

Master of Public Health
Integrative Learning Experience Report

Equitable Research Partnerships in Public Health

by

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submitted in partial fulfillment of the requirements for the degree

MASTER OF PUBLIC HEALTH

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February 2023 - June 2023

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2023

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Summary

This integrated learning experience report is an extensive review of my enriching internship experience at Feed the Future Innovation Lab for Livestock Systems located at the University of Florida, Gainesville, Florida. This experience bolstered my practical skills in data analysis, international research collaborations, and program evaluation, allowing me to integrate MPH academic knowledge with real-world scenarios. Collaborating with a dynamic team of public health professionals, I actively contributed to initiatives addressing equity in global research collaborations. I extended nutrition and food safety assistance to ongoing research projects under Innovation Lab for Livestock Systems. I collected the data and analyzed it using statistical software to inspect in-country authorship inclusion from lower-income and middle-income country partners. Later, I presented the results at the Innovation Lab for Livestock Systems faculty meeting in the form of a presentation. To assist with the ongoing Innovation Lab for Livestock Systems projects I scheduled interviews with the principal investigators of projects and my preceptor to optimize research implementation considering nutrition outcomes. I generated an SPSS code sheet for continuous monitoring of authorships, a white paper addressing authorship inclusion from low-resource countries, a presentation, a post-interview follow-up sheet to improve the current Innovation Lab for Livestock Systems projects, and a research bibliography on Water, Sanitation, and Hygiene (WaSH). As I embark on my public health career, I am confident that the insights gained from these experiences will serve as a solid foundation, guiding my future endeavors in promoting health equity and well-being for communities.

Subject Keywords: Public Health, Helicopter Science, Research Equity, Nutrition, Food Safety, Nutrition Outcomes, Water, Sanitation and Hygiene (WaSH)

Table of Contents

Summary	iii
List of Abbreviations	2
List of Figures	3
List of Tables.....	3
Chapter 1 - Literature Review	4
Chapter 2 - Learning Objectives and Project Description.....	7
Chapter 3 - Results	10
Chapter 4 - Discussion	16
Chapter 5 - Competencies.....	17
Student Attainment of MPH Foundational Competencies	17
Student Attainment of MPH Emphasis Area Competencies	19
References or Bibliography	21
Appendix A - White Paper	23
Appendix B - Meeting Summaries	29

List of Abbreviations

AOI	Area of Inquiry
HICD	Human and Institutional Capacity Development
HFDN	Human Health, Food Safety, Diets and Nutrition
ILRL	International Livestock Research Institute
LMICs	Low- and Middle-Income Countries
MIT	Markets and Innovation Translation
PI	Principal Investigator
PDM	Production and Disease Management
SPSS	Statistical Package for Social Sciences
UF	University of Florida
USAID	United States Agency for International Development
WaSH	Water, Sanitation, and Hygiene

List of Figures

Figure 3.1 Countries of Research.....	10
Figure 3.2 Area of Inquiry of Publications	11
Figure 3.3 Affiliation countries of first Authors of Publications.....	12

List of Tables

Table 2.1 Summary of Portfolio Products	7
Table 3.1 First Author Affiliation.....	11
Table 3.2 Meeting Summaries	13
Table 3.3 Competencies Addressed.....	15
Table 5.1 Summary of MPH Foundational Competencies	17
Table 5.2 MPH Foundational Competencies and Course Taught In	18
Table 5.3 Summary of MPH Emphasis Area Competencies	19

Chapter 1 - Literature Review

The issue of underrepresentation of authors from Low- and Middle-Income Countries (LMICs) in research has been widely discussed and acknowledged (1). A recent analysis revealed that one-fifth of all COVID-19-related articles in Africa were authored by foreign researchers (2), indicating disparities in the research ecosystem. These disparities are evident in the unbalanced relationships between High-Income Countries (HICs) and LMICs, where financial constraints often lead to unequal cooperation with HIC researchers. Such inequitable collaborations driven by power disparities can exacerbate differences in research expertise, knowledge, or experiences. Additionally, the impact of local collaborators within partnerships may be limited in many LMIC contexts due to the lack of in-country training opportunities and a scarcity of established senior researchers. As a result, women and junior LMIC partners may face challenges in accessing long-term career growth opportunities in research, while power imbalances can restrict the influence of LMIC partners in agenda-setting and study conceptualization. Given these observations, inadequate acknowledgment of scientific contributions from LMIC researchers helps perpetuate systemic issues (3-5).

A core tenet of equitable research is to prioritize respect and dignity for the community in which partnerships are formed and data are collected. To ensure they are open and fair, policies surrounding authorship and data-sharing procedures, for instance, should be considered and defined at the outset of a research partnership (6). Equitable research must originate from the target community and can help that population. Through the course of the collaboration, crowdsourcing is used to collect suggestions and input. This acknowledges the value of including end users, the public, and research beneficiaries in the planning and execution of research initiatives (4). Finally, the literature on the inclusion of academics from lower and middle-income countries as authors in works published in high-income nations emphasizes both the drawbacks and advantages of such approaches. Although writers with high incomes now have a disproportionate share of the publications, attempts are being undertaken to encourage more egalitarian cooperation and information sharing. The involvement of researchers from lower and middle-income countries in scientific publications may be improved through strategies including mentoring programs, joint research projects, and support efforts, ultimately producing a more inclusive and varied global scientific community (7). Innovation Lab for Livestock Systems wants to continuously evaluate the participation of collaborating researchers from LMIC partner countries in their publications thus a code book is developed.

The scientific importance of guiding in-country research partners in research collaborations is multifaceted and significant. By providing guidance and support to local collaborators in research partnerships, several crucial benefits are realized, contributing to the advancement of scientific knowledge and promoting equitable and impactful research practices. Local partners possess valuable knowledge about the local context, culture, and challenges (8). Guiding and supporting them in research collaborations allows for the integration of this expertise, ensuring that the research is relevant and tailored to the specific needs and conditions of the region. As a result, the scientific output becomes more comprehensive and applicable, with potential real-world impact (9,10).

Extending help to the in-country research partners fosters equitable and collaborative partnerships between researchers from high-income countries (HICs) and Low- and Middle-Income Countries (LMICs) (11). Such partnerships promote mutual respect, knowledge exchange, and shared decision-making, breaking down traditional power imbalances and enhancing the inclusivity of the scientific community (12). By offering guidance and support, researchers from HICs can help build the research capacity of their in-country partners (10). This capacity-building process may include training in research methodologies, data analysis techniques, and scientific writing skills. As a result, local researchers become better equipped to lead future research projects independently, contributing to the long-term sustainability of research in LMICs (13).

