



ATRAP project taps the potential of citizen science in the fight against Bilharzia

ATRAP PROJECT TAPS THE POTENTIAL OF CITIZEN SCIENCE IN THE FIGHT AGAINST BILHARZIA



On sept 21, 2023, the ATRAP project closed its phase 1 with a dissemination workshop that was held in Lake Victoria Hotel Entebbe. The event was graced by the ambassador of Belgium to Uganda, H.E Hugues Chantry and the Vice Chancellor Mbarara University of Science and Technology (MUST)

ATRAP (Action Towards Reducing Aquatic snail-borne Parasitic diseases) is an interdisciplinary and international collaboration between Mbarara University of Science and Technology (MUST) in

Uganda, The University of Kinshasa in the Democratic Republic of Congo-(DRC), and the Royal Museum for Central Africa (RMCA) in Belgium. The project is centred around snail borne diseases with major emphasis on bilharzia (also known as schistosomiasis). The disease affects over 200 million people worldwide, mainly over 90 % of whom are in the sub-Saharan Africa, Uganda inclusive. In Uganda the study was conducted in the districts of Kagadi and Ntoroko.



Dr. Tine Huyse and Dr. Casim Umba Tolo.

The project is headed by Dr. Tine Huyse from RMCA who is the Belgian promoter and Dr. Casim Umba Tolo from MUST who is the local promoter. Dr. Viola Nyakato, Assoc. Prof. Grace Kagoro Rugunda and Dr. Ronald Twongyirwe are project team members who serve as MUST co-promoters in Uganda.



L-R: Assoc. Prof. Grace Kagoro Rugunda, Prof. Celestino Obua, Dr. Tine Huyse, H.E Hugues Chantry and Dr. Casim Umba Tolo.

Dr. Tine commended the MUST administration for the support rendered to the project,

and emphasized the call from WHO: the need for snail control and behavior change to stop risky practices like open defecation and contact with contaminated water, to prevent the transmission of the diseases.

Dr. Umba Tolo Casim on his part, recognized the support from ATRAP, through providing state of the art lab equipment for water sampling and analysis. He also pointed out that the project strengthens participatory and interdisciplinary outreach activities to the community, making it inclusive and people-centred.

The Vice Chancellor of MUST, Prof. Celestino Obua, acknowledged the support from the Belgium Development Cooperation to MUST. “This has empowered us to nurture talent among our students. I also extend my sincere heartfelt appreciation to the Royal Museum of Central Africa for choosing to collaborate with MUST in implementing the innovative ATRAP project”



Ms. Eva November from the RMCA

Ms. Eva November from the RMCA was pleased with the excellent work done by the ATRAP project. She added that ATRAP and the sister project HARISSA that worked on natural hazards empowered the community through the citizen science approach. She complimented the engagement of citizen scientist and added that this got the ATRAP project the best of results.

Mr. Hugues Chantry, the ambassador of the kingdom of Belgium to Uganda applauded the project implementers especially the PIs, Dr. Casim Umba Tolo and Dr. Tine Huyse, for thinking about areas that have not received much attention yet need immediate intervention for the wellness of the community. The ambassador commended the approach of working with citizen scientists as a way of bring the community on board.

“Many people don’t know what researches are going on, notwithstanding the results of studies, but with citizen scientists the community is able to know what is going on through their own people [and] this is good”.

Engaging citizen scientists helps to translate findings and best practices to the community.



Prof. Celestino Obua Vice Chancellor MUST



Mr. Hugues Chantry, the ambassador of the kingdom of Belgium to Uganda



The keynote speaker Dr. Narcis Kabatereine shared statistics about the current and historical trends of bilharzia in Uganda. He said the recent mapping in 2022 revealed that 96 districts are affected out of 145 districts, of which 45 districts are high transmission, and 25 are medium transmission. Additionally, 4 districts were free of bilharzia from over 80% prevalence, meaning transmission can be interrupted. These included Rukungiri, Kiruhura and some other districts in the Teso region



The keynote speaker Dr. Narcis kabatereine

The Executive Director of the Vector Control Division (VCD) of Uganda, Dr. Alfred Mubangizi, said they were thrilled with the works of the ATRAP Project and added that this fits well with the vision of VCD: to achieve a Uganda free of neglected tropical diseases and related morbidity and disability. He added that the project was also in line with the VCD's mission "To provide cost effective, sustainable, equitable, pro-people, pro-poor, and community-owned interventions for the prevention, control and elimination of NTDs". Identifying and mapping bilharzia transmission risk sites is important as it leads to targeted interventions



The Executive Director of the Vector Control Division (VCD) of Uganda, Dr. Alfred Mubangizi

