Final Evaluation Report

Your Details	
Full Name	Mataba Bulugu Lisesi
Project Title	Safeguarding the Critically Endangered Tiny Squeaker frog (*Arthroleptis kidogo*) in Mkingu Nature Forest Reserve, Tanzania.
Application ID	43360 - 1
Date of this Report	27th July 2025

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
To determine population size and distribution of *Arthroleptis kidogo* in Mkingu Nature Forest Reserve			√	Initially, we planned to use the mark-recapture technique, but due to the very small size of the frog, this approach was deemed impractical and potentially harmful. We therefore adopted occupancy-based surveys using presence and absence data, recorded through visual encounter and opportunistic searches. Surveys were systematically conducted across 4 sub-sites sites, each 2 containing sampling point (totaling 8 sub-sites). Within each sub-site, 15 transects (100 m × 2 m) were established, giving a total of 120 transects across the study area. Our original design proposed 12 sub-sites (10 transects each), but we adjusted the layout to maintain the intended 120 transects while improving coverage and accessibility in steep terrain. During the surveys, we recorded a total of (23) individuals of *Arthroleptis kidogo*, along with (36) individuals of *A. fichika* and (31) individuals of *A. affinis*. The presence of these co-occurring species provides valuable ecological context and comparative data for habitat characterization. **NOTE: *Arthroleptis kidogo* was recorded in two sub-sites only.** Key environmental variables (including temperature, humidity, canopy cover, leaf litter depth, elevation, and GPS coordinates) were recorded at every transect. Preliminary analysis indicates that *A. kidogo* occupancy is closely associated with high canopy density, deep leaf litter, and moist microhabitats.

				A preliminary distribution map generation is in progress using ArcGIS Pro (Fig. 1, see the progress so far), visualizing occupancy points across the 8 surveyed sub-sites. Further spatial modeling of habitat suitability is ongoing. **Next step**: Complete the data analysis and produce a manuscript and final report elaborating the abundance and distribution of *Arthroleptis kidogo* in Mkingu Nature Forest Reserve, to be submitted for publication and shared with conservation stakeholders by December 2025.

