Urban food markets in Africa: Incentivizing food safety using a pull-push approach

Project inception report

March 2019

CGIAR

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

ILRI thanks all donors and organizations which globally support its work through their contributions to the CGIAR Trust Fund

Compiled by Kristina Roesel

Edited and formatted by Tezira Lore

Citation

ILRI (International Livestock Research Institute). 2019. *Urban food markets in Africa: Incentivizing food safety using a pull-push approach*. Project inception report. Nairobi, Kenya: ILRI.

Patron: Professor Peter C Doherty AC, FAA, FRS
Animal scientist, Nobel Prize Laureate for Physiology or Medicine–1996

Box 30709, Nairobi 00100 Kenya
Phone +254 20 422 3000
Fax +254 20 422 3001
Email ilri-kenya@cgiar.org

ilri.org
better lives through livestock

ILRI is a CGIAR research centre

Box 5689, Addis Ababa, Ethiopia
Phone +251 11 617 2000
Fax +251 11 667 6923
Email ilri-ethiopia@cgiar.org

ILRI has offices in East Africa • South Asia • Southeast and East Asia • Southern Africa • West Africa

Contents

Abbreviations and acronyms iii
Acknowledgements iv
Summary v
Ethiopia inception meeting: 11-16 February 2019 in Addis Ababa 6
Burkina Faso inception meeting: 12-14 March 2019 in Ouagadougou 8
Annex 1: Joint statement of collaboration 9
Annex 2: Ethiopia inception meeting 14
Agenda 14
Joint planning meeting of food safety grants in Ethiopia funded by the Bill & Melinda Gates Foundation and the UK Department for International Development (2018–22) 15
Group discussions with food safety stakeholders in Ethiopia 20
Lists of participants 22
Annex 3: Burkina Faso inception meeting 24
Agenda 24
Group discussions with food safety stakeholders in Burkina Faso 25
List of participants 30
Annex 4: Pull-push project planning, by work packages 32
WP 1: Estimating burden and cost of foodborne illness (lead: University of Florida) 32
WP 2: Understanding poultry meat and vegetable value chains (lead: ILRI) 32
WP 3: Quantitative risk assessment and cost-effectiveness analysis of candidate interventions (lead: WUR) 33
WP 4: Build capacity and motivation of regulators to manage food safety (lead: ILRI) 35
WP 5: Empower value chain actors to manage food safety (lead: ILRI) 35
WP 6: Design and implement a consumer campaign (lead: WUR) 35
WP 7: Impact assessment of pull-push intervention (lead: ILRI and WUR) 35
WP 8: Project management (lead: ILRI) 36

Abbreviations and acronyms

A4NH	CGIAR Research Program on Agriculture for Nutrition and Health
AAU	Addis Ababa University
ABNORM	Agence Burkinabé de Normalisation
AU	African Union
CAPES	Centre d'Analyses des Politiques Economiques et Sociales
DTU	Technical University of Denmark
ECOWAS	Economic Community of West African States
ETEC	Enterotoxigenic *Escherichia coli*
FAO	Food and Agriculture Organization of the United Nations
GMT	Greenwich Mean Time
ILRI	International Livestock Research Institute
IRSAT	Institut de Recherche en Sciences Appliquées et Technologies
KAP	knowledge, attitudes and practices
NTS	non-typhoidal *Salmonella*
QMRA	quantitative microbial risk assessment
REDCap	Research Electronic Data Capture
UK	United Kingdom
WHO	World Health Organization
WUR	Wageningen University & Research
WP	work package

Acknowledgements

The *Urban food markets in Africa: Incentivizing food safety using a pull-push approach* project is supported by the Bill & Melinda Gates Foundation, UK Aid from the United Kingdom (UK) Government's Department for International Development, and the CGIAR Research Program on Agriculture for Nutrition and Health led by the International Food Policy Research Institute.

Summary

In November 2018, the *Urban food markets in Africa: Incentivizing food safety using a pull-push approach* project (Pull-push project) was awarded a four-year grant by the United Kingdom (UK) Government's Department for International Development and the Bill & Melinda Gates Foundation for implementation in Ethiopia and Burkina Faso. Project inception, planning and stakeholder workshops took place on 11–16 February 2019 in Addis Ababa, Ethiopia and 12–14 March in Ouagadougou, Burkina Faso.

The Pull-push project has the following work packages (WPs):

- WP 1: Estimating burden and cost of key foodborne illnesses in Burkina Faso and Ethiopia
- WP 2: Understanding the poultry and vegetable value chains in urban markets in Burkina Faso and Ethiopia
- WP 3: Quantitative microbial risk assessment and cost-effectiveness analysis of candidate market-based interventions
- WP 4: Build capacity and motivation of regulators to manage food safety
- WP 5: Empower market-level value chain actors to manage food safety
- WP 6: Design and implementation of a consumer campaign
- WP 7: Impact assessment of pull-push intervention
- WP 8: Project management

During the inception and planning meetings in Ethiopia, the overall project Gantt chart was reviewed and finalized and planning focused on WPs 1, 2 and 3. In Burkina Faso, planning focused on WPs 2 and 7. The body of this report presents the key discussion points and activities of the respective planning meetings. Further details are contained in the annexes.

Ethiopia inception meeting: 11-16 February 2019 in Addis Ababa

The Pull-push project planning meetings in Ethiopia were aligned with several high-level food safety events in Addis Ababa that took place during the same week, namely, the launch of the World Bank Global Food Safety Partnership report, *Food safety in Africa: Past endeavors and future directions*, on 11 February 2019, the First Food and Agriculture Organization of the United Nations (FAO)/World Health Organization (WHO)/African Union (AU) International Food Safety Conference on 12–13 February 2019 and meetings of the Global Food Safety Initiative on 14 February 2019.

In addition, workshops were organized with three other new food safety research projects in Ethiopia supported by the Bill & Melinda Gates Foundation and the UK Department for International Development. The three projects are

- Ensuring safety and quality of milk and dairy products across the dairy value chain in Ethiopia (ENSURE);
- Foodborne disease epidemiology, surveillance and control in African low- and middle-income countries (FOCAL); and
- The assessment and management of risk from non-typhoidal *Salmonella*, diarrhoeagenic *Escherichia coli* and *Campylobacter* in raw beef and dairy in Ethiopia (TARTARE).

In a written joint statement of collaboration (Annex 1), the principal investigators of the projects committed to conduct synergistic, mutually beneficial and efficient food safety projects that leverage each other's resources.

The week of food safety activities started on 11 February 2019 with a Pull-push project inception meeting at the International Livestock Research Institute (ILRI) Addis Ababa campus to introduce all team members and agree on the objectives and agenda of the week. The team brainstormed on challenges to be addressed and expectations from and contributions to the project. They also discussed the draft project presentation for the stakeholder meeting set for 14 February 2019 and the questions to be addressed to the stakeholders.

The team then moved to the regional office of the Global One Health initiative for the joint planning meeting of the four new food safety projects. The meeting helped the different project team members to get acquainted with each other and their respective research approaches. Discussions followed on specific areas of collaboration as outlined in the joint statement. Details of the discussions, presentations and lists of participants at the various meetings are available in Annex 2.

Immediate outcomes of the joint planning meeting

- Overlap in study sites were identified and noted by the projects' principal investigators
- From March 2019, the four principal investigators will convene monthly Zoom meetings every second Wednesday of the month to follow up on progress. Barbara Kowalczyk (TARTARE) will chair the meetings during the first year.
- Five cross-project groups will continue discussions on the work in Ethiopia:
    - Group 1: Laboratory protocols
    - Group 2: Capacity development
    - Group 3: Policy engagement
    - Group 4: Risk analysis
    - Group 5: Interventions

On 12-13 February 2019, the First FAO/WHO/AU International Food Safety Conference convened some 500 participants from over 110 countries (Figure 1). At the close of the conference, 13 areas emerged as priorities for future engagement including "enabling consumers and civil society to engage and contribute to food safety discussions, foster ownership of decisions, collaborative actions and public confidence in food systems, and drive enhanced food safety practices, sustainable food systems and related policies", in short, the pull-push approach.

Figure 1: Participants at the First FAO/WHO/AU food safety conference, Addis Ababa, Ethiopia, 12–13 February 2019.

On the morning of 14 February 2019, the Pull-push project team visited local formal and informal urban markets. Selected photos are available in the project's Flickr album. In the afternoon, and jointly with the other three food safety projects, the projects were officially launched at the Hilton Hotel in Addis Ababa.

The launch was hosted and cost-shared by all four projects, moderated by Getnet Yimer, Eastern Africa Regional Director of the Global One Health initiative at Ohio State University, and facilitated by Ewen LeBorgne (ILRI consultant). Present were national and regional food safety stakeholders, project team members, donor representatives (Kristen MacNaughtan of the Bill & Melinda Gates Foundation and Áine McGowan of the UK Department for International Development) and high-level speakers including Gebregziabher Gebreyohannes, Ethiopia Minister for Agriculture and ILRI board member; Afework Kassu, Ethiopia State Minister for Science and Higher Education; the Senior Advisor to the State Minister of Health; and Mitike Molla Sisay, Vice President for Research, Technology Transfer and Community Services at Addis Ababa University.

There were introductory presentations on the projects followed by an interactive and dynamic question-and-answer session and a joint press statement. The event was covered on various media outlets including Ethiopian television (AfriHealth TV), the ILRI News blog and the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) website. Photos of the event are available in the project's Flickr album.

On the morning of 15 February 2019, members of the four project teams and stakeholders met at the Hilton Hotel for group discussions on project activities. The notes of the group discussions chaired by the Pull-push project team members are available in Annex 2. In the afternoon, the Pull-push project planning continued with reflections on the week's meetings (Figure 2). Details are available in Annex 4 (WP 8).

