

# Feed the Future Innovation Lab

## For Collaborative Research on Nutrition - Asia

### Purdue University - Annual Report - Year 4

## Feed the Future Innovation Lab

For Collaborative Research on Global Nutrition

### Annual Report

*Purdue University*

*Year 4 (2013-2014)*

*Feed the Future Nutrition Innovation Lab-Asia*

#### **Principal Investigator:**

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#### **Objective 1 (as stated in Year 4 Implementation Plan): Research**

Understand and measure the connections between agricultural capacity, technology adoption, nutrition outcomes, and conditioning factors at levels of aggregation ranging from household-to-district levels. The key objective is to develop an empirically-based and data-driven understanding of the overlap between agricultural issues and health/nutrition issues in Nepal, so as to improve the effectiveness of agriculture and nutrition policy in Nepal and elsewhere.

*Substantial progress achieved and efforts continuing. Details below.*

#### **Specific Objectives (as stated in Year 4 Implementation Plan): Data Collection**

No primary data collection (survey) activities were undertaken in Nepal during the year. In 2013, we worked with partners in the Ministry of Agriculture to obtain a very important set of monthly data on agricultural prices covering more than 45 districts and 20 commodities. The dataset available to us consists of approximately 40,000 data points representing monthly observations of agricultural prices over the period 1998-2011. During the year, we will be designing and implementing an analysis of these data.

**Specific Objectives (as stated in Year 4 Implementation Plan): Capacity Building**

Increase the capacity and effectiveness of research institutions in Nepal and train students at the graduate level to become contributing members of the global community fighting against hunger and malnutrition.

*Progress achieved, as detailed below.*

## Introduction/Overview of Work Plan Rationale/Objectives

Nepal faces a number of development challenges, including poor agricultural performance, and chronic and widespread child malnutrition. This Work Plan aims to study available evidence regarding food security, malnutrition and related topics in Nepal and to undertake primary research on key issues relating agriculture to nutritional outcomes, while simultaneously engaging in training to improve knowledge and capacity in Nepal. We attempt to work closely with the Managing Entity (ME) and project partners in Nepal to build new collaborations and strengthen existing collaborations with Nepalese partners around the topic of agriculture and nutrition. Work Plan activities are designed to be fully aligned with Nepal's Integrated Nutrition Plan (INP) goals and priorities as they relate to agriculture.

## Section I: Research Activities and Progress on Specific Objectives

### Focal area: *Discrete socio-economic analysis*

Activity 1: Current efforts focus on generating research deliverables from prior investments of time and resources. In past years, we secured access to a number of datasets, including multiple rounds of the Nepal Living Standards survey (NLSS), Nepal Demographic and Health Survey (DHS) data, and remotely-sensed satellite data (maximum value Advanced Very High Resolution Radiometer (AVHRR) Normalized Difference Vegetation Index (NDVI) composites from the NASA Global Inventory Monitoring and Modeling Systems (GIMMS) group at NASA's Biospheric Sciences Branch). Working directly with Nepal's Central Bureau of Statistics, we successfully gained access to the most recent round of the NLSS data (2011). In Year 4, we made substantial progress on several fronts and have achieved momentum on analysis and writing. Keeping with our goal to develop useful data and make these data available to other members of the Nutrition Innovation Lab (NIL) research team, we released an analysis-ready dataset to project partners. We have developed a pipeline of research papers, some of which are now in peer review, and some of which are in working paper form. Two MS theses were completed and a PhD dissertation is underway. A partnership with a graduate student at Tribhuvan University was successfully completed.

### Focal area: *Agricultural price analysis*

Activity 2: We obtained from the Ministry of Agriculture a large dataset consisting of agricultural market prices observed at monthly intervals in more than 45 Nepalese districts and four Indian border markets. These data cover more than 20 important agricultural commodities and constitute approximately 40,000 price observations over the period 1998-2011. We have incorporated these data into our analysis of child growth, and are assessing the empirical evidence regarding the role of agricultural prices

and price variability on nutrition outcomes. In addition, we have undertaken an analysis of the factors influencing price behavior as a way of identifying available and effective policy levers for influencing nutrition outcomes through sectoral and macroeconomic policy changes.

