CHOICE OF INCOME GENERATING ACTIVITIES BY NEPALESE FARMERS

Vivek Gupta[1]
Tej Gautam
Basu D. Bhandari[2]

[1] Gupta and Gautam are Graduate Student in the Department of Agricultural Economics and Agribusiness LSU, Baton Rouge, LA

[2] Bhandari is Post Doc. Fellow in the department of Agricultural Economics and Agribusiness, LSU

Corresponding author: Tej Gautam (tgauta1@lsu.edu)

CHOICE OF INCOME GENERATING ACTIVITIES BY NEPALESE FARMERS

Abstract:
Income generating activities play a vital role to improve the livelihood of rural people in developing countries. International donor agencies and national policy makers would like to see subsistence farming transformed into commercial agriculture to enhance the well beings of people in developing countries. In Nepal for the last two decades or so, farmers are incorporating income generating activities in subsistent farming systems. Most popular income generating activities include mushroom cultivation, sericulture, apiculture, and fish culture. Our objective in this paper is to use a multinomial logit model to determine the factors affecting the choice of income generating activities by Nepalese farmers. Some of the important explanatory variables used in this model are availability of water, inputs (such as seeds and disinfectants), technology, and market accessibility. We use 2012 census data available from the Agricultural Census of Nepal to conduct this analysis. Preliminary results indicated that availability of inputs and accessibility to markets are the major determinants in selecting income generation activities. The outcome of this study may help to promote ideal income generating activities for the benefit of rural farmers in Nepal or other developing countries.

Keywords: *subsistence farming, commercial agriculture, cash crops*

1. Introduction

Farming is more than just another avenue of employment for farmers in developing countries. It is a way of life. In fact, for most of these subsistence farmers, agricultural activity is enmeshed in their very ethos of life; which is why the structural transformation of an economy from traditional agriculture to modern industrialization is a lot more challenging than it seems at the outset. In the literature on peasants, explanations of peasant behavior have often been sought in the specificity of their motives, postulating that peasants are not utility maximizers, by difference with other households, but are motivated instead by the satisfaction of their needs or by the desire to ensure 'simple production'(Vergopoulos 1978). While it may be true that subsistence farmers in developing countries aspire towards income growth and material well-being, food self-sufficiency and income security may be more compelling and immediately pertinent issues for them.

Nepalese Agriculture is in a low development stage. The sector still has more than two-thirds of the population engaged in agriculture, productivity and competitiveness of the sector are low, adoption of improved technology is fettered and even though most cultivated area is devoted to cereals, food trade deficit and malnutrition has been growing. Some subsectors such as dairy processing, poultry, tea, vegetable seed and fisheries show dynamism, but overall, these favorable indicators are not yet sufficient to ameliorate a large number of people engaged in agriculture out of poverty and make a significant contribution in reducing malnutrition and ensure food security of the Himalayan nation. When the long-term agricultural strategic plan known as the Agriculture Perspective Plan (APP) was launched in 1995-96, the Nepalese agricultural sector was performing much worse than

today. The current low development status of Nepalese agriculture spuriously makes us forget that over the past two decades, there has been improvement in living standards and that the agricultural sector overall is performing better today than in the past. Productivity, infrastructure, food security, and poverty have improved. However, some indicators such as food and agricultural trade deficit and land per capita have headed south. In spite of relative performance improvement than the past, agricultural sector in Nepal is still tottering. The improvement has been too little and the change has been deceptively too slow, both in terms of what the country had planned to achieve and relative to the progress made by its neighbors over the same period of time. In the agricultural case, growth has been not only slow (about 3%), but also highly inconsistent. Nepal's youth and some of its most productive labor force have emigrated for job elsewhere. About 300,000 migrants leave Nepal annually and this has been a growing trend for the past 10 years. Though remittance growth has shown a positive trend, estimated at over $3 billion per year (representing more than 20% of GDP), these resources have mostly gone into consumption and loan repayment rather than capital formation and investment. A number of factors explain the weak growth performance of agriculture over the past two decades. During this period the 12-year conflict that concluded in 2006 had adverse effects on the agricultural sector. Hundreds of thousands of rural households left the land behind and moved to the cities - mostly to the Kathmandu Valley; others moved abroad. These movements of rural population resulted in a situation of labor and investment scarcity in rural areas. Rapidly growing urbanization implied that large tracts of peri-urban fertile agricultural land have been converted to residential uses. Political instability has resulted in the lack of stable government and leaders who could make a continued effort to implement policies, plans,

and programs. Policies have proliferated, allegedly in favor of agriculture, but in many cases policies have been left at the draft stage, and lacked the supporting legislation and resources for implementation (MOAD 2014).

