



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Innovation Lab for Nutrition: 4th Annual Scientific Symposium

Minding the Gaps Along the Agriculture-to- Nutrition Pathway

18 – 20 July 2016, Kathmandu, Nepal

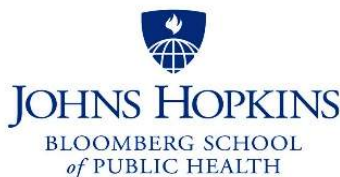
SYMPOSIUM SUMMARY

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<http://www.nutritioninnovationlab.org/2016-symposium/>



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INAUGURAL SESSION

The symposium began with welcome addresses by **Dr. Keith West** from the Innovation Lab for Nutrition and Johns Hopkins University and **Dr. Madhu Devkota** from the Institute of Medicine, Tribhuvan University. The aims of the symposium and a brief history of its growth over the years were introduced. Both speakers called upon the audience, specifically young scientists, to define the pathways between agriculture and nutrition and its scientific gaps and carefully track what works, and what remains to be unpacked.



The opening address, given by **Ms. Shanda Steimer** of USAID/ Nepal, highlighted the shared priorities of the US and Nepali governments, and how the symposium embodies those ideals. Citing past and future efforts, Steimer called for a continuing identification of best practices, and addressing the challenges of evidence-based program implementation.



Dr. Jessica Fanzo, from the Johns Hopkins University Berman Institute of Bioethics, delivered the keynote address that illustrated the global challenge in providing sustainable diets. As the world transitions through diets, there are health, environmental, social, ethical, and sovereignty challenges that arise. Tying together poverty reduction, climate change adaptation and food policy with globalization and food trade were emphasized as they collectively serve as a panacea in providing sustainable diets and enduring nutrition security.



The Joint Secretary of the National Planning Commission, **Mr. Madhu Kumar Marasini**, delivered remarks stressing the importance of scaling up high-impact interventions, as demonstrated by the Nepali government's commitments, the comprehensive nutrition policy Multi-Sectoral Nutrition Plan (MSNP). This is done by tackling infrastructure, establishing a private sector platform, and engaging parliament and media.



The Chief Guest, **Hon. Dr. Yuba Raj Khatiwada**, Vice-Chair of the National Planning Commission outlined sustainable and strategic investments to be made by the state, namely environmental protection, prioritizing investments in future generations, mobilizing communities, engagement in family-level outreach and emphasized the state's role in ensuring effective public health management.



As the Inaugural Session Chair, **the Hon. Prof. Dr. Geeta Bhakta Joshi**, member of the National Planning Commission emphasized the importance of generating quality data, and research showcase in strengthening coordination and managing shocks. Platforms such as the symposium were lauded as being ideal hubs to increase cross-disciplinary discussions in order to prioritize and plan a research agenda for tackling nutrition issues.



A MULTI-PRONGED APPROACH TO IMPROVING CHILD NUTRITION-RELATED OUTCOMES: METHODOLOGICAL APPROACHES & FINDINGS



Left to Right: Mr. Sanjay Rijal, Dr. Andrew L. Thorne-Lyman, Dr. Gerald Shively, Dr. Ganesh Thapa, Ms. Gogi Grewal, Ms. Bhim Kumari Pun, Dr. Kenda Cunningham, moderator Dr. Rolf Klemm

Dr. Kenda Cunningham	Suaahara: an at-scale, multi-sectoral nutrition program influences knowledge and practices while enhancing equity
Ms. Bhim Kumari Pun	Reaching disadvantaged groups through peers to improve health and nutrition behaviors
Ms. Gogi Grewal	“Sunaula Hazar Din” Community Action for Nutrition Project Impact Evaluation: Preliminary Midline Results
Dr. Gerald Shively Dr. Ganesh Thapa	Transportation Development and Child Nutrition in Nepal
Dr. Andrew L. Thorne-Lyman	Household food insecurity as a predictor of child development in peri-urban Nepal: A cross sectional analysis
Mr. Sanjay Rijal	Improvement in nutrition status among under 5 children in Karnali: evidence from linking IYCF with Child Grant (CG)