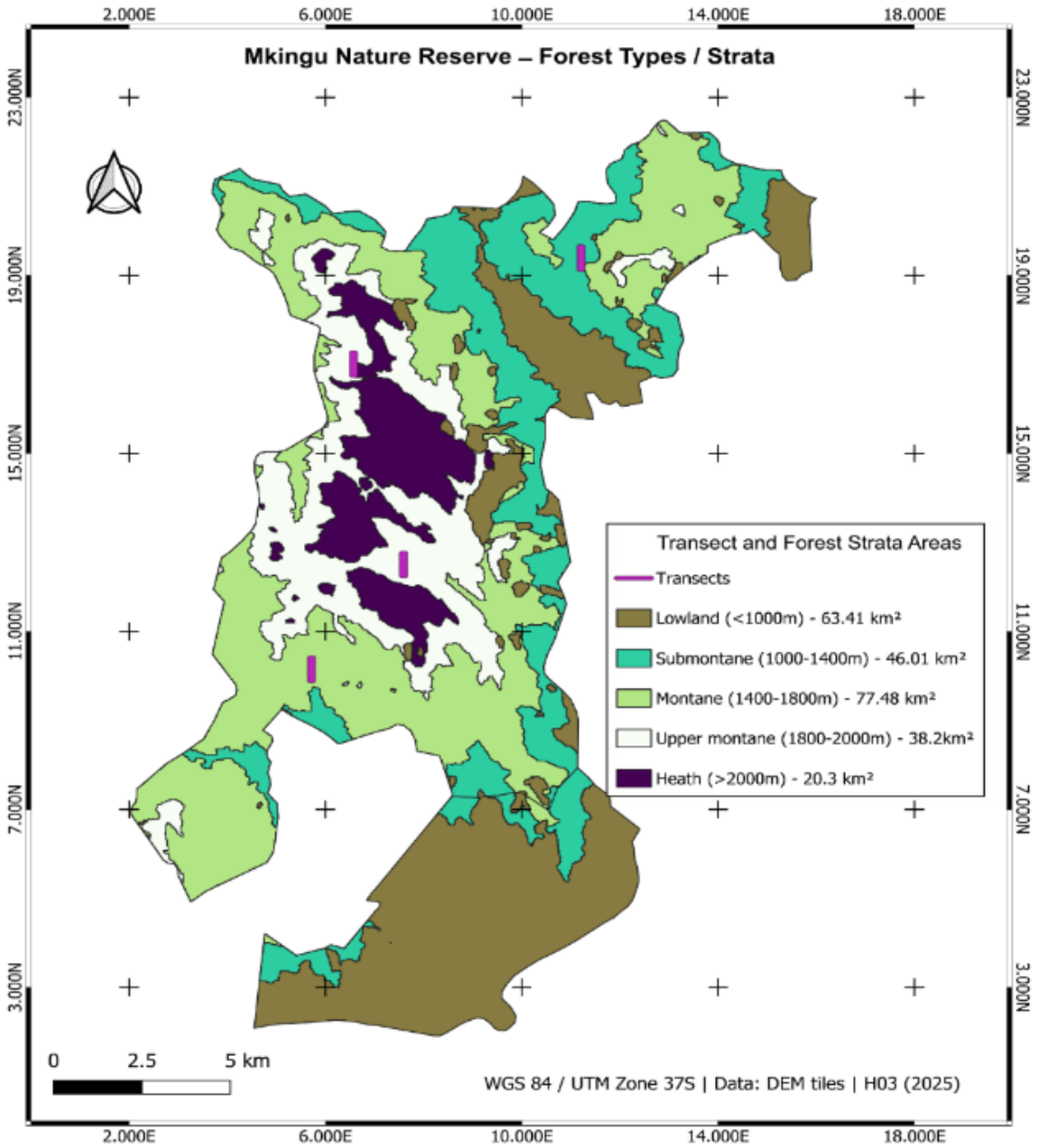

Figure 1. Elevation-based stratification of forest habitats in Mkingu Nature Reserve (245 km²), Nguru Mountains, Tanzania. Strata boundaries and transect locations are shown.

To improve current understanding on habitat preference that determines the distribution of *Arthroleptis kidogo* in Mkingu nature forest reserve.			√	Environmental and microhabitat data were collected at each transect and frog encounter location. Data included canopy cover, leaf litter depth, temperature, humidity, elevation, GPS coordinates, and proximity to human disturbance. Results showed that *Arthroleptis kidogo* strongly prefers high humidity, deep leaf litter, and shaded forest understorey with minimal disturbance. These findings are now guiding habitat protection priorities and future restoration planning within Mkingu Nature Forest Reserve. A threat assessment was fully integrated into the ecological surveys. All visible threats encountered along transects were systematically recorded, geo-referenced, and photographed (as shown in Fig. 4 and 5). The main threats documented inside the reserve included active agricultural farms, pit-sawing activities, and charcoal burning, all of which directly lead to forest degradation, leaf litter removal, and habitat fragmentation. These activities were particularly concentrated inside the forest along access routes used by local communities. The spatial distribution of these threats is being incorporated into our final GIS maps to identify high-risk zones for *A. kidogo* conservation. **Next step**: The ecological and threat assessment results will be fully synthesized in the final report and scientific manuscript detailing the abundance, habitat preference, threat distribution, and conservation implications for *Arthroleptis kidogo* in Mkingu Nature Forest Reserve.
To decrease the willingness of 1000 farmers to engage in activities that threaten the survival of the target species by 50% through behaviour change campaigns.		√		We reached over 1,000 community members adjacent to the forest reserve, including smallholder farmers, charcoal producers, pit-saw operators, teachers, primary and secondary school pupils, village leaders, and youth groups, through a combination of school talks, village meetings, and leaflet distribution. In total, we conducted (5) school-based conservation talks in five, 11 small groups discussion with locals farmers and 2 village environmental committee meetings across three targeted villages surrounding Mkingu Nature Forest Reserve. We also printed and distributed approximately 400 Swahili conservation leaflets directly to households, schools, and village offices. Structured interviews with 240 villagers conducted before and after the awareness campaign showed a clear improvement in knowledge and attitudes toward the conservation importance of *Arthroleptis kidogo*. Based on self-reported responses and field observations, the willingness to engage in destructive activities (such as forest

