



EcoHealth Alliance

Mid-Term Evaluation

**Strengthening Health Security and Biosecurity in Tanzania
by Biodetection Capacity Building**

*A partnership project of the Tanzanian Veterinary Laboratory Agency
and the Centre for Military Medicine, Finnish Defence Forces*

RFQ 400000691-MTE Tanzania

United Republic of Tanzania
April 2-8, 2017

EcoHealth Alliance
Ellen P. Carlin
Carlyle Gollogly



Final Report: May 9, 2017

Table of Contents

| | |
|--|-----------|
| Summary | 2 |
| Assessment | 3 |
| Major Accomplishments | 3 |
| Key Findings | 3 |
| Challenges, Lessons, and Recommendations | 6 |
| Further Recommendations and Considerations | 7 |
| Conclusions | 8 |
| Appendix A: Methodology | 10 |
| Appendix B: Relevant Documentation Reviewed | 12 |
| Appendix C: Agenda and Participants | 13 |
| Appendix D: Evaluation Matrix | 16 |
| Appendix E: Acronyms | 34 |

List of Tables

- Table 1: Challenges, Lessons, and Recommendations
- Table 2: Further Recommendations and Considerations
- Table 3: Summary assessment based on evaluated criteria

Summary

The bilateral collaboration between Finnish Centre for Military Medicine and the Tanzania Veterinary Laboratory Agency (TVLA) to strengthen laboratory capacity and raise awareness in biosecurity and biosafety in Tanzania is exemplary of engagements based on a commitment to sustainability, ownership, and long-term success in mitigating infectious disease threats. “Strengthening Health Security and Biosecurity in Tanzania by Biodetection Capacity Building” can be seen as a model to international partnerships supporting the reduction and management of infectious diseases. The approach applied in designing and implementing this project is one of shared accountability, open and transparent management, and a One Health collaboration that will leave an impact on the enhanced capacity of Tanzania to detect, diagnose, and respond to infectious disease threats.

Major Achievements

- Collaborative effort with clear ownership and engagement apparent on both sides
- The benefit provided relative to the program costs is substantial
- On schedule to achieve the objectives for which it was designed
- Strong level of ownership and pride in Tanzanian project personnel
- Potential real impact on the accuracy of disease diagnosis in animal and human populations

Key Challenges

- Capabilities not likely to be sustained without continued internal and/or external support
- QA/QC in the laboratory
- Institutional costs to TVLA undefined

With the provision of mobile rtPCR equipment to key zonal animal health laboratories operating in rural districts with high burdens of disease, daily animal-human interfacing, and previously underserved populations, the expertise and capabilities of Tanzanian health sectors to deal with biothreat management in concordance with a One Health strategy is strengthened and the possibility of infectious disease outbreaks reduced.

This mid-term evaluation (MTE) was designed to address achievements and value-add of the project thus far; provide recommendations for improvement; and assess the need for/relevance of continuation of financing until 2018. The project’s primary objective – to outfit Tanzanian veterinary diagnostic laboratories with mobile equipment allowing a more rapid response to suspected outbreaks – is on schedule for completion by the project’s end date. The transference of human capacity and increased capability in responding to disease threats has been a major focus of the project and is creating solutions to disease mitigation that exceed the single infectious disease focus paradigms of many other projects. Training on laboratory equipment and biosafety and security practices has enhanced TVLA’s ability to manage and respond to threats posed by pathogens of security concern and a burden to an already overtaxed health system. The capacity gained through this program has allowed TVLA to become a valid resource within the community and government. Overall, the evaluation team has found that this project has been a success in executing and implementing activities at a community-based level that supports larger policies on global health security.

The greatest challenge faced will be sustainability. This project has built a foundation that has laid the groundwork for what can be a sustainable solution to zoonosis biodetection; however, without continuation of internal and/or external support, it will be difficult to maintain the newly-found capacity. The next phase, in whatever form it takes, should build on this foundation, ensure its stability, and support the advancement of the project activities conducted thus far. In addition to maintenance, growth is critical. This project can be leveraged to advance scientific research and a better understanding of and response to global disease threats. Continuing to develop human capacity, as well as ensuring technology and resources are available to address the burden of disease in Tanzania, are outcomes that require continued investment and collaboration.

Primary Recommendations

- Management emphasis on M&E, and training on fiscal methods
- Standardization of training, sampling plans, and testing algorithms
- Focus on key elements of operations: cost-sharing, power supply, and vehicular transport
- Development of QA/QC protocols

Assessment

Based on guidance from the Finnish government, this mid-term evaluation (MTE) was designed to address achievements and value-add of the “Strengthening Health Security and Biosecurity in Tanzania by Biodetection Capacity Building” project thus far; provide recommendations for improvement; and assess the need for/relevance of continuation of financing until 2018. A team of two (2) evaluators from EcoHealth Alliance participated in a week-long evaluation of the project. This took place in Tanzania (henceforth URT) from 01-08 April 2017. The evaluation team (ET) visited project sites in Arusha and Dar es Salaam and were accompanied by Tanzanian and Finnish project personnel, as well as the Finnish Permanent Secretary from the Ministry of Social Affairs and Health (MoSH) and a Senior Advisor from the Ministry of Foreign Affairs (MFA), Finland.

The results from the evaluation are presented in this report, to include the following:

1. Relevance, efficiency, effectiveness, impact, sustainability, coordination, complementarity, and coherence of the project to date.
2. Evaluation of performance of the project to date, how well it has achieved its objectives and purposes, successes and constraints, and any other outcomes.
3. Recommendations for improvements and practical solutions for the duration of the project period in order to achieve the objectives, improve the effectiveness and efficiency, ensure sustainability, and remove constraints.

Major Accomplishments

1. The project has established functioning qPCR laboratories in three (3) locations, and supplied the training, equipment, and consumables to diagnose seven (7) major zoonotic diseases.
2. Approximately 30-40 individuals have been trained to conduct these diagnostics, adding a substantial level of technical capability that did not previously exist in URT.
3. TVLA has received a significant training emphasis on biosafety and biosecurity (BS&S) that had been insufficiently prioritized previously.
4. Time to detection of the priority zoonoses has been decreased. Previously it could take up to a week to get a laboratory diagnosis; now, depending on what the sample is and where it was taken, that time is reduced to three (3) days or, in some cases, one (1) day.
5. The project has in many ways supported the objectives of major international frameworks, including GHSA, the Global Partnership Program (GPP), and the Biological and Toxin Weapons Convention (BWC). For instance, instead of transporting pathogenic samples across the country to the Central Veterinary Laboratory (CVL), the zonal laboratories can extract and send DNA, minimizing the transport of actual pathogens and the major biosecurity risks inherent in that process.

Key Findings

URT has made significant progress in its approach to animal and zoonotic disease control, but is still struggling to optimize detection and control. This project supports enhanced country capacity in disease detection, reporting, and response by strengthening laboratory and field capabilities through diagnosis of clinical samples. It also supports enhanced communication, information sharing, collaboration, and a One Health approach to the mitigation of infectious disease threats.

The following categories highlight major findings of the MTE based on six requested criteria:

Relevance

- Finland (FI) worked from the project’s inception to ensure participation of a strong Tanzanian partner agency, as well as development of desired outcomes such that the project would be

mutually beneficial to both countries. *This is truly a collaborative effort with clear ownership and engagement apparent on both sides.*

- Both countries have described substantial benefit based on their own needs. While the MTE did not incorporate interaction with private sector representatives, community level representatives, or other stakeholders, TVLA's outreach to such communities is evident and utilizes both a multi-sectoral and multi-level approach.
- The particular relevance of the proposed objectives to both URT and Finland has remained stable since the project's inception.

Efficiency

- *EHA assesses from a qualitative perspective that the benefit provided to URT (and FI) relative to the program costs is substantial.* Although not assessed quantitatively, we believe that the potential health benefits of early detection are high and are worth the program costs.
- Project activities have generally expended a relatively small level of fiscal and human resources quite efficiently. The project is operating within budget and the milestone objectives are being met on time. All activities are anticipated to be complete by the project end date.
- Training is one of the most critical forms of technical assistance that FI provides. Major training has been undertaken in both FI and URT and appears to have provided the needed outcome – i.e., a Dar es Salaam-based technical staff capable of collecting samples and performing diagnostics, and training their counterparts in the zonal area to do the same. The train-the-trainer approach that FI has employed is the most efficient means to achieve the project training goals.
- Day-to-day management, including coordination and communication, appears effective on the parts of both partners. There are open lines of communication, regular in-person meetings and phone calls, and a sharing of information, including fiscal information, that serves the project well and allows challenges to be raised and addressed.
- Institutionally, TVLA appears to be cooperating well with other stakeholders, including within its own ministry and with other ministries. Similarly, at the Finnish level the project is quite multi-sectoral, involving three ministries, each of which appears to have substantial understanding that the project is an important undertaking supporting national and international development and public health goals.
- Finnish monitoring of the project and indicators to ensure that pre-determined objectives are met has been an open and collaborative process inclusive of the URT partners. The project, however, might benefit more with Finnish-organized implementation of additional monitoring and evaluation, as well as enhanced project coordination. Finland's hands-off approach is laudable, and speaks to longer-term sustainability in ensuring URT ownership. Striking a balance, however, with hands-on oversight as the project execution continues is key in assessing capability gaps, and internally identifying practices that can support enhanced implementation, management, and overall achievement of project goals. For example, areas that can benefit from enhanced oversight include troubleshooting laboratory contamination issues, sampling models, and confidence among trained staff in their abilities.

Effectiveness

- *The project is on schedule to achieve the objectives for which it is was designed.*
- Three operational labs for PCR detection of zoonoses have now been established in Dar, Arusha, and Mwanza. The labs have the equipment, reagents, and supplies that they need to perform the testing.
- The project is also effective for advancing knowledge in FI. It provides a kind of "live agent training" to which the scientists there would not otherwise have access.
- This project appears to have an acceptable level of risk. FI has created an environment in which TVLA has ownership of this program; this seems to have developed a sense of accountability on the part of URT for ensuring the project's success and continuation. This, combined with traditional approaches to ensuring accounting transparency, and regular

reminders that the project is finite in duration, have likely mitigated risks to the project such as corruption. Training provision by FI to TVLA on standard accounting processes could mitigate this risk further.

