

Shifting from crops to livestock: smallholders' livelihood adaptation dynamics in Nueva Ecija province, Philippines



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1. Introduction

- This study forms part of a PhD research project on the role of livestock in climate change adaptation of smallholder livestock keepers in the Philippines.
- Livelihood transitions in most agricultural nations are conditioned by changes in both social and climate systems.
- There is an increasing recognition of livestock role in the livelihood adaptation process yet studies in developing countries in Asia is rare.
- In the Philippines, climate change related extreme events such as typhoons, floods and droughts have detrimental impacts on crop production and have significantly affected the livelihood of cash-focused rural villages.
- Water buffalo, locally known as "carabao" dairying is increasingly used as a buffer activity to recover from crop losses.
- The study aims to understand how farmers take water buffalo dairying as transformative opportunity, and whether the shift from cropping to dairying can be a viable climate change adaptation strategy for climate-resilient smallholder farmers' livelihoods.

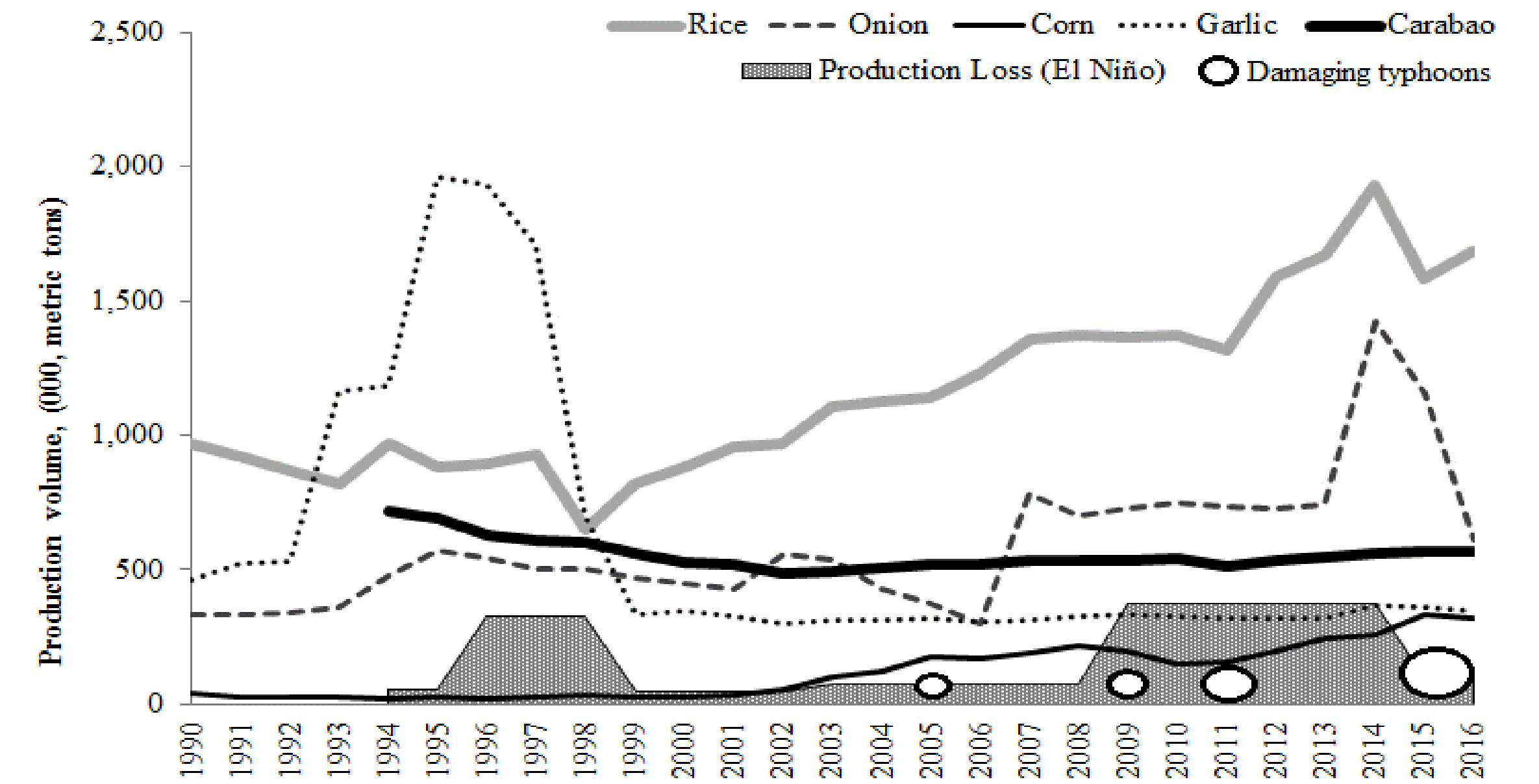


Figure 1: Historical production volume changes of major crops and water buffalo, plotted against losses from typhoons and El Niño damages in Nueva Ecija province, Philippines. (Data sources: PSA, <http://psa.gov.ph> and PAGASA, <http://www.pagasa.dost.gov.ph>)