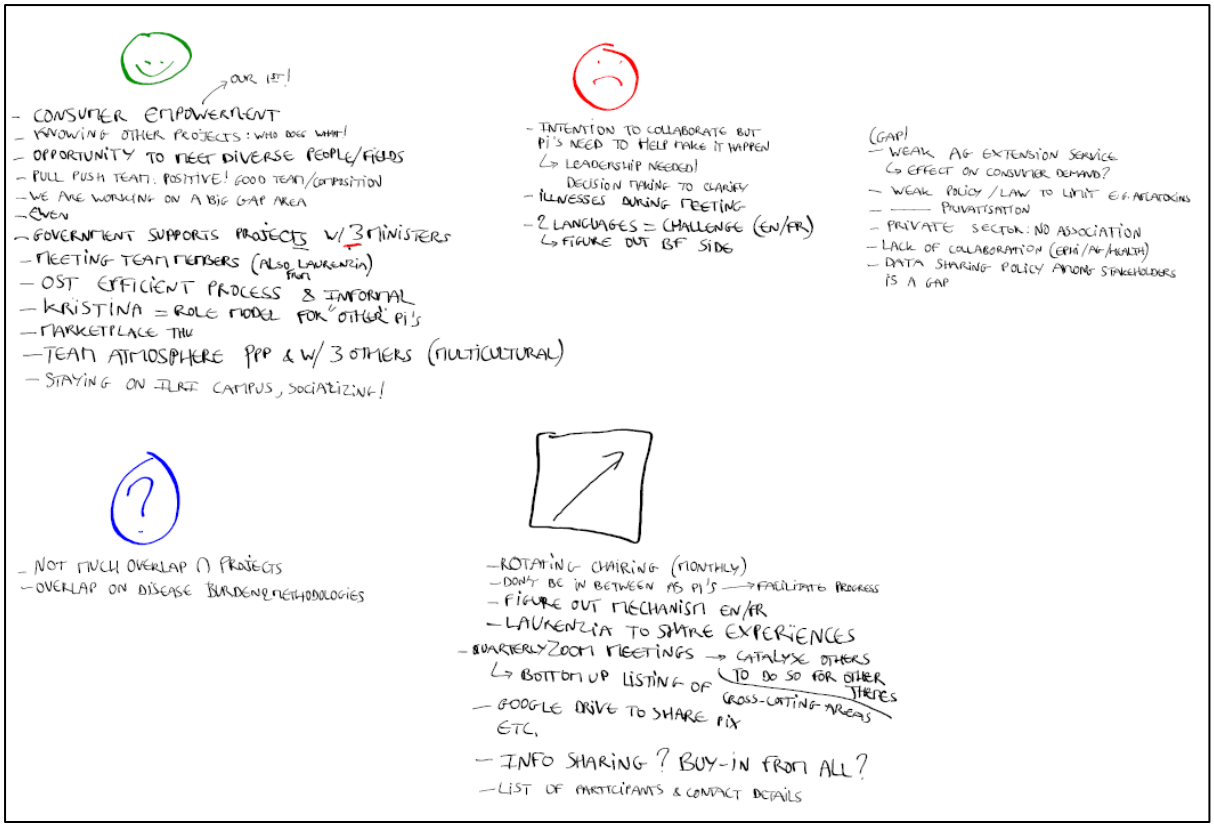


Figure 2: Considerations for the design and strategy of the Pull-push project.

Burkina Faso inception meeting: 12-14 March 2019 in Ouagadougou

In Burkina Faso, the team held planning meetings on 12 March 2019 (introductions and WP 2) and 13 March 2019 (site visits and WP 7). The agenda and list of participants are available in Annex 3. Selected photos of the site visits are available in the project's Flickr album.

On March 14, 2019, the project team held a stakeholder meeting at the Royal Beach Hotel in Ouagadougou. After a series of presentations by the team, group discussions were held in the afternoon to gather as much information as possible to prepare for the implementation of the project. Participants were divided into four groups that discussed food policy and safety, consumer welfare, intervention and food safety, and choice of market. Afterwards, a question-and-answer session was held before the close of the meeting. Notes of the group discussions chaired by the Pull-push team members are available in Annex 2. The *Observateur Paalga* newspaper reported on the project inception.

Annex 1: Joint statement of collaboration

Joint Statement of Collaboration
between
***The Assessment and Management of Risk from non-typhoidal Salmonella, diarrheagenic Escherichia coli* and *Campylobacter in Raw Beef and Dairy in Ethiopia* (TARTARE) Project (The Ohio State University – OPP1195603)**
and
***Ensuring the Safety and Quality of Milk and Dairy Products Across the Dairy* (ESQM-DAD) Value Chain in Ethiopia Project (Addis Ababa University – OPP1195646)**
and
***Urban Food Markets in Africa – incentivizing food safety* (Pull-Push Project) Project (International Livesrock Research Institute – OPP1195588)**
and
***Foodborne Disease Epidemiology, Surveillance and Control in African LMIC* (FOCAL) Project (Technical University of Denmark – OPP1195617)**

Parts of the four proposals mentioned above (OPP1195603, OPP1195646, OPP1195588, and OPP1195617) are synergistic and collaboration between the projects will minimize redundancy while, at the same time, achieving sustainable project outcomes, contributing to the development of a food safety agenda and advancing food safety in Ethiopia and other low- and middle-income countries (LMIC) through research, capacity building and stakeholder involvement. In addition, the collaboration will strengthen partnership between the involved institutions both those inside and outside Ethiopia including research and academic institutes in other African LMIC, as two of the projects involve several countries.

This joint statement outlines a commitment between the four projects to conduct synergistic, mutually-beneficial and efficient food safety projects in Ethiopia that leverage each other's resources. After a thorough and productive discussion among the project leaderships and review by the other project partners, the following key points of collaboration have been identified:

Geographical study areas (OSU, AAU, ILRI, DTU)

Three projects (OSU, ILRI, DTU) plan to work in eastern Haraghe zone (Haramaya woreda and Harar city) in the Oromia region, and three projects (OSU, ILRI, AAU) will also work in the Amhara region (North Gondar). To maximize resources, we agreed to utilize the same zones and woredas (districts) for field sample collection when the proposed regions overlap. Sampling dates and selection of sampling locations e.g. farms, food markets and dairy cooperatives, will be coordinated to the extent possible to avoid redundancy. In addition, OSU and DTU agreed to align study population (area) for the planned community surveys, so that research approach and results will be comparable (see below).

Community surveys (OSU, DTU)

Both OSU and DTU will perform community surveys to estimate the incidence of diarrhea, but where OSU will conduct face-to-face interviews with enrolled participants, DTU will be using a smartphone solution to administer the questionnaire. OSU and DTU agreed to align the questionnaires where relevant, so that the results subsequently can be compared, which could serve as a validation of the results and suggest best practice for subsequent projects, either in Ethiopia or in other countries.

The recruitment of participants from both type of studies will require contribution from local health extension workers (HEWs), and to minimize the burden on these, the two projects will coordinate their activities in Haramaya/Harar as well as other regional projects (e.g. CHAMPS).

Burden of Disease studies (OSU, ILRI, DTU)

Three projects will conduct burden of disease studies for selected pathogens. When these overlap, it was agreed to align methods e.g. use the same disease outcome trees and other pertinent data such as disability weights. To obtain data for populating the disease burden models (incidence, mortality, etiologies, etc.), all three projects plan to review available information in hospital records. To avoid duplication of work and troubling hospital record keepers more than necessary, ILRI offered to retrieve relevant hospital data for all studies to be shared with the other projects.

Epidemiological studies focusing on children (OSU, DTU)

Both OSU and DTU intend to sample children (< 15 and < 5 yrs., respectively) and collect information on symptoms and exposure sources to be used in epidemiological studies. In Haramaya, these projects will consequently be seeking out the same patients for enrollment i.e. children < 5 yrs. presenting with diarrhea. To minimize the burden on the patients and their caregivers, we will therefore be coordinating sampling and questionnaire administration. Likewise, we will coordinate the laboratory analysis (i.e. culturing and isolation) of the feces samples from the children and their caregivers to avoid duplication of work.

Microbiological methods and sharing of data (OSU, AAU, ILRI, DTU)

All projects have agreed to harmonize laboratory protocols, to the extent possible, when similar pathogens are targeted, e.g. *Salmonella*, *Campylobacter* and enterotoxigenic *E. coli*. The details of the methodologies will be jointly agreed upon at the commencement of the project implementation. Culture and isolation will be conducted as originally planned at respective partner institutes. Harmonizing methodologies will minimize variability between the projects, which will facilitate collaborative activities including the sharing of isolates and results. DTU will in addition to culture and isolation, also perform WGS on selected foodborne pathogens including those targeted by the other projects. It was agreed to share isolates from the other projects with DTU for WGS, and DTU will share all WGS results with all projects' partners through a joint password-protected data-sharing platform following the requirements of BMGF and DFID. Further, DTU will support a platform building on the pipelines and databases created by the H2020 EU project COMPARE. COMPARE has strong links with the EMBL-EBI European Nucleotide Archive (ENA) and the National Center for Biotechnology Information (NCBI, which is also hosting Genome Trakr), enabling rapid sharing data with the entire world through the International Nucleotide Sequence Database Collaboration (INSDC).

Sharing of survey tools (OSU, AAU, ILRI, DTU)

OSU and DTU will develop questionnaires asking about recent food exposure in children. These survey tools could be complemented using components of the generic ILRI tool Rapid Integrated Assessment of food safety and nutrition (RIA) that will also be used in the Push-Pull project. The RIA tool includes focus group discussion guides, validated participatory epidemiology tools and questionnaires for different actors in animal sourced food value chains to assess knowledge, attitudes, practices including consumption patterns (amounts and frequencies) of animal sourced foods. University of Florida (UF), partner of the both the TARTARE and the Push-Pull project, also has vast experience in developing electronic surveys using the REDCap platform, which may be useful for the other projects as well.

ILRI has developed a protocol for a systematic literature review of zoonotic hazards in the dairy value chain, which has been applied in Tanzania (https://doi.org/10.1017/S146625231600013X) and

can be shared with the other projects e.g. the protocol for adaptation to milk-borne hazards to be investigated by AAU.

Quantitative Microbial Risk Assessment (OSU, AAU, ILRI, DTU)

All projects collect food prevalence data from various food production chains (beef, dairy, poultry, small ruminant meat, vegetables), and three of the projects (OSU, AAU, ILRI) will analyse and enumerate commensal *E. coli* isolated from food. These data will be valuable for the QMRA models planned to be developed by OSU and ILRI. It was, therefore, agreed to share data on pathogen prevalence and *E. coli* enumeration between projects, and when feasible, without compromising the original study objective, to align the design of the prevalence studies to optimize the usefulness of the data collected by the projects.

Interventions studies (OSU, AAU, ILRI)

The projects led by OSU and AAU plan to do intervention studies in the dairy chain. Coordination of these activities has been described in a separate joint statement between these two universities. In addition, the interventions involving training of regulators and value chain actors will collaborate with the Push-Pull project led by ILRI.

Gender considerations

As recommended by our BMGF program officer, we plan to have a gender specialist (i.e. Dr. Kathleen Colverson from UF) review all four proposals to find further opportunities for focusing on gender and align gender activities. We also plan to incorporate gender training for the project teams based on workshops developed through the Livestock Innovation Lab (LSIL). This would be funded by savings achieved by combining activities.

Joint stakeholder meetings and policy engagement (OSU, AAU, ILRI, DTU)

All four projects plan to involve national food safety stakeholders of which many will be overlapping across projects. So, even though some of the activities planned for the stakeholders differ between projects, we agreed to organize joint stakeholder meetings to avoid stakeholder fatigue and to save meeting costs. In particular, we agreed to the usefulness of a joint inception meeting, where stakeholders will be informed of and encouraged to come with input to the planned activities, which we believe would benefit stakeholder engagement and across-projects coordination of e.g. sampling and implementation of interventions. Moreover, feedback on research findings from the various projects will be provided in regular stakeholder meetings (for instance as part of the ILRI-led capacity building activities to create an enabling environment). As the project partners have different national partners who can mobilize different sets of food safety stakeholders, these joint meetings will also facilitate network building between the national food safety stakeholders from the governmental and non-governmental sector.