Impact

- *Although difficult to measure, the training of human health personnel has potentially increased the accuracy of disease diagnosis in URT, which may then mitigate morbidity and mortality among its animal and human populations.*
- An important impact for URT is the training and enhanced capabilities with standard operating procedures that may ultimately assist its potential to achieve laboratory accreditation.
- Through sharing information, samples, and diagnostic capabilities, TVLA feels that it is becoming a resource for local communities and for other laboratories; such an impact may grow as the project matures and more partners become aware of it.
- Working at the community level allows the URT government to relate to its people that they are working to keep their population safe and healthy, a particularly relevant impact in a continent that is still concerned about Ebola.

Sustainability

- *Overall, the capabilities that the project has developed are not likely to be sustainable without continued internal and/or external support.* It may be sustainable if a cost-sharing plan with external donors is developed.
- Many global health projects have supported the development of capacity and laboratory capabilities focused on a single disease. A significant success of this project is its focus on agreed-upon priority pathogens and technology transfer that has a multi-pathogen focus and ability to incorporate additional pathogens. This allows for a more streamlined process in disease detection and optimization of lab capacity.
- The zonal laboratories do not have access to generators or other forms of back-up power supply, which is critical in maintaining cold chain and best practices. Supporting this infrastructure is key to sustainability.
- Securing support of a dedicated project vehicle or transport mechanism for the use of personnel in outbreak response and sample transport is necessary to avoid delays in project execution due to the lack of dependable transportation.
- EHA does not have access to a specific accounting of the number of times, locations, and species from which samples have been collected. It appears that there is no systematic approach to sample collection for the purpose of monitoring/biosurveillance. Developing such an approach could allow for maximizing sample collection, thereby providing a path both to maintaining a high level of capability in using the system, and in creating fertile ground for the future funding of more research-oriented projects.
- Without standardization in M&E, as well as routine sampling to optimize laboratory output and accuracy, there is a level of risk involved in the ability to respond to a high-volume outbreak. Practice and additional, regular training (even table-top training but especially lab bench and systems management training) will be key to ensuring high-throughput capacity.

Coordination, Complementarity, Coherence/Aid Effectiveness

- The partners have done an excellent job ensuring the integration and collaboration internally among the bilateral teams, achieving immediate goals and ensuring broader impact to Tanzanian and even global health. This successful model is reflected in external communication practices, as well.
- *The project has facilitated a strong level of ownership and pride in the URT project personnel.* URT is proactive in continuing to enhance its capabilities, which FI's way of managing this program has supported.
- Clear communication has been a priority, particularly in terms of fiscal transparency for both sides of the partnership.

- The project is complementary to other ongoing (and perhaps future) initiatives in the country. For instance, the IAEA is in the process of providing a qPCR machine for the zonal laboratory in Dodoma to extend project capabilities. It appears to be very synergistic with other ongoing programs in-country supported by USAID, FAO, OIE, the Africa Union, and the Southern African Development Community through information sharing, attendance at technical meeting groups, regional workshops, etc. It does not appear that TVLA is duplicating efforts, but rather adding to country capacity through the mentioned programs as well as by supporting international frameworks.
- The MTE did not reveal contradictions with existing TVLA or Tanzanian policies. In general, this project appears synergistic with policies, plans, and goals of the URT. URT is finalizing its National Health Security Action Plan to address gaps revealed by the Joint External Evaluation (JEE). The ET feels that this project is an excellent example of capacity building that rolls up into the larger goals of One Health and GHSA.

Challenges, Lessons, and Recommendations

Table 1: Challenges, Lessons, and Recommendations

| | |
|------------------------------|---|
| 1. Management | <p>a. Project oversight: FI should consider implementation of more and perhaps more random M&E in addition to the routine coordination. FI's hands-off approach is laudable but in some respects may be reducing opportunities to assess capability gaps, and therefore to find efficiencies and achieve goals.</p> <p>b. Fiscal accountability: All projects like this carry an inherent risk in financial management, whether as a result of inadvertent mismanagement or corruption. Provision by FI to TVLA of training on standard accounting processes could mitigate this risk.</p> |
| 2. Standardization | <p>a. Training: FI should solidify its training plan between now and the end of the project to ensure maximization of opportunities for training and for certification of project personnel before the project's completion. Four (4) satellite laboratories (plus the Dodoma lab with support from IAEA) will be operating soon and will need at least annual training follow-up and M&E. Using existing experience, FI should consider developing training manuals (or transferring Finnish manuals to URT) that TVLA can use for training promoting the ToT approach, and increased sustainability.</p> <p>b. Sampling plan: With three (3) laboratories up and running, and two (2) more on the way (Iringa and Dodoma), the development of a regular sampling plan is advised. Because the quantity of samples that will be received passively for processing, or actively as a result of outbreaks, is unknown and irregular, a plan to capture a certain minimum number of samples in a variety of areas, with analysis shared across all trained laboratories, may be an important element to ensure practice and sustainment of the learned skillset.</p> <p>c. Testing algorithm: Because testing on rtPCR is expensive, it may ultimately be preferable to undertake a rapid test or other screening prior to utilizing the PCR equipment. FI should consider developing such an algorithm with the TVLA partners. The cost reduction achieved through development and implementation of such a testing algorithm will need to be weighed against the benefits of regular practicing on the equipment as described above.</p> |
| 3. General operations | <p>a. Cost sharing analyses: TVLA has expressed an interest in recouping operational costs. TVLA should undertake an evidence-based analysis of its overhead expenditures on this project. Operational costs need to be fully evaluated before a fair level of cost sharing for future stages of the project can be determined.</p> |

| | |
|---|--|
| | <p>Because TVLA has limited capacity for such an evaluation, external support is required. This could be achieved by securing a volunteer, short-term business analyst, or Master's or PhD business student to assist in this task.</p> <p>b. Power supply: Although costly, it is important to ensure integrity of the power supply. Although a generator has been provided to the lab in Dar, it is also critical that the zonal laboratories are able to maintain stable power in routine operations. Back-up power systems dedicated to the project labs may be a viable alternative to generators.</p> <p>c. Vehicular transport: Ensuring sustainability of capacity to collect and transport samples via laboratory vehicles is an important issue for TVLA. One option to achieve this would be for TVLA to purchase a vehicle with its own funds, and then lease the vehicle to the project to provide routine operational support.</p> |
| 4. Quality assurance/control (QA/QC) | <p>a. Protocol development: FI should help TVLA establish QA/QC protocols and practices. A plan or an algorithm for QC would be useful; it could be as simple as the provision of additional guidelines or protocols to ensure quality results. Institutionalization of QC measures will be particularly important in a large outbreak situation. In the laboratory, the primary challenge assessed is contamination. For instance, in Arusha, some controls have shown up positive for brucellosis. This could be the result of room contamination or human error. When these instances occur, the team attempts trouble shooting among the scientists and technicians at the lab, but further training and assistance from FI on this and other potential QA/QC issues is needed.</p> |

Further Recommendations and Considerations

Table 2: Further Recommendations and Considerations

| | |
|--|---|
| Future funding | <p>Many projects are at risk of losing the capacity gained because sustainment funding is unavailable. With this project, one significant benefit is its non- disease-specific approach; the equipment and training is applicable to almost any pathogen of interest. EHA encourages TVLA to begin plans in 2017 to seek funding both from its own government as well as from a variety of external sources. Such funding could focus on continued training; provision of further resources to the remaining zonal laboratories; or development of scientific projects (through USAID EPT-PREDICT, DTRA CBEP, or other initiatives) that can leverage the system.</p> |
| Leveraging the system for science | <p>This is a capacity building program; however, this capacity may also be utilized toward the advancement and development of scientific research. This could help ensure the sustainment of the investment and continued development of URT response capacity. The approach could include anything from support of PhD-level research projects for local personnel to additional bilateral programs. In addition, deep sequencing, culture, and greater understanding of disease strains in-country is of interest to TVLA.</p> |
| Expanding to other pathogens | <p>TVLA is very interested in leveraging its new capacity for diagnosis of other burdensome diseases, such as rabies, trypanosomiasis, and bluetongue. While Dr. Nikkari has indicated a willingness to fund rabies assays, a longer-term plan is needed to use the new capacity for multiple diseases that are priorities and significant issues for URT.</p> |
| Accreditation | <p>WHO-Afro and CDC have encouraged laboratories in Africa to become accredited. Accreditation of African laboratories is critical due to the</p> |

| | |
|---|--|
| | agents they work with, and supporting TVLA’s steps toward this process is key to enhanced BS&S. It may improve outcomes by allowing more rapid detection of diseases (i.e., no longer shipping samples overseas for confirmatory testing). It may also enhance sustainability outcomes by supporting TVLA’s ability to achieve project funding from other sources. |
| Expanding reach into zonal areas | TVLA expressed an ultimate interest in expanding capability to other zonal laboratories unaddressed by this project, speaking to an opportunity to further enhance capability reach. It is, however, most important to ensure quality over quantity, and the priority right now should be to ensure complete capabilities at the laboratories already identified by this project. |
| Equipment | Although this project has not had issues with equipment, maintenance and calibration may eventually be needed. Although the Tanzanians have shown ability to support troubleshooting of some issues, a dearth of technicians to do such work inhibits optimal URT laboratory diagnostic capacity. Ensuring bioengineering capacity is necessary for the long-term success of this project, and may necessitate an in-country or external training for this capability, much as this project provided in-country training for laboratory diagnostics. |
| Gender equality | While a major emphasis for the project is to promote the training of women in the qPCR technique, URT faces a practical challenge with very few women working in the animal health sector there. URT trains women whenever it can, and thus is doing a good job within existing constraints; continued promotion and support of women in this field is critical. |
| Mentorship | Mentorship supports capacity building. It can be conducted through simple activities like ensuring staff are aware of conference opportunities, inviting them to co-author publications, and generally expanding this capacity-building work into scientific endeavors that will assist the long-term health of Tanzanian humans and animals. It is key to support both technical engagement and leadership among more junior scientists. The project’s excellent focus thus far on supporting scientific attendance at meetings should be continued and enhanced. |

Conclusions

EHA assesses that the “Strengthening Health Security and Biosecurity in Tanzania by Biodetection Capacity Building” project is on track to meet its bilateral objectives, and is a successful example of diagnostic laboratory capacity building toward accurate and rapid detection of outbreaks in a country with prior minimal capacity to do so. For the full benefits of the project to be sustained past the project completion date in 2018, some form of funding, ideally through a cost-sharing model between URT and a fiscal supporter, will need to be developed.