Poverty is still an Achilles heel (25% of the population) in a country abound with geographically remote and inaccessible mountain terrain. Most of the poor inhabit the rural areas and poverty is closely associated to a stagnant agricultural growth and rural economy. The rural population remains large and increasing despite urbanization, from about 18 million (89% of total) in 1996 to 24 million (82%) in 2010 (MOAD 2014). Agriculture employed about 14 million persons in 2010, 64% of the workforce. Gains in reducing poverty cannot be attributed solely to development of the agriculture sector, as there have been significant other influences including increased urban employment, remittances from migrant labor abroad, and increasing GDP contributions from sectors other than agriculture including tourism and services. Women farmers' participation increased from 40% to 50%. Similarly, disadvantaged groups comprised over 50% of total participating farmers (MOAD 2014).

In spite of the economy growing at a snail's pace, there are a few positive signals in the agricultural sector. For instance, income per capita and productivity of agricultural labor have increased, poverty has reduced, and malnutrition has marginally receded. Road connectivity has considerably augmented and irrigation cover has increased as well. In almost all agriculture subsectors (crops, livestock, fishery, and forestry), production or/and productivity gains have been made.

Agribusiness and commercial agriculture is finally seeing the light of day. The poultry and dairy processing industry are on the growth trajectory and the private sector

productivity is growing; other dynamic agribusiness sectors include tea, flowers and vegetable seeds. Poultry production has highly commercialized, solely through private sector investment. Growth in the poultry sector is an example of mobilizing private investment with conducive policy and regulatory environment, demand growth, agribusiness functioning in the value chain (for feed, egg and meat processing, cold storage and distribution). By 2008 there were 1,288 companies processing and manufacturing agricultural products, in 2011 there were about 5,500 agricultural cooperatives (mostly dairy, tea, coffee, honey and citrus), and over 13,000 registered community forestry groups (MOAD 2014).

There is a plethora of literature on how the rural non-farm sector via wage and self-employment can change the landscape of rural income generation, ensure income stability of farmers and food security in rural households. Going down that path would mean detachment of the farmer from his farm and farming activity as a whole to a large extent, which would largely encumber the process of structural transformation and agricultural commercialization. In this paper, we want to explore the factors that incentivize production of cash crops and the nature of those incentives. It is our belief that our study results will prove to be beneficial for policymakers in Nepal to formulate agricultural policies that help in the commercialization of the sector, incentivize cash crop production in which Nepal has a comparative advantage and also plan to create the right infrastructure, financial and physical, that incentivizes farmers to indulge more in cash crop production. The insights to be gained by other similar developing countries like Nepal cannot be stressed upon enough.

2. Literature Review

Traditional agriculture is significantly affected by the vagaries of the climatic conditions. Global climate change has increased the risk manifold. Together with missing markets for crop insurance, credit access etc. farming can be an unsettling experience.

Inhabitants of marginal environments are portrayed in the burgeoning livelihoods literature as experts in the craft of survival under conditions of adversity. One important pathway towards livelihood sustainability involves avoidance of long-term dependency on only one or two income sources. Income diversification has been shown to be positively associated not only with wealth accumulation, but also with an increased ability to withstand exogenous shocks, at least in terms of partial consumption smoothing (Block and Webb 2001). The commitment to 'diversification' as an explicit objective within livelihood development strategies assumes not only that diversification will lead to reduced vulnerability and/or improved levels of consumption for most households involved, but that poorest households in risky environments can, and indeed want to, avail themselves of opportunities presented; that is, that their current portfolios reflect constraint rather than choice (Block and Webb 2001).

Specialization and commercialization has long been propagated by economists as part of a broader strategy of comparative advantage. The underlying premise is that markets allow households to increase their incomes by producing that which provides the highest returns to land and labor, and then using cash to buy household consumption items, rather than being constrained to produce all the various goods needed for consumption (Govereh and Jayne 2003). While this concept of comparative advantage is well accepted under the assumption of frictionless markets, in reality the process of commercialization involving

non-food cash crops can be slowed down by risks and costs in the food marketing system. Food market failures give rise to the well-understood non-separability of household production and consumption decisions, which accounts for the potential breakdown of agricultural commercialization strategies based on comparative advantage (Govereh and Jayne 2003).