Dr. Kenda Cunningham, International Food Policy Research Institute

Dr. Kenda Cunningham shared lessons learned from the USAID-funded Suaahara program using data from a cross-sectional midline process evaluation study involving data from 480 households in both Suaahara (S) and comparison areas (C). The Suaahara study showed that there was a high level of exposure to nutrition information and services among pregnant women and mothers while the program also reached disadvantaged groups (DAG). In the S areas compared to C areas, knowledge was higher regarding early breastfeeding initiation (S: 91% vs C: 73%; P: <0.001); exclusive breastfeeding (S: 68% vs. C: 16%; P: <0.001); and about the need to provide extra meals during child illness (S: 54% vs. C: 19%; P: <0.001). Equity analysis showed that gaps were also narrower in Suaahara areas for most of these practices: women eating more during pregnancy (S diff: -3%; C diff: 19%; P: 0.01); and children consuming dairy (S diff: 6%; C diff: 18%; P: 0.03); and being introduced milk (S diff: -6%; C diff: 27%; P: 0.02) at 6 to 8 months. Dr. Cunningham stressed the importance of achieving high coverage and equity for multi-sectoral programs such as Suaahara.

Ms. Bhim Kumari Pun, Suaahara/Save the Children International

Ms. Bhim Kumari Pun presented a study seeking to understand Peer Facilitator (PF) effectiveness in improving IYCF behaviors and maternal practices during pregnancy and lactation in DAGs in the

Suaahara Program. Improvements were seen among women in the PF-exposed group in several reported practices: breast feeding the youngest child within one hour of birth (74% Vs 63%, $p < 0.001$), achieving a minimum recommended meal frequency (88% Vs 76%, $p < 0.05$) and feeding children egg (21% Vs 15%, $p < 0.05$) in past 24 hours and taking iron folic acid during pregnancy for recommended days (60% Vs 51%, $p < 0.05$).

Ms. Gogi Grewal, World Bank Nepal

Ms. Gogi Grewal presented the Sunaula Hazar Din (SHD) Community Action for Nutrition project impact evaluation and preliminary results for treatment effect at midline. Communities set a nutrition goal and submitted a plan and budget to the government. Reducing open defecation, promoting animal protein consumption and clean water were the priorities. Animal source food consumption doubled in expert recommended areas, while female leadership did not seem to influence expert recommended focus areas. Among outcomes assessed and reported to have improved were the percentages of pregnant women taking IFA supplements for at least 180 days, children under 6 months exclusively breastfed, households reporting no smoke in the room while cooking, and households reporting use of an improved toilet by 4%, 4%, 3% and 6% respectively.

Dr. Gerald Shively, Purdue University

Dr. Ganesh Thapa, International Food Policy Research Institute

Drs. Gerald Shively and Dr. Ganesh Thapa presented findings from a study examining ecological associations between transportation infrastructure and child nutrition in Nepal. Their presentation asked: is better road access tied to better nutritional status? Dr. Thapa described how multiple datasets (DHS, Department of Roads data) were merged to obtain the necessary variables. Roads were weighted based on road quality. Results showed significant positive associations between road density and HAZ and WHZ scores. On average, each additional 100 km per km² increase in sealed-road-equivalent density was associated with a 0.22-0.28 point higher average HAZ and 0.04-0.09 point higher district-average WHZ. Dr. Shively concluded that payoffs in improving nutritional status could occur with continued efforts to improve road access in rural Nepal.

Dr. Andrew L. Thorne-Lyman, Harvard University

Dr. Andrew L. Thorne-Lyman presented results from a cross-sectional study examining the association between household food insecurity and child development. Results showed poorer child development was more likely in households with more severe food insecurity: The odds of low development scores based on standardized tests was 1.33 times higher among food insecure than food secure households ($p < 0.5$). Dr. Thorne-Lyman advocated that more frequent use of field-adapted, validated child development tests would better enable researchers to reveal pathways between child nutrition, reflected by stunting, and development in the future.