Table 3: Summary assessment based on evaluated criteria

| Objective | Evaluation Criteria | | | | | |
|---|---------------------|---|---------------|--------|---|--|
| | Relevance | Efficiency | Effectiveness | Impact | Sustainability | Coordination/ Complementarity/ Coherence |
| 1. CAPACITY Build local capacity on detection of biothreat pathogens and diagnosis of infectious diseases | | Enhanced oversight on part of FI can improve efficiency in development of this capacity | | | Will not be sustainable at project completion without external resources | |
| 2. DIAGNOSTICS Develop a diagnostic system based on local needs, suitable for field use | | | | | Will not be sustainable at project completion without external resources | Extent of formal coordination with other projects, agencies unclear; if support goes away, diagnostics go away |
| 3. TRAINING Train local experts and authorities in use of the detection methodologies | | Solidification and optimization of training plan needed | | | Expected sustainability for 1-2 years based on TOT model, but not longer without additional support | |
| 4. AWARENESS Raise local knowledge and awareness in biosecurity, biosafety, and biothreat reduction | | | | | Expected sustainability for 1-2 years | |

Appendix A: Methodology

The MTE is an external and independent exercise designed to assess the relevance, efficiency, effectiveness, impact, and sustainability of the project. The MTE was carried out by two project evaluators from EHA with expertise in issues related to public health, veterinary medicine, biosafety and security, microbiology, zoonoses, and the implementation and management of global public health programs. The evaluation team developed a tool and quality assurance measures to implement the MTE in a way that was an open and transparent learning process for all stakeholders. The MTE report is designed to provide relevant stakeholders with key insights and information that can be used to enhance project implementation, effectiveness, and outcomes. It will also provide a resource for informed decision-making during the life of the project and in consideration of continued project sustainability.

Following selection of the evaluators, the first stage of the project was to develop the MTE tool. The evaluators devised an evaluation matrix based on the project objectives to ascertain project achievement against the established evaluation criteria, taking into account international and national policies relevant to the project. The evaluation matrix consisted of a series of questions, categorized according to project objectives, cross-cutting themes, and information deemed important by the evaluators. The matrix questions cover the following topics:

- I. General Information
- II. Project Activities
- III. Progress Toward Specific Targeted End Results 1-6
- IV. Evaluation Against Tanzania's National *Health Sector Strategic Plan (2015-2020)*
- V. Support of International Partnerships
- VI. Meeting One Health Goals & Cross-Cutting Themes
- VII. Project Sustainability

The number of questions included under each topic area was determined by the evaluators and deemed sufficient to gather the information required to adequately complete the evaluation. The questions were devised following review of relevant project documentation and reference materials provided by the Finnish team at the onset of the project. In addition, the evaluators conducted a review of additional reference materials they deemed necessary to provide background and context to the project. The matrix was occasionally updated during the evaluation when additional information or adaptation was required.

The evaluation matrix was utilized to create a summary assessment, which is a color-coded matrix reflecting the various levels of current capacity in relation to achievement of the project objectives. Objectives were evaluated and color coded according to the evaluation criteria outlined in the MTE guidelines. The capacity rating was based on qualitative definitions assigned to each color and the evaluators' assessment. Coding was guided by the information gained during completion of the evaluation matrix. The measures used to complete the matrix and summary table are qualitative in nature; quantitative metrics were not developed or utilized during this evaluation.

Although overlap among project objectives do exist, the project objectives were evaluated independently to reflect the current level of URT capacity toward the overall achievements of the project objectives. The system is devised of three colors reflecting various levels of capacity:

Green: Capacity is in place and activities have been achieved or will be fully achieved by the end of the project (2018) resulting in full execution of objectives.

Yellow: Capacity is being developed and activities are partially achieved, but may be at risk of reaching full potential by project close date without intervention or additional support.

Red: Capacity is not in place and activities have not been achieved, and/or will not be viable past project end date.

Once evaluation criteria and matrices were finalized, the evaluators traveled to Tanzania for a one-week visit to conduct the evaluation. The evaluators were joined by representatives from FI and URT, all of whom took part in the evaluation. The ET visited project sites including laboratories in Arusha and Dar es Salaam; field sites in Ngorongoro Conservation Area; and partner institutions to facilitate interviews and discussions with project personnel (see Appendix C: Agenda and Participants). The ET ensured that the approach taken during the evaluation was a transparent process, allowing for open participation by all stakeholders, as it was designed to be a learning process for all involved and full participation was a key component in conducting this evaluation.

The ET input the information gained during these informal interviews and discussions into the matrix in real time. The information was then reviewed following discussions, and follow-up questions asked to ensure accuracy and clarity in completion of the matrix. The information was then be used to complete the summary matrix highlighting the key findings and recommendations. The matrix information was edited for clarity for the final report.

The team presented general findings from the evaluation at the close of the week in a roundtable discussion with the URT and FI teams that took part in the evaluation.

After conducting the evaluation visit, the ET drafted a five-page report which includes a summary of key findings, major accomplishments, challenges faced, and recommendations. The report was reviewed internally by EHA experts (Dr. William Karesh, Executive Vice President for Health and Policy; Ms. Catherine Machalaba, Health and Policy Program Coordinator) to ensure quality assurance of the information presented. A draft report will be shared with the MFA for review, and upon receiving any comments, the ET will provide a revision within five (5) working days. Upon final submission to the MFA, the ET understands that the report will be shared with various stakeholders, including the Project Board, in order to facilitate information sharing and decision making on the project and in the larger global context. If requested, a briefing of the information gained during the evaluation will be scheduled by teleconference with relevant stakeholders chosen by FI and URT.

Assumptions and Constraints

- Due to delays in securing performers to complete the MTE, the task was behind schedule. Once EHA was selected and the contract awarded, the MTE was undertaken rapidly in order to support the FI project timeline. The ET was given a short amount of time to review documents, prepare for the evaluation, and travel to URT to complete the task.
- The ET was given one week to complete the evaluation in country. Although sufficient, additional time, such as visiting the Mwanza lab, would have added value to the completeness of the evaluation and provided an opportunity to speak with additional stakeholders.
- From review of all documentation, the team assumes that the project is running smoothly and is supporting URT and FI public health and development goals. A broader understanding of FI's development policies would have been of assistance to the ET.

Appendix B: Relevant Documentation Reviewed

Project Documents

- Project Document URT-FI 2014
- Semi-annual Progress Report & Summary of Financial Report October-December 2014
- Semi-annual Progress Report & Summary of Financial Report January-May 2015
- Semi-annual Progress Report & Summary of Financial Report June-November 2015
- Semi-annual Progress Report & Summary of Financial Report December 2015-May 2016
- Semi-annual Progress Report & Summary of Financial Report June-November 2016
- Semi-annual Work Plan January-June 2015
- Semi-annual Work Plan June-December 2015
- Work Plan 2016
- Work Plan 2017
- FI-TZ Project Board Meeting Presentation February 2016
- FI-TZ Project Board Meeting Presentation March 2017
- Strengthening Health and Biosecurity in Tanzania March 2017
- TVLA Tangible Activities, Equipment and Consumables 2017
- Rationale for the Mid-Term Evaluation
- Publications: TVLA-SOTLK In-house assays (Publications_MTE_4_7_2017)

Reference Documents

- Advancing the Global Health Security Agenda: Progress and Early Impact from US Investment
- Driving Outcomes toward the Global Health Security Agenda: Action Package Commitments
- GHSA Overview Presentation
- GHSA JEE Assessment of the United Republic of Tanzania

Appendix C: Agenda and Participants

Delegation

MTE team: Dr Ellen Carlin, EcoHealth Alliance
Carlyle Gollogly, EcoHealth Alliance

TVLA representatives: Dr Furaha Mramba, TVLA, TANZANIA
Dr Joseph Masambu, TVLA, TANZANIA
Dr Zachariah Makondo, TVLA, TANZANIA

SOTLK Project PI: Prof. Simo Nikkari, Centres for Military Medicine and Biothreat Preparedness, FDF, FINLAND

FI FORMIN rep: Anna Wickström-Nøjgaard, Senior Adviser, Ministry for Foreign Affairs; FI

FI Gov't rep, observer: Permanent Secretary Päivi Sillanaukee, MoSH, FI

Saturday 1 April

20.00 **Arrival at Kilimanjaro airport (KIA) (KL569)**
*Dr Päivi Sillanaukee, Simo Nikkari, Anna Wickström-Nøjgaard
Dr Ellen Carlin, Carlyle Gollogly*

22.00 – 23.00 **Transfer to hotel**
*The Arusha hotel
Main Road, Kilimanjaro, 1000*

Sunday 2 April

8.00 **Breakfast meeting**
FI and EcoHealth Alliance team

9.00 **Shopping for lost travel supplies**
Anna W-N/supported by Tz team

10.00 **Checkout from hotel and area orientation**

13.30 **Lunch meeting at Midway restaurant Arusha**
Introductions
Mission goals and program
The whole delegation (MTE team, FI team, TZ Team including Arusha TVLA representation)

15.30 – 19.00 **Travel to Karatu**
*Participants:
Finland: Dr Päivi Sillanaukee, Prof. Simo Nikkari, Anna Wickström-Nøjgaard
TVLA: Dr Furaha Mramba, Dr Joseph Masambu, Dr Zachariah Makondo
EcoHealth Alliance: Dr Ellen Carlin, Carlyle Gollogly*

20.00 **Dinner in Ngorongoro Farm House**
*Oldeani Road, Karatu
FI and EcoHealth Alliance team*

Monday 3 April

07:30- 16.00 **MTE of the health and biosecurity project; Visit to Ngorongoro Conservation Area Authority (NCAA)**
Sampling of Maasai cattle (brucellosis study)
Orientation of Human-Livestock-wildlife interface and wildlife diversity
*Participants:
Finland: Dr Päivi Sillanaukee, Prof. Simo Nikkari, Anna Wickström-Nøjgaard
EcoHealth Alliance: Dr Ellen Carlin, Carlyle Gollogly
TVLA: Dr Furaha Mramba, Dr Joseph Masambu, Dr Zachariah Makondo + NCAA hosts*

