**Mr. Mwadime Nyange** – Plant Taxonomy Technologist from National Museums of Kenya. Assisted in data collection and plant identification.

**Eight field assistants** and volunteers (in different forests) - Data collection, local guiding, information sharing

**Ten KFS personnel** (Conservators, forest managers and forest rangers) - Permission to work within their jurisdiction, offer of valuable information about the forests e.g. maps, guiding through forests.





Cheplunguch wetland, North Nandi





Old stems as habitats for other forms of biodiversity





Canopy opening caused by naturally falling or cut trees





Occasional forest glades offer grazing opportunities



A glade in the forest





Thicket of Trichocladus trees, possibly colonizing spot of past harvesting of Cedar and Olive trees





Harvesting of a young stem of Cedar tree





Eroded forest path





Recording of plants





The look at a forest section





Farming at a forest edge





Landslide blockage enroute to a forest site



Nursery of indigenous trees