

ANH Academy

Agriculture, Nutrition and Health Academy Week
20-24 June 2016, Addis Ababa

#ANH2016

www.ANH-Academy.org

Conference Booklet

Learning Labs: 20-21 June 2016

Research Conference: 22-24 June 2016

The Hilton, Addis Ababa



RESEARCH PROGRAM ON
Agriculture for
Nutrition
and Health

Led by IFPRI



LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE



TABLE OF CONTENTS

| | |
|--|----|
| WELCOME TO THE AGRICULTURE, NUTRITION & HEALTH ACADEMY WEEK | 2 |
| ANH ACADEMY WEEK - INTERNATIONAL STEERING COMMITTEE | 4 |
| ANH ACADEMY WEEK - EXECUTIVE COMMITTEE | 4 |
| LEARNING LABS | 5 |
| RESEARCH CONFERENCE | 14 |
| Keynote speakers..... | 14 |
| Session 1: Agriculture And Nutrition Linkages | 16 |
| Session 2: Agriculture and Sustainable Diets | 24 |
| Session 3: Health Impacts of Animal Sourced Foods | 29 |
| Session 4: Women, Households and Nutrition..... | 37 |
| Session 5: Markets, Value Chains and Nutrition | 46 |
| Session 6: Determinants of Diets and Nutrition..... | 55 |
| POSTER PRESENTATIONS..... | 63 |
| Theme 1: Agriculture And Food Systems, Environmental Change And Diets | 63 |
| Theme 2: Agriculture And Human Health Linkages | 64 |
| Theme 3: Contribution Of Agriculture And Food Systems Policies And Programmes Towards Nutrition | 65 |
| Theme 4: Drivers Of Food Environment At National, Community And Household Levels | 65 |
| Theme 5: Institutions And Governance Of Food Systems..... | 66 |

WELCOME TO THE AGRICULTURE, NUTRITION & HEALTH ACADEMY WEEK

On behalf of the Agriculture, Nutrition & Health Academy, the ANH Academy Week International Steering Committee and all our partners, we warmly welcome you to the first annual ANH Academy Week.

The ANH Academy was established to broaden the research community working on nutrition and health consequences of changing agriculture and food systems, particularly in low and middle income countries, and to accelerate the development and sharing of innovative research methods and their application.

This week has been organized to share recent innovative research, stimulate new research collaboration, and strengthen capacity in this challenging interdisciplinary area. For this reason, it includes opportunities for mentoring and training as well as presentations and discussion of new research findings from around the world.

The Week has several themes that relate to priorities identified by ANH Academy members, including methods and metrics for sustainable diets, food environments and food safety in food systems, which are also the focus of ANH Academy working groups. We will also explore, through keynotes and panel sessions, the role of research in supporting policy.

It is an honour and a privilege to host a truly global community of researchers and research-users for this exciting week of learning, sharing and collaboration. We look forward to your participation and will be interested to get your feedback on this first ANH Academy week, in order to help us plan future activities in a way that best meets your interests and needs.

With best wishes,



Dr. Suneetha Kadiyala,
Senior Lecturer in Nutrition-
Sensitive Development,
London School of Hygiene &
Tropical Medicine (LSHTM);
PI for the IMMANA
programme



Prof. Jeff Waage,
Chair, Leverhulme Centre for
Agriculture and Food Systems
for Nutrition (LCIRAH);
Director, London International
Development Centre (LIDC)



Dr. John McDermott,
Director, CGIAR Research
Program on Agriculture for
Nutrition and Health,
International Food Policy
Research Institute (IFPRI)



About the Academy

The Agriculture, Nutrition & Health (ANH) Academy is a global research network in agriculture and food systems for improved nutrition and health to serve as a platform for learning and sharing.

The ANH Academy is part of the three workstreams of the IMMANA programme. It is also a broader partnership that aims to foster a community of researchers working at the intersection of agriculture, nutrition and health.

The ANH Academy is jointly founded and initial coordination is provided by the Leverhulme Centre on Integrative Research in Agriculture and Health (LCIRAH), IMMANA and CGIAR's Research Program on Agriculture for Nutrition and Health (A4NH). We welcome new partnerships to support Academy activities.

Aim and objectives

The aim of the ANH Academy is to foster a global community of interdisciplinary researchers working on agriculture and food systems for improved nutrition and health.

The objectives of the Academy are to:

1. Share innovative research in agriculture and food systems for improved nutrition and health;
2. Stimulate the development and harmonisation of new research;
3. Help strengthen the capacity of the research community to undertake inter-sectoral and interdisciplinary research;
4. Facilitate the uptake of robust evidence in policies and programming in agriculture and food systems for improved nutrition and health.

Activities

The Academy will include the following activities:

- An annual research conference, starting in June 2016
- Technical and policy working groups
- Online and face-to-face seminars and workshops
- Online and face-to-face training opportunities
- An online collaborative platform.

Get involved

Any researcher working at the intersection of agriculture and food systems, nutrition and/ or health can apply to become a member of the Academy. Membership is free of charge.

To join the Academy visit our website: ANH-Academy.org

ANH ACADEMY WEEK - INTERNATIONAL STEERING COMMITTEE

Dr. Suneetha Kadiyala, Senior Lecturer in Nutrition-Sensitive Development, London School of Hygiene & Tropical Medicine; PI for the IMMANA programme

Prof. Jeff Waage, Chair, Leverhulme Centre for Agriculture and Food Systems for Nutrition (LCIRAH); Director, London International Development Centre (LIDC)

Mr. Haris Gazdar, Senior Researcher, Collective for Social Science Research

Dr. Delia Grace, Program Manager, Food Safety Zoonoses, International Livestock Research Institute (ILRI)

Dr. Anna Lartey, Director of Nutrition Division, FAO

Prof. William Masters, Professor, Friedman School of Nutrition Science and Policy, Tufts University; Co-Director of IMMANA Fellowships

Dr. John McDermott, Director, CGIAR Research Program on Agriculture for Nutrition and Health, International Food Policy Research Institute (IFPRI)

Dr. Tassew Woldehanna, Assistant Professor in Economics at Addis Ababa University

Dr. Francis Zotor, President; and **Dr. Paul Amuna**, Head of Scientific Programming and Global Links, African Nutrition Society

ANH ACADEMY WEEK - EXECUTIVE COMMITTEE

Joe Yates, Research & Knowledge Uptake Manager, London School of Hygiene & Tropical Medicine (LSHTM); and London International Development Centre (LIDC)

Sofia Kalamatianou, Research Assistant, Innovative Methods and Metrics for Agriculture and Nutrition Actions (IMMANA), London School of Hygiene & Tropical Medicine (LSHTM); and London International Development Centre (LIDC)

Namukolo Covic, Research Coordinator in the Poverty, Health and Nutrition Division, International Food Policy Research Institute (IFPRI), based in Addis Ababa

Zak Gersten, Fellowships Coordinator, Innovative Methods and Metrics for Agriculture and Nutrition Actions (IMMANA), Friedman School of Nutrition Science and Policy, Tufts University

LCIRAH Team, comprised of members from London School of Hygiene & Tropical Medicine (LSHTM), School of Oriental & African Studies (SOAS) and Royal Veterinary College (RVC).



LEARNING LABS

Monday 20 – Tuesday 21 June, 2016

| Learning Lab: Plenary Masterclass, 20 June Mixed methods in process and impact evaluation | |
|---|--|
| <i>Lead organisation(s)</i> | Emory University |
| <i>Facilitator(s)</i> | Amy Webb Girard |
| <i>Overview of session</i> | Drawing from the presenter's experiences and the most up to date research, this session will provide an overview of the use of mixed methods approaches to enhance the evaluation of complex / integrated interventions and programs. Throughout the session, participants will be encouraged to ask questions and, time permitting, to network with other participants to facilitate sharing experiences with mixed methods including successes, challenges and lessons learned. |
| <i>Learning objectives/outcomes</i> | After completion of this one hour session learners will be able to 1) Discuss the benefits and drawbacks of using mixed methods in the evaluation of complex intervention / programs 2) Identify where in a program /research cycle mixed methods may be most useful 3) Identify novel complementary mixed methods that can be implemented throughout the program cycle 4) Identify team / training needs for implementing mixed methods 5) Identify strategies to avoid common pitfalls in mixed methods |
| <i>Target audience</i> | All |
| <i>Level</i> | Beginner to Intermediate |

| Learning Lab: Parallel Session, 20 June (repeated 21 June) Measuring food insecurity and malnutrition: Construction and interpretation of standard indicators using existing data | |
|---|---|
| <i>Lead organisation(s)</i> | Tufts University |
| <i>Facilitator(s)</i> | Prof. William A. Masters |
| <i>Overview of session</i> | Participants will explore and critique the draft "User's Guide" developed by the FSIN Technical Working Group on Measuring Food Security and Nutrition (http://www.fsincop.net/topics/fns-measurement). During the first 1.5 hr Learning Lab session we will review the draft guidebook, which explains how to construct and interpret the principal indicators available from existing data. For the second 1.5 hr session we will break into small working groups around each type of indicator then report back with guidance for the most effective use of existing data sources in research, policymaking and program management. Updated versions of the User's Guide will be available here: http://goo.gl/m1Q5XI |

| | |
|-------------------------------------|---|
| <i>Learning objectives/outcomes</i> | <ul style="list-style-type: none"> - Identify data sources and calculations behind 37 widely-used indicators of food security and nutrition - Select the most appropriate indicator for policy analysis, program design and management - Prioritize among future investments in data collection and analysis to obtain the most useful kinds of new data |
| <i>Target audience</i> | Researchers and policy analysts using quantitative indicators from public data sources such as FAO Food Balance Sheets, household consumption surveys and anthropometric measurement. |
| <i>Level</i> | Basic: Only prerequisite is an interest in quantitative measurement of differences in food security and nutrition over time or across locations. |

| Learning Lab: Parallel Session, 20 June (repeated 21 June) | |
|--|---|
| Systematic reviews within Evidence-informed Decision-Making (EIDM) in nutrition and health | |
| <i>Lead organisation(s)</i> | EVIDENT |
| <i>Facilitator(s)</i> | Roos Verstraeten/Richmond Aryeetey |
| <i>Overview of session</i> | There is a need to strengthen, formalise, share and use knowledge and evidence on health problems in order to i) serve as the basis for setting research and policy priorities for health, and ii) align the production of scientific knowledge and evidence with the information needs of decision-makers. This is especially urgent in settings where resources are limited, which means policy-makers and researchers should make best use of evidence to make more well-informed decisions linked to their own context. This session will highlight the stepwise process to obtain evidence on the effectiveness of health interventions appropriate to their setting and their priorities. |
| <i>Learning objectives/outcomes</i> | <ul style="list-style-type: none"> - Identify different sources of evidence for EIDM - Identify the steps involved in conducting a systematic review; - Appreciate and use good practices of framing a question |
| <i>Target audience</i> | Professionals already involved in activities of systematic reviews and/or knowledge management, or are willing to do so in a near future. |
| <i>Level</i> | Basic |

| Learning Lab: Parallel Learning Session, 20 June (repeated 21 June) | |
|--|--|
| Optifood | |
| <i>Facilitator(s)</i> | Frances Knight |
| <i>Overview of session</i> | <p>Optifood is a software tool that applies linear programming to target group specific dietary intake, food cost, food composition and nutrient requirement data to:</p> <ul style="list-style-type: none"> - Analyse the potential nutritional quality and content of diets for specific target groups based on average consumption patterns and local food supply (i.e. for 12-23mo children from Eastern Uganda, pregnant women from the Guatemalan Western Highlands, adolescent girls from peri-urban Lima, Peru) - Determine whether it is possible to meet nutrient requirements for this target group using local foods and identify the nutrient gaps in local diets using the concept of 'problem nutrients' - Identify the best local food sources of nutrients or alternative nutrient sources (bio fortification, new foods, supplements, fortified foods) - Develop, test and cost sets of food based recommendations for the target group that would provide, or come as close as possible to providing nutrient adequacy if put into practice - Estimate the financial cost of providing diets that would meet the minimum nutrient requirements for the target group and the content of these diets |

| | |
|-------------------------------------|--|
| | <p>These results can be used for informing the design or estimating the potential impact of agricultural interventions, such as intercropping, bio fortification, home gardens or the introduction or amplification of value chains. Optifood can also be applied in the development of behaviour change interventions for pregnant women, nursing mothers, complementary feeding or other nutritionally vulnerable target groups, to provide evidence for advocacy concerned with food supply and affordability, assist policy decisions and in the development of fortified or other food products.</p> |
| <i>Learning objectives/outcomes</i> | <p>Presently, it is recommended that Optifood be taught through a 5 day workshop. The half day taster workshop as part of the ANH Academy Learning Labs is designed to enable potential users to learn more about how Optifood can be used to make agricultural programs more nutrition sensitive. The overall aim of the workshop is to build sufficient understanding of the data requirements, use, outputs and potential applications of Optifood to enable rich discussion regarding the possible value of Optifood to ANH Academy members working in Agriculture and Nutrition</p> <p>The specific objectives of the workshop are to:</p> <ul style="list-style-type: none"> - Introduce participants to the Optifood tool and its key functions - Demonstrate the application of the Optifood tool to either 24hr recall data or HCES data for 1-3 specific target groups to identify problem nutrients, best food sources to fill nutrient gaps and food-based recommendations to improve nutrient intake - Discuss key contextual issues such as dietary patterns, food list inclusions, food availability and acceptability - Discuss the potential applications of the Optifood analysis results in the current work/interest area of workshop participants |
| <i>Target audience</i> | <p>Researchers with some nutrition knowledge, who are used to looking at and managing data and interested in learning about the possible applications of Optifood for agriculture and nutrition programs</p> |
| <i>Level</i> | <p>Intermediate</p> |

| Learning Lab: Parallel Session, 20 June | |
|--|---|
| Mainstreaming Nutrition in National Agriculture Investment Plans: evidence generation at country level towards CAADP monitoring and evaluation | |
| <i>Lead organisation(s)</i> | A4NH/IFPRI, FAO, NEPAD |
| <i>Facilitator(s)</i> | To be confirmed soon |
| <i>Overview of session</i> | <p>This learning session is informed by the fact that countries have been mainstreaming nutrition in National Agriculture Investment Plans (NAIPS) at least since 2011 and some nutrition indicators were added to the CAADP Results Framework in 2015. The results framework forms a key instrument of the AUC's Regional Strategic Analysis and Knowledge Support System (ReSAKSS) to monitor CAADP progress. The CAADP nutrition team at NEPAD and AUC have recently conducted a workshop for ECOWAS on "Regional sensitization workshop on integrating Food and Nutrition Security, Baselines and Targets in the NAIP Appraisal and the Biennial Review Processes." The learning session will also tap into the outcomes of that meeting so that the session can address pertinent issues that have been raised there and also to promote continuity of efforts towards this common goal.</p> |

| | |
|-------------------------------------|---|
| <i>Learning objectives/outcomes</i> | <ul style="list-style-type: none"> - Contribute to preparations for monitoring nutrition as part of the CAADP biennial review by addressing how nutrition may be incorporated into this process by CAADP Teams at country level - Interrogate the challenges that may be faced in this process and how these may be addressed - Use the deliberations of the session to make recommendations on how to bring nutrition into the country biennial review process and who needs to come on board. - Capacity of participants to address inputs into the nutrition indicators provided in the CAADP Results Framework Strengthened - A report of the deliberations and issues raised to share through agriculture, nutrition and CAADP networks so that even countries that are not able to come may benefit from the information generated |
| <i>Target audience</i> | Country and regional CAADP Teams and collaborating organisations including academic institutions and researchers |

| Learning Lab: Lightning Sessions, 20 June (repeated 21 June) Getting Published | |
|---|---|
| <i>Lead organisation(s)</i> | African Nutrition Society (ANS) |
| <i>Facilitator (s)</i> | Rev Dr Tom Ndanu |
| <i>Overview</i> | Writing a scientific manuscript does not mean it will automatically get published. It is important to gain an understanding of the standard format for writing in the sciences and the purpose of each section in a scientific paper. Appreciation must be given to and key rules must be learnt in organising scientific writing, paragraphing not to mention scientific English (nomenclature, abbreviations). Important areas often overlooked by potential authors are the rules of Publication Ethics (COPE) or to make some time to view samples of journal papers or particularly how various referencing methods are used by Journals. Explanation will be given to participants about the submission and peer-review process drawing from the Nutrition Society Journal examples and help given to identify types and purpose of papers (e.g. primary research, review, systematic review) |
| <i>Learning objectives/outcomes</i> | <p>At the end of the session participants should be familiar with how:</p> <ul style="list-style-type: none"> - Types of observations ,and nature of hypothesis testing - Who qualifies as a writer? - The structure of the paper - Aspects of English in technical writing - Authorship and Publishing <p>Introduction to submission procedure, and peer-review process through eJP examples.</p> |
| <i>Target audience</i> | Early career; anyone seeking a bump up their publishing record |
| <i>Level</i> | Basic |

| Learning Lab: Parallel Session & Lightning Sessions, 20 June ANH101: Core Disciplines in Agriculture-Nutrition-Health Research Student and Early Career Teaching Seminar | |
|---|--|
| <i>Lead organisation(s)</i> | LCIRAH |
| <i>Facilitator(s)</i> | Various |
| <i>Learning objectives/outcomes</i> | The emerging field of agri-health research requires researchers to use and engage with theories and methods from several different disciplines, yet most researchers are trained as specialists in just one. |

| | |
|------------------------|--|
| | <p>This peer-taught seminar will provide participants with:</p> <ul style="list-style-type: none"> - A broad understanding of the core disciplines and key methods relevant to interdisciplinary agriculture-nutrition-health research, presenting the basics in epidemiology, health and agricultural economics, development studies, nutrition, and anthropology, and providing time for discussion and questions. - Key information so that those wishing to engage with a discipline or method know what questions to ask of an expert, or where to go for further information |
| <i>Target audience</i> | Early-career researchers aiming to gain a basic understanding of the disciplines that are core to interdisciplinary agriculture-nutrition-health research |
| <i>Level</i> | Basic |

| Learning Lab: Lightning Sessions, 20 June Interdisciplinary Journeys | |
|--|---|
| <i>Lead organisation(s)</i> | Swedish University of Agricultural Sciences & LCIRAH |
| <i>Facilitator(s)</i> | Linley Chiwona-Karlton & Sabrina Trautman |
| <i>Overview of session</i> | <p>As a young academician seeking higher education, it is difficult to know what exactly you want to specialise in. In my younger days I thought that cookery was a rather interesting hobby. In case I got married, it would be important that I knew how to cook for my husband. But when I went to university, I changed to dietetics and thought I would look “smart” in a white uniform. But all that changed when I saw the numerous hungry faces on television in 1984. Little did I know then that those faces on television, would impact my interests and career path. Those faces took me on a long interdisciplinary career journey in the fields of nutrition, health and agriculture.</p> <p>Come and hear our stories to get inspired. Sabrina has just embarked on her interdisciplinary journey through her PhD training, how did she do it? More importantly, how can you make your own interdisciplinary journey in agriculture, nutrition and health.</p> |
| <i>Learning objectives/outcomes</i> | <p>At the end of the session participants should be familiar with how:</p> <ul style="list-style-type: none"> - Nutrition as a biological science is the foundation for Interdisciplinarity - Research and Networking provide options to strengthen your base and versatility - To build multi-disciplinary teams for research for development projects and research |
| <i>Target audience</i> | Early career; mid-career; mature career; anyone seeking a new challenge |
| <i>Level</i> | Basic |

| Learning Lab: Parallel Session, 21 June Using the Women’s Empowerment in Agriculture Index (WEAI) for Nutrition Sensitive Programming | |
|---|--|
| <i>Lead organisation(s)</i> | IFPRI |
| <i>Facilitator(s)</i> | Hazel Malapit; Kenda Cunningham |
| <i>Overview of session</i> | <p>This course will provide an introduction to the WEAI, the first comprehensive and standardized measure to directly measure women’s empowerment and inclusion in the agricultural sector. The course will cover the conceptual underpinnings of the WEAI, its domains and component indicators, and the ongoing development of a nutrition-sensitive WEAI for use in agricultural development projects under Phase 2 of the Gender, Agriculture and Assets Project (GAAP2). Special emphasis will be placed on best practices around survey design and implementation, and its relevance as a tool</p> |

