7th Annual Feed the Future Innovation Lab for Nutrition
Scientific Symposium

AGRICULTURE TO NUTRITION:
PATHWAYS TO RESILIENCE

PROCEEDINGS REPORT

HOTEL YAK AND YETI
KATHMANDU, NEPAL
DECEMBER 10-12, 2019

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FOR MORE INFORMATION VISIT:
https://www.nutritioninnovationlab.org/symposiums/2019-symposium
ABOUT THE SYMPOSIUM

The Feed the Future Innovation Lab for Nutrition hosted the 7th Annual Scientific Symposium on Agriculture to Nutrition: Pathways to Resilience from 10-12th December 2019 in Kathmandu, Nepal. The thematic focus of symposium was building resilience, a concept gaining attention within the development world, and when adopted, seeks to anticipate, absorb, accommodate or recover from disasters and crises in a prompt, efficient and sustainable manner. Building resilience includes protecting, restoring and improving livelihoods systems in the face of threats that impact agriculture, nutrition, food security and food safety, especially in the context of low- and middle-income countries. The three-day event brought together 459 participants from the government, local, regional and international academics, program implementers, policy makers and students. The symposium had seven scientific abstract-driven sessions with 30 presentations, two policy panel discussions and 45 poster presentations. The seven workshops held on the final day of the symposium focused on academic writing, ethical approval process, measuring resilience, use of open data tool kit and, dietetics were attended by 176 participants. Two satellite events, the first by the Global Panel on Agriculture and Food Systems for Nutrition (GloPAN) and the next by the World Vegetable Center (WorldVeg), were also held this year. GloPAN launched its new online, interactive policy tool: Food Systems and Diets: a handbook of essential policies, that provides evidence and recommendations on food system strengthening in low-middle income countries. WorldVeg presented their pilot study on novel school garden design that targeted children and their caregivers jointly with garden- and nutrition-based education to create changes in food behavior.
DAY 1: DECEMBER 10TH, 2019

WELCOME REMARKS

Dr. Ramesh Kant Adhikari, chair of the symposium steering committee, and Dr. Andrew Thorne-Lyman from Johns Hopkins University and Feed the Future Innovation Lab for Nutrition, delivered the welcoming remarks on behalf of the organizers. Dr. Adhikari welcomed participants and introduced the symposium theme of resilience, calling on academicians, policymakers, and program implementers to focus on protecting and restoring food systems to improve nutrition. Dr. Thorne-Lyman highlighted the breadth of this year’s conference, with sessions on public-private partnerships, social inequality, agricultural practices and, food safety and encouraged attendees to engage in the skill-building workshops. Both speakers emphasized the growth of the symposia, with over 450 participants this year and 152 abstracts received, showing the growing trend of interdisciplinary approaches to improve nutrition through agriculture.

OPENING REMARKS

Ms. Adriana Hayes, Acting Mission Director of USAID Nepal, delivered the opening remarks at this year’s symposium. Ms. Hayes commended Nepal’s strong commitment to improving nutrition, as exemplified by the government’s significant investments in nutrition and its multisectoral nutrition plan. She attributed Nepal’s decline in stunting to strong government leadership, collaboration, and integration of research in implementation. She described a need for further research on the impact of social inequality, socio-cultural norms, biological mechanisms, and the effect of labor migration on nutrition in Nepal. Ms. Hayes concluded by encouraging attendees to use the conference as an opportunity to continue and inspire future collaboration in research, policy, and implementation.

INAUGURAL ADDRESS

Dr. Dil Bahadur Gurung, Honorable Member of the National Planning Commission, recognized Nepal’s gains in nutrition, while acknowledging the current trends of continued undernutrition in children and growing overnutrition. With many factors affecting the agriculture to nutrition pathway, Dr. Gurung highlighted the need to scale up nutrition through a multisectoral, evidenced-based approach in nutrition policy and planning. He emphasized the Government of Nepal’s prioritization of nutrition, as demonstrated by the Multisectoral Nutrition Plan, whereby, several ministries are committed to improving food access, food security, and safety. Dr. Gurung called on the symposium researchers to collaborate with the government to come up with evidence-based policies and programs for the future.
In his keynote address, Dr. Howarth Bouis, Founding Director of Harvest Plus and Senior Research Fellow at IFPRI, provided an economist’s perspective on agricultural strategies to improve nutrition. Dr. Bouis presented evidence on how the green revolution led to increased production and decreased prices for staples, providing the necessary calories for a growing population, but the same trend was not experienced by production and prices of non-staple foods. He stressed how increasing prices of vegetables, fruits, animal products, and pulses require poor populations to fulfill their caloric needs predominantly via staples and their dietary quality is constrained by price, resulting in high rates of micronutrient deficiencies. He presented the need for agricultural interventions that increase production and lower prices of nutritious foods, along with biofortification to increase the nutritional quality of affordable and widely consumed staples. Dr. Bouis concluded a mix of these direct and indirect approaches, along with long-term commitments to agricultural programs are necessary in addressing diet quality to reduce malnutrition.