16.00 – 19.00 **Lunchbox snack**
Travel to Arusha via Snake Park and Maasai Culture Museum
*The Arusha hotel
Main Road, Kilimanjaro, 1000*

20.00 **Dinner**

The Arusha hotel

Tuesday 4 April

- 9.00 - 13.00** **MTE of the health and biosecurity project continues; Tanzania Veterinary Laboratory Agency (TVLA), Ministry of Agriculture, Livestock and Fisheries, Arusha**
Presentations by Drs Mramba and Makondo
General discussion
Tour of laboratory facilities and operations
Meeting with Manager Paul Sanka
Finland: Dr Päivi Sillanaukee, Simo-Pekka Parviainen, Prof. Simo Nikkari, Anna Wickström-Nøjgaard
EcoHealth Alliance: Dr Ellen Carlin, Carlyle Gollogly
TVLA: Dr Furaha Mramba, Dr Joseph Masambu, Dr Zachariah Makondo, Ray Kayaga + Manager Paul Sanka + Arusha TVLA staff
East African Community Road
P.O. Box 1068, Arusha
- 13.30 - 14.30** **Lunch**
- 14.30-15.50** **Travel from Arusha to Kilimanjaro airport (KIA)**
Depart to Dar es Salaam (Precisionair PW425)
Finland: Dr Päivi Sillanaukee, Simo-Pekka Parviainen, Prof. Simo Nikkari,, Anna Wickström-Nøjgaard
EcoHealth Alliance: Dr Ellen Carlin, Carlyle Gollogly
- 18.05** **Arrival in Dar es Salaam**
- 18.30 – 19.30** **Transfer to hotel**
Mr Simo-Pekka Parviainen /FI Dar embassy meets delegation
Hotel Southern Sun
Garden avenue, Dar es Salaam, 0001
- 20.00** **Dinner**
Hotel Southern Sun

Wednesday 5 April

- 8.20** **Travel to Finnish Embassy**
Finland: Dr Päivi Sillanaukee, Simo-Pekka Parviainen, Prof. Simo Nikkari, Anna Wickström-Nøjgaard, escorted by Mr Simo-Pekka Parviainen (FI Embassy)
- 8.30 – 12.30** **Meeting at Finnish Embassy and lunch**
Päivi Sillanaukee, Simo-Pekka Parviainen, Pekka Hukka, Anna Wickström-Nøjgaard, Simo Nikkari
- 8.30 – 14.30** **Travel to TVLA, tour of laboratory facilities and interviews**
Ellen Carlin, Carlyle Gollogly, travel escorted by Dr Masambu
TVLA team
- 12.30 – 16.30** **Travel to TVLA and tour of laboratory facilities**
Anna Wickström-Nøjgaard
TVLA team
- not confirmed** **President's Office**
Dr Päivi Sillanaukee, Amb. Pekka Hukka / Simo-Pekka Parviainen, Prof. Simo Nikkari, on hold at Dar FI embassy and Southern Sun
- 16.00 – 16.45** **Conference call (JEE Senior Advisory Group)**
Simo Nikkari
- 18:40 – 22.00** **Hosted Dinner by Finnish Ambassador Hukka (including travel)**
Finland: Dr Päivi Sillanaukee, Prof. Simo Nikkari, Anna Wickström-Nøjgaard, EcoHealth Alliance: Dr Ellen Carlin, Carlyle Gollogly, teams escorted by Simo-Pekka Parviainen
TVLA: Dr Joseph Masambu, Dr Zachariah Makondo

Thursday 6 April

- 9.00 – 14.00** **MTE report drafting**
EcoHealth Alliance: Dr Ellen Carlin, Carlyle Gollogly
- 9:00 – 10.00** **Tanzania MoH visit**

- Päivi Sillanaukee, Simo-Pekka Parviainen, Simo Nikkari, AnnaWickström-Nøjgaard*
10:30 – 12.00 US Embassy (Dar es Salaam)
Päivi Sillanaukee, Simo-Pekka Parviainen, Simo Nikkari, AnnaWickström-Nøjgaard
- 12:30 – 13.30 Lunch**
- 14.00 – 15.00 WHO Tanzania Country Office**
FI: Päivi Sillanaukee, Simo-Pekka Parviainen, Simo Nikkari, AnnaWickström-Nøjgaard
 TVLA: Dr Masambu
 EcoHealth Alliance: Dr Ellen Carlin, Carlyle Gollogly
 Luthuli Road, Dar-es-Salaam
 Host: Dr Richard Banda, Officer in Charge
- 15.30 – 16.30 EcoHealth Alliance Interview of Simo Nikkari on project activities**
 Southern Sun Hotel
 Ellen Carlin, Carlyle Gollogly
- 19.30 Departure to Dar airport for Helsinki**
 AnnaWickström-Nøjgaard

Friday 7 April

- 9:00 – 14.30 Tour of TVLA-SOTLK laboratory and other TVLA facilities**
Review of project activities by MTE team (Carlin and Gollogly)
- TVLA activities (presented by Dr Makondo)
 - SOTLK activities (presented by Prof Nikkari)
 - o Project R&D activities
 - o Local capacity building on biothreat pathogen diagnosis
 - o Diagnostic systems
 - o Training and one-health collaboration
 - o Awareness raising in biothreat reduction
 - Roundtable discussion on
 - o Strategic goals and achievements of the project to strengthen Tanzania's OneHealth policy
 - o The project as a part of Finland's contribution to GHSA, BTWC and GP (Sillanaukee and Nikkari)
 - o The JEE Alliance (Sillanaukee)
 - Current urgent project development needs
 - o Rabies diagnostics
 - Further questions by MTE team
- Ellen Carlin, Carlyle Gollogly (EcoHealth Alliance)*
Dr Joseph Masambu, Dr Zachariah Makondo, Ray Kayaga (TVLA representatives)
Simo Nikkari (SOTLK representative, Principal Investigator of the Project)
Päivi Sillanaukee (Panelist, FI Government observer)
- 17:30 - 19:00 Wrap up dinner**
Ellen Carlin, Carlyle Gollogly, Simo Nikkari, Päivi Sillanaukee

Saturday 8 April

- 8:30 – 9:30 Breakfast meeting (Southern Sun)**
 Providing review of scientific literature on assay development for MTE team, and listing scientific input and community outreach of the project for MTE team
 (Nikkari)
 JEE Alliance information for EcoHealth Alliance (*Sillanaukee*)
Ellen Carlin, Carlyle Gollogly (EcoHealth Alliance MTE team)
Simo Nikkari (SOTLK representative, Principal Investigator of the Project)
Päivi Sillanaukee (JEE Alliance Chair)
- 10.00 – 13.00 Development of required material for MTE team**
Sillanaukee and Nikkari
- 19:00 Departure for Dar es Salaam airport**
Ellen Carlin, Carlyle Gollogly, Simo Nikkari, Päivi Sillanaukee
- 23.10 Depart to Helsinki (KL569)**

Appendix D: Evaluation Matrix

The following matrix was used to collect information during site visits, interviews, roundtables, and via document review. The questions were developed by EHA prior to departure for URT based on review of the proposal criteria and other materials provided by FI; they were modified slightly during the course of the trip as deemed appropriate by the evaluators. The majority of the information collected came from direct discussion with URT and FI representatives.

TABLE OF CONTENTS

- I. General
- II. Activities
- III. Progress Toward Specific Targeted End Results 1-6
- IV. Evaluation Against Tanzania's National *Health Sector Strategic Plan* (2015-2020)
- V. Support of International Partnerships
- VI. Meeting One Health Goals & Cross-Cutting Themes
- VII. Project Sustainability

I. GENERAL

| Questions | Comments |
|--|--|
| Impact | |
| 1. Does the system being developed meet local needs? | <p>The Finnish team visited URT early on to assess country needs. Once TVLA was established as the partner, together they decided the focus would be on biothreats because TVLA had insufficient capacity to deal with these threats. PCR capacity existed but was limited on both animal and human health sides. They did have PCR at CIDB through the rinderpest eradication campaign project (UMN-supported). AIDB system – rtPCR; but needed to be calibrated; that was the challenge. The human health lab had capacity, but not really for the major zoonotic diseases, and there was no PCR in the zones.</p> <p>During a 2007 RVF outbreak, biosafety protocols were an issue on the animal side; and limited capacity in the public health sector necessitated shipping of samples to CDC Kenya. Additional and continued zoonotic disease threats and risks followed in the form of AI, Brucellosis, Ebola, <i>Yp</i>. With brucellosis, for instance, the veterinary labs had only rose Bengal and serology capacity; TVLA states that capacity for <i>Brucella</i> diagnosis was even worse on the public health side.</p> <p>Three operational labs for PCR detection of zoonoses have now been established in Mwanza, Arusha, and Dar. TVLA feels this is a very tangible result that meets their needs, and furthermore allows them to partner with other projects. PCR machines and training will be used for samples for a variety of projects that send them in.</p> <p>URT relayed that the impact to them is huge: set up of a lab AND supply consumables and reagents for seven diseases; training was a big gap that this project has filled; sample collection and analysis. In sum, they had clearly identified gaps, and they feel this program has helped fill those gaps.</p> |