Capacity building activities (OSU, AAU, ILRI, DTU)

Capacity building activities will be coordinated between the four projects and we will align our efforts with capacity building activities being developed by other organizations such as WHO and FAO and projects such as CAGED and EXCAM. The project PIs will continuously coordinate capacity building opportunities and distribute this information to all project partners. For example, when training needs overlap (e.g. quantitative microbial risk assessment), the projects will plan joint training opportunities. Further, whenever one project administers a training opportunity, the other projects will be informed and invited to participate in the training, given the capacity of the training opportunity. For example, as part of the capacity building activities in the project led by DTU, DTU will throughout the project host postdoc fellows and PhD students for training in WGS, metagenomics, bioinformatics, surveillance and source attribution modeling. If relevant, DTU will be happy to host fellows and PhD students from the other projects as well, if they have funding for their own travel and accommodation. Similarly, OSU has conducted a One Health Summer Institute for

the past seven years in Ethiopia and has an NIH Fogarty Global Infectious Diseases grant that aims to create a sustainable critical mass of capable scientists that can effectively conduct research on zoonotic diseases and implement prevention and control systems; these programs will be leveraged to deliver local training and capacity building. Finally, we will engage with relevant stakeholders, including government agencies such as EPHI and FMHACA, about sustainability of the projects beyond current funding and conserve capacity-building efforts conducted in these projects. Outcomes of these discussions including options for solutions will be presented the funders and relevant policy decision makers with the aim to strengthen and institutionalize food safety research and management activities at the national and regional levels and align these capacities with government infrastructure.

Information sharing and communication (OSU, AAU, ILRI, DTU)

Information sharing and ongoing communication will be essential for coordinating activities and optimizing resources. We plan for having joint annual project and stakeholder meetings with the first meeting taken place in the beginning of 2019. The inception meeting will start with a 2-day consortium meeting for project partners from all four projects, including project-specific breakout sessions, and end with a 1-2 day meeting for stakeholders, where parts of the program also will be project specific. As the project led by DTU involves three other African LMIC, only one annual face-to-face meeting is planned to take place in Ethiopia during the four-year project period. DTU and partners agreed to move this meeting to year 1 in order to coordinate with the three other projects, but there will not be funding available for non-Ethiopian partners to participate in the following annual meetings in Ethiopia. Overall, communication between projects will therefore be through the local researchers from Haramaya University and through quarterly web-conferences. We will develop an aide memoire setting out the salient features of each project and how they contribute to answer broader research questions. The project led by OSU and AAU have more overlapping activities and will meet more regularly both at face-to-face meetings (twice a year) and through web-meetings (bi-monthly), as described in their separate joint statement.

Review of approaches and results

The fact that there will be four projects working for the improvement of food safety in Ethiopia (and other LMIC) creates a unique opportunity for the project partners, and especially the PIs, to use each other for advice and for reviewing each other's approaches and results, and discuss any issue arising during the course of the projects. We will, therefore, as part of the quarterly web-conferences have a part of the agenda fixed for such discussions and feedback.

Leveraging Human Resources

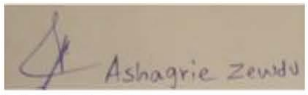
To the extent possible, the four projects will leverage and potentially pool resources to hire staff that are fully dedicated to project activities. Detailed discussions regarding this will be undertaken if and when the projects are funded. Local project team members will need to be heavily engaged in these discussions, which we expect to result in a formal organizational plan for in-country support.

In summary, the OSU, AAU, ILRI and DTU project teams are very excited about collaborating and appreciate the recommendation by the reviewers and BMGF program officer to work jointly in a synergistic manner. Further, the project leadership agreed to have a synergistic partnership with other BMGF funded complementary projects such as CAGED and other potential future projects. Having a portfolio of complementary projects in a high priority, high burden country offers the opportunity to build critical mass, to combine information from multiple projects, to validate approaches and methods, and to cover a broad range of issues. Any given project is able to draw on others and so is less likely to fail to meet objectives, and the regular co-operation between projects is an unprecedented opportunity to raise the profile of food safety in Ethiopia. The project teams would like to confirm that all team members are informed of this collaboration and have agreed to work with utmost commitment to ensure that not only are all projects successfully carried out, but

also to develop other high impact synergistic activities that will be beneficial to the communities and the nation.

Sincerely,

Barbara Kowalcyk
Principal Investigator (TARTARE)
The Ohio State University



Ashagrie Zewdu
Principal Investigator (ESQM-DAD)
Addis Ababa University (AAU)

Delia Grace
Principal Investigator (Push-Pull Project)
International Livestock Research Institute

Tine Hald
Principal Investigator (FOCAL)
Technical University of Denmark

Annex 2: Ethiopia inception meeting

Agenda

Monday 11 February 2019		
8:30-10:00	Introductory meeting Pull-push project	ILRI
10:00-10:30	Transfer to Global One Health initiative office	Pick-up ILRI Hostel reception
10:45-11:00	Coffee break	Ohio State University Global One Health initiative office
11:00-18:00	Joint planning meeting of the four food safety projects in Ethiopia funded by the Bill & Melinda Gates Foundation and the UK Department for International Development	Ohio State University Global One Health initiative office
18:00	Cultural group dinner	Transfer to restaurant
21:00	Transfer to ILRI	Pick-up from restaurant
Tuesday 12 February 2019		
8:00	Transfer to African Union Conference Centre	Pick-up ILRI Hostel reception
10:00-19:30	First FAO/WHO/AU International Food Safety Conference	African Union Conference Centre
19:30-21:30	Conference dinner	
21:30	Transfer to ILRI	Pick-up from conference venue
Wednesday 13 February 2019		
8:00	Transfer to African Union Conference Centre	Pick-up ILRI Hostel reception
Whole day	FAO/WHO/AU International Food Safety Conference	African Union Conference Centre
19:00	Transfer to ILRI	Pick-up from conference venue
Thursday 14 February 2019		
8:30-10:30	Site visit to urban markets	Pick-up ILRI Hostel reception
11:30-12:00	Transfer to Hilton Hotel	Pick-up ILRI Hostel reception
12:00-13:00	Lunch break	Hilton Hotel
13:00-17:00	Joint stakeholder engagement meeting	Hilton Hotel
17:00	Press briefing and reception	Hilton Hotel
18:30	Transfer to ILRI	Transfer from Hilton Hotel
Friday 15 February 2019		
8:30	Transfer to Hilton Hotel	Pick-up ILRI Hostel reception
9:00-10:30	Group meetings with stakeholders	Hilton Hotel
10:30-10:45	Coffee break	Hilton Hotel
10:45-12:00	Group meetings with stakeholders	Hilton Hotel
12:00	Lunch at Hilton Hotel	
14:00	Transfer to ILRI	Transfer from Hilton Hotel
14:30-17:30	Planning meeting (Pull-push project)	ILRI
19:00	Group dinner	Zebu Club, ILRI
Saturday 16 February 2019		
9:00-10:30	Planning meeting (Pull-push project)	ILRI
10:30-11:00	Coffee break	ILRI
11:00-12:30	Planning meeting (Pull-push project)	ILRI
12:30-13:30	Wrap-up, closing and lunch	ILRI
13:30-15:00	Side meetings and departure	ILRI

Joint planning meeting of food safety grants in Ethiopia funded by the Bill & Melinda Gates Foundation and the UK Department for International Development (2018–22)

Presentations of the projects

- Urban food markets in Africa: Incentivizing food safety. Introducing the Pull-push project
- Ensuring the safety and quality of milk and dairy products across the dairy value chain in Ethiopia
- Foodborne disease epidemiology, surveillance and control in African low- and middle-income countries

Arie Havelaar mentioned other projects in Ethiopia: Children, chickens, eggs, environmental enteric dysfunction and *Campylobacter* (CAGED) and Assessing young children's exposure to *Campylobacter* infections in rural Ethiopia (EXCAM) (started February 2019). *Campylobacter* without borders conference on 8 September (abstract submission deadline 15 February).

Cross-project group discussions

Group 1: Laboratory protocols

The types of samples, microorganisms of interest and standard operating procedures for each project were discussed. The teams agreed to share the microbiological protocols for each project and prepare harmonized protocols.

1. The Pull-push project will isolate and characterize enterotoxigenic *E. coli* (ETEC), non-typhoidal *Salmonella* (NTS) and *Campylobacter* from poultry meat (neck and skin) and one vegetable which will be selected based on availability and consumption preference in the study areas.
2. FOCAL will work on metagenomics analysis of samples from children, animals, food and the environment.
3. TARTARE will isolate and characterize *Salmonella*, *E. coli* and *Campylobacter* from dairy and beef value chains.
4. ENSURE will isolate and characterize *Salmonella*, *Listeria*, *E. coli* and *Campylobacter* from the dairy value chain.

Group 2: Capacity development

Not discussed

Group 3: Policy engagement

Projects listed their policy stakeholders then discussed overlaps, gaps and how to avoid overburden. The Global One Health initiative has offices in eight countries including Ethiopia, Tanzania and Mozambique, holds regular meetings with policymakers and participates in health campaigns (e.g. One Health Day).

Possible policy stakeholders

ENSURE

Ethiopian Food and Drug Administration; Ministry of Health; Ministry of Agriculture; East Hararghe Administration (livestock and fishery resources development office); Harar people; East Hararghe zonal health office; hospitals; local clinics

FOCAL

East African Policy Research Institute; consumer associations; Food and Nutrition Society of Ethiopia; smallholder producers; non-governmental organizations; Ethiopian Public Health Institute; Ethiopian Institute of Agricultural Research; Ethiopian National Accreditation Office; private sector (e.g. Agribless); Ethiopian Food, Medicine and Healthcare Administration and Control Authority; Ethiopian Standard Agency; Ethiopian Meat and Dairy Technology Institute; Ministry of Education; Ministry of Agriculture; Ministry of Health; Ministry of Science and Technology; Ministry of Trade and Industry

Pull-push project

African Chicken Genetic Gains project; Alem Farm; associations of Ethiopian horticultural professionals; meat and dairy boards; consumer associations; East African Policy Research Institute; EthioChicken;

Ethiopian Association of Livestock Production; Ethiopian Public Health Institute; Ethiopian Standard Agency; Horticulture Authority; Ministry of Agriculture; Ministry of Education; Ministry of Health; Ministry of Trade; nutrition non-governmental organizations; Oxfam; poultry associations; vegetable/horticulture associations; World Health Organization; Water, Sanitation and Hygiene initiative

TARTARE
Slaughterhouses; beef fattening farms; butcheries; cooperative associations; Empowering Evidence-Driven Advocacy project (Ethiopian Public Health Institute); Ethiopian Institute of Agricultural Research; hospitals; industry; Melkassa Agricultural Research Center; meat exporters; Ministry of Agriculture; Ministry of Education; Ministry of Health; non-governmental organizations; Public Health Emergency Management Center; unions

Next steps
FOCAL deliverable: One Health task force. Discussion was on whether this could be integrated. The FOCAL task force could report or discuss during the Global One Health initiative meeting. One representative per project could join the task force.