| | |
|-------------------------------------|--|
| | for measuring and tracking both the intended and unintended impacts of nutrition-sensitive agricultural programs on women's empowerment. |
| <i>Learning objectives/outcomes</i> | At the end of this course, the participant will be able to: <ul style="list-style-type: none"> - Understand how and why gender considerations and women's empowerment matter for nutrition-sensitive agricultural programs - Understand how the WEAI can be used to diagnose areas of disempowerment, and monitor intended and unintended impacts of agricultural development programs on women's empowerment - Understand how the WEAI data is collected, and be familiar with best practices on survey implementation |
| <i>Target audience</i> | The course is appropriate for participants with some background and/or strong interest in gender issues in ANH programs |
| <i>Level</i> | Basic |

| Learning Lab: Parallel Session, 20 June (repeated 21 June) Data that Speaks: Data Visualization for Impact | |
|--|---|
| <i>Lead organisation(s)</i> | ICRAF |
| <i>Facilitator(s)</i> | Christine Lamanna, Todd Rosenstock |
| <i>Overview of session</i> | The data we collect comes alive through visualizations – plots, tables, and graphics – that tell a story and answer a question. The right data visualization can make your work more impactful, whether for publication in a journal, for a presentation, or for informing policy and decision makers. In this interactive session, we will go over the basics of data visualization for different objectives, and learn about cutting edge tools available for making your data speak for different audiences. |
| <i>Learning objectives/outcomes</i> | <ul style="list-style-type: none"> - How to present data for journal articles, presentations, policy makers, etc. - Familiarity with new interactive data visualization options - Students will leave with a new visualization from their own data |
| <i>Target audience</i> | Masters & PhD students |
| <i>Level</i> | All levels. We will provide a sample dataset. Students should bring their own data that they would like to visualize if they have it. Students should also bring laptops if possible. |

| Learning Lab: Parallel Session, 21 June Mapping and analysing policies to inform security and nutrition planning: opportunities, challenges and emerging research needs | |
|--|--|
| <i>Lead organisation(s)</i> | Food and Agriculture Organisation |
| <i>Facilitator(s)</i> | Charlotte Dufour and Marie-Caroline Dodé |

| | |
|-------------------------------------|---|
| <i>Learning objectives/outcomes</i> | At the end of the session, participants will: <ul style="list-style-type: none"> - understand the importance of policy coherence to promote nutrition-sensitive food systems - understand the importance of policy mapping and analysis to inform political decisions for food security and nutrition and be aware of current tools that are used / being developed - discuss research gaps (in terms of data and tools) and identify priority research areas related to policy coherence, mapping and analysis for nutrition-sensitive food systems |
| <i>Target audience</i> | Researchers and students interested in the political environment which can influence how food systems impact nutrition. |
| <i>Level</i> | Advanced. Participants need to have basic notions of nutrition-sensitive food systems and the type of policies that are relevant |

| Learning Lab: Parallel Session, 21 June Innovative Food Systems and Qualitative Social Research (IFSTAL) | |
|--|--|
| <i>Lead organisation(s)</i> | IFSTAL / LCIRAH |
| <i>Facilitator(s)</i> | Lauren Blake |
| <i>Overview of session</i> | An introduction to food systems approach and qualitative social research, and what they can offer to tackling agriculture and health challenges. Groups then work with case studies to address a problem, practicing employing a food systems analysis and mapping, then designing qualitative research plans that complement other research methods and disciplinary approaches. |
| <i>Learning objectives/outcomes</i> | <ul style="list-style-type: none"> - Understanding of a food systems approach to agriculture and health research - Ability to apply a basic food systems analysis to problems - Intermediate understanding of qualitative social research and in relation to agriculture and health - Ability to integrate qualitative social research into a research plan and agriculture and/or health problem - Applying interdisciplinarity to one's work - Appreciation for the complex, broad and interacting nature of food issues |
| <i>Target audience</i> | Researchers and practitioners wanting to improve their understanding of wider food issues and/or their interdisciplinary skills. Anyone wanting a better understanding of food systems and/or qualitative research. |
| <i>Level</i> | Basic/Intermediate |

| Learning Lab: Plenary Learning Workshop, 21 June Options for achieving optimal diets in resource-limiting settings | |
|--|---|
| <i>Lead organisation(s)</i> | Healthy Food Systems: Nutrition – Diversity - Safety, University of Sydney Agriculture, Nutrition and Health Academy (International Livestock Research Institute, London School of Hygiene & Tropical Medicine and the Royal Veterinary College) |
| <i>Facilitator(s)</i> | Robyn Alders (USyd) Delia Grace (ILRI) Paula Dominguez-Salas (LSHTM and RVC) |

| | |
|-------------------------------------|---|
| <i>Overview of session</i> | <p>There is no single, perfect diet that fits everyone but rather a series of dietary options depending on locally available food and the age, gender and reproductive status of each person. In many resource-poor environments, food availability is influenced by seasonal farming and production patterns, livestock ownership, indigenous plants and animals, socioeconomic circumstances, cultural beliefs and the presence of affordable food produced elsewhere. Other influences include the bioavailability and density of key macro and micro-nutrients varies across different foods and by season, and trade-offs and synergies between nutritional security, food safety, livelihoods, women's empowerment and ecosystem services.</p> <p>Taking an ecohealth approach, this workshop will review options for promoting linkages between nutritional programs and nutrition-sensitive agriculture and value-chains at local and national levels, with a strong focus on sustainable systems, process and policy.</p> <p>This plenary workshop and associated reception is co-hosted by the Australian Centre for International Agricultural Research and the Academy for Agriculture, Nutrition and Health.</p> |
| <i>Learning objectives/outcomes</i> | <ul style="list-style-type: none"> - To review the impact of the characteristics of agroecological zones on food availability (including the effects of rainfall, soil types, vegetation and food loss and waste) on local food availability. - To assess options for quantifying the nutritional content of available foods and formulating optimal diets across the seasons tailored by age, gender and reproductive status. - To understand and evaluate possible trade-offs and synergies between nutritional security and other health and wellbeing goals. - To agree on processes that promote facilitating policy environments in support of sustainable, nutrition-sensitive agriculture and value chains and associated interdisciplinary and multisectoral collaboration. - To launch, in collaboration with the African Union Pan African Veterinary Vaccine Centre, the Australian Centre for International Agricultural Research and the Kyeema Foundation, the first cold chain manual targeting animal health practitioners to improve the effectiveness of animal health vaccination campaigns in support of food and nutrition security. A small number of hard copies of the manual will be distributed via lucky door prizes at the end of the workshop. |
| <i>Target audience</i> | Practitioners in low to middle-income countries involved with: maternal and infant nutrition; nutrition-sensitive agriculture and value chains; indigenous foods; and food and nutrition security. |
| <i>Level</i> | This interdisciplinary workshop has no minimal knowledge requirements, simply an interest in ecologically sustainable and ethical diets. |

| ATONU Side Event Session, 21 June | |
|---|---|
| Agriculture to Nutrition (ATONU): Improving Nutrition Outcomes through Optimized Agriculture Investments Project: Share experiences on selection of nutrition-sensitive interventions for agricultural projects, design of impact evaluations and implementation | |
| <i>Lead Organization:</i> | Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) |
| <i>Facilitators:</i> | (i) Dr Simbarashe Sibanda, Dr Tshilidzi Madzivhandila, and Bertha Mkandawire, FANRPAN (ii) Dr Tedelle Dessie, ILRI (iii) Dr Amy Webb-Girard, Emory University (iv) Dr Jef Leroy, IFPRI (v) Dr Nilupa Gunaratna and Dr Abdallah Noor, Harvard Chan School of Public Health |
| <i>Overview of Session:</i> | ATONU project aims to answer the following questions: (i) What can agriculture projects and programs do to deliver positive nutrition outcomes? (ii) What potential interventions along the agricultural value chain will impact the nutrition status of women and young children? (iii) Under what conditions do increases in agricultural income lead to improved nutritional outcomes? (iv) Which entry points along the agricultural value chain have the greatest potential impact for empowering women and improving children's nutrition? (v) How can agricultural interventions be designed to improve nutritional outcomes within smallholder farm families? ATONU is working with ILRI's African Chicken Genetic Gains (ACGG) project in Ethiopia and Tanzania to answer these questions. |
| <i>Objectives of Side event:</i> | (i) Share overview of ATONU and ACGG projects (ii) Share the frameworks for selecting agricultural development projects with potential for integrating nutrition, and NSI identification and selection (iii) Discuss different nutrition-sensitive interventions, what works (iv) Share information on the proposed nutrition-sensitive interventions for ACGG (v) Discuss impact evaluation designs for agriculture-nutrition interventions in research and development projects (vi) Discuss proposed design for the ACGG Project |
| <i>Target audience:</i> | Research and development practitioners, thought leaders in agriculture-nutrition, policy makers and other agricultural value chain actors. |
| <i>Level:</i> | Advanced: Knowledge of agriculture-nutrition and nutrition-sensitive interventions and impact evaluation design. |

RESEARCH CONFERENCE

Wednesday 22 – Friday 24 June, 2016

KEYNOTE SPEAKERS

Wednesday, 22 June 2016

Dr. Agnes Kalibata

President, Alliance for a Green Revolution in Africa (AGRA)

Dr. Kalibata leads AGRA's efforts with the participation of public and private partners towards ensuring a food secure Africa through rapid, sustainable agricultural growth and improved productivity by empowering millions of smallholder farmers. She is a former Minister of Agriculture and Animal Resources in Rwanda and is widely considered to be one of the most successful Agriculture Ministers in sub-Saharan Africa. Dr. Kalibata has held several other leadership positions, including Permanent Secretary of Ministry of Agriculture and Deputy Vice Chancellor of University of Rwanda. She has also worked for the International Institute of Tropical Agriculture (IITA) in Uganda, and various other agricultural development organizations. She currently sits on various boards including the International Fertilizer Development Corporation (IFDC), the Sustainable Trade Initiative, the Africa Risk Capacity, and the Global Agenda Council of the WEF. She is a distinguished agricultural scientist, policy maker and thought leader and holds a PhD in Entomology from the University of Massachusetts, Amherst.



Dr George Bigirwa

*Senior Program Officer, Program for Africa's Seed System,
Alliance for a Green Revolution in Africa (AGRA)*

Dr. George Bigirwa holds a PhD in Plant Pathology from Makerere University and works with AGRA as the Regional Head of East and Southern Africa. He also holds a post graduate diploma in Maize Improvement from CIMMYT-Mexico. Other additional trainings include: Rockefeller Foundation Postdoctoral Fellow, High Performance Leadership Course at the University of Chicago, Research Management and Administration from Swaziland, Integrated Pest Management from Germany and three months Visiting Scientist at CIMMYT-Mexico. George joined AGRA in 2007 as Program Officer in-charge of supporting and mentoring seed entrepreneurs in Eastern and Southern Africa now totaling 78. Within AGRA he has risen in ranks from Program Officer, Senior Program Officer, Associate Director to the current position. Before joining AGRA he worked with the National Agricultural Research organization (NARO) of Uganda for 22 years in different capacities including administration, maize and rice crop development which resulted in the release of six maize hybrids and five rice varieties widely grown in Uganda and neighboring countries. George also served on various regional bodies like chairing the Maize and Wheat Network for Eastern and Central Africa (ECAMAW) and the East and Central Africa Rice Research Network (ECARRN). Other roles played include providing consultancy services to various institutions like FAO, Rockefeller Foundation and Association for Strengthening Agricultural Research for East and Southern Africa (ASARECA). He currently sits on the Investment Committee for the African Seed Investment Fund and he is also a member of the Project Advisory Committee for the Sweet potato Action for Security and Health in Africa (SASHA) a project of the International Potato Center (CIP). George has published widely and also supervised several post graduate students



Thursday, 23 June 2016

Haris Gazdar,

Senior Researcher, Collective for Social Science Research

Haris Gazdar works with the Collective for Social Science Research which is an independent research organization that specializes in social policy and political economy. He has taught as well as conducted academic research in the UK, India, and Pakistan. Besides his academic and consultancy assignments, he has worked on an honorary basis as adviser to research programmes, government and non-governmental organizations, and political parties. His current interests include nutrition, hunger, food security, women's work, care, and social protection. The Collective is part of the Leveraging Agriculture for Nutrition in South Asia (LANSA) research consortium and Haris Gazdar is the principal investigator from the Collective on a number of studies. He is also part of the Core Management Team and on the Consortium Steering Group of LANSA. He is currently part of a number of working groups providing technical advice to national and provincial government on social protection, poverty measurement, and agriculture-nutrition



Making Nutrition Digestible: Conversations Across Tables

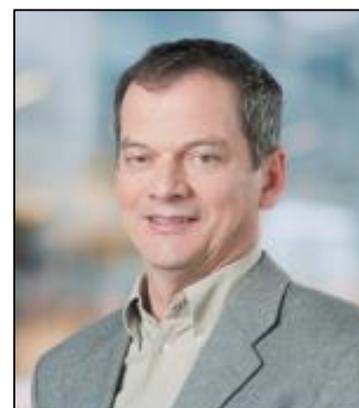
Knowledge creation on nutrition and its linkages with agriculture and social policy areas occur across disciplinary boundaries. While advances in knowledge in one field give hope for change on the ground, how these advances are understood and implemented is not self-evident. Despite consensus that nutrition improvement is an outcome of complex interactions between different actors, how any of the knowledge generated for nutrition improvement can become part of a conversation with citizens and in the political process remains largely unaddressed. This talk reflects on the experience of holding conversations about nutrition and hunger across tables and disciplines, to draw out lessons for future exchange.

Friday, 24 June 2016

Shawn Baker

Director, Nutrition Team, Bill and Melinda Gates Foundation

Shawn Baker is Director of the Nutrition team at the Bill and Melinda Gates Foundation. In this role, he leads the foundation's efforts to ensure that women and children receive the nutrition they need for healthy growth and development. Before joining the foundation in 2013, Baker served as Vice President and Regional Director for Africa for Helen Keller International. He shaped flagship programs including vitamin A supplementation through child health days and food fortification. He led the development of strategic regional relationships, particularly with the 15-nation West African Health Organization. Shawn also served as country director for Niger and Bangladesh.



SESSION 1: AGRICULTURE AND NUTRITION LINKAGES

Session Chair: Will Masters

NUTRITIONAL BARRIERS TO AGRICULTURAL PRODUCTIVITY IN UGANDA

Rosemary E. Isoto

Faculty at Makerere University, Uganda

Project summary:

Malnourishment is common among rural smallholder farmers, particularly among women who do the bulk of agricultural work in many parts of Africa. This study addresses the effects of nutritional intake on labour productivity and earnings, using the 2005-06 and 2009-10 rounds of the Uganda National Panel Surveys (UNPS). Food intake from that survey's seven-day dietary recall module will be converted to nutrient intake per day, for use in explaining the household's farm productivity estimated from the survey's plot-level agricultural module. Aim 1 of the study is to test for thresholds of nutrient intake that may be associated

with higher productivity, thereby contributing to low-intake poverty traps. Aim 2 is to test for gender differences in the nutrition-productivity relationship, which could arise from systematic failure of intra-household allocation to meet the nutritional needs of one gender as opposed to the other. Unobservable factors such as skill or luck that affect both intake and productivity will be addressed using household fixed effects and a variety of instrumental variables. Results will inform metrics for nutritional adequacy, as well as measures of gender disparities affecting the agriculture-nutrition relationship in Africa.

PROBABILISTIC CAUSAL MODELS FOR NUTRITION OUTCOMES OF AGRICULTURAL ACTIONS

Eike Luedeling

World Agroforestry Centre (ICRAF; Nairobi, Kenya) and Center for Development Research (ZEF; Bonn, Germany)

Predicting the impacts of agricultural actions on nutrition outcomes is a difficult task, complicated by the complexity of food systems and scarcity of information on many of their drivers. Scientific approaches that cannot handle complexity and uncertainty are of limited use in such a setting. Methodologies used by solution-oriented decision scientists, however, hold promise for overcoming these constraints. They allow making projections of likely nutrition effects of development actions by using all available information, including data and expert knowledge. Probabilistic forecasts are generated by causal impact models, developed in participatory processes involving decision-makers, subject-matter experts and stakeholders. These

forecasts articulate projected impacts as probability distributions, acknowledging that it is not possible to provide exact predictions in the face of imperfect information. While even such 'fuzzy' predictions are often sufficient for guiding decisions, Value of Information analysis can be employed to set priorities for decision-specific research.

In this IMMANA-supported project, Bayesian Network models are constructed to describe and quantify nutrition-related impact pathways of agricultural actions in Kenya and Uganda. Initial results of a study investigating the prospective impacts of introducing fruit trees into small farms in Kenya will be presented.

CHARACTERIZING POST-HARVEST LOSSES IN RURAL COMMUNITIES OF NORTHERN NIGERIA: A PANACEA TO REDUCING HOUSEHOLD FOOD INSECURITY

Hassan Ishaq Ibrahim, Hussaini Yusuf Ibrahim and Segun Solomon Adeola

Department of Agricultural Economics and Extension

Federal University Dutsin-Ma, Katsina State, Nigeria

Hibrahim@fudutsinma.edu.ng/ Senior Lecturer

Keywords: Post-harvest loss, Food crops, rural communities, Katsina

Introduction

Food losses and wastages contribute to household food insecurity. Food insecurity can exacerbate household malnutrition. Nigeria loses about 2.4 billion tonnes of food crops yearly due to poor harvest and storage facilities. These losses limit the potential income of the farmers, threaten household food security and nutrition (Thamaga-Chitja et al., 2004 cited by Okoruwa et al., 2011). Kaiya (2014) opined that post-harvest loss (PHL) is the degradation in both quantity and quality of food produced from harvest to consumption. The quality of losses includes those that affect nutrients or caloric compositions. The estimate from the Food and Agricultural Organisation puts global food loss and wastages at 32 percent while in Sub Saharan Africa, PHL is estimated to be 37 percent (Kaminski and Christiaensen, 2014). However, Affognon et al. (2015) as cited by (Kaminski and Christiaensen, 2014) observed that PHL data are spotty (scanty) and of poor quality. This study attempts to fill the knowledge gap on the incidence of PHL in northern Nigeria by characterizing PHL in the study area based on crops affected, the stages and possible causes.

Methods

Located in Northern Nigeria, Katsina lies between Latitude 12° 15'N and Longitude 7° 30'E. The state occupies a land area of 24,192Km² and has a population of about 3,878,344 people based on the 1991 census figures. The state is bounded in the east by Kano and Jigawa States, in the west by Zamfara State, in the south by Kaduna and in the north by Niger republic. The indigenes are Hausa and Fulani. Due to its vast arable land, it is currently playing a leading role in commodity and food production namely; Cotton, groundnut, millet,

sorghum, maize, rice, wheat and vegetables. Data were obtained via focus group discussion (FDG) with crop farmers randomly selected from 21 Villages across the three Agricultural Development Zones in the State. The FDG sessions involved 8-10 participants per village, with a moderator and note taker to facilitate the process. Data were analyzed using descriptive statistics.

Findings and interpretations

We found that the incidence of food shortages exist in all sampled villages. The major causes were post harvest losses at various stages along the value chain. Most cases of PHL were experienced in key food crops such as maize, millet, sorghum, soybean and cowpea, highlighting the importance of curbing the menace. Our findings also revealed that PHL during harvest was mainly due to termite attack before farm produce were evacuated from the farm and mechanical damage during harvesting operations. Theft and mechanical damage were the major causes of PHL during post harvest handling of produce. Moisture induced rotting due to poor storage conditions was a very common occurrence in the sampled villages. This emphasizes the need to provide rural farmers with modern storage facilities at the village level. Majority of the sampled villages reported that PHL were very severe at harvesting and during storage. Few farmers had received training from public agricultural extension services on harvest/post harvest handling operations. Efforts to reduce post-harvest losses in food crops should therefore be directed at providing appropriate information on post-harvest handling of crops and to facilitate access to appropriate storage facilities by farmers.