Mr. Sanjay Rijal, UNICEF

Mr. Sanjay Rijal presented evidence from a baseline and endline cross-sectional study for national expansion of the Nepal Government's Child Grant (CG) Program in 5 Karnali districts (Jumla, Humla, Dolpa, Mugu and Kalikot). Using quantitative and qualitative methods, the study assessed changes in child dietary practices that occurred during the 5-year implementation of an Infant and Young

Child Feeding (IYCF) program. Since the rollout of the CG program, the proportion of children receiving complementary food above 6 months of age rose from 24% at baseline to 36% at end line. Also, minimum meal frequency, minimum dietary diversity and minimum acceptable diets have all improved in program areas, although patterns in exclusive breastfeeding were mixed, being higher in Dolpa and Jumla but lower in Kalikot, Mugu and Humla at endline compared to baseline.

NUTRITION GOVERNANCE: LEVERAGING MULTIPLE SECTORS FOR SUSTAINED NUTRITION SECURITY THROUGH NEPAL'S MULTI-SECTORAL NUTRITION PLAN (MSNP)

Mr. Pradiumna Dahal	A Journey to MSNP: Evolution, Process, and Way Forward
Dr. Patrick Webb	Measuring Nutrition Governance in Nepal
Ms. Savita Malla	Advocacy and Communication Strategies for Increasing Engagement of Sectors and Stakeholders
Mr. Madhukar Shrestha	Pathways to Better Nutrition: Findings from Nepal



Left to Right: Mr. Madhukar Shrestha, Ms. Savita Malla, Mr. Pradiumna Dahal, Dr. Patrick Webb, moderator Mr. Atmaram Pandey

Mr. Pradiumna Dahal, UNICEF

Mr. Pradiumna Dahal outlined the history and evolution of MSNP. Challenges included inadequate capacity and a varied understanding of how to implement the MSNP. Despite challenges in implementing the MSNP, its strengths were the participatory and inclusive development of the plan, the enabling of environments for multi-sector collaboration, and high level nutrition champions. Informed by the evidence review, situation analysis, causality analysis, and theory of change programming, a new MSNP-II (2018-2022) has been developed.

Prof. Dr. Patrick Webb, Tufts University

Dr. Patrick Webb discussed the role of 'nutrition governance' in supporting effective pro-nutrition policy implementation across ministries and sectors. Using PoSHAN Policy Study survey data (2013), Dr. Webb showed that the odds of feeling sufficiently consulted, discussing nutrition frequently with colleagues and the adequacy of their colleagues' training for nutrition was 2.1, 2.1 and 1.9 times higher in MSNP sites compared to other sites respectively. Significant improvements due to multi-sector actions were reported for certain domains such as making policy decisions based on technical evidence relating to nutrition (55.3% in 2014 to 90.4% in 2015) and attempting to include all stakeholders in discussions on nutrition (48.5% in 2014 to 63.2% in 2015). Persistent obstacles to effective policy making, however, remains such as there being a lack of information-sharing across

ministries, necessary financial resources, and clear definition and delineation of responsibilities. Dr. Webb noted there are opportunities to measure effective nutrition governance when sample sizes are large and questions are carefully developed and tested.

Ms. Savita Malla, National Planning Commission

Ms. Savita Malla presented the advocacy and communication strategy of the MSNP and key strategic tools - advocacy with multisectoral stakeholders, social mobilization, behavior change communication on social values and norms and positive behavior promotion through change agents/groups – to implement the strategy. In presenting evidence of how these strategies have been implemented, Ms. Malla made the case for advocacy strategies targeted at a wide range of stakeholders – policy makers, communities and households - and their ability to influence social norms, values and practices that play a role in determining nutritional status of populations. Future efforts to understand the impact of such strategies could include the measurement of process and outcome indicators where the strategy has been implemented to ascertain impact of these strategies.

Mr. Madhukar Shrestha, SPRING/Helen Keller International

As MSNP aims to reduce maternal and child undernutrition through multi-sectoral collaboration, Mr. Madhukar Shrestha presented how SPRING's Pathways to Better Nutrition study tracked plans, drivers of change, priorities, and funding. The MSNP increased priorities and financing for nutrition between 2014-2016, including in the agriculture sector, and understanding of MSNP was improved. This evidence supports MSNP implementation process improvements.

