News and updates from *AfricanBioServices*, a European Union-funded research project investigating ecosystem services in the greater Serengeti-Mara ecosystem in eastern Africa.

View this email in your browser

AfricanBioServices Updates

September 2017

Note from the project coordinator

Our AfricanBioServices project has reached a milestone as we are already midway to the final date. During the first half of the project, we have collected a variety of data and there is time to start analysing these data. We are, however, all committed to upload our data to our joint relational database through the repository. This database will be one of the most important outputs from this project. I am sure that most of you have collected many exciting scientific results that will be published in highly reputed international scientific journals. I look forward to the next phase when all these outputs will be published.

On 1 May 2017, we submitted our first periodic report to the European Union (EU). The EU services have already reviewed the submitted report (21 months), and as a part of the review process, the Executive Committee was in Brussels on 12–13 June 2017 to discuss the report with the commission. During the meeting, we were given oral feedback from two reviewers, from our EU project advisor (Christophe Coudon) and from a group of other EU project advisors.

In mid July, the EU gave us formal feedback which was overall positive. We are on the right track, but of course they want us to make a few changes which will be discussed by the Executive Committee and the General Assembly over the next few months. One of the critical remarks was that we need to ensure we achieve sufficient generalization of our predictions; for instance, can other ecosystems (i.e. in Europe) benefit from the extended knowledge from AfricanBioServices? Furthermore, we must ensure that key datasets are uploaded in the relational database as soon as possible because, as discussed above, the database will be a

very important output from this project. Everybody must therefore assist us in this effort.

Finally, I have some good news from our institution, the Norwegian University of Science and Technology (NTNU). Between June and August 2017, we witnessed the graduation of five Masters and three PhD students supported by the project.

The Masters students and the titles of their theses are as follows:

- Philbert Ngoti: Feeding ecology of Eastern black rhinoceroses (*Diceros bicornis michaeli*) in southern Serengeti National Park, Tanzania
- Michael Joseph Tarimo: Sustainable gravel construction and maintenance in Serengeti National Park
- Damari Samwel: Assessment of illegal harvesting of resident ungulates in Serengeti ecosystem
- Ingrid Aase Lingaas Fossum: Dietary composition, overlap and competition between impala and domestic goat as revealed by DNA meta-barcoding
- Tuva Setsaas: Human impact on population dynamics and behaviour of impala (*Aepyceros melampus*) in and around Serengeti National Park, Tanzania

The first three Masters students are employed by Tanzania National Parks (TANAPA) and based in Serengeti. Thus, TANAPA has also directly benefitted from the AfricanBioServices project.

The three PhD students and the titles of their theses are as follows:

- Emmanuel Masenga: Behavioural ecology of free-ranging and reintroduced African wild dog (*Lycaon pictus*) packs in the Serengeti ecosystem, Tanzania
- Emmanuel Clamsen Mmassy: Ecology and conservation challenges of the Kori bustard in the Serengeti National Park
- Richard Daniel Lyamuya: Depredation of livestock by wild carnivores in the eastern Serengeti ecosystem, Tanzania

All three PhD students are employed by the Tanzania Wildlife Research Institute (TAWIRI). Over the coming two years, we hope to produce many more Masters and PhD students through the project.

Eivin Røskaft

Coordinator, AfricanBioServices project

Integrating ecosystem dynamics with disease control strategies: foot-and-mouth disease as a case study

As one of the activities under Work Package 4, a survey on foot-and-mouth disease seroprevalence has been conducted in five villages under different land use types in the Maasai Mara ecosystem in Kenya. A total of 1170 head of cattle were randomly sampled from 390 herds across the villages and samples screened for foot-and-mouth disease antibodies at the International Livestock Research Institute laboratories. Further characterization of circulating serotypes is being carried out at the ISZLER Food and Agriculture Organization laboratory in Italy and will be completed soon.

Daniel Nthiwa at work in the ILRI laboratory, screening samples for foot-and-mouth disease antibodies.

Questionnaires exploring animal management strategies (e.g. grazing patterns, sharing of watering points, market sources and other predictor variables) have been compiled and a metafile (dataset ID 1115) uploaded to the project repository as at 9 February 2017. Preliminary analyses of datasets have been carried out and will be presented at the upcoming TAWIRI conference in November 2017.

Mapping of livestock movement to understand their role in foot-and-mouth disease transmission dynamics has also started in four villages and will be extended to more villages in order to have a comprehensive overview of the movement of livestock in the area.