The Innovation Lab for Livestock Systems was established by Feed the Future, a U.S. Government's global hunger and food security initiative, to conduct long-term research and capacity-development activities, primarily through applied research that is multidisciplinary, integrated, and competitively funded. The International Livestock Research Institute (ILRI) and the University of Florida's Institute of Food and Agricultural Sciences (IFAS) collaborate to lead the Innovation Lab for Livestock Systems, one of more than 20 Feed the Future Innovation Labs. The Bill & Melinda Gates Foundation and the United States Agency for International Development (USAID) both provided funding for the Innovation Lab for Livestock Systems. The Innovation Lab for Livestock Systems is run by a management entity, which includes the area of inquiry team leaders and cross-cutting specialists at the University of Florida, regional coordinators headquartered in each target region or nation, and regional coordinators. The management entity collaborates with an external advisory board and an internal advisory committee based at the University of Florida.

Nearly 50 projects with novel methods that address country-specific research objectives defined through collaboration with national stakeholders have received financing from the

Innovation Lab for Livestock Systems. They also incorporate gender, human health, and nutrition components, as well as human and institutional capacity development (HICD). The Innovation Lab for Livestock Systems aims to use appropriate, advanced technologies, capacity development, and policies to sustainably improve livestock productivity, marketing, and animal-source food consumption to improve the diet, health, incomes, and livelihoods of vulnerable people. Other goals include enhancing the environmental sustainability of livestock systems, strengthening the resilience of vulnerable communities, and improving our understanding of how livestock systems evolve and affect food security, nutrition, and health. The three areas of inquiry include human health, food safety, diets & nutrition, production & disease management, and markets & innovation translation. During my time at Innovation Lab for Livestock Systems, I worked under the worthy mentorship of Dr. Sarah McKune and Dr. Arie Havelaar. Both serve Innovation Lab for Livestock Systems as co-leads of human health, food safety, diets & nutrition (14).

My preceptor Dr. Sarah McKune serves as a research associate professor at the University of Florida. Her education credentials include an MPH (Global Health) from Emory University, Ph.D. in Interdisciplinary Ecology from UF. She also worked as a Post-Doctoral Fellow for the CGIAR's collaborative research program on Climate Change, Agriculture, and Food Security. As Director of Public Health Programs, Dr. McKune oversaw the College's campus-based and online MPH and Public Health Certificate programs when she joined the College of Public Health and Health Professions in 2013. She accepted a combined post with the Center for African Studies and the Department of Environmental and Global Health at the University of Florida in 2016.

Chapter 2 - Learning Objectives and Project Description

I started my internship in February and completed it by June 2023. During this time at Innovation Lab for Livestock Systems, I participated in faculty meetings, Dr. McKune's weekly lab meetings, data collection for Innovation Lab for Livestock Systems publications authorship, presented my data in Innovation Lab for Livestock Systems faculty meeting, wrote the first draft of white paper on authorship inclusion, scheduled meetings with principal investigators of ongoing Innovation Lab for Livestock Systems projects, prepared meeting materials and summaries and compiled a bibliography on Water, Sanitation and Hygiene (WaSH). While completing these projects I accomplished the following learning objectives:

1. Understand global public health research and equitable research partnership with low- and middle-income countries under the scope of Innovation Lab for Livestock Systems.
2. Analyze the inclusion of LMIC partner country researchers in the Innovation Lab for Livestock Systems publications for continuous monitoring and improvement of research equity.
3. Participate and arrange meetings with principal investigators to understand project management, barriers in a research project in LMICs, and the importance of supporting collaborators to improve research outcomes.
4. Improve academic writing, literature review, and research presentation skills through various tasks

I achieved these learning objectives through my portfolio products shown in Table 2.1.

Table 2.1 Summary of Portfolio Products

Portfolio Product		Description
1	SPSS Code Sheet	The coded data sheet for continuous monitoring of LMIC author inclusion at Innovation Lab for Livestock Systems addresses variables to determine descriptive statistics and bivariate analysis
2	White Paper and presentation on the results of LMIC author inclusion at Innovation Lab for Livestock Systems	The scientific paper was written on the LMIC author's inclusion in the publications of Innovation Lab for Livestock Systems and presentation during the faculty meeting

3	Meeting summaries with PIs	Scheduling and post-interview notes on required assistance to principal investigators of current Innovation Lab for Livestock Systems projects addressing research barriers and nutrition and food safety to improve research outcomes
4	WaSH and hygiene bibliography	A research bibliography addressing interventions of WaSH to improve nutrition outcomes in lower-income and middle-income countries to gather preliminary data from the last five years to write a grant to USAID on WaSH

Learning Objective 1 – I attended Innovation Lab for Livestock Systems faculty meetings that offered me shadowing numerous public health professionals and observe top-notch expertise in international project management and international collaborations. As the completed projects were being presented in Innovation Lab for Livestock Systems meetings I learned valuable insights into living conditions and the social environment of low-income countries from Africa and then how a research intervention can improve the health of people living in those areas. I learned about barriers and social constraints of successfully implementing research protocols and what can be done to improve them. I kept making notes of significant leanings from the meetings.

Learning Objective 2 – I collected data from 127 Innovation Lab for Livestock Systems publications and traced the country affiliation of all authors on the papers through their current workplaces, research profiles, and LinkedIn accounts. The affiliation of authors was linked to the country they were serving at the time of data collection. I sorted the data on Excel sheets and SPSS sheets. Then I applied statistical analysis using SPSS to identify descriptive statistics regarding author affiliation and many other variables predicting research equity. R software was used to determine the citations per year of the publications. It improved my data management and analysis skills. Dr. Arie Havelaar helped me in using R software and shared his course materials with me to learn further.

Learning Objectives 3 – Through email, I contacted 6 principal investigators of ongoing Innovation Lab for Livestock Systems projects and invited them to schedule a meeting with Drs. Sarah McKune and Arie Havelaar. Dr. McKune allowed me to go through approved proposals

for these projects to prepare for the meeting and understand the scope of each research. It helped me to learn about project writing skills. The objectives of these meetings were 1) to give PIs direct access to AOI leads for contribution/support to their efforts, and 2) to explore opportunities for enhanced contribution of the proposed research to AOI2 objectives. The latter may be achieved via the alignment of methods/approaches across projects, the addition of research elements at no cost, or additional research elements, supported by the AOI. I prepared the Zoom meeting summaries and shared them with the participants to follow up. This experience allowed me to observe segments of a large-scale research intervention/outreach and barriers in the way. The AOI heads talked the PIs through the hurdles and offered maximum assistance based on their own experience and knowledge. The meeting summaries will be presented at the Innovation Lab for Livestock Systems meeting and will be published in the quarterly report of Innovation Lab for Livestock Systems.