| | |
|---|--|
| <p>2. Would you say local capacity for biodetection has improved? By how much and in what ways?</p> | <p>Laboratory capacity & technology transfer is the main focus of this project, and TVLA feels it is successful in that regard. TVLA feels that the ability to have PCR machines in zonal laboratories, and even to be able to bring them to non-laboratory settings, is the biggest impact of this project; it has simplified and speeded diagnosis.</p> <p>Dr. Mramba indicated that this project is helping people and animals by filling a capability gap in molecular capacity. They can conduct tests on zoonoses that they were unable to before, both in Dar and in the localities. The northern zone has typically been where many outbreaks started, so it is an appropriate area to have this increased capacity for biodetection.</p> |
| <p>3. What are some specific examples of direct impact the program has had thus far?</p> | <p>The lab's response to the 2016 anthrax outbreak in Ngorongoro is a direct result of the project.</p> <p>Brucellosis provides another good example. Previously, it was difficult to advise a farmer to cull based on a rose Bengal brucellosis screening test; and if they wanted confirmatory testing, the sample had to be sent by bus to Dar. Now they can diagnose more quickly and accurately.</p> <p>Human hospitals/district health centers have been bringing them samples to help them rule out anthrax. (Human health labs don't always have the necessary kits.) These human institutions are using the TVLA capacity more as they learn about its existence.</p> <p>RVF outbreak in 2007-2008: country struggled with where to send samples. They spent a lot of money to send to South Africa. Now they do it themselves. People have training, kits, and equipment. And they know how to handle the samples.</p> <p>AI was suspected in Mwanza. Brought sample to CVL for confirmation.</p> <p>Indirectly, an important impact is on the lab itself. TVLA feels that this project allows them credibility on their path toward laboratory accreditation.</p> |
| <p>4. Have the field packages been used for outbreaks? When and where?</p> | <p>Yes. 2016 livestock anthrax outbreak - see above.</p> |
| <p>5. Has the use of the field packages reduced overall time to detection for any outbreaks?</p> | <p>Yes – anthrax serves as an example. In general, it previously could take up to a week to get a laboratory diagnosis; now, depending on what the sample it is and where it was taken, that time is reduced to 3 days or, in some cases, 1 day.</p> |
| <p>6. Has there been any impact on infectious disease-related health outcomes to date?</p> | <p>It is difficult to measure this at this stage, but it is an important outcome to ultimately assess. The training of human health personnel has potentially increased the accuracy of disease diagnosis, such as for <i>Brucella</i>, which may then mitigate morbidity and mortality. Also, the increased capacity for prevention likely improves health outcomes in general – but again, this is difficult to measure.</p> |
| <p>7. At this stage, do you predict all Tanzanians will benefit in some way from this work?</p> | <p>TVLA believes that the project is building a capacity that is very important to the country as a whole. Dr. Mramba has indicated her belief that the project is helping both people and animals.</p> |

| | |
|---|--|
| 8. Has the project been able to reduce inequality of areas served by biodetection capabilities? | Enhanced capacity and technology transfer in zonal areas is likely helping the more rural areas that have traditionally been underserved by laboratories with advanced capacities. This in turn may ultimately help improve the stability of the entire country. A project like this can potentially help elevate the country to a more stable level that can lead to reduced inequality in other areas (economy, job security). That being said, any immediate impacts on inequality are difficult to measure quantitatively. |
| 9. What are TVLA's primary challenges with the project? | <p>In the lab, the primary challenge is contamination. For instance, Arusha has had some controls show up positive for brucellosis. The source could be room contamination or human error. They attempt trouble shooting among the lab scientists and technicians. Further training from Finnish experts is likely needed to resolve this.</p> <p>There is no generator in Arusha, but hopefully they will acquire one soon.</p> |
| Project focus | |
| 10. Is the focus on biothreats as opposed to traditional public health useful? | Yes, it appears to be useful and it was the focus mutually determined by both parties. Beyond its direct impact, the emphasis on biothreats helps URT address its role in larger agendas, like GHSA, which in turn are working synergistically with more traditional public health approaches. Further, these diseases aren't really separate from traditional public health –brucellosis, for instance, is both a defense threat and a traditional public health threat. The technology and the system being deployed can ultimately be applied beyond biothreats, thereby having the potential for complementary benefits. |
| 11. Are there any areas that could use additional emphasis? | <p>Continued training and M&E follow-up on the part of FI are key. TVLA could use additional support in trouble-shooting, such as with contamination of controls.</p> <p>Quality control: an algorithm for quality control (QC) or even just additional guidelines or protocols to ensure quality results would be useful. QC will be particularly important in the event of a large outbreak situation, which will require rigor as well as experience with handling large volumes of samples.</p> |
| General support | |
| 12. How often have Finnish experts traveled to URT (plan was 2x/year)? | Finnish officials have traveled to URT at least 2x/year for the duration of the project thus far. |
| 13. Has there been sufficient face-time between Finnish and URT experts? | <p>As noted above, the Fins have traveled to URT ~6 times; the Tanzanians have traveled to Finland 2 times (symposium and training event). Dr. Nikkari has also interacted with the TVLA team at the biodefense conference in Munich.</p> <p>The team members also communicate formally through the Project Board, which includes both Finnish and Tanzanian representatives. They speak twice per year by Skype.</p> |

II. ACTIVITIES

The following “activities” were described as priorities in the Finnish planning documents.

1. Assay Development

| Questions | Comments |
|---|--|
| Field trials in URT | |
| 1. Have the assays been trialed in the field? | <p>Some of the assays and the functionality of the diagnostic RT-PCR system have been trialed in field conditions in Finland. (Ref: Mölsä M, Hemmilä H, Katz A, Niemimaa J, Forbes KM, Huitu O, Stuart P, Henttonen H, Nikkari S. Monitoring biothreat agents (<i>Francisella tularensis</i>, <i>Bacillus anthracis</i> and <i>Yersinia pestis</i>) with a portable real-time PCR instrument. J Microbiol Methods 115:89-93, 2015.) Other assays have been published in scientific journals but have not been validated separately in URT field or laboratory conditions. Finland trusts that the assays work in this environment.</p> <p>Not all assays have been utilized by TVLA yet; they are trained on them but they have not had to apply them all yet.</p> <p>All assays are functional in Dar, but full capability has not been transferred to Arusha yet (i.e., Arusha staff are trained on all assays but not yet confident in all of them); Dar’s assistance is required.</p> |
| 2. Where and how many times? | n/a |
| Sample collection in URT | |
| 3. How many samples have been collected? | <p>EHA does not have a formal up-to-date accounting of the number of times, locations, species from which, circumstances in which, and results from samples that have been collected. However, documentation from Finland indicates that more than 500 samples have been collected from livestock, wildlife, and humans. Active sampling generally occurs twice per year (dry and rainy seasons). Thus far, animal samples have been positive for anthrax, brucellosis, and plague.</p> <p>Further discussion with TVLA while visiting Arusha indicates the following:</p> <ul style="list-style-type: none"> ▪ Livestock species from which samples have been collected include cattle, goats, and sheep; TVLA has also increased focus on pigs this year – 70 samples – looking for <i>Brucella</i>. ▪ Wild animals: many species ▪ Humans: 27 samples. 8 of 12 positive for anthrax; 2 of 3 positive for <i>Yp</i>; 3 of 4 positive for <i>Vibrio cholerae</i>. <p>The results are entered online into EpiCollect (where, when, what collected). TVLA is planning more collection in Ngorongoro; to date, mostly livestock with limited wildlife sampling there. TVLA also has plans for collection in Serengeti and other areas with a focus on wild animals.</p> |
| 4. From where and from what species? | See above. |
| Overall tool development | |

| | |
|---|---|
| 5. Has the project improved rapid assay development for pathogens in general? | Yes – this is a tangential benefit FI has received. Working in URT, according to Dr. Nikkari, provides “live agent training” that they would never get in FI. |
| 6. For non-malarial fever pathogens? | Yes |
| 7. For hemorrhagic pathogens? | Yes |
| 8. For transboundary animal diseases? | Yes |

2-3. Technology Transfer & Laboratory Capacity Building

| Questions | Comments |
|---|---|
| Equipment, reagents, and other supplies for diagnosis of infectious diseases in URT | |
| 9. What equipment, supplies, and reagents does the lab now have that it didn't have before? | All of the materials related to the PCR process. |
| 10. Does Finland send replacement reagents when URT runs out? | Yes, but the URT laboratories are learning to acquire reagents on their own. |
| 11. Have URT laboratorians been trained to use all of the supplies? | Yes – the trainings have covered processes to use the equipment and supplies that support running the diagnostic tests. |
| 12. Are there any equipment, reagents, or supplies that are missing? | The labs have the equipment, reagents, and supplies that they need to perform the testing. When they run out, they can let FI know, but they are also learning the supply chain and procurement process. For instance, they have discovered that when they need new Qiagen kits, instead of asking FI to send them, it makes more sense to purchase from South Africa because they get them within 2 days. They also need generators or other back-up power supply in the zonal areas. |
| Capacity for detection of different classes of pathogen | |
| 13. Has the project improved ability to detect non-malarial fever-causing diseases? | Yes |
| 14. Has the project improved ability to detect hemorrhagic diseases? | Yes |
| 15. Has the project improved ability to detect transboundary animal diseases? | Yes |

4-5. Training

| Questions | Comments |
|---|----------|
| Local training in URT by Finnish experts | |

| | |
|---|---|
| <p>16. What training has been undertaken?</p> | <p>Train-the-trainers approach.</p> <p>~11 URT personnel traveled to FI for initial training over two trips, including women. Training in Finland including some basic skills like pipetting; instruction in biosafety and biosecurity; and a biothreats conference. Some of the training occurred in a BSL3 laboratory.</p> <p>In addition, FI has visited URT several times. The first trip was to provide training in Dar. A primary goal was to assist with laboratory set-up. ~6 individuals were initially trained, including someone from the public health lab.</p> <p>TVLA, using the training it received, has since trained 10 additional people in Dar. Dar staff have traveled to the zonal labs with Finland to train personnel there. Dar staff went first to do some initial training and lab set-up, followed by FI staff who provided training for some additional skills:</p> <ul style="list-style-type: none"> □ Arusha: Dar personnel traveled to Arusha and trained 6 people, including 2 from Ngorongoro area conservation authority where they have a diagnostic lab, and 2 from URT wildlife research institute from a diagnostic lab near Arusha. 2 of the individuals trained in Arusha were women. The Arusha lab is currently most comfortable in 3 pathogens: brucellosis, AI, and RVF. (Finnish and EHA staff believes they must also be capable in anthrax as well, given their response to the 2016 outbreak.) □ Mwanza: Dar personnel have trained 6 individuals in Mwanza, including 1 individual from the National Institute for Medical Research. <p>Finland provides certificates of completion at the end of the training. All three labs have been trained on all six pathogens, but not all labs have experience with all of them since the training.</p> <p>TVLA views the training as representative of a very fruitful collaboration. It's not just about consumables. It's about establishing a lab – in fact, three. A complete system. The training has also been multisectoral (wildlife, human health).</p> |
| <p>17. How many individuals total have participated to date? Have the groups been diverse in terms of gender or other minorities?</p> | <p>Approximately 30 (see above).</p> |
| <p>18. Is there any additional training URT feels would be helpful?</p> | <p>Training in May 2017 in Dodoma is planned (central government is shifting there from Dar). IAEA is providing funding for Dodoma PCR machine et al. Finnish documentation also indicates that two trainings will occur in URT in Fall 2017: one in Arusha, one in Iringa.</p> <p>FI will provide further trainings in Finland on how to handle particular diseases. E.g., they have learned <i>Brucella abortus</i>, but what about other species? They have received more kits to assess other species. One kit is just for <i>B. abortus</i>; the other kit, which is prepared in Finland in-house, indicates if there are other species (<i>B. spp</i>).</p> |
| <p>Participation of URT experts in conferences and workshops in Finland and Europe</p> | |
| <p>20. What conferences and workshops have URT personnel attended?</p> | <p>NBC 2015 symposium, Finland, 2015; Medical Biodefence (MBD) Conference, Germany, 2016; BWC, Geneva, Aug 2015 – side event on GHSA; BWC Geneva Dec 2015 and Nov 2016</p> |