In his keynote address, Dr. Reddy, President of the Public Health Foundation of India, described how climate change, commerce, and conflict pose challenges to agriculture and food systems, making them increasingly vulnerable. He explained climate change poses serious threats to agriculture and nutrition, through decreased yields caused by heat stress, droughts, pests and temperature fluctuations. To combat the effect of climate change on agriculture, Dr. Reddy suggested diversification of crops and introducing policy actions that promote climate smart agriculture. In commerce, Dr. Reddy described a mismatch between the science of nutrition and the marketing of nutrition and a similar contrast between what foods are needed for optimal nutrition compared to what foods are being produced. He expressed the need for policy interventions to regulate commerce and improve diet quality. Conflict, Dr. Reddy explained, can perpetuate crises that result in agricultural shortages and threaten the resilience of the food system. Dr. Reddy concluded by urging attendees to take action on climate, commerce, and conflict to protect food systems and agricultural production for future generations.
HIGHLIGHTS FROM THE GOVERNMENT OF NEPAL’S MULTISECTORAL NUTRITION PLAN

KIRAN RUPAKHETEE, JOINT SECRETARY, NATIONAL PLANNING COMMISSION, NEPAL

Dr. Rupakhetee, Joint Secretary of the National Planning Commission, stated Nepal’s stunting rate is decreasing by 3.1% annually, but that this rate needs to be increased to achieve the SDG goals. He presented highlights of Nepal’s second Multisectoral Nutrition Plan (MSNP II) which brings together the health, WASH, agriculture, women and children, local development, and education sectors to improve nutrition. Under the new government scheme, the MSNP II provides grants from the federal government to the provincial governments, that distribute to the local governments for nutrition-related policies and programs. Dr. Rupakhetee explained the MSNP II promotes agricultural inputs, diversified crops and local foods to support a more resilient food system. Some of the challenges he mentioned were the new decentralized government structure, especially building capacity at the provincial and local levels, and ethical, meaningful private sector engagement.

AGRICULTURE TO NUTRITION PATHWAYS

MODERATOR: TEK BAHADUR GURUNG, NEPAL AGRICULTURAL RESEARCH COUNCIL

LIVESTOCK PRODUCTS AND HOUSEHOLD FOOD INSECURITY IN NIGERIA

YUSUF M. ADEKUNLE, INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE (IITA), NIGERIA

Mr. Adekunle presented research on the relationship between household livestock production and household food insecurity in Nigeria. Using data from General Household Survey for Nigeria, Mr. Adekunle revealed high levels of food insecurity across the country, with 52% of the population being mildly food insecure and 11.6% being severely food insecure. Households not producing eggs or milk was associated with a 12.6% greater probability of being severely food insecure. Mr. Adekunle found a reduction in severe food insecurity when households produced eggs and milk, with the greatest reductions among female-headed households. He further demonstrated the selling of eggs and milk produced in
households was associated with a reduction in food insecurity, though the effect was found to be stronger for eggs than for milk. Mr. Adekunle concluded by stating that household egg and milk production, combined with facilitation of market access to sell the livestock products, are promising strategies to reduce food insecurity in Nigeria.

SOILS AND SOUTH ASIAN STUNTING: LOW SOIL ZINC AVAILABILITY DRIVES CHILD STUNTING IN NEPAL
LEAH BEVIS, OHIO STATE UNIVERSITY, USA

Dr. Bevis explained that while zinc deficiency may arise from poor diet diversity and insufficient intake of animal source foods, low zinc concentrations in crops may also play a role in insufficient intakes. Using stunting as an indicator of zinc deficiency, Dr. Bevis sought to understand the relationship between soil zinc availability and stunting in Nepal. Using soil maps of the Terai based on 11,670 soil samples and NDHS data on stunting, Dr. Bevis revealed a 3-4% reduction in stunting from low to high soil zinc areas. She also found a significant reduction in anemia between low to high zinc areas and that the relationship between zinc soil concentration and stunting was strongest in farmers and areas with less market access. Dr. Bevis suggested fertilizers fortified in zinc could be used to increase zinc soil and crop concentrations and subsequently decrease zinc deficiency in Nepal.

PATHWAYS BETWEEN AGRICULTURE AND NUTRITION: AN EVIDENCE AND GAP MAP OF RESEARCH TOOLS, METRICS AND METHODS
THALIA SPARLING, IMMANA/ UNIVERSITY COLLEGE LONDON, UK

Dr. Sparling explained that the food crisis in 2008 led to increased funding in methods and tools to better understand and measure the agriculture to nutrition pathway. After conducting an extensive systematic literature review of the various tools, metrics and methods published in the last decade, Dr. Sparling mapped the innovations onto existing agriculture-nutrition frameworks to see where the gaps in evidence lie. She provided a demonstration of the Gap Map interactive visualizer, showing how filters can be used to explore the tools, methods, and metrics stratified over twelve thematic domains and their sub-divisions. Dr. Sparling demonstrated how some areas, such as food production, water footprint, ecology, and climate change, experienced a proliferation of innovations, while others experienced much less growth. Finally, Dr. Sparling encouraged attendees to use the interactive resource as a tool to address the existing evidence gaps in the agriculture to nutrition pathway.
SAFE FOOD FOR A HEALTHIER NEPAL: PRIMING A NATIONAL AFLATOXION RESPONSE
JAGGER HARVEY, KANSAS STATE UNIVERSITY, USA

