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PARTICIPATORY EPIDEMIOLOGY TRAINING AND ASSESSMENT IN BUNDIBUGYO DISTRICT, UGANDA

A report from STOP Spillover

September 21-October 27, 2022



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STRATEGIES TO PREVENT SPILLOVER (STOP SPILLOVER)

Strategies to Prevent Spillover (STOP Spillover) enhances global understanding of the complex causes of the spread of a selected group of zoonotic viruses from animals to humans. The project builds government and stakeholder capacity in priority Asian and African countries to identify, assess, and monitor risks associated with these viruses and develop and introduce proven and novel risk reduction measures. “Spillover” refers to an event in which an emerging zoonotic virus is transferred from a non-human animal host species (livestock or wildlife) to another, or to humans.

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DEFINITION OF TERMS

Participatory appraisal: a family of approaches and methods that enable people to present, share, and analyze their knowledge of life and conditions, to plan, and to act. It is participatory, flexible, lightly structured, adaptable, exploratory, empowering, and inventive.

Participatory epidemiology (PE): the use of participatory approaches and methods to improve understanding of the patterns of disease in populations. It is based on conventional epidemiological concepts and allows for the investigation of interactions between host, agent, and environment but in a social context of disease transmission.

Outcome mapping (OM): a structured participatory tool that uses a bottom-up collaborative process to engage all spillover ecosystem stakeholders (both traditional and non-traditional) to drive the change and own the process, which builds towards self-reliance and sustainability. Through the OM process, stakeholders work towards stopping spillover through mapping their outcomes and working with critical partners to identify, design, and implement relevant interventions.

One Health-Design Research and Mentorship Working Groups (OH-DreaM): technical groups at the country level consisting of STOP Spillover country team members, local stakeholders, and STOP Spillover Resource Hub members who have technical expertise in specific issue areas. These groups work together to address a specific thematic area, help close an information or data gap, and/or develop an intervention.

LIST OF ABBREVIATIONS

AFROHUN.....	Africa One Health University Network
FGD.....	Focus Group Discussion
KII.....	Key Informant Interview
OH-DReaM.....	One Health Design Research and Mentorship
OM.....	Outcome Mapping
PE.....	Participatory Epidemiology
PRA.....	Participatory Rural Appraisal
SBC.....	Social And Behavior Change
STOP Spillover.....	Strategies to Prevent Spillover
USAID.....	United States Agency for International Development
VHT.....	Village Health Team
WLE.....	Wildlife, Livestock And Epidemiology Hub

INTRODUCTION

Strategies to Prevent (STOP) Spillover was launched in Uganda in 2020 and held an outcome mapping (OM) planning workshop in September 2021 during which national stakeholders prioritized the bat-human interface as the initial high-risk interface for the project to support risk reduction interventions. The project conducted a three-day interface workshop in Bundibugyo, which was selected as the target district due to the presence of several modes of human-bat interaction. The specific human-bat interactions in Bundibugyo include hunting, cave tourism, agricultural fields, a large bat population in the community, and a history of an Ebola outbreak.

Local stakeholders identified activities to address the gaps and challenges at the bat-human interface during the OM process. Following this process, the year two work plan (November 2021-April 2022) was drafted and reviewed. Implementation is largely driven by activity-specific One Health-Design Research and Mentorship (OH-DReaM) Working Groups, which are technical groups formed at the country level by STOP Spillover. The following research activities and interventions were planned specifically for the bat-human interface in Bundibugyo district.

Activity 1: Investigate bat host ecology and human behavioral risk factors associated with human-bat interaction.

Activity 2: Explore the behavioral, sociocultural, gender-specific, and economic risk factors

Activity 3: Improve household and community practices to reduce human contact with bats by engaging communities through a social and behavior change intervention strategy to promote safe practices.

Activity 4: Improve household and community practices to reduce human contact with bats by promoting protection of household and communal water resources and food safety.

Activity 5: Develop and evaluate a community-based bat-human interface monitoring program for zoonotic spillover early warning and response.

LOCATION, GEOGRAPHY, AND POPULATION

Bundibugyo district is located in Western Uganda approximately 85 kilometers by road west of Fort Portal and approximately 378 kilometers by road west of Kampala. It is located along the Rwenzori Mountain ranges in close proximity to the Democratic Republic of Congo. The predominant ethnicities in the town are the Bamba and the Bakonjo, as well as other groups including the Batooro. The District lies between two conservation areas, the Semliki National Park and the Rwenzori National Park, which has led to a high level of human-wildlife interaction. The area has many rock shelters and caves that wildlife, including bats, use as habitats.

The people of Bundibugyo are predominantly farmers who cultivate cocoa, coffee, and vanilla to earn a living. Farming activities revolve around the two major rainy seasons in March-May and July-November. The area has fertile soil, but widespread deforestation and poor farming methods has led to a deterioration in soil fertility and lower crops yields.

The communities have been affected by landslides that are largely a result of agricultural activities on steep slopes. Floods and erosion are also common. In Harugale sub-county, the villages on the hillsides of the Rwenzori National Park, including Nyalulu and Bimara, have experienced heavy landslides that led to loss of lives and continue to affect human activities, particularly agriculture during the rainy season. The landslides have also cut off some roads, hindering service delivery. During the rainy season, floods negatively impact crops including

cocoa, maize, bananas, beans, and maize, as well as houses and animals. For example, in Bimara, a village of around 85 households, about 45 gardens near river valleys have been flooded. This situation led to the displacement of families and unemployment and left people, particularly widows, vulnerable to famine.

Poverty is rising due to a drop in cocoa production, a major cash crop in the area. People have limited land for food production and this, coupled with vermin, pests, and diseases, has led to food insecurity. The proceeds from farming are used to purchase food and other basic necessities for households. The community's access to health centers, schools, and clean water is limited. In Burondo sub-county, children walk over five kilometers to access schools including Burondo primary school and Rwambale primary school.

PURPOSE OF PARTICIPATORY EPIDEMIOLOGY AND ASSESSMENT TRAINING



The training aimed to strengthen community members' knowledge of bats and bat ecology, their impact on farming and livelihoods activities, and associated health risks, and promote their participation in activities for surveillance, control, and health evaluation using participatory epidemiology (PE) techniques. The assessment was an opportunity for personnel from across the project activities better understand the diverse drivers of behavioral, socio-cultural, gender-related, and economic risk factors at the bat-human interface in Bundibugyo district. STOP Spillover country team staff, local and national OH-DReaM working group members, research assistants, and community mobilizers attended the training.

OBJECTIVES OF THE TRAINING AND ASSESSMENTS

1. To equip participants with knowledge and skills in participatory epidemiology.
2. To apply the concepts of participatory epidemiology and use tools such as semi-structured interviews, transect walks, mapping exercises, ranking, and matrices to undertake a participatory assessment to better understand social, behavioral, cultural, and traditional practices that increase human and bat interactions and the risks of spillover.
3. To analyze the data and use the results of participatory assessments to inform the refinement of data collection tools, the social and behavior change (SBC) strategy, and project interventions in general.

KEY DELIVERABLES

1. A team of individuals, OH-DReaM working group members, and research assistants trained on participatory epidemiology to support participatory assessment and research activities for STOP Spillover.
2. A report on the participatory epidemiology workshop and assessment implementation including the findings from the participatory assessment in the target communities of Bundibugyo District.

METHODOLOGY

Dr. Jeffrey Mariner, a veterinary epidemiologist specialized in participatory epidemiology from Tufts University, and Terrence Odoch, the technical lead for wildlife, livestock, epidemiology, behavior change, and gender strategy (WLE) on the STOP Spillover Uganda team, facilitated the training. Shamilah Namusisi, Edith Nantongo, and Charles Kato from STOP Spillover provided facilitation support. The first phase of the training (September 21-28, 2022) provided a two-and-a-half day introduction to the concepts and techniques of participatory epidemiology. Trainees participated in role playing activities, discussions (group and plenary), presentations, and experience sharing. In the second half of this phase, the training course shifted to guided field practice with community meetings held over two days in the three sub-counties of Burondo, Ntandi, and Harugale where project activities will be implemented. The local OH-DReaM team was instrumental in supporting mobilization efforts for community engagement and data collection in the three sub-counties and shared important local knowledge during the training program. The research assistants participated in community meetings and interviews, giving them the opportunity to lead discussions and take notes.