In many developing countries, cash crops have been observed to be highly involved with international markets while the nature of food markets remain local. Food market integration would reduce price variance and the correlation between individual and aggregate output. It is also likely to increase the market price elasticity of food demand and to decrease the correlation between crop revenues (Fafchamps 1992). Concurrently, however, improving food productivity has limited potential for agricultural growth if food markets are not better integrated.(Fafchamps 1992)

During incipient agricultural transformation, it is likely, therefore, that diversification levels are similar between different aggregation levels because each region has to grow crops its residents want to consume due to the absence of well-developed agricultural produce markets. As rural markets develop, however, the discrepancy between the market price of a commodity and its decision price at the farm level is reduced. To put it differently, the development of rural markets is a process which allows farmers to adopt production choices that reflect their comparative advantages more closely, contributing to productivity improvement at the aggregate level evaluated at common, market prices. If this development occurs, production at a less aggregate level could be less diverse than that at a more aggregate level. Initially, when some produce markets are thin with volatile prices and insurance markets are incomplete, farm households may participate in produce markets

only marginally. As their constraints on consumption smoothing are eliminated, however, they may increase their production of lucrative crops (Kurosaki and Fafchamps 2002). Similarly, development of rural labor markets enables farmers to grow more market-oriented crops through the reduction of constraints on family labor endowments (De Janvry, Fafchamps et al. 1991).

Quantitative results produced by (Kurosaki 2003) indicate that, first, cropping patterns of a traditional and subsistence agriculture changed substantially over the period with rising concentration of crop acreage in districts with higher and growing productivity, which contributed to the improvement in land productivity at the aggregate level. This change is therefore consistent with crop shifts reflecting static and dynamic comparative advantage. Second, the crop diversification level also changed as the cropping patterns changed.

Diversification is definitely being accepted in the literature as a norm. Very few people collect all their income from any one source, hold all their wealth in the form of any single asset, or use their assets in just one activity, which conforms to the notion on not keeping all your eggs in the same basket. Multiple motives drive households and individuals to diversify assets, incomes, and activities. The first set of motives comprise what are traditionally termed "push factors": risk reduction, response to diminishing factor returns in any given use, such as family labor supply in the presence of land constraints driven by population pressure and fragmented landholdings, reaction to crisis or liquidity constraints, high transactions costs that induce households to self-provision in several goods and services, etc. The second set of motives comprise "pull factors": realization of strategic complementarities between activities, such as crop-livestock integration or

milling and hog production, specialization according to comparative advantage accorded by superior technologies, skills or endowments, etc. These micro level determinants of diversification are mirrored at more aggregate levels. From the "push factor perspective", diversification is driven by limited risk bearing capacity in the presence of incomplete or weak financial systems that create strong incentives to select a portfolio of activities in order to stabilize income flows and consumption, by constraints in labor and land markets, and by climatic uncertainty. From the "pull factor perspective", local engines of growth such as commercial agriculture or proximity to an urban area create opportunities for income diversification in production- and expenditure-linkage activities.(Barrett, Reardon et al. 2001)

Individuals own assets, some of which (non-productive assets, such as household valuables) generate "unearned" income directly and others of which (productive assets, such as human capital, land, livestock) generate "earned" income only indirectly through their allocation to activities such as farming, weaving or commerce (Barrett, Reardon et al. 2001). Assets, activities, and income are thus complementary measures in the study of diversification behaviors. Income as a metric is of particular interest because of it can be interpreted in terms of a welfare outcome. But it can be difficult to distinguish (constrained) choice from chance in income draws. Assets offer a store of wealth as well as sources of income, and portfolio theory focuses on asset allocation (Barrett, Reardon et al. 2001).

3. Data Source and Description

This study uses data from the National Census of Agriculture Nepal 2011-12 conducted and prepared by the Central Bureau of Statistics (CBS). The first National Sample Census of Agriculture was conducted in 1961/62 and since then, CBS has given continuity to this operation. The sampling frame used for the agriculture census is basically derived from the household schedule of the National Population and Housing Census 2011 which contains information about the holdings of agricultural land, household information, crop information and livestock as well. The sample census was carried across all 75 districts of Nepal. The sample does not include corporate/commercial farmers and the identification of an agricultural household was done under desired criterion as per geographical location.