Learning Objective 4 – I presented the authorship data in an Innovation Lab for Livestock Systems meeting on 21st April 2023 and then added some more variables to my research as per meeting suggestions. I wrote it in the form of paper as well my preceptor helped me improve it. The paper will be published soon with further additions of variables and statistics. During McKune Lab meetings I participated in reviewing/editing a research paper on socio-ecological theory addressing nutrition interventions, attended the U.S.G. Global Nutrition Coordination plan webinar (exploring anemia ecology), and learned about meta-analysis. Later, I made a bibliography on Water, Sanitation, and Hygiene (WaSH) based on the last 5-year of intervention studies using PubMed and Google Scholar. All this work enhances my capacity to contribute to meaningful research.

Chapter 3 - Results

Assessment of In-Country Author Inclusion

Most of the primary research papers are based on research conducted in the partner countries and the review papers are based on comparison across lower and middle-income countries (LMIC) and developed countries. The details of the research countries are shown in Figure 3.1.

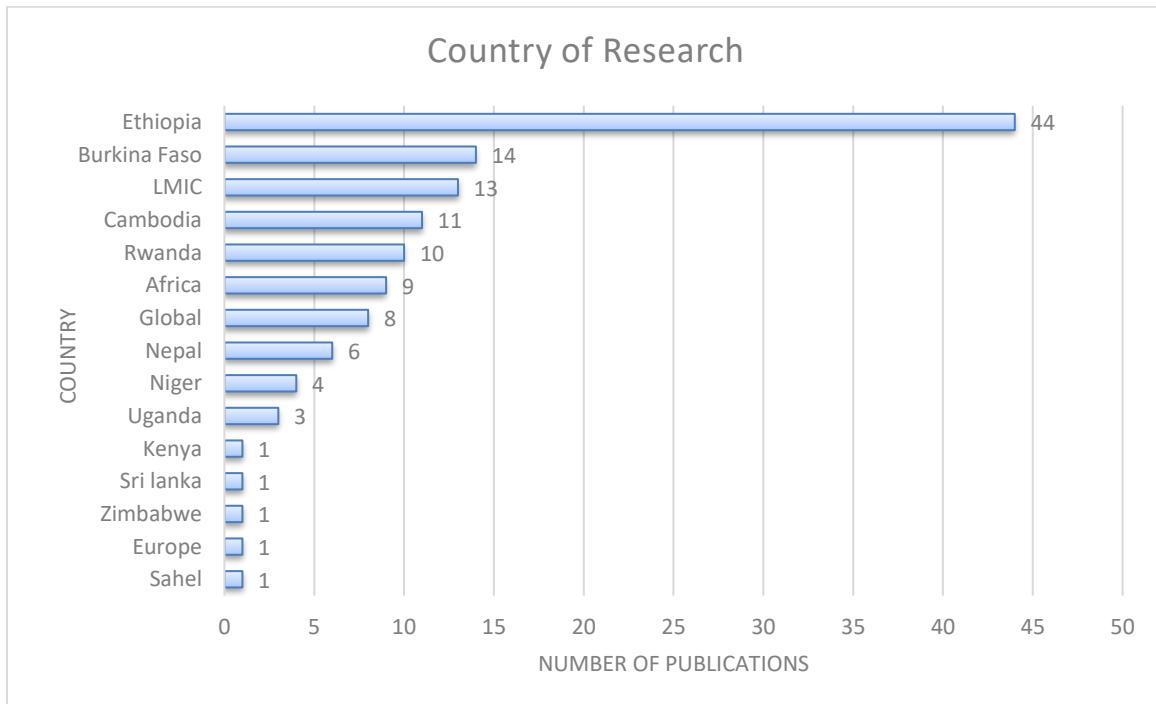


Figure 3.1 Countries of Research

Area of Inquiry:

The investigation of AOIs across this published literature shows that the primary focus of 60.6% of articles was Production & Disease Management (PDM), 31.5% inspected Human Health, Food Safety, Diets & Nutrition (HFDN), and 7.9% examined Markets and Innovation Translation (MIT). The details are in Figure 3.2.

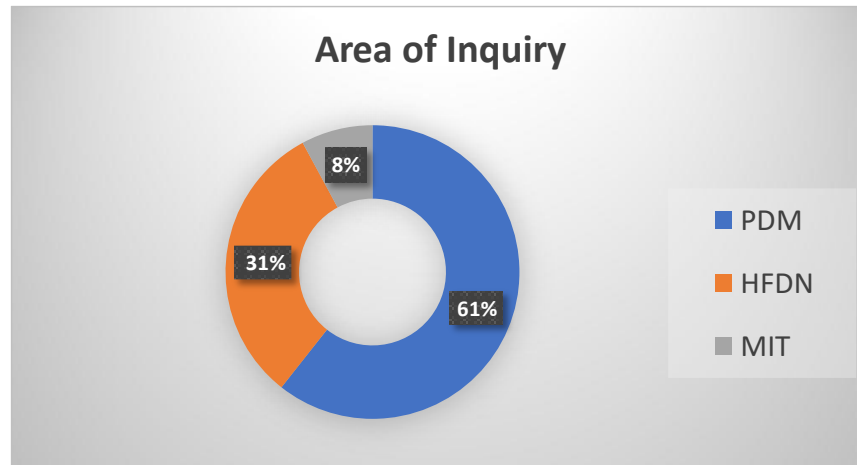


Figure 3.2 Area of Inquiry of Publications

The number and percentage of publications that include in-country researchers - The total number of analyzed publications were 127. The publications that had authors (first author or co-author) from LMIC partner countries were 91 (71.1%). Most in-country researchers were from Ethiopia (35/127, 27.5%). The AOI division of the 91 papers with in-country partner authors was 65 (71.42%) PDM, 20 (21.9%) HHFDN, and 6 (6.5%) MIT research papers.