To address the specter of harmful fungal toxins (mycotoxins/aflatoxin) in Nepal, the Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss (PHLIL) has mobilized an international, interdisciplinary team to enhance capacity within the Nepali research system, characterize aflatoxin contamination in the food and feed supply, and work with a diverse set of stakeholders to resolve a plan to reduce future contamination. The project established a new, versatile mycotoxin laboratory at the Nepal Academy of Science and Technology, which played a critical role in surveying markets and households in 20 districts in the west, mid-west and far-west Terai and Hills. The survey found aflatoxin contamination was: higher in maize and groundnut; moderate in chilies and soy nuggets; and low in wheat-based infant complementary food and rice. Another important project component was investigating the association of food contamination, aflatoxin exposure and stunting. In this presentation, Dr. Harvey synthesized project results across the biophysical, agro-economic, risk communication and policy spaces, and discussed the emerging stakeholder-informed, integrated plan to reduce aflatoxin problem in Nepal.

AGRICULTURE, FOOD SECURITY AND NUTRITION: A CAUSAL MEDIATION ANALYSIS OF A MULTI-SECTORAL INTERVENTION
KENDA CUNNINGHAM, SUAAHARA II (USAID), HELEN KELLER INTERNATIONAL, NEPAL

Dr. Cunningham presented preliminary results on Suahara II, a large-scale, multi-component intervention package being delivered across Nepal with the aim of improving maternal and child nutritional outcomes. The specific research question Dr. Cunningham addressed was the impact of exposure to social and behavior change communication (SBCC) on maternal and child dietary diversity. She presented the pathways by which exposure to SBCCs on enhanced homestead food production could impact dietary diversity, while considering various mediators along the pathway. Dr. Cunningham found an association between SBCC exposure and dietary diversity, but that the effect size was small. However, the effect size increased with greater exposure to SBCCs and in those receiving the Agriculture Plus package (enhanced homestead food production, intensive health, WASH and GESI). Dr. Cunningham concluded by saying further research needs to be conducted to understand the mediators impacting the effectiveness and reach of SBCCs in promoting dietary diversity and investment in agricultural inputs should complement SBCC interventions.
The panelists discussed the role of the private sector in engaging in a more nutritious food environment, how the government could facilitate these partnerships, and how to define and regulate “junk food”. Dr. Vaidya expressed a need for an updated Food Act to reflect the new research and agricultural developments to ensure food safety. Dr. Sharma advocated for collaboration with the private sector to encourage fortified foods, and regulation of the private sector to limit unhealthy foods in the market. Mr. Neupane supported tax exemptions for companies producing healthy or fortified foods and encouraged policies that support private-public partnerships to engage the private sector. Dr. Minas said small and medium enterprises need assistance in penetrating the market, whereas large ones need more regulations and advocacy. He also supported food fortification to combat micronutrient deficiencies and food labeling schemes that promote healthy foods and regulate unhealthy ones. The panelists agreed a multisectoral approach to nutrition requires the participation of the private sector which can play an important role in making food more diverse, healthy and affordable. There was a strong consensus from the experts in the room that even if junk food does not hold a legal discussion, adequate scientific guidance exists to define processed and unhealthy foods that should be incorporated in policy regulation of such foods.
Dr. Nancy Mock began this session by providing a definition of resilience, “the ability of people, households, communities, countries and systems to mitigate, adapt to and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth (USAID, 2012)”. She presented a framework on resilience, explaining three components: a set of capacities including people, money, tools, agriculture, and gender equity; a shock, stress, or disturbance; and the effect on well-being outcomes and trajectories. Dr. Mock highlighted how Nepal has the opportunity to support and build big transformative capacities, such as infrastructure and good governance, through the decentralization of the government. She explained how nutrition can be both a capacity and a well-being outcome. Dr. Mock provided examples of measurable nutrition-related transformative capacities in rural Nepal, including household access to formal safety nets, to markets, and to agricultural extensions.