The second phase of the training (October 16-27, 2022) involved a one-day orientation and nine days of field activities. During the meeting, Dr. Mariner provided a recap on all participatory epidemiology tools to allow for recall and continuity of the participatory assessment exercises. Tools covered during the training session included proportional piling, matrix scoring, focus group discussion, dividing piles, and triangulation. All participants had the opportunity to practice using the tools to prepare them to use them during the field assessment.

Community entry in the three target sub-counties

Community members and PE facilitators opened the community meetings with greetings and introductions. In some of the communities, a community member opened the meeting with a prayer. The PE team provided a brief background on STOP Spillover and the PE activity and emphasized that it was important to learn from the community about their livelihoods and their knowledge and interactions with wildlife. The

PE team obtained verbal consent from the participants to allow the team to undertake the activity.

Participant characteristics

Overall, more men attended community meetings than women. This was partly attributed to women's demanding roles in business and caring for children. Participants included men, women, youth, local leaders (religious, political, and cultural leaders), village health team members, farmers, elders, health workers, and a few staff from non-governmental organizations (NGOs). Discussions were conducted in multiple languages including Lukhondo, Lubwisi, Rutoro, Luganda, and English depending on the language preference of the participants. The team used PE tools including proportional piling, seasonal calendars, timelines, and maps to promote discussion on the key topics of the study.

Teaming and work execution

The PE teams were clustered to include staff, research assistants, local OH-DReaM teams, and community mobilisers. Team members took on facilitation, note taking, and interpretation roles, which rotated during the meetings and interviews. Team members had the opportunity to practice each role to improve their PE skills. At the end of each day, the team held a reflection session to assess the day's work and to prepare for the subsequent activity. Hand written notes were turned into soft copies and shared with the team lead and report writer for analysis and report compilation.

Fieldwork

Participants were divided into four teams (orange, pineapple, mango, and mobile) in preparation for the field exercises. Planning for fieldwork was done and three teams were each assigned a different sub-county. The mobile team moved with one of the other teams to give them more opportunities for practical, hands-on experience using the participatory epidemiology tools and time to compile daily reports.

The study teams conducted key informant interviews (KIIs) with influential members of the community (elderly members, hunters, cultural leaders, traditional healers, active FGD participants, and game rangers) to better understand the risk factors for human-bat interaction. KIIs followed a set of questions guided by a checklist tailored to the interviewee's area of specialized knowledge.

PARTICIPATORY EPIDEMIOLOGY TRAINING

DAY ONE

The PE training commenced at 9.30 a.m. with a session for participants to introduce themselves and their roles on the project and/or in the community. Jeff Mariner gave a brief overview of the STOP Spillover project, emphasizing that the project aims to reduce the risk of spillover of diseases from wildlife to humans. The participatory assessment team will make a major contribution to the data that will be used to design interventions to reduce spillover risks in Uganda.

“We want to understand how people are interacting with bats and the risks involved in making contact so that the risks can be mitigated through appropriate interventions; it is therefore important that everyone in the room understands the project goal.” – Jeff Mariner, trainer

Participants' Expectations

Participants shared what they hoped to gain from the participatory training and assessment.

Participants expectations of training session

1. Acquire skills to work with communities
2. Understand people's way of life and their culture, norms, and values
3. Understand community practices
4. Learn about diseases present in Bundibugyo
5. Understand the landscape, geography, and animals and how these impact daily life
6. Bring different teams together
7. Identify the knowledge gaps and assets in the community

Overview of Participatory Epidemiology

Mariner introduced participatory epidemiology as the use of participatory rural appraisal techniques (PRA) to collect epidemiological knowledge and intelligence. The approach has been used to investigate factors affecting spread of several zoonotic diseases (highly pathogenic avian influenza, rift valley fever, etc.) and to inform solutions to mitigate risks for both animals and humans.

Mariner emphasized that PRA methods are used as a learning approach to gather qualitative data from key informants who have in-depth information on local issues. Problems are solved using multiple methods and perspectives and working with experts to find best fit solutions to inform decision making.

ORIGINS OF PARTICIPATORY EPIDEMIOLOGY

International NGOs adopted PE from animal health programs to use in needs assessment, drive innovation, and provide insights for programming. Initially, conventional scientists considered the approach too anecdotal to inform studies and publications; however, PE is now widely accepted as a qualitative inquiry tool. Papers on the approach are routinely accepted at international conferences and in peer-reviewed journals, and conferences and journals have hosted special PE-focused sessions and thematic issues.

COMMUNITY KNOWLEDGE SYSTEMS

This session explored the theme of indigenous knowledge and how PE approaches can use it to solve community problems. Mariner noted that it is important to understand what the community knows and who might have more knowledge on a particular area of concern (e.g., hunters might have more knowledge about the types of bats). Each community has a specialized knowledge system that uses different terminology, language, and insights regarding wildlife, diseases, symptoms, and vectors.

TOOLKIT OF METHODS

Participants learned about different participatory epidemiology data collection tools as outlined below.

A: Primary sources

- Semi-structured interviews, with key informants or in small groups
- Ranking and scoring tools: simple ranking, pairwise ranking, proportional piling, matrix scoring
- Visualization tools: mapping, Venn diagrams, seasonal calendars, and timelines
- Direct observation: transect walks, site visits, examination, and sample collection and testing

B: Secondary sources

Secondary sources include all existing information relevant to the objective of the assessment, such as publications, reports, maps, and informal literature like mission reports. It is important to consult secondary sources on both technical and socio-cultural topics.

Training participants engaged in further discussions to understand how and when different data collection methods should be used.

For example:

- Direct observation using transect walks: walk through the community to observe different characteristics such as settlement patterns, social services, and risk factors in the community (e.g., trees with bats, open water sources, household hygiene practices).
- Semi-structured interviews: use checklists and open-ended, non-leading questions so the community can discuss their concerns about particular issues (e.g., what are your disease concerns?).
- Visualization: often done through mapping
- Scoring and piling techniques: help to determine the magnitude of a problem or the importance/significance of something to the community. It is important to listen to the reason why the scores are allocated to identify community values, beliefs, and life situations.
- Key diagnostics: used where more investigation is needed and, where possible, make use of the laboratory and field-based tests.
- Box. # Conducting semi-structured interviews
- When conducting semi-structured interviews, be mindful of
 - Who is present
 - Who is talking
 - Who is not talking (and find out why)
 - Body language (posture and expression) and dress

Participants were shown the following picture of an interview and then asked to share their observations.

Box. 2 Participant interview observations.



The facilitator asked participants: What would you do if someone doesn't want to talk to you? Most responded that one has to accept this and leave and agreed that building rapport is an important starting point in obtaining a successful interview. Participants gave examples and shared experiences of building rapport, including holding the baby if the mother is busy.

Data Checking and Analysis

Data collected during PE is checked for correctness, completeness, and accuracy, and this starts in the field. Below are several ways in which data is checked and analyzed.

Observations

- While interviewing, you should meet people where they are.
- The interviewer is overdressed, which may be a distraction.
- The woman may not have been notified of or prepared for the interview, since she is preparing food at home.
- The interviewer is likely not going to get the intended information because the woman is focused on preparing food (it is important to arrange for a time when people are available and comfortable).
- The interviewer is more focused on recording responses than listening (data collection tool is a barrier; not using active listening).
- The interviewer shows no respect for the woman being interviewed.
- There is no cultural sensitivity.
- The man has no expression; he has not established a relationship with the woman.
- The environment of the interview is not a comfortable one.

Table 1. Methods for checking and analyzing data

Method	Explanation
Probing	Allows for collecting additional information not mentioned by the interviewee by asking questions not in the initial checklist.
Triangulation	Uses multiple methods of data collection to overcome bias. Bias is only considering on perspective which can limit understanding of a given situation. Assumptions, attitudes, values, and beliefs can contribute to bias and can result in an incorrect or incomplete analysis.
In PRA, we don't eliminate bias, but we want to understand it in order to manage it.	
Conflict of interest	Look out for potential conflict of interest that may cause distortion of information, and address it during analysis.
Weighing of evidence	Look out for potential conflicting information to help you to decide whether to use the evidence or not and to find any reasons behind the bias.
On-the-spot analysis	Helps to synthesize the data collected quickly and make decisions on how to proceed with the next level of data collection.