Group 4: Risk analysis

- TARTARE (Gondar): Assess burden of disease (*Salmonella*, *Campylobacter* and *E. coli*) based on hospital data and other records.
- Technical University of Denmark (DTU): True incidence of foodborne disease. Metagenomics, populations at risk, literature review, healthcare data (disaggregated by age and sex), diarrhoea envelope, aetiology proportions by systematic review, surveillance data and mortality estimation. Attribution modelling using whole genome sequencing data. Find source-specific genes by Bayesian machine learning.
- TARTARE: Economics of burden of disease. Get data from hospitals and do prospective surveys (community and health care provider surveys). Focus on NTS, *Campylobacter*, *E. coli*, beef and milk. Add questions to identify economic costs. Cost-effectiveness analysis based on cost of illness modelling.
- ILRI: Quantitative microbial risk assessment (QMRA) and cost-effectiveness analysis of poultry, vegetables, NTS, *Campylobacter*, *E. coli*. QMRA will feed into the data and intervention WPs. Refine and validate with data from WPs on public health, value chains and experimental data and intervention, including meta-analysis.
- ILRI: Burden of disease based on data from the WHO Foodborne Disease Burden Epidemiology Reference Group (FERG). We can use national data if available. The attribution is based on expert opinion. Data on enteropathogenic *E. coli* are not available from FERG and need to be estimated.
- TARTARE: Burden of disease (beef and dairy) and risk ranking. This can be based on disability-adjusted life years or mortality in children; this will give different outcomes.
- TARTARE: QMRA to compare risk reduction of interventions (including uncertainties) and input into economic models. Use actual generated data, surveys and interventions and account for uncertainty and gender differences in consumption and susceptibility.
- FOCAL (Nigeria): Children under five years of age; source tracking; sources of infection (food, sewage, animals, vegetables); use different methods. Culturing and whole genome sequencing will be carried out in Pretoria.
- Modelling and risk assessment, uncertainty and sensitivity analysis and which parameters play a bigger role in the models. Sobol method looks at effects but also interactions between parameters; optimized by the University of Florida.
- Most groups will use R while some will use Microsoft Excel, @RISK, Visual Basic, Python and MATLAB.
- DTU will examine possible links between domestic practices and illness in children.
- We all work on the same pathogens. Merge top-down and bottom-up approaches formally. How fine-grained can attribution be? Point of attribution selected is the entry into the preparation area, not the end product; this can also simulate effects of different levels of hygiene during food preparation. Can also model interventions in the preparation area. FOCAL has risk factors and includes hygiene during

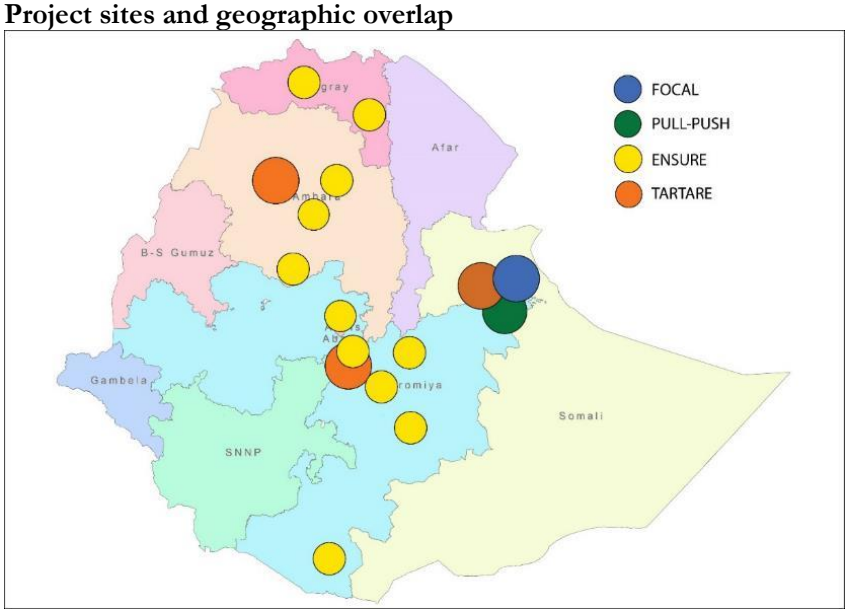
food preparation. Preparation as a source of contamination (animals, water, surfaces): do we need to model this as well? People recognize unsafe food and remove it. Slaughtering as a contamination source. Poultry slaughtering at the home can be a source of contamination so must be modelled. In peri-urban areas, there are no good slaughterhouses so home-based slaughtering of poultry may occur.

- Use dynamic models developed in CAGED and EXCAM projects.
- Use modular process risk model and similar mathematical equations for standard processes. Compare methods and models at some point in time and how they affect cost-effectiveness. Model choice is important. Mark has done a lot of work on model choices; we still support single-hit models. Monetize disability-adjusted life years using Gross Domestic Product? Rob will try to develop a more detailed cost of illness model.
- Use platforms like Slack, Box or Dropbox to share information. GitHub is preferred over Dropbox because of better control about changes. Geraldine and Mark to propose.
- Quarterly conference calls: Marcel to coordinate and Arie to arrange Zoom. Targeted time: 1300-1400 hours GMT.
- An email list will be created for this group and other interested people. Team members should send an email to Marcel to be added to the list.
- Work plans will be shared within three months.

Group 5: Interventions

- TARTARE project campaign on good hygienic practices for beef butchers has already started. Campaign for dairy value chain needs to be developed. Training is given through ENSURE project. ENSURE does the baseline survey, TARTARE the endline survey.
- ENSURE: Training women on dairy production; training commercial laboratories; training male and female farmers
- Since training interventions are being done in dairy and beef value chains, exchange of training materials could be useful but combined development might not work.
- Principal investigators to link the persons responsible for the training (WP 5 in the Pull-push project) to see what level information and data exchange is useful.

Project sites and geographic overlap



Presentation on gender by Kathy Colverson

- She will carry out gender analysis in TARTARE, FOCAL and ENSURE projects (analysis of who is trained and how the training is evaluated).
- She is interested in myths and taboos around consumption of animal-source food (Kristina sent her reports from the Safe Food, Fair Food project: https://hdl.handle.net/10568/67179,

https://hdl.handle.net/10568/53045, https://hdl.handle.net/10568/72831 and https://hdl.handle.net/10568/42451)

- We discussed alignment of gender training activities in Ethiopia and involving the Pull-push project but there is no mechanism in place yet. Kristina will follow up with A4NH gender and equity team for co-funding.
- She shared the Gantt chart of her activities and will share training materials and curricula.

Presentation on Research Electronic Data Capture (REDCap) by Arie Havelaar

- Internet access needed (virtual private network)
- No software download needed (everything web-based)
- Internal review board compliant; REDCap database is accepted by such boards as a good way of protecting data when doing ethical reviews
- Can do basic descriptive analysis
- REDCap mobile app for offline data collection with Open Data Kit
- A lot of discussion about data sharing. It does not seem feasible nor legal to share data at the storage point
    - Nagoya Protocol on Access and Benefit Sharing (according to Ethiopian law, the biobanks need to be in Ethiopia and after analysis in the United States of America, the samples must be destroyed)
    - General data protection regulation in the European Union
    - Other regulations in the United States of America
- What data do we need to share and why? Laboratory protocol and risk analysis working groups should discuss.
- Do we export samples? Who goes where for training and when?
- What are the costs?
- What is the agreed way forward?
- Other sharing suggestions: use R to share codes

Discussion on ethical approvals

- What needs ethical approval? (example from questionnaire survey: "Who in the household cooks the chicken?")
- Who owns the data?
- Who shares the data and what do others do with it?
- Is university clearance needed for national internal review board clearance?
- Getnet to get a checklist on what criteria our data sharing needs to fulfil and a checklist for the ethical review process. Principal investigators will then develop a data sharing plan indicating where and from whom approval is needed (including other regional requirements e.g. United States of America and the European Union).

Presentation on sample shipment by Yitagele Terefe

Requirements to ship biological samples abroad

- Sample preparation requirements (temperature)
- Packaging requirements and guidelines: biological category (A or B) and country of import requirements
- Permits
- Selection of courier agency that can transport our samples safely

Required pre-shipment documents

- Export permit
- Import permit
- Material Transfer Agreement
- Assurance letter

- Courier description

Who can give export permits in Ethiopia? (experience with veterinary biological samples)

- Ministry of Livestock and Fisheries Development
- Ministry of Agriculture and Livestock Development
- Ministry of Science and Higher Education
- Ethiopian Biodiversity Institute

From where we can get import permits?

- Centers for Disease Control and Prevention
- Animal and Plant Health Inspection Service, United States Department of Agriculture

Requirements for export permits

- Original application letter from home institute
- Letter of support or Material Transfer Agreement from the collaborator in institute abroad
- Approved proposal (Ethiopian Biodiversity Institute)
- Material Transfer Agreement between home institute, researcher and Ethiopian Biodiversity Institute
- Assurance letter (Ethiopian Biodiversity Institute)
- National Research Ethics Review Committee approved proposal for the Ministry of Science and Higher Education

Challenges faced in obtaining export permits

- Long duration of proposal review
- Poor cross-sectoral collaboration
- Permit issued for genetic material not the sample
- Lack of flexibility

Challenges faced during sample shipment

- Routine and non-flexible permit processing
- Integrity of samples was affected by temperature variation (continuous thawing)
- Some courier agencies had cold chain restrictions which affected the transport conditions

Group discussions with food safety stakeholders in Ethiopia

Chickens

- Chickens bought for festivities are often purchased on the eve of the holiday then slaughtered at the household to prepare doro wat (traditional chicken stew). Chickens are slaughtered by men and prepared by women. Preparation time is about six hours (washing, cleaning and cooking). There is no culture of buying parts of chickens.
- In urban areas, household slaughter of chickens accounts for about 80% while slaughterhouses account for 20% (the proportion of household slaughter is higher in rural areas).
- In peri-urban areas, people keep chickens in the backyard. In 2005-06, people stopped eating chicken after one farm was affected by Gumboro. Producers (Elfora, Alema) were also affected.
- There is higher consumption of chicken in the eastern and southern parts of the country than in the north.
- Chicken slaughter companies include Chicko Meat (Dutch company), Alema and Elfora. Chicko Meat plans to start rearing its own broiler chickens because they don't have enough supply.
- There has been a campaign by the Ministry of Agriculture to increase consumption of chicken meat and eggs.
- There are small slaughterhouses around Bishoftu. Supermarkets source their chickens from slaughterhouses and households. Value chain interventions to improve hygiene should be targeted at households and slaughterhouses. Vaccination can be targeted for large-scale producers. Cold chain management is also important.
- EthioChicken distributes vaccinated day-old chicks to growers (Sasso for broilers and Bovas for layers). The company has a veterinarian for each region. It has 80% of the market. Growers raise the chickens for up to 45 days, after which they are moved to farmers. They deliver to around 5000 growers in 500 to 10000 locations. Eighty percent of their chickens are dual purpose while 20% are layers. Farmers keep chickens for eggs and meat. About 30% of production is for own consumption while the rest is sold. Article on EthioChicken. Contact: Fseha Tesfu, Sales Director, EthioChicken. ethiochicken.com

Consumer campaigns

- There are no known consumer campaigns on food safety
- Ministry of Health has extension workers in villages to teach basic healthcare.
- Important channels to share hygiene information are television and newspapers
- Most people are literate in local languages
- In Harar, there is a government institution on consumers. Consumer cooperatives also exist.
- Customers make visual observations of the shop or vendor to assess food safety and quality. Good quality increases customers' trust in the shop or vendor. Information is shared by word of mouth.
- WHO, Ministry of Health and Bill & Melinda Gates Foundation campaign on water, sanitation and hygiene. Contact: Mr M. Yeshitila, WHO Regional Office Ethiopia
- Awareness raising among value chain actors is very important.
- Authorities check shops on food safety issues.

