



Agricultural Change, Outmigration and Food Security

Workshop on

Integrating Social and Agriculture Science: Building Foundation for Interdisciplinary Research in Nepal

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Outline

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Background

- In the second part of the 20th century, world agriculture has been dramatically revolutionized with innovations in green revolution technologies facilitated by the development of new markets (World Bank 2008; Majumdar et al. 2001; Mamdani 1972).
- Traditional family-based farming systems are rapidly transitioning towards commercialization and rural farm households are increasingly reliant on modern farm technologies.
- At the same time, farmers are also shifting their occupation towards non-farm occupations (Bhandari 2013).

Background

- Migration has been a global phenomenon.
 - In 2013, 232 million were international migrants.
 - South Asians - among the largest group (36 million in 2013).
 - Domestic migrants also constitute a significant proportion (in 2010, 11 percent of the total population moved internally).
- Outmigration particularly from developing countries is quite significant, and the contribution of rural farm households in supplying migrants is increasing (Jokish 2002).

Background

- UN World Food Programme (WFP) reports that 110 out of 210 countries are facing food security problems (FAO, WFP, and IFAD 2013).
- About 842 million people are estimated to have been in chronic hunger (2011-2013).
- About 12 percent of the global population (one in eight persons) estimated to be not receiving enough food to run active life.
- 827 million undernourished people live in developing countries.
- South Asians alone 295 million (35 percent of the total).



Agricultural Change, Outmigration and Food Security: Is there a Link?

Theoretical Reviews

1. Agricultural Change and Outmigration

- Migration, perhaps, one of the most studied subjects - both substantively as well as from a methodological perspective across many disciplines- sociology, demography, economics, environment, and political science.
- Previous studies have developed several theoretical and conceptual frameworks (for example, push-pull, New Economics of Labor Migration etc.) to identify the determinants of migration.

Theoretical Reviews

1. Agricultural Change and Outmigration

- A number of studies exist to explain why people migrate from rural agrarian settings (Piotrowski, Ghimire and Rindfuss 2013; Massey, Axinn and Ghimire 2007; Bhandari 2004, Bilsborrow 2002; Massey et al. 1998; 1993; Stark and Bloom 1985).
- However, little is known about the potential link between agricultural change (here, farm technology use) and outmigration in migrant sending communities.

Theoretical Reviews

1. Agricultural Change and Outmigration

- In this study, we combine the labor substitution hypothesis with multiphasic demographic response hypothesis, and develop a new theoretical framework to test the relationships between technology use and outmigration.

Theoretical Reviews

1. Agricultural Change and Outmigration

- Evidence suggests that the uses of labor-saving farm technologies, both mechanical and biochemical, substitute for labor (Agarwal 1983; Binswanger 1978; Schutjer and Van der Veen 1977).
- The uses of such technologies decrease the need for manual labor and thus release the labor out of agriculture. In the absence of off-employment opportunities, there is strong reason to expect that the replaced human labor will migrate (Massey et al. 1998).

Research Question - 1

1. To what extent does changes in agriculture (here technology use) influence labor outmigration?

The Hypothesis

Use of labor-saving technologies in crop production reduces the demand for farm labor, creates a surplus labor pool and thus, encourages out-migration

Family based farming



Uses of labor-based farm technologies

Market based farming



Uses of labor-saving farm technologies



Out-migration



Theoretical Reviews

2. Outmigration and Agricultural Productivity

- Moreover, much of the previous studies has further focused on economic consequences of migration and remittances to sending communities through cash remittances and loss of labor.

Theoretical Reviews

2. Outmigration and Agricultural Productivity

- One line of research suggests that migration contributes positively to the migrant-sending communities through remittances.
- Migrants are viewed as an important source of income through their ability to send remittances.
- Remittances from migration are often invested in land purchases, agricultural improvement, and use of labor-saving technologies (Credit hypothesis).

Research Question - 2

2. To what extent does remittances from labor outmigration influence agricultural productivity (measure of food security)?

The Hypothesis: Credit Hypothesis

2. Outmigration and Agricultural Productivity

- We argued that:
- Households that received remittances are more likely to use labor-saving farm technologies than those that did not receive remittances.
- Thus, the use of labor-saving modern farm technologies will ultimately increase agricultural productivity, independent of the effect of lost labor.

