



Diversification on Small Farms: An empirical investigation of panel data from 2001 to 2010

Sadia Hussain

Farah Said

Lahore School of Economics

Motivation

- Pakistan growth trajectory marred by sluggish growth, double-digit inflation, global recession and natural disasters.
 - Around **21%** of the population lives below the poverty line using US\$1.25 a day (World Bank, 2014)
- Agriculture to GDP ratio declined from **26%** to **22%** although accounting for **45%** of Pakistan's workforce (PBS, 2010)
- Around **64%** of the population is rural primarily involved in crop cultivation, livestock rearing and on-farm and off-farm labor (Agriculture Census, 2010)

Motivation

- Imperative to understand rural dynamics for poverty alleviation as well as inclusive growth
- The welfare of rural households not restricted to agriculture only
 - Complementary or trade-off between non-farm and farm activities.
 - 66% of the cultivators are involved in at least one non-agricultural activity
- Research question:

Have diversified households fared better on welfare indicators as compared to specialized households over the last decade?

Main Findings

We use the Pakistan Panel Household Survey (2001,2010) and find that:

1. Rural households do not typically transition from one source of livelihood to another.
2. **Diversified** households experienced a significant increase in consumption and income respectively in contrast to **specialized** households.

Literature

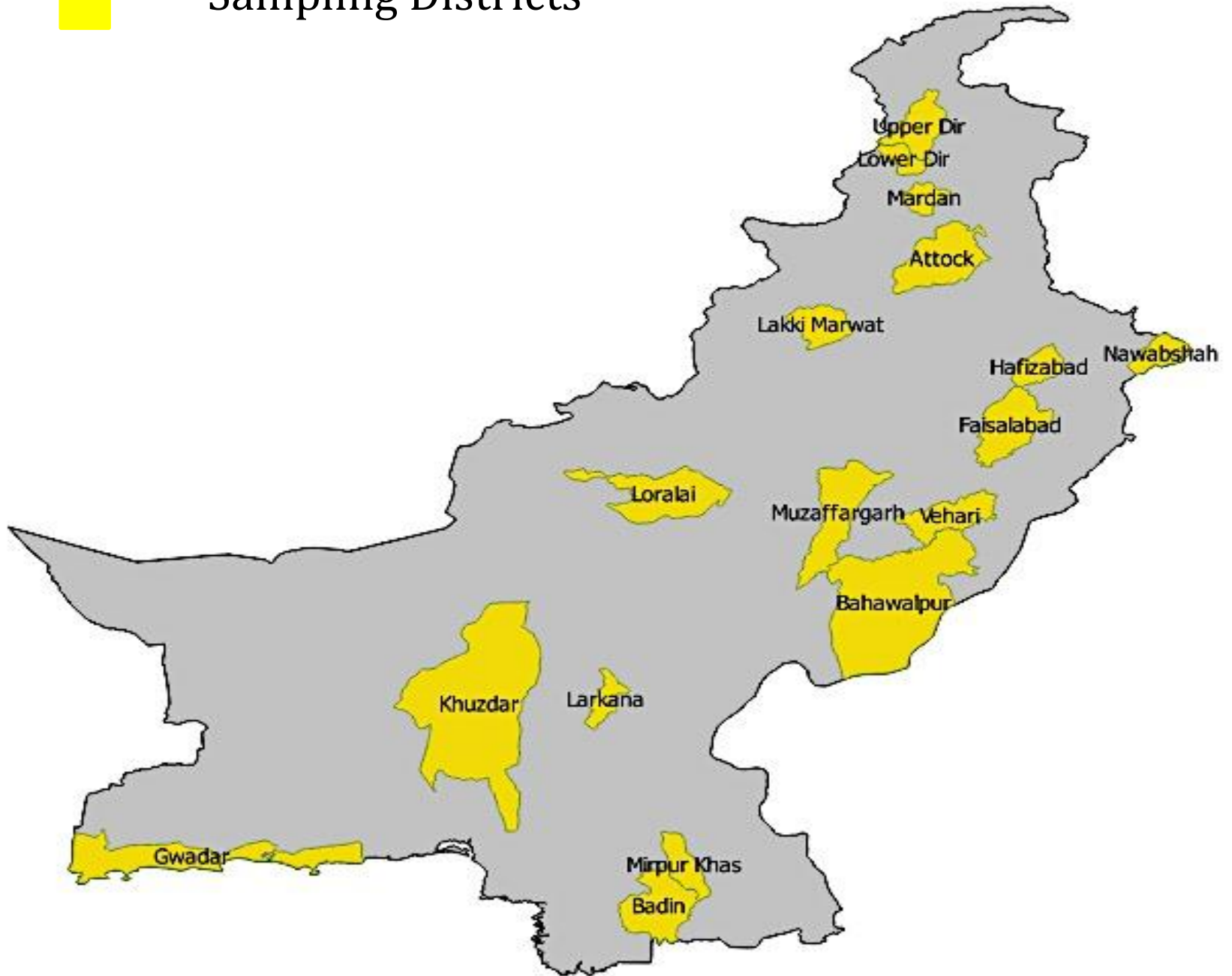
- At the provincial level, there is little or no evidence for agricultural transformation
 - However, there is evidence of reallocation of land towards high-value added crops at the district level (Kurosaki, 2003)
- Mixed evidence regarding shifts towards diversification.
 - However, some form of diversification is common despite levels of development (David et al, 2016; Reardon and Escobar, 2001)
- Complementarities production, consumption and investment between farm and non-farm activities between the two are supported by empirical findings (Ploeg and Renting, 2014, Wiggins et al, 2010, Reardon and Escobar, 2001)
 - Findings suggest that one must address the synergies between farm and non-farm activities to promote rural growth.