Laboratory capacity building

- There is need for training before installing expensive and advanced equipment.
- There is need for the projects to collaborate in building capacity, purchasing consumables and sharing facilities.
- Consider creating a regional laboratory capacity building scheme.
- There is need for biomedical engineers to install and maintain biomedical equipment.

Challenges in food safety regulation

- Lack of established standards for animal-source food products.
- Lack of an established food chain regulatory body.

- The Ethiopian Food, Medicine and Healthcare Administration and Control Authority does not handle inspection and quality assurance of animal-source foods.
- There are overlaps in regulatory mandate between the Ministry of Agriculture and the Ethiopian Food, Medicine and Healthcare Administration and Control Authority.
- Absence of strong regulatory and inspection facilities in local slaughterhouses.
- Widespread backyard slaughtering activities
- Irregular supply of water and electricity in food processing plants
- Lack of technology in inspection of food processing plants

Roles and responsibilities of the Ethiopian Food, Medicine and Healthcare Administration and Control Authority

- Inspection of pre-licensing procedures by food processing plants
- Administration of centre of competence tests
- Product registration
- Quarantine control
- Testing of consignments
- Post-marketing surveillance

Lists of participants

Planning meetings in Ethiopia (11, 15, 16 February 2019)

Name	Institution
Silvia Alonso	ILRI Ethiopia
Kebede Amenu	Addis Ababa University
Tadesse Guadu	University of Gondar
Arie Hendrik Havelaar	University of Florida
Stella Ikileng	ILRI Kenya
Geraldine Klarenberg	University of Florida
Ewen LeBorgne	Process Change
Birhanu Lenjiso	East African Policy Research Institute
Johanna Lindahl	ILRI Vietnam
Wacera Ndonga	ILRI Kenya
Kristina Roesel	ILRI Kenya/Freie Universität Berlin
Yitagele Terefe	Haramaya University
Coen van Wagenberg	Wageningen Economic Research
Marcel Zwietering	Wageningen University
Ralph Roothaert	World Vegetable Center

Stakeholder meetings in Ethiopia (11, 14, 15 February 2019)

Name	Institution
Abdi Keba	Holeta Research Center
Abebe Assefa	Biftu Selale Farmers Cooperatives union
Abel Adelbayo Adedeji	Nigeria Center for Disease
Abrha Negash	Ethiopian Meat and Dairy Industry Development Institute
Adey Melese	Ethiopian Society of Animal Production
Ahmed Sufi	Harer Livestock Bureau
Ahmed Yousef	Ohio State University
Alem Abrha	Yekatit 12 Hospital
Alganesh Tolla	Ethiopian Institute of Agricultural Research
Arie Havelaar	University of Florida
Ashagrie Zewdu	Addis Ababa University
Aynadis Tamene	Addis Ababa University
Barbara Kowalcyk	Ohio State University
Belisario Moiane	Eduardo Mondlane University
Belachew Tefera	Jimma University
Berhanu Ayka	Addis Ababa University
Berhanu Legesse	Belles Laboratory
Best Magoma	Kilimanjaro Region
Biruk Tadesse	Ethiopian Public Health Institute
Binyam Negussie	University of Waterloo
Birhanu Lenjiso	East African Policy Research Institute
Blandina T. Mmbaga	Kilimanjaro Clinical Research Institute
Cesar Palha de Sousa	Eduardo Mondlane University
Christianah I. Ayolabi	University of Legos
Christina Rock	Kansas State University
Clotilde da Graca Nampulo	Ministry of Health/Mozambique
Coen van Wagenburg	Wageningen University
Custódia Macuamule	Eduardo Mondlane University
Elna Buys	University of Pretoria
Elsa Maria Salvador	Eduardo Mondlane University
Emmana Alemu	Ethiopian Public Health Institute
Emmanuel Widimiel Lema	Regional Veterinary Officer, Kilimanjaro Region
Ewen LeBorgne	Consultant
Eyasu Tigabu	Ethiopian Public Health Institute
Fasil Awol	Ethiopian Veterinary Association
Fayemi Olanrewaju E.	Mountain Top University
Frehiwot Abera	Ethiopian Public Health Institute
Gashaw Andarge	University of Gondar
George Cosmas Kauki	Epidemiology and Disease Control Section
Geraldine Klarenberg	University of Florida
Getnet Yimer	Ohio State University
Happiness Kumburu	Kilimanjaro Clinical Research Institute
Hailu Regassa	Ethiopian Meat and Dairy Industry Development Institute

Hiwot Tadesse	Ethiopian Food and Drug Administration
Jasna Kovac	Penn State University
Jemal Yesuf	Haramaya University
Inje D. Brower	Wageningen University & Research (WUR)
Jessie Vipham	Kansas State University
Kara Morgan	Ohio State University
Kassahun Asmare	Ohio State University
Kate Thomas	Kilimanjaro Clinical Research Institute, Tanzania
Kathleen Colverson	Ohio State University
Kebede Amenu	ILRI Ethiopia
Kedir Sheaka	ADS Corporate
Kidist Zelyas	Ethiopian Public Health Institute
Kristen MacNaughtan	Bill & Melinda Gates Foundation
Kristina Roesel	ILRI Kenya
Marcel Zwietering	Wageningen University
Mark Weir	Ohio State University
Mengistu Ketema	Haramaya University
Mohammed Kabir	East Hararghe Health Bureau
Mollegn Bitew	Ethiopian Biotech
Negga Asamen	Ethiopian Public Health Institute
Olanrewaju E. Fayemi	Mountain Top University
Patrick Murigu Kamau	National Food Institute, DTU
Redwan Ahmed	Haramaya University
Robert Scharff	Ohio State University
Samuel Demissie	Standard Agency
Sara M. Pires	National Food Institute, DTU
Jason Scheffler	Ohio State University
Sentayehu Worknehe	Haramaya University
Silishi Negatu	University of Gondar
Sibonsio Moyo	ILRI Ethiopia
Silvia Alonso	ILRI Ethiopia
Silvia Murphy	Centers for Disease Control and Prevention
Srinivasan Ramasamy	World Vegetable Center
Sisay Yifru	University of Gondar
Sylvester A. Ibemgbo	Mountain Top University
Tadelech Negissie	Addis Ababa Health Bureau
Tadesse Guadu	University of Gondar
Tesfaye Gobena	Haramaya University
Tesfaye Sysaye	Addis Ababa University
Tesfaye Legesse	Ethiopian Public Health Institute
Teshale Belihu	
Tine Hald	University of Denmark
Wacera Ndonga	ILRI Kenya
Wondwossen Gebreyes	Ohio State University
Xiaoxun Shi	Penn State university
Yadeta Dessie	Haramaya University
Yeshitilla Mogessie	Public Health Emergency Management
Yitagel Terefe	Haramaya University
Yohanes Mehari	SNV
Yonas Hailu	Haramaya University
Zelalem Yilma	Land o' Lakes
Zerihun Abebe	Ministry of Health
Fesha Tesfu	EthioChicken
Ralph Roothaert	World Vegetable Center
Aine McGowan	UK Department for International Development

Annex 3: Burkina Faso inception meeting

Agenda

Tuesday 12 March 2019	
9:00-10:30	Introduction Participants Program for the week (Kristina) Pull-push project (Kristina) Launch in Addis (Kristina/Laurencia/Kebede) Progress on contracts (Kristina)
10:30-11:00	Coffee/tea break
11:00-12:30	Planning Thursday meeting Who will be there? (Laurencia) Meeting agenda (Kristina) What do we want to get from the meeting? (Kristina)
12:30-13:30	Lunch
13:30-15 :00	Planning WP 2: Understanding value chains (Kebede, Vianey, Laurencia, Kristina, Michel, Michelle, Srini, Gemma) Output: draft protocols
15:00-15:30	Coffee/tea break
15:30-17:00	Planning WP 2 continued
Wednesday 13 March 2019	
8:30-12:30	Visit of market sites in Ouagadougou
12:30-13:30	Lunch
13:30-15:00	Planning WP 7: Impact assessment (Birhanu, Daniel, Ruerd, Silvia) Report back from previous day and continue discussions in working groups (with Ruerd and Gemma)
15:00-15:30	Coffee/tea break
15:30-17:00	Planning continued Pay out travel reimbursements and per diems (Rose)
18:00	Group dinner
Thursday 14 March 2019	
8:30-9:00	Stakeholder meeting (registration)
9:00-9:05	Welcome address by Michel Dione (ILRI Burkina Faso)
9:05-9:10	Presentation of the meeting agenda (Djelika Pare)
9:10-9:40	Introduction of participants
9:40-10:00	Presentation by Michel Dione (ILRI Burkina Faso): ILRI in West Africa
10:00-10:20	Presentation by Silvia Alonso (ILRI Ethiopia): Why food safety matters
10:20-10:30	Questions and answers
10:30-11:00	Coffee/tea break and media interviews
11:00-11:30	Presentation by Kristina Roesel (ILRI Kenya): Pull-push project
11:30-12:00	Questions and answers
12:00-13:00	Lunch
13:00-15:00	Group meetings with stakeholders
15:00-16:00	Wrap-up session (Djelika Pare)
16:00	Closing remarks (Michel Dione) and cocktail

Group discussions with food safety stakeholders in Burkina Faso

Group 1: Food policy and safety


Existing documents: What are the policies?

- CODEX Alimentarius defining sanitary standards for all food products
- Environment and Health: Law no. 022-2005/AN/25 May 2005 on the Code of Public Hygiene in Burkina Faso
- Law no. 026-2017/AN/15 May 2017 on pesticide and fertilizer management in Burkina Faso; this law has been added to Law no. 025 on plants
- Regarding the Ministry of Animal and Water Resources, the Veterinary Public Health Code exists as well as Law no. 8-2017/AN of 16 November 2017
- West African Economic and Monetary Union Regulation, Regulation no. 007/2007 on safety of plants, pets, animal and food
- Law no. 23/94/ADP on Public Health Code
- Regulation on the import of animal and vegetable seeds
- Law no. 011-2007 on a national system of standardization, certification, accreditation and promotion of quality in Burkina Faso
- Catalogue of Burkinabé standards on food products
- National quality policies and Economic Community of West African States (ECOWAS) regional quality policies
- Norme Burkina Faso Certification System
- National Food and Nutrition Safety Policy

Implementation stakeholders

- Ministry of Environment
- Ministry of Agriculture
- Ministry of Security
- Ministry of Health
- Ministry of Trade, Industry and Crafts
- Ministry of Animal Resources
- Ministry of National Education and Literacy
- Research centres linked to the Ministry of Higher Education, Scientific Research and Innovation
- Professional associations and non-governmental organizations
- Ministry of Economy, Finance and Development (mainly customs)
- League of Consumers
- National Federation of Food and Processing Industries of Burkina Faso
- Burkinabé Agency of Standardization, Metrology and Quality
- Chamber of Agriculture
- National Public Health Laboratory

- Technical and financial partners
- Civil society organizations

Implementation mechanisms

- Setting up of committees (monitoring, supervision, orientation and evolution)
- Information and raising awareness
- Enforcement
- Legislation
- Implementation of projects and programs
- Technical and permanent secretariat

Are policies focused on commodities (meat, vegetables, eggs)?