Dr. Shively defined resilience as the ability to recover quickly from difficulties and stated that building resilience to adverse shocks can promote well-being. He explained the objective of this research was to develop a method to measure resilience using household data and to test whether patterns of resilience differ across population subgroups. He presented a new measure of nutritional resiliency based on the concept of reversion to the mean following a shock. By measuring dietary diversity at three time points: baseline, change from baseline, and subsequent outcome, a statistical test can be conducted to compare recovery after an adverse shock to decline after an improvement, with resulting asymmetric recovery indicative of resilience. Applying this measure of resilience to longitudinal data collected in Nepal, Dr. Shively found women and children from market-oriented households, those with more assets and better access to credit, and from districts with more developed infrastructure experienced greater resilience.
Ms. Udas introduced the Resilient Mountain Solutions (RMS) initiative, a multi-component intervention strategy run by the International Centre for Integrated Mountain Development (ICIMOD) to increase resiliency in the Himalayan range. Ms. Udas presented the specific challenges of the Kavre district pilot site, including poor land-use planning, high use of chemical fertilizers and pesticides, male out-migration, and climate change impacts. To address some of these challenges, Ms. Udas and colleagues conducted a study to test the use of Jholmal, a traditional pesticide made of cow’s urine, compared to Business as Usual (BAU) farmers’ practices on rice crop yields. Ms. Udas revealed significantly greater rice yields associated with Jholmal plots compared to BAU and, through the simulation of a sensitivity analysis, found the Jholmal strategy to result in resiliency compared to BAU which resulted in poverty trap after a shock. Ms. Udas cautioned Jholmal had to be used 100% of the time to avert a second collapse, and it was a sustainable strategy only for small holder farmers due to the quantity of cow urine required to produce the Jholmal.

Dr. Gauchan began his presentation by introducing the diversity of traditional food crops in the Himalayan areas of Nepal, including amaranth, buckwheat, barley, foxtail millet, and others. He explained how these crops account for 30-75% of production in the high mountain regions of Nepal and how their short maturation periods and high nutritional value are advantageous to the mountainous population. Dr. Gauchan identified a need for value chain development of these crops, as evidenced by the trend of declining production in country and an increase in the importation of such crops into Nepal due to consumer demand. He suggested various strategies at each step of the value chain, such as the development of community seed banks, introducing innovations to improve crop processing, and policy initiatives to assist farmers in standardizing and commercializing their products.

Ms. Joshi presented research on the relationship between aspects of the large cardamom value chain and food security in Bhojpur, Nepal. She explained how cardamom production is the main source of livelihood for the Eastern Hills, but that farmers lack improved cultivation practices resulting in low returns, threatened livelihoods, and food insecurity. Ms. Joshi described the various marketing channels identified in Bhojpur and found most farmers were not using the market channel that provides the highest margin of profit. She also identified the farmers experiencing the highest diet diversity score were those engaged in a market channel from farmer to medium trader or exporter, and that the farmers selling to exporters experienced the highest food security. Ms. Joshi concluded by highlighting the steps along the value chain in need of improvement, such as minimal use of fertilizers and pesticides and the lack of purchasing power from the market.
Dr. Dahal defined anti-nutrients as toxins, either natural toxins found in dry food and feed or artificial toxins, such as chemical pesticides. Porous packaging, he explained, contributes greatly to the contamination of agricultural crops with such anti-nutrients, resulting in high rates of post-harvest loss. To combat these issues, he suggested implementing dry and cold chains to protect against harvest loss in both the wet and dry seasons.

**MULTISECTORAL PROGRAMMING**

**MODERATOR: ROJEE SUWAL, SUAAHARA II (USAID), HELEN KELLER INTERNATIONAL, NEPAL**

Mr. KC introduced the Strengthening Economic Evaluation for Multisectoral Strategies for Nutrition (SEEMS) program, a 3-year study aimed at uncovering the most appropriate methods to measure cost-effectiveness of multi-sectoral programming in nutrition. He explained how the program builds on the nutrition-sensitive value chain framework by increasing supply, adding nutritional value, minimizing loss and increasing demand. Using the Suahara II impact pathway, Mr. KC demonstrated the SEEMS procedures and tools for evaluating the cost effectiveness of interventions. He showed that in one district of Nepal, the economic costs, meaning the personnel and beneficiaries, represented the largest (50%) portion of the overall cost.
ASSESSING MUNICIPAL- RESOURCE ALLOCATION AND UTILIZATION FOR NUTRITION

SHRADDA MANANDHAR, SUAHAARA II (USAID), HELEN KELLER INTERNATIONAL, NEPAL

Ms. Manandhar presented research on municipality-level allocation of funds for nutrition following the decentralization of the government of Nepal and the implementation of the Multi-Sectoral Nutrition Plan II. The qualitative methods used included in-depth interviews with key stakeholders, focus groups discussions with people involved in budget allocation and utilization, and document analysis. Using a thematic analysis approach, Ms. Manandhar delineated a 7-step planning process for budget allocation and identified some common nutrition-related interventions receiving budget allocation. She also identified allocation facilitators, like increased community participation, and allocation barriers, like insufficient funds or lack of trained staff. Ms. Manandhar suggested the next steps would involve implementing nutrition-related interventions at the various levels of government and provision of technical assistance to address some of the barriers to nutrition prioritization in budget allocation.

