Project Update: June 2015

Executive Summary

A third of the world's amphibian species are threatened with extinction and habitat loss is the primary threat worldwide. At the Kwame Nkrumah University of Science and Technology (KNUST) campus, the Wewe River provides critical habitats for at least 12 amphibian species. Amphibian populations at the Wewe River have declined precipitously as a result of farming and fuelwood extraction, and illegal disposal of sewage by local people. Amphibian surveys and restoration activities were therefore, conducted at the KNUST Wewe River and other key ecological zones on campus. Concurrently, we carried out educational campaigns on campus and beyond. We also organised amphibian surveys and training workshops for students.

Activity 1: Amphibian surveys and monitoring

Amphibian surveys were conducted within these main habitat zones on the Kwame Nkrumah University of Science and Technology (KNUST) campus which also forms part of the Moist Semi deciduous South-east Subtype forest zone (Hall and Swaine, 1981): KNUST Botanical Garden (Arboretum), Faculty of Renewable Natural Resources (FRNR) demonstration farm and along the KNUST Wewe Riparian zone. Concurrent to these surveys, we also recorded threats to amphibians in these habitats.

The Botanical garden (6⁰ 35'N, 1⁰ 30'W) serves as a recreational ground as well as a research station. The FRNR demonstration farm (06⁰ 43'N, 01⁰ 36'W) is an integrated land use system comprising of *leuceana leucocephala*, *Gliricidia sepium* and *Tectona grandis* plantations, an aquaculture land use site, vegetable farms and fragments of natural forest. The Riparian zone (Wewe area: 6⁰ 48'N, 1⁰32'E) has a distinct habitat existing in mutual balance with the river. The heterogeneity of age and structure of the riparian vegetation is a benefit to the variety of wildlife present on the site. The Wewe River passes through four local communities (Kotei, Ayeduase, Ayigya and Ahensan) and within the KNUST campus. The river in addition is also an essential source of household and irrigation water for these communities.

Surveys were conducted both in the dry and wet seasons. In each zone, we established four of 100 m transects to survey amphibians in suitable habitats. We visually scanned the terrain, investigated refuge areas by lifting rocks, logs, and debris while listening for frog calls (Rödel and Ernst 2004). Species diversity was estimated using the Shannon Index and richness was calculated using Chao2 and Jackknife in PAST (V 2.01). Analysis of similarity of anuran assemblage was done using (ANOSIM), PrimerE (ver 6).

We recorded a total of 592 individuals belonging to two families and 10 species (Appendix 1). Of this, 268 (45.27%), 191 (32.26 %) and 133 (22.47%) individuals were recorded in the riparian zone, the FRNR farm and the arboretum respectively. The FRNR farm recorded the highest number of species (n=10), followed by the Riparian zone (n=7 species) and the arboretum (n=6). The FRNR farm had the highest diversity followed by the riparian zone with the arboretum having the least diversity of anurans (Appendix 2). Although the three sampled zones were differently diverse, a similarity index of 0.722 indicates that the three zones are

similar in terms of species composition. Overall, one species, *Phrynobatrachus alleni*, is threatened according to IUCN Red List Categories (Appendix 3). *P. alleni* was recorded in all three habitats and also had the highest number of individuals among the observed species.

Habitat fragmentation and degradation as a result of widespread illegal farming activities, extraction of bamboo and trees by local people and the dumping of water and liquid waste were rampant along the Riparian zone (Wewe River).

Activity 2: Habitat restoration and establishment of vegetation corridors

Together with students from different faculties including Biological Sciences, Chemistry and FRNR, SAVE THE FROGS! KNUST chapter removed invasive weeds and conducted enrichment planting with over 500 seedlings of two native tree species (Terminalia superba and Ceiba within pentandra) 2 ha of the KNUST riparian wetland (http://www.savethefrogs.com/frogblog/events-frogs/ghana-restoring-degraded-habitats-foramphibians/). We re-established vegetation corridors to connect amphibian populations and also to buffer them from stressors. Our restoration efforts will help counter the local amphibian population declines by increasing habitat quality along the river. The restored areas will also provide important habitat and protection for co-occurring wildlife including various species of mammals, reptiles, birds, crabs and fishes.