The Hypothesis: Labor Loss Hypothesis

2. Outmigration and Agricultural Productivity

- Other line of research argues that outmigration negatively influences migrant-sending communities through loss of labor thus negatively affecting agricultural production (de Brauw 2007; Jokish 2002; Adhikari 2001).
- Outmigration of young population creates a shortage of farm labor.
- This loss of labor may adversely affect agricultural production and thus, agricultural productivity, independent of the effects of remittances (lost labor hypothesis).

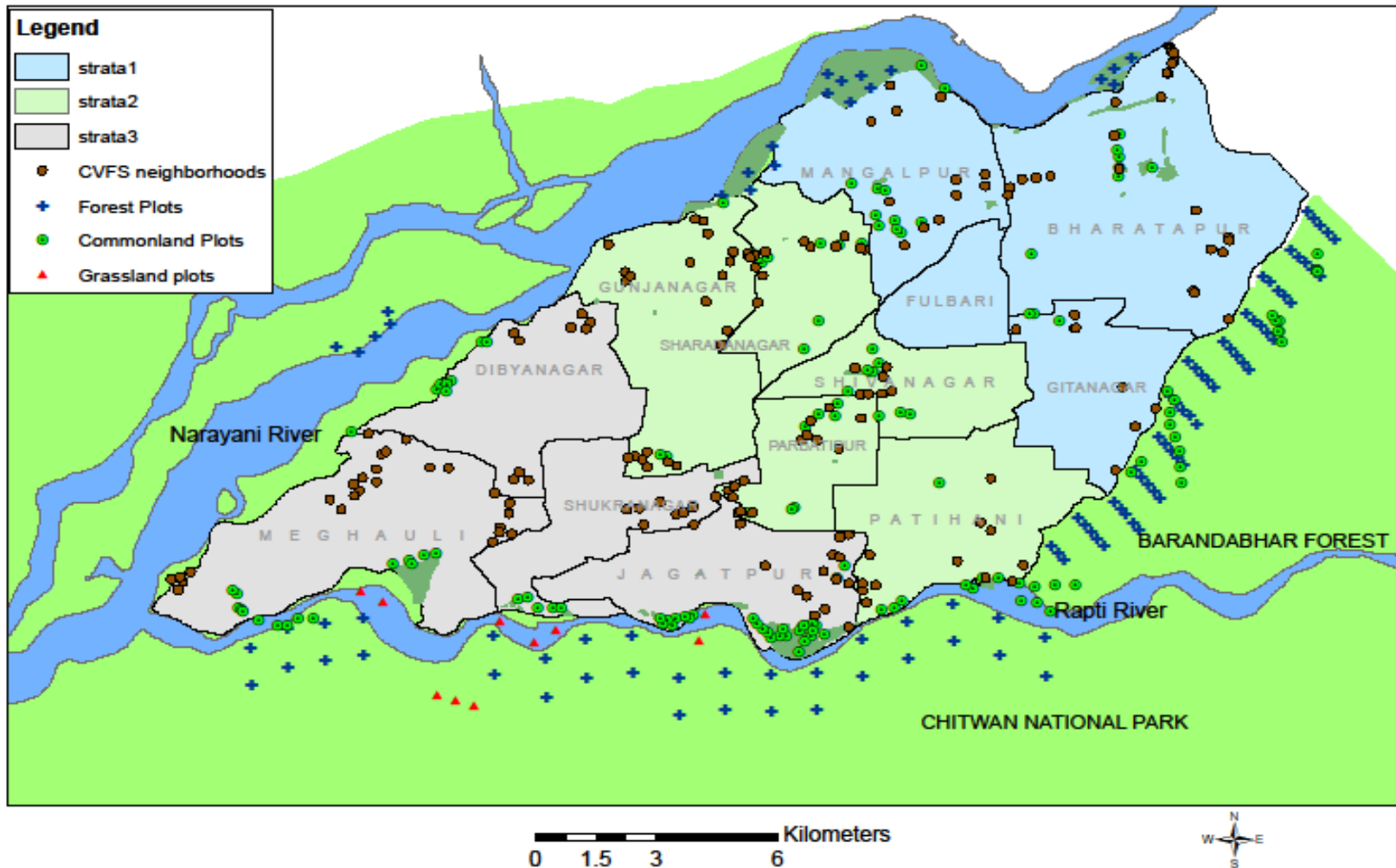
Study Setting

- Western Chitwan Valley situated in the south-central Nepal
- Before 1950s, the Valley was covered with dense forest
- During 1950s, the Valley opened for settlement with distribution of land to farmers of adjoining areas
- Population grew rapidly due to migration and high fertility



Study Setting: The Western Chitwan Valley

Figure 1: Map of Western Chitwan



Study Setting

Agriculture in the Valley

- Predominantly subsistence based farming
- An overwhelming majority of households survey grow crops and raise animals
- Almost every household used its own family labor in farming
- Recently, farming is experiencing rapid modernization and family mode of production is changing. Some farm households use labor-saving modern mechanical (tractors and modern farm implements) as well as bio-chemical (chemical fertilizers and pesticides) inputs in crop production

Data

- **Chitwan Valley Family Study (CVFS)**
 - Migration and Remittances: Through Monthly Household Registration – Away from home most of the time in the past month and amount of remittances received each month
 - Technology Use: Baseline Agriculture and Prospective Seasonal Agriculture Surveys
 - Agricultural Productivity: Crop Yield Measurement during Baseline Agriculture and Prospective Seasonal Agriculture Surveys
- We propose to collect new data from a CVFS subsample of 1,200 households (500 households for crop yield measurement).

Measures

Migration

- Migration both as a predictor and an outcome.
- A migrant is someone who lived away from his/her household most of the time in the given month.
- With detailed monthly migration records, we will create individual and household level migration measures:
 - Number of migrants by gender
 - Number of migrant months