				clearing, charcoal burning, and pit-sawing) declined by approximately 15%, short of the original 50% target. The slower rate of behaviour change was mainly due to the absence of immediate, reliable alternative livelihood options for households dependent on forest-based income. During a recent follow-up visit, we observed that some former farms had been replanted again, indicating continued pressure on the forest despite improved awareness. **Next step**: In the second phase, we will introduce and scale up alternative livelihood interventions, including beekeeping, agroforestry, eco-friendly farming, and sustainable land-use practices, based on community preferences and feasibility, to support long-term and measurable behaviour change.
To enhance in-country capacity to protect the *A.kidogo*		√		Four local youth were hired and trained as field assistants on amphibian ecology, survey techniques, and conservation practices. In addition, six university students participated in workshops on amphibian research methods, data collection, and conservation principles. An ecology field course was not formally organized as a standalone certified course; however, practical field-based training was fully integrated into the project through hands-on participation in frog surveys, habitat assessments, and threat documentation within Mkingu Nature Forest Reserve. At this stage, the trained local youth were not formally registered as local forest guides, as this requires a separate legal process under the relevant national authorities. However, the project team has formally recommended these trainees to village leadership and the forest reserve management as skilled local conservation assistants eligible for future employment in research, monitoring, and guiding activities. Due to budget constraints, fewer university students were involved in direct fieldwork than initially anticipated. Nevertheless, university-based workshops, mentorship, and data interpretation sessions ensured that knowledge was effectively transferred, and capacity enhanced locally. **Next step**: To build on this initial success, we plan to expand training opportunities to include more local participants and university students. Our goal is to conduct structured on-site training at the Mkingu Nature Forest Reserve for both groups,

				ensuring sustained practical field exposure and strengthening long-term conservation capacity.

2. Describe the three most important outcomes of your project.

a) Improved ecological knowledge of *Arthroleptis kidogo.*

This project generated the first baseline data on the occurrence and habitat associations of the Critically Endangered *A. kidogo* in Mkingu Nature Forest Reserve. Through occupancy surveys, we identified priority areas for conservation based on environmental predictors, such as leaf litter depth, canopy cover, and humidity.

b) Strengthened local capacity for conservation action.

We trained four local youths from nearby villages and six students from the University of Dar es Salaam on amphibian ecology, habitat data collection, and conservation methods. This created a local resource base for ongoing and future monitoring efforts, particularly among underrepresented youth.

c) Increased community engagement and awareness.

We reached more than 1,000 community members through targeted education efforts using Swahili-language materials, village meetings, and stakeholder dialogues. As a result, community attitudes toward the conservation of *A. kidogo* became more supportive. This lays the foundation for integrating community-based monitoring and sustainable resource use in future phases.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

a) Difficulty using capture-mark recapture method to collect *A. kidogo* population data: Our original plan to estimate population size using mark-recapture proved unfeasible due to the frog's extremely small size and high handling sensitivity. To prevent injury or stress, we switched to presence-absence surveys using occupancy modelling, which still yielded useful insights into distribution patterns.

b) Limitations in student field involvement: Due to high transport and accommodation costs, we were unable to bring all 15 university students into the field as initially planned. Instead, we trained four local youth in Mkingu and provided supplementary training to six university students at the University of Dar es Salaam through indoor workshops and mentorship.

c) Barriers in faith-based outreach: Attempts to conduct conservation awareness through churches were unsuccessful due to reluctance from religious leaders. As an alternative, we shifted our awareness campaigns to public village gatherings and direct engagement with local leaders, which proved highly effective.