Number and percentage of publications that had in-country researchers as the first author - The number of publications with researchers from LMIC partner countries (in-country) as first authors was 55 out of 127 (43.3%). Considering only the partner countries, the country (number, percentage) affiliation of these first authors was Ethiopia (30, 54.5%), Burkina Faso (8, 14.5%), Niger (6, 10.9%), Cambodia (6, 10.9%), Nepal (3, 5.4%), Kenya (2, 3.6%), and Uganda (1, 1.8%) as shown in table 3.1. Among these publications 47 (85.45%) focused on PDM, 5 (9%) examined HHFDN, and 4 (7.2%) investigated MIT areas of inquiry. Most of these PDM AOI publications had first authors affiliated with Ethiopia (26, 47.27%).

Table 3.1 First Author Affiliation

Sr. No	First Author Affiliation	Number	Percentage
1	Ethiopia	30	23.6
2	Burkina Faso	8	6.3
3	Niger	6	4.7
4	Cambodia	6	4.7
5	Nepal	3	2.4
6	Kenya	3	1.6
7	Uganda	1	0.8
8	USA	61	48.0
9	Sweden	5	3.9

10	UK	3	2.4
11	Belgium	2	1.6
	Total	127	100.0

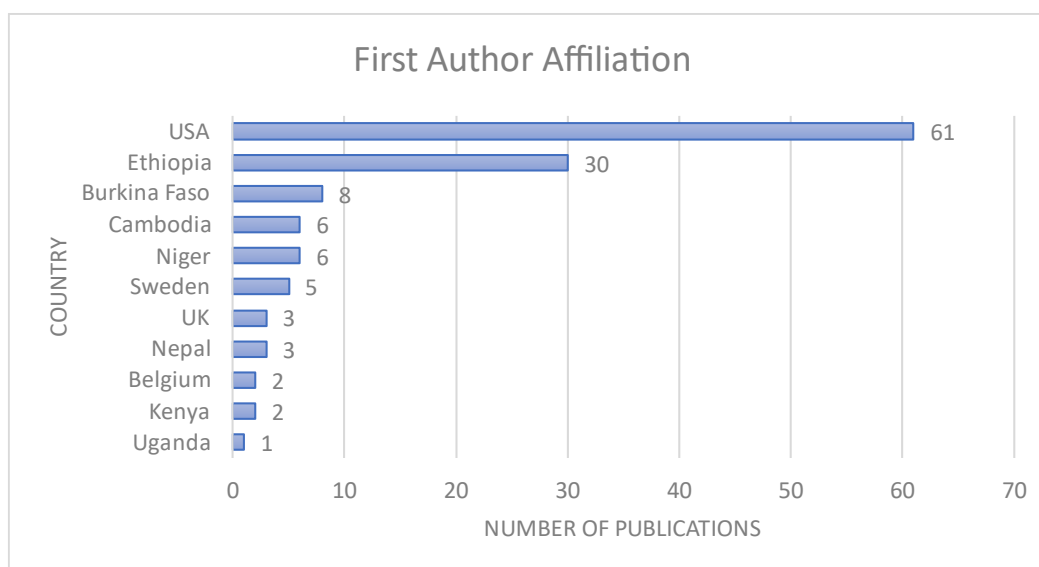


Figure 3.3 Affiliation countries of first Authors of Publications

Number and percent of publications that have authors from LMIC but who were not considered “in-country” partners (they may be based at a US institution or otherwise) - The number of publications that had researchers from LMIC countries but who were not considered Innovation Lab for Livestock Systems in-country partners was 17 (13.3%). It included India (5), Sri Lanka (1), Botswana (1), Mali (1), Myanmar (2), Egypt (1), Vietnam (2), Togo (1), Zambia (1), Tanzania (1), and Colombia (1).

Number and percent of publications that had first authors from LMIC but who are not “in-country” partners - There were no publications that had first authors from LMIC, who were not “in-country” partners. Although 61 publications had United States-based first authors, 5 Swedish, 3 European, and 2 first authors were from Belgium.

Access Status - There were 97 (76.4) open-access articles published in peer-reviewed journals while 30 (23.6%) are not open-access articles.

Meetings with Principal Investigators

The objectives of these meetings were 1) to give PIs direct access to AOI leads for contribution/support to their efforts, and 2) to explore opportunities for enhanced contribution of the proposed research to AOI2 objectives. The latter may be achieved via the alignment of

methods/approaches across projects, the addition of research elements at no cost, or additional research elements, supported by the AOI.

Table 3.2 Meeting Summaries

Name	Required Assistance/Follow-up
Michel Dion (PI) Claudia Ganser (Co-PI)	1. Claudia/Michel will share the survey to solicit feedback from Drs. McKune & Havelaar on indicators of diarrhea, proximity to animals, and nutrition 2. Michel Dion will follow up with Dr. McKune if he wants access to IDRC-developed Gender and Intersectionality Transformative Approaches to improved poultry production or the Un Oeuf flipbook 3. Dr. Havelaar will connect Michel Dion with Roy Curtis at the Vet school at UF 4. Claudia/Micheal will share lab protocols 5. Dr. McKune will share the CAGED survey
Felicia Wu (PI)	1. Dr. Wu will check survey validation with the team considering the fasting practices of the target population. 2. Dr. Wu will follow up with Dr. McKune regarding gender analysis outcomes - if gender differences exist, we can consider a follow-up qualitative study 3. Dr. Wu can connect with Mulu to further discuss her project 4. Dr. McKune will share the WEAI R code
Andrew Stringer (PI) (Andy)	1. Dr. Stringer looks to learn from the CAGED project and assessment of animal ownership-associated risks and safety. 2. In data collection, Dr. Stringer is recommended to consider hand sanitation before eating, handling food, and feeding a child. 3. Further discussion at IP meeting with Dr. Arie in May 2023

Name	Required Assistance/Follow-up
Bhola Shankar Shrestha (PI)	1. Project needs support to enhance effective data collection for objectives 2 and 3 2. Follow-up meeting in the presence of Dr. Havelaar, Dr. De Vries, and Dr. Laurie Miller would be helpful to identify missing pieces and fulfilling the objective of this meeting. 3. Mr. Shrestha is responsible for objective 1 and it does not require any assistance for now.
Clarisse Umutoni (PI)	1. Ms. Umutoni would appreciate guidance to address household nutrition, partner influence on animal-sourced food consumption, and barriers to the consumption of animal-sourced foods. 2. Ms. Umutoni is requested to share the baseline and multi-dimensional poverty piece of the survey (baseline survey and overview of student-led nutrition study) 3. Ms. Umutoni would like to explore the nutritional quality of the targeted food products of the project and needs financial assistance for this. Thus, recommended to continue reflecting on any possibility of improving the human health/nutritional impact of the overall study, including small side projects such as those supporting student research. 4. Dr. McKune will share MINERVA materials currently in development to evaluate resilience in the target population of Niger (Zinder) 5. Dr. McKune will follow up on how much financial assistance can be provided under her AOI (Discuss possible support to the Niger REACH project to evaluate the nutritional value of ASF products with Saskia, Geoff, and Arie)
Zongo Moussa (PI)	Mr. Moussa was unable to connect at the designated meeting time and the proposal is still being developed. Dr. McKune emailed to have a meeting rescheduled, but we didn't hear back from him.