Data

- Pakistan Panel Household Survey (PPHS) by Pakistan Institute of Development Economics (PIDE).
- Conducted in 2001, 2004 and 2010.
- Used 2001 and 2010 rounds to construct a balanced panel covering all 4 provinces and 16 districts
- Sample consists of 2058 rural households followed over a period of ten years

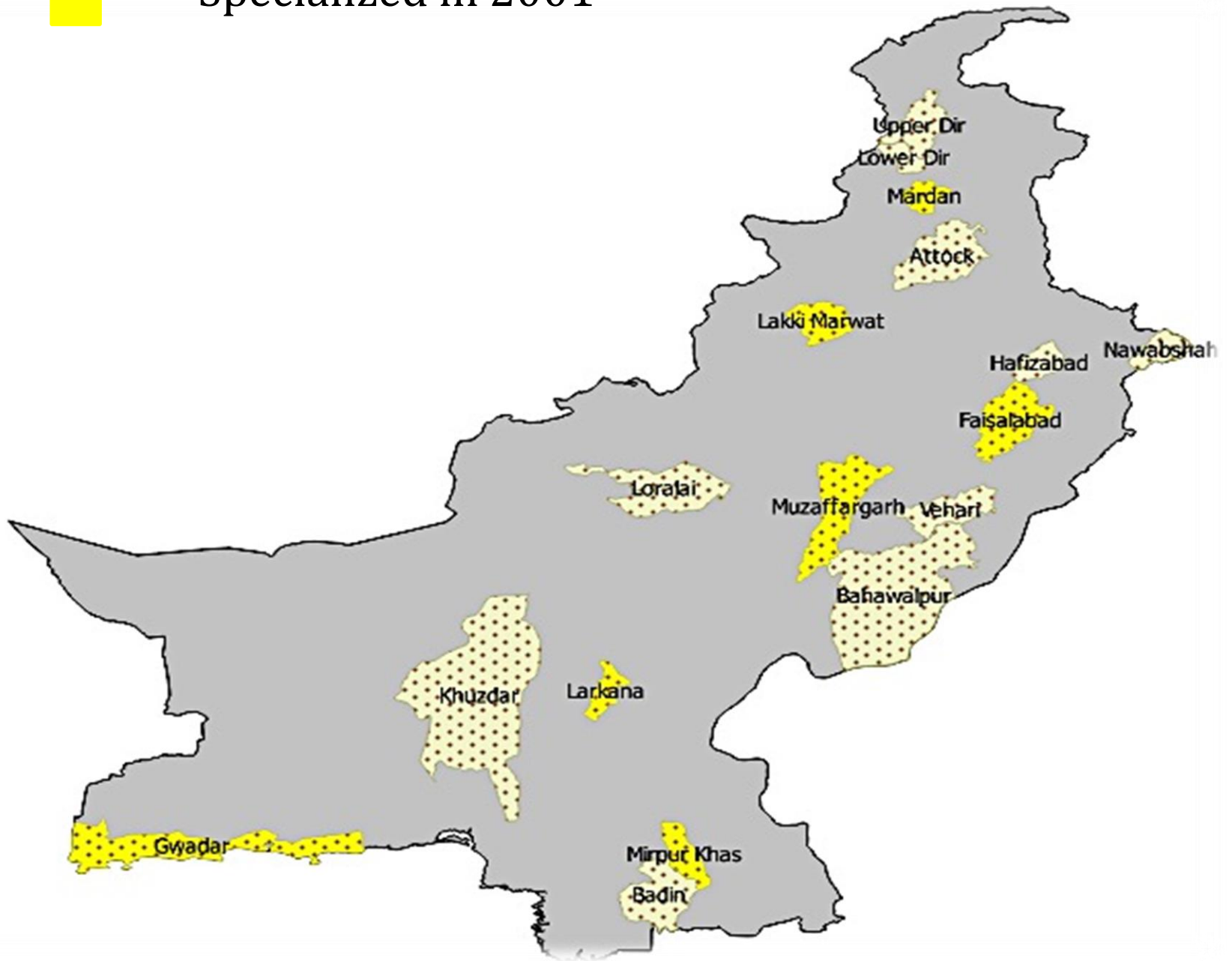


Sampling Districts

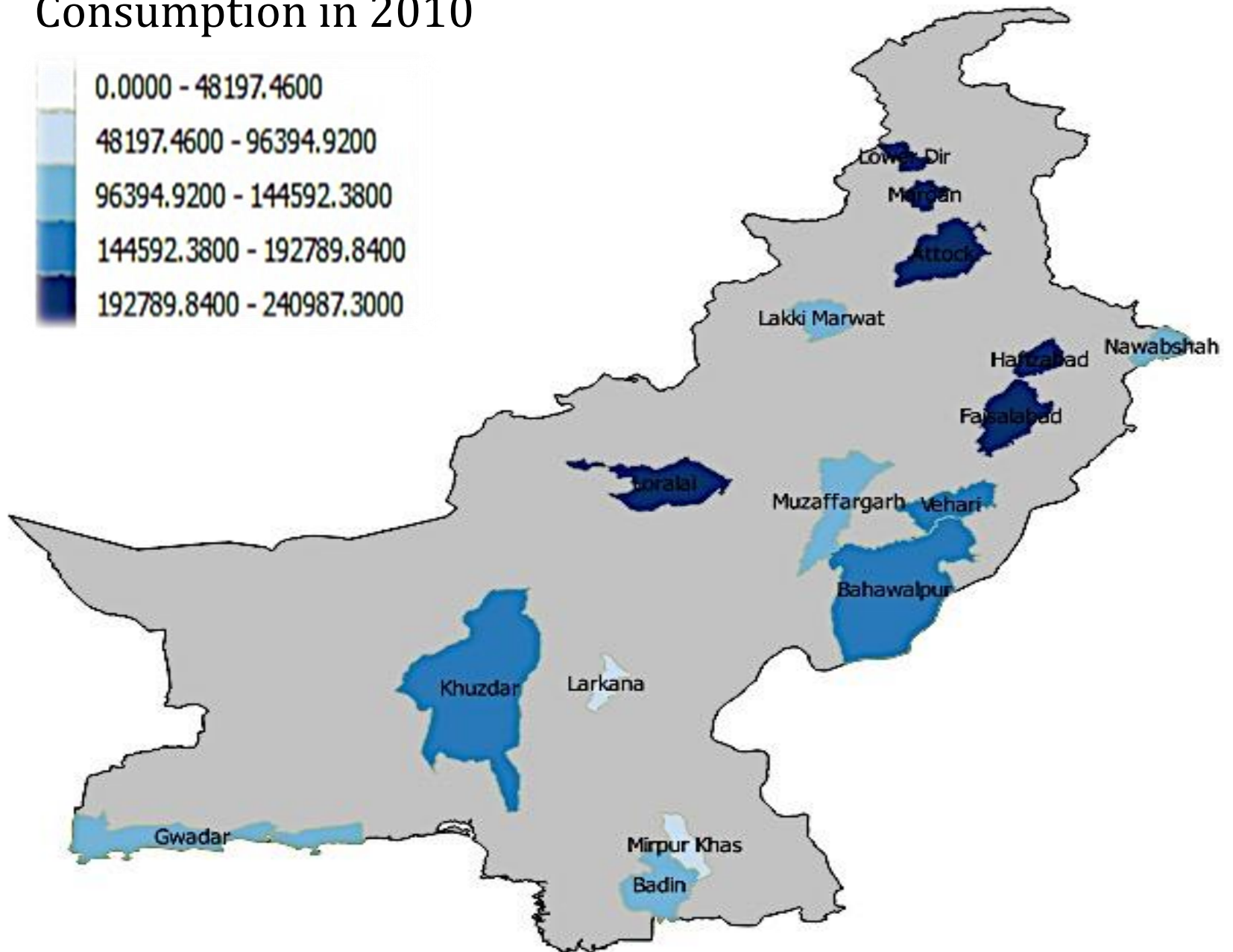




Specialized in 2001



Consumption in 2010



Diversification

- We use two definitions of 'diversification':
 1. Diversification in cultivation - Measured through the number of crops cultivated
 2. Diversification by livelihood- Measured through number of sources of income.
- Livelihood defined as:
 - **Cultivators**- cultivated land in 2001 or 2010
 - **Livestock**- owned livestock in 2001 or 2010
 - **Land-owners**- own landholdings in 2001 or 2010
 - **Wage Employment**-worked off-farm for wages in 2001 or 2010
 - **Business Enterprise**-own a business in 2001 or 2001