Policies are focused on product commodities: foodstuffs of plant and animal origin, plant products, veterinary drugs, pesticides, processed products, animal feed etc. Policies are implemented at national, regional and international levels.

Implementation challenges

- Lack of awareness of policies and requirements
- Poor collaboration among technical services
- Insufficient extension information
- Insufficient resources for implementation
- Absence of a national food safety coordination structure
- Low involvement of stakeholders

Group 2: Consumer welfare


Main challenges in the governance of food safety

- Healthy products are not available
- Hygiene and environmental challenges
- Sometimes products are not accessible because of prices
- Lack of information (e.g. on origin, source of produce, health/hygiene status)
- Delays in handling of products by transporters and retailers as well as the market environment
- Contamination, traceability and conservation
- Quality of products
- Certification is not always reliable for consumers
- Producers focus on price and do not consider other aspects such as quality, stability, time and diversity. When the price is low, it is difficult to improve the quality.
- Diseases may be inapparent
- Transport conditions
- Organizations (commissions/institutions) that could drive this agenda

Stakeholders involved in food safety and consumer welfare

- Consumer organizations such as the consumer league (communication and raising awareness)
- Certification organizations such as Agence Burkinabé de Normalisation (ABNORM)
- Producers
- Processors and carriers
- Traders and merchants
- State institutions, e.g. ministries, health and research laboratories, police
- Production and communication agencies

Rights of consumers in terms of food safety

- Consumers have a legal right to quality.
- Rights are poorly enforced. Bad products must be destroyed. It is possible to close the store and apply sanctions on companies that have to pay penalties because laws exist. There are also community rights in neighbourhoods. The community can also sanction carriers and traders.
- Professionalization of stakeholders (carriers and retailers) through self-regulation.
- Traditional expectations and accepted practice influence actions in this domain.

Types of claims

- Community sanctions
- Post-sale product returns (exchange, warranty)
- Customer complaints
- Competition by choice for quality
- Market segmentation (trustworthy, high standards or otherwise)
- Accusations of greed
- Relationship (permanent communication)
- Product boycotts
- Denunciation on radio

Group 3: Intervention and food safety

Food safety interventions by the government and non-governmental stakeholders

- The Ministry of Animal Resources has developed specifications for the production of eggs and milk and for the processing of animal food products
- Capacity building of stakeholders involved in food processing
- Standards on animal products
- National and regional food quality policies and regulations
- Establishment of a national CODEX Alimentarius Committee
- Quality control laboratory
- Participatory approaches
- Development of a modern poultry slaughterhouse in Bobo-Dioulasso

- Establishment of a control authority for animal products and phytosanitary quality of plant products
- Establishment of a health watch authority (consumer league, ABNORM)
- Communal hygiene inspection
- Standards development in Burkina Faso (ABNORM)
- Research projects and laboratories
- Harmonization of sub-regional texts
- Good collaboration in some areas such as the import of frozen poultry
- Multisectoral collaboration through One Health
- Existence of a CODEX National Committee
- Existence of support structures for stakeholders through monitoring, control and raising awareness

Successes

- Awareness creation among some stakeholders
- Improved quality of food sold
- Introduction of improved processing and sales tools

Challenges

- Geographic accessibility
- Weak organization of stakeholders along the value chain
- Lack of coordination among implementing ministries
- Lack of certification
- Lack of exemplarity (champions)
- Low monitoring
- Insufficient implementation
- Lack of resources
- Cultural habits
- Lack of knowledge policy

Reasons behind the challenges

- Low financial capacity
- Corruption
- Low level of education and skill of stakeholders
- Low involvement of stakeholders
- Lack of stakeholder commitment
- Lack of competent authorities

Group 4: Choice of market


What motivates and influences poultry and vegetable buyers?

- Product characteristics: nutritional and organoleptic quality; packaging and display; price; availability; ease of use; freshness; state of product (raw or processed); quantity; origin; advertising
- Seller characteristics: cleanliness; reputation; behaviour; possession of vendor certification
- Buyer characteristics: knowledge of and trust in the product; level of education; health status; specific product requirements

Can the quality of the environment and the service provider have a negative influence on the choice?

- Yes, because there may be a perception that some products are reserved for elite customers.
- Intrusive shop assistants could have a negative effect on customers' purchasing behaviour.
- In markets, food products displayed on shelves are better perceived as being of better quality than those displayed on the ground.
- Some customers prefer to buy fruit from roadside vendors because the products are well presented despite the high prices.

Conclusion

Burkina Faso is recognized for its local chicken; this presents many opportunities for the project. The team will identify an implementation strategy that will be shared later. The team will also conduct key informant interviews with stakeholders in the vegetable and poultry sectors to better understand the sectors.

List of participants

Planning meetings in Burkina Faso (12-13 March 2019)

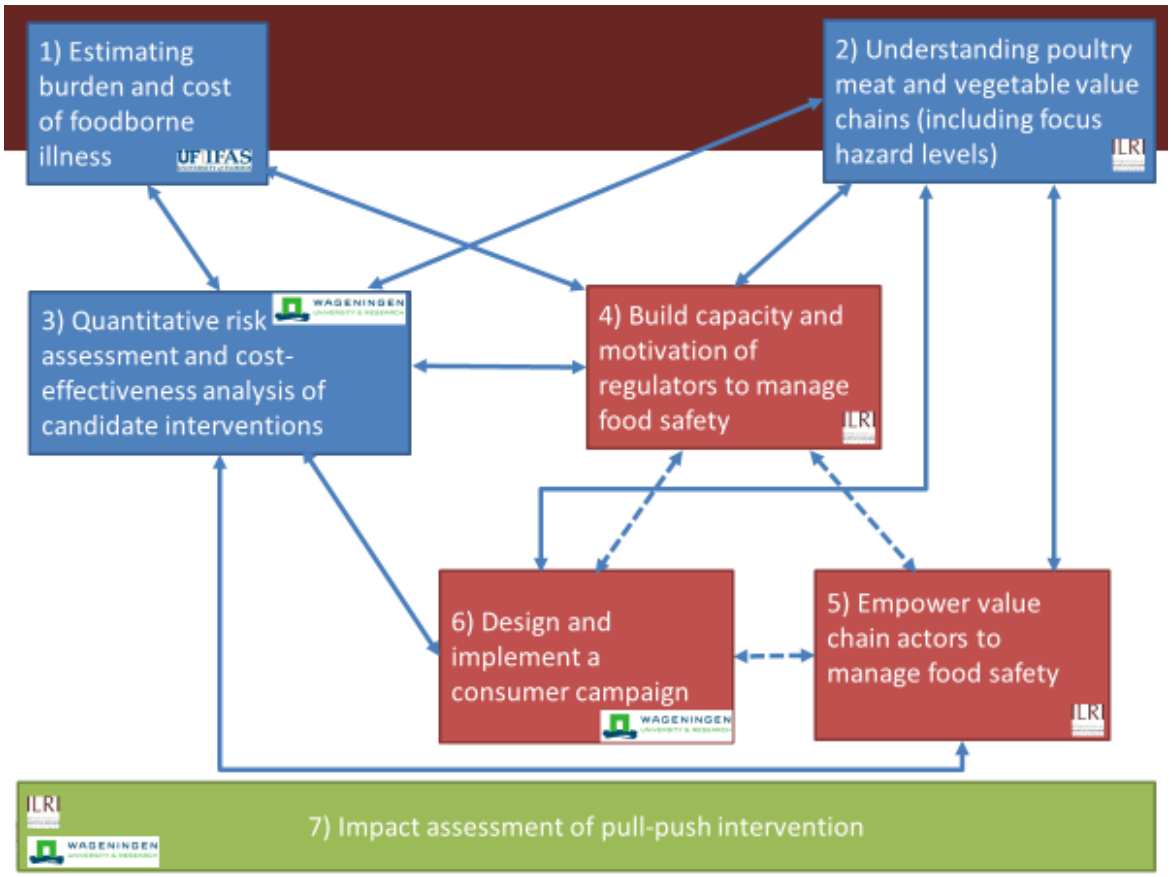
First name	Institution
Silvia Alonso	ILRI Ethiopia
Kebede Amenu	Addis Ababa University
Michelle Danyluk	University of Florida
Michel Dione	ILRI Burkina Faso
Daniel Kaboré	Centre d'Analyses des Politiques Economiques et Sociales (CAPES)
Mireille Karambiri	ILRI Burkina Faso
Birhanu Lenjiso	East African Policy Research Institute
Rosekellen Njiru	ILRI Kenya
Laurencia Ouattara	Institut de Recherche en Sciences Appliquées et Technologies (IRSAT)
Srini Ramasamy	World Vegetable Center
Kristina Roesel	ILRI Kenya
Ruerd Ruben	Wageningen Economic Research
Gemma Tacken	Wageningen Economic Research
Vianney Tarpaga	Institut de l'Environnement et Recherches Agricoles

Stakeholder meetings in Burkina Faso (14 March 2019)

Name	Institution
Samuel Neya	Institut National d'Environnement et de Recherche Agricole
Abdoulaye Pedehombga	Africa Santé
Nakré Gisele Pare	Direction Générale des Services Vétérinaires
Nofou Ouedraogo	Institut National d'Environnement et de Recherche Agricole
Sidi Boro	Ligue des Consommateurs du Burkina
Désiré Nanema	Ministère de l'Agriculture et des Aménagements Hydrauliques
Hagrétou Sawadogo	IRSAT
Harem Kourougou	Direction Nationale
Gemma Tacken	Wageningen University & Research
Daouda Doulgou	Laboratoire Nationale de Santé Publique
Oumar Sanogo	Centre National de Recherche Scientifique et Technologique
Leguet Ganou	IRSAT
Clarisse Dawende	IRSAT
Dieudonné Ouattara	Ministère de l'Agriculture et des Aménagements Hydrauliques
Kiema Wilfrid	Agence Burkinabé de Normalisation/Direction Nationale de la Certification
Guy Ilboudo	Direction Générale des Services Vétérinaires
Cheick Amed Kanazoe	
Vianney Tarpaga	Institut National d'Environnement et de Recherche Agricole
Ruerd Ruben	Wageningen University & Research
Kebede Amenu	Addis Ababa University
Laurencia Ouattara	IRSAT
Loukman Taonsa	Inter Profession Volaille et Légumes
Moussa Sayaogo	Inter Profession Volaille et Légumes
Rasmané Zongo	Union Nationale des Producteurs de Volaille et de Légumes
Dieudonné Kologo	Union Nationale des Producteurs de Volaille et de Légumes
Daniel Kaboré	Centre d'Analyses des Politiques Economiques et Sociales
Haoua Traoré	Inter Profession Volaille et Légumes
Simon Sanou	Institut National de Santé Publique
Honoré Zidouemba	SNV
Anita Zida	
Erdjouman Sanou	Centre d'Analyses des Politiques Economiques et Sociales
Prosper	Food and Agriculture Organization of the United Nations
Romain Kenfack	Tanager (SELEVER program)