For this study we used the variables mentioned in table 1

Table 1: Description of the variables used

VARIABLE	DEFINITION
CASH CROPS	Cash crops (mushroom, bee keeping and aquiculture)
HHSIZE	Number of people living in a household
GENDER	Sex of household head
DALIT	One of the caste group (so called lowest caste group)
BRAHMIN	Another category of caste
JANAJATI	One of the ethnic group of caste system
MJECO_ACTVT	Economic activities of household head (4 major group)
YRSCH	Years of schooling of household head
AGE	Age of the household head
LOAN	Loan from credit lenders
OCCUP	Occupation of household head (categorized in four group)
EASTERN	Eastern development region
CENTRAL	Central development region
WESTERN	Western development region
MIDWESTERN	Mid-western development region
TOTAL_AREA	Land holding by a household
MPRODN	Major production of a household

The observation consists of three group of cash crops: mushroom, bee keeping and aquiculture. Gender represents the sex of household head in a family. Three major caste group (Brahmin, janajati and dalit) are included in the study. The variable major economic activity has four categories in which categoty1 includes the activity of household head involved in mine, industry and construction, category 2 includes household head involved in wholesale and hotel, category 3 includes the involvement in transportation and communication, and category 4 includes involvement in education,

health and social work. Similarly, we categorized occupation into four major groups (agricultural sector, government work, business and technician/ expert). Major production sectors are cereal, livestock, fruit/vegetable and bird. Years of schooling represents the highest level of education completed by household head.

Table 2 represents the descriptive statistics of the variables used in this study. Out of 125,000 household information, we obtained 546 household involved in cash crop activity. Household size ranges from 2 to 21 members, years of schooling ranges from 2 to 17 years, age ranges from 21 to 83 years and land holding from 0.0032 hectare to 7.43 Ha.

Table 2: Descriptive statistics

VARIABLE	OBS	MEAN	STD. DEV.	MIN	MAX
CASHCROP	546	3.0531	0.7161	1	3
HHSIZE	546	6.3443	3.1961	2	21
GENDER	546	0.4158	0.4933	0	1
DALIT	546	0.0385	0.1925	0	1
BRAHMIN	546	0.5879	0.4927	0	1
JANAJATI	546	0.2839	0.4513	0	1
LOAN	546	0.2344	0.4240	0	1
YRSCH	546	8.0568	3.2349	2	17
AGE	546	47.4854	13.1185	21	83
EASTERN	546	0.2692	0.4440	0	1
CENTRAL	546	0.1026	0.3037	0	1
WESTERN	546	0.2308	0.4217	0	1
MIDWESTERN	546	0.1905	0.3930	0	1
TOTAL_AREA	546	0.3623	0.8814	0.0032	7.4362
MPRODN	546	1.2051	0.5402	1	3
MJECO_ACTVT	546	2.2546	1.0576	1	4
OCCUP	546	1.5568	1.0394	1	4

4. Methodology

In this study we estimate a model of farmers' participation in cash cropping activities and cash crop determination. Farmers have three types of cash crops: mushroom, bee keeping and aquiculture. We begin with general specification applying some statistical test if these categorization are appropriate. As we see that a discrete choice involved, multinomial logit model would be appropriate approach to estimate the probabilities that each individual chooses each cash crops. The model is derived from the theory of probabilistic choice developed by D. McFadden. It is based on the utility maximization in which utility conditional on the choice of farmers' alternative j for crop selection is specified in linear form: $V_{ij} = B_j X_i + u_{ij}$

Where, V_{ij} is the indirect utility function of individual i for selecting cash crop j which is a linear function of explanatory variable ($\mathbf{X}_i$) that represents household size, caste, occupation, economic activities, gender, age and regional factors; β_j is the vector of parameters to be estimated; and u_{ij} is the stochastic component of utility capturing unobserved determinants of crop. The individual farmer is assumed to choose the crop k (k=1, 2, 3) for which V_{ij} is the highest. Thus the probability of choosing crop j by an individual i, is given by

$$P_{ij} = Pr\ (V_j > V_k) \text{ for all } j \neq k$$

$$= pr\ (\beta_j X_i + u_{ij} > \beta_k X_i + u_{ik})$$

$$= Pr\ (\beta_j X_i - \beta_k X_i > u_{ik} - u_{ij})$$

Assuming u_{ij}'s are distributed independently and identically, their difference have a logistic distribution and the probabilities take the multinomial logit form which can be estimated easily. The estimated coefficients β_j are interpreted as the effect of variable on the utility of being in one crop alternative j compared to the utility from the base category of cash crop.