We plan to initiate a foot-and-mouth disease outbreak monitoring scheme from September 2017 to

characterize circulating viruses. Animals suspected to be infected with the disease will be sampled and reported through the official channels. The frequency of outbreaks and factors that may be associated with occurrence will be assessed.

We are grateful to the Maasai farmers who participated in the seroprevalence survey and the local authorities for their assistance in mobilizing the farmers. We look forward to finalizing the remaining work and writing up the publications.

Contributed by Daniel Nthiwa, Silvia Alonso and Bernard Bett

Four rounds of household questionnaire surveys successfully completed

The team from Work Package 5 has successfully completed four quarterly household questionnaire surveys covering some 1000 households in 25 villages across the greater Serengeti-Mara ecosystem in Tanzania and Kenya. Enumerators and researchers from the TAWIRI and the International Livestock Research Institute (ILRI) collected the field data under the supervision of two postdoctoral researchers, Xi Jiao and Solomon Zena Walelign, from the University of Copenhagen.

Before each round of field surveys, workshops were held to train the enumerators on the use of new instruments and refresh their knowledge on quarterly income surveys. Data collection at the household level comprised the following surveys:
(i) two annual household surveys covering demographics, assets and shock experience;
(ii) four quarterly household income surveys covering all types of income in detail, including environmental income;
(iii) focus group discussions and choice experiment surveys evaluating household livelihood strategy responses to road development, effects of varying meat prices on demand, and risk and time preference;
(iv) local natural resource management institutions and the violence in resource conflicts (designed by Ole Magnus Theisen from the NTNU); and
(v) unmatched count technique surveys into illegal bushmeat hunting and grazing.

The database containing the collected data from these four rounds of surveys, accompanied by a description of the variables, constitutes Deliverable 5.1 that is to be submitted to the EU by the end of September 2017.

Staff from ILRI and TAWIRI specialized in geographical information systems (GIS) are also working on Deliverable 5.2, which combines spatial data layers collected under Work Package 1 with GIS maps produced from the data collected in the 1000-household survey on dependence on ecosystem services.

Xi and Solomon are currently working on three publications related to household reliance on ecosystem services, illegal grazing in the protected areas, and livelihood strategy choices in relation to road development. Two of these will be presented at the biannual TAWIRI conference scheduled for November 2017.

The University of Copenhagen is grateful to ILRI and TAWIRI for the invaluable assistance received in implementing the household surveys in Kenya and Tanzania. We look forward to finalizing the remaining fieldwork, deliverables and joint publications.

Contributed by Xi Jiao, Solomon Z. Walelign and Martin R. Nielsen

---

How does fire affect the forage of rhinos?

Philbert Ngoti defended his Master's project at NTNU in June 2017. His study included identifying the plant species rhinos prefer to eat and examining how these plant species are associated with fire. The black rhinoceros (*Diceros bicornis*) is a critically endangered savanna species restricted to protected areas representing about 5% of its historical range. In Serengeti, a small population of about 40 animals lives in the south of the park.

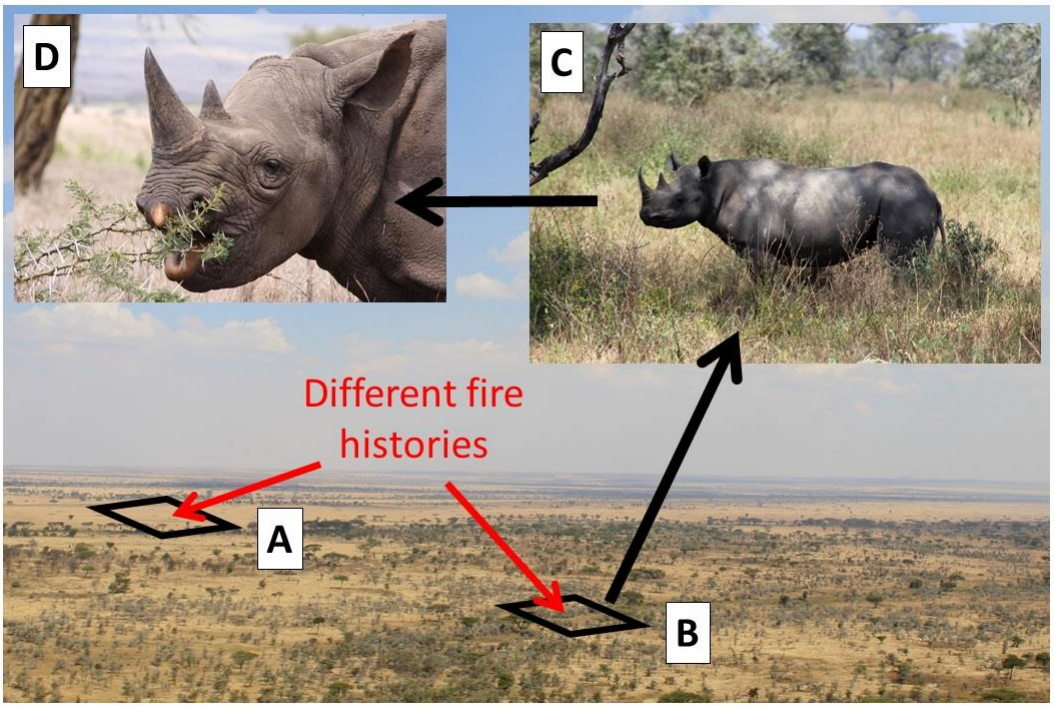
Ngoti observed and recorded the plant species that the animals were eating. He also compared the vegetation where the animals were eating to the vegetation of the areas in general and collected dung of rhinos. The dung was analysed for DNA content of plant species. Based on his results, Ngoti concluded that nine shrub and forage species were preferred and made up a large share of the forage of rhinos in this area, in particular, species of the genus *Indigofera*.