DEVELOPING GUIDANCE FOR THE FIRST NUTRITION-SENSITIVE AGRICULTURE INDICATOR UNDER FEED THE FUTURE INITIATIVE

Lidan Du¹, Heather Danton²

¹SPRING (Strengthening Partnerships, Results, and Innovations in Nutrition Globally) Project/HKI, USA;

²SPRING Project/JSI, USA

Introduction:

Feed the Future, the U.S. Government's global hunger and food security initiative, has recently issued a new nutrition-sensitive agriculture indicator. This outcome indicator focuses on intended consumption of nutrient-rich value chain commodities (NRVCC), since increased home consumption of targeted commodities may not happen automatically with increased production. This indicator also complements the Feed the Future population-based indicators that capture actual consumption of targeted NRVCC among the women of reproductive age and children aged 6-23 months in the zone of influence (ZOI). USAID commissioned the SPRING project to develop technical guidance on data collection for this indicator.

Methods:

The specific indicator is worded as follows: "Total quantity of targeted nutrient-rich value chain commodities produced by direct beneficiary households that is set aside for home consumption" (Feed the Future, 2014). SPRING first conducted key informant interviews with experts on NRVCC production and monitoring & evaluation (M&E) methods, as well as M&E staff affiliated with Feed the Future implementing partners (IP) in country, to get a sense of existing issues in collecting production and sales data of different types of NRVCC. The team then conducted field work focusing on data collection challenges in four countries (Bangladesh, Cambodia, Malawi and Zambia) from April to October 2015. Field work consisted of 1) on-site observations of data collection sessions, 2) focus group discussions with beneficiary farmers, 3) review of IPs' sampling schemes, original data sheets, analytical results, and external data quality review documents,

and 4) meetings with IPs' technical management and M&E teams to validate the research findings. Data from all approaches were systematically reviewed to identify similar and unique data collection challenges and constraints across various types of NRVCC and geographical settings to guide the development of data collection guidance.

Findings and interpretations:

Findings concerning the NRVCC indicator include: 1) data collection required for the NRVCC indicator poses little additional burden for IPs as it is part of the total production component of gross margin data collection, 2) the NRVCC indicator has a complex time dimension as it includes information for quantities of production that, at the time of data collection, have already been consumed as well as may be planned for future consumption, 3) the perishability and harvest characteristics of the NRVCC are complicating factors for data collection, 4) traditional measurement units are commonly used by direct beneficiaries when reporting quantities that could introduce errors when being converted into the metric units, and 5) caution is needed when setting targets for this indicator as the quantity of consumption will eventually plateau, which may vary by contexts and types of NRVCC. Complete NRVCC data collection guidance is being incorporated into the revised Feed the Future Agricultural Indicators Guide (Nelson and Swindale, 2015). Although the NRVCC indicator helps to monitor the effectiveness of interventions designed to improve diets via the "production pathway", complementary outcome and intermediate level indicators along all agriculture-nutrition pathways will be needed to assess the overall impact of agriculture on nutrition

EVALUATING THE FOOD AND NUTRITION SECURITY IMPACT OF AGRICULTURAL TECHNOLOGIES. EVIDENCE FROM MEASURING THE MULTIDIMENSIONAL FOOD SECURITY IMPACT OF RAINWATER HARVESTING DECISION IN NORTH EAST ETHIOPIA

Anteneh Girma¹, Menale Kassie², Siegfried Bauer³

¹Ethiopian Agricultural Transformation Agency, Addis Ababa, Ethiopia;

²International Center of Insect Physiology and Ecology (icipe), Nairobi, Kenya;

³Institute of Project and Regional Planning, Justus Liebig University Giessen, Germany
a.girmahaile@gmail.com, Senior Technical Expert-Monitoring & Evaluation

Introduction:

In light of the recent policy focus to enhance the contribution of agricultural for improving nutrition and health in smallholder farm households, the importance of evaluating the impact of agricultural technologies is increasingly recognized. Despite the development of many different indicators in the past decade, there is still lack of a single measure which captures the multidimensional aspects of food and nutrition security concept (Coates, 2013). This study developed a method to measure the household food security impact of integrated rainwater harvesting practices (IRWHP) that goes beyond approaching food security as unidimensional concept.

Methods:

We followed Alkire and Foster (2007; 2011) multidimensional poverty index framework to construct a multidimensional household food security index incorporating the well-recognized pillars of food security: availability, access, and utilization. Our empirical analysis relies on cross-sectional data from 354 farm households and 974 plots. Identifying the impact of adopting IRWHP is not straightforward, in particular using cross-sectional data wherein reverse causality, endogenous selection and omitted variables biases are all potentially important problems. Users and non-users may be systematically different in terms of their observed and unobserved plot and household characteristics. Further, they may be systematically selected by development agents based on their propensity to use these practices. To estimate the impact of IRWHP, one needs to take into account the possibility of self-selection. An endogenous switching probit regression model in a counterfactual framework

employed to account for the endogenous choice of IRWHP. In addition, following the construction multidimensional household food security index (MFSI), our outcome equation also takes truncated data. We employed multivariate tobit model to investigate how the decision to use IRWHP is influencing the three components of the index.

Findings and interpretations:

The unconditional result shows that IRWHP have a role to reduce household multidimensional food security status, under a situation where more than 50 % of the population is multidimensional food insecure. In addition, there is a statistical significance difference on the three deprivation values that constitute the MSFI where the practices have a positive role to improve the three components of the food security dimensions. However, given that the use of IRWHP use is endogenous, a simple comparison of the outcome indicators demands careful interpretation. Results show that the use of IRWHP has a significant positive impact on household food security status. The counterfactual multidimensional food security analysis reveals that non users would have benefited more and confirms that non-users are constrained to use IRWHP and thereby enhance food security. The result from multivariate tobit model shows that the decision to use IRWHP has significantly influenced the access and utilization components of the multidimensional food security index. This study suggests that policies that enhance the promotion of IRWHP would be central for the sustainable intensification of smallholder agriculture that simultaneously foster food security and enhance resource sustainability.

EXAMINING THE INFLUENCE OF AGRICULTURAL PRODUCTION ON SEASONAL CHANGES IN HOUSEHOLD DIETARY DIVERSITY IN BURKINA FASO

Jérôme W Somé¹ and Andrew D Jones¹

¹Department of Nutritional Sciences, School of Public Health, University of Michigan, Ann Arbor, MI 48109, USA
wsome@umich.edu, Research Fellow

Introduction

Diverse diets are an important determinant of many positive nutrition and health outcomes. Smallholder farming households in low-income settings are vulnerable to seasonal changes in dietary diversity because of fluctuations in food availability and access. Yet, few studies have assessed temporal variability in dietary diversity or the household-level characteristics that may modify this variability.(1-3) We assessed seasonal variation in household dietary diversity at four different time periods of the year in Burkina Faso, and determined the extent to which household socioeconomic status and agricultural production diversity modify changes in dietary diversity across seasons.

Methods

We examined data from the Burkina Faso 2014 Continuous Multisectoral Survey (EMC) (Enquête Multisectorielle Continue), a nationally representative survey of 10,800 households. Household food consumption and expenditure data were collected during four different survey rounds in 2014: 1) January – March (post-harvest season), 2) April – June (early lean season), 3) July – September (late lean season), and 4) October – December (harvest season). For each season, individual food items consumed by households during the previous week were grouped into nine food groups, and were used to create a continuous food group dietary diversity score. The food groups were adapted from those used to construct the Minimum Dietary Diversity – Women (MDD-W), an indicator developed to reflect the extent to which women are meeting their dietary micronutrient needs.(4) We validated the adapted dietary diversity indicator using data on under-five child anthropometric measurements and household food security, also available in the EMC. We used a mixed effect model accounting for repeated

measurements and the complex sampling design of the EMC to assess the association between seasons and household dietary diversity. We adjusted the model for predefined, time invariant covariates including household head's characteristics, agricultural production for the most recent harvest season, household size and food expenditures. We tested statistical interactions between seasonality and household socioeconomic status and agricultural production diversity.

Findings and interpretations

Approximately three-quarters of households (72.1%) resided in rural areas and 71.6% of them were involved in agricultural activities. Heads of household were predominantly male (86.1%) with a mean \pm SD age of 46.1 ± 15.4 years. Most lacked any formal education (75.3%) and only 3.3% had a post-secondary education. The median number of household members was 6 (interquartile range: 4-9). Household dietary diversity was greatest during the harvest season and lowest during the post-harvest season (5.56 ± 1.31 vs. 4.71 ± 1.33 ; $p < 0.0001$). There was no difference in household dietary diversity between the early and late lean seasons (5.06 ± 1.46 vs. 5.08 ± 1.49 ; $p = 0.328$). The association between seasonality and household dietary diversity varied by education level of household head and crop production diversity. No seasonal variation was observed among households with highly educated household head (i.e., university education). There was a variation in dietary diversity between early and late lean seasons in the group of households with medium crop diversity (production of 3-4 crops). Development and targeting of interventions aimed at improving household dietary diversity should account for seasonal changes in household vulnerability and the existing agricultural assets and management practices of households.

REALIGNING AGRICULTURE TO IMPROVE NUTRITION: FINDINGS FROM THE FINAL EVALUATION OF THE RAIN PROJECT IN ZAMBIA.

Jody Harris¹, Phuong Hong Nguyen¹, Lan Tran Mai¹, Marjolein Smit-Mwanawenge², Rahul Rawat¹

¹ International Food Policy Research Institute, USA

² Concern Worldwide, Zambia

Introduction

Zambia is among countries struggling to reduce high levels of malnutrition, with 40% of children under five stunted for their age (CSO et al, 2014). Current evidence suggests that interventions will be needed from several sectors at once to reduce undernutrition (Ruel and Alderman 2013). The Realigning Agriculture to Improve Nutrition (RAIN) project was a five-year (2011-2015) intervention to improve child nutrition through integrated agriculture, nutrition and health interventions in the first two years of life. RAIN was implemented by Concern Worldwide and comprised agricultural input provision, information dissemination, and social marketing, delivered through group meetings, home visits, and community events.

Methods

The primary objective of the evaluation was to assess the impact of RAIN intervention packages on nutrition outcomes among children aged 24-59 months. Secondary objectives were to assess impact on infant and young child feeding practices; on health and nutrition knowledge; on women's empowerment; and on household agricultural production. A hybrid design was adopted that combines a cluster randomized probability design of the two RAIN interventions, with a plausibility design that compares the intervention arms to a control group, yielding three study arms: 1) agriculture plus nutrition; 2) agriculture alone; and 3) control. Repeated cross-sectional household surveys and anthropometric measurements were administered at baseline 2011 (n= 3000households) and endline 2015 (n=3500 households). Primary analysis is by intent to treat, using difference-in-difference (DID) estimates to assess change between study arms and over time; sub group analyses are undertaken among confirmed RAIN participants, and among children whose age throughout the project would have allowed them to

participate for the full 1000 days from conception to age two.

Findings and interpretations

Overall, stunting reduced significantly from 2011-2015 in all three study arms ($p < 0.001$). In the intent to treat analysis among children 24-59m, stunting reduction in the two RAIN intervention arms (-12.3 pp for Ag-Nutrition, -13.7pp for Ag only) was smaller compared to control (-22 pp) ($p < 0.05$). There was no difference over time between the two intervention arms. Wasting increased in all three study arms over time ($p < 0.001$), but increased more in the control group (7.4 pp) compared to the two intervention arms (~3pp) ($p < 0.05$), suggesting a protective effect of interventions on wasting. Among confirmed RAIN participants, DID impact estimates on wasting remain significant, at 4.6pp in favour of the agriculture group, ($p < 0.05$). In the age group that had the most potential to benefit (24-48m), DID analysis showed no impacts on stunting or wasting over time between any of the study arms. The limited results realised by RAIN may be partly attributed to low coverage achieved by the program, with 35% of eligible households reporting participation in RAIN groups at endline, and home visits by frontline agriculture and health workers at around 50% and 10% respectively. Preliminary analyses indicate some positive impacts of RAIN on different dimensions of agricultural production, dietary diversity, and women's empowerment, and will be reported at the conference.

Funding statement:

This research was supported by the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) led by IFPRI, and Concern Worldwide through the Realigning Agriculture to Improve Nutrition (RAIN) project. The RAIN project receives funding from Irish Aid and the Kerry Group

NATIONAL INFORMATION PLATFORMS FOR NUTRITION: AN INTERNATIONAL INITIATIVE TO IMPROVE THE ANALYSIS OF EXISTING DATA TO UNDERSTAND HOW TO IMPROVE HUMAN NUTRITION

Perrine Geniez, Mélanie Broin, Milko Škofič and Andrew Hall

*Global Support Facility for National Information Platforms for Nutrition
c/o Agropolis International, 34394 Montpellier, France
geniez@agropolis.fr, nutrition expert*

While there is a growing need for more and better data to track improvements in human nutritional status towards national and international development goals, many countries have existing data that could be analysed in greater depth to help understand what has driven recent improvements, particularly the role of agriculture to prevent malnutrition among young children. The aim of National Information Platforms for Nutrition, which is an initiative of the European Union supported by the United Kingdom Department for International Development and the Bill and Melinda Gates Foundation, is to support seven countries initially to bring together all data available on important nutritional outcomes, such as stunted linear growth, wasting and anaemia, with data from all sectors that could be applied analytically to understand what factors have driven changes in prevalence or may have protected children from malnutrition. The potential

sectoral sources of data include: health, agriculture, livestock, fisheries, food prices, water, sanitation, social protection, population and the environment. The first five countries to start establishing platforms are Bangladesh, Ethiopia, Kenya, Niger and Laos. A Global Support Facility has been established by the Agrinatura Consortium at Agropolis International, and a group of experts has been constituted to provide technical advice.

The presentation will discuss some of the political and practical challenges experienced while setting up a NIPN in the first five countries to enable the platform to be multisectoral as well as objective and non-sectoral in its analytical approach, and will briefly describe the challenges for estimating the attributable impact of programmes and investments in agriculture to prevent malnutrition.

SESSION 2: AGRICULTURE AND SUSTAINABLE DIETS

Session Chair: Alan Dangour

SURVEILLANCE OF CLIMATE-SMART AGRICULTURE FOR NUTRITION (SCAN)

Todd S. Rosenstock^{1,2}, Christine Lamanna¹, Brian DeRenzi³, Suneetha Kadiyala⁴, and Sabrina Chesterman^{1, 5}

¹ World Agroforestry Centre (ICRAF), Nairobi, Kenya

² CGIAR Research Program on Climate Change, Agriculture and Food Security Nairobi, Kenya

³ University of Cape Town, Cape Town, South Africa

⁴ Leverhulme Centre for Integrated Research on Agriculture and Health, London, England

⁵ London School of Hygiene and Tropical Medicine, London, England

Initiatives to scale up ‘climate-smart agriculture’ (CSA) have the potential to affect change in food systems at scales meaningful to global nutrition and health. At this time, however, the efforts lack the means necessary to document outcomes and learn from that evidence. The IMMANA-funded *Surveillance of Climate-smart Agriculture for Nutrition (SCAN)* project aims to help establish the infrastructure needed to increase the spatial and temporal resolution of data available.

Specifically, we are evaluating alternatives for data collection via mobile devices, SMS and call centers, data aggregation from disparate sources, and data analytics and visualizations (eg, hypervolumes and instantaneous feedback to farmers). Through these activities, SCAN innovates across methods, partnerships, and metrics to increase the quantity and quality of data available and help improve development decisions and outcomes.

ADAPTATION TO CLIMATE CHANGE AND THE IMPACTS ON HOUSEHOLD FOOD SECURITY AMONG RURAL FARMERS IN UMZINYATHI DISTRICT MUNICIPALITY OF KWAZULU-NATAL, SOUTH AFRICA

Stephen Shisanya¹, Paramu Mafongoya²

¹*Food and Nutrition Security Consulting - Africa, South Africa*

²*University of KwaZulu-Natal, South Africa*

Introduction

Climate change is projected to increase with more frequent extreme weather events with regions such as South Asia and Africa expected to be particularly vulnerable (Aggarwal and Singh 2010). Individuals, households, communities and nations will make deliberate changes and respond to these multiple climate change pressures through a process of adaptation with the intention of minimising the impacts of such threats (Adger et. al. 2005). Smallholder and subsistence farmers are likely to suffer complex, localized impacts of climate change with a likelihood of experiencing negative effects of climate change agricultural productivity and hence household food security (Aggarwal and Singh 2010).

Methods

This study is based on a data set collected among 200 households of uMzinyathi District, South Africa and looks at adaptation and the impacts on household food security among smallholder farming community. Quantitative data was collected through a questionnaire while qualitative data was collected through asking open ended questions to focus groups and key informants on what they do to counter perceived changes in temperature and rainfall. Key informants helped to give a general picture of the community and a reflection on past climate risks. Data was collected on demographic characteristics and socio-economic conditions of family/households which included a review on yields and incomes of household's from both agricultural farming systems and non-farm activities. A conceptual framework (Adopted from IPCC

2007) is employed in the study to comprehensively capture household responses to the vulnerability components: exposure, sensitivity and adoptive capacity in the context of household farming systems and adaptation to climate change.

Findings and interpretations

The results showed that 95% of surveyed households were aware that climate is changing and that they are expecting negative impacts of climate change in future especially on their crop production systems. Household will undertake crop management and soil management practices to respond to the changing climate. 83% of households anticipate that they will alter their livelihoods systems to respond to climate change with 59% of households indicating that government grants will play an important role in their adaptation to climate change. Households assessed (97%) were found to be severely food insecure while 3% were moderately food insecure. Households were worried about the negative impacts of climate change which included droughts, floods and soil erosion. Households who were found to be vulnerable to climate change recorded high levels of food insecurity. Concerns over decline in prices of farm products, increase in cost of farming inputs and anxiety over occurrence of livestock diseases exacerbated household food insecurity. Rural farmers should be assisted with packages that can help them undertake effective adaptation mechanisms to climate change. Information will play a critical role in ensuring farmers can do what is within their means to address household food security in a changing climate.

SUSTAINABLE AND HEALTHY DIETS IN INDIA

Rosemary Green^{1,2}, James Milner¹, Edward Joy^{1,2}, Sutapa Agrawal³, Lukasz Aleksandrowicz^{1,2}, Sylvia Vetter⁴, Francesca Harris¹, Andy Haines¹, Alan Dangour^{1,2}

¹Faculty of Epidemiology and Population Health, London School of Hygiene & Tropical Medicine, Keppel Street, London, WC1E 7HT, UK;

²Leverhulme Centre for Integrative Research on Agriculture and Health, 36 Gordon Square, London WC1H 0PD;

³Public Health Foundation of India, New Delhi, India;

⁴School of Biological Sciences, University of Aberdeen, Aberdeen, AB24 2TZ, UK

Introduction

Diets affect the current and future health of populations while their production affects the environment with consequences for future food security. Thus, dietary changes have the potential to deliver health and environmental co-benefits (Green *et al.*, 2015; Milner *et al.*, 2015). The present study quantified health and environmental effects of typical dietary patterns in India where diets and environments are diverse and changing. Some of the food security challenges facing India include a rapidly growing and urbanising population, a dual burden of undernutrition and overweight and increasing water stress, particularly in areas of North West India.

Methods

Food consumption data were analysed for >7000 adults from the Indian Migration Study (IMS; Bowen *et al.*, 2011). Distinct dietary patterns were defined using finite mixture modelling. The health effects of dietary pattern membership were investigated using an epidemiological approach, controlling for possible confounders. Furthermore, the greenhouse gas (GHG) emissions and water footprints (WFs) of dietary patterns were estimated through matching of relevant production data for India (Mekonnen & Hoekstra, 2010). The potential to improve the nutrient profile of diets while minimising GHG emissions and WFs was quantified using linear optimisation models. Health impacts resulting from dietary changes were estimated using life tables.

Findings and interpretations

Five distinct, regionally-distributed dietary patterns were identified including rice- and wheat-based patterns. Average macronutrient profile of dietary patterns conformed to WHO guidelines. However, there was inadequate fruit and vegetable, iron and zinc consumption among some patterns and excessive sodium consumption in all patterns. Several dietary patterns were independently associated with risk factors for diabetes and hypertension.