STORIES OF CHANGE IN NUTRITION IN NEPAL LAUNCH

The Stories of Change in Nutrition launch was led by **Dr. Kenda Cunningham** from the International Food Policy Research Institute. Quantitative data, mothers' perspectives, and policy opinions sought were used to offer explanations for Nepal's improvements in child nutrition from 1996-2011. Noted, was a steady decline in the prevalence of stunting, wasting and maternal underweight during this 15-year time period. Major factors ('drivers') seeming to explain improved height for age of children included an increased asset index, better maternal education, improved health services and sanitation in the country. Factors associated with improvements in child growth was increased access to health services while factors associated with improvements in child weight gain were improved sanitation and health services. The major contributors to higher maternal weights were sanitation (35%) and asset accumulation (19%). Despite a few weaknesses of MSNP, Dr. Kenda also noted that MSNP has led to governmental prioritization of nutrition activities.



Left to Right: Mr. Madhu Kumar Marasini, Dr. Ramesh Kant Adhikari, Dr. Rajendra Prasad Pant

The panel, consisting of **Dr. Rajendra Prasad Pant**, **Dr. Ramesh Kant Adhikari**, and **Mr. Madhu Kumar Marasini**, noted the importance yet insufficiency of economic growth in improving childhood nutrition. New and unmet challenges such as anemia and food safety, and the push to use economic growth to build infrastructure, were also

highlighted. Upcoming goals for the Nepal Government include mitigating income inequality, increasing education access and improving women’s empowerment. Dr. Cunningham concluded the session by highlighting the importance of the political and economic context in setting the stage for advancing food security and improved nutritional status in the country.

BRAC APPROACH TO TACKLING ULTRA POVERTY: EXPERIENCES FROM AROUND THE WORLD

On 19 July 2016, **Dr. Ahmed Mushtaque Raza Chowdhury, Vice-Chair of BRAC**, delivered **the day’s keynote address** where he noted the critical role civil society organizations play in reducing poverty and improving health and life expectancy by working in economic development, social protection, expanding horizons, empowerment, and well-being and resilience. Dr. Chowdhury noted that despite progress, challenges remain: deeply impoverished households are socially invisible and are often not reached by poverty reduction programs. BRAC’s innovative but intensive model for reaching the ultra-poor, the “Graduation Program” have produced remarkable outcomes. Studies have documented its impact on poverty reduction and improved well-being. Dr. Chowdhury concluded by asserting that for those lowest on the economic spectrum, a “big push” intervention may provide critical leverage for upward mobility.



THE ROLE OF HOME FOOD PRODUCTION IN CONSUMPTION

Dr. Devendra Gauchan	Role of Home Gardens in Homestead Production, Biodiversity Conservation and Family Nutrition in Nepal
Mr. Bishnu Dulal	Homesteaded Food Production and Dietary Diversity of Women and Children (6-23m) in rural Nepal: An Associational Analysis
Dr. Keith West	Home Food Production Buffers against a Diet of Impoverishment in Rural Nepal



Left to right: Dr. Keith West, Mr. Bishnu Dulal, Dr. Devendra Gauchan, moderator Dr. Shibani Ghosh

Dr. Devendra Gauchan, Bioversity International - Nepal

Bioversity International's home garden program supports households cultivating diverse species of plants. Its goal is to substantially contribute to families' food and income. Dr. Devendra Gauchan explored the value of promoting bio-diverse home gardens as an environmentally and economically sustainable way to increase access to and consumption of nutritious food. Among the households that adopted home gardens (HG), there was an associated 14%, 21% and 29% increase in total cultivated species and varieties, total cultivated vegetable species and varieties and traditional species and varieties grown respectively. Adoption of the HG approach was associated with a net 600 kg increase in total farm production among households that adopted a HG approach compared to the control group making a case for HG contributing to overall on-farm maintenance and nutrition. In households that adopted HG, the share of HG income to agrichash income was associated with a 50% increase in consumption of nutrient rich fruits and vegetables. The households adopting HG technology had on average a 383.9 kg production gain, Rs 5941.0 income gain and 126.3 kg consumption gain as compared to the households that did not adopt this technology. Home gardens can be improved by linking nuclear units with market access and utilization. Expanding access to training and empowering women and the land-poor can help to promote the cultivation of such gardens.