| | |
|---|---|
| 21. Are any additional conferences or workshops planned? | Yes. BS&S meeting Bagamoyo – Dr. Nikkari will lecture. There will also be a training event in September in Finland. They have flexible budget to send personnel to conferences that come up. |
| 22. Have these events been beneficial? | Dr. Nikkari noted that the MBD in Germany is major biothreat conference, i.e., like ASM Biodefense conference, but brings in even more countries thereby placing URT on an international stage. Dr. Mramba spoke very highly of her participation in the BWC; this participation seems to have significantly raised her awareness of BWC issues, allowing her to elevate them politically with her leadership. |
| 23. Have URT personnel presented papers, abstracts, or posters? | Dr. Makondo gave a presentation on the project at a conference in Baltimore, MD, USA. |
| Local training workshops | |
| 24. How many training workshops have been held in URT? Where were they held? | Dar (2), Arusha (2), Mwanza (2). See Question 16 above. |
| 26. Who attended? How many? | <p>The local trainings bring in people from all over the country for about a week – they learn how to handle samples, where to take them, and how to detect clinical signs in animals. This helps to standardize protocols across the country. The trainings include veterinarians, lab techs, etc.</p> <p>Domestic: Participants were from TVLA labs, NCAA, Public Health Laboratory (Dar and Mwanza), and NIMR; International: 8 staff went to BSL-3 training in FI – 1 from Public Health Lab (priority given to female lab staff – 4 women)</p> |
| 27. Are the individuals who received the training practicing what they've learned through real work or exercises? | The training is employed to analyze samples from routine surveillance, from outbreaks, and from samples provided to the lab from veterinarians, universities, other labs, etc. EHA does not have an accounting of how many samples have been run by each lab or by individual laboratorians. |
| Quality Assurance/Monitoring & Evaluation | |
| 28. What, if any, QA, QM, and M&E has been undertaken? | <p>QA has not been undertaken for this project. To some extent there is Finnish QA support more on the BS&S side, and perhaps in the sharing of SOPs. QA was not included in the plan from the beginning. But they have since added more SOPs to capture needed elements, which can be viewed as a form of QA.</p> <p>The Southern African Development Community (SADC) supports quality management. They have started implementing it through SOPs, harmonizing with other East African countries for 16 diseases. That project has ended. They have managed to validate some of the tests, but need to include more.</p> <p>GHSA identified QM as a gap. TVLA has submitted proposal to DTRA for training on instrumentation and calibration that is in line with QA needs. Difficult to engage URT accreditation body to come and assess – that remains to be done.</p> <p>DOD CBEP assisted URT to develop a disease surveillance system plan (DSSP). DTRA has asked URT to present ideas for further work, and URT has asked for assistance with focus on QM.</p> <p>URT has relied on CDC for handling equipment problems, like calibration. Otherwise they have to bring technician from outside, which is very expensive.</p> |

| | |
|---|---|
| | M&E is undertaken to the extent that FI trainers evaluate the TZ laboratorians and labs. |
| 29. Does the project ensure that the skills are maintained and passed on to other personnel? (Long-term impact of training) | Train-the-trainer approach is a key element of ensuring skill maintenance and leadership. However, project sustainability will be the real driver of that as discussed in the Sustainability section below. |

6. Capacity Building

| Questions | Comments |
|--|---|
| Coordination meetings arranged by TVLA in URT | |
| 30. What coordination meetings have been arranged by TVLA? Who has attended and what were the topics? | <p>A good example is the agricultural trade fair TVLA hosted in Arusha – farmers, pharmaceutical companies, local university, other ministerial and NGO stakeholders. This was an opportunity for TVLA to demonstrate the resources they now have to support this community.</p> <p>During USAID’s IDENTIFY project, they established a National Multisector Diagnostic Laboratory Network that has continued. The Network normally holds one coordination meeting annually. This year during that meeting, it was agreed that if the project can support a national biosafety and biosecurity network, it will be launched in Bagamoyo this year at a meeting that will chart out how the network will be managed.</p> |
| 31. Has this project improved coordination among stakeholders? | According to TVLA, it is becoming a resource for the local community and with other labs. For instance, the human health labs are aware of TVLA’s capabilities and are sharing samples and information about diseases like brucellosis. Such effects may grow in the future as the project matures and more partners become aware of it. |
| Scientific conferences arranged in URT | |
| 32. What scientific conferences have been held in URT? | <ul style="list-style-type: none"> ▪ 33rd Tanzania Veterinary Association Annual Scientific Conference at the Arusha International Conference Center (2015) ▪ 34th Tanzania Veterinary Association Annual Scientific Conference at the Arusha International Conference Center (2016) ▪ Knowledge Exchange Workshop Enhancing Zoonotic Disease Surveillance (2016) |
| 33. Have there been any regional meetings organized or attended that have focused on biothreat reduction? | <ul style="list-style-type: none"> ▪ Nanenane Agricultural event, National Multi-sectoral Lab Coordination Meeting (2016), TVA exhibition, TVA scientific meetings, regional/national projects ▪ One Health (multisector) diagnostic lab network meetings (2), Nanenane (2), TVA exhibition (1) <p>According to TVLA, these improve information sharing as well as publicity about the project, conveying that they are not struggling to diagnose disease anymore.</p> |
| Scientific reports and manuals | |
| 34. Have any scientific reports or publications been developed based on this project? Who are the authors/what level of involvement has URT had in them? | None to date. This is not a research project – however, a paper about the capacity that has been built in URT, and lessons learned for application in other regions, countries, or zones, could be beneficial toward the end of the project period. |

| | |
|---|---|
| 35. Have any manuals or written protocols been developed based on this project? | URT is arranging with FI to complete a BS&S manual. Probably need a 5-day meeting. Want to finalize, print, and distribute. Previously, they were not seriously implementing BS&S control measures – so this is an important piece for them. (Needs funding.) |
|---|---|

III. PROGRESS TOWARD SPECIFIC TARGETED END RESULTS

The following “results” were defined in the Finnish planning documents.

Result 1. Targets determined for microbial identification based on need determined by TVLA

| Questions | Comments |
|--|--|
| List of diagnostic assays confirmed | |
| 1. What is the final list of diagnostic assays that are being/have been developed? | <p>FI has developed the following assays for use in the project:</p> <ul style="list-style-type: none"> ▪ Avian influenza A ▪ Rift Valley fever ▪ Brucella [can differentiate between the different clinically relevant species] ▪ Ebola ▪ <i>Yersinia pestis</i> ▪ <i>Bacillus anthracis</i> <p>Dar and Arusha also received kits for <i>Vibrio cholerae</i> as a result of the outbreak.</p> |
| Goal to develop key assays by 2018 | |
| 2. Which assays are still in development? | None – they are all complete. |
| 3. Which assays does the TVLA <u>not</u> have that would be most useful to them? | <p>They have all of the assays that were agreed to.</p> <p>TVLA has separately noted that TVLA would like to leverage the system for rabies and trypanosomiasis, prioritizing rabies. Dr. Nikkari indicated that the project can support this.</p> |

Result 2. Diagnostics assays for the selected agents developed

| Questions | Comments |
|--|--|
| Assay specifications provided to TVLA and reports in peer-reviewed journals | |
| 4. Have the assays been validated through peer review? | Yes. |
| 5. Have they been tested in or validated for field conditions? | Not for URT field conditions. FI had previously tested/used the assays via military use in field conditions (mobile labs). |

Result 3. Three biodetectors transferred and in use in URT

| Questions | Comments |
|---|----------|
| 3 biodetectors available for use at TVLA | |

| | |
|---|--|
| 6. How many detectors are available for field use? What labs are they stored at? | <p>4 machines are placed and 1 will be placed soon = 5</p> <ul style="list-style-type: none"> ▪ Dar – 2 (one for lab bench, one for sending out temporarily to other zones) ▪ Arusha – 1 ▪ Mwanza – 1 ▪ Iringa will have 1 soon <p>In addition, the IAEA is providing the same rtPCR machine to the lab in Dodoma.</p> |
| 7. How many times have they each been deployed? | No specific data. |
| 8. Does the field sample bag have everything needed for field use? | Yes. TVLA had no complaints about the bag or other mobile paraphernalia. |
| Biodetectors efficiently run by local staff | |
| 9. Have local staff learned to deploy the field sample bags and use them in a certain amount of time? | Yes – see Training section. |
| 10. Does the sample require confirmatory testing after zonal testing? | <p>The general process appears to be that collectors collect sample, bring back to zonal lab, analyze, then send to Dar for confirmation. There does not appear to be a systematic approach to this yet, however. Finland hopes that for now, all positive samples/DNA are being sent to Dar for confirmatory testing, or at least a representative sample from a herd. (Negative samples might also be relevant to send on a case-by-case basis.)</p> <p>Once the labs are fully trained and practiced, the idea is that the zonal labs would be sufficiently competent do all the confirmatory testing themselves.</p> <p>If a sample is positive for an OIE-reportable disease, they send it to a reference lab for verification and report to OIE. They also send rtPCR results of positive samples to FI for review.</p> <p>The second Dar machine: the idea is to be able to bring it to one of the 7 zones that have centers but no PCR. In a crisis, DVS can directly set up of those labs.</p> <p>The next step in the evolution of the project might be a mobile lab (BSL 2+).</p> <p>Dr. Nikkari would ideally like TVLA to culture the strains to generate more material for scientific investigation in the future.</p> |
| 11. Have the field sample bags been used for general surveillance activities? What else? | Yes, but EHA did not receive numbers. Collection of samples is not systematic. TVLA appears to collect at least twice a year, once in dry season and once in rainy season. Plus the testing of samples that are brought into them by the community (vets, public health labs). Plus outbreaks. |
| 12. What challenges have TVLA faced using the bags in the field? | No issues with the field bags were relayed. |