Average GHG emissions associated with diets were 3.1 kg CO_{2eqv} *per capita per day* (~half that of UK). Average total WF (rainwater and groundwater) was 2884 L *per capita per day*. Rice-based diets had greater GHG emissions and total WFs due to paddy production during the rainy season. Wheat-based diets had greater blue WFs (groundwater only) due to reliance on irrigation during the dry season. Reduced blue WFs could be achieved through decreased consumption of wheat, sugar and animal products and increased consumption of pulses, potatoes and vegetables. Diets with up to 30% lower WFs may deliver reduced burden of cardiovascular disease and several cancers. This study is novel in quantifying the health and environmental implications of dietary patterns in India and optimising dietary choices for present and future food and nutrition security.

Acknowledgements: This study forms part of the Sustainable and Healthy Diets in India (SAHDI) project supported by the Wellcome Trust Our Planet, Our Health programme (Grant number 103932).

FOREST FOODS AND HEALTHY DIETS: QUANTIFYING THE CONTRIBUTIONS

Dominic Rowland^{1,2}, Amy Ickowitz², Bronwen Powell², Robert Nasi², Terry Sunderland².

¹*School of Oriental and African Studies (SOAS), United Kingdom;*

²*Center for International Forestry Research (CIFOR), Indonesia
dominic_rowland@soas.ac.uk, PhD candidate*

Keywords forests, diets, bushmeat, wild foods, wild edible plants

Introduction

Forested landscapes may be of great importance to the dietary quality of people living in proximity to forested areas. We investigate the dietary contributions of wild forest foods in smallholder dominated forested landscapes in 24 tropical countries. Using data from the Poverty and Environment Network (PEN) we estimate the contributions of forest foods to meeting dietary recommendations, compare quantities of forest-source plant and animal source foods consumed with national averages and compare the relative contributions of forest foods to smallholder agriculture.

Methods

We use data from the Poverty and Environment Network (PEN)¹, a collaborative research project led by the Centre for International Forestry Research (CIFOR). The PEN project was designed to investigate the relative contributions of agricultural, forest and non-forest environmental income and contains data collected on the quantities of forest products (including foods) used by households. The PEN surveyed forest and environmental resource use and income from 8,151 households in 333 villages living in, or adjacent to, forested landscapes in 58 sites across 25 tropical countries. Research sites were selected to represent “smallholder-dominated rural landscapes in which households have at least some degree of access to forest resources” Here we test the hypothesis that the consumption of forest foods can make important contributions to dietary quality. Drawing on data collected using a standardized methodology in 58 forest-adjacent communities in 25 countries across the tropics, we estimate the contributions that

micronutrient-rich forest-source foods make to meeting individual dietary recommendations, compare quantities of forest plant foods and animal source foods with national averages and compare the relative contributions of forest foods to smallholder agriculture.

Findings and interpretations

We identify four site level typologies of forest food use: forest food dependent, limited forest food use, forest food supplementation and specialist forest food consumers. For forest food dependent and specialist forest food sites, those engaged in the consumption of high quantities of forest foods obtain a large proportion of recommended fruits and vegetables and animal source foods from forests. For both limited forest food use and forest food supplementation sites however, the quantities being consumed likely make little contribution to nutrition, though, in the context of diets otherwise lacking in sources of micronutrients could be of importance.

We find some forest food consumers enjoy nutritional superior diets to their national counterparts, but this applies only to those households heavily engaged in the extraction and consumption of forest foods. For the average forest food user, the quantities micronutrient rich food groups consumed from forests are relatively low compared to national average consumption quantities of these food groups, but may be significant if supplemented by other sources.

If indeed forests substantially contribute to dietary quality in some areas, forest loss and land use change (including that driven by agricultural expansion) may result in unforeseen, adverse consequences on nutrition for local people.

SYNERGIES AND TRADE-OFFS FOR SUSTAINABLE AGRICULTURE: NUTRITIONAL YIELDS AND CLIMATE-RESILIENCE FOR CEREAL CROPS IN CENTRAL INDIA

Ruth DeFries¹, Pinki Mondal^{1,2}, Deepti Singh³, Ishan Agrawal⁴, Jessica Fanzo⁵,
Roseline Remans^{6,7}, Stephen Wood⁸

¹ Department of Ecology, Evolution and Environmental Biology, Columbia University, New York, USA

² Center for International Earth Science Information Network, Columbia University, New York, USA

³ Lamont-Doherty Earth Observatory, Columbia University, New York, USA

⁴ Foundation for Ecological Security, Mandla, Madhya Pradesh, India

⁵ Berman Institute of Bioethics, Johns Hopkins University, Maryland, USA

⁶ Agriculture and Food Security Center, Columbia University, New York, USA

⁷ Bioversity International, Addis Ababa, Ethiopia

⁸ School of Forestry and Environmental Studies, Yale University, Connecticut, USA

rremans@ei.columbia.edu; Associate Research Scientist

Keywords: sustainable agriculture, central India, climate resilience, nutritional yields, trade off analysis

Introduction

Sustainable agriculture has multiple and diverse goals. Society relies on agricultural systems to provide sufficient nutrients required in the human diet, and economic returns for farmers others who derive livelihoods from the food system. At the same time, sustainable agricultural systems aims to adapt to climate change and variability, reduce greenhouse gas emissions and environmental impacts of agrochemicals, and use land and water efficiently. While the concept of sustainable agriculture remains broad and ill-defined, policy-makers require pragmatic approaches to navigate trade-offs and synergies among these many objectives to guide decisions about agricultural investments. We illustrate an approach to examine trade-offs and synergies among these objectives for monsoon cereal crops in central India.

Methods

We use agricultural census data and nutritional content to estimate nutritional yields and examine the sensitivity of yields to monsoon rainfall and temperature. The metric of nutritional yield (DeFries et al., 2015) estimates, for a nutrient, the number of adults (average for male and female between 19 and 50 years old) who can fulfill 100% of their recommended dietary reference intake (DRI) from one hectare for one year. To quantify the sensitivities of yield to variability in precipitation and temperature, we construct individual mixed models for each of the monsoon cereal crops grown in the landscape: rice, sorghum, small millet, and maize. Response variables are yields reported for the

district for each year available from 2000 to 2012.

Predictor variables are total monsoon rainfall, mean seasonal temperature (either mean or mean maximum daily), soil type, and crop- and season-specific irrigation. To identify how cereal crops compare in terms of conventional yields (tonnes/ha), nutritional yields (adults who can obtain 100% DRI for each nutrient/ha) and climate sensitivities, we scale each attribute to values between 0 and 1.

Findings and interpretations

For the study settings of Central India, rice, the dominant crop in the region, is the least land efficient for providing iron and most sensitive to rainfall variability. Sorghum and maize provide high nutritional yields while small millet is most resilient to climate variability in this case. No single crop is superior for all objectives in this region. Instead, understanding which crops, or combination of crops, and crops and livestock, meet objectives for sustainable agriculture requires identifying region-specific priorities and empirical analysis that considers nutritional content, yields, and climate sensitivity among other factors. The analysis provides a pragmatic approach to quantify trade-offs and synergies among crops for disparate attributes for sustainable agriculture. Using a mainly subsistence and highly monsoon dependent study region in central India to examine monsoon cereal crops from 2000 to 2012, the approach illustrates the choices among crop types that decision makers – whether local farmers or national policy makers – need to confront.

SESSION 3: HEALTH IMPACTS OF ANIMAL SOURCED FOODS

Session Chair: Delia Grace

EXPLORING THE PATHWAYS BETWEEN ANIMAL HEALTH INTERVENTIONS AND CHILD NUTRITION IN TANZANIA: IS SYSTEM DYNAMICS A USEFUL TOOL?

Mieghan Bruce^{1,2}, Furaha Mramba³, Robyn Alders⁴, Julia de Bruyn⁴, Msafiri Kalloka³, Wende Maulaga³, Jonathan Rushton^{1,2}

1 Department of Production and Population Health, Royal Veterinary College, UK;

2 Leverhulme Centre for Integrated Research on Agriculture and Health, UK;

3 Tanzanian Veterinary Laboratory Agency, Ministry of Agriculture, Livestock and Fisheries Development, Tanzania;

4 Faculty of Veterinary Science and Charles Perkins Centre, University of Sydney, Australia

Contact: Mieghan Bruce, mbruce@rvc.ac.uk

Keywords: System dynamics, food system, pathway analyses, livestock health, child nutrition

Introduction

Animal-source foods are some of the best sources of high-quality protein and micronutrients needed for healthy physical and cognitive development, especially among children. Increasing intake of poultry, dairy and other livestock products can alleviate many of the nutritional deficiencies currently experienced in Africa. However, livestock contributions to health and nutrition are complex, due to the diverse biological and socioeconomic dimensions within food systems. The aim of this project is to explore the use of system dynamics modeling as a tool to investigate the different pathways from livestock production to child nutrition within smallholder households in Tanzania.

Methods

The study was conducted in two villages in Singida Region, central Tanzania. This study focuses on poultry and small ruminants, species that are closely integrated with other farming activities and with preventable diseases that are known to reduce productivity. The development of the system dynamics model was carried out in three overlapping phases. Firstly, a conceptual pathways model was developed during semi-structured interviews and focus group discussions that were conducted with members of households enrolled in the “Strengthening food and nutrition security through family poultry and crop integration in Tanzania and Zambia” (Nkuku4U) project. The conceptual model included livestock population dynamics, income and home-consumption pathways, as well as indicators for child nutrition within smallholder households. Secondly, to estimate the burden of gastrointestinal parasites in small ruminants, interviews were conducted and biological samples from sheep and goats were collected and analysed. Data from the

Nkuku4U project were integrated into the pathways model. Finally, the impact of livestock health on child nutrition was assessed using the system dynamics models, quantified by data from the second phase. Different animal health intervention scenarios were also simulated to evaluate the relative importance of the different pathways from livestock health to child nutrition.

Findings and interpretation

The inclusion of people’s knowledge and perceptions of systems is critical to ensure the model is applicable to the relevant animal health intervention being proposed. The focus group discussions with participating families proved invaluable for contextualizing the pathways from livestock interventions to child nutrition, specific for the social and ecological conditions in this region of central Tanzania. However, there are broader environmental and social factors that have not been included in the model, which limited the results. For example, Newcastle disease vaccination in poultry flocks will decrease mortality, thereby increasing the flock size and in turn, increasing the amount of food required to maintain the flock. Including data on the scavengeable feed resource base available for livestock will improve the ability of the model to capture nuances in the evolution of poultry populations. Future iterations of the system dynamics model should also be extended to provide intermediary indices for the multiple indirect pathways such as intrahousehold dynamics. Despite these limitations, the models developed and simulated in this study demonstrate proof-of-concept for the utility of system dynamics in the evaluation of the complex linkages between animal health interventions and child nutrition.

WOMEN'S ENGAGEMENT IN LIVESTOCK INTERVENTIONS: IMPLICATIONS FOR WOMEN'S EMPOWERMENT AND MATERNAL AND CHILD NUTRITION

Amy Webb

*Emory University
Rollins School of Public Health
Hubert Department of Global Health, Atlanta, USA
awebb3@emory.edu, Assistant Professor*

Greater women's empowerment has been associated with improved maternal and child nutrition (MCN). There is growing interest in agricultural strategies to enhance women's empowerment and accelerate progress in MCN. Livestock focused agricultural strategies that target increased production and consumption of animal source foods by women and children may offer an especially powerful strategy given that ASF, specifically milk, eggs, fish, and meat, are rich in the bioavailable micronutrients, growth factors and protein needed to meet the elevated nutrient needs of

pregnancy, lactation, and early child growth and development.

In the context of three ongoing livestock-focused value chain projects in Kenya, Ethiopia and Tanzania, we are using mixed methods to identify the domains of women's empowerment relevant for MCN in the context of livestock-focused agriculture, refine indices for measuring women's empowerment and characterize ASF availability and consumption patterns among women and children. In this presentation we provide an overview of the methodological approach and preliminary findings.

MILK CONSUMPTION, NUTRITION AND HEALTH IN SOUTHERN ETHIOPIA

Bekele Megersa

Faculty of Veterinary Medicine, Hawassa University

Summary

Pastoralist households in Ethiopia and elsewhere keep multiple livestock species and livelihood strategies to address their diverse needs and environmental constraints. Maintaining adequate milk consumption especially for children is a major challenge, as households have few other sources of the nutrients needed for healthy growth and cognitive development, and milk is increasingly sold in exchange for lower-cost cereal grains. This study uses a case study in the Borana region of Ethiopia to develop improved diet diversity measures for these settings, where standard food-frequency questionnaires may miss the many ways in which animal source foods are consumed. This new

food-frequency measure will then be used to test links between milk consumption and children's growth and health status. A secondary aim is to calculate the exchange values of milk sold for grain in terms of nutritional value, to determine whether pastoralist households are improving or worsening their nutrient intake by trading one for the other. The validated diet diversity score could be applicable to other pastoralist communities across Africa, and our focus on nutrient exchange ratios can be used in other settings to measure the contribution of market activity to nutritional adequacy.

IS EXPOSURE TO ANIMAL FECES HARMFUL TO CHILD NUTRITION AND HEALTH OUTCOMES? OBSERVATIONAL EVIDENCE FROM FOUR RURAL SURVEYS

Derek Headey¹, Kalle Hirvonen², Alive & Thrive Research Team¹

¹The International Food Policy Research Institute (IFPRI), USA;

²The International Food Policy Research Institute (IFPRI), Ethiopia;

d.headey@cgiar.org, Senior Research Fellow

Keywords: Sanitation; hygiene; livestock; animal faeces; child nutrition; child morbidity

Introduction

In developing countries livestock ownership is considered essential for increasing availability and access to nutrient-rich animal-sourced foods.¹ However, it has also been posited that animal exposure may be a significant risk factor for childhood morbidity, including diarrhea² and environmental enteric disorder,³ both of which may significantly contribute to child stunting. However, none of the research thus far has used large socio-economic or nutrition survey to test whether close exposure to animals or their feces is adversely associated with child anthropometry or morbidity symptoms in large samples and diverse settings.

Methods

This study uses four recent surveys from three countries to test whether exposure to animals or animal feces is associated with reductions in height-for-age or weight-for-height z scores. Three large nutrition surveys conducted in rural areas of Ethiopia, Bangladesh and Vietnam (from the Alive and Thrive Study) utilized hygiene spot checks, which includes checks for the presence of animal feces in the compound, as well as other dimensions of child, maternal and household hygiene. In addition an agricultural survey from rural Ethiopia (from the Feed the Future project) included questions on whether different types of livestock were kept in the main homestead dwelling overnight. All four surveys included questions on child dietary diversity that were used to construct indicators of animal sourced food consumption, as well as indicators of household socioeconomic status, maternal education, household demographics, sanitation and water quality and livestock ownership. Adjusted and unadjusted least

squares regressions were used to test whether the presence of animal feces in the compound, or the presence of animals in the homestead dwelling overnight, were associated with HAZ or WHZ outcomes, controlling for the confounding factors described above.

Findings and interpretations

In the Alive and Thrive Surveys animal feces were visible in 38-42% of household compounds across the three countries. In all surveys approximately two-thirds of households owned poultry. Ownership of any type of livestock was particularly high in Ethiopia (around 90%) and about half of poultry-owning households in Ethiopia kept their animals indoors overnight close to where children sleep. Regression models for children 6-24 months of age indicate that the presence of animal feces is robustly and negatively associated with child HAZ in the Ethiopian and Bangladesh Alive and Thrive Surveys, whilst keeping poultry indoors is associated with lower HAZ scores in the Ethiopia Feed the Future survey. There were no significant associations in Vietnam for the adjusted HAZ or WHZ models, nor was keeping non-poultry animals indoors associated with worse nutrition outcomes in Ethiopia. Hence in three of the four surveys analyzed we find significant associations between HAZ scores and observed animal feces, or keeping animals indoors near where children sleep. This evidence suggests that exposure to livestock and their feces poses significant risks for child growth outcomes, and that WASH programs need to focus more attention on reducing exposure to all excreta, human and animal.

ECONOMIC COSTS OF AFLATOXINS IN KENYAN DAIRY VALUE CHAIN

Senerwa DM^{1,2}, Sirma AJ¹, Mtimet N¹, Nzuma J², Kangethe EK², Lindahl JF^{1,3}, and Grace D¹

¹ International Livestock research Institute, P.O.Box 30709-00100, Nairobi, Kenya;

² University of Nairobi, P.O.Box 29053-00625, Nairobi;

³ Swedish University of Agricultural Sciences, Department of Clinical Sciences, P.O.Box 7054, SE-750 07, Uppsala, Sweden
dsenerwa@gmail.com, Lecturer

Keywords: Aflatoxins, Costs, Milk, feeds, Kenya

Introduction

Mycotoxin producing fungi contaminate feeds pre- or post harvest and produce aflatoxins B1, B2, G1 and G2. Aflatoxin B1 is a class 1 human carcinogen and is converted to aflatoxin M1 by cows and secreted in milk. Aflatoxin M1 is a class 2B (possible) carcinogen and is associated with stunting in children. Aflatoxin B1 in feeds causes a decrease in milk production, reduced feed conversion efficiency and reduced fertility. A cross-sectional study to assess the economic costs of aflatoxins was done in five counties in Kenya.

Methods

A map of the five agro-ecological zones of Kenya was used to select the study sites: Kisii and Bungoma (temperate), Tharaka-Nithi (humid), Kwale (sub-humid), and Isiolo (semi-arid). One sublocation was randomly selected from each county. Multistage cluster sampling was done with sub-locations, then villages, then dairy farmers (Dohoo et al., 2012). Milk samples were collected from the dairy farmers. Feed samples were collected from the dairy farmers, feed traders and feed manufacturers. Aflatoxin B1 and M1 quantification in dairy feeds and milk was done using a competitive ELISA. Possible economic costs of aflatoxins were estimated using annual quantities/market prices of

feeds and milk having aflatoxin B1 or M1 respectively above the WHO/FAO standards.

Findings and interpretations

Sixty two of 101 (61.4%) dairy feed samples from feed manufacturers had aflatoxin B1 levels above the FAO/WHO/Kenya limit of 5 ppb. If this Kenyan legislation would be enforced, the possible economic cost per year for dairy feed manufacturers would be 22.2 billion US\$. Seventeen of 118 (14.4%) dairy feed samples from farmers had aflatoxin B1 levels above 120 ppb. Aflatoxin B1 concentrations above 120 ppb in dairy feeds has been shown to cause a 25 % drop in milk production (Guthrie and Bedell, 1979). The annual cost for farmers in Kenya feeding their cows on dairy feeds with aflatoxin B1 above 120 ppb is estimated at 37.4 million US\$. Of the 283 milk samples from the five counties, 10.3% had aflatoxin B1 levels above WHO/FAO limit of 50ppb which would cost dairy farmers 113.4 million US \$ per year, if legislation was enforced. Education of farmers, feed manufacturers and traders on good agricultural and feed storage practises could reduce the level of contamination and multiplication of aflatoxin producing fungi and increase profits for the dairy farmers.

ANIMAL HEALTH MANAGEMENT IN AQUACULTURE AND POULTRY SYSTEMS IN BANGLADESH: A DECISION-MAKING PERSPECTIVE

Maria Garza¹, Chadag Vishnumurthy Mohan², Meezanur Rahman³, Barbara Wieland⁴, Barbara Häsler^{1,5}

¹Royal Veterinary College, UK;

²WorldFish Centre, Jalan Batu Maung, Penang, Malaysia

³WorldFish, Bangladesh and South Asia Office, Banani, Dhaka, Bangladesh

⁴International Livestock Research Institute, Addis Ababa, Ethiopia

⁵Leverhulme Centre for Integrative Research on Agriculture and Health

mgarza3@rvc.ac.uk, Research assistant

Keywords: Aquaculture, poultry, socio-economic impact, infectious diseases, decision-making

Introduction: The aquaculture and poultry sectors in Bangladesh are a significant employer, contribute around 6% to the total Gross Domestic Product and are critical for food security, as fish followed by poultry products represent the most important protein and micronutrients source in the diets [1]–[3]. A rise in demand for these products is predicted due to population growth [4]. However, infectious animal diseases and poor animal health systems governance constitute important barriers for the development of safe and sustainable production systems [2], [5]. This study aimed to understand the decision making environment for animal health management to identify potential constraints for animal disease control.