Mr. Bishnu Dulal, Suaahara/Helen Keller International

The Homestead Food Production (HFP) component of Suaahara aims to increase access to and consumption of locally produced, nutrient-dense and diverse foods (via seed and chick distribution, vegetable garden cultivation, technical, agriculture and livestock training, etc.) Using cross-sectional seasonal monitoring data, Mr. Bishnu Dulal described a study that indicated a positive and significant association of HFP participation with dietary diversity for mothers ($\beta=0.05$, $P=0.010$) and young children ($\beta=0.07$, $P=0.017$). The degree of HFP participation was positively associated with the degree of child dietary diversity.

Dr. Keith West, Johns Hopkins University

Using the PoSHAN data – an annual longitudinal household survey conducted across Nepal's three agro-ecological regions – Dr. Keith West presented data cross-sectionally assessing the association between seven-day maternal food frequency and home-grown food in rainy and dry seasons. Household production of animal source foods, carotene-rich fruits and vegetables, and other fruits and vegetables was associated with a significantly increased odds of consuming those foods. Diets of women were poor in quality: median intakes are often 0 to 2 times per week for non-staples. 20-40% of households produced nutritious foods and were more likely to consume them. The analysis points towards progress opportunities via home food production.

THE INFLUENCE OF MYCOTOXINS ON FOOD AVAILABILITY AND NUTRITIONAL STATUS

Dr. Ahmed Kablan	International Concerns in Food Safety/Food Security: a USAID Perspective
Ms. Johanna Y. Andrews-Treviño	"Molds Attack Rice - But We Don't Know What To Do" – A Qualitative Study Of Farming Families' Perceptions Of Food Safety In Banke, Nepal
Dr. Shibani Ghosh	Factors associated with serum aflatoxin levels in pregnant women in Banke district, Nepal – Aflacohort Study



Left to Right: Dr. Shibani Ghosh, Ms. Johanna Y. Andrews-Treviño, Dr. Ahmed Kablan, moderator Dr. Baidya Nath Mahato

Dr. Ahmed Kablan, USAID

Dr. Ahmad Kablan noted that as dietary diversity increases, so do food safety concerns, especially chemical and biological food contamination. Limited budgets often interfere with attempts to address food safety concerns. Currently, food safety efforts focus heavily on mycotoxins, particularly aflatoxins. More coordination and integrated project design within USAID (GH, DHCA, BFS) and with other agencies (CDC, FDA, USDA) is required. Food safety is important to foreign assistance for trade advancement, improving public health and enhancing food security and nutrition.

Ms. Johanna Y. Andrews-Trevino, Tufts University

The results from the qualitative study that Ms. Johanna Y. Andrews-Trevino presented helped characterize food safety-related knowledge and practices of farming families, particularly aflatoxin exposure and mold. While farmers did report sorting mold-affected food, and were for the most part able to recognize aflatoxin producing molds through shown pictures, none had heard about aflatoxins. Major issues discussed included pests, pesticide overuse, molds, and unpredictable weather. Food safety was affected by lack of knowledge, lack of time, and lack of inputs and infrastructure. Participants reported employing a mixture of both effective and ineffective food safety strategies.

Dr. Shibani Ghosh, Tufts University

Dr. Shibani Ghosh described results from a preliminary analysis of serum aflatoxin (AFB1) and its associated factors in a sub-sample of pregnant women in a cohort study. Ninety-five percent of the women had detectable serum aflatoxin levels. There was a negative association between serum AFB1 levels and age of pregnant women and education, but it was statistically significant for age only. The high risk foods examined in relationship to AFB1 exposure were rice, maize, maize products, and groundnuts. Both maize and groundnut consumption had significant association with

the serum aflatoxin level. Women who reported purchasing rice (26%) had significantly higher levels of serum AFB1 (but not maize or ground nuts which were purchased by more households). The next steps include examining the role of high and low aflatoxin levels on birth outcomes and child growth.