### ***Lessons learned and challenges in implementing proposed activities***

No impediments to progress at this time.

### ***Solutions/resolutions applied or to be applied***

## **Section II: Capacity-Building Activities**

Focal area: *Degree training*

Activities: Ganesh Thapa began his PhD training in Agricultural Economics at Purdue University in August 2012. Mr. Thapa successfully completed and defended his PhD prospectus in 2014. Professor Patrick Webb (Tufts University) is serving as an outside committee member for Mr. Thapa. We are working to position Mr. Thapa for successful completion of his PhD and reintegration to the academic and policy research community in Nepal. A second student, Celeste Sununtnasuk, completed her MS degree in Agricultural Economics at Purdue University in May 2013. She worked extensively with Nepal DHS and NLSS data and recently joined the International Food Policy Research Institute (IFPRI) in Washington, DC. Binod Khanal, an MS student at Tribhuvan University completed his degree in February 2013. Mr. Khanal undertook fieldwork with the support of a small NIL grant administered by Purdue. An additional Purdue MS student, Tim Smith, participated in NIL Nepal research and completed his thesis in 2014. His participation was provided by cost-sharing to the project by Purdue University.

### ***Lessons learned and challenges in implementing proposed activities***

Identifying well-prepared host-country students for graduate degree training in the US has been a significant challenge. From a logistical point of view, early project delays and the substantial investment in student recruitment, screening and processing has meant that we are likely to train only a single Nepalese student at the PhD level in this phase of the project.

### ***Solutions/resolutions applied or to be applied***

We have made a commitment to support Mr. Thapa and it is essential that we maintain continuity of funding to support him through completion of his degree. If the NIL project ends before he completes his degree, we may need to hold budget in reserve and explore options for a no-cost extension beyond 2015.

### Outputs (not previously or elsewhere reported)

Smith, Timothy and Gerald Shively. "Household vs. community determinants of child nutrition: a multilevel regression approach for Nepal." In review at *Food and Nutrition Bulletin*.

### Leveraging and Cost-Sharing

Substantial leveraging for Year 4 Work Plan activities in Nepal came in the form of NASA support for our collaboration with Dr. Molly Brown at NASA. While it is not possible to put an exact dollar amount on the value of this leveraging, Dr. Brown has devoted substantial amounts of time to our efforts, served as an external committee member for one graduate student at Purdue, participated in a NIL-sponsored organized panel, and continues to collaborate on data analysis and writing. In our use of remotely-sensed vegetation data, we are creatively leveraging hundreds of millions of dollars in past US government investment in satellite data collection and processing. Additionally, Purdue University has supported two MS students who have contributed to project output.

### Vignettes

Among our tasks is to work with agricultural market price data from districts indicated in Figure 1 below. These have been combined with DHS data on child growth outcomes to provide insights into how patterns of short-and long-run nutrition outcomes align with levels and changes in agricultural prices and other features of Nepal's economy. We have also combined these data with information from a range of sources on factors relevant to the functioning of agricultural markets, including construction of roads and bridges, agricultural production, population, fuel prices, etc. Figure 2 illustrates the district-level association between bridge density (in 2006) and district average height-for-age Z-scores (in 2011).