2. Research Design

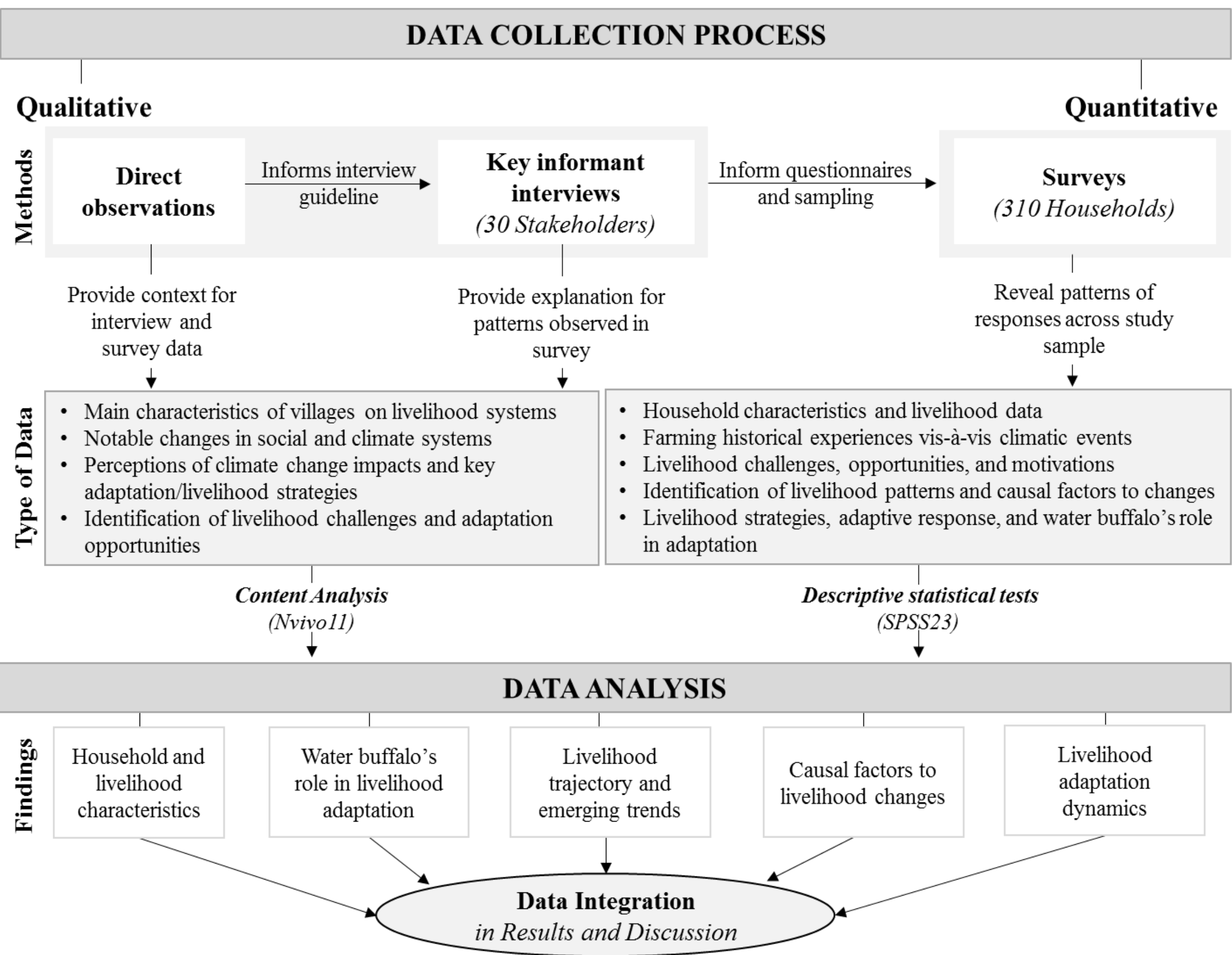


Figure 2. The mixed method approach used in data collection process and analysis.