Variable	2001	2010
Age of household head (years)	47	51
Income to consumption ratio	3.3	3.5
Family size	8	7
Literate (%)	81	81
Land-owners (%)		
Land-owners (%)	56**	60**
Small land-owners: 3 acres or less (%)	22	26
Medium land-owners: 3 to 10 acres (%)	19	16
Large land-owners: more than 10 acres (%)	13	12
Cultivators (%)		
Cultivators (%)	56**	53**
Nonagricultural business (%)	20***	10***
Wage employment (%)	67**	88**
Livestock owners (%)	70**	74**
Report experiencing production shocks (%)	55	84
Type of crops cultivated in a year	4	3

*** p<0.01, ** p<0.05, * p<0.1

Specialized by Source of Income

- 42% of the sample households specialized (had only one source of income)

2010(%)	2001 (%)	Landowners only	Cultivators only	Wage Employees only	Business only	Livestock only
Landowners only		34%	0%	2%	14%	3%
Cultivators only		0%	44%	1%	6%	2%
Wage employees only		48%	41%	94%	46%	28%B
Business only		2%	3%	0%	17%	2%
Livestock only		16%	13%	2%	18%	65%
(Total # in 2001)		100% (102)	100% (78)	100% (416)	100% (96)	100% (173)

16 % of the households moved towards diversification over time

2010 (%) \ 2001 (%)	Landowners only	Cultivators only	Wage employees only	Business only	Livestock only
Landowners & cultivators	31%	41%	9%	24%	15%
Landowners, cultivators & wage employees	24%	12%	79%	16%	10%
Landowners & wage employees only	45%	0%	12%	36%	5%
Wage employees & cultivators	0%	29%	0%	16%	0%
Livestock and cultivators	0%	17%	0%	8%	70%
(Total # in 2001)	100% (58)	100% (82)	100% (67)	100% (25)	100% (20)

12 % households moved towards specialization over time

2010 (%) \ 2001 (%)	Landowners & wage employees only	Wage employees & cultivators	Livestock & cultivators	Landowners, cultivators & wage employees
Landowners only	4%	0%	0%	0%
Cultivators only	0%	17%	15%	0%
Wage employees only	95%	83%	27%	100%
Business only	0%	0%	2%	0%
Livestock only	1%	0%	57%	0%
(Total # in 2001)	100% (99)	100% (48)	100% (60)	100% (44)



Hypothesis

- 1) If the consumption expenditures in diversified households both in 2001 and 2010 are higher or lower than specialized households and diversified in 2001 only
- 2) If the income levels in diversified households both in 2001 and 2010 are higher or lower than specialized households and diversified in 2001 only

Growth in consumption

Regressors	Total consumption (Rs.)	Nonfood consumption (Rs.)
<i>Consumption (Rs.), 2001</i>	-0.00497 (0.0421)	0.424* (0.243)
<i>Diversified, 2001</i>	-45,152 (33466)	-21,664 (18517)
<i>Diversified, 2001 & 2010</i>	71,790*** (25339)	39,356*** (11115)
<i>Number of cash crops cultivated, 2001</i>	426.4 (7355)	10,725 (9502)
<i>Literacy, 2001</i>	8,069* (4501)	3,476 (3908)
<i>Dependency ratio, 2001</i>	-20,286* (11603)	-1,502 (9775)
Observations	1,126	699

Standard errors have been clustered at village level

Controls include number of household assets and age of household head

Growth in Income

Regressors	Total Income (Rs.)
<i>Total Income (Rs.), 2001</i>	-0.00187 (0.00237)
<i>Diversified, 2001</i>	-176617 (289418)
<i>Diversified, 2001 & 2010</i>	1024000** (510966)
<i>Number of cash crops cultivated, 2001</i>	-158168 (225214)
<i>Literacy, 2001</i>	50040 (229767)
<i>Dependency ratio, 2001</i>	165637 (113666)
<i>Value of household assets (Rs.), 2001</i>	10.38* (6.195)
Observations	1126
Standard errors have been clustered at village level	
Controls include number of household assets and age of household head	



Results

- Diversified households in both 2001 and 2010 experienced an increase in consumption of Rs.77,000 as compared to specialized and diversified in 2001 only households
- Diversified households in both 2001 and 2010 experienced an increase in income of Rs. 1 million as compared to other groups



Conclusion

- Findings highlight the role of public investment in promoting synergies across agricultural and non-agricultural sectors
 - Agricultural policies should be geared towards promoting non-farm activities through commerce, growth in services and manufacturing
- Improving rural welfare does not require re-allocation of resources but optimizing the complementarities across rural activities