Bias in PRA

Bias leads to data that is not representative of a group or situation and can occur during data collection, analysis, and reporting.

Participatory epidemiological literature highlights several simple sources of bias:

- Road bias: collecting data along a road due to easier accessibility
- Seasonal bias: collecting data during one season of the year that results in incomplete information (e.g., wet season versus dry season)
- Educational bias: collecting data from people with more education (e.g., teachers) and ignoring those less education experience because the conversations feel more comfortable

Participants were encouraged to refer to

handouts for more information on bias.

Participatory epidemiology differs from conventional epidemiology because it seeks to understand the bias of stakeholder groups within the community as these unique perspectives can help or hinder the implementation of community interventions.

Participation

In his presentation, Mariner explored participants' understanding of participation and community-based participation. Several people defined participation as sharing knowledge to increase agency and listening to multiple voices, as well as supporting people to find solutions, make decisions, and manage programs to address their own development challenges.

Table 2. A typology of participation

1.	Passive participation: people participate by being told what is going to happen or has already happened.
2.	Participation by giving information: people provide responses based on specific questions asked (e.g., answering questions in an interview).
3.	Participation by consultation: the community provides information but is not involved in the decision-making process.
4.	Participation for material incentives: communities “give something for something,” such as labor for a construction project.
5.	Functional participation: people form groups to meet predetermined project objectives.
6.	Interactive participation: the community is included in the process to analyze their challenges and participates in choosing and monitoring interventions.
7.	Self-mobilization: the community organizes themselves to solve a problem without external influences and requests support to move forward with solutions.

Group work

Following the preliminary discussion on the typology of participation, participants formed four groups (pineapple, apple, banana, and orange) to further discuss participation and provide examples from their experiences with the different levels of participation. Each group presented in a plenary session following the group work.

Table 3: Pineapple group presentation

Typology of participation	Examples of participation
Passive participation	An immunization outreach campaign in which communities were informed about the activity and outreach post and asked to bring children for vaccination.
Participation by giving information	Metal works survey in Kiira Municipality, Wakiso District where people were asked about their businesses and did not receive feedback after the survey.
Participation by consultation	World Vision outreach on malaria in Amuria District where the community was asked to discuss their malaria knowledge. The community needed mosquito nets for malaria prevention, but these were not provided.
Participation for material incentives	Save the Children asked a community in Harugale sub-county, Bundibugyo District to provide labor to transport materials for the construction of a school and, in-turn, Save the Children built a community school.
Functional participation	The Red Cross asked a community to form groups, and the project extended economic support to these groups.
Interactive participation	Plan International in Kamuli District used PRA tools to understand community needs, which were prioritized in project design with active participation of the community. The Parish Development Committees were strengthened to monitor the projects.

Self-mobilization	Albinism Umbrella Uganda, a local self-led organization, was founded by persons with albinism to uplift the economic and social status of persons with albinism in Uganda. The organization has partnered with several development agencies to improve service delivery and advocate for rights of persons with albinism.
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The other groups also presented and shared their experiences. It was noted that all each level of participation are important in project management and that effective participation requires resources .

Conducting interviews (role play)

Mariner asked for volunteers to participate in an interviewing role play activity. Three participants shared their work challenges when interviewed by Mariner. In a group discussion following the interviews, the group used a ranking technique to organize the challenges in order of priority.

Participant reflections on using the ranking technique

Ranking of problems

- Low salaries: 38
- Career development: 25
- Family pressure: 10
- Transport: 6
- Workload: 1

What went well in the interviews

- Interviewer held good eye contact with the interviewees
- Interviewer made good use of his hands
- Interviewer showed interest in the discussion by leaning forward to listen to each informant
- Evidence of active listening through nodding, smiling, good eye contact, and leaning forward
- A healthy discussion with the three informants led to a consensus on the ranking process

Points to consider while interviewing

- Always seek consent before starting the interview
- Always start the interview with an ice-breaker or comfortable topic
- The interview process made use of different types of questions: open-ended questions (What are your work-related challenges?), probing questions (How is your child?), follow-up questions (Do you have a family?), and leading question (Do you have a family?).
- It is important to identify the dominant speaker and find a creative way of managing him/her
- Be careful to manage saboteurs who disrupt the group
- Reflection about the proportional piling exercise
- Proportional piling can be used with available materials such as stones

- Start by asking open-ended questions and enlist responses
- Do a quick analysis and categorize the responses
- Agree on the symbols to use for each category
- The choice to use symbols, words, or pictures depends on the group and literacy level
- Draw the symbols and corresponding circles
- Give 100 beans and ask them which of these are the most important
- Divide the beans through discussion and consensus
- Count and write down the ranking and ask for an explanation of the ranking choices
- Record the discussion

Tool Kit of Methods

- Secondary sources
- Direct observation
- Semi-structured interviews
 - Checklists vs. questionnaires
 - Open-ended questions
 - Discovery
 - Non-leading
 - Probing
- Visualization - mapping
- Scoring - piling
- Key diagnostics



Group work on proportional piling technique

The four groups selected a question to practice the proportional piling technique. The groups practiced the tool and reported back in plenary:

Group	Question
Pineapple	Where do you seek health care services in this community?
Orange	What economic activities are carried out in Bulondo?
Banana	What challenges did the community face during COVID-19 outbreak?
Apple	What is the impact of big families in Bundibugyo?

Insights from the plenary discussion

- Audio recording of discussions is not encouraged, especially if it was not included in the Institutional Revenue Board (IRB) submission.
- Each group member should be encouraged to actively participate in the activity
- Different groups of people will provide different response even though the same tools is used

DAYS TWO AND THREE

Recap of day one activities

Participants shared what they learned during day one, and the Deputy Prime Minister of the Kingdom of the Bwa' Bamba was acknowledged.

Defining community-based and community-owned

The facilitator asked the team for their understanding of community based. Participants generally defined this as a situation in which the community is involved in decision-making and owns the activity. An activity is community-owned when the community perceives an initiative as their own, and they participate in developing, implementing, and financing the activity. An activity can be participatory but not community-owned or community-based.

Additional PRA Tools for participatory assessment

Transect walk: uses observation and visualization to describe and show the location and distribution of different features in a community. It is a good tool for community entry as it provides a fair understanding of the community and paves the way for a more tailored assessment.

Participatory mapping: the physical illustration using a diagram that represents the community. A community map shows key features, locations, and points of interest. It makes use of local materials to illustrate the key features and should include a compass. Examples of participatory maps include resource maps, risk maps, and maps of seasonal migration of pastoral and nomadic communities.

Participatory mapping exercises

Group work on mapping

Participants divided into their groups to develop maps for the three communities of Ntandi, Harugale, and Burondo.

Ntandi sub-county

Figure 1. Map of Ntandi town council showing areas of bat concentration

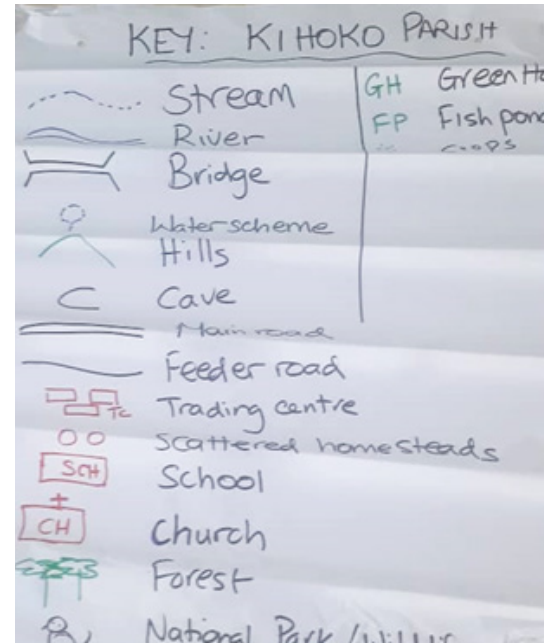
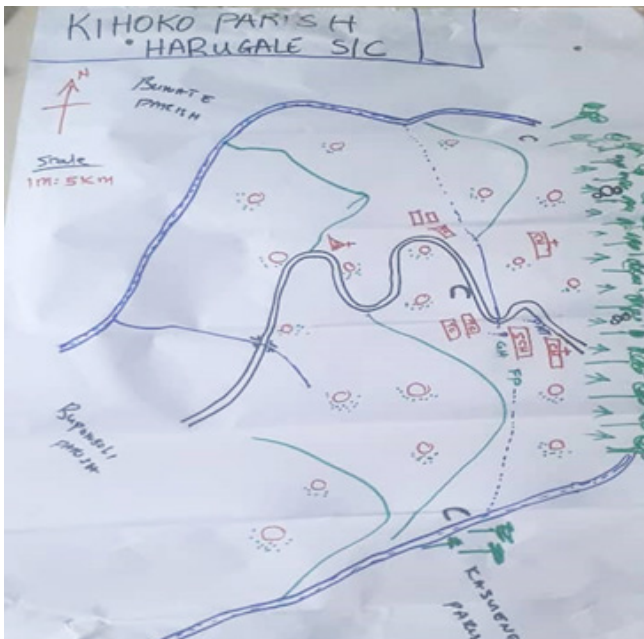