Consider the outcomes 1, 2, 3 recorded in j, and the explanatory variables X. Assume that there are j = 3 outcomes: "mushroom", "bee keeping", and "aquiculture". In the multinomial logit model, we estimate a set of coefficients, β_1, β_2 and β_3, corresponding to each outcome:

$$\Pr(j = 1) = \frac{e^{X\beta_1}}{e^{X\beta_1)} + e^{X\beta_2} + e^{X\beta_3}}$$

$$\Pr(j=2) = \frac{e^{X\beta_2}}{e^{X\beta_1)} + e^{X\beta_2} + e^{X\beta_3}}$$

$$\Pr(j=3) = \frac{e^{X\beta_3}}{e^{X\beta_1)} + e^{X\beta_2} + e^{X\beta_3}}$$

The model, however, is unidentified in the sense that there is more than one solution to β_1, β_2 and β_3 that leads to the same probabilities for j = 1, 2, 3. To identify the model, we arbitrarily set one of β_1, β_2 or β_3 equal to 0 — it does not matter which. That is, if we arbitrarily set $\beta_1 = 0$, the remaining coefficients $\beta_2$and β_3 will measure the change relative to the j = 1 group. The coefficients will differ because they have different interpretations, but the predicted probabilities for j = 1, 2, and 3 will still be the same. Thus either parameterization will be a solution to the same underlying model.

Setting $\beta_1 = 0$, the equations become

$$\Pr(j = 1) = \frac{1}{1 + e^{X\beta_2} + e^{X\beta_3}}$$

$$\Pr(j = 2) = \frac{e^{X\beta_2}}{1 + e^{X\beta_2} + e^{X\beta_3}}$$

$$\Pr(j = 3) = \frac{e^{X\beta_3}}{1 + e^{X\beta_2} + e^{X\beta_3}}$$

The relative probability of j = 2 to the base outcome is $\frac{\Pr(y = 2)}{\Pr(y = 1)} = e^{X\beta^2}$

Let's call this ratio the relative risk, and let's further assume that X and $\beta_k^{(2)}$ are vectors equal to $(X_1, X_2, \ldots, X_k)$ and $(\beta_1, \beta_2, \ldots\ldots, \beta_k)'$ respectively. The ratio of the relative risk for a one-unit change in x_i is then

$$\frac{e^{\beta_1^2 X_1 + \ldots + \beta_1^2 (X_i + 1) + \ldots\ldots + \beta_k^2 X_k}}{e^{\beta_1^2 X_1 + \ldots + \beta_1^2 X_i + \ldots\ldots + \beta_k^2 X_k}} = e^{\beta_i^2}$$

Thus the exponentiated value of a coefficient is the relative-risk ratio for a one-unit change in the corresponding variable (risk is measured as the risk of the outcome relative to the base outcome).

4.1. Empirical results

Table 3: Estimated result for cash crop adoption using multinomial logit method

VARIABLES	MUSHROOM	BEE KEEPING (Base)	AQUICULTURE
HHSIZE	23.61		0.204**
	(5,394)		(0.0929)
GENDER	63.30		-3.566***
	(10,442)		(0.910)
BRAHMIN	284.1		4.449***
	(105,978)		(1.466)
JANAJATI	301.1		4.132***
	(101,615)		(1.168)
YRSCH	14.52		-0.241*
	(1,292)		(0.146)
AGE	-9.179		0.124***
	(612.7)		(0.0385)
EASTERN	178.9		3.125***
	(18,409)		(1.170)
WESTERN	160.7		-0.530
	(15,191)		(0.953)
TOTAL_AREA	-34.09		0.794***
	(4,114)		(0.226)
MPRODN	37.87		3.167***
	(11,024)		(0.693)
2.MJECO_ACTVT	123.0		-3.582***
	(14,567)		(0.881)
3.OCCUP	-65.11		4.732***
	(27,137)		(1.034)
CONSTANT	-472.5		-14.44***
	(118,240)		(3.137)
Observations	546	546	546

Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table 3 displays the estimated results that are significant at least in one of the groups of outcome. We specified bee keeping as base group and compared the coefficients of other cash crops (mushroom and aquiculture) to base group of cash crops..