Result 4. Local experts and trainers capable to use the diagnostic assays

| Questions | Comments |
|---|---|
| Training program for at least 4 people, including female experts | |
| 13. Have at least four people been trained in the assays? Is four enough? | Yes – well more than 4 have been trained – see Training section. Training is ongoing and appears to have reached a sufficient critical mass that the system is deployable and functional. |
| 14. How many women? | See Trainings. Varies per lab. TVLA has made an effort to ensure women are trained. Dr. Mramba is actively engaged in ensuring as much equality as possible. |
| Trainees confident in using the diagnostic assays | |
| 15. How do you/have you assessed trainee confidence in using the assays? | FI has visited URT to provide M&E and issue certificates to trainees once they've shown they are capable in use of the equipment. This internal project assessment activity may lay a building block toward accreditation of the laboratory facility. |

Result 5. Biosecurity and biosafety training program completed by 2018

| Questions | Comments |
|---|---|
| Course programs for 16 experts, including female experts | |
| 16. How many experts have been trained in laboratory biosecurity and biosafety? | TVLA views this project as a significant increase in emphasis on BS&S. Nearly 40 people trained: 11 centers (2 people each) and 7 centers (2 people each). |
| 17. How many women have been trained? | In Arusha, 2 women trained. In Dar, 2 women - all technicians. Mwanza – 1 woman technician. A challenge is that in the country's animal health sector, there are very few women, so they struggle to find women to train. But they train them whenever there is the opportunity. |
| 18. Is the BSS training synergistic with FETP or other available training? | USAID (IDENTIFY) and FAO previously supported the regional BS&S network. DTRA supported development of DSSP and of the National One Health Strategic Plan. TVLA is hopeful about launching the DSSP soon. TVLA had some prior BS&S training – Kenya, Uganda, African Biosafety Network. Now going to establish National BS&S Laboratory Network later this year, as described above. Draws public health, animal health, wildlife, universities. Finnish program aligns with that and will support it. FI has paid institutional fee for TVLA African Biosafety Network. |
| 19. Do you participate in any regional or international BSS training? | See above. |

Result 6. Information shared with other partners in URT according to the One Health Strategy as well as community outreach achieved in URT

| Questions | Comments |
|-----------|----------|
|-----------|----------|

| Coordination meetings arranged by TVLA | |
|---|---|
| 20. Has TVLA arranged meetings for information sharing? Among what stakeholders? | Yes - see Section II.6, Capacity Building. TVLA has indicated that its capacity for information sharing was there before 2012 but was minimal, and has improved now since the project's implementation. |
| Implementation of new diagnostic tools in URT | |
| 21. Have the new diagnostics been put to work? On a pilot basis or a permanent basis? | <p>Yes. The system is used in three primary ways: for twice-yearly surveillance (wet and dry seasons), for analyzing samples sent in from the community, and for outbreaks.</p> <p>One particular example of its utility is that now, instead of sending full sample to lab in Dar, other labs can extract DNA and just send that, minimizing the risk of transporting pathogens.</p> |
| 23. How much of the technology has been shared outside of the project? | <p>TVLA is using the technology to assist the human health labs.</p> <p>The inclusion of outside agencies, like wildlife and public health, has helped with knowledge transfer.</p> |

IV. EVALUATION AGAINST TANZANIA'S NATIONAL HEALTH SECTOR STRATEGIC PLAN (2015-2020)

| Strategic Objective | Comments |
|--|--|
| 1. Quality improvement of primary health care services in communities and health facilities | Implementation of mobile units in zonal and central laboratory supports technology transfer and increased infrastructure in animal laboratory facilities, promoting the mitigation of infectious disease (ID) threats to the human population. Labs are being used by health sector to confirm sample results, providing them additional support and resources. Increased response time to possible ID outbreaks and decrease reporting time furthering rapid mobilization should an outbreak occur. |
| 2. Improve equitable access to services in country by focusing on geographic regions with higher disease burdens and focus on higher risk populations | Project supports rural communities with a seemingly high intersection of wildlife, livestock, and human interaction, supporting both high risk and disadvantaged populations, as well as border regions with an increased disease burden. Takes capacity to the field providing on-the-ground support in critical areas. |
| 3. Active community partnership through intensified interactions with the population from improvement and social wellbeing | TVLA zonal laboratories and teams appear to be highly engaged in the community and local populations. Mobile equipment has given them the capacity to respond to ID threats that was not previously there. They can now respond to suspected outbreaks, test samples for the local community, and are a resource to other sectors. They also support information sharing through workshops and trade shows with the local community. Attendees include local farmers, commercial industry, universities, etc., promoting a multi-sectoral community approach to public health and health security. Excellent example of community based ID capacity building and project execution providing direct results to local populations at a critical animal-human interface. |
| 4. The health and social welfare sector will achieve a higher rate of return on investment by applying modern management methods and engaging in innovative partnerships | Project partnership with FI and URT is an innovative project that supports modern laboratory techniques and technology in austere environments providing URT advanced capacity to respond to threats. Partnership management is open and transparent, creating an environment of shared investment, ownership and desire for |

| | |
|---|---|
| | success. |
| 5. Address the social determinate of healthy multi-sectoral collaboration, and advocate for the inclusion of promoting and protecting health in other sectors policies and strategies | TVLA under the MALF now has the ability to support animal health through increased technology and human capability that did not previously exist. They are integrated in the community and government utilizing a multi-sectoral approach in the application and resource of the technology provided. Community based project that supports national and international policies and plans (URT National Strategic Plan, GHSA, etc.) The project has taken a multi-sectoral approach in training, including participants from human and wildlife sectors. TVLA can more actively participate in multi-sectoral projects, workshops, networks, etc. now that it has a capacity to be a resource in the community (prior to this project, capacity was limited, and engagement was not as active as a result; it now has the capacity to be a significant support to public health in the national and international arena.) |

V. SUPPORT OF INTERNATIONAL PARTNERSHIPS

Global Health Security Agenda (GHSA)

| Questions | Comments |
|--|---|
| GHSA support | |
| 1. What are the project's goals in support of the GHSA? | This project is Finland's major contribution to the GHSA in URT. During WHO JEE evaluation of URT, gaps were identified. One of the gaps was lab capacity. This project is trying to bridge those gaps on the veterinary side but also on the public health side because the pathogens are zoonotic. (Public Health sector is bridging its own gaps through USAID initiatives.) |
| 2. Has the project met its goals supporting the GHSA? | Yes. It has been building BS&S capacity in a somewhat unspecified way according to Dr. Nikkari; he believes it goes to the foundations of biosecurity. |
| 3. Has there been progress toward each of the 4 relevant action packages? - Zoonotic Disease - Biosafety and Biosecurity - National Laboratory System - Real-Time Surveillance | Yes – all four. |
| Future work relevant to GHSA | |
| 4. Are any further activities planned that will directly or indirectly support the goals of the GHSA? | Full completion and implementation of this project will do so, by further strengthening zoonotic disease detection capabilities and readiness. |

Global Partnership (GP) Program

| Questions | Comments |
|-----------|----------|
|-----------|----------|

| GPP support | |
|--|---|
| 5. What are the project's goals in support of the GP? | Finland has been a long-standing supporter of GP, and wants to be actively involved in the future as well. One of Finland's concrete commitments to GP is this collaborative project, strengthening laboratory capacity and raising awareness on biosecurity and biosafety in Tanzania, in addition to active participation in the GP meetings. |
| 6. Has the project met its goals in supporting the GPP? | Yes. This project has met its goals in supporting the GP, including the areas of focus (biosecurity) identified in 2011 and "deliverables" on biosecurity identified in 2012. |
| Strengthening national capacity to prevent, prepare, respond | |
| 7. Has the project improved development and maintenance of appropriate and effective measures to prevent, prepare for, and respond to the deliberate use of biological agents? Provide examples. | Overall, this project is designed to support biothreat reduction and to help URT prevent, prepare for, and be better able to respond to outbreaks. For instance, the BS&S training has likely helped in prevention of outbreaks in that it reduces the potential for accidental infection or release. |
| Strengthening global networks | |
| 8. Has the project helped to strengthen local, national, and global networks to rapidly identify, confirm, and respond to biological threats? Provide examples. | Yes. Placing PCR equipment in the zonal labs and developing field bags promotes rapid detection, which promotes enhanced capacity for threat reduction. Such field and laboratory capacity have likely enhanced URT's ability to respond. |

Biological and Toxin Weapons Convention (BWC)

| Questions | Comments |
|---|--|
| BWC support | |
| 9. What are the project's goals in support of the BWC? | Increased engagement is the primary goal. And, in the long-term, supporting URT's path to ratification. |
| 10. Has the project met its goals in supporting the BWC? | Dr. Nikkari feels they have achieved a lot with respect to BWC via encouragement of URT's top expert (Dr. Mramba) to participate in those meetings, and to approach the URT ambassador to participate. |
| Meetings | |
| 11. Has the project supported Tanzanian personnel to travel to BWC meetings? | Yes, Dr. Mramba has attended several BWC meetings, improving her awareness of it. |
| Ratification | |
| 12. Has the project improved the likelihood of Tanzanian ratification of the BWC? | Dr. Mramba has worked toward elevating the ratification issue to relevant political levels within URT. She spoke with the URT ambassador in Geneva. Has tried to develop an approach. Will ultimately approach Parliament. But they have a new President now and a new ambassador, so she has to start again. She also approached the foreign affairs ambassador to see if he will discuss with President. |