The group named the four major types of bats in Ntandi sub-county:

- Kelibho (small, insect-eating bat)
- Kimulobbu (medium-sized bat that destroys coffee beans and fruit)
- Kisagalagombi (giant bat that eats fruits)
- Mpeheli (climbing bat that climbs trees and eats fruit)
- Kelibho and Kimulobbu live in houses while the Kisagalagombi and Mpeheli live in the Semliki forest

Harugale sub-county

Figure 2. Map of Kihoko Parish showing areas with wildlife



According to the map, bats are concentrated in churches, schools, and caves. A number of wildlife species live in the Rwenzori National Park, including baboons and monkeys. During the discussion on bat interaction with wildlife, one of the participants mentioned a Bwamba tradition that “when a bat eats part of the fruit you let children eat the rest so they don’t lose their teeth.”

The following questions should be asked during the field visit to Harugale:

- What types of bats reside in caves and what do they eat?
- What is the community’s relationship with bats?

Burondo sub-county

Figure 3. Map of Burondo sub-county



In Burondo sub-county, people often come across bat roosts in palm trees while hunting. Bats also roost in banana trees. The Sempaya stream provides water for wild animals, bats, and humans, which poses a risk of contamination. Kyakatimba has a lot of mosquitoes which attracts insect-eating bats. Areas bordering Virunga National Park have a lot of bats because many live in the park.

Developing seasonal calendars as a tool for participatory mapping

Seasonal calendars can be used to show seasonal variations in community activities and reveal potential interactions with wild animals, including bat-human interactions. Bats are common in the dry season because it is harvest season, and they come to eat the ripe fruit (coffee cherries, etc.). People also come into contact with bats during weeding which happens during the rainy season. Bats can be found in coffee and cocoa trees and banana plants.

Group work on seasonal calendars

Participants divided into three groups to develop seasonal calendars for each sub-county and discuss the economic activities and wildlife-humans interactions that take place during the different seasons.

Figure 4. Seasonal calendar for Harugale

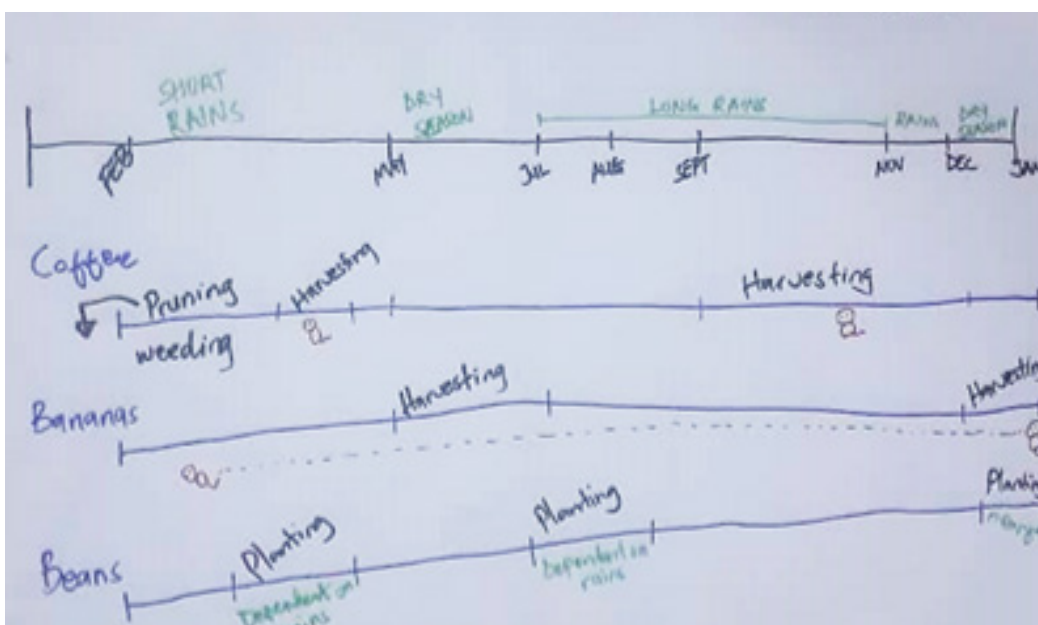
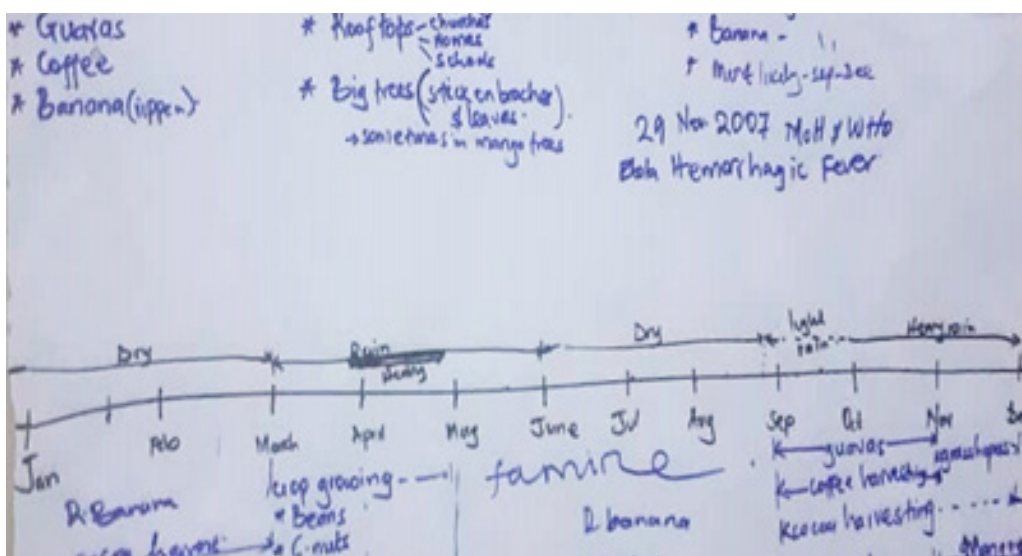


Figure 5. Seasonal calendar for Burondo



DAY FOUR

Day four recapped the first day of phase two of the PE assessment and started with a reflection exercise.

Box 3. Summary of the reflection exercise

“There are so many things I discovered even though I’m already working in this community—I discovered that people eat bats.”

“I learned how to use PRA tools.”

“It’s better to conduct a participatory assessment before outcome mapping so that you can approach outcome mapping with preliminary information.”

“A community member asked me after the meeting if there would be repercussions for those who opened up about eating bats. I assured her that the information was for study purposes only.”

“Every time you go back to the community, you will learn new information.”

“Wildlife is a major source of protein because the area doesn’t have many domestic animals.”

“Though there is evidence of harmful practices in the community, risk perceptions of diseases are low.”

“We recorded over five types of bats and only two big bats are edible.”