The Citizen science and its benefits to both the community and the Project

Co-MC: Assoc. Prof. Grace Kagoro gave insights of citizen scientists . She said that to tackle the study's challenges, ATRAP embarked on an innovative approach, called 'citizen science'. This is the engagement of non-expert community members in scientific research. This helps in dissemination of information to the community and creates a sense of ownership of interventions within the people



Co-MC: Assoc. Prof. Grace Kagoro introducing the session of citizen scientists

Insights from the citizen scientists

The 25 citizen scientists working in Ntoroko and Kagadi were present at the conference. They shared their experiences including some of the following highlights:

They mobilized the community members for awareness raising and dissemination of results using mechanism such as community radios, megaphone announcement, church gathering, house-to-house engagement and community circles.



Citizen Scientists L-R: Mr. Bahungirehe Crezestom , Ategeka Augustine and Ms. Janet Tumusiime

The citizen scientists worked closely with the community leaders to sensitize the community about snail-borne diseases and how they can control the diseases.

They monitored water contact sites in their parishes and reported about snail presence and human activities. In addition, they earned respect in the community and some became leaders. "It has brought equality and equity in our community, I stand before you as a woman leader as a citizen scientist. Me and my other colleagues have achieved a lot in this project. Who am I to stand before such an audience and speak, thanks to ATRAP I am confident enough now". Said Ms. Janet Tumusiime



Mr. Chris Twebaze, the senior Vector control officer and coordinator neglect tropical diseases in Kagadi District was optimistic that achieving elimination of bilharzia was a possibility since they have experience of eliminating NTDS like river blindness. He however emphasized the need for continuous collaboration, the kind that ATRAP offers.



ATRAP supports further education and research



ATRAP supported six interdisciplinary PhD students: 2 at MUST, 2 in Belgium and 2 in DR. Congo. In addition, an equal number of masters students were supported in the respective countries. Some of the candidates include:

Mr. Julius Tumusiime ATRAP PhD student and Assistant Lecturer-Biology (MUST)



We have registered significant success for the last 5 years. The study found out that snails that spread urogenital schistosomiasis which were thought to be absent in the Lake Albert region are actually present. We therefore highlight a possibility of an outbreak of this type of bilharzia, which easily spread through open urination in snail contaminated water. We also found that the intestinal schistosomiasis is actively spreading at the lake shores but not in the upland communities. There is need for improvement of hygiene and access to safe water among lake communities.

Ms. Noelia Valderrama Bhraunxs (PhD student KU Leuven and Africa Museum-Belgium)



The use of citizen science is cost effective, generating high quality and quantity of data, as confirmed by comparing with expert collected data. She urged the vector control division to take up citizen science approach for better results in the community.

Ms. Namirembe Daisy (Former Ms. Student and now ATRAP administrative assistant)

I am the project administrative assistant and I was a masters student on the ATRAP project. My master's research was on Liverflukes and bilharzia in livestock and wild mammals. I collected fecal samples from animals from Kagadi and Ntoroko districts and was examined for parasite eggs from the biology laboratory at MUST. I found liver flukes eggs in most cattle but very few had bilharzia worm eggs. This part of the study was addressing one of the project objective on food security and also to support Zero hunger, which is one of the SDGs



Mr. Maxson Kenneth Anyolitho (ATRAP PhD student FIS, Assistant Lecturer Lira University)



Proud Mentor Maxson and Dr. Wangalwa Rapheal

Before the intervention, we conducted baseline studies to establish the level of knowledge, attitudes and practices (KAPs) regarding the disease by the community, their lived experience with the disease and how such experiences affected their perceptions. Our community-led bottom-up interventions had significant improvements in knowledge and attitudes, but not so much in practices regarding the disease. Furthermore, the CSs better understood the problems associated with bilharzia, recommended appropriate actions, owned the intervention and gained more respect and trust.

Ms. Mercy Gloria Ashepet (PhD Student KU Leuven and Africa Museum-Belgium)



We have a lot of data, enough from the community, from the expert, our policy makers are challenged to incorporate all this information in our community policies and dissemination. The question stands: Will the results be of use to the community?

The ATRAP policy brief presented to the stakeholders



Dr. Viola Nyakato Moderating the section on community leaders and their role in fighting snail-borne disease

Background

Snail-borne diseases pose a significant public and veterinary health burden in Uganda. Bilharzia is highly prevalent around major water bodies, where infection levels can reach up to 90%. Also, liver fluke disease in cattle is highly prevalent, causing lower milk production and an estimated annual loss of US\$ 92.4 million due to condemned liver alone.