AGRICULTURAL GROUP PARTICIPATION: ASSOCIATIONS WITH MODERN FARMING PRACTICES AND DIETARY DIVERSITY

SUMANTA NEUPANE, IFPRI/ CGIAR/ NIL, NEPAL

Mr. Neupane explained his interest in understanding whether membership in agricultural groups improved agricultural practices and nutritional outcomes among small-holder farmer families in Nepal. He used the PoSHAN longitudinal data to observe the relationships between agricultural group membership and improved farming practices and diet quality. Mr. Neupane found households with agricultural group membership had lower counts of improved farming practices, though this decrease was not universal when stratified by specific farming practices. He also shared that group participation was associated with a greater production of staples, pro-vitamin A source foods, milk and eggs, but that child consumption of most foods was not associated with group participation. Mr. Neupane concluded more research needs to be conducted to understand what factors of agricultural group participation may play a role in the uptake of improved practices and affect household nutritional outcomes.
KEYNOTE ADDRESS: IMPACT OF CONNECTIVITY ON NEPALI FOODS, FOOD HABITS AND NUTRITION

GANGA KHAREL, PROFESSOR OF FOOD TECHNOLOGY, TRIBHUVAN UNIVERSITY, NEPAL

Dr. Kharel presented a comprehensive review of the shifting food trends in Nepal which he attributed to the advent of globalization and urbanization. Dr. Kharel provided examples of the shift in production and consumption of different food groups, such as increases in fish, meat, and ready-to-eat foods and decreases in whole beans, pulses, and home-made meals based on seasonally available crops. He also noted a change in the time and frequency of meals, highlighting more frequent meals and snack times. Dr. Kharel linked these shifting trends to the decrease in undernourishment and increase in over-nourishment in Nepal, concluding that strategies such as changing food habits, nutrition education, and the production of more nutritious foods could mitigate some of these challenges.

STUDY FINDINGS FROM THE NUTRITION INNOVATION LAB

SERUM AFLATOXIN B1-LYSINE ADDUCT CONCENTRATIONS ARE ASSOCIATED WITH BOTH LENGTH AND LENGTH-FOR-AGE Z-SCORE AT TWO YEARS OF LIFE

SHIBANI GHOSH, TUFTS UNIVERSITY, USA

Dr. Ghosh presented findings from the AflaCohort study, an observational birth cohort study in the Banke district of Nepal, aimed at understanding the relationship between aflatoxin and child growth in South Asia. She described how detectable aflatoxin was common and higher among mothers than children, but that levels increased in children with age. Dr. Ghosh revealed a negative association between log aflatoxin exposure and child length, but a positive association between log aflatoxin exposure and child weight. She stated the need for future research in the mechanisms of aflatoxin affecting child length by looking at inflammatory markers and long bone growth over time.
CHILDHOOD LINEAR GROWTH VELOCITY IN THE PLAINS (TARAI) OF NEPAL: A NEW APPROACH TO MEASURING POPULATION-LEVEL LINEAR GROWTH FALTERING IN PRE-SCHOOL AGED CHILDREN

SWETHA MANOHAR, JOHNS HOPKINS UNIVERSITY, USA

Dr. Manohar presented growth faltering as a dynamic process and a failure to reach ones’ growth potential, regardless of height-for-age z-score, that is best measured with metrics of velocity versus only static measures of attained status. Using the PoSHAN longitudinal cohort data of the Terai region, Dr. Manohar measured the annualized child growth velocities and compared them to sex-specific, median growth velocity curves derived from the WHO and Tanner growth references. She found the study population was growing at a linear growth velocity below the reference, with higher rates of faltering in children less than 24 months and reduced rates after 2 years of age regardless of stunting status. Dr. Manohar revealed more extreme linear growth faltering in girls compared to boys and found maternal short stature and parity to increase the odds of faltering. She demonstrated how factors such as maternal education, access to health care, and proximity to markets, paved roads, and schools decreased the odds of under-five child growth faltering.

CONSUMPTION PATTERNS OF PROCESSED FOOD IN NEPAL

ANDREW THORNE-LYMAN, JOHNS HOPKINS UNIVERSITY, USA

To generate information on processed food consumption in Nepal, Dr. Thorne-Lyman presented data from the PoSHAN community studies which included a 30-day expenditure recall on 46 food items and a 7-day food frequency questionnaire. He found all households bought processed foods, with oil and ghee, snacks, sugar and noodles residing in the top ten most purchased items. The study revealed increases in snack consumption in children under five over time and the greatest snack consumption was observed in the Terai. Dr. Thorne-Lyman concluded by stating concern for the increasing consumption of snack foods in young children, a need for a comprehensive diet survey in Nepal, and consideration of oil fortification given its universal consumption.
MEASURING GOVERNANCE IN NUTRITION: CAN IT HELP EXPLAIN PROGRESS OR STALEMATE?

PATRICK WEBB, TUFTS UNIVERSITY, USA

After identifying a lack in nutrition governance research, Dr. Webb led a study in the PoSHAN study sites, using a mixed methods approach to interview civil servants across the various levels of government and ministries. The questions asked in the interview related to 5 broad themes: understanding nutrition and responsibilities; collaboration within/across offices; resource access; capacity; and coordination. Dr. Webb explained how the answers to these questions were scored and, via principal component analysis, a nutrition governance index (NGI) was derived. The NGI was found to be associated with a 3% increase in height-for-age z-score, and that this relationship strengthened over a three-year period, aligning with the nutrition policy and program initiatives implemented at that time. Dr. Webb said the NGI was a feasible way to measure nutrition governance and provides a means to evaluate the quality of policy implementation and its effects on nutritional outcomes.