Activity 3: Environmental awareness creation and capacity building

Through monthly radio broadcasts, public announcements, distribution of flyers, pasting posters on faculty and departmental billboards, we reached the general university community and surrounding localities with our amphibian conservation message. We also constantly blog and put up on our social media pages, events and progress on the project; <u>http://www.savethefrogs.com/frogblog/events-frogs/ghana-restoring-degraded-habitats-for-amphibians/; https://www.facebook.com/savethefrogs.ghana.9</u>.

In addition to our outreach programmes, we also organised an amphibian field school where 20 undergraduate students were trained in amphibian monitoring protocols, identification and how to enter field notes. Participants were also educated about the importance of amphibians and the need to monitor and conserve them.

K-WRAP was also featured on the 6th Annual Save The Frogs Day, the largest day of amphibian education and conservation action. During this event, we rallied support of students and the general university community to eliminate threats facing the Wewe River and its amphibians (<u>http://www.savethefrogs.com/day/2014/index.html#ghana</u>).

Activity 4: Impacts of amphibian conservation outreach on local people

We also monitored and evaluated the impacts our conservation outreaches had had on the general public by using evidence-based measurement tools/questionnaires. Thus, we used structured questionnaire to interview 90 individuals comprising of students and local people on their level of awareness on amphibian population declines in the Kumasi Metropolis. Majority of respondents 73.3% were aware of the amphibian population declines. Respondents were also asked about their level of awareness concerning the major threats to local amphibians. All

perceived that habitat destruction as a result of urbanisation was the major threat to the survival of amphibians in the metropolis.

Upcoming and on-going activities

We have started additional habitat screening and monitoring to map out permanent sites for long-term monitoring of amphibian populations and their habitats, selecting permanent sites and creating visual and acoustic sampling routes. Alongside, we are also providing quantitative assessments of relevant habitat characteristics (water depth, canopy cover and aquatic vegetation) and recording geographic coordinates of detected amphibian species altogether helping us build a comprehensive database of amphibian species diversity and abundance at KNUST Wewe River. The database is to be the first online repository of the amphibians of any given area in Ghana, with such information serving as an effective tool for the long-term monitoring of amphibian populations and the ecosystem health of the wetland as we continue with our habitat restoration activities.

References

Hall J. B., and Swaine M. D. 1981. Distribution and ecology of vascular plants in a tropical rain forest: Forest vegetation in Ghana. W. Junk, The Hague, 383pp.

Rödel M.-O. and Ernst R. 2004. Measuring and monitoring amphibian diversity in tropical forests. An evaluation of methods with recommendations for standardization. Ecotropica, 10:1–14.

Appendix 1

Family	Scientific Name	Number of Individuals recorded		
Arthroleptidae Arthroleptis sp		79		
Ranidae	Phrynobatrachus	latifrons 64		
	Phrynobatrachu	s alleni 115		
	Phrynobatrachu	s calcaratus 84		
	Phrynobatrachu	s gutturosus 31		
	Phrynobatrachu	s plicatus 91		
	Ptychadena bibr	roni 19		
	Ptychadena long	girostris 72		
	Ptychadena mas	scareniensis 17		
	Hoplobatrachus	occipitalis 12		

Table1: Checklist of Anuran species

Appendix 2

Table 2: Species diversity of anurans in KNUST habitats

Index	Arboretum	Riparian	FRN Farm
Shannon Diversity	1.786	1.802	2.247

Appendix 3

Table 3: Species, their conservation status and habitats

st concern	R, A, F
st concern	R, A, F
ar threatened	R, A, F
st concern	R, A, F
st concern	F
st concern	R, A, F
st concern	R, F
st concern	R, A, F
st concern	F
st concern	F
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Habitat: A-Arboretum; R-Riparian zone; F-Farm

Appendix 4

Project Pictures