APPROACHES TO IMPROVE AGRICULTURAL PRODUCTION

Dr. Y. B. Thapa	Approaches for Improving Food and Nutrition Security: Vision of Agriculture Development Strategy, Nepal
Mr. Damodar Kanel	Application of a crop yield forecasting tool for cereal crop production in Nepal to strengthen early warning and planning for agriculture and food security
Dr. Sunila Rai	Periphyton Enhanced System to Increase Yield in Polyculture Ponds with Carps and Small Indigenous Species



Left to Right: Mr. Damodar Kanel, Dr. Sunila Rai, Dr. Y. B. Thapa, moderator Dr. Devendra Gauchan

Dr. Y. B. Thapa, Nepal Agricultural Economics Society

Nepal's expected population increase poses challenges to food and nutrition security (FNS). FNS are crosscutting topics and fit well within several Agricultural Development Strategy (ADS) components. Dr. Y. B. Thapa advocated for ADS and FNS cohesion and triangulation. Sharing methods to calculate the composite score of the FNS impact on ADS, he explained how the ADS is affordable, and although FNS only makes up 5% of the costs, all other components are indirect investments in FNS.

Mr. Damodar Kanel, United Nations World Food Programme

Mr. Damodar Kanel presented a crop yield forecasting tool: Regional Agricultural Forecasting Toolbox (CRAFT), the first such tool customized for South Asia, which was developed as part of Nepal Food Security Monitoring System (NeKSAP). Innovatively incorporating weather/seasonal predictors and other factors (soil quality, crop and irrigation mask, etc.) the tool aims to provide reliable forecasts prior to the harvest of cereal crops. Only having started last year, the model has shown promising results: estimates and forecasts were closely related. There was less than 1% and 3% difference between the 2014/15 forecast and estimate in wheat and paddy production respectively. The tool has great potential to minimize adverse impacts of decreased production.

Dr. Sunila Rai, Agriculture and Forestry University

Dr. Sunila Rai presented results of trials examining the effects of periphyton enhanced systems on increased yield in polyculture ponds with carp and small indigenous species (SIS). Data was collected on growth, water quality, and periphyton analysis. From two trials, including a farm trial, higher

production and profits were found when using carp, SIS, 50% feed, and bamboo mats method. In on-station trial, the net fish yield was 5.5 ton/ha/yr and the gross margin was NRs 5557.9 using that method. The farm trial in Chitwan and Nawalparasi districts showed that the fish production increased by 34.6 kg/pond and 35.2 kg/pond respectively among farmers adopting the method. Similarly, the income increased by NRs 8650/pond and NRs 9524/pond in Chitwan and Nawalparasi districts respectively. Given that the technology uses locally available, cost effective, and sustainable materials, Dr. Rai suggested scaling up such trials in communities to transfer the technology to farmers, given the promising trial results.

ROLE OF WOMEN IN IMPROVING CHILD NUTRITION OUTCOMES



Left to Right: Ms. Rupa Shiwakoti, Dr. Rolf Klemm, Dr. Laurie Miller, moderator Prof. Dr. Sharad Onta

Dr. Laurie Miller	Does the education level of women participants influence their response to a community development intervention?
Dr. Rolf Klemm	The quality of a woman's diet & nutritional status is strongly associated with household food insecurity in rural in Nepal
Ms. Rupa Shiwakoti	Women's Empowerment and Nutritional Status of Children: A Community-based Study from Selected Village Development Committees of Bhaktapur District, Nepal

Dr. Laurie Miller, Tufts University

Dr. Laurie Miller presented findings from a cluster randomized study assessing how women's education levels influenced response to an intensive livestock-based intervention implemented by Heifer Nepal that aimed to improve participating households' living standards. The rate of increase in SES was significantly higher for women with higher education levels. Households with women with higher education levels made greater gains in household hygiene and child dietary diversity. Height-for-age only improved among children with the most educated mothers. Results suggested that education mediates the participants' ability to utilize inputs and to put intervention-related behaviors into practice.