VI. MEETING ONE HEALTH GOALS & CROSS-CUTTING THEMES

| Questions | Comments |
|--|--|
| One Health | |
| 1. Have the human laboratories received as much benefit as the veterinary laboratories? | The project was, from inception, designed to be administered by the Ministry of Agriculture, Livestock, and Fisheries. Direct benefit was designed for the veterinary laboratories, but it was understood that the project would indirectly benefit the human health and wildlife health sectors. Thus, the distribution of benefits is appropriate for the purpose of the project, and toward One Health ends. |
| 2. Tanzania has numerous infectious disease concerns, including HIV/AIDS tuberculosis, malaria, and many neglected tropical diseases. Has the Finnish intervention helped in detection of these diseases in any way? | Yes. The veterinary laboratories can now potentially accommodate more infectious diseases if they can access resources to acquire reagents and kits, and getting SOPs and any additional required training. TVLA is interested in rabies and trypanosomiasis – they are priority zoonoses to be implemented through One Health collaboration. |
| Communication | |
| 3. Have stakeholders been trained to support greater in-country communication with inter-sectoral groups, for example, in disease reporting and response? | Yes. See above sections on information sharing. |
| 4. Are any samples deep-sequenced, and if so are they sent to Finland for this purpose? Are the results communicated back to URT? | TVLA indicated that Finland is willing to offer sequencing services when URT needs it. This is not critical to the implementation of this project and is somewhat outside of its scope. |
| 5. Does the URT capacity integrate with regional sample sharing and disease-reporting frameworks? How does this project integrate within regional East Africa capacity? | URT is actively engaged in a number of regional networks in East Africa and South Africa on surveillance, BS&S, etc. This project seems to be allowing them to better report disease status in URT as the country now has an enhanced capacity to take part in these networks. From its inception, the project designers understood that ultimately the information gained could be rolled up into the regional and global (OIE, GHSA, etc.) networks and initiatives. |
| 6. Is TVLA communicating results to regional and international disease reporting networks (OIE, GOARN, etc.)? | TVLA indicates that they follow the guidelines of the national and international reporting policies. |
| Inequality | |
| 7. Is the way this project has been implemented an example of how development projects can reduce gender or socioeconomic inequality? | Yes. See numerous sections above describing integration of women and provision of access to diagnostics in rural communities. This project could be used as a model for other development projects in terms of its inclusion of women, targeting of underserved areas, and its focus on sustainability. |
| Climate change | |

| | |
|---|--|
| 8. Does this project support Tanzania's efforts to deal with impacts of climate change re: infectious diseases? | While not direct, this project gives URT an enhanced capability to respond to the changing world around them, such as environmental changes due to climate change. |
|---|--|

VII. PROJECT SUSTAINABILITY

| Questions | Comments |
|--|--|
| Questions for Tanzania | |
| 1. Does Tanzania have enough trained personnel and resources to sustain use of the equipment after the funding ends? | <p>For human resources – yes, they are comfortable. With reagents, consumables, and the training of additional personnel are where they would struggle. They may be able to manage through other donor support – maybe not for all six diseases, but at least for some of the priority diseases.</p> <p>Some donors understand now they have to provide some minimum support for reagents and equipment. Even just supporting reagents would be huge. Their own budget is limited but they set aside a very small amount to buy kits. In sum, they can put it in their own budget and look for other donors – but it will not quite be enough to support a full-fledged program as it exists now.</p> <p>They have a good relationship with FAO, who have been assisting them with reagents and some equipment for other work supporting FAO's programs for animal disease control.</p> <p>The URT Prime Minister's office supports some diseases like RVF and may be a place from where they can draw support (as a "public good").</p> |
| 2. Will you be able to maintain the qPCR equipment after the Finnish project ends? | TVLA has indicated that it will not be possible for them to financially support bringing in technicians or purchasing new machines on their own. |
| 3. Has the procurement of generators for TVLA in Dar mitigated the risk from power outages? Are you able to procure fuel for the generators with your own funds? | Project is supporting purchase of fuel. With time, TVLA will see if they can include it in the budget. The generator will also assist other projects. |
| 4. Do you believe the project should be extended past 2018: in terms of Finnish funding? In terms of relevance to Tanzania? | TVLA believes sufficiently in the positive impact of the project that it is their hope that, when it concludes in 2018, support will continue. |

| | |
|---|--|
| <p>5. If it were funded, what would you like to change? Improvements? Addressing implementation challenges?</p> | <p>Some key issues the TVLA has experienced, and which a second phase of the project could address, are:</p> <ul style="list-style-type: none"> ▪ <i>Overhead costs:</i> Paying for electricity, water, administrative functions (overhead paid for by TVLA); would like to request assistance (though not for entire amount). TVLA does have administrative funds for this project, but highly restricted. ▪ <i>Vehicles:</i> Finland can cover tires, wear and tear, and mileage; but ideally they could convert that to covering entire vehicles. Not just a matter of efficiency, but also safety in the field. Perhaps they could turn money for hiring project personnel toward paying for a vehicle instead: administrative funds are still available from the grant, according to project write-up. ▪ <i>Cost sharing analyses:</i> TVLA lacks time/resources to get personnel to do evidence-based analysis and calculations of wear and tear of car, use of lab equipment (e.g., freezer for this project), etc., but ideally would like evaluation of operational costs and determination of fair way of cost sharing. URT does not have internal capacity to do the analysis. Want to discuss and then request permission from Project Board for things that are not currently included. TVLA noted that they have a lot of financial visibility on the project, which is very helpful to them. ▪ <i>Training:</i> Need to set up a planned program for training. They will have 4 satellite laboratories operating soon that will need at least annual follow-up. Also need an M&E plan. ▪ <i>Expanding to more diseases:</i> Interested in other diseases – e.g., rabies, trypanosomiasis, bluetongue. The challenge is that defense ministries do not typically fund agents like this (although Dr. Nikkari has expressed willingness to fund rabies). TVLA would like to get connected with other interested donors. A Gates Foundation project was being implemented in coastal areas and Zanzibar (almost over now) with a rapid testing component and canine vaccination. Ideally TVLA could produce its own canine vaccine. ▪ <i>Equipment:</i> maintenance and calibration. ▪ <i>Accreditation:</i> achieving and maintaining accreditation status. ▪ <i>Expanded reach into zonal areas:</i> More reach into other zones with things like biosafety cabinets, other equipment, training. ▪ <i>Testing algorithm:</i> Testing on rtPCR is expensive. It may make sense to do rapid test or screening test first, saving rtPCR for when needed (potentially through development of an algorithm with help of Finland). Would help reduce costs. ▪ <i>Strain characterization:</i> Would like to know more about strains - characterization might be helpful. E.g., in preparing vaccines. So, could send samples for sequencing somewhere. |
| Questions for Finland | |
| <p>6. Has the project kept to the schedules outlined in the work plan (p.25)?</p> | <p>Yes. There have been some routine and expected delays in implementation, but the project is catching up and all activities are expected to be completed by the pre-determined end date.</p> |

| | |
|---|---|
| <p>7. Have the budget deviations been sufficiently small to allow sufficient funds to complete the project by 2018?</p> | <p>Yes. Through the Project Board and clear communication between the Finnish and URT teams, there is overall fiscal visibility on both sides that has allowed for smooth execution and permits the project to respond flexibly to unforeseen needs. This is an unusual element of this project allowing TVLA to feel a strong sense of management and collaboration.</p> |
| <p>8. If this project is supported past 2018, what would you like to see changed or addressed?</p> | <p>Dr. Nikkari: would like to see collaborators move out from their comfort zone, ensure that they can order supplies. Finland's role could continue in training the trainers, as well as perhaps adding on scientific elements like systematic surveillance and analysis, or pathogen characterization.</p> |
| <p>9. What lessons have you learned from implementation of this work?</p> | <p>Crisis management operations, live agent training – these are great lessons to apply to Finland. Huge impact on Finland's knowledge of developing countries, and Africa in particular.</p> |

Appendix E: Acronyms

| | |
|-----------|--|
| AFRO | Regional Office for Africa (WHO) |
| AI | avian influenza |
| ASM | American Society for Microbiology |
| BS&S | biosafety and biosecurity |
| BSL | biosafety level |
| BWC | Biological and Toxin Weapons Convention |
| CBRN | chemical, biological, radiological, nuclear |
| CBEP | Cooperative Biological Engagement Program (U.S. Department of Defense) |
| CIDB | Center for Infectious Diseases and Biotechnology (Tanzania) |
| CVL | Central Veterinary Laboratory (Tanzania) |
| DSSP | Disease System Surveillance Plan |
| DTRA | United States Defense Threat Reduction Agency |
| DVS | Director of Veterinary Services (Tanzania) |
| EHA | EcoHealth Alliance |
| ET | Evaluation Team |
| FAO | United Nations Food and Agriculture Organization |
| FI | Finland |
| GHSA | Global Health Security Agenda |
| GPP | Global Partnership Program |
| IAEA | International Atomic Energy Agency |
| ID | Infectious Disease |
| JEE | Joint External Evaluation |
| M&E | monitoring and evaluation |
| MALF | Ministry of Agriculture, Livestock and Fisheries (Tanzania) |
| MBD | Medical Biodefense |
| MFA | Ministry of Foreign Affairs (Finland) |
| MoD | Ministry of Defence (Finland) |
| MoH | Ministry of Health, Community Development, Gender, Elderly and Children (Tanzania) |
| MoSH | Ministry of Social Affairs and Health (Finland) |
| NBC | Nuclear Biological and Chemical |
| NCAA | Ngorongoro Conservation Area Authority |
| NIMR | National Institute for Medical Research (Tanzania) |
| OIE | World Organisation for Animal Health |
| PCR | polymerase chain reaction |
| qPCR | quantitative PCR |
| QA | quality assurance |
| QC | quality control |
| QM | quality management |
| rtPCR | real-time PCR |
| SADC | Southern African Development Community |
| SOTLK | Centre for Military Medicine, Finnish Defence Forces, Finland |
| TOT | Training-of-Trainer (also called “train-the-trainer”) |
| TVLA | Tanzania Veterinary Laboratory Agency |
| UMN | University of Minnesota |
| URT | United Republic of Tanzania |
| USAID | U.S. Agency for International Development |
| WHO | World Health Organization |
| <i>Yp</i> | <i>Yersinia pestis</i> |