Prime Minister Rev. Thomas shared details about the types of bats present in the communities:

1) Kelibho: a small bat that lives in houses and other buildings. It makes sounds similar to rats. Traditionally, it is burnt and given to women by men to secure their hand in marriage;

2) Kimulobhu: a medium bat that lives in mango and other trees. It is the most commonly eaten bat. It makes a noise that sounds like “yoop-yoop,” which lets people know its location. It stays quiet when in danger. Traditional healers have used the head of this bat to keep themselves from falling asleep when hunting for witches;

3) Kisagalambi: a giant bat that is quiet when it expels a sticky sputum from its mouth; and

4) Mpeheli: a flying squirrel that climbs trees and flies between them. The community also divides bat species fruit bats and insect-eating bats.

Matrix scoring

In Phase 2, the facilitator introduced a PE tool called matrix scoring. This is a proportional piling technique that scores a list of items such as diseases, sources of livelihoods, and food types against a number of indicators to create a two-dimensional matrix of scores. The tool takes some time to implement and is used to elicit a more detailed analysis from participants who are more knowledgeable about an issue.

The facilitator formed four groups (mango, pineapple, orange, and mobile) to practice using matrix scoring (Table #, Table #). Participants observed that it is important to rank the issues under discussion before applying the second category of indicators. The session concluded with a planning exercise for the second phase of data collection in the three communities.

Table 4. Economic activities in Burondo (mango group)

	Tree cutting	Tourism	Hunting	Farming	Fishing	Total
Bats	6	4	6	13	3	32
Monkeys	2	5	7	14	2	30
Giant rats	7	0	6	3	0	16
Wild pigs	1	0	1	0	0	2
	16	9	20	30	5	80

Table 5. Diseases affecting different age groups (pineapple group)

	Malaria	Cholera	Ebola	Typhoid	Total
0-5 years	20	1	0	1	22
6-12 years	13	2	0	4	19
13-17 years	7	1	0	7	15
18-30 years	3	1	0	6	10
31-30 years	4	2	0	10	18
Above 60 years	6	3	1	6	16
	53	10	3	34	100

FINDINGS FROM PARTICIPATORY ASSESSMENT

The PE training included a practical participatory assessment in two sub-counties of Harugale and Burondo, and Ntandi town council. The assessment team visited 34 villages to conduct FGDs and KIIIs with community members to understand the risk factors for bat-human interaction, community knowledge, and livelihood activities/options.

Table 6. Villages/sites visited in each sub-county

No	Village	Sub-county	No	Village	Sub-county
1	Kihoko I	Harugale	24	Kyakatimba II	Burondo
2	Kihoko II		25	Kinoni I	
3	Izahura		26	Kinyanjojo II	
4	Bimara		27	Kinyanjojo	
6	Nyalulu		28	Burondo I	
7	Harugale central village		29	Burondo central	
8	Kasulenga		30	Burondo 2	
9	Kitsolima II		31	Kyakatimba I	
10	Bukarara		32	Mwembi II	
11	Kirindi		33	Burangangapasi II	
12	Kabuteti		34	Kinyambogo	
13	Karangitsio I				
14	Karangitsio II				
15	Mpulya III	Ntandi			
16	Mpulya II				
17	Karongoti				
18	Ntandi East Cell				
19	Ntandi West				
20	Bundimasoli				
21	Kabale				
22	Isura II				
23	Ntandi Kapepe				

COMMUNITY LIVELIHOODS AND ECONOMIC ACTIVITIES



Using proportional piling and matrix ranking during an FGD in Mpulya III village, Ntandi Town Council to assess livelihood options

Participants in the three communities confirmed that farming is the primary livelihood activity. Most participants grow cash crops including cocoa, coffee, and vanilla. Food crops, such as cassava, bananas (matooke), sweet potatoes, yams, and beans, are often grown on a small scale for household consumption. People also grow fruits including passion fruits, mangoes, guavas, paw paws, and avocado. Some people raise cattle, goats, sheep, pigs, rabbits, chickens, and ducks though this takes place on a small scale due to a shortage of pastures, thieves, the presence of wild animals (predators) from Mt Rwenzori and Semliki National parks, and the destruction of vanilla vines by chickens.

A few households are also venturing into mushroom growing and tree nurseries, particularly in busy towns located along the road. Participants confirmed petty trade as another major source of income. Some of the

common products and services are charcoal, saloon, cassava flour, fish mongering, and cocoa and coffee broking. The selling of dry reeds and firewood was reported primarily in Burondo sub-county because of its proximity to swamps and forests in Semliki National Park. The community in Burondo sub-county also reported mining sand from streams, fishing from the Semliki river, and quarrying as major sources of income. Brick making and laying and transport, particularly using motorcycles (boda-boda) were common sources of income for youth, particularly in Ntandi town council and Burondo sub-county.

All three sub-counties reported hunting as a source of meat (animal protein) and, in some cases, income. Commonly hunted animals include monkeys, bats, baboons, porcupines, giant rats, and squirrels. Saving and Credit Associations (SACCOs) exist in all three sub-counties as avenues for members to save and borrow money with low interest.

The communities have formed SACCOs for men, youth, and women, which also provide social support to their members. In Harugale, some of the prominent saving and lending groups are Bimara silk group, Bimara Abare Hawoma women’s group, Muhonja women’s group, Rural Disabled Women’s Association (RUDIWA), and Halugale joint environmental conservation and land management group. These groups allow members to save and borrow at a low interest rate of 10% over three months. “Animals like monkeys, baboons, buffaloes, bats, hippos, and wild pigs cross to our farms and destroy our crops. When we report the problems to the game rangers, nothing is done to protect us from these animals.”-a participant in FGD Burondo

Economic difficulties faced by communities

- Wild animals such as baboons, elephants, monkeys, buffaloes sometimes attack people while working in their gardens.
- Wildlife including monitor lizards and pythons from Semliki River eat chickens and goats, particularly in Burondo.
- Crop pests and diseases (coffee borer beetles, banana bacterial wilt, parasitic lichens, and vermin) affects yields, leading to food insecurity and poverty.
- Landslides and erosion during the rainy season destroys crops.
- Middlemen buy premature vanilla from local farmers, which reduces profits from vanilla farming.

Box 4. Livelihoods



WILDLIFE AND ECOSYSTEM INTERACTION

Burondo and Ntandi are close to Semliki National Park where a number of wildlife species live. Similarly, Harugale is located next to Mt. Rwenzori National Park. As a result, the communities of these three sub-counties have regular interactions with wildlife. Species living in the area include large mammals: baboons, black and white colobus monkeys, vervet monkeys, and gray-cheeked mangabeys. Harugale has a number of rivers and streams including River Tokwe, Kabangale stream, Lugo stream, Babutete stream, and Nyaruru stream, which provide water for wildlife and domestic use. Ntandi and Burondo also have a number of streams flowing into the Semliki river; these water points are sites of frequent human-wildlife interaction and can increase health risks, particularly for those who do not purify their drinking water.

Using proportional piling to assess wildlife destruction of crops and livestock

- Baboons: 25%
- Bats: 19%
- Doves 18%
- Mongooses 18%
- Monkey 15%
- Squirrels 5%

**25% of people participating in the exercise ranked baboons as the most destructive animal, etc.*

The community reported that many of these wild animals destroy their crops, which affects their livelihoods. In Kyakatimba village in Ntandi, the community pays a few people

to guard their crops. Using proportional piling, the community evaluated which animals are the most destructive (Box 1). According to the community, baboons are responsible for the highest level of crop damage, followed by bats. Additionally, monitor lizards eat chicks; mongoose, monkeys, and squirrels damage cocoa; and pythons eat goats and poultry. Antelope, turtles, porcupines, snakes, and rats also destroy crops.

Wildlife is also a source of food and income for many families in the area because it is readily available.

“Once you have the meat, it’s easy to find a buyer within the community and in town. For example, a kilo of edible/giant rat is 10,000 Uganda shilling. We don’t sell the meat openly, but you will always find a buyer,” -a youth in Bundimasoli village, Ntandi Town council.

Some respondents reported that eating wildlife is associated with strength and vitality. Communities on the mountain side said that poorer households were entirely dependent on wildlife for animal protein as they did not have sufficient income to purchase animal protein derived from livestock. More affluent households reported that they consumed both wildlife and livestock-derived foods. The communities reported that they have insufficient space to raise livestock, and the PE teams rarely observed chickens and goats.