CONTEXTUAL FACTORS I: GENDER-RELATED INFLUENCES ON NUTRITION

MODERATOR: NEETI ARYAL KHANAL, TRIBHUVAN UNIVERSITY, NEPAL

GENDERED PATTERNS OF WORK INTENSITY IN RURAL NEPAL AND INDIA: COMPLEMENTING ENERGY EXPENDITURE TO TIME-USE INFORMATION

GIACOMO ZANELLO, UNIVERSITY OF READING, UK

Dr. Zanello began his presentation by highlighting the distinction between time intensity and energy intensity, two considerations relevant to the uptake of agricultural interventions as these may affect energy expenditures and subsequent nutritional status. Dr. Zanello and colleagues conducted studies in rural Nepal and India where they combined time-use information with accelerometry to measure and compare energy and time ratios of different types of work. He found that both men and women engage in time and energy consuming work, but that women compensate for heavier burdens of productive and reproductive work by having less leisure time. In light of these findings, Dr. Zanello urged that gender-sensitive agricultural interventions should consider how people manage their workloads and how workloads may differ by gender, season, and context.

REVISITING THE EMPOWERMENT PROCESS: LINKAGES BETWEEN GENDER EQUITY AND NUTRITION IN RURAL INDIA

EMILY FIVIAN, LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE, UK

Ms. Fivian explained the women’s empowerment hypothesis that if disadvantaged women from rural areas had more power, they would increase the resources available to the household and allocate more for nutrition. To study this hypothesis, Ms. Fivian and colleagues initiated the Upscaling Participatory Action and Videos for Agriculture and Nutrition (UPAVAN) trial in Odisha, India. She presented the statistical
model, aimed to assess the direct effects of the exposure to livestock equity and land equity and the indirect effects of decision equity and total agricultural production on the outcomes of maternal BMI and dietary diversity. Ms. Fivian found women’s empowerment in agriculture was associated with maternal dietary diversity, but not with BMI and there was no evidence of mediation by decision equity or production value in the pathway between livestock or land equity and maternal diet or BMI. She suggested the null findings may be a result of imperfect indicators used to measure empowerment and women’s empowerment and engagement in agriculture may result in greater energy expenditure.

CONTEXTUALIZING ADOLESCENT GIRLS’ NUTRITION IN THE PLAINS OF NEPAL
JOANNA MORRISON, UNIVERSITY COLLEGE LONDON INSTITUTE FOR GLOBAL HEALTH, UK

Dr. Morrison expressed her motivation for studying adolescent nutrition because of its importance for the health of the individual but also for the intergenerational effects of malnutrition. She presented the context of the Low Birth Weight South Asia trial, in the Dhanusha district of Nepal’s Terai, explaining how the social value of honor causes girls to experience increasing regulation of their behavior to protect their reputation and sexuality. Morrison and colleagues conducted focus group discussions with adolescent girls, young mothers, grandmothers, and female community health volunteers to understand the drivers of eating behavior in adolescent girls. She found girls were not to eat outside their home or go outside without purpose, and the girls expressed not eating as much food as boys because they are less active and move away from home after marriage. Dr. Morrison concluded that patriarchal norms and the need to maintain honor affect girls eating behavior in Dhanusha and Participatory Action Research may play a role in developing interventions.

UNDERSTANDING HOW DOMAINS OF EMPOWERMENT AFFECT ASF CONSUMPTION ACROSS THREE AFRICAN COUNTRIES
OLGA MUNOZ, UNIVERSITY OF FLORIDA, USA

In her research, Dr. Munoz sought to distinguish how the different domains of empowerment in agriculture contribute to animal-source food consumption and dietary diversity across different contexts, specifically Uganda, Ethiopia, and Burkina Faso. With this aim, she used cross-sectional household surveys including a 24-hour dietary recall and the abbreviated Women’s Empowerment in Agriculture Index (A-WEAI) in mother-infant pairs in the three countries. Across all three contexts, women experienced greater empowerment in production, income, and ownership but experienced varying levels of
disempowerment in credit, leadership, and time, which differed by context. The average dietary diversity score was three out of six food groups and animal source food consumption was associated with empowerment in production, but only in Uganda. Dr. Munoz described additional analyses for future research endeavors to elucidate the relationship between women’s empowerment and diet diversity.