Dr. Rolf Klemm, Johns Hopkins University

Dr. Rolf Klemm presented data from the PoSHAN community study and described the relationship between household food security, dietary intake and women's nutritional status. Household food insecurity was the highest in mountains (48.8%) followed by hills (40.1%) and terai (35.2%). Dr. Klemm highlighted the fact that inadequate dietary intake and poor nutritional status were poverty driven. There were associations between women's dietary diversity and nutritional status, and

household food insecurity: women's dietary diversity and nutrition status worsened with increased severity of household food insecurity. The woman's dietary diversity score was 7.0 in food secure households and 5.3 in households with severe food insecurity. Thirty-one percent of the women experiencing severe household food insecurity had low BMI (<18.5) and 37% of them had low MUAC (<22.5cm). Dr. Klemm also noted the utility of the HFIAS scale for identifying vulnerable households due to the strong relationship between wealth quintile and food security and the observed seasonal patterns.

Ms. Rupa Shiwakoti, Karuna Foundation

Ms. Rupa Shiwakoti presented the findings from cross-sectional study aimed at assessing the relationship between the maternal empowerment levels and nutritional status of their young children. The findings showed strong associations between empowerment and nutrition outcomes even after adjusting for numerous demographic covariates. There was a five-fold increase in odds of underweight, a three-fold increase in odds of stunting, and a ten-fold increase in odds of wasting among children whose mothers had low empowerment status compared to high empowerment status.

STUDENT SESSION

The student session was held to expose students from a variety of disciplinary backgrounds (agriculture, nutrition, public health, forestry) from Nepali universities to the public health nutrition methodology, specifically dietary assessments. Sixteen nominated students also presented posters and received feedback from an interdisciplinary team of US and Nepali faculty, as well as their peers. The wide range of poster topics covered agricultural techniques for improved production to factors affecting nutritional outcomes and food security. The Student Poster Competition was won by Baburam Acharya, who presented on factors affecting anemia in Lalitpur, followed by Milan Dhakal and Rekha KC in 2nd and 3rd place, respectively.



DIETARY ASSESSMENT WORKSHOP: In collaboration with the symposium secretariat, faculty from the Dept. of Community Medicine and Public Health, Institute of Medicine, headed by **Dr. Madhu Dixit Devkota**, organized and led an informative and insightful dietary assessment workshop and set the stage for the day's activities.

Dr. Archana Amatya gave an introduction to dietary assessments, describing their definition and purpose. She then reviewed the different methods for dietary assessment and noted the strengths and weaknesses of each method that should be considered when applying methods to a particular research questions and context.

Dr. Binjwala Shrestha expanded on understanding context, describing the necessity of adopting a cultural and social lens in studying dietary intake. She went on to elaborate on food belief systems and how they influence nutritional status.

Finally, **Dr. Nani Shova Shakya** described dietary assessment methods used in dietetics and clinical settings. This served to set students up to participate in a hands-on dietary assessment exercise

where food portion models and food exchange tables were used to expose students to nutrient composition calculations and assessing portion sizes. The dynamic session concluded with students weighing and calculating the macronutrient content of portions of their own meals at lunchtime.

PANEL DISCUSSION

A panel discussion with local and international experts provided students the chance to learn about topics salient to nutrition and dietary assessment and to ask questions to experts. Issues discussed ranged from the technical, such as the difference between nutritional status and dietary intake, to the socio-cultural, such as the need to be sensitive and empathetic when asking questions about child feeding practices. Discussions highlighted the challenges in accounting cooking and processing in assessing nutrient intake, factors affecting iron and zinc bioavailability, and the importance of study design in establishing causality between dietary intakes and disease outcomes.