Since mass drug administration alone does not suffice to control these diseases, the World Health Organization recommends complementing treatment by snail control and community involvement. However, the lack of snail experts and snail data hampers the design of targeted control measures. Also, despite be-

haviour change interventions, risky practices such as open defecation persist in Uganda, resulting in high re-infection rates. Community-based snail monitoring presents a valuable and cost-effective complement to classical surveillance programs, and increases scientific literacy at the same time.

Co-designed and community-led bilharzia awareness campaigns increase ownership and are more sustainable and cost-effective compared to conventional top-down interventions.

Methods

Together with village and district leaders, ATRAP established a network of 25 community members, also called citizen scientists (CSs). They weekly monitored snail presence and water-related activities between 2020-2023 at 76 fixed preselected water contact sites. These data together with expert data were used to identify potential snail-borne disease transmission sites. The CSs simultaneously developed and coordinated community-led awareness campaigns to induce sustainable behaviour change



KEY RESULTS

1) Large-scale data generated

Key finding 1: More vector snails found in upland streams & rivers, compared to lake sites.

Key finding 2: Risky water practices are most frequent at lake sites but also upland.

Key finding 3: citizen-driven snail monitoring is 8x cheaper than expert sampling.

Key finding 4: Key stakeholder interviews (n=110) highlight risky practices like free-range grazing and unsafe water sources for livestock. This, together with limited knowledge of the diseases, poses a greater risk of spreading liver and blood flukes among animals.

2) Proof of active human and animal disease transmission

Key finding 1: High prevalence & overlapping distribution of human and animal parasites.

Key finding 2: Abattoir visits revealed 57% of livestock infected with liver flukes.

Key finding 3: First record of snail host of urogenital bilharzia in Ntoroko and Kagadi, highlighting the potential for outbreaks of the disease given the observed risky water practices in the area

3) Awareness raised & communities empowered



Dr. Julius Lejju Dean Faculty of Science MUST Dr. Tine Huyse from RMCA

Key finding 1: The skills and knowledge of snail disease vectors of both the citizen scientists and the community at large improved significantly.

Key finding 2: They recommended appropriate actions & channels to use for awareness and subsequently owned and took charge of the awareness campaign, reaching an estimated 50,000 individuals in just one week.

Key finding 3: After the campaign, at least 91% as opposed to 73% at baseline, think it is important to avoid contact with contaminated water. Actual preventive practices and health-seeking behaviour, however, did not significantly change.

Key finding 4: CSs gained more respect and trust from the community because of their accumulated knowledge and meaningful contribution to the community's well-being.

4) Bridging policy with citizen science

Key finding 1: Over 50% of consulted leaders trust data generated by the ATRAP citizen scientists given the proof of robust quality checks and the regular training of the CSs.

Key finding 2: The leaders also recommend constant supervision to ensure that the citizen scientists carry out their tasks precisely and that the data is accurate.

Key finding 3: Citizen-generated recommendations can incite actions at the local level as demonstrated in several sub-counties, with the creation of Water Teams and reparation of water boreholes after dissemination of ATRAP findings.



Participatory community-based approaches support communities to take responsibility, implement vector control measures & ensure that healthy behaviours are part of the social fabric.



RECOMMENDATIONS

The high prevalence and overlapping distribution of human and animal parasites call for an integrated One Health approach & cross-ministry collaboration

Recognize and support CS as a way of doing science by streamlining CS in government activities.

Adopt bottom-up citizen-led approaches in designing & implementing behaviour change campaigns.

Ensure continued communication and involvement of citizens right from the start

Support modern farming practices such as routine de-worming, controlled grazing, and use of cow troughs.

Implement citizen science to monitor snail distribution to guide snail control in areas with proven disease transmission.

Prioritize safe water access and drug treatment in areas with a higher risk of transmission of snail-borne diseases based on citizen-generated data.

Empower communities to take an active role in the mass drug administration program.

This marked the end of phase one of the ATRAP Project.

Announcement: ATRAP WINS ANOTHER GRANT



On September 20 2023, ATRAP Project won yet another prize

ATRAP (‘Action Towards Reducing Aquatic snail-borne Parasitic diseases’) project has won the international NTD Innovation Prize for its pioneering work on the neglected tropical disease schistosomiasis (bilharzia) in Uganda and DR Congo. ATRAP was lauded for its innovative approach, which hinged on collaborating with local residents to monitor snail vectors in their environment and co-design awareness campaigns. The American Leprosy Missions, in partnership with Novartis, awarded its fifth annual NTD Innovation Prize worth \$40,000 to ATRAP at the international conference on the control of neglected tropical diseases in Dar es Salaam, Tanzania.



MC of the day: Dr. Ronald Twongyirwe

Pictorial moments at the event





Congratulations to the ATRAP Project , the sky is no-longer the limit