UNDERSTANDING AND ENHANCING THE LINKS BETWEEN AGRICULTURE, NUTRITION AND RESILIENCE: PANEL DISCUSSION

MODERATOR: COREY O’HARA, IDE/ TUFTS UNIVERSITY

PANELISTS: HARI BAHADUR KC, JOINT SECRETARY, MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT
SRIJU SHARMA, USAID/ SABAL PROJECT
ABID HUSSAIN, ICIMOD
KIRAN OJHA, LUTHERAN WORLD RELIEF

Dr. O’Hara started the panel discussion with a presentation on the results of Anukulan project to evaluate the impact of agricultural and marketing interventions in rural Nepal. He found the intervention package was successful in improving livelihoods, through increased production and women’s empowerment in the specific domains of confidence, capability, knowledge, and income. Ms. Sharma presented the findings of Sabal, a four-year multi-level intervention program for resilience and food security in Nepal, revealing social capital, ability to recover from shocks, and household dietary diversity all increased whereas the cumulative impact of shocks decreased. Ms. Sharma highlighted the need for a multisectoral approach to resilience strengthening and a community group approach to facilitate government linkages. Dr. Hussain described ICIMOD’s three approaches to link agriculture, nutrition and resilience including accessibility to food and markets, agrobiodiversity to diversify crop production, and a systems approach to identify and support positive feedback loops in agriculture. Dr. KC invoked the Ministry of Agriculture’s role in working with provincial and local level governments to align policy initiatives and its responsibility in
regulating processed foods, pesticides, hormones, and nutrients. Mr. Ojha presented Lutheran World Relief’s approach to flood resiliency in the river basins on the Nepal-India border, highlighting the various strategies that can be employed to prevent or mitigate the effects of flooding on agriculture and community nutrition. The panelists agreed multi-sectoral approaches are necessary for promoting resilience, agriculture, and food security.

CONTEXTUAL FACTORS II: SOCIO-CULTURAL FACTORS INFLUENCING DIETARY CONSUMPTION AND GROWTH

MODERATOR: KHEM BAHADUR KARKI, INSTITUTE OF MEDICINE (IOM), NEPAL

DIETARY DIVERSITY AND ITS ASSOCIATED FACTORS AMONG PREGNANT WOMEN IN BAGLUNG MUNICIPALITY

VINTUNA SHRESTHA, INSTITUTE OF MEDICINE, NEPAL

Ms. Shrestha presented her research on maternal dietary diversity and associated factors in a population of pregnant women in the Baglung municipality, Nepal. Methods included a 24-hour recall tool, the NDHS questionnaire for wealth index and women’s empowerment, and the FANTA household food insecurity access scale. While most (96.6%) of the sample was found to be food secure, only 55% reported a diverse diet (diet diversity score ≥ 5), with the mean diet diversity score being 4.76. Apart from fat, Ms. Shrestha showed the pregnant women had inadequate nutrient intakes and factors such as earning status, family type, wealth quintile, and women’s empowerment were all associated with diet diversity.

SOCIO-ECONOMIC AND CULTURAL FACTORS INFLUENCE EGG CONSUMPTION PRACTICE AMONG 6-23 MONTHS CHILDREN IN NEPAL

FEMILA SAPKOTA, SUAAHARA II, HELEN KELLER INTERNATIONAL, NEPAL

According to the NDHS, only 13% of children aged 6 to 23 months in Nepal consume eggs, despite their being relatively inexpensive and nutrient rich, explained Ms. Sapkota. The objective of the study was to
explore the socio-economic and cultural factors that influence egg consumption among children, using 24-hour diet recalls and qualitative methods in the Suahara intervention areas. Ms. Sapkota found the facilitators of egg consumption included knowledge of the benefits of egg consumption, chicken ownership, and prioritization of children and their growth. Some of the barriers included limited access to eggs, low chicken ownership, cultural and religious restrictions, and misperceptions regarding the risks of egg consumption. Ms. Sapkota showed a significant increase in egg consumption after one year of the Suahara II program but recommended additional improvements in access and marketing to increase consumption.

ACCEPTABILITY AND UTILIZATION OF FORTIFIED BALANCED ENERGY PROTEIN SUPPLEMENT AMONG PREGNANT WOMEN IN RURAL NEPAL

TSERING PEMA LAMA, NEPAL NUTRITION INTERVENTION PROJECT- SARLAHI (NNIPS)/ JOHNS HOPKINS UNIVERSITY, NEPAL

Dr. Lama presented a need for nutritional interventions in the Sarlahi district of Nepal to address high rates of adverse birth events. Though balanced protein-energy (BPE) supplements have been shown to improve maternal nutritional status and birth outcomes, and despite WHO recommendations of BPE supplementation in settings with high levels of undernourished pregnant women, few settings have implemented the intervention due to a lack of guidance on the best supplement for use. To address this gap, Dr. Lama investigated acceptability and consumption compliance of various supplement options among pregnant women in Sarlahi with the use of mix methods, including focus group discussions and hedonic testing. Dr. Lama found the seasoned pillows, sweet Plumpy' Mum, and vanilla biscuits to be the most preferred and acceptable supplements for daily consumption. She highlighted how the 8-week pilot study among pregnant women revealed high compliance, but issues such as supplement sharing, and misconceptions would need to be addressed in the upcoming trial.