POSTER SESSION

The winner of the poster session held on the second day was **KP Lamsal**, from the **Nepali Technical Assistance Group**, as voted for the symposium attendees. The runner up was **Sumit Karn**, from the **Food and Agriculture Organization**



Presenter	Poster Title
Rupendra Chaulagain	Prevalence and Risk Factors of Porcine Cysticercosis in Kathmandu Valley, Nepal
Bijay Khanal	Effect of Medicated and Non-Medicated Multi-nutrient Block on Milk production, composition and Gastro-intestinal Parasites in Buffalo
KP Lamsal	Safety of Energy Drinks and Its Impact on Public Health
Tania Sharmin	Interdisciplinary support to the smallholder farmers for changing their nutritional behavior in southwest Bangladesh
Suneel Piryani	Adolescents Students' Nutritional Status in Government and Private Schools of Lalitpur sub-metropolitan city, Nepal
Ashma Luitel	Promoting Yoghurt to Improve Child Nutrition in Far-Western Nepal (The Big Ideas DAHI Project): Learning and experiences with designing and implementing a Behavior Change Communication (BCC) campaign
Chet Raj Pant	Maternal and Child Health Nutrition in Madan Pokhara: An Evaluation of the Reach and Effectiveness of the Multi-Sectoral Nutrition Plan
Mohan Sharma	Understanding seasonal variation and spatial differences to the milk production and house hold nutrition in Gandaki River Basin (GRB)
Chandra Puri	Household Nutritional Security and Women's Income Generation Through Drip Irrigation for Kitchen Gardens In Syangja District, Nepal
Sandhya Lohani	How does your life change when he leaves? Gender dynamics and agricultural work in the context of labor migration and the recent earthquake in Nepal
Samsher Basnet	Bucket Drip Irrigation Kit Use for Vegetable Production and Building Women's Enterprise in Drought Prone Kapilvastu District, Nepal
Ashika Sharma	Influence of Front-of Pack Nutrition Claims on Urban Nepalis' Perceptions of and Purchase Intentions Towards Snack Foods
Sudeep Uprety	Strengthening Media Response to Nutrition and Health Issues in Urban Settings of Nepal: An Implementation Research Experience
Merina Shrestha	Testing of a Field-Friendly Method to Measure the Potential Impact of Food Security and Nutritional Interventions on Child Development in Banke, Nepal
Dilip Kumar Jha	Creating Awareness of Nutritional Value of Fisheries in Rural Nepal
Ram Krishna Neupane	Validation Of Nutrient Expert Tool For Site Specific Fertilizer Recommendation To Enhance Productivity of Rice, Wheat and Maize Among Small-holder Farmers in Jhapa and Morang Districts of Nepal

Presenter	Poster Title
Sumit Karn	Engaging Women in Rural Poultry Program for Promotion of Animal Source Foods Intake at Household Level
Nirmala Pandey	Improved animal housing and fodder management to cope with livestock feed crisis and health in Bajura District; Nepal
Sudarshan Paudel	Nutritional Status of Young Children (6-12 years) at Dukuchhap Village in Lalitpur District: a cross sectional survey
Ram Krishna Chandyo	Prevalence of vitamin A deficiency among lactating mothers and infants in Bhaktapur, Nepal
Anushree KC	Anemia status in pregnant women in Banke, Nepal
Ashish Pokharel	Factors linked to low MUAC in pregnant women in Banke, Nepal

THE WAY FORWARD

Dr. Patrick Webb, Director of USAID's Feed the Future Nutrition Innovation Lab, in his closing remarks, underlined the symposium's purpose again: focus on gaps to prevent bad judgments and bad decisions. While complex, unpacking the linkages between agriculture and nutrition is possible and progress can be made. As reflected during the symposium: strength of research has improved with studies moving from descriptive to impact evaluations and more causal analyses. Webb noted that the prominence of dietary diversity and its limitations. He called for attention to the need for market access and roads to improve food and nutrition security and urged more concerted efforts to understand the role of food safety across the agriculture-nutrition pathway. Webb concluded that collectively; academics, policy makers and program implementers in Nepal; are on our way to achieve to our intended goal: research to policy and its implementation.



A special thanks to Chandni Karmacharya & Swetha Manohar, lead organizers of the event, the Symposium Secretariat, co-hosting organizations: the Nepali Technical Assistant Group (NTAG), Institute of Medicine, Johns Hopkins University, Tufts University, the Nepal Agriculture Research Council (NARC) and, the event's funders, the USAID/ Nepal