4. Describe the involvement of local communities and how they have benefited from the project.

Local communities participated in several meaningful ways:

- Employment: We hired local guides and porters from Maskati and Pemba villages during field surveys, supporting livelihoods through temporary but fair-paying opportunities.
- Training: Four local individuals were trained in frog survey techniques and environmental data collection, strengthening their skills and opening future opportunities in conservation fieldwork.
- Business support: We procured most food supplies and local services from village businesses during field operations, supporting local economies.
- Awareness raising: More than 1,000 villagers were engaged in conservation education sessions, which improved their understanding of amphibians and the threats posed by deforestation, agriculture, and charcoal production.

5. Are there any plans to continue this work?

Yes, we have concrete plans to continue this work through a proposed second phase of the project. Building on the ecological findings and community engagement achieved so far, the next phase will focus on expanding occupancy surveys across additional parts of the Nguru Mountains to refine our understanding of the species' range. We will also design and implement sustainable livelihood interventions, including beekeeping, agroforestry, and eco-friendly farming, to reduce pressure on frog habitats while supporting local communities. Furthermore, we plan to establish a community-based monitoring system, enabling trained local youth and conservation clubs to participate in long-term tracking of *Arthroleptis kidogo* populations. Collaborations with key institutions such as the Women in Conservation Organization (WICO), Tanzania Forest Research Institute (TAFORI), Mkingu Nature Forest Reserve authority and local government authorities will be strengthened to ensure sustainability, policy integration, and wider conservation impact.

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

We plan to share the results of our work through a combination of scientific, community-based, and digital platforms. A scientific manuscript detailing our findings on *Arthroleptis kidogo*'s occupancy, habitat preferences, and conservation threats is currently being prepared for submission to a peer-reviewed journal in herpetology or tropical conservation. At the community level, we will develop user-friendly Swahili fact sheets and posters for dissemination in local schools, village leadership offices, and conservation clubs. These materials will feature photos, habitat maps, and key messages aimed at increasing awareness and local stewardship.

We also intend to present our findings at regional and international conservation forums. Notably, we plan to participate in the Tanzania Wildlife Research Institute (TAWIRI) International Conference in December 2025. To ensure broader visibility, we will produce and share digital content including infographics, short educational videos, and summaries via social media and organizational websites. Finally, we will engage directly with relevant stakeholders, including government agencies and NGOs, to ensure the findings inform conservation policy and future planning efforts.

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

Looking ahead, the most important next steps involve building on the baseline data we have gathered to ensure long-term protection of *Arthroleptis kidogo* and its habitat. First, we aim to expand our occupancy surveys across other forest reserves with similar ecological conditions to assess the broader distribution of the species. Second, habitat suitability models will be developed to identify and prioritize critical conservation areas within and beyond Mkingu Nature Forest Reserve.

In parallel, we plan to implement a second phase of the project focused on introducing and scaling up sustainable alternative livelihoods for communities living adjacent to the reserve. This will directly address the socioeconomic drivers of habitat degradation. Another priority is to introduce amphibian's education programs in local schools, train more local youth in conservation methods, and establish a long-term monitoring framework in collaboration with partners like TAWIRI, WICO, and local village environmental committees. Lastly, we will work to secure additional funding and strengthen collaborations to ensure the sustainability of conservation efforts for *A. kidogo* and other amphibians in the Eastern Arc Mountains.

8. 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 logo was prominently used in various project materials and activities. It appeared on banners during awareness events, printed educational materials distributed in communities and schools, and fieldwork vests worn by the project team. The Foundation was also acknowledged during all stakeholder workshops, community meetings, and school talks. Additionally, we mentioned Rufford's support in all our social media posts and digital outreach related to the project. The logo and recognition were included in our visual materials and will also be featured in upcoming presentations, including at the Tanzania Wildlife Research Institute (TAWIRI) international conference. This ensured that the Foundation received consistent and respectful publicity throughout the duration of the project.