THE IMPACT OF PATERNAL LABOUR MIGRATION ON THE LEFT-BEHIND CHILD’S GROWTH – EVIDENCE FROM A BIRTH COHORT IN DHANUSHA DISTRICT, NEPAL

NAOMI SAVILLE, UNIVERSITY COLLEGE LONDON, NEPAL

Dr. Saville described high increases in personal remittances in Nepal, primarily due to male labor migration, and highlighted Dhanusha as having the highest rate of labor migration in the country. Dr. Saville and colleagues investigated whether there was a relationship between paternal labor migration and stunting in a birth cohort of 600 children, who were measured every month in their first two years of life and measured again at age six. The investigators found low height-for-age z-scores to be associated with paternal labor migration in younger children but not in older children and stunting was greater for children whose fathers were away for less than a year, but no effect was seen for longer durations of absence. Dr. Saville concluded they found no evidence of a benefit of paternal migration on child growth and more research is needed to understand how paternal absence, debt from migration, and household prioritizations of investments may mediate any existing relationship.
AFLATOXIN EXPOSURE AND DIETARY DETERMINANTS IN CHILDREN LIVING IN BANKE, NEPAL
ASHISH LAMICHHANE, NIL/ HELEN KELLER INTERNATIONAL, NEPAL

Mr. Lamichhane explained how the negative health risks of aflatoxin exposure and its associations with child growth faltering motivated a study to identify risk factors associated with aflatoxin exposure in Nepalese infants. Using data from the AflaCohort study, Mr. Lamichhane found dairy products, flesh foods, and other fruits and vegetables were associated with higher aflatoxin concentrations. The specific foods associated with higher aflatoxin concentrations were large fish, infant formula, groundnut and cauliflower, whereas maize, bananas and mangoes were associated with lower aflatoxin concentrations. Mr. Lamichhane hypothesized the aflatoxin levels being associated with large fish and infant formula may be caused by contaminated feed, suggesting a contaminated food chain.

ANEMIA AMONG PRESCHOOL-AGED CHILDREN IN NEPAL: VARIATIONS IN NATIONAL PREVALENCE AND STRENGTH OF ASSOCIATED RISK FACTORS FROM 2013 TO 2016
MONICA PASQUALINO, JOHNS HOPKINS UNIVERSITY, USA

Ms. Pasqualino investigated national trends in the prevalence of anemia among children 6-59 months of age. She analyzed data from the POSHAN study sites, where anemia assessment was conducted annually on a random, nationally representative sample. The prevalence of anemia in children under 5 decreased in 2014 (52.1%) but increased in 2016 (59.5%), with maternal anemia following the same trend. The highest rates were observed in the youngest children and those living in the Terai. Ms. Pasqualino highlighted many factors associated with anemia in children, such as young age, stunting, diarrhea experience, not being dewormed, food insecurity, presence of open defecation, and lack of improved toilet. She concluded that despite the fluctuations in anemia over the three-year period, risk factors remained stable, suggesting the need to invest in interventions that address maternal and child health care, reducing infection, and improving dietary quality and household sanitation.
Children of Depressed Mothers in Rural Nepal Consume Diets with Less Diversity and Fewer Animal Source Foods (ASFS)

Laurie Miller, Tufts University, USA

Dr. Miller expressed the home environment is key to child nutrition, and that many factors such as food availability and quality, sanitation, child feeding, and parental engagement may be influenced by maternal depression. She explained the prevalence of maternal depression is higher in LMICs and may have lasting and intergenerational effects. To address this issue in Nepal, Dr. Miller and colleagues conducted cross-sectional surveys with a depression screening test in rural women with young children and found that over 20% of mothers were at risk for depression. In unadjusted models, children with depressed mothers revealed the following significant associations: lower z-scores, poorer performance on development measures and had poorer diets. After adjustment, only child diet was found to be associated with maternal depression. Dr. Miller stressed the importance of addressing the totality of the child environment, which includes maternal depression, and suggested maternal depression screening should be included in nutritional interventions.

Dietary Diversity and Wasting Among Children Aged 06-23 Months and Its Associated Factors in Dalits and Non-Dalits: A Cross Sectional Comparative Study of Dhanusha District

Anil Kumar Sah, Institute of Medicine (IOM), Nepal

Mr. Sah described the objective of his study was to identify the factors associated with dietary diversity and wasting among Dalit and non-Dalit castes. The study was conducted in the Dhanusha district of the Terai where wasting rates are the highest in Nepal. Using NDHS data, Mr. Sah found similar rates of minimum dietary diversity among Dalit and non-Dalit children, but a higher prevalence of wasting among Dalit children. Child age, knowledge of child feeding practices, and child illness were associated with minimum diet diversity in Dalit children, whereas knowledge of child feeding practices and birth interval were important factors in non-Dalit children. Based on these findings, Mr. Sah promoted community based maternal education for reducing undernutrition among Dalit and non-Dalit children.

Vote of Thanks

Dr. Manohar and Dr. Webb concluded the symposium by presenting the poster presentation winners and thanked all the attendees and organizers for participating in another successful Feed the Future Innovation Lab for Nutrition Scientific Symposium.
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