Mireille Bayala	Observateur Paalga
Silvia Alonso	ILRI
Zimidin Ouédrago	LeFaso.net
Isidora Gnanada	Institut National d'Environnement et de Recherche Agricole
Abdul Coulidiaty	African Science Partnership for Intervention Research Excellence
Habibata Zerbo	Ministère des Ressources Animales et Halieutiques
Mireille Karambiri	ILRI-Burkina Faso
Daouda Sangeusso	Interpreter
Hamidou Joel Ouya	Interpreter
Rosekellen Njiru	ILRI
Srini Ramasamy	World Vegetable Center
Djelika Pare	Facilitator
Christian Dovonou	Vétérinaires Sans Frontières
Lyville Katibire	Ministry of Agriculture
Klaudia Sabedani	
Michael Kinda	
Salibou Kaonolobou	Union Nationale des Producteurs de Volaille et de Légumes
Hamadou Sanon	Direction Regionale de la Santé
Kristina Roesel	ILRI
Kasaaoun Bonkounigou	
Michelle Danyluk	University of Florida

Annex 4: Pull-push project planning, by work packages



Schematic diagram of WPs 1 to 7 (technical components of the project).

WP 1: Estimating burden and cost of foodborne illness (lead: University of Florida)

- Extract FERG country-specific data (incidence, deaths, disability-adjusted life years) for foodborne disease by *Campylobacter*, *Salmonella* and ETEC in Ethiopia and Burkina Faso.
- Combine with WHO data for attribution to specific food groups of interest to the project (poultry and vegetables).
- Organize additional expert elicitation of ETEC to food groups and attribution of all diseases to specific food products (chicken meat and tomatoes).
- Update FERG 2010 data to 2017 based on Institute for Health Metrics and Evaluation trends and other relevant data.

Next steps

- Arie to draft a letter for clearance of national FERG data (contact persons identified during inception meetings).
- WP progress calls: Coen, Arie, Geraldine and Tadesse
- Coen and Tadesse to draft the protocol for the cost of illness study.

WP 2: Understanding poultry meat and vegetable value chains (lead: ILRI)

Research questions

- Consumers: What animal-source foods and vegetables are most frequently consumed? How are they prepared? How often are they eaten? (quantification in questionnaire survey).
- Value chain: Where do these products come from? How are they produced, transported, processed and handled at retail?

Methods

- Participatory appraisals: Start with consumers and trace back from there (Venn diagrams); key informant interviews and focus group discussions
- Census of vegetable and chicken outlets
- In-depth cross-sectional: Rapid integrated assessment questionnaire to share with team to add questions relevant to WP3, WP6 and WP7; biological sampling

Study sites and recruitment of participants in Ethiopia

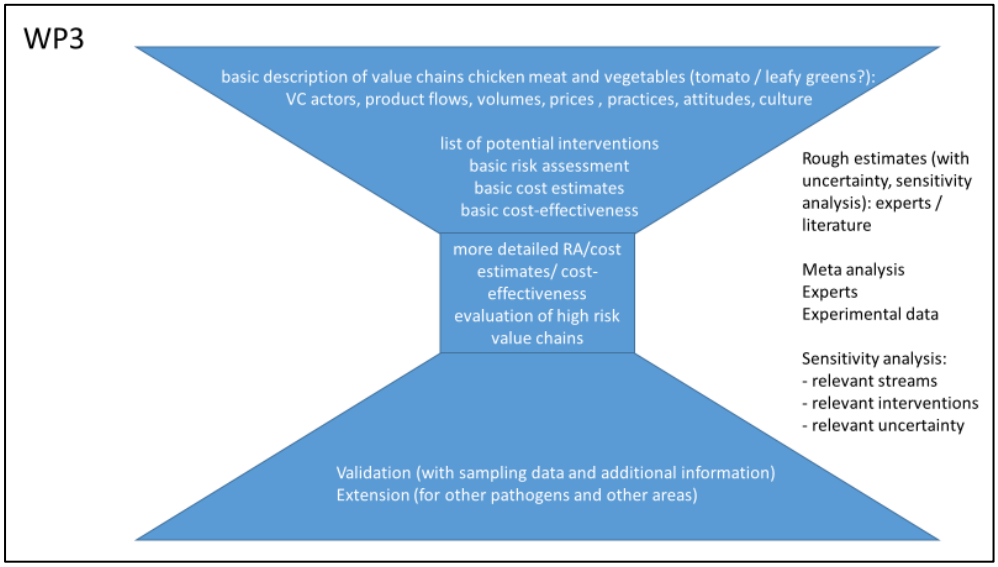
- Dire Dawa – Harar – Haramaya (different production systems and consumption habits)
- List of households from village headmen; randomize to get a cross-section of households
- Smallest administrative unit, select three randomly and from these, get a list of households (alternative: randomly select streets)
- High-income vs. low-income strata

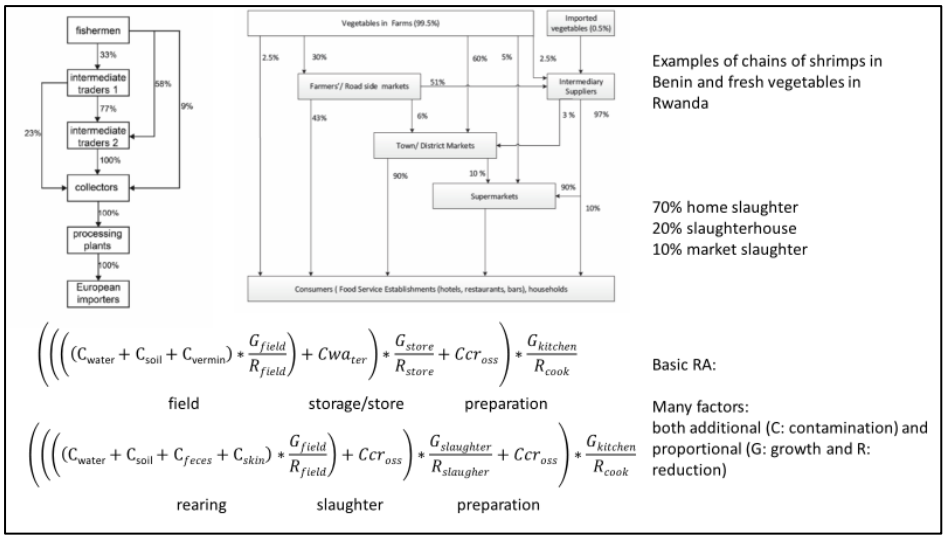
Next steps

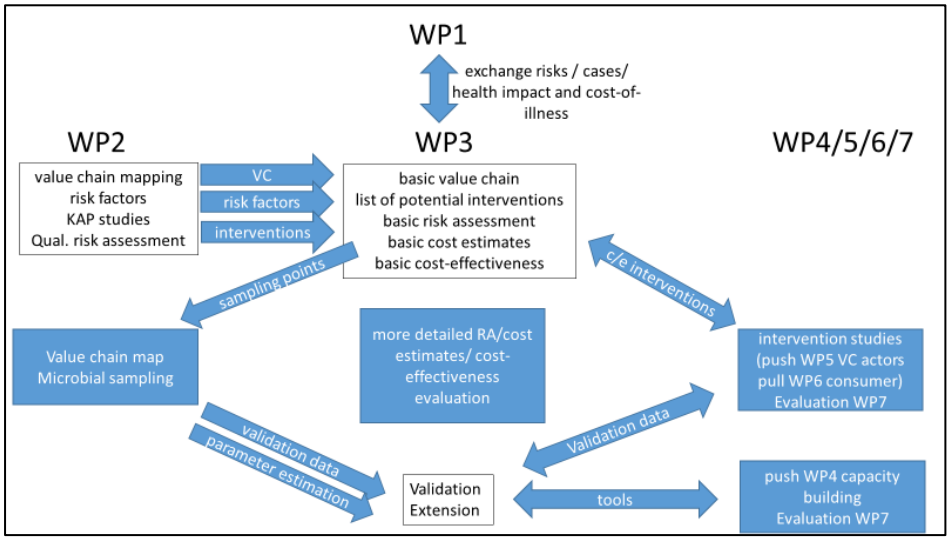
- Weekly progress meetings, beginning 4 March and coordinated by Kebede (Kebede, Silvia, Ralph, Yitagele and Michelle).
- Silvia to consult Kebede on randomization of consumers in Ethiopia
- Michel to consult Laurencia on randomization of consumers in Burkina Faso
- Kristina to send draft for participatory rural appraisals by 23 February
- Kristina to outline for Kebede what each exercise should achieve
- Silvia to share census protocol
- Ralph to check tools available for vegetable value chains (Oxfam)
- CGIAR Research Program on Livestock tools for value chain mapping (semi-structured interviews)
- Picture cards of animal-source food and vegetables: listing, ranking, flow charts
- Ralph to get a list and picture cards for vegetables
- Arie and Marcel to clarify why they prefer tomatoes

WP 3: Quantitative risk assessment and cost-effectiveness analysis of candidate interventions (lead: WUR)

Marcel presented the approach of WP 3 and interactions with other WPs.







List of decisions to be made

- Commodities:
- Chicken: *Salmonella; Campylobacter;* generic *E. coli*
- Vegetables: (*Salmonella;* ETEC*;* generic *E. coli*). Discussion around tomatoes
- Setting: Peri-urban; type of value chain; end point (catering, street food, restaurants, home kitchens)
- Proportion streams through value chain (actors, quantities, sources and starting point)
- Risks points; cross contamination
- Interventions
- Stakeholders
- Timing with other WPs
- Systematic literature review of food safety interventions (globally). ILRI already has the data downloaded (Johanna and Silvia). Focus on all vegetables. Silvia to check algorithm; new scientist will analyse and finalize.

Next steps

- Quarterly Zoom calls: Marcel, Arie, Geraldine and Coen
- Cross-project Zoom calls with Ethiopia project (Marcel to coordinate during the first year)

WP 4: Build capacity and motivation of regulators to manage food safety (lead: ILRI)

- This WP is one of the interventions and will be planned in detail when data on WP2 has been collected.
- Stakeholder mapping has been done as part of the inception meetings in Ethiopia and Burkina Faso and the related group discussions have given some initial insights that can be used for a situational analysis of the regulatory framework as well as food safety policies, their current implementation, successes and failures.

WP 5: Empower value chain actors to manage food safety (lead: ILRI)

The planning of this WP relies on the findings of WP2. However, materials for training on good hygienic practices will be collated. Extension agencies in the project countries have been identified during the inception meetings (i.e. Water, Sanitation and Hygiene initiative).