9. Provide a full list of all the members of your team and their role in the project.

The project was implemented by a dedicated team comprising the following members:

1. Mataba Bulugu Lisesi (project lead) - oversaw overall project implementation, coordinated ecological surveys, managed research design, led community outreach activities, and ensured timely reporting.
2. Eva Johnson (field assistant) - supported ecological data collection, habitat assessments, and assisted in organizing fieldwork logistics and coordination.
3. Sarah Mshanga (field assistant) - contributed to frog surveys, environmental variable recording and assisted with daily field activities.
4. Stephen Lucumay (project advisor) - played a central role in permit acquisition, liaised with local authorities and village leaders, coordinated community meetings, facilitated local training.
5. Fransis Kadudu (local guide) - assisted in forest navigation, supported community engagement efforts, and advised on terrain accessibility in the study area

6. Yusi Phabian and Mathius Pasian (local porters) - provided essential logistical support by carrying field equipment and assisting the research team at the Maskati sub-site.
7. Costa Peter (local guide) - provided field navigation support and facilitated community entry at Pemba sub-site.
8. Ismail Sarumu and Sarumu Ally (local porters) – assisted with field gears and equipment handling and logistics at Pemba sub-site.

All team members, including the principal investigator, actively participated in all field activities throughout the duration of the project. Their collaboration and contributions were instrumental in the successful execution of the project's objectives.

10. Any other comments?

This project marked a critical step forward in the conservation of *Arthroleptis kidogo*, a species that remains poorly known and highly threatened in its native habitat. Despite logistical and methodological challenges, we successfully generated baseline data, enhanced local conservation capacity, and raised awareness within surrounding communities. The transition from a mark-recapture approach to occupancy modeling was essential and allowed us to collect meaningful data without harming these tiny frogs. The project has also sparked local interest in amphibian conservation and laid the foundation for long-term engagement through behavior change and alternative livelihoods. We are deeply grateful to The Rufford Foundation for supporting this work, which not only benefited the species but also strengthened grassroots conservation efforts in the region.

ANNEX – Financial Report

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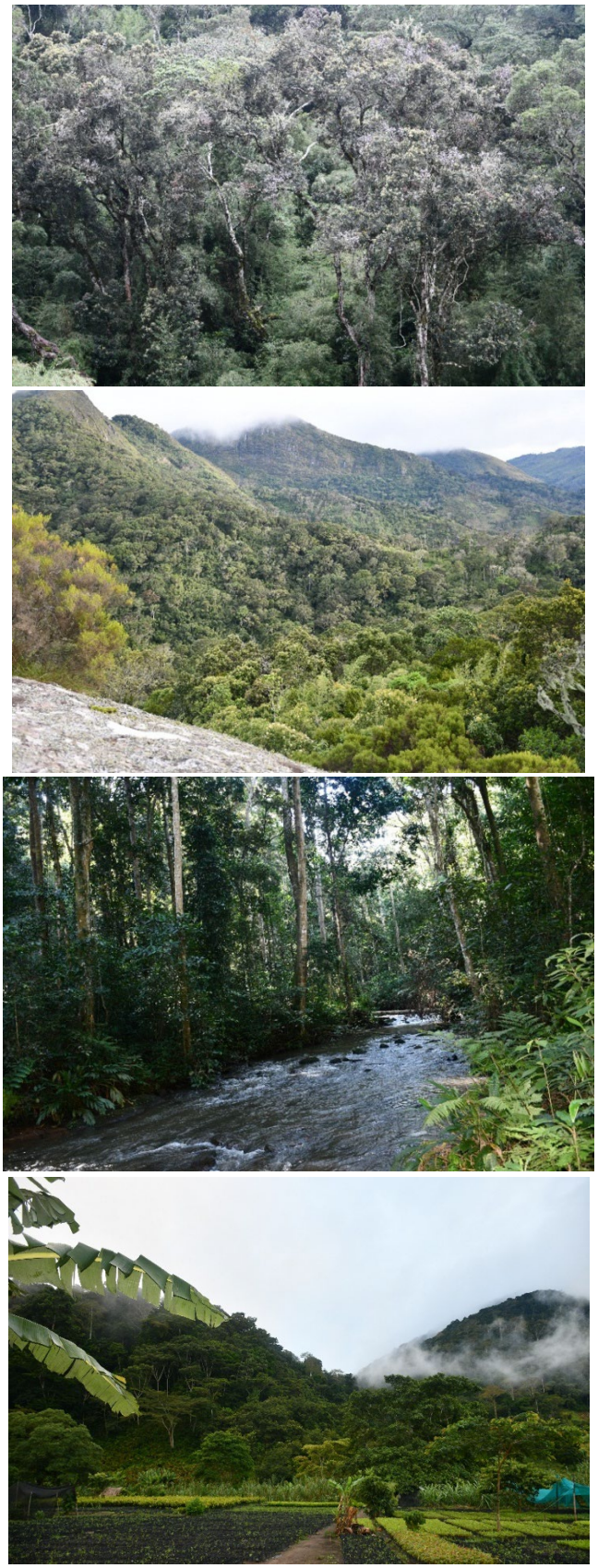