Methods: A total of 28 semi-structured questionnaire-based interviews with decision makers in different capacities, from private and public institutions as well as NGOs from the aquaculture and poultry sectors were conducted. They were used to explore the following topics: (i) decision pathways for investments in animal health, (ii) key decision-criteria used to make investments into animal health (e.g. legal requirements, trade expectations, cost-benefit measure, zoonotic impact), (iii) consideration of the value of a production system in decision-making, (iv) consideration of disease impact analysis of a production system in decision-making, (v) constraints in decision-making and (vi) information gaps to improve methodology.

Conversations were recorded, transcribed and the results analysed based on the framework method [6], [7], which allows the development of themes obtained inductively by experiences and opinions of participants and deductively based on reviewed literature. Transcripts were analysed and coded by describing the content and ideas as well as by adding key notes about the context, interviewee tone, and linkages identified.

Next, themes were identified following the sections of the questionnaire. Moreover, other recurrent themes that emerged were also described. Finally, data were charted and summarised for interpretation with the aim to understand the decision-making environment and elaborate recommendations.

Findings and interpretations: A multitude of public and private institutions were found to take decisions on animal health management; e.g. government extension activities, private service provision, implementation support by international organisations, and research. Similar structures were described in both sectors, but they differed in complexity and level of formality.

Interviews identified substantial constraints to decision-making; the most prominent being insufficient resources to investigate and tackle infectious animal diseases. In aquaculture, a dearth of legislation and capacity for disease surveillance was described – except for compliance with export requirements. In contrast, a major driver for animal health management in poultry were public health and socio-economic impacts caused by avian influenza. In both sectors, decision-makers rarely relied on impact studies and prioritised problem-solving on anecdotal evidence or so-called “common knowledge”. Formal decision-making processes were absent or claimed to be of internal use. Particularly in aquaculture, disease response was often found to be ad hoc due to a lack of reliable prevalence data; no respondent reported objective decision processes considering multiple criteria. In addition, communication among stakeholders, particularly between private and research stakeholders was reported to be weak. The findings highlight differences between sectors, identify possibilities for improved decision-making and a need to invest in evidence-based approaches.

IMPACTS OF SMALLHOLDER-FARMERS' PARTICIPATION IN DAIRY VALUE CHAIN ON FOOD AND NUTRITION SECURITY IN ETHIOPIA: USING MULTIPLE FOOD ACCESS MEASUREMENTS

Geday A. Elias¹, Montaigne Etienne ², Padilla Martine³, Tolossa Degefa⁴

^{1,2}MOISA, Sup-Agro Montpellier, France;

³CIHEAM Montpellier, France;

⁴College of development studies, Addis Ababa University, Ethiopia

eliasab54@gmail.com OR elias.geday@supagro.inra.fr - PhD Candidate

Keywords: food security, impacts, milk value chain, nutrition, smallholder farmer.

Introduction:

While linking smallholder farmer to dairy value chain industry identifies as a potential pathway to get out of poverty trap by raising incomes and by increasing the availability of nutrient-dense foods in Sub Saharan African countries, much less is known about the impact of smallholder participation in dairy value chain on household food security and nutrition. We analyze impacts of smallholder participation in formal milk value chain on farm household income, food and nutrition security with survey data from Ethiopia.

Methods:

We used cross-sectional data from two districts of dairy farm households, in a mixed farming system of Ethiopian highlands. The data collected using semi-structured interview with 333 randomly selected smallholder farm households and Focus Group Discussion (4FGDs). Chi-square test and T-test analyses were performed to examine the difference of food security and nutritional status between participated and non participated households. To assess households' access to food and nutrition security outcomes, we employed multiple measurements such as per capita dietary energy supply, household dietary diversity, food consumption Score, household food insecurity access scale, months of household food provisioning score and

household income. We used propensity score matching model to analyze impact pathways.

Findings and interpretations:

Of the total 333 sampled households, only 34.5% of smallholder farmers are participated in the milk value chain. The results show that as compared to households without participation, households with participation had higher dietary energy supply, dietary diversity, farm and household income. Similarly participated households had better resilience capacity in coping to food insecurity problem than non participated households. However, there was a negative association between participation in the milk value chain and level of milk consumption. We found that smallholder farmer participation in milk value chain had a positive effect on food sufficiency, dietary quality, income and coping capacity to food insecurity in significant way. This study, therefore, confirms the potential role of smallholder farmers' participation in agrifood value chain to get out of poverty trap through improving rural household income, food security and nutrition. In addition to promoting pro-smallholder dairy value chain through up scaling farmers' group cooperatives; awareness on the importance of dairy product consumption should further be promoted among rural people.

A GOVERNANCE ASSESSMENT OF NAIROBI'S POULTRY MEAT VALUE CHAINS: UNDERSTANDING A TRANSITIONING URBAN FOOD ENVIRONMENT

Maud Carron^{1,2}, Pablo Alarcon^{1,2}, Barbara Häsler^{1,2}, Eric Fèvre^{3,4}, Maurice Karani³, Patrick Muinde³, James Akoko³, Joshua Onono⁵, Jonathan Rushton^{1,2}

¹Royal Veterinary College (RVC), UK;

²Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH), UK;

³International Livestock Research Institute (ILRI), Kenya;

⁴University of Liverpool, UK;

⁵University of Nairobi, Kenya

mcarron@rvc.ac.uk PhD candidate RVC

Keywords: chicken, value chain, food system, governance, Nairobi

Introduction

Research on livestock food systems in developing countries remains limited, yet these systems are rapidly evolving and shape the food environment of consumers and people involved in the production continuum, at local and national levels. The aim of this study was to use a value chain framework to perform a governance assessment of Nairobi's poultry meat system, thus identifying corresponding determinants and drivers of this dynamic urban food environment.

Methods

Livestock value chain analyses in Africa are few and focus mainly on the marketing continuum. Using a value chain analysis framework allows for a greater scope of analysis, linking product flows and socio-economic determinants of the food system. Data collection involved 18 focus group discussions and 236 interviews with various poultry meat value chain stakeholders in Nairobi. Analysis included chain mapping and identification of governance themes. The study identified 10 chain profiles, characterising the broiler and indigenous chicken systems. For each profile, a distinct set of product flows, institutional context characteristics, barriers to business, power relationships between groups involved, as well as information flows, were identified and recorded in templates. The potential effect of each governance theme on the chicken and meat flows was considered, allowing for the identification of drivers affecting the accessibility, availability and affordability of poultry protein.

Findings and interpretations

Nairobi's chicken meat system, a transitioning urban food environment, is divided into a local chicken and a commercial broiler production component. Local chickens are culturally important and regarded as delicacies for festivities, while broiler meat represents the desired new source of income and cheaper source of poultry protein. Prohibitive feed prices for broilers combined to a lack of government support, limit this growing source of business to seasonal production. Accessibility, availability and affordability of broiler meat for consumers is highly dependent on a few power groups within the system who control market information and set prices, namely the brokers and large integrated broiler companies. Few producer associations were reported, thus limiting farmers' empowerment in terms of market access. Very minimal governmental oversight was documented in most chains, with the exception of the large broiler companies. The importance of informal chains in Nairobi was associated to irregular access to meat and asymmetrical distribution of food safety risks and nutritional benefits. For example, low value parts (intestines, head and feet) of broiler production facilities were reported to be sold to consumers in informal settlements in poor sanitary conditions. The study highlighted the effects of governance structure on chicken meat supply.

SESSION 4: WOMEN, HOUSEHOLDS AND NUTRITION

Session chair: Suneeth Kadiyala

WOMEN'S TIME USE, AGRICULTURE AND NUTRITION IN ZAMBIA

Cynthia Runyararo Matare

Cornell University

Summary

Child feeding and care practices are constrained by other maternal obligations, such as agricultural production, obtaining water and fuelwood, cooking and cleaning and other household activities. Women's time use has been difficult to measure due to its variation from day to day, as well as location-specific differences in how time allocation is conducted and described. This study will use two rounds of focus group interviews

among a diverse sample of mothers with infants and young children in the Lundazi and Chadiza districts of Zambia to generate a stylized time allocation instrument, whose results will then be validated by direct observation of time use for a subsample of participants. The validated time allocation survey instrument will then be available for use across Zambia, while this approach to generating location-specific questionnaires can be replicated elsewhere.

THE WOMEN'S EMPOWERMENT IN NUTRITION INDEX (WENI): MEASURING NUTRITIONAL EMPOWERMENT TO BETTER LINK AGRICULTURE TO NUTRITION

Sudha Narayanan

*Indira Gandhi Institute of Development Research (IGIDR), Mumbai
sudha@igidr.ac.in*

Abstract

In this project, we ask: When does empowerment in the agricultural realm translate into empowerment in the nutritional realm? We further ask if women who are empowered to make agricultural decisions are also empowered to make optimal nutrition decisions in ways that enhance or protect their own nutritional status and the status of others? Moreover, we ask whether and to what extent nutritional social norms and cultural practices facilitate or limit this translation? We propose to address these questions by developing a new index, the Women's Empowerment in Nutrition Index (WENI),

a robust metric that will aggregate factors that reflect nutritional empowerment across rural agricultural contexts. We conceptualize the notion of nutritional empowerment as the capacity for a woman, and not just her children, to be well fed and healthy; to have a meaningful say in household nutritional practices; and to receive support in implementing them. WENI will thus provide crucial insights in nutritional empowerment's role in mediating the pathway between agriculture and nutritional outcomes. In the presentation, we share insights from formative research in three sites Bangladesh and India (Odisha and Bihar).

INTRA-HOUSEHOLD ALLOCATION AND CHILD-NUTRITION IN BIHAR, INDIA

Nitya Mittal

Department of Economics, Columbia University

Summary

The foods allocated to children in agricultural households are often nutritionally inadequate, reflecting complex patterns of age and sex discrimination associated with gender roles and other aspects of intra-household relationships. This study uses an original 24-hour recall survey of individual intake combined with data on a variety of individual and household attributes in Bihar, to test for variation in allocation of dietary energy and specific nutrients to children in diverse circumstances. The primary aim of the study is to test for differences in the allocation of

dietary energy as opposed to micronutrients among children, hypothesizing that while energy is allocated to working adults, micronutrients may be differentially allocated to children. A secondary aim is to use the 24-hour recall data to validate results from two less costly approaches, namely monthly consumption expenditures and food-frequency measures. Findings from both aims will guide the measurement of nutritional adequacy in households where individual intake may differ significantly from the household's per-capita average.

IS WOMEN'S EMPOWERMENT A PATHWAY TO IMPROVING CHILD HEALTH OUTCOMES IN AN INTEGRATED AGRICULTURE AND NUTRITION PROGRAM? EVIDENCE FROM A RANDOMIZED CONTROL TRIAL IN BURKINA FASO

Jessica Heckert¹, Deanna K. Olney¹, & Marie T. Ruel¹

¹International Food Policy Research Institute, United States of America
J.Heckert@cgiar.org, Associate Research Fellow

Keywords: women's empowerment, child nutrition, causal mediation, homestead food production, Burkina Faso

Introduction: Integrated agriculture, nutrition, and health programs often target women beneficiaries because of women's potential to improve children's access to food and healthcare. Empirical evidence links women's empowerment to improved child health; however, conclusions are drawn primarily from cross-sectional data (1,2). Herein we further disentangle the relationship between women's empowerment and child health using data from the Enhanced Homestead Food Production (E-HFP) intervention, which was designed and implemented by Helen Keller International in Burkina Faso. It targeted mothers of 3- to 12-month-olds at enrollment, facilitated small-scale agriculture among women, and encouraged optimal nutrition and health practices via behavior change communication.

Methods: E-HFP was evaluated with a cluster randomized control trial. A household panel survey, which included anthropometric and hemoglobin measures, was used to collect data at baseline (February-May 2010) and after two years of program exposure (February-June 2012). The analytic sample ranged from 933 to 1098 and was limited to women who reported living with a spouse.

In cross-sectional analyses we used multivariate logistic regression to predict anaemic, stunted, underweight, and wasted. We separately included 4 domains of women's empowerment (purchasing decisions, healthcare decisions, family planning decisions, and spousal communication) while controlling for a range of confounding variables. To test if resource availability moderates the relationship between women's empowerment and child health we then included an interaction between empowerment and household resources.

Previous work found E-HFP had a positive impact on women's empowerment and child health (4,5).

Capitalizing on the panel design, we used causal

mediation with structural equation models to test whether changes in women's empowerment partially mediated the program impact on reducing wasting and anemia and calculated the proportion of the program impact that could be attributed to improved women's empowerment (indirect effect) (6,7). Models used full information maximum likelihood and accounted for clustering at the village level.

Findings and interpretations: In cross-sectional analyses, the relationship between women's empowerment and undernutrition was significantly moderated by resources availability. Higher empowerment and ownership of resources was associated with lower odds of undernutrition, whereas in the absence of household resources, decision making was not associated with better child health. This was observed across a number of outcomes, for example, when purchasing decisions predicted wasted ($B_{emp}=0.004$, $p=ns$; $B_{rec}=0.323$, $p<0.10$; $B_{inter}=-0.065$, $p<0.05$) among 3-5 month olds in 2010 and when healthcare decisions predicted stunted ($B_{emp}=-0.029$, $p=ns$; $B_{rec}=0.049$, $p=ns$; $B_{inter}=-0.114$, $p<0.05$) for 27 to 36 month olds in 2012. Causal mediation analysis revealed that indirect effects, operating through women's empowerment were responsible for a significant portion (-1.4 percentage points, $p<0.05$) of the overall program impact (-9.2 percentage points, $p<0.05$) on the decline in wasting among children aged 3-12 months at baseline. The program impacts on reducing anemia were not attributable to increases in women's empowerment. Findings suggest that empowerment helps women leverage available resources and implement optimal nutrition and health practices. Interventions that aim to improve child health should incorporate aspects that empower women. Additionally, empowering women will yield better outcomes if done so in the context of programs that also increase the availability of resources

WOMEN'S POSITION, BIRTH ORDER AND CHILD NUTRITIONAL STATUS IN ETHIOPIA

Hilde Bras¹, Jornt Mandemakers¹

¹Wageningen University and Research Centre, Sociology of Consumption and Households group, Department of Social Sciences, The Netherlands

hilde.bras@wur.nl, full professor

Keywords: women's position; empowerment; birth order; gender; child nutritional status

Introduction

Women's position is seen as key to improved child nutrition (Asian Development Bank 2013; Unicef 2011; Christiaensen & Alderman 2004; Smith et al. 2002; Sen 1989). However, in many cultures child nutritional status also varies according to gender and birth order because of specific food distribution patterns, care giving practices, and access to formal health care (Garenne 2003; Horton 1988; Behrman 1988). Whereas female empowerment may be expected to increase household resources for children, it is unclear whether it also compensates the nutrition security of the worst-off children in the household (Fledderjohan et al. 2014). Does having a more empowered mother straighten sibling inequalities in nutritional status?

Methods

We base our analysis on the 2011/12 and 2013/14 waves of the Ethiopian Rural Socioeconomic Survey (ERSS). We used the 2,486 households (out of 5,881 participating households) that had information on at least one child aged five and younger. Children's nutritional status was assessed by means of four WHO reference population standardized measures for children aged 6 months until 5 years: height-for age (stunting) ($N=4,732$), weight-for-age (underweight) ($N=5,075$), bmi for age ($N=4,745$), and weight-for-height (wasting) ($N=4,751$). Nutritional status in Ethiopia has improved over the last decades (Tesfai, Adugna, & Nagothu 2015), in the ERSS data still 41% of under-fives were stunted, 26% underweight and 11% wasted. Mother's educational level and spousal age gap were used as indicators for women's position. A child's position was defined by gender and birth order (first born versus other parities) and their interaction (first

born x male). The data were analyzed with fixed effects models to control for all observed and unobserved family-specific characteristics. We thus focus on within-family (between sibling) differences. We included interactions with maternal characteristics to examine whether sibling differences in nutritional status depend on maternal characteristics. Standard errors were adjusted for clustering of observations in mothers and children.

Findings and interpretations

Preliminary analyses showed that children with better educated mothers had significantly better nutritional outcomes (e.g.: 44% stunted for illiterate mothers compared to 24% for mothers with some tertiary education), no differences were found by spousal age gap. While earlier studies on Ethiopia reported earlier-born children and girls to be more nutrition secure (Hadley et al. 2008; Mekonnen et al. 2005; Collin 2006; Vosti & Witcover 1993), the ERSS data, in contrast, reveal that especially girls had a considerable disadvantage for all four outcomes compared to boys (figure 1). Especially firstborn girls fared worse for height-for-age and weight-for-age. Analyses including interactions with mother's education for height-for-age and weight-for-age show there is indeed compensation within the sibling set when the mother is better educated; maternal education decreases the boy-advantage, and the firstborn-girl disadvantage (figure 2). Our findings show that mother's position not only improves nutritional status in general, which has been found before, but that empowerment also straightens out long lasting sibling inequalities, particularly ameliorating the health position of girls in households.

HOUSEHOLD FOOD INSECURITY ASSOCIATED WITH CHILD DEVELOPMENT IN A RURAL KENYAN COMMUNITY ON LAKE VICTORIA

Erin Milner¹, Kathryn Fiorella², Matthew Hickey³, Charles Salmen³, Dan Omollo⁴, Brian Mattah⁴, Richard Magerenge⁴, Justin Brashares⁵, Lia H.C. Fernald¹

¹School of Public Health, University of California Berkeley, USA;

²Atkinson Center for a Sustainable Future, Cornell University, USA;

³School of Medicine, University of California San Francisco, USA;

⁴Organic Health Response, Kenya;

⁵ Environmental Science, Policy and Management, University of California Berkeley, USA

emmilner@berkeley.edu, PhD Candidate

Keywords: food insecurity, child development, livelihoods, nutrition

Introduction: Despite having food resources available, millions of people around Lake Victoria remain food insecure (1). The association between food insecurity and child development is understudied, particularly in developing countries and early childhood. Over 200 million children are not meeting their developmental potential and Sub-Saharan Africa has the highest percentage of disadvantaged children (2). Lake Victoria's fishery is declining (3), threatening livelihoods and food insecurity (4). Fishery involvement and agriculture determine food security in the area (3). In this study we test: 1) whether food insecurity is associated with child development and 2) whether diets and growth mediate the pathway.

Methods: Panel data was collected from 300 rural households with children under two years on Mfangano Island in the Kenyan part of Lake Victoria. Broadly representative of the region, the island is vulnerable to changes in the lake as most inhabitants rely on fish for consumption and income alongside agricultural livelihoods. Households were visited nine times every three months from 2012-2014. The Ages and Stages Questionnaire [ASQ] Gross Motor, Personal-Social, and Communication subscales were used to measure child development (5). Household food insecurity was assessed using the Household Food Insecurity Access Scale [HFIAS], and a scale of chronic household food insecurity was created (6). A 24-hour recall was administered to calculate children's dietary intake and anthropometric measurements (length/height and weight) were taken on all children. Linear multivariate regressions using Generalized Estimating Equations models were used to test associations between chronic household food insecurity and ASQ subscales. Regression models controlled for child, maternal, and household characteristics. For associations found to be statistically significant, we tested whether child dietary

intake and/or stunting, wasting, and underweight status mediate the pathway between chronic household food insecurity and child development outcomes. Path analyses were conducted with mediators, controlling for potential child, maternal, and household confounders.

Findings and interpretations: Results indicate that chronic household food insecurity was associated with ASQ scores. Performance on the Gross Motor subscale was most strongly associated with chronic household food insecurity ($\beta=-0.044$, 95% CI: -0.068 to -0.020, $p=0.004$). Stunting was significantly associated with gross motor ($\beta=-0.28$, 95% CI: -0.40 to -0.16, $p<0.0001$), personal-social ($\beta=-0.15$, 95% CI: -0.27 to -0.031, $p=0.014$), and communication scores ($\beta=-0.19$, 95% CI: -0.30 to -0.067, $p=0.002$). Underweight was also significantly associated with gross motor scores ($\beta=-0.30$, 95% CI: -0.51 to -0.085, $p=0.006$). Mediation analyses suggest that some of the association between chronic household food insecurity and child development was explained by anthropometry (length/height-for-age). Children's diets in terms of caloric and macronutrient intake were not found to mediate the pathway. In the context of rural communities around Lake Victoria, chronic household food insecurity is a contributor to poor gross motor development. Child stunting and underweight lie on the pathway between chronic household food insecurity and gross motor development. Thus, improving child development, particularly in households with children under two years during the most vulnerable growth period requires programs and policies that address chronic food insecurity. Approaches focused on building resilience to fishery changes and engaging in sustainable livelihood practices will be important in these subsistence-based communities

SEASONAL CHANGES IN THE PREVALENCE OF FOOD INSECURITY AMONG RURAL HOUSEHOLDS IN EAST ETHIOPIA: A LONGITUDINAL PANEL STUDY.