For aquiculture outcomes, gender coefficient indicates that the multinomial logit for male relative to female is 3.56 unit lower for being in aquiculture compared to bee- keeping given all other predictor variables are held constant. One unit increase in household size, the multinomial log- odds for choosing aquiculture compared to bee- keeping would expected to increase by 0.204 unit. Similarly, one more year of age, the multinomial logit- odds for choosing aquiculture compared to bee- keeping would expect to increase by 0.124. In the case of caste, one unit increase in Brahmin and janajati, the multinomial logit- odds for choosing aquiculture compared to bee- keeping would expect to increase by 4.44 and 4.13 units respectively. Likewise, major economic activity2(whole sale and hotel work) would expected to decrease for choosing aquiculture compared to bee-keeping but the multinomial log- odds of choosing aquiculture for occupation category 3(business) would expected to increase by 4.73 units.

None of the coefficients in "mushroom" are statistically significant and hence does not make any sense to compare to base group. Further evaluation in data file is required. We plan to figure out the problem later on and report the result in reasonable form.

4.2. Marginal Effect

Table 4: Marginal effect

	Delta method					
	Margin	Std. Err.	z	p>|z|	95%	CI
OCCUP						
1	0.6230	29.2324	0.02	0.983	-56.6715	57.9176
2	0.1420	130.9264	0.00	0.999	-256.469	256.753
3	0.5620	35.0174	0.02	0.987	-68.071	69.1949
4	0.7296	12.8881	0.06	0.955	-24.5307	25.9898
MJECO_ACTVT						
1	0.6811	41.3367	0.02	0.987	-80.3374	81.6996
2	0.7082	23.1244	0.03	0.976	-44.6148	46.0313
3	0.1082	20.9498	0.01	0.996	-40.9528	41.1693
4	0.5596	25.5337	0.02	0.983	-49.4855	50.6048

We tried to obtain the marginal effect of explanatory variables using delta method but able to reported occupation and major economic activities only. Results show that none of the coefficients are statistically significant. We will report reasonable results after evaluating data in accurately.

4.3. Independence of irrelevant alternative (IIA) Test

We employed Hausman test for testing IIA property which is the stringent assumption of multinomial logit model that the outcome categories should follow it. However; we are unable to get positive definite in our preliminary result. We might have some problems in the data and may require some additional information. We gather all information and follow standard procedure for estimating parameters later on.

5. Future work

In our initial phase of this study, some of the information regarding household characteristics such as income, technology adoption, access to market, and extension service are missing. We will get enough information that affects cash crop selection. Then we will go through an intensive empirical work that includes testing for IIA, getting marginal effect of each variables, relative risk ratio and model fit. We will test the hypothesis in each step wherever required to maintain the consistency regarding model fit. After those steps, we will be able to report reliable results and be able to interpret the parameters correctly and then will suggest policy implication regarding the cash crop selection among the farmers. We will follow standard procedure of multinomial logit model by testing all of its required assumptions. If some of the assumptions such as IIA criteria is violated, we will adopt alternative methodology.

6. Bibliography

Barrett, C. B., et al. (2001). "Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications." Food policy **26**(4): 315-331.

Block, S. and P. Webb (2001). "The dynamics of livelihood diversification in post-famine Ethiopia." Food policy **26**(4): 333-350.

De Janvry, A., et al. (1991). "Peasant household behaviour with missing markets: some paradoxes explained." The Economic Journal: 1400-1417.

Fafchamps, M. (1992). "Cash crop production, food price volatility, and rural market integration in the third world." American Journal of Agricultural Economics **74**(1): 90-99.

Govereh, J. and T. S. Jayne (2003). "Cash cropping and food crop productivity: synergies or trade-offs?" Agricultural Economics **28**(1): 39-50.

Kurosaki, T. (2003). "Specialization and diversification in agricultural transformation: the case of West Punjab, 1903–92." American Journal of Agricultural Economics **85**(2): 372-386.

Kurosaki, T. and M. Fafchamps (2002). "Insurance market efficiency and crop choices in Pakistan." Journal of Development Economics **67**(2): 419-453.

Vergopoulos, K. (1978). "Capitalism and peasant productivity." The Journal of Peasant Studies **5**(4): 446-465.

Government of Nepal (2014). “Agricultural Development Strategy.” Ministry of Agricultural Development