WP 6: Design and implement a consumer campaign (lead: WUR)

The detailed planning of this WP relies on the findings of WP 2. To obtain relevant information, Gemma will review the WP 2 survey tools and add. Consumption habits and consumer motivation were discussed during the stakeholder meetings.

WP 7: Impact assessment of pull-push intervention (lead: ILRI and WUR)

The design is in progress but will consist of behavioural impact evaluation led by WUR and epidemiological impact led by ILRI. This will be timetabled around the interventions.

WP 8: Project management (lead: ILRI)

Contractual agreements (all still in progress)

Review of work plan for 2019

Activities scheduled for year 1 were reviewed with the team at the Ethiopia meeting on 15 February 2019. Changes to the proposal (version of 8 October 2018) are indicated in red (text) and yellow (boxes) in the Gantt chart below.

ID	Activity (Task name)	WP	Rapporteur (Task owner)	Q1	Q2	Q3	Q4
1	Inception meeting in Ethiopia and Burkina Faso	8	ILRI (Kristina)				
2	Review Gantt chart at inception meeting	8	ILRI (Kristina)				
3	Finalization of study protocols	8	ILRI (Delia)				
4	Design of WP 7	7	ILRI (Delia), CAPES (Daniel), East African Policy Research Institute (Birhanu), WUR (Ruerd)				
5	Ethical clearance from national ethics boards and ILRI Institutional Research Ethics Committee	8	ILRI (Kristina)				
6	Recruitment of researcher WP 3	3	WUR (Marcel)				
7	Recruitment of sandwich PhD student WP 7	7	WUR (Ruerd), Daniel (CAPES), Birhanu (East African Policy Research Institute)				
8	Recruitment of PhD student WP 1	1	University of Florida (Arie)				
9	Organize meetings with national representatives for clearance of country-specific FERG estimates	1	University of Florida (Arie)				
10	Triangulation of FERG data with Institute for Health Metrics and Evaluation results	1	University of Florida (Arie)				
11	Review of literature on incidence and deaths of *Campylobacter*, NTS and ETEC in Ethiopia and Burkina Faso	1	University of Florida (Arie)				
12	Conduct a Delphi survey with at least five experts on poultry (broiler meat) value chains in Ethiopia and Burkina Faso	1	University of Florida (Arie)				
13	Conduct a Delphi survey with at least five experts on vegetable value chains in Ethiopia and Burkina Faso	1	University of Florida (Arie)				
14	Comparative analysis of these different approaches to assessing burden (including with DTU)		University of Florida (Arie)				
15	Conduct a desk study to assess statistical live and lost Gross Domestic Product (productivity burden)	1	WUR (Coen)				
16	Review of literature on cost of illness	1	WUR (Coen)				
17	Collect hospital data on cost of illness	1	Addis Ababa University (AAU) (Kebede and Tadesse), ILRI (Michel)				
18	Conduct a contingent evaluation on the willingness to pay to avoid illness	1	WUR (Coen)				
19	Hold stakeholder meetings with country stakeholders to validate the findings of WP 1 and seek endorsement	1	WUR (Coen), University of Florida (Arie)				
20	Systematic review of grey and published literature (PRISMA guidelines)	2	ILRI (new epidemiologist)				

21	Conduct 30 participatory appraisals with producers and consumers (five per value chain node and study site) for value chain and system effects mapping	2	ILRI (new epidemiologist) with IRSAT (Laurencia) and AAU (Kebede)				
22	Conduct at least two key informant interviews with other supply chain actors per country and value chain	2	ILRI (new epidemiologist) with IRSAT (Laurencia) and AAU (Kebede)				
23	Conduct geographic positioning system-based census of vegetable and poultry (meat) traders in each market	2	ILRI (new epidemiologist) with IRSAT (Laurencia) and AAU (Kebede)				
24	Develop and pilot a knowledge, attitudes and practices (KAP) questionnaire	2, 6	ILRI (new epidemiologist) and WUR (Gemma)				
25	Administer a KAP questionnaire at baseline and endline of the intervention	2, 6	ILRI (new epidemiologist) with IRSAT (Laurencia) and AAU (Kebede)				
26	Analyze data and write findings and conclusions	2, 6	ILRI (new epidemiologist) with IRSAT (Laurencia) and AAU (Kebede)				
27	Recruit informal market outlets in each country for intervention study participation	2	ILRI (new epidemiologist) with IRSAT (Laurencia) and AAU (Kebede)				
28	Conduct surveys on prevalence and levels of foodborne pathogens (*Campylobacter*, NTS and ETEC) and commensal *E. coli* at informal markets in all study sites: protocol preparation and procurement; recruitment, orientation and training of laboratory technicians on protocols	2	University of Florida (Michelle) with IRSAT (Laurencia), AAU (Kebede) and Haramaya University (Yitagele)				
29	Analyse purchased samples at laboratory for pathogens	2	University of Florida (Michelle) with IRSAT (Laurencia), AAU (Kebede) and Haramaya University (Yitagele)				
30	Disseminate evidence of prevalence at market level	2	University of Florida (Michelle) with IRSAT (Laurencia) and AAU (Kebede)				
31	Conduct a qualitative risk assessment during feedback meeting with regulators where mapped value chains and findings from KAP survey and prevalence study are shared and discussed	2	University of Florida (Michelle) with IRSAT (Laurencia) and AAU (Kebede)				
32	Identify and engage with food safety partners, regulators, ministries of health and finance and donors	2	ILRI (Silvia in Ethiopia and Michel in Burkina Faso)				
33	Conduct training on food safety in informal markets including risk-based vs. hazard-based approaches, burden of foodborne disease, cost of illness, risk mitigation, legislation etc.	4	ILRI (new epidemiologist)				
34	Establish quantitative estimates of current foodborne disease risks (baseline QMRA model)	3	WUR (Marcel)				
35	Conduct systematic literature review on interventions mitigating risks in hazard-commodity combinations (long list of interventions)	3	ILRI (Johanna)				
36	Organize stakeholder workshop to discuss feasibility of long-listed interventions in local context	3	WUR (Marcel), ILRI (new epidemiologist)				
37	Develop stochastic model for analysis of cost-effectiveness of interventions, microbial risk mitigation, food safety and public health impact of most relevant (shortlisted) interventions	3	WUR (Marcel)				
38	Validate stochastic model and develop materials for remote teaching post project	3	WUR (Marcel)				
39	Conduct review of existing tools successfully used in high-income countries (e.g. checklists, frameworks and web-based applications)	4	ILRI (new epidemiologist)				
40	Adapt existing support tools to low- and middle-income countries with input from WP 1 and WP3	4	ILRI (new epidemiologist)				
41	Organize stakeholder workshop to discuss feasibility of adapted tool in local context and discuss most feasible delivery mechanisms	4	ILRI (new epidemiologist)				
42	Develop training curriculum for value chain actors based on outputs of WP 3	5	Each partner on different components and countries (lead: ILRI new epidemiologist)				
43	Recruit at least 50% of the value chain actors from the census generated in WP 2 (women proportionally recruited)	5	ILRI (new epidemiologist) with IRSAT (Laurencia) and AAU (Kebede)				

44	Train stakeholders on food safety concepts, control measures and marketing tools with focus on the control points identified in WP 3	5	Each partner on different components and countries (lead: ILRI new epidemiologist)				
45	Provide follow up support through face-to-face individual meetings	5	Each partner on different components and countries (lead: ILRI new epidemiologist)				
46	Develop plan for refresher training and feedback meetings (iterative adjustment of tools)	4	ILRI (new epidemiologist) with IRSAT (Laurencia) and AAU (Kebede)				
47	Mentoring and continued professional development	4	Each partner on different components and countries (lead: ILRI new epidemiologist)				
48	Develop appropriate exit strategy during training sessions on where participants can source advice and training materials beyond the life of the project	5	Each partner on different components and countries (lead: ILRI new epidemiologist)				
49	Use the KAP results (WP 2) to determine food choice motives of consumers	6	WUR (Gemma)				
50	Develop a communication plan for consumer campaign	6	WUR (Gemma) and local campaigner in each country				
51	Develop consumer campaign materials	6	WUR (Gemma) and local campaigner in each country				
52	Pre-test consumer campaign in a small qualitative setup	6	WUR (Gemma) and local campaigner in each country				
53	Revise campaign materials	6	WUR (Gemma) and local campaigner in each country				
54	Implement campaign over 9-12 months to reach consumers	6	WUR (Gemma) and local campaigner in each country				
55	Assess impact of interventions separately (baseline and endline)	7	ILRI (new epidemiologist and Birhanu) in Ethiopia, ILRI (new epidemiologist) and CAPES in Burkina Faso				
56	Analyse the impact of the combination of the consumer campaign, supply chain actor training and public policymaker training	7	ILRI (new epidemiologist and Birhanu) in Ethiopia, ILRI (new epidemiologist) and CAPES in Burkina Faso				
57	Annual project planning meeting in Ethiopia and Burkina Faso	8	ILRI (Kristina)				
58	Regular progress reporting against milestones	8	ILRI (Kristina)				
59	Regular dissemination of updates to external audience (website)	8	ILRI (Kristina)				
60	Publications		All				
61	Final project synthesis meeting	8	ILRI (Kristina)				

Ethical clearance

- Both countries: Conditional approval from ILRI Institutional Research Ethics Committee (Kristina); valid for six months after which all instruments should be submitted
- Ethiopia: Draft protocols (WP 1, WP 2 members)
- Get support letters from Addis Ababa University, Haramaya University and University of Gondar (Kebede, Yitagele and Tadesse) and submit application to the National Research Ethics Review Committee for clearance (Kebede and Kristina)
- Burkina Faso: ILRI Institutional Research Ethics Committee approval is sufficient

Internal progress meetings

Monthly hour-long Zoom calls on the first Monday of the month. Ethiopia 1330 hours GMT; Burkina Faso 1430 hours GMT

Communication resources: Pull-push project

Web page: https://www.ilri.org/research/projects/urban-food-markets-africa-incentivizing-food-safety-using-pull-push-approach
Outputs in CGSpace: https://cgspace.cgiar.org/handle/10568/98429
Brief in English: https://hdl.handle.net/10568/100115
Brief in French: https://hdl.handle.net/10568/100210

Next steps

- Consolidate photos and captions by 20 February (Ethiopia) and 20 March (Burkina Faso)
- Finalize agreements (ILRI Program Manager and partners)
    - WUR
    - Addis Ababa University
    - University of Florida
    - IRSAT
    - Institut National d'Environnement et de Recherche Agricole
    - Consultancies
- Recruitments
    - Researcher and research assistant (University of Florida budget)
    - Researcher (WUR budget)
    - WP 7 PhD student through ILRI (ILRI budget)
    - Project coordinator (scientist ILRI budget A4NH)
    - Project management assistant (ILRI budget)
    - Research assistant Ethiopia (ILRI budget, cost shared with A4NH)
    - Research assistant Burkina Faso (ILRI budget)
- Mailing list