Gudina Egata¹, Yemane Berhane², Alemayehu Worku³

¹ PhD, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia, , e-mail: gudina_egata@yahoo.com, Lecturer and researcher and post-graduate program coordinator at College of Health and Medical Sciences,

² Professor, Director, Addis Continental Institute of public Health, Addis Ababa, Ethiopia.

³ Professor, School of Public Health, Addis Ababa University, Addis Ababa, Ethiopia.

Key words: Ethiopia, Household Food Insecurity, Kersa, Longitudinal Panel study.

Introduction

Food insecurity has become a major public health problem affecting the general population worldwide. However, little has been known about seasonal variation in the prevalence of household food insecurity and its correlates in low-income countries like Ethiopia using advanced analysis to design time – oriented interventions. The aim of this study was to assess the seasonal changes in the prevalence of food insecurity and its correlates in the wet and dry seasons among rural households in east Ethiopia.

Methods

A longitudinal panel study was conducted from August, 2011 to February, 2012 among mothers in rural and semi-urban households in east rural Ethiopia. Data were collected from 2,132 randomly selected households. Odds ratio along with 95% confidence interval was estimated to identify predictors of household food insecurity using a conditional fixed- effects logistic regression analysis.

Findings and interpretations

Nearly 45% [44.56 %, 95% CI: (42.45%, 46.67%)] and 21.2 %, [95% CI: (19.4%, 22.9 %)] of the households were food insecure in the wet and dry season, respectively. Food insecurity was positively associated with paternal occupation (being non-farmer) [AOR (95% CI) = 2.9 (1.8, 4.6)]. In contrast, being in the middle [AOR (95% CI) = 0.50 (0.37 , 0.68)] and higher [AOR (95% CI) = 0.32 (0.24 , 0.44)] household's socio - economic positions and dry season [AOR (95% CI) = 0.38(0.29 , 0.52)] had protective effect against food insecurity.

In conclusion, food insecurity was more common in wet season and associated with basic household factors. Season - oriented food security interventions should be designed to enable the poor rural households have access to adequate food and achieve desired Millennium Development Goals in low – income countries including Ethiopia.

ENHANCING THE CONTRIBUTION OF LEGUMES AND SMALL GRAINS TO HOUSEHOLD NUTRITION SECURITY AMONG SMALLHOLDER WOMEN FARMERS OF ZIMBABWE

Florence Mtambanengwe¹, Paul Mapfumo; Hatirarami Nezomba, Grace Manzeke, Maud Muchuweti²

¹Soil Fertility Consortium for Southern Africa, Department of Soil Science & Agricultural Engineering, University of Zimbabwe, P.O. Box MP 167, Mount Pleasant, Harare, ZIMBABWE;

²Faculty of Science, University of Zimbabwe, P.O. Box MP 167, Mount Pleasant, Harare, ZIMBABWE

fmtamba@gmail.com Associate Professor

Key words: Grain legumes; Learning alliances; Learning Centre; Participatory action research; Small grains

Introduction

In a typical Zimbabwean smallholder farming system, women often play a critical role in conserving wide ranging germplasm of legumes and small grain cereals (Mapfumo *et al.* 2001), which are known sources of protein, iron, zinc and calcium essential for human nutrition. However, information about processing and use of these crops is often not shared. This study hypothesizes that development of different dietary preparations by women farmers will enhance uptake of small grain cereals and legumes as entry points for climate change adaptation. This paper reports preliminary findings of the initial stages of a women farmer learning alliance around legume and small grain production.

Methods

The study was conducted in Hwedza smallholder farming area (18° 41'S:31°42' E) 150 km, southeast of Harare. Hwedza receives 600-900 mm rainfall annum⁻¹ between November and March. Using participatory action research methodologies, farmers were mobilized for visioning and diagnosis using the Learning Centre (LC) approach introduced by the Soil Fertility Consortium for Southern Africa (SOFECSA) (Mapfumo *et al.*, 2013) in two different wards. The diagnostic phase indicated that food insecurity linked to the poor performance of the climate sensitive staple maize, and lack of a shared knowledge and information on processing and utilization of drought tolerant small grain cereals and legumes ranked as the key challenges women faced. A major outcome was farmer self-organization into learning alliances for participatory testing of local germplasm compared with improved varieties of legumes and small grains on field-based LCs at the beginning of the 2015-2016 season (November).

Criteria for field type and position, crops to grow, hectareage for each crop, agronomic management as well as indicators for monitoring and evaluation of the LC performance was co-developed by the alliance and researchers during focus group discussions and key informant interviews. Planned activities include germplasm exhibitions, cooking competitions, recipe development and testing, and food testing.

Findings and interpretations

Two field-based Learning Centres measuring approximately 0.5 ha were successfully established by the two learning alliances each with 20-30 women farmers. Despite being some 30 km apart, choice of food crops to put in the LC were similar across sites. Farmers prioritized finger millet, cowpea, bambaranut and maize using a mix of local germplasm whose performance was compared against improved hybrids. Both finger millet and cowpea were planted took up much of the hectareage constituting >60% of the field, followed by about 25% planted to maize, while bambaranut has the least hectareage of <20%. Ranking top among farmer preferred attributes for crop choice was the contribution to household food security, followed by known nutritional attributes (e.g. role in primary health complexities, contribution to child and maternal health), and tolerance to drought. Other important attributes included value the food crop had in home-based diets, ease of processing and utilization, scope for generating income through value addition. Cowpea and finger millet satisfied most of the criteria. Cowpea was superior because of its multiple edible forms including dry grain, leaves, green pods (which can arrest the 'hunger period'). There is scope for increasing the range of food products through such knowledge sharing alliances.

DO BOYS EAT BETTER THAN GIRLS IN INDIA? LONGITUDINAL EVIDENCE FROM YOUNG LIVES

Elisabetta Aurino

¹Imperial College London, UK;

e.aurino@imperial.ac.uk

Keywords: Children & adolescents; gender; dietary diversity; Andhra Pradesh & Telangana

Introduction

This paper examines gender inequalities in the quality of children's diet, as defined by dietary diversity, among two cohorts of children growing up in Andhra Pradesh and Telangana. Dietary diversity is a fundamental aspect of good nutrition: a varied diet is essential for ensuring an adequate intake of the macro- and micro-nutrients (vitamins and minerals) that are required for children's healthy growth and proper physical, cognitive and socioemotional development.

Methods

The paper uses three rounds of longitudinal data from Young Lives, an international study of childhood poverty, in order to document the evolution of gender gaps in dietary diversity and the consumption of different foods for two cohorts at different ages in Andhra Pradesh and Telangana. The empirical estimates control for a wide range of child and household backgrounds, as well as for community characteristics.

Findings and interpretations

The empirical results show that while no gender-based disparities in dietary quality occur at 5, 8 and 12 years old, a wide pro-boy gap emerges in the middle of adolescence at 15 years old. Specifically, 15-year-old

girls tend to consume fewer of the types of foods that contain most of the protein and micronutrients that are necessary for their healthy development, such as eggs, legumes, root vegetables, fruit and meat. The results are robust even when controlling for factors that may explain the observed gender gap during adolescence (differential onset of puberty between boys and girls, differences in time-use, and gender variation in dietary behaviours and physical activity). Finally, gender differentials in dietary quality in mid-adolescence do not vary by maternal education, poverty or place of residence, whilst they are moderated by levels of the caregiver's educational aspirations. Specifically, the pro-boy bias is particularly marked amongst adolescents with 'academically aspiring' caregivers.

In the context of India, these findings are important for a number of reasons. First, India is home to the largest youth population in the world and adolescent health is a key policy priority. Second, the burden of malnutrition among both girls and young women is the highest in the world. Furthermore, improving adolescent girls' diets, beyond being a development objective per se, can also help to break the intergenerational cycle of malnutrition.

SESSION 5: MARKETS, VALUE CHAINS AND NUTRITION

Session chair: Bhavani Shankar

LEVERAGING VALUE CHAINS TO IMPROVE NUTRITION: COLLABORATIVE LEARNING INITIATIVE ON METHODS AND METRICS FOR IMPROVING THE IDENTIFICATION, DESIGN AND EVALUATION OF INTERVENTIONS

Aisha Twalibu

Save the Children

Background

Emerging evidence on the nutrition double burden suggests income growth alone cannot solve the problem of malnutrition and may in fact create problems linked to overweight and obesity. The challenge from the nutrition perspective is how to sustainably improve diets, as well as other health related behaviours, across different low-income populations. In recent years, the nutrition community has explored value chain approaches to address malnutrition. The value chain framework focuses on the actors involved in the production, processing, trade and consumption of a given product, and the opportunities to achieve beneficial economic outcomes for some or all of the actors through changes in the structures, systems and relationships. Because value chains play a key role in determining food availability, affordability and quality, they have a role in shaping diets and can contribute to improving nutrition. Most applications, however, have focused on a single chain and its implications for nutrition, which from a diet quality perspective implies a partial solution at best. The challenge lies in better understanding the options for leveraging a set of value chains (a multi-chain focus) to address the various constraints to improving the diets of a given group of vulnerable households.

This project aims to operationalise and validate a multidisciplinary framework, including methods and metrics, to support the identification, design and evaluation of interventions in value chains for nutritious foods and improve the sustainability and effectiveness of the World Food Programme (WFP) programmes in Malawi. The project builds on ongoing operational research between the CGIAR Agriculture for Nutrition and Health (A4NH) programme and WFP. This study is also linked to an IFPRI led impact evaluation of an integrated agriculture and nutrition intervention implemented by Save the Children in Malawi.

Activities

The project scope includes five overlapping phases, with phases 2 and 3 currently underway:

1. Stakeholder engagement, literature and project review, and framework development. The preliminary framework was refined and adapted to the context in Malawi. Preliminary criteria for value chain selection were also proposed and validated with key stakeholders.
2. Secondary data analysis of nutrition problems and characterising diets. Data is being examined from multiple sources to identify the nutrition problems and underlying factors that are contributing to malnutrition in Malawi. Food consumption data is being analysed to characterise diets, also identifying the relative contributions of different foods relative to the overall diet. Particular value chains were selected for further in-depth analysis.
3. Mixed methods primary data collection, focusing on rural communities in selected target areas in Malawi. Data collection included a multiple rounds of household surveys, a nutrition-oriented market assessment and a multi-chain analysis focussing on the key foods identified during the characterisation of diets, and qualitative assessments of gender-related dynamics involved.
4. Simulations of effects from potential interventions: Scenarios will be developed involving alternative intervention options along the value chain, and economic models will be developed to simulate the potential costs, effects and returns to investment for scaling-up interventions.
5. Synthesis and dissemination: Detailed design of interventions for WFP Malawi that will be prioritised during the simulation stage, and a rigorous impact evaluation will be designed. Evidence generated by this project and by other A4NH and WFP activities will be used to provide broader and Malawi specific guidance on methods and metrics. Research outputs will be validated at a multidisciplinary workshop including stakeholders in Malawi and A4NH research partners.

Preliminary insights from secondary data analysis

Low-income households in Malawi face multiple constraints across the dietary, behavioural and health determinants of optimal nutrition. With regards to food intake, whilst Malawian diets are dominated by maize, a range of more nutritious foods are also available on markets and are being consumed, including poultry, fish, beans, peas, groundnuts and vitamin A rich vegetables and fruits. However, the quantity and balance is not adequate to meet requirements for optimal health, especially in nutritionally vulnerable target groups including pregnant women and children under two.

WFP operations in Malawi focus on addressing nutrient gaps through food assistance to low-income populations. WFP transfers include both cash and foods readily consumed in Malawian diets, alongside specialised nutritious foods targeting critical age groups in the lifecycle. Preliminary data suggests that WFP food transfers are most cost-efficient when they include specialised nutritious foods. However, there is also evidence that the food environment and markets can deliver nutrient content relatively efficiently, particularly outside seasonal periods when prices peak.

The potential for WFP to link demand, supply and value-addition through engagement with actors along the set of value chains that deliver nutritious foods to local

populations appears to date to be largely untapped. However, value chain linkages across WFP operations in Malawi are emerging through the Purchase for Progress supply side and market development activities, though the emphasis to date has mostly been on maize. The Home-Grown School Feeding programme is also showing particular promise in this area. Applying the conceptual framework in Malawi to identify a context-specific interventions aimed at improving the diets of low-income populations highlights several important considerations. Firstly, the time horizon and resource requirements for the different interventions ranges from highly intensive investments to strengthen supply likely to take considerable time to yield results, to less costly information campaigns promoting consumption of nutritious foods that can yield benefits on shorter timescales. Secondly, most of the interventions require some form of social investment to allow participation of low-income households in the market-based transactions (in terms of both supply and demand), particularly during the pre-harvest lean season, implying an important role for the public sector. Thirdly, they require some form of multisectoral coordination activities, including the development of standards and quality assurance mechanisms, marketing infrastructure, and support services to chain actors that are necessary for nutrition related value addition to factor into chain transactions.

DEVELOPING AN INNOVATIVE APPROACH TO MEASURING THE LIVELIHOODS OF SMALLHOLDER FARMERS AND TESTING CRITICAL LINKAGES FROM FARMER LIVELIHOODS TO NUTRITION

Andrew D. Jones¹

¹*Department of Nutritional Sciences, School of Public Health, University of Michigan, Ann Arbor, MI USA
jonesand@umich.edu, Assistant Professor*

This presentation will summarize advances to date in the development of methodologies and survey instruments designed to develop an integrated, nutrition-sensitive metric for assessing the livelihoods of smallholder farmers in Burkina Faso. Updates on progress in the design and implementation of a

methodological randomized controlled trial to assess the effect of agricultural survey design on the measurement of farmer livelihood characteristics relevant to the assessment of agriculture and nutrition linkages will also be discussed.

CASE STUDY OF FOOD DISTRIBUTION VALUE CHAIN UNDER THE SUPPLEMENTARY NUTRITION PROGRAMME IN TWO INDIAN STATES

Rohit Parasar¹, R V Bhavani¹

¹MS Swaminathan Research Foundation, Chennai, India;
rohit@mssrf.res.in Research Fellow

Keywords: Value-chains, Agriculture, Nutrition, Food Distribution, India

Introduction

India has experienced rapid economic growth, but a large proportion of the population is under-nourished. The Supplementary Nutrition Programme (SNP) under the national Integrated Child Development Service (ICDS) Scheme presents a unique example of a state-led food distribution initiative to address under-nutrition. Targeted at pregnant and lactating women, children (0-6 years) and adolescent girls, the SNP operates through an agri-food value chain to improve nutrition status of these vulnerable groups. Different states follow different models of delivery within a common programmatic framework. This study examines the model of the SNP in Telangana and Tamil Nadu (TN) states, with focus on the mechanisms of governance and institutional delivery and their impact.

Methods

The framework outlined in Henson and Humphrey (2015) is used to identify the role of different actors in the pro-nutrition agri-food value chain beyond the farm. The choice of states was guided by TN being a state with superior track record of food and nutrition policies (Cavatorta et al., 2015); and Telangana a new state that came into being in 2014. Preliminary information was gathered from secondary data sources, viz. government websites and published reports. Officials coordinating the ICDS in the two states were met with for detailed information on operation of the SNP on the ground. Based on this, a schematic framework linking the different actors in the value chain under SNP in each state was drawn. A qualitative assessment of the operation of the programme was then undertaken to understand the innovations in the approach and the costs and benefits. This was done

through interviews with a sample of the different actors, comprising the manufacturers of different components of the SNP, the ICDS project officers, workers at the ICDS centres and members of the target group. An assessment was also made using state-level data sets, to see the association between expenditure on SNP and under-nutrition rates.

Findings and interpretations

The SNP in Telangana comprises a combination of hot cooked meal at the ICDS centres for both women and children and distribution of fortified pre-mix manufactured by a state enterprise: Telangana Foods. The model in TN is a combination of hot cooked meal for children at the ICDS centres and distribution of fortified pre-mix manufactured by private sector - women's cooperative partnership. Telangana Foods is a unique example of an enterprise exclusively manufacturing fortified food for distribution under government programmes; the cooperative model promotes entrepreneurship, empowering women from deprived socioeconomic groups. Both states are spending more from their own funds over and above the prescribed allocation under the programme, highlighting their commitment to address the problem of undernutrition. Analysis shows that higher spending by a state on SNP is associated with lower levels of under-nutrition. The differentiated models are examples of innovative value chains and highlight the importance of economies of scale. The mechanism also supports post-harvest processing of nutrient-dense and climate-smart crops like millets that has implications for rainfed agriculture characteristic of a large part of India. They present institutional mechanisms for food delivery that can be replicated by other states

BUY OR MAKE? FARM PRODUCTION DIVERSITY, MARKET FOOD AVAILABILITY AND DIET DIVERSITY IN AFGHANISTAN

Giacomo Zanello¹, Bhavani Shankar², Nigel Poole²

¹ *University of Reading, UK*

² *SOAS, University of London, UK*

g.zanello@reading.ac.uk (Lecturer in Food Economics and Health)

Keywords: Farm production, markets, diet diversity, Afghanistan

Introduction

Since the livelihoods of a large proportion of those suffering from undernutrition are agriculture-based, the “agriculture for nutrition” agenda that has emerged over the last decade has emphasised the development of interventions promoting greater farm-level production diversity, such as home gardens and livestock donations. Recently this literature has begun to debate the relative importance of markets versus on-farm production diversity for the diversification of diets. In this paper, we advance this strand of literature in providing dietary diversity and nutrition by constructing richer characterisations of food availability in the market. Our setting is Afghanistan, where difficult terrain and conflict result in poor infrastructure and substantial variation in market food availability, making the central question investigated in this paper particularly important.

Methods

We use data from Afghanistan’s National Risk and Vulnerability Assessment (NRVA) household survey of 2011-12. NRVA 2011-12 is a nationally and regionally representative survey of the living standards of 20,828 households that was undertaken by the Central Statistics Organization of Afghanistan. The household questionnaire includes a module with seven-day recall information for the household on the quantity and sourcing of more than ninety foods typical to the Afghan diet. There is also community (Shura) level information on aspects such as local markets. We use the NRVA data to estimate a series of regressions that explore relationships between crop diversity, role of markets, and dietary diversity. A key innovation in the paper is that we capture a much richer characterisation of the market’s ability to provide diverse foods by not just including the proximity of a market to the

household but also food availability and diversity in the local market. Another innovation is that we are able to split the analysis up by season, allowing the relative influence of on-farm and market influences on diet diversity to vary by season. We test the robustness of our results in different ways, including the use of instrumental variables to address potential endogeneity issues.

Findings and interpretations

Our results show that both production diversity as well as market food availability and diversity are important for diet diversity. Production diversity coefficients are positive and statistically significant across alternative specifications. A lack of market availability within the Shura (local community) is found to negatively influence diet diversity, while a greater diversity of food availability in the nearest market has a strong positive influence on diet diversity. Crucially, more than 80% of the diversity in household diets is accounted for by market purchased foods, while only about 11% is accounted for by own-production. This underscores the relative importance of markets compared to own production in providing high quality diets. Food availability in the market is found to have an especially strong influence on diet diversity in the spring and summer seasons when roads are passable and market connectivity improves, compared to autumn and winter.

These results have important policy implications. The “agriculture for nutrition” agenda has tended to emphasise traditional interventions of the type the nutrition community is most comfortable with, i.e. interventions at the level of individual producers/consumers, such as home gardens. Our results point out the fundamental importance of broad based food market development in providing nutrition.

WHAT MATTERS MOST FOR CULTIVATING HEALTHY DIETS: AGRICULTURAL DIVERSIFICATION OR MARKET INTEGRATION?