Figure 2. Different views of Mkingu Nature Forest Reserve (©Mataba Lisesi)

Figure 3. The photos of *Arthroleptis kidogo* recorded during field survey (©Mataba Lisesi)

Figure 4. Agricultural farms preparation observed within the Mkingu nature forest reserve (©Mataba Lisesi)

Figure 5. Charcoal burning sign (on the left) and Pit-sawing sign (on the right) inside Mkingu Nature Forest Reserve (©Mataba Lisesi)

Figure 6. Team leader (Mataba Lisesi) identifying frog specimen (on the left side) and Recording observations after encountering forest destruction along the transect (on the right side) ©Costa Peter.

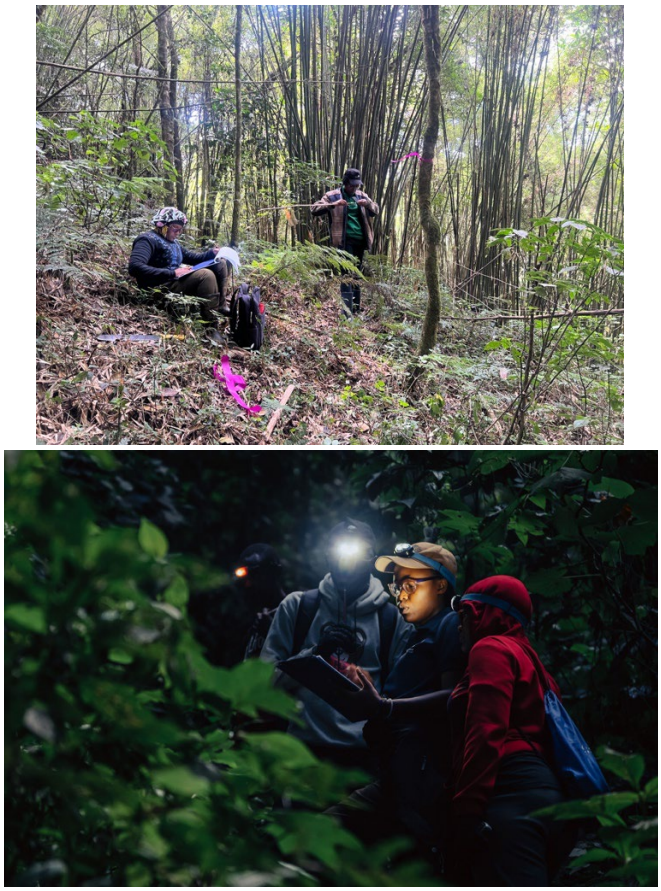

Figure 7. Team member recording habitat characteristics data along the marked transect during the day (left side) and the recording encountered Arthroleptis species during the night (right side) (©Mataba Lisesi).

Figure 8. Photos of university students involved direct in fieldwork inside Mkingu Nature Forest Reserve (©Mataba Lisesi).