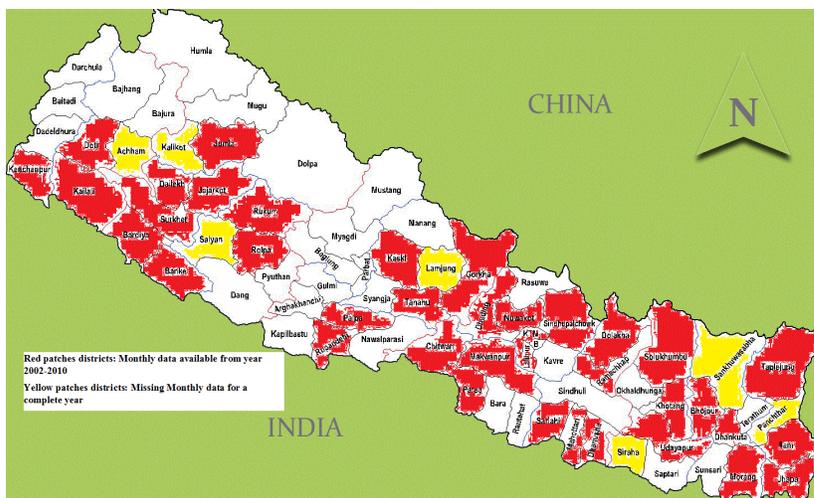


Figure 1. Map of districts with agricultural market price data

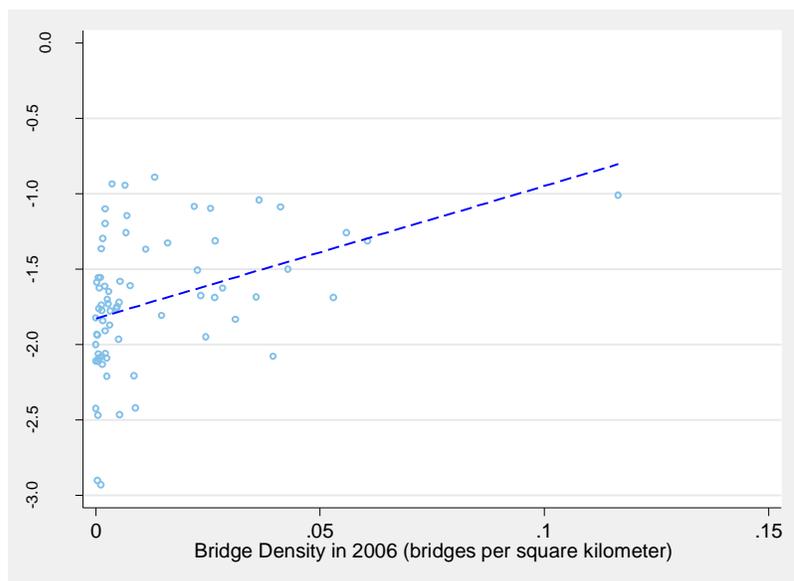


Figure 2. Bridge density and stunting in Nepal

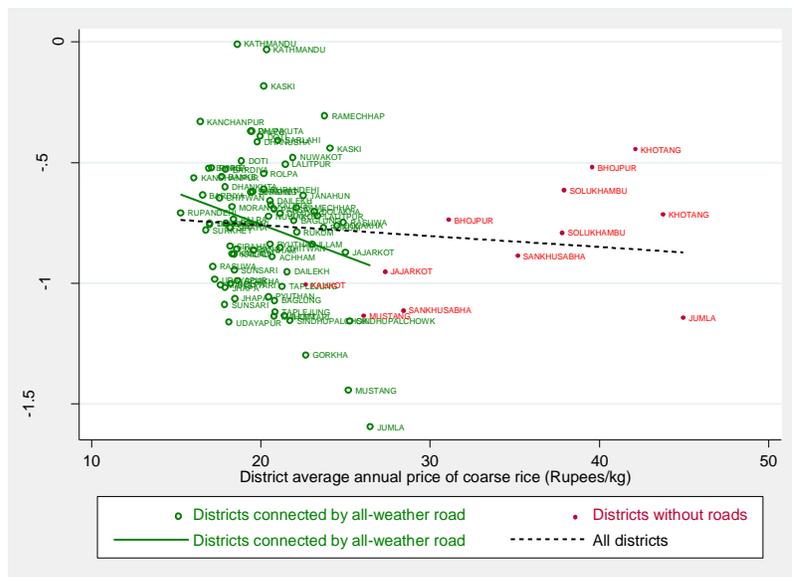


Figure 3. Rice prices, roads and child weight-for-height in Nepal