Andrew D. Jones¹

¹Department of Nutritional Sciences, School of Public Health, University of Michigan, Ann Arbor, MI USA
jonesand@umich.edu, Assistant Professor

Keywords: agricultural biodiversity, market access, dietary diversity

Introduction

Agriculture, trade, and macroeconomic policies in low- and middle-income countries (LMICs) are incentivizing increases in farm size, greater commercial production, and the integration of farms into global markets (1). These trends have opened opportunities for poverty reduction and access to new food markets, but have also led to agricultural transformations toward genetically uniform monocultures (2). The impacts of these changes on the quality of human diets, and the relative importance of market integration vis-à-vis the preservation of agricultural biodiversity (and associated ecosystem services) for supporting healthy and sustainable diets is not clear (3, 4).

Methods

This study examines the evidence for the importance of agricultural biodiversity and market access on the quality and diversity of diets among households in LMICs. The aim is to determine the magnitude and direction of the association of each factor on diets, as well as potential mediating and moderating influences on this relationship in different contexts. A literature review was conducted to systematically identify peer-reviewed, empirical research articles that examined the relationship of agricultural biodiversity and/or market access with dietary outcomes. The intake of specific micronutrients, overall diet quality, and dietary diversity were identified *a priori* as eligible outcomes. Given the critical importance of the scale of assessment of these relationships, the diversity of species or cultivars at both the household- and landscape-scale were considered. Similarly, individual-, household-, and regional-level diets were examined. Studies were limited to those that focused on terrestrial, cultivated

agricultural biodiversity. The substantial heterogeneity in outcomes assessed and measurement approaches employed among the identified studies precluded a meta-analysis of results. Rather, study findings were qualitatively compared.

Findings and interpretations

We identified 22 studies, all cross-sectional, that examined the relationship between agricultural biodiversity and the quality or diversity of diets, and 11 studies examining the association of market access with these outcomes. Overall, greater agricultural biodiversity and greater access to markets were associated with more diverse household-level diets. Marginal changes in dietary diversity were dependent on the extent of existing market access or biodiversity. The magnitude of the relationships varied greatly across studies, and few studies examined the mechanisms underlying these relationships. Longitudinal and quasi-experimental studies are needed to strengthen the causal inference of these associations. In particular, the association between market access and diet quality may be confounded given that market access, measured using self-reported distance to major roads or population centers, does not account for road quality or other potential socioeconomic barriers to markets. Furthermore, access to agricultural input markets, output markets, as well as retail food markets may have very different influences on diets, but these differences have not been adequately explored. In addition, almost no data are available to assess the influence of landscape-level agricultural biodiversity on diets. Finally, additional research is needed to understand how agroecological context and place may moderate these relationships.

CHILDREN'S DIETS, NUTRITION KNOWLEDGE, AND ACCESS TO MARKETS

Kalle Hirvonen¹, John Hoddinott², Bart Minten¹, David Stifel³

¹IFPRI, Ethiopia;

² Cornell University, USA;

³ Lafayette College, USA

k.hirvonen@cgiar.org, Associate Research Fellow

Keywords: dietary diversity, food markets, remoteness, Ethiopia

Introduction

Behavioural Change Communication has been found to be effective at improving child feeding practices in a number of randomized control trials, but many of these have taken place in localities characterized by good access to markets. However, poor access to foods is likely to be a limiting factor on the effectiveness of BCC to improve caregiver understanding of the importance of diet quality (Penny et al. 2005). In this study, we explore these two areas together by using novel data from an area with a large variation in transportation costs over a relatively short distance but with similar agro-climatic conditions.

Methods

We use novel survey data from Alefa district in the rugged terrain of northwestern Ethiopia. This area was chosen because the large variation in transportation costs over relatively short distances in the district allows us to carefully assess the impact of these varying costs by comparing it within a situation of similar physical and climatic conditions. The study site is an isolated area with little to no electricity or mobile phone access. The market town of Atsedemariam is central to the study, which is connected to a major metropolitan area. Communities transport foods to and from the market town, relying on donkeys or foot traffic because of the difficult terrain. The final sample used in the analysis consists of 448 households that have children who are less than 60 months of age.

The survey instrument included a module on children's dietary diversity as well as caregiver's nutrition knowledge. We use multivariate regression techniques to study the relationship between children's dietary

diversity, access to market and nutrition knowledge. In our regression model, we controlled for household demographics, education levels and wealth. We further used an Instrumental Variable (IV) approach to address the bias arising from the endogeneity of household nutrition knowledge.

Findings and interpretations

The dietary diversity among children in our sample is low. Children residing in the average household consume from 3 food groups (out of the maximum of 7) and only in 7.5 percent of the households do the children meet the WHO recommendation of eating from 4 or more food groups.

Our IV-regression results show that improving household knowledge on child feeding practices has a considerable impact on children's dietary diversity. According to the analysis, if the average household's nutrition knowledge is improved to the level of the most knowledgeable household in the sample, this would result in a 1.03 food group increase in children's diets.

These results show that improved nutrition knowledge leads to better diets – a result found in a host of other settings (Santos et al. 2001; Bhandari et al. 2004; Penny et al. 2005; Zaman, Ashraf, and Martines 2008). But, does this effect depend on access to foods? Quantifying the impact across the market gradient, we find that nutrition knowledge leads to considerable improvements in children's diets – but only in areas with relatively good market access. Strikingly, improving nutrition knowledge in the most remote localities has no impact on the diversity of children's diets.

MARKET ACCESS, WELFARE AND NUTRITION: EVIDENCE FROM ETHIOPIA

David Stifel¹ and Bart Minten²

¹Lafayette College, USA ;

²International Food Policy Research Institute, Ethiopia;
Bart Minten, b.minten@cgiar.org, Senior research fellow

Keywords: agricultural markets, nutrition, welfare, diet diversity, Ethiopia

Introduction

Despite the recent policy emphasis on making functional improvements to agricultural value chains and on assuring better market access in order to achieve better nutritional and health outcomes in developing countries, there is little solid evidence of the impact of improved market access and lower transport costs on nutritional outcomes. Using a unique data source not only permits us to estimate the causal impact of rural feeder roads (or the absence of such roads) on different measures of household well-being, but it also allows us to explore the pathways through which remoteness from markets affects welfare and nutrition.

Methods

Since roads are not randomly placed, an empirical challenge common to all studies that estimate the impacts of roads is that the causal relationship between improved road access and the apparent benefits of this access are difficult to distinguish. In other words, it is difficult to determine if roads are placed in higher productivity or higher income areas, or if incomes and productivity are higher as a result of the roads. We address this problem of causation in a quasi-experimental manner by conducting a household survey of a relatively homogeneous region in northwestern Ethiopia. This sample area was selected purposefully in order that the primary differences between communities in the otherwise homogeneous region are

the transport costs between the communities and the particular market to which community members travel. In our study area, these transportation costs differ substantially within the region, but they differ because of the geography of the region, not because of road placement.

Findings and interpretations

We estimate the impact of improved market access on household well-being and nutrition using a quasi-experimental setting in Ethiopia. We find that households in remote areas consume substantially less than households nearer to markets, they are more food insecure, and their school enrollment rates are lower. Although their diets are also less diverse, we find no significant differences in anthropometric measures. Part of these welfare differences can be attributed to lower household agricultural production in remote areas. But agricultural production differences alone do not account for all of the differences in household consumption levels for remote households. An additional contributing factor is the deteriorating terms of trade for remote households that negatively affects both the size of the agricultural surplus that these households market and the quantity of food items that they purchase. Reducing transaction costs associated with poor rural infrastructure can pay off important dividends as it can facilitate households' abilities to transform marketed surpluses into consumption goods and into healthier, more diverse diets.

AGRICULTURE, INFRASTRUCTURE AND NUTRITION LINKAGES IN RURAL INDIA: A STATE LEVEL ANALYSIS

Mehroosh Tak¹, Bhavani Shankar¹

¹LCIRAH/SOAS, U.K.

mt83@soas.ac.uk, PhD Candidate

Keywords: agriculture, dietary diversity, rural infrastructure, panel data

Introduction

India is home to a third of the world's undernourished children and the prevalence of micronutrient deficiency amongst its adult population is high. This persistent poor performance, in the face of high economic growth, has failed to reduce malnutrition. A part of the solution may lie in the agri-food sector, which has proven to be better at reducing poverty than non-agriculture sectors. Rural infrastructure investments in roads and markets have the potential to promote diet diversity by making a range of foods, particularly perishable nutritious foods, widely available. However, this is a neglected aspect of the agriculture-nutrition research agenda, and relatively little is known about the influence of markets and infrastructure on dietary diversity.

Methods

The paper seeks to fill this knowledge gap by studying the roles of production diversity and infrastructure in improving dietary diversity in India. We do this by examining both demand and supply side factors influencing dietary diversity at a cross-state level for rural India. Based on a review of existing literature we first construct a framework conceptualising the pathways between agriculture and dietary diversity with a focus on state-level factors. Subsequently, the paper constructs and exploits a rich household consumption

expenditure dataset from 1990 to 2008 containing four measures of dietary diversity (DD) for Indian states. DD data are combined with cross-sectional time-series data on economic growth, welfare and rural infrastructure to build a synthetic panel dataset with T=15 and N=16. Both static and dynamic panel data regression models are applied to the data. Specifically, we employ Blundell-Bond (Blundell and Bond, 1998) and corrected least square dummy variable (LSDV) estimators (Bruno, 2005) along side fixed and random effect estimators to explore the state level determinants of DD in India.

Findings and interpretations

The paper finds that dietary diversity in India has been increasing since 1990s with urban food baskets being more diverse than rural ones. However, rural diets have been diversifying at a faster rate than urban diets. The regression models find support for the hypothesis that an increase in market coverage improves diet diversity. Female literacy is also found to be an important determinant of cross-state diet diversity, but there is less support for the role of road infrastructure. The finding on the role of market coverage in improving diet diversity lends support to the notion that market evolution is important for nutrition, and underlines the need for broad-based food market development as a cornerstone of agriculture for nutrition strategies.

SESSION 6: DETERMINANTS OF DIETS AND NUTRITION

Session chair: Jennifer Coates

AFFORDABILITY OF NUTRITIOUS DIETS IN AFRICA: FOOD PRICE DATA LANDSCAPING IN GHANA AND TANZANIA

Anna Herforth¹, Daniel Sarpong², Fulgence Mishili³, William Masters⁴, Jennifer Coates⁴

¹Columbia University, USA;

²University of Ghana, Ghana;

³Sokoine University, Tanzania;

⁴Tufts University, USA

anna@annaherforth.net, Adjunct Associate Research Scientist

Keywords: food access, food environments, food prices, Africa

Introduction: Availability and affordability of foods – two basic components of the food environment – have a strong relationship to diet quality, yet existing metrics are inadequate to monitor them (Herforth and Ahmed 2015). The “Indicators of Affordability of Nutritious Diets in Africa” (IANDA) Project aims to develop indicators of the availability and affordability of nutritious diets in markets throughout the year, and facilitate their use by policymakers. The purpose of this paper is to understand existing sources of food price data in two countries, Ghana and Tanzania, and to assess whether they contain adequate information for the creation of such indicators.

Methods: The research team identified a list of potential food price data sources based on personal prior knowledge. Key informants were interviewed from each agency or organization collecting the food price data, following a semi-structured interview guide including information about where the data were collected (regions and markets), who collects the data, what foods are included, how data are collected (methodology), when (frequency and seasons), and why the data are collected (mandate and end use). To identify foods that may be included in the data source, interviewers probed for foods within each of the 10 food groups of the Minimum Dietary Diversity for Women (MDD-W) (EU et al. 2014). Potential data sources that included fewer than three food groups were excluded. Among the remaining sources, the key informants were contacted again to provide (1) methodologies/questionnaires for how the food price data were collected, and (2) the datasets themselves. Data were reviewed for the diversity of foods and food

groups they contain, frequency of information, and geographic coverage. The foods present in the dataset were compared to existing definitions of dietary quality to assess the potential for each dataset to provide adequate information about prices of diverse, nutritious diets.

Findings and interpretations: In each country, there are three data sources that have potential to provide adequate information for monitoring availability and affordability of nutritious diets. In Ghana, these are collected by the Ministry of Food and Agriculture, Ghana Statistical Service, and Esoko (a private, grant-funded initiative). In Tanzania, by the Ministry of Industry and Trade (MIT), MVIWATA (the national network of small-scale farmer groups in Tanzania), and Tanzania Horticultural Association (TAHA) which collaborates with Esoko (data source under development). The available datasets cover all administrative regions of the country on at least a bi-weekly basis. They include many starchy staples, legumes, meats and eggs. Only a few fruits and vegetables are included; green leafy vegetables are almost entirely absent from these nationally-harmonized data sources, possibly related to the wide diversity in horticultural produce across geographies and seasons. Dairy is absent in the Ghana data sources. We conclude there is a sufficient diversity of foods represented in existing food price data to construct some indicators of nutritious diets, but not all desired comprehensive indicators. More foods (such as green leafy vegetables) may need to be added to existing data collection efforts to enable monitoring the affordability of all parts of a nutritious diet

STRENGTHENING THE MONITORING AND EVALUATION OF THE GHANA SCHOOL FEEDING PROGRAM: IMPROVED METHODS, METRICS, AND TOOLS

Matilda E. Laar

*Postdoctoral Fellow
Friedman School of Nutrition Science and Policy
Tufts University, USA*

School feeding program is among the most universal form of nutrition interventions aiming to improve nutrition, health and educational outcomes of under-privileged children. The Ghana School Feeding Program (GSFP), a government initiative started in 2005, is modeled after the “home-grown” approach, which aims to link its school feeding program to local agricultural development through cost-effective local food procurement from small holder farmers. The program is mandated to use locally grown foods to provide one nutritious meal every school day for kindergarten and primary school children in poor communities. Aimed at addressing the Millennium Development Goals (MDG 1, 2 and 3) on poverty, hunger and education, the long-term goal of the GSFP is to reduce poverty and food insecurity. The specific objectives of the GSFP are to decrease child hunger and malnutrition, increase school enrollment, attendance, and retention, and improve

local agricultural production. The lack of simple and effective evaluation methods, metrics, and tools hinder process and impact assessments of the GSFP that are needed to inform decisions to improve program efficiency and effectiveness. Furthermore, monitoring and evaluation (M&E) efforts to date have emphasized assessment of educational (e.g., girl-child enrollment and attendance) and qualitative agricultural (e.g., farmer-reported cultivated land size) outputs, while outcomes and outputs that assess nutritional quality of the meals and the link between school feeding and local agriculture have been ignored. With the recent (2015) development of a comprehensive M&E plan and tools by the GSFP. Our aim was to conduct a pilot study to assess the feasibility of using the new M&E tools to monitor the nutrition and agriculture objectives the program. We report progress made in this effort, the key challenges and lessons learned till date.

EVALUATION OF ALTERNATIVE SCHOOL FEEDING MODELS ON NUTRITION, EDUCATION, AGRICULTURE AND OTHER SOCIAL OUTCOMES IN GHANA: PRELIMINARY FINDINGS FROM A CLUSTER RANDOMISED CONTROL TRIAL.

Clement Adamba¹, [Felix Asante](#)¹, [Elisabetta Aurino](#)², Irene Ayi¹, Kwasebena Bosompem¹, Gloria Folson¹, Lesley Drake², Aulo Gelli³, Meena Fernandes¹, Edoardo Masset⁴, Isaac Osei-Akoto¹, Getrude Ananse-Baiden²

¹University of Ghana, Ghana

²Imperial College London, UK

³IFPRI, US

⁴3ie, UK

Felix Asante: FAasante@ug.edu.gh, Director, ISSER, University of Ghana;

Elisabetta Aurino: e.aurino@imperial.ac.uk, Research Fellow, Imperial College London)

Keywords: School feeding – child and adolescent health – nutrition – food security – learning

Introduction

'Home-grown' school feeding programmes are complex interventions with the potential to link the increased demand for school feeding goods and services to community-based stakeholders, including smallholder farmers and women's groups. There is limited rigorous evidence, however, that this is the case in practice. This evaluation will examine explicitly, and from a holistic perspective, the simultaneous impact of a national school meals programme on micronutrient status, alongside outcomes in nutrition, education and agriculture domains. This evaluation will examine explicitly, and from a holistic perspective, the simultaneous impact of a national school meals programme on micronutrient status, alongside outcomes in nutrition, education and agriculture domains.

Methods

The 3-year study involved a cluster-randomised control trial designed around the scale-up of the national school feeding programme, including 116 primary schools in 58 districts in Ghana. The randomly assigned interventions were: 1) a school feeding programme

group, including schools and communities where the standard government programme is implemented; 2) 'home-grown' school feeding, including schools and communities where the standard programme is implemented alongside an innovative pilot project aimed at enhancing nutrition and agriculture; and 3) a control group, including schools and households from communities where the intervention was delayed. The evaluation followed a mixed-method approach, including child-, household-, school- and community-level surveys as well as focus group discussions with project stakeholders. Two baselines were conducted in August 2013 and February 2014 and endline was completed in March 2016.

Findings and interpretations

The presentation will provide preliminary findings from the impact evaluation, including child health and nutritional status, school participation and learning, and smallholder farmer income. Intermediate outcomes along the agriculture and nutrition pathways will also be measured (e.g. children's dietary diversity, children's time use, agriculture production etc).

FOOD CONSUMPTION IN INDIA: COMPARISON OF NATIONAL AND REGIONAL DIETARY DATA SOURCES

Lukasz Aleksandrowicz^{1,2}, Mehroosh Tak³, Rosemary Green^{1,2}, Andy Haines²

¹Leverhulme Centre for Integrative Research on Agriculture on Health, UK;

²London School of Hygiene & Tropical Medicine, UK;

³School of Oriental and African Studies, UK

Lukasz.Aleksandrowicz@lshtm.ac.uk, PhD candidate, LCIRAH

Keywords: dietary intake, nutrition, India

Introduction

Accurate data on dietary intake is important for public health, nutrition and agricultural policy outcomes. India is undergoing a nutrition transition, with a double burden of over- and under-nutrition¹. The National Sample Survey (NSS) is a nationally-representative data source used for generating estimates of nutritional outcomes in India. The NSS has shown a decrease in calories over recent decades as incomes have grown², though evidence suggests this may be due to methodological limitations³. Despite policymakers' reliance on the NSSO, it has not been compared to other sources of dietary data in the country.

Methods

We compare intake of selected food groups across six Indian national and regional surveys, representing various methodologies. The NSS and Indian Human Development Survey (IHDS) estimated intake through household consumer expenditure; the Indian Migration Study (IMS) and the Andhra Pradesh Child and Parent Study (APCAPS) used food-frequency questionnaires (FFQs); FAO food balance sheets (FBSs) represent food availability at the national level; and the National Nutrition Monitoring Bureau (NNMB) used a weighment method at the household level. Surveys were conducted over various years between 2004-2012. We calculated intake of major food groups (cereals, pulses, dairy, oils, meat, eggs, fruits, vegetables, and sugar) and compared these between survey types, matching for relevant years, regions, and economic groups, where available, for ages 18-59. Household-level data were converted to individual intake using Indian adjustment factors based on age and sex.

Relative differences in absolute daily intake, and for food groups, were calculated across the survey comparisons. Spearman coefficients assessed the similarity of ranked food group intake across comparisons.

Findings and interpretations

The NSS expenditure survey showed a decline in absolute food intake in India between 2005/6 - 2010/11, while the IHDS, using similar methods, and FBSs, showed an overall increase over the same years. Differences in total intake across all food groups were smallest between the two national expenditure surveys (2% relative difference). Relative to the expenditure surveys, FFQs and FBS overestimated total intake (29% and 35%, respectively), and the weighment method underestimated intake (-14%).

Consumption of cereals had high agreement across survey types (average 4% relative difference across all survey comparisons), while dairy, fruit and nuts, and meat and fish had the least agreement (46%, 40%, and 31% relative differences, respectively). Spearman coefficients showed high correlation of ranked intake of food groups across surveys.