Table 3.3 Competencies Addressed

Portfolio Product		Number and Competency Addressed	
1	SPSS Code Sheet	2.	Select quantitative and qualitative data collection methods appropriate for a given public health context
		3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming, and software, as appropriate
2	White Paper and presentation on the results of LMIC author inclusion at Innovation Lab for Livestock Systems	1.	Apply epidemiological methods to the breadth of settings and situations in public health practice
		3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming, and software, as appropriate
		4.	Interpret results of data analysis for public health research, policy, or practice
		19	Communicate audience-appropriate public health content, both in writing and through oral presentation
3	Meeting summaries with PIs	13.	Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes
		16.	Apply principles of leadership, governance, and management, which include creating a vision, empowering others, fostering collaboration, and guiding decision making
4	WaSH and hygiene bibliography	7.	Assess population needs, assets, and capacities that affect communities' health

Chapter 4 - Discussion

Researchers from high-income nations produce over 80% of the world's scientific publications, while those from low-income nations produce only about 1%, according to a report released by the Global Research Council in 2016 (12). This discrepancy shows that there is a considerable divide in the representation and participation of scientists from low- and middle-income nations. Researchers examined the patterns of authorship in scientific publications across a range of disciplines. High-impact journals tend to favor authors from high-income nations, according to the study. The authors emphasized the necessity of addressing this disparity and advocating for more fair authorship procedures (15).

A survey identified certain significant obstacles to lower- and middle-income researchers' inclusion in scientific publications. The survey participants, who were mainly from low- and middle-income countries, listed financial access restrictions, a lack of infrastructure for doing research, and insufficient mentorship opportunities as major obstacles. These elements play a part in the underrepresentation of researchers from low- and middle-income nations as authors in high-income nation publications. Numerous proposals and activities have been put into place to remedy these inequities (16). The Open Research Scholarships program, for instance, was started by the African Academy of Sciences to increase the visibility and capacity of African early-career researchers by funding the publication of their work in international journals. Like this, the International Network for Government Science Advice (INGSA, n.d.) has promoted greater collaboration and diversity in scientific publishing through programs including mentorship programs and joint research projects (17).

Programs for mentoring and capacity building can be designed to aid and direct researchers from lower- and middle-income nations. These courses may concentrate on improving research methodology, mastering the publication process, and honing scientific writing abilities. Researchers can contribute more successfully as authors in publications from high-income nations if they are given the required resources and training. Additionally, efforts should be made to improve accessibility and lessen linguistic hurdles. This may entail offering translation services, promoting the use of plain language in scientific writing, and enhancing the accessibility of research articles through open-access programs. Such actions can encourage greater inclusivity in academic publishing and enable academics from many backgrounds to actively participate in the scientific debate.

Chapter 5 - Competencies

Student Attainment of MPH Foundational Competencies

Table 5.1 Summary of MPH Foundational Competencies

Number and Competency		Description
1.	Apply epidemiological methods to the breadth of settings and situations in public health practice	The assessment of data regarding Innovation Lab for Livestock Systems publications on their website enabled me to apply epidemiological methods to derive results for targeted variables.
2.	Select quantitative and qualitative data collection methods appropriate for a given public health context	I applied a quantitative data collection method to extract data from a primary source to identify the inclusion of authors in Innovation Lab for Livestock Systems publications and applied a qualitative data collection method to make a WaSH and hygiene bibliography to collect preliminary data for a grant submission to USAID on Animal WaSH.
3.	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming, and software, as appropriate	I used Microsoft Excel, SPSS, and R program to code and analyze the data to identify descriptive statistics on author inclusivity and equity in Innovation Lab for Livestock Systems publications.
4.	Interpret results of data analysis for public health research, policy, or practice	The interpretation of data results was done mainly using descriptive statistics and bivariate analysis for LMIC author inclusion.
7.	Assess population needs, assets, and capacities that affect communities' health	The identification of interventions that access population needs and capacities in terms of hygiene, food safety, and nutrition in LMICs.
13.	Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes	The strengthening of partnerships through mid-project discussions with principal investigators to enhance public health intervention strategies and nutrition outcomes in African countries.
16.	Apply principles of leadership, governance, and management, which include creating a vision, empowering others, fostering collaboration, and guiding decision making	Communicating and conducting interview calls with principal investigators and discussing their hurdles to applying interventions in African countries and then following up with the assessment they required.
19.	Communicate audience-appropriate public health content, both in writing and through oral presentation	The presentation of the white paper in the form of a presentation at the Innovation Lab for Livestock Systems faculty meeting. The

		presentation was catered according to the audience.
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Below is a list of the 22 Public Health Foundational Competencies, the competency number, and the courses they are taught in to facilitate completing the table above.

Table 5.2 MPH Foundational Competencies and Course Taught In

22 Public Health Foundational Competencies Course Mapping	MP H 701	MPH 720		MP H 754	MP H 802	MP H 818
Evidence-based Approaches to Public Health						
1. Apply epidemiological methods to the breadth of settings and situations in public health practice	x			x		
2. Select quantitative and qualitative data collection methods appropriate for a given public health context	x	x		x		
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming, and software, as appropriate	x	x		x		
4. Interpret results of data analysis for public health research, policy, or practice	x			x		
Public Health and Health Care Systems						
5. Compare the organization, structure, and function of health care, public health, and regulatory systems across national and international settings		x				
6. Discuss how structural bias, social inequities, and racism undermine health and create challenges to achieving health equity at organizational, community, and societal levels						x
Planning and Management to Promote Health						
7. Assess population needs, assets, and capacities that affect communities' health		x			x	
8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs						x
9. Design a population-based policy, program, project, or intervention				x		
10. Explain the basic principles and tools of budget and resource management		x		x		
11. Select methods to evaluate public health programs	x	x		x		
Policy in Public Health						
12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence		x		x	x	
13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes		x			x	
14. Advocate for political, social, or economic policies and programs that will improve health in diverse populations		x				x
15. Evaluate policies for their impact on public health and health equity		x			x	
Leadership						
16. Apply principles of leadership, governance, and management, which include creating a vision, empowering others, fostering collaboration, and guiding decision making		x				x