“Wild animals are good and make us strong because they don’t eat medicine from doctors, they eat herbs. None of you will live up to my age because of the different types of wildlife I have eaten.” -an elder in Ntandi West

Wildlife is also used for medicinal purposes. More recently, conservation efforts have limited the communities' access to wildlife for food and other purposes.

Wildlife significance and use as defined by the communities

Wildlife (Including local name) And Significance and uses

Snake

- Source of food
- Treatment of stone in the stomach
- Head is eaten to boost men's sexual libido

Edible rat (Akatista)

- Highly nutritious
- Used in raw form to treat marasmus
- Tail reduces pain when tied around a painful breast
- Increases life span
- Increases the volume of blood in the body and used to treat anemia
- Used to boost the immune system
- Used to increasing CD4 count for those with HIV
- Treats malnutrition
- Treats hangovers
- Smooths the skin
- Treats skin problems (the hair is burned and applied to the affected part of the skin)
- Used to barter (one edible rat can be exchanged for a rooster)

Squirrel (Emigembo)

- Stimulates hair growth in children
- Makes good soup

Baboon (Engerebe)

- A delicacy and source of meat
- Used to boost immunity

Monkey (Egende)

- Delicacy and source of meat
- Used to boost immunity

Alligator (Embayi)

- Used to heal back pain
- Skin used for cultural decorations

Colobus monkey

- Delicacy and source of meat
- Skin used for cultural decoration

- The presence of its skin in the house is a source of good luck

Tortoise

- Increases life span
- Reduces back pain
- Reduces heart problems
- The white tortoise is in high demand and therefore a source of income

Crocodile

- Promotes growth of teeth
- Increase life span

Guinea fowl

- Source of food

Mongoose

- Source of food

Porcupines

- Source of food

Antelopes

- Source of food
- Horns used as painkillers and to remove bad blood from the body

Turtle

- Source of food

Elephant

- Source of food

Monitor lizard

- Source of food

Bush rat

- Source of food

Crab

- Source of food
- Crab soup used to cure cough

Other animals found near or in the communities include Uganda kob, bush pig, heron, effumbe, fox, large toad, nkenge, nkelebe, nkanga, and mbia.

BAT AND HUMAN INTERACTIONS

Household decision making regards use of fine mangoes and those eaten by bats using dividing pile tool in Ntandi Town council

TYPES OF BATS FOUND IN THE COMMUNITIES

Bats are among the most populous wildlife species in Bundibugyo District. In all three communities, bats were reported to be living in communities and regularly interacting with people. Communities identified two major categories of bat: 1) the small insectivorous bats “akakorokombe,” commonly seen to eat insects at night where there is light, and 2) the big brown fruit eating bats “omulima” (Bakonjo) or Mbehi (luwamba). As mentioned in the section on participatory mapping exercise, the communities identified five species of bat in local languages and described their behaviors and calls.

The different types of bats are associated with different traditional benefits including food. The small black bats known as akakorokombe are not edible and commonly live in ceilings in houses, schools, and hospitals. Community members believe that houses without ceilings are a blessing in disguise for the lack of bats in these houses. The bats largely feed on insects including mosquitoes, and their presence is associated with bed bugs, mites, and lice. They prefer living in dark corners. Because akakorokombe live in hospitals where people are sick and die, they are believed to be poisonous and associated with sadness, curses, witchcraft, and death.

The big brown bats known as “omulima” eat fruit and are eaten by people

in most communities as a source of protein. They commonly live in forests, caves, large trees, and gardens. During the day, bats are not visible in the community, but at night they leave their roosts to feed on ripe fruit such as mangoes, yellow bananas, avocados, and coffee berries. The large bat known locally as Mpeheli is black and makes sound like a knocking nail. They prefer habitats near cold, flooding water.

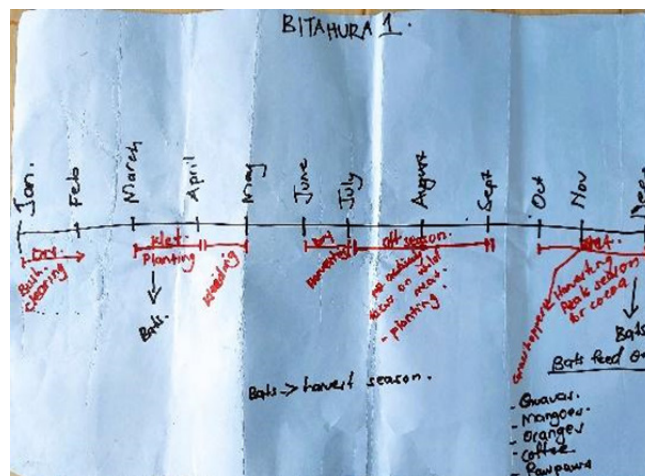
Table 7. Traditional beliefs around certain species of bat

Types	Importance/benefits	Dangers/risks/ disadvantages
Emirima (large bat)	<ul style="list-style-type: none"> • Boosts sexual performance in men • Increases life span • Promotes growth of strong teeth in children (“You will never lose a tooth when you eat a bat”) • Makes one physically fit and strong by boosting the immune system • Makes children become clever • Given to young men to eat after circumcision to show sign of maturity • Used to treat cough • Meat served to husbands hind the relationship and leads to stable families • Used to speed up labor process in childbirth • Strengthens the bones • Treats malnutrition • Treats hardened stomach/constipation • Used by traditional healers to boost customers’ business (“the teeth of giant bats, giant rats, and other herbal medicines are wrapped together in a piece of cloth and put in a shop’s money drawer to attract customers”) • Traditional healers say that eating bats’ wings makes one live longer • Eating bats, especially the legs, heads, and the heart strengthens love between couples. One traditional healer said if you burn/roast bat wings and use the ashes in food or tea, there will be no chances of divorce • “Omulima, is unique from other bats, when you eat it, your enemies will not defeat you, you remain strong and respected” <ul style="list-style-type: none"> ● Disperses seeds ● Attracts tourists to the caves where they roost. This brings revenue to some individuals in communities. ● Used for research purposes especially regarding potentially associated pathogens 	<ul style="list-style-type: none"> • Destroys foods crops (bananas, coffee, guavas, mangoes, avocado) • Pollutes water sources (stream) • Believed to transmit diseases like Ebola and Marburg; when humans eat food or fruits that have been in contact with bats, they can acquire dangerous diseases (“The big bats leave vomitus on fruit”) • Eating fruit bitten by bats is believed to cause diarrhea

<p>Akokorokombe (small bat)</p>	<ul style="list-style-type: none"> • Not a food source • Burned to preserve marriage • Uses as a biological agent to eliminate mosquitoes • Used to treat backaches • Used to address developmental delays in children, particularly walking. When a bat's leg is tied to a baby's hand, the baby will start walking • Makes noise while hanging in the roof, which helps to wake people up early in the morning • 	<ul style="list-style-type: none"> • Bat excreta causes a bed smell in the houses ("Just two bats can excrete two kgs of feces in the ceiling in just two days") • Believed to have acidic urine that weakens ceilings and contributes to their collapse • Pollutes harvested rainwater in homes • Infests households with lice, bed bugs, and mites, which affects both humans and livestock • Believed that akakorokombe can pick one's hair or piece of cloth as litigated by a traditional healer
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SEASONAL AND CLIMATE FACTORS THAT INFLUENCE BAT PRESENCE.

The communities report that bats are endemic because of the large nearby conservation areas where they live and breed. The bat presence is also largely influenced by seasonal factors. Bats seek shelter in houses during the heavy rainy season April-July. Some of the bats take shelter in the gardens under banana leaves and shoots and in coffee and cocoa trees, and people come into contact with them as they weed their gardens. During the harvest season (August-October), the bat population is high in the gardens because they come to feed on maturing plants. Children also eat this food which poses a risk of spillover from bats to humans.



A seasonal calendar for Bitahura over one season

Deforestation has also destroyed bat habitats, which drives them to seek shelter in trees and caves near communities. Insectivorous bats enter houses to look for insects to eat, including mosquitoes. and to seek shelter from harsh climates.

ACTIVITIES THAT INCREASE BAT-HUMAN INTERACTIONS

Communities shared their experiences of activities that put them in close contact with bats.