Intake of foods eaten out of the home may explain the relative underestimation of expenditure surveys and the weighment method, compared to FFQs and FBSs, while FBSs may overestimate intake as they may not fully account for wastage along the food value chain. Although it was not possible to validate the compared data against any gold standard, relative differences in consumption estimates may highlight potential sources of under- or over-estimation for policymakers using these dietary intake data.

UNDERSTATING SCHOOL CHILDREN'S KNOWLEDGE AND PERCEPTION OF BEVERAGE CONSUMPTION PATTERNS IN DHAKA, BANGLADESH

Parnali Dhar Chowdhury¹, Sonia Pervin²

¹International Development Research Centre (IDRC), Canada;

² International Centre for Diarrhoeal Disease Research, Bangladesh;

pdharchowdhury@idrc.ca; Research Awardee

Keywords: Child Obesity, Sugar-sweetened beverage consumption, Bangladesh

Introduction

The childhood obesity epidemic is a major public health challenge of the 21st century in many countries worldwide as 170 million children younger than 18 years are overweight¹. Although obesity is a multifactorial disorder, one of the strategies to reduce obesity involves decreasing the energy intake from added sugars in an individual's diet. In the low income countries like Bangladesh, a school based country wide study in 2014 has been demonstrated that among children, 9.6% were overweight and 3.5% children were obese². Children in Dhaka city were two times more likely being obese than children living in other cities³. The aim of the current research is to understand the risk factors associated with 'beverage consumption pattern' among schoolchildren in Dhaka in combination of 'sugary drinks consumption behavior' and 'environmental influences'.

Methods

In a baseline survey, 30 wards of Dhaka City Corporation encompassing 4,140 children were surveyed to evaluate the prevalence of obesity. In the next step, a list of total 13 schools was formulated and invited; however only four schools (i.e., two English medium and two Bangle medium schools) were purposefully selected. All children from Grade 3 to Grade 5 will be surveyed with a 72-hour Beverage Intake Questionnaire (BIQ) focusing on a 72-hour dietary recall data specific to sugary drinks and drinking

water consumption. In the next step, semi-structured focus group discussions (FGDs) will be developed to discuss the information that parents and teachers share with children about sugary drink consumption, and their opinions on beverage advertisements, premium offers and collectibles with drinks, and child-oriented sugary drinks. For each FGDs participant a socio-economic questionnaire (SEQ) will be filled out. Besides, we will perform key informant interviews (KIIs) to collect information from a wide range of experts—including teacher and policy makers, involve with schools, planner of schools and parents/guardian—who have detailed knowledge about opportunity of school facilities and experiencing barriers for school health programs. KIIs will focus more on knowledge about local food environment, attitude of their children and students to wards healthy food from their perspective.

Findings and interpretations

The proposed study will be implemented from May 2016. The primary intended use of knowledge gained from this research will be to increase awareness among local school teachers, and parents of schoolchildren in Dhaka through a short report dissemination to the schools. The research will have influence to understand the need for establishing rules and regulations that promote drinking water behavior during school time and non-sugary healthy drinks consumption by schoolchildren.

THE SOCIAL DETERMINANTS OF FOOD CONSUMPTION PATTERNS AND NUTRITIONAL STATUS OF OLDER PERSONS IN ZAMBIA: A CASE OF MILENGE DISTRICT, LUAPULA PROVINCE.

Geoffrey Maila¹, Keiron Audain¹, Pamela Marinda¹

¹*School of Agricultural Sciences*

Department of Food Science & Nutrition. University of Zambia

Keywords: Older persons, nutritional status, Sub-Saharan Africa, diet quality

Introduction

The prevalence of food insecurity and malnutrition remains high in Sub-Saharan Africa (SSA). Older persons are believed to be particularly vulnerable, and existing health risks associated with old age can be exacerbated. Various factors have led to increased life expectancy in SSA. As a result, the older person population has increased; thus maintaining their health is of growing importance. However, to date there is limited research on the impact of their social environment on food choices and nutritional status. The aim of this study is to assess the social determinants of food consumption patterns and their relationship with nutritional and health status of older persons in Milenge district of Luapula province of Zambia.

Methods

A cross-sectional survey of 140 older persons will be randomly selected from the rural areas of Milenge district. Participants will be interviewed using a standardised semi-structured questionnaire comprising of the following sections; social determinants questionnaire, health questionnaire, food frequency questionnaire (FFQ), nutritional knowledge, household food security access scale (HFIAS) and anthropometric measurements.

The weight and the height of the respondents will be measured and used to calculate the body mass index (BMI). The waist circumference of the respondent will also be measured. Data will be analysed using Statistical Package for the Social Sciences (SPSS) 17.0 version. Descriptive statistics will be used to summarise and describe various sample characteristics and the relationship between variables will be established using correlation analysis.

Findings and interpretations

This study will commence in March 2016, and predicts a significant number of respondents will be underweight (BMI < 18.5) whilst a lesser number will be overweight (BMI > 24.5). Based on the high national prevalence of food insecurity, respondents are expected to be food insecure and food consumption patterns will be largely determined by their social environment. A significant number of respondents may experience nutrition-related health consequences, attributed to poor nutritional status and/or a lack of nutrition knowledge. A positive correlation is expected between food consumption patterns and nutritional status as well as health.

DIFFERENCE IN LEVELS AND PREDICTORS OF FOOD INSECURITY AMONG URBAN AND RURAL HOUSEHOLDS OF KOMBOLCHA DISTRICT OF EAST HARERGE ZONE, ETHIOPIA

Asnake Ararsa Irenso¹, Negga Baraki¹, Haji Kedir¹

¹Haramaya University, College of Health and Medical Science, Ethiopia
abbaabokku@gmail.com

Keywords: Dietary diversity, food insecurity, urban, rural

Introduction

Food security exists when all people, at all times, have social, physical and economic access to sufficient, safe and nutritious food for a healthy and active life. In Ethiopia over 12,000,000 people are chronically or sporadically food insecure (MoARD, 2010). This is not only a violation of fundamental right but also breaching of primary economic right of a human being (The Sphere Project, 2004). Food security and vulnerability assessments in Ethiopia, like in many developing countries, have traditionally focused on rural areas (WFP-Ethiopia, 2009). Therefore, the study assess levels and predictors of household food insecurity in urban and rural households.

Methods

The study was conducted in Kombolcha district of eastern Ethiopia. This district is a major khat producer. Cross-sectional study was conducted in 2014. One urban and five rural Wards were included. Using stratified sampling 144 urban and 570 rural, a total of 714 households were selected. Standardized food security assessment tools namely Food Insecurity Access Scale and House Hold Dietary Diversity Score were used. Data was coded and entered in the computer using EpiData 3.0 and exported to SPSS version 20 for analysis. Descriptive summary using frequencies, proportions, graphs and cross tabs was used to present study results. Analysis of Variance (ANOVA), independent sample t-test were performed to assess the significance of association between different variables. Hierarchical linear regression was used. Collinearity statistics (i.e., Tolerance and VIF) were all

within accepted limits. Univariate outliers identified in initial data screening were modified. Mahalanobis distance scores indicated no multivariate outliers. The assumptions of normality, linearity and homoscedasticity were all satisfied.

Findings and interpretations

The Proportion of households that fall in food insecurity category was accounted for 74.6 percent (81.5 percent rural and 47.9 percent urban households). Using household dietary diversity score, 41.2% (73.6 urban and 32.9% rural households), 45.3% (24.3% urban and 50.7% rural) and 13.5% (2.1% urban and 16.4 rural households) had high, medium and low dietary diversity respectively. The most important adjusted predictor of food insecurity for rural households as measured by both tools were socioeconomic status and livelihood zones. Using HDD and HFIAS the most important predictor of food insecurity among urban households were vegetable garden ownership and women occupation respectively. High prevalence of food insecurity in major cash crop producing district could be explained in part by heavy reliance on single source of income and food purchase (93.8% urban and 89.3% rural). In addition, most farmers were smallholder farmers (only 1.6% possess land more than two hectare) and most produce once a year. This is comparable to finding from rural southern Ethiopia (82.3%) and sub-national level (85.8%) food insecurity (Addis Continental Institute of Public Health, 2009; Regasa & Stoecker, 2011). However, food insecurity of rural Farta district of North-Western Ethiopia where lower (70.7 percent) (Endale et al., 2014).

IMPACTS OF FOOD PRICE CHANGES ON FOOD AND NUTRITION SECURITY: ESTIMATES OF THE MINIMUM CALORIE EXPENDITURE SHARE FOR MOZAMBIQUE AND BANGLADESH

Fiorella Picchioni¹

¹LCIRAH/SOAS, United Kingdom;

F_picchioni@soas.ac.uk, PhD Candidate

Keywords: Food prices, food and nutrition security, indicator

Introduction:

There are conflicting views about the impacts of global food price spikes on global food and nutrition security (FNS). Key questions concern the extent to which food insecure populations have experienced food price increases (as a result of interactions between global prices and their transmission to domestic markets, supply-demand situations and policies) and how far any changes in food prices have been counteracted by economic and income growth. This suggests that it is the relationship between food prices and income that is critical for FNS – an *apparently* fundamental observation that has received relatively little attention in much of the debate.

This paper presents preliminary insights of the Minimum Calorie Expenditure Share (MCES), a novel and accessible food price indicator that calculates the expenditure required to meet a minimum per capita calorie from staples consumption as a share of total expenditure in different income groups of a population. We argue that the MCES, being an indicator of real food prices relative to real incomes, can better capture the effects of global and domestic staple food price changes on FNS of poor people.

Methods:

Firstly, methodological implications and data requirements for the construction and validation of MCES estimates are described. The study draws on data

from Mozambique and Bangladesh during the 2008/09 food crisis and it takes into account (among other factors) seasonality, location and income distribution. Different econometric methods are employed to analyse the association between the MCES and some commonly used indicators of food and nutrition security.

Secondly, preliminary estimates of the MCES are presented and discussed as a comparative analysis between Mozambique and Bangladesh. It is found that generally the MCES is associated with other common FNS indicators, although the strength of the correlation varies across income groups, season and space.

Findings and interpretations:

We derive that it is fundamental to differentiate the effects of food price changes between the rich and the poor consumers (both in urban and rural areas) in the importance of food in their expenditure and their reliance of markets food acquisition. Commonly used deflator to derive real food prices (such as CPI and MUV) can be misleading when examining the impacts of food price changes for poor people. The MCES appears to be reliable and timely indicator that can effectively integrate different elements of FNS and, when coupled with other relevant indicators, it can refine the understanding, monitoring and mapping of the impacts of food price crisis on poor communities in low income countries.

POSTER PRESENTATIONS

THEME 1: AGRICULTURE AND FOOD SYSTEMS, ENVIRONMENTAL CHANGE AND DIETS

| TITLE | PRESENTER | CONTACT DETAILS |
|--|---|---|
| Measuring milk and dietary intake among children in the face of changes in the Borana Pastoral System | Bekele Megersa, <i>School Veterinary Medicine, Hawassa Ethiopia</i> | bekelebati@gmail.com |
| Provitamin A carotenoid content and sensory evaluation of Vitamin-A rich banana cultivars for potential adoption in Eastern Africa | Deborah Nabuu, <i>Bioversity International</i> | d.nabuuma@cgiar.org |
| Maturity protein content and yield stability of cowpea in Uganda | Gabriel Ddamulira, <i>National Crops Resources Research Institute</i> | ddamuliragab@yahoo.co.uk |
| Evolving Sustainable Integrated Farming System in Semi-arid region with tribal communities to fight Malnutrition | Deepak Sharma, <i>VAAGDHARA, India</i> | deepakpal33@gmail.com |
| Determinant factors for wasted fish during harvesting at Amerti and Fichawa reservoirs Oromia/Ethiopia | Demeke Teklu, <i>Oromia Agricultural Research Institute, Ethiopia</i> | demeketeklu@yahoo.com |
| Agronomic interventions to improve zinc bioavailability in rice systems | Hafeez ur Rehman, <i>University of Agriculture, Faisalabad</i> | hafeezcp@gmail.com |
| Links and Relations between Ugandan Urban Households' Agricultural Practices with BMI, Dietary Diversity, Food Security and Health | Heather Mackay, <i>Dpt of Geography and Economic History, Umeå University, Sweden</i> | Heather.Mackay@umu.se |
| The Use of Poultry Manure toward the Development of Healthy, Profitable and Sustainable Groundnut production in Nigeria | Usman Ibrahim, <i>Department of Agronomy, Federal University, Gashua, Yobe State, Nigeria</i> | ibusman2007@yahoo.com |
| Utilization Of Amaranth Sorghum Grains Complementary Food To Enhance The Nutrition Status Of Children In Poor Resource Settings | Judith K. Okoth, <i>Jomo Kenyatta University of Agriculture and Technology</i> | judithokoth@agr.jkuat.ac.ke, kanensi@gmail.com |
| Quality Assessment of Gari Produced Using a Gari Frying Machine | Babarinsa Olumuyiwa, <i>Ilorin, Nigeria</i> | kanmix1@yahoo.com |
| Sorghum Performance Under Climate Change In Sudan | Mohamed Babekir Elgali, <i>University of Gezira, Sudan</i> | melgali@yahoo.com |
| Effect of drying methods on mineral composition of orange fruit (<i>Citrus sinensis</i>) peel flour in biscuit making | Rwubatsé Bernard, <i>University of Rwanda</i> | rbernard5b@gmail.com |
| Fruit tree portfolios for year-round production of fresh fruits: a new approach | Stepha McMullin, <i>Rhine Waal University, Germany</i> | s.mcmullin@cgiar.org |

| | | |
|--|---|--------------------------|
| for improving nutrition of smallholder farmer families in Kenya | | |
| Household food security and changes in diet patterns in Nepal | Narayan Subedi, <i>Tribhuvan University, Nepal and Nepal Public Health Foundation</i> | subedi.narayan@gmail.com |
| Wild foods in Bundabunda Ward Zambia: An assessment of diversity and potential contribution to food and nutrition security | Doreen Hikeezi, <i>School of Agricultural Science, University of Zambia, Zambia</i> | doreenhikeezi@yahoo.com |

THEME 2: AGRICULTURE AND HUMAN HEALTH LINKAGES

| TITLE | PRESENTER | CONTACT DETAILS |
|--|--|----------------------------------|
| Introducing length measurements as part of growth monitoring and promotion in rural Ghana: Reliability of length measurements by community nurses and health volunteers | Matilda Essandoh Laar, <i>McGill University, Montreal, Canada</i> | matilda.laar@tufts.edu |
| Improving micronutrient status in women and children through more efficient use of livestock carcasses | Robyn Alders, <i>University of Sydney, Australia</i> | robyn.alders@sydney.edu.au |
| Implications of Household Food Insecurity on Pregnancy Nutrition and Birth Outcomes: A Population-Based Prospective Cohort Study in South Western Ethiopia (PhD Project) | Alemzewed Roba, <i>Hawassa University, Ethiopia</i> | alemzewedcr2000@yahoo.com |
| Factor structure of women's empowerment and correlations with women's anaemia: A case study of Uganda | Amy Webb Girard, <i>Emory University, Atlanta, USA</i> | awebb3@emory.edu |
| Linkages between Health and Agriculture sectors in Ethiopia: A formative research exploring barriers, facilitators and opportunities to providing nutritional services | Girmay Ayana, <i>Ethiopian Public Health Institute</i> | girmayayana@yahoo.com |
| Demystifying the Pathways of Impact of a Livestock Transfer Program on Household Resilience and Food Security in Central Malawi | Jennifer Lane, <i>Land O'Lakes International Development, Malawi</i> | jennifer.lane@idd.landolakes.com |
| Food Safety Knowledge, Practices and Behaviors of Mothers and Caregivers in Tanzania | Joan Msuya, <i>Ohio State University, USA/ Tanzania</i> | joanmsuya@yahoo.com |
| Chicken ownership has a positive impact on length-for-age Z-scores of infants and young children in central Tanzania | Julia de Bruyn, <i>University of Sydney, Australia</i> | julia.debruyn@sydney.edu.au |
| Perceived role of container smoking in milk hygiene and safety: Results of qualitative exploratory study in Borana, Ethiopia | Kebede Amenu, <i>School of Veterinary Medicine, Hawassa University</i> | kamenu@gmail.com |
| Adherence to the World Health Organisation and Dutch Guidelines for a | Liesbeth Temme, <i>The National Institute for Public Health and</i> | Liesbeth.Temme@rivm.nl |

| | | |
|--|--|---|
| healthy diet and associations with environmental sustainability and (chronic disease) mortality; the EPIC-NL Cohort study. | <i>the Environment (RIVM), the Netherlands</i> | |
| Child Nutritional Status, Welfare and Health in Nigerian Households | Adesugba Margaret, <i>International Food Policy Research Institute, Nigeria</i> | madesugba@cgiar.org |
| Agronomic bio-fortification: A missing link in alleviating dietary zinc deficiency in Zimbabwe? | Muneta Grace Manzeke, <i>Soil Fertility Consortium for Southern Africa/ University of Zimbabwe</i> | manzekegrace@gmail.com / gmanzeke@agric.uz.ac.zw |
| The role of water, sanitation and hygiene in Agri-health linkage: an integrated approach for improved nutrition | Mulubirhan Assefa, <i>School of Public Health/Mekelle University, Ethiopia</i> | mulubirhanassefa@yahoo.com |

THEME 3: CONTRIBUTION OF AGRICULTURE AND FOOD SYSTEMS POLICIES AND PROGRAMMES TOWARDS NUTRITION

| TITLE | PRESENTER | CONTACT DETAILS |
|---|---|-----------------------------|
| One-Pot One-Hour: Policy Lessons for Agriculture and Nutrition Linkages in Health Extension (Rwanda) | Anne Wanlund, <i>Gardens for Health International, Rwanda</i> | anne@gardensforhealth.org |
| Nutrition Promotion via Agricultural Extension Services: Addressing mixed messages | Edye Kuyper, <i>University of California, Davis, United States</i> | emkuyper@ucdavis.edu |
| Food Insecurity Among Farming Households In Some Rural Areas Of North Western Nigeria: An Ordered Logit Regression Approach | Hussaini Yusuf Ibrahim, <i>Faculty of Agriculture Federal University, Nigeria</i> | ihussaini@fudutsinma.edu.ng |

THEME 4: DRIVERS OF FOOD ENVIRONMENT AT NATIONAL, COMMUNITY AND HOUSEHOLD LEVELS

| TITLE | PRESENTER | CONTACT DETAILS |
|--|--|-----------------------|
| Delivery of iron-fortified yoghurt, through a dairy value chain program, increases hemoglobin concentration among children 2 to 5 years in Northern Senegal. | Agnès Le Port, <i>IFPRI, Dakar, Senegal</i> | A.LePort@cgiar.org |
| Affordability of Nutritious Diets in Africa: Food Price Data Landscaping in Ghana and Tanzania | Anna Herforth, <i>Columbia University, USA</i> | anna@annaherforth.net |

| | | |
|--|---|----------------------------|
| Improving Complementary Feeding during the Lean Season: Results from a Trials of Improved Practices Study in the Mchinji District, Malawi | Meghan Anson, Concern Worldwide, Malawi | meghan.anson@concern.net |
| Drivers behind seasonal changes in household animal-source food consumption in Timor-Leste | Robyn Alders, <i>University of Sydney, Australia</i> | robyn.alders@sydney.edu.au |
| Nutrition knowledge, attitudes and dietary intake of women of reproductive age in Bundabunda Ward, Zambia | Hilda Lumbwe, <i>Department of Veterinary Services, Ministry of Fisheries and Livestock, Zambia</i> | hildalumbwe@gmail.com |

THEME 5: INSTITUTIONS AND GOVERNANCE OF FOOD SYSTEMS

| TITLE | PRESENTER | CONTACT DETAILS |
|--|---|----------------------|
| Institutional Understandings and Relationships to Address Agriculture-Nutrition Linkages in Ethiopia | Nick Chisholm, University College Cork, Ireland | n.chisholm@ucc.ie |
| Nutri Sensitive Micro Planning: an Approach to address malnutrition | Jayesh Joshi, <i>VAAGDHARA, India</i> | jjoshi@vaagdhara.org |

ANH Academy

Agriculture, Nutrition
& Health Academy

With thanks for additional support and sponsorship from:



**BILL & MELINDA
GATES foundation**