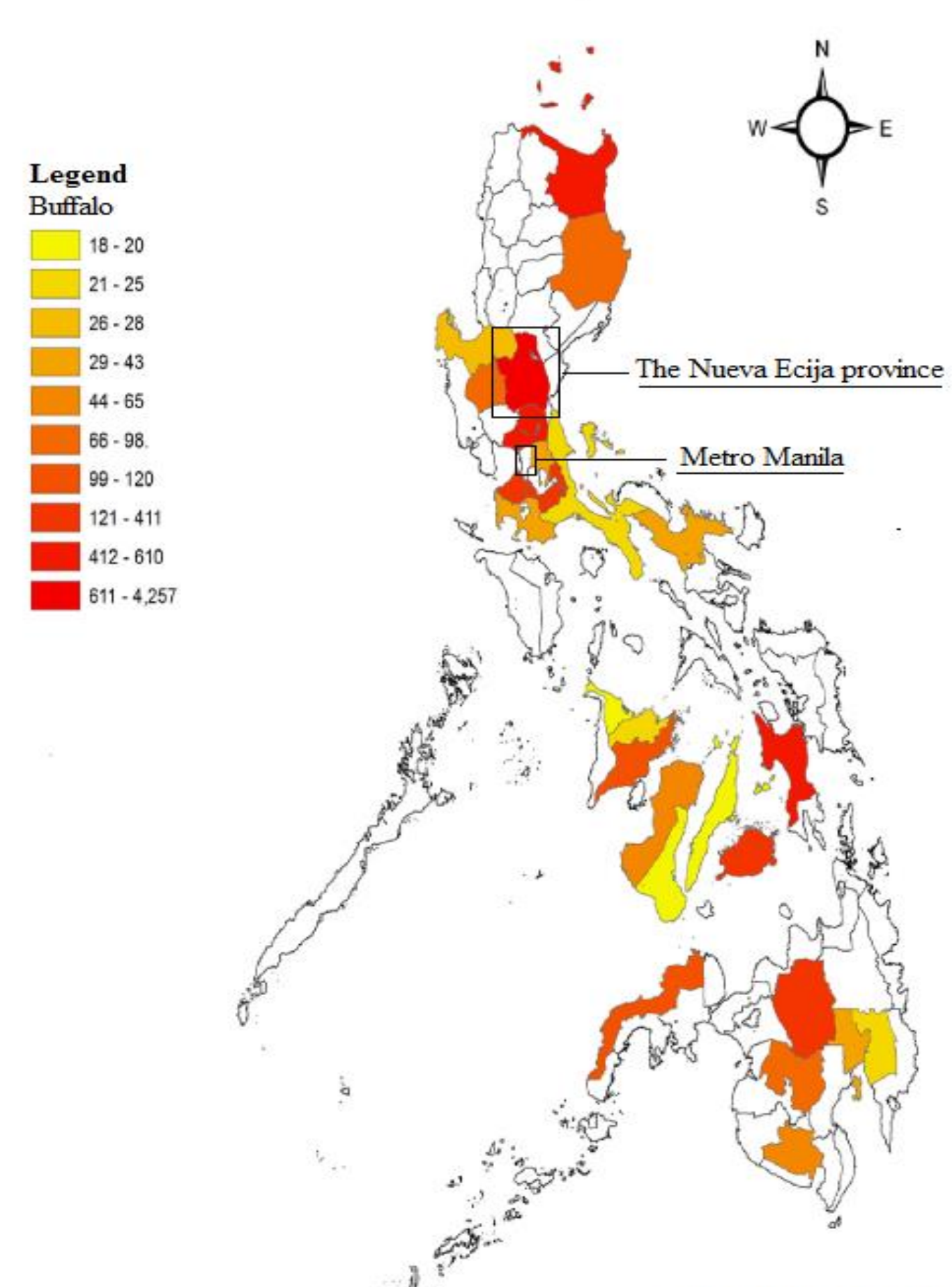


Figure 3. The location of the study area vs dairy buffalo inventory in the country.

3. Background of the study area

Table 1. Sociodemographic and agricultural characteristics of the study area

Indicator	Nueva Ecija province	Country values
Sociodemographic		
Total population	2.15 million	100.98 million
Urban: Rural	27.3%: 72.7%	45.3%: 54.7%
Number of households	496,977	22.98 million
Average household size	4.3	4.4
Population density	378 sq. km.	337 sq. km
Education, Literacy rate (simple literacy) *	93.5%	96.5%
Poverty Incidence on population	22.6%	16.5%
Agriculture		
Land area (in hectares)	575,133	30,000,000
Number of farms, by land use	119,148	5,560,000
Average farm area per farm/holding	1.68	1.29
Top crops: Rice (metric tons)	1,684,352	19,276,346
Corn	31,930	7,914,908
Top livestock: Carabao (heads)	56,820	2,881,890
Cattle	30,666	2,547,610
Chicken	8,825,309	175,316,920
Duck	467,033	10,841,960
Goats	72,450	3,710,350

*The percentage of the population 10 years old and over, who can read, write and understand simple messages in any language or dialect. Data source, PSA

4. Key findings

- Shifting from crops to water buffalo dairying were motivated by the need for alternative livelihoods, and to averse the risks from recurrent crop failures and market shocks.
- Next to income source, dairying functions as a buffer in case of unexpected cash needs, and as insurance mechanism during crop losses.
- Profit was the main push factor to farmers livelihood decisions and activities. Evidence to the emerging trend in water buffalo dairying was seen, that from 1990 crops contributed over 90% income, until 2010 livestock exceeded income from cropping, and the shift to buffalo dairying started.

Table 2: Friedman's tests result showing water buffalo's buffering functions to farmers livelihoods, N=298

Livelihood function ¹	Reasons for importance	Mean	SD	Mean Rank ^a
Income	For buying viands, Household basic items	4.73	0.45	5.42
Buffering	Covering unexpected costs, or insurance mechanisms in case of crop losses	4.28	0.65	4.81
Accumulation	To increase income and production, buying more caracows	3.34	0.76	3.48
Consumption	We cannot afford to buy milk and beef	2.58	0.59	2.45
Social integration	To be able to work with other farmers and call them for assistance	2.08	0.81	1.82
Friedman Test		$\chi^2 (5, N=298) = 914.54, p < 0.001$		
Kendall's W		0.614		

^aThe higher the mean rank of a function, the greater the level of importance in the livelihoods. ¹Categories adopted and modified from Dorward et al., 2005.