Ngoti also studied how the preferred plant species were associated with fire history. Examining satellite image-generated fire maps and recording the distribution of plant species led to the conclusion that the rhinos seem to prefer plant species that are not burned too often. Plots that had been burned only once during the past 10 years had the highest cover of preferred plant species.

The results of Ngoti's thesis are now incorporated into a submitted paper and will hopefully generate more knowledge on how to manage the vegetation species preferred by wild rhinoceroses and thus help their populations increase.

This project was carried out in collaboration with T. Michael Anderson, Mawazo L. Nzunda and Daniel M. Griffith from Wake Forest, and James D.M. Speed, Frode Fossøy, Eivin Røskaft and Bente J. Graae,

AfricanBioServices researchers from NTNU. The project had substantial support from National Geographic. Ngoti is now back in his position with TANAPA.



Ngoti recorded vegetation composition in sites with different fire history (A) and (B) and which kind of vegetation the rhinos preferred to visit (C), and observed and recorded the plant species that the rhinos eat. He was then able to list the preferred species and analyse how they are associated with different fire regimes (photo credit: Phil Perry and Luisa Arenedo).

Contributed by Bente J. Graae

Update on publications, media coverage and social media

Journal articles

Bedelian, C. and Ogutu, J.O. 2017. Trade-offs for climate-resilient pastoral livelihoods in wildlife conservancies in the Mara ecosystem, Kenya. *Pastoralism: Research, Policy and Practice* 7: 10. http://hdl.handle.net/10568/81274

Bett, B., Kiunga, P., Gachohi, J., Sindato, C., Mbotha, D., Robinson, T., Lindahl, J. and Grace, D. 2017. Effects of climate change on the occurrence and distribution of livestock diseases. *Preventive Veterinary Medicine* 137, Part B: 119–129. http://hdl.handle.net/10568/78394

Ogutu, J.O., Kuloba, B., Piepho, H.-P. and Kanga, E. 2017. Wildlife population dynamics in human-

dominated landscapes under community-based conservation: The example of Nakuru Wildlife Conservancy, Kenya. *PLOS ONE* 12(1): e0169730. http://hdl.handle.net/10568/79930

Media coverage

A struggle for land and survival in Kenya's restive highlands (*AFP*, 3 Feb 2017)

Neglect, poor strategies and too much focus on big five killing Kenya's wildlife (*The Standard*, 12 Feb 2017)

East Africa's drought threatens iconic wildebeest migration *(New Scientist*, 24 May 2017)

Livestock-wildlife trade-offs for pastoral livelihoods in the conservancies of the Masai Mara (*ILRI News*, 5 Jun 2017)

Sheep are not stupid, and they are not helpless either (*BBC Earth*, 19 Apr 2017)

The great thing about mass wildebeest drownings (*The Atlantic*, 19 Jun 2017)

Changing the course of history for Kenya's wildlife (*The Guardian*, 26 Jun 2017)

AfricanBioServices Facebook page

https://www.facebook.com/AfricanBioServices/

Give us your feedback!

We welcome your feedback on this newsletter. Please feel free to share your views by sending us an email. Remember to send your contributions for the next newsletter to Tezira Lore (t.lore@cgiar.org).