22 Public Health Foundational Competencies Course Mapping		MP H 701	MPH 720		MP H 754	MP H 802	MP H 818
17. Apply negotiation and mediation skills to address organizational or community challenges			x				
Communication							
18. Select communication strategies for different audiences and sectors			DMP 815, FNDH 880 or KIN 796				
19. Communicate audience-appropriate public health content, both in writing and through oral presentation			DMP 815, FNDH 880 or KIN 796				
20. Describe the importance of cultural competence in communicating public health content			x				x
Interprofessional Practice							
21. Perform effectively on interprofessional teams			x				x
Systems Thinking							
22. Apply systems thinking tools to a public health issue					x	x	

Student Attainment of MPH Emphasis Area Competencies

The competencies listed in Table 5.3 are those which were achieved and applied through my MPH emphasis area coursework and applied practical experience. My nutritional epidemiology coursework (FNDH 844) proved to be most beneficial in completing my ILE. The courses FNDH 600 and FNDH 820 gave me a strong foundation in the understanding of chronic diseases of public health significance and associated risk factors that are common in low- and middle-income countries. I applied knowledge from FNDH 844 and FNDH 880 while performing data analysis and presenting it in meetings. These courses thoroughly cover competencies 1, 2, 3, 4, and 5. I applied them during my internship to work on global public health, nutrition program management, data analysis, and improvement of nutrition outcomes by improving research design and literature review.

Table 5.3 Summary of MPH Emphasis Area Competencies

MPH Emphasis Area:		
Number and Competency		Description
1	Information literacy of public health nutrition	Inform public health practice through analysis of evidence-based policy, systems, and environmental change.
2	Compare and relate research to practice	Examine chronic disease surveillance, policy, program planning and evaluation, and program management, in the context of public health nutrition.

3	Population-based health administration	Critically examine population-based nutrition programs.
4	Analysis of human nutrition principles	Examine epidemiological concepts of human nutrition to improve population health and reduce disease risk.
5	Analysis of nutrition epidemiology	Describe criteria for validity in nutritional epidemiological methodology.

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Appendix A - White Paper



Feed the Future
Innovation Lab for Livestock Systems

Assessment of In-Country Author Inclusion in the Publications of Feed the Future **Innovation Lab for Livestock Systems**

The Innovation Lab for Livestock Systems at Feed the Future develops long-term research and capacity-building initiatives, through multidisciplinary, integrated, and competitively financed applied research. This synthesis aims to analyze the authorship and inclusion of low- and middle-income country (LMIC) partners in publications that have come from the Innovation Lab for Livestock Systems-funded research. The LMIC partners include Burkina Faso, Niger, Nigeria, Ethiopia, Rwanda, Nepal, Cambodia, Kenya, and Uganda. Focusing on these countries, Innovation Lab for Livestock Systems explores three areas of inquiry (AOI); Markets and Innovation Translation, Production and Disease Management, and Human Health, Food Safety, Diets & Nutrition in its research. Innovation Lab for Livestock Systems has generated 127 peer-reviewed journal articles as of April 10th, 2023. The enrichment of scientific knowledge through a variety of perspectives and experiences is one of the major advantages of having lower and middle-income researchers write for journals. Researchers from various socioeconomic strata provide original approaches, insights, and contextual knowledge to the research process. Their participation can aid in enlarging the study field, improving the reliability of the results, and advancing the relevance and usefulness of scientific developments in many contexts.

Materials & Methods:

The data of published work was assessed through the Innovation Lab for Livestock Systems website and then it was extracted into sheets. To generate the analysis of the Innovation Lab for Livestock Systems publications the data was coded into Excel sheets and SPSS 2022 to calculate accurate percentages. The data was extracted for the first author, affiliation country of the first author, in-country partners, non-LMIC and LMIC country partners, country of research, area of inquiry, access status, and Doi. The country affiliation and country of research were coded on SPSS and details of codes are provided in a separate code book.

Results:

Most of the primary research papers are based on research conducted in the partner countries and the review papers are based on comparison across lower and middle-income countries (LMIC) and developed countries. The details of the research countries are shown in Figure 1.

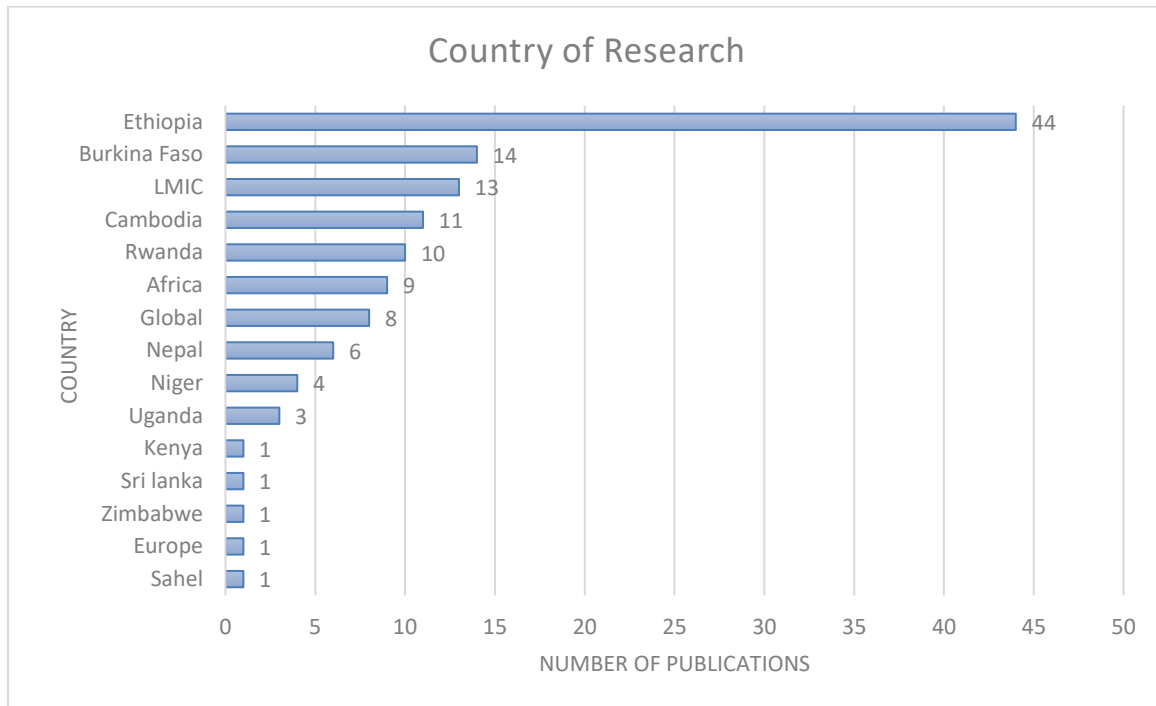


Figure 1. The country of research in the publications

Area of Inquiry:

The investigation of AOIs across this published literature shows that the primary focus of 60.6% of articles is Production & Disease Management (PDM), 31.5% inspect Human Health, Food Safety, Diets & Nutrition (HFDN), and 7.9% examine Markets and Innovation Translation (MIT). The details are in Figure 2.

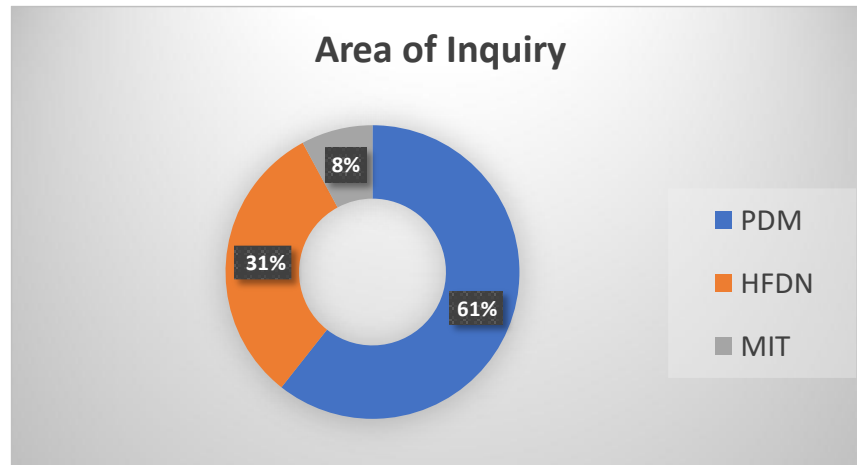


Figure 2. Area of Inquiry of Publications

1. Number and percentage of publications that include in-country researchers.

The total number of analyzed publications is 127. The publications that have authors (first author or co-author) from LMIC partner countries are 91 (71.1%). Most in-country researchers are from Ethiopia (35/127, 27.5%). The AOI division of the 91 papers with in-country partner authors is 65 (71.42%) PDM, 20 (21.9%) HHFDN, and 6 (6.5%) MIT research papers.

2. Number and percentage of publications that have in-country researchers as the first author.

The number of publications with researchers from LMIC partner countries (in-country) as first authors is 55 out of 127 (43.3%). Considering only the partner countries, the country (number, percentage) affiliation of these first authors is Ethiopia (30, 54.5%), Burkina Faso (8, 14.5%), Niger (6, 10.9%), Cambodia (6, 10.9%), Nepal (3, 5.4%), Kenya (2, 3.6%), and Uganda (1, 1.8%). Among these publications 47 (85.45%) focus on PDM, 5 (9%) examine HHFDN, and 4 (7.2%) investigate MIT areas of inquiry. Most of these PDM AOI publications have first authors affiliated with Ethiopia (26, 47.27%).

Sr. No	First Author Affiliation	Number	Percentage
1	Ethiopia	30	23.6
2	Burkina Faso	8	6.3
3	Niger	6	4.7
4	Cambodia	6	4.7
5	Nepal	3	2.4
6	Kenya	3	1.6
7	Uganda	1	0.8

8	USA	61	48.0
9	Sweden	5	3.9
10	UK	3	2.4
11	Belgium	2	1.6
	Total	127	100.0

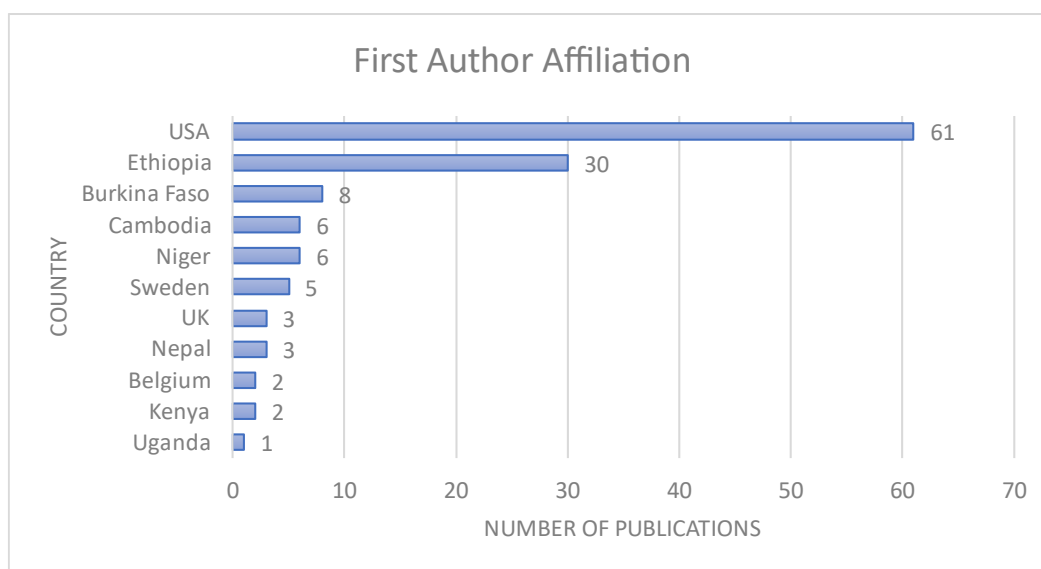


Figure 3. Affiliation countries of first authors of Publications

3. Number and percent of publications that have authors from LMIC but who are not considered “in-country” partners (they may be based at a US institution or otherwise).