Table 7. Activities that increase exposure to bats according to FGDs

Activity	Exposure
Farming	Bats hide in shrubs, cocoa trees, banana and fruit plantations. During gardening activities (planting, weeding and harvesting), community members are in constant contact with bats and/or their fecal waste and vomitus. During growing and harvest seasons, bats are present in fruit trees and eat the fruit that is also eaten community. The risk of exposure to transmitted diseases is higher in communities experience water scarcity and/or for school-age children because these populations may not wash the fruit before eating it.
Collecting firewood and fruit	Women and children are exposed to bats when collecting firewood and picking fruit from the forest.
Hunting	Community members use catapults and nets for hunting bats from caves, trees, and game parks.
Fetching water	Women and children are exposed to bats when they collect water from streams near bat caves.

BAT HUNTING AND PREPARATION

Bat hunting contributes to the livelihoods and food security of the communities of Bundibugyo. Communities hunt bats using several methods including a catapult to shoot bats from trees. Some cave hunters use mosquito nets that they spread at the entrance and poke the bats with a stick. The bats are trapped in the net as they flee the cave. Men and adolescent boys are the primary bat hunters. In most of the communities, people use sticks to beat the bats away from gardens and households. Bats are processed and prepared in the following ways:

- The carcass is handled with bare hands when it is put in a bag and transported home for processing.
- Bats are skinned in a way similar to goats and roasted by hanging on sharp sticks. Men are the primary preparers and consumers of roasted bats.
- Bats are also prepared by smoking off the hair, removing the intestines, washing, and cooking, similar to chicken. They are cooked with tomatoes, onions, and other ingredients.
- Traditional healer use live bats to communicate to evil or ancestral powers or spirits.

- Traditional healers sun dry bats with or without the intestines prior to using as a powder. According to a traditional healer, “We use them for strengthening marriage relationships and love. This involves putting sundried bat powder in a small saucepan and adding burning charcoal. Then, as the wind blows the smoke, you mention the name of your lover. In that way, your relationship remains strong.”

Buying and selling of bats in the community

Communities reported that some individuals sell and buy bats. In Harugale, the giant bats (omutima) are in high demand as food and medicine. Traditional healers may also pay a high price for bats because they need specific types and sizes, sometimes urgently. As a result, this type of bat is expensive and costs at least UGX 20,000 shillings (USD 5). The economic value of bats motivates hunting in the community. Sometimes bats are exchanged for items such as chicken and other types of food.

MEASURES THAT HAVE BEEN USED TO KEEP BATS OUT OF HOUSEHOLDS

When asked how they keep bats out of their homes, many participants said they have not tried because they did not perceive bats as harmful or they thought it was impossible to keep bats away. Others thought bats were useful. Some people had attempted to keep bats away using the following methods:

- Using sticks to chase bats away
- Mixing ash, red pepper, “mubirizi,” and water and sprinkling the mixture around the house to prevent bats from entering
- Spraying bats with chemicals
- Planting unique bat-repellent tree species
- Most of the households said that despite all these interventions, the bats remained in their homes.

COMMUNITY PROPOSALS TO MINIMIZE HUMAN-WILDLIFE INTERACTIONS

Bat-specific interventions

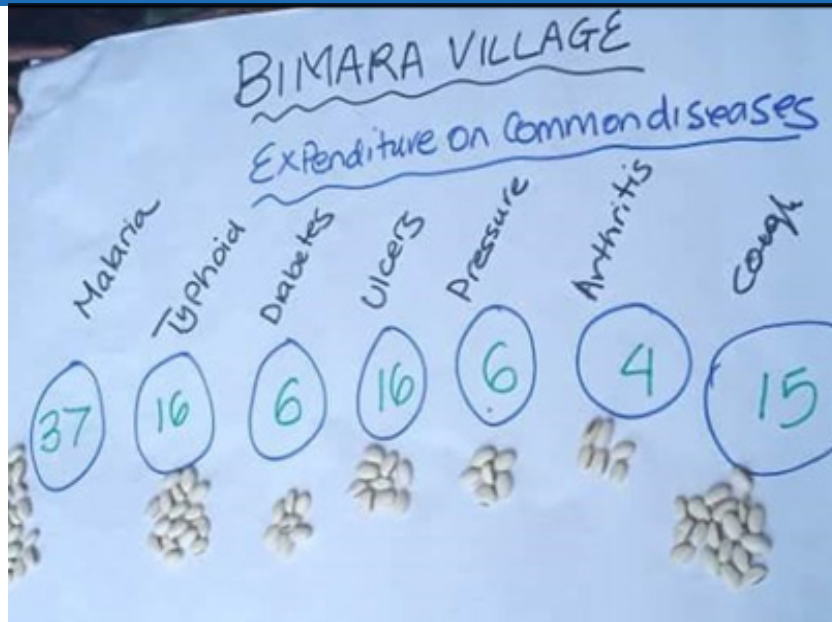
- Wire mesh should be provided to cover house ventilators and prevent bats from entering houses.
- Uganda Wildlife Authority (UWA) should introduce the “omutembo tree,” a species bats prefer, in the game parks, to help attract bats back into the conservation areas and away from the communities.
- Nets could be introduced to trap bats and reduce the destruction bats cause to crops and other property.

Wildlife interventions

- Increase direct cooperation with UWA to ensure revenue sharing to compensate people for their destroyed crops and livestock.
- A tap water system with treated water should be introduced to reduce risks of consuming water contaminated by wild animals.
- Local community members should be trained on how to protect people and property from wild animals.
- Fencing with bee hives could be installed to scare away elephants because they fear bees.

HEALTH PRACTICES

The participatory assessment evaluated the health status of people living in the three sub-counties, including common diseases, health seeking behaviors, and health practices.



COMMON DISEASES AND HEALTH CONDITIONS

The communities reported that diseases largely affect children under five years and the elderly. Some of the common diseases cited included malaria, typhoid, cough, stomach ulcers, diarrhea, diabetes, hypertension, eye diseases and arthritis. Discussions revealed malaria to be the leading cause of sickness, followed by typhoid, gastrointestinal infections often related to stomach ulcers, and coughs/colds. Older people complained of diabetes, hypertension, and arthritis. Malaria is prevalent because mosquitoes breed in cocoa trees and areas around the several streams and swamps in the communities.

The communities explained that typhoid, diarrhea and cough were caused by drinking unpurified water from streams. People also associated ulcers with hunger caused by the limited availability of food in most of the households and impurities in the locally milled cassava flour commonly eaten in the area.

HEALTH SEEKING BEHAVIOR AND PRACTICES

Findings reveal that the majority of households use herbal remedies for immediate relief when they are unwell.

The community shared that this traditional knowledge has been passed down from generation to generation and remains useful. Using herbal remedies first is largely motivated by their availability and difficulty in traveling to government health centers due to distance and difficult terrain (e.g., Karagitsio II village in Harugale). Burondo HCIII, Ntandi HCIII, and Bupomboli H/C III were reported to have poor quality services, including long wait times, frequent drug stock outs, and not enough health care workers. Some people choose to visit private clinics if they can afford it.

Table 8. Medicinal remedies used by the communities

Local remedies (local, English, and scientific names)	Diseases
Kibirizi mixed with Nimu (lemon) and Ekinyaso (Embena) Leaves of passion fruits, avocado leaves, Muthoghongera Omubiriri and aloe Vera, enzombu, endene, Kiremyamuliro	Fever and malaria
Dried and crushed pawpaw seeds used as tea	Typhoid
Black jack (<i>Biden philosa</i>) and Macadona (Kibumbanyungu)	Diarrhea and typhoid
Crushed sweet potato vein taken in cold water	Diarrhea
Cocktail of Moringa, Engote, and Neem tree bark	Back pain
Leaves of guava and mango trees are boiled and drank	
Omwenyi, Eucalyptus, and mango tree bark (<i>Mangifera indica</i> , mango tree)	
“Kirimyamulero” added to honey	Cough
<i>Prunus africana</i> (Engothe), Wambogya Mugambiasis	COVID-19 and worms

Community health workers, also known as Village Health Team members (VHTs), link communities to health facilities. They often provide first aid and treat simple ailments such as fever, headache, and diarrhea and provide oral rehydration and anti-malarial medicines. VHTs and local council leaders provide information about sanitation and personal hygiene best practices .