 - A time-varying measure of whether or not an individual migrated in any month.

Measures

Remittances

- We operationalize remittances as:
 - whether or not the household received any remittances,
 - from how many migrants,
 - amount received in last 12 months.

Measures

Farm Technology Use

- Farm technology use: (1) tractors, (2) farm implements, (3) chemical fertilizers, and (4) pesticides.
- We will operationalize farm technology use as:
 - (1) dichotomous measures of the use of each specific type of farm technology, for example, use of tractor; and
 - (2) summary measures of technology use

Exit from Farming

A dichotomous measure of whether households did or did not do any farming

Measures

Agricultural Productivity

- Will be measured as crop yield per unit land area (i.e. metric ton per hectare).
- We will estimate productivity for each major crop grown by a household and a crop yield index.

Measures

Covariates

Will include individual, household, and neighborhood level factors such as:

- Gender
- Age
- Marital status
- Education
- Land size and land quality
- Land and livestock ownership
- Off-farm employment
- Previous migration experience
- Migration status of other household members
- Ethnicity
- Access to markets, banks, agricultural cooperatives, dairies, and distance to urban centers
- Migration specific social capital (migration networks)
- Measures of household level predisposition to innovation

Analysis

➤ The general approach to investigate our hypotheses related to outmigration and remittance variables to agricultural variables in this regression framework:

- $Y_{hct} = a_o + a_1 \text{OutMigration}_{hct} + a_2 X_{hct} + a_3 W_{ct} + H_h + e_{hct}$
- $Y_{hct} = b_o + b_1 \text{Remittances}_{hct} + b_2 X_{hct} + b_3 W_{ct} + H_h + v_{hct}$
- $Y_{hct} = d_o + d_1 \text{OutMigration}_{hct} + d_2 \text{Remittances}_{hct} + d_3 X_{hct} + d_4 W_{ct} + H_h + n_{hct}$

Where: Y_{hct} is the relevant agricultural measure (productivity, technology inputs, exit from farming, female participation in farming) for household h in community c in time t , X_{hct} is a vector of household covariates, W_{ct} is a vector of community-level covariates and H_h is a household fixed effect.

Expected Outputs

Empirical evidence of the consequences of agricultural change in labor outmigration and agricultural productivity

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-Thank You-