The number of publications that have researchers from LMIC countries but who are not considered Innovation Lab for Livestock Systems in-country partners is 17 (13.3%). It includes India (5), Sri Lanka (1), Botswana (1), Mali (1), Myanmar (2), Egypt (1), Vietnam (2), Togo (1), Zambia (1), Tanzania (1), and Colombia (1).

4. Number and percent of publications that have first authors from LMIC but who are not “in-country” partners.

There are no publications that have first authors from LMIC, who are not “in-country” partners. Although 61 publications have United States-based first authors, 5 Swedish, 3 European, and 2 first authors are from Belgium.

5. Access Status

There are 97 (76.4) open-access articles published in peer-reviewed journals while 30 (23.6%) are not open-access articles.

Discussion:

Researchers from high-income nations produce over 80% of the world's scientific publications, while those from low-income nations produce only about 1%, according to a report released by the Global Research Council in 2016 (Global Research Council, 2016). This discrepancy shows that there is a considerable divide in the representation and participation of scientists from low- and middle-income nations. Additionally, Saldaa-Zorrilla et al. (2020) examined the patterns of authorship in scientific publications across a range of disciplines. In particular, high-impact journals tend to favor authors from high-income nations, according to the study. The authors emphasized the necessity of addressing this disparity and advocating for more fair authorship procedures.

A survey done by Wagner et al. (2020) identified certain significant obstacles to lower- and middle-income researchers' inclusion in scientific publications. The survey participants, who were mainly from low- and middle-income countries, listed financial access restrictions, a lack of infrastructure for doing research, and insufficient mentorship opportunities as major obstacles. These elements play a part in the underrepresentation of researchers from low- and middle-income nations as authors in high-income nation publications. Numerous proposals and activities have been put into place to remedy these inequities. The Open Research Scholarships program, for instance, was started by the African Academy of Sciences to increase the visibility and capacity of African early-career researchers by funding the publication of their work in international journals (African Academy of Sciences, n.d.). Similar to this, the International Network for Government Science Advice (INGSA, n.d.) has promoted greater collaboration and diversity in scientific publishing through programs including mentorship programs and joint research projects.

Programs for mentoring and capacity building can be designed to aid and direct researchers from lower- and middle-income nations. These courses may concentrate on improving research methodology, mastering the publication process, and honing scientific writing abilities. Researchers can contribute more successfully as authors in publications from high-income nations if they are given the required resources and training. Additionally, efforts should be made to improve accessibility and lessen linguistic hurdles. This may entail offering translation services, promoting the use of plain language in scientific writing, and enhancing the accessibility of research articles through open-access programs. Such actions can encourage greater inclusivity in academic publishing and enable academics from many backgrounds to actively participate in the scientific debate.

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Appendix B - Meeting Summaries

Principal Investigator Meetings Summary



Feed the Future
Innovation Lab for Livestock Systems

Name	Project Title & Location	Required Assistance/Follow-up
Michel Dion (PI) Claudia Ganser (Co-PI)	POULTRY LOSSES AND ONE HEALTH (POLOH): Reducing losses and zoonotic risks along the poultry value chain through a One Health approach Burkina Faso, Centre Nord	1. Claudia/Michel will share the survey to solicit feedback from Drs. McKune & Havelaar on indicators of diarrhea, proximity to animals, and nutrition 2. Michel Dion will follow up with Dr. McKune if he wants access to IDRC-developed Gender and Intersectionality Transformative Approaches to improved poultry production or the Un Oeuf flipbook 3. Dr. Havelaar will connect Michel Dion with Roy Curtis at the Vet school at UF 4. Claudia/Micheal will share lab protocols 5. Dr. McKune will share the CAGED survey
Felicia Wu (PI)	Aflatoxin M1 Health Risks vs. Benefits of Dairy Consumption in Ethiopian Children: An Epidemiological Trial and Risk-Benefit Analysis Ethiopia; Region Southern Nations, Nationalities, and Peoples (SNNP) (Zones Gurage and Hadiya)	1. Dr. Wu will check survey validation with the team considering the fasting practices of the target population. 2. Dr. Wu will follow up with Dr. McKune regarding gender analysis outcomes - if gender differences exist, we can consider a follow-up qualitative study 3. Dr. Wu can connect with Mulu to further discuss her project 4. Dr. McKune will share the WEAI R code
Andrew Stringer (PI) (Andy)	Improving smallholder poultry production and egg consumption in children under two in Ethiopia Ethiopia, Misrak Shewa Zone	1. Dr. Stringer looks to learn from the CAGED project and assessment of animal ownership-associated risks and safety. 2. In data collection, Dr. Stringer is recommended to consider hand sanitation before eating, handling food, and feeding a child. 3. Further discussion at IP meeting with Dr. Arie in May 2023
Bhola Shankar Shrestha (PI)	Integrated approach to enhance milk quality, dairy animal productivity and milk consumption by vulnerable household members in rural Nepal Rural Nepal	1. Project needs support to enhance effective data collection for objectives 2 and 3 2. Follow-up meeting in the presence of Dr. Havelaar, Dr. De Vries, and Dr. Laurie Miller would be helpful to identify missing pieces and fulfilling the objective of this meeting. 3. Mr. Shrestha is responsible for objective 1 and it does not require any assistance for now.



Feed the Future
Innovation Lab for Livestock Systems

Clarisse Umutoni (PI)	Enhancing the productivity and resilience of agro-pastoral systems, and income, food and nutrition security through market-oriented innovations in Niger Niger	1. Ms. Umutoni would appreciate guidance to address household nutrition, partner influence on animal-sourced food consumption, and barriers to the consumption of animal-sourced foods. 2. Ms. Umutoni is requested to share the baseline and multi-dimensional poverty piece of the survey (baseline survey and overview of student-led nutrition study) 3. Ms. Umutoni would like to explore the nutritional quality of the targeted food products of the project and needs financial assistance for this. Thus, recommended to continue reflecting on any possibility of improving the human health/nutritional impact of the overall study, including small side projects such as those supporting student research. 4. Dr. McKune will share MINERVA materials currently in development to evaluate resilience in the target population of Niger (Zinder) 5. Dr. McKune will follow-up on how much financial assistance can be provided under her AOI (Discuss possible support to the Niger REACH project to evaluate the nutritional value of ASF products with Saskia, Geoff, and Arie)
Zongo Moussa (PI)	-	<i>Mr. Moussa was unable to connect at the designated meeting time and the proposal is still being developed. Dr. McKune emailed to have a meeting rescheduled, but we didn't hear back from him.</i>