FOOD, WATER, AND SANITATION

Water: Rivers and streams are major sources of domestic water in the three communities. River Tokwe and Nyaruru streams are the major sources of water in Harugale sub-county. Trees alongside streams are major habitats for bats. In the evening, bats are seen diving and playing in the stream where people collect water for domestic use. Monkeys and baboons also play in and drink the water in streams, which is a primary point of interaction with humans. Although water from these streams is perceived to be unsafe for drinking, community members confirm they do drink it. They also drink harvested rainwater, which can

also be contaminated by bats hiding in gutters. is equally contaminated by bats since they hide in the gutters. Many households reported they did not boil their drinking water because of a lack of fuel and/or firewood for boiling water and a general preference for drinking water that has not been boiled.

“I prefer drinking unboiled water because it is tasty; boiled water is tasteless.” -a man in Kabingo I village

Men also said that their farming activities near the national park and away from their homes is a barrier to boiling water before drinking.

“We keep on moving from place to place and there is a likelihood of spending three days away from home, so it’s better for you to get used to drinking the natural water. For me I’m allergic to boiled water, and when I drink it I develop a cough.” -a man in NAME village

Food safety: Some of the food safety practices observed in the community

were fairly good. Most participants confirmed that they cover stored food in a container and keep it warm. In some of the households infested with bats, uncovered food and water in the houses is contaminated by bats excreta, especially from the bats that live in ceilings. Washing fruit before eating is not a common practice in the area. Most people, particularly children, pick fruit from the gardens and immediately eat them.

In some of the FGDs, community members reported that children eat fruit that are partially eaten by wildlife including bats, monkeys and baboons. There is a traditional belief children's teeth will be stronger if they eat on fruit partially eaten by bats. Sanitation and Hygiene: During the FGDs, the research teams explored the sanitation

and hygiene practices of the communities. Findings revealed that many households own a latrine, although some latrines are not built. Communities reported that handwashing practices are poor, particularly after visiting the pit latrine.

“In most of the households, people put a jerrycan with water outside a latrine for handwashing only when they anticipate that there is a visitor coming to the home.”
-FGD Kinyanjoko

CONCLUSION

Participants in the PE training and field assessment learned the knowledge and skills they will use in further research and intervention activities for STOP Spillover project activities in Bundibugyo. The STOP Spillover team, participants, and other stakeholders now have more insights into the social, cultural, behavioral, and economic activities at the bat-human interface.

The activity provided opportunities for the project team to work closely with the OH-DREAM members and better understand the critical role PE will play in project activities at the bat-human interface. One lesson learned from the results of the PE assessment is that it should have been conducted before interface OM. The project team now has a relationship with community and can now better work with community members to develop and adapt more innovative

interventions.

The findings reveal that communities are constantly interacting with bats and other wildlife as they go about their daily activities. While there were several observed dangers of interaction with wildlife, the communities also see the wildlife presence as beneficial in terms of a food source, traditional medicine, spiritual healing, and community relationships. Health authorities do communicate about the health risks of bat and wildlife interaction, such as Ebola and Marburg, but the communities' risk perception is low because they have not experienced disease outbreaks directly related to bat or wildlife consumption.

They did express willingness to try different interventions to keep bats away from their households, largely motivated by the discomfort bats cause (e.g., they smell bad,

bring in bugs and lice, and destroy parts of their houses).

move into areas with unfriendly terrain. This was corrected in Phase 2.

ACHIEVEMENTS

1. Twenty-four participants (Annex 1), including research assistants, OH-DReaM members, STOP Spillover project staff, received training on participatory epidemiology, practiced applying their skills in guided field practice, and began to acquire an understanding of the communities where STOP Spillover will be implemented.
2. The participatory assessment took place in Ntandi town council and Harugale and Burondo sub-counties and provided information on wildlife-human interactions (including bats), livelihoods, health practices, and water and sanitation systems in the communities. This information will inform the project interventions designed to help communities safely live with bats.
3. The community meetings were instrumental in introducing the project to the communities and laid a firm foundation for subsequent community activities.
4. The district-based OH-DReaM team actively participated in the training which reinforced a collaborative relationship between the partners and seemed to improve their confidence in supporting project activities.

CHALLENGES

1. The activity took place during the wet season. Rains often interrupted community meetings or delayed participants in reaching meeting venues.
2. Transport was a challenge as some of the hired vehicles were not in good running conditions hence several breakdowns were experienced during the activity especially when they had to

NEXT STEPS

1. Disseminate the findings of the PE exercise to both national and international STOP Spillover team members and to key project stakeholders including district and community leaders, national stakeholders, and USAID.
2. Use the findings to refine STOP Spillover interventions 1) improving household and community practices to reduce human contact with bats, and 2) promoting protection of household and communal water resources and food safety.
3. Use the knowledge obtained through the participatory assessment to further refine and initiate the participatory surveillance program.
4. Complete activity 1.2.6.2: Assessment of behavioral, sociocultural, gender-specific, and economic risk factors to concurrently inform interventions that improve household and community practices to reduce human contact with bats.

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APPENDIX 2: PHOTOS OF PE TRAINING



Jeff Mariner explains the use of community maps during the training session



Rev. Thomas presents the proposed checklist of topics to explore during the field assessment



Matte presents the map of Kihoko I village following group work session on mapping



Jeff demonstrates the use of proportional piling as a tool for participatory mapping

PHOTOS FOR PARTICIPATORY ASSESSMENT



A community dialogue meeting in Ntandi Town Council



One of the participants explains the community map drawn in



An ongoing community meeting in Burondo sub-county



Using proportional mapping during participatory assessment in Ntandi town council



A traditional healer's shrines in Harugale sub-county



A proportional piling study in Harugale sub-county



Discussing common human diseases using proportional piling as a tool in Harugale sub-county



Discussing sources of animal proteins using proportional piling as a tool in Harugale sub-county

APPENDIX 3: CHECKLIST FOR FOCUS GROUP DISCUSSION

Livelihoods

- Major questions explored
- Livelihood activities
- Activities that increase interactions with wildlife

Health practices

- How sick people are attended to
- Which health facilities do they use
- Which other alternative medicine do they use
- How far is the health facility from their location

Food, water, and sanitation

- The types of food they survive on
- The sources where they obtain the food
- Methods of collection
- Contamination points of water sources
- Who collects the food
- Who prepares the food
- Different points of interactions with wildlife
- Different practices involved in handling water

Interactions with and knowledge about bats

- The different bat species in the area
- Habitats
- Dangers of bats
- Uses of bats
- Seasons of interactions
- Who is more exposed to the bats
- Bat value chain

Bat value chain

- Hunting and methods used
- Transportation
- Processing/preparation
- Trade
- Consumers
- Risks involved in associating with bats throughout the value chain

APPENDIX 4: CHECKLIST FOR KEY INFORMANT INTERVIEW

The interview is intended to provide a deeper understanding of economic, behavioral, socio-cultural, and gender-based factors that contribute to increased risk of human-bat interaction and possible transmission of viruses from bats to humans. Results from this discussion will contribute to the development of social and behavior change strategies, development of a bat monitoring system, and related activities.

1. Do you know the different species (types) of bats in this area?
2. What is responsible for the high number of bats in the community (homes, schools, churches, crops)?
3. What are some of the benefits of bats?
Probe:
 - a. Cultural, environmental, agriculture, health and environmental benefits
 - b. What role do bats play in people's diets?
 3. If bats have traditional medicinal values
 - a. What species/types of bats are used for medicinal purposes?
 - b. Where are the bats for traditional medicine obtained from?
 - c. How are they used in treatment of disease?
 - d. What conditions/disease do they treat?
4. What are some of the dangers or disturbances caused by bats?
 - a. Role of bats in diseases like Ebola and Marburg
 - b. Damage to crops
 - c. Contamination of food and water
 - d. Shame
5. What activities bring people close to bats in the community?
Probe:
 - a. Role that are dominated by women, men, youth, boys, and girls
6. What measures have been used to keep bats out of households? Have these measures been successful?
7. What would a successful bat control program look like?
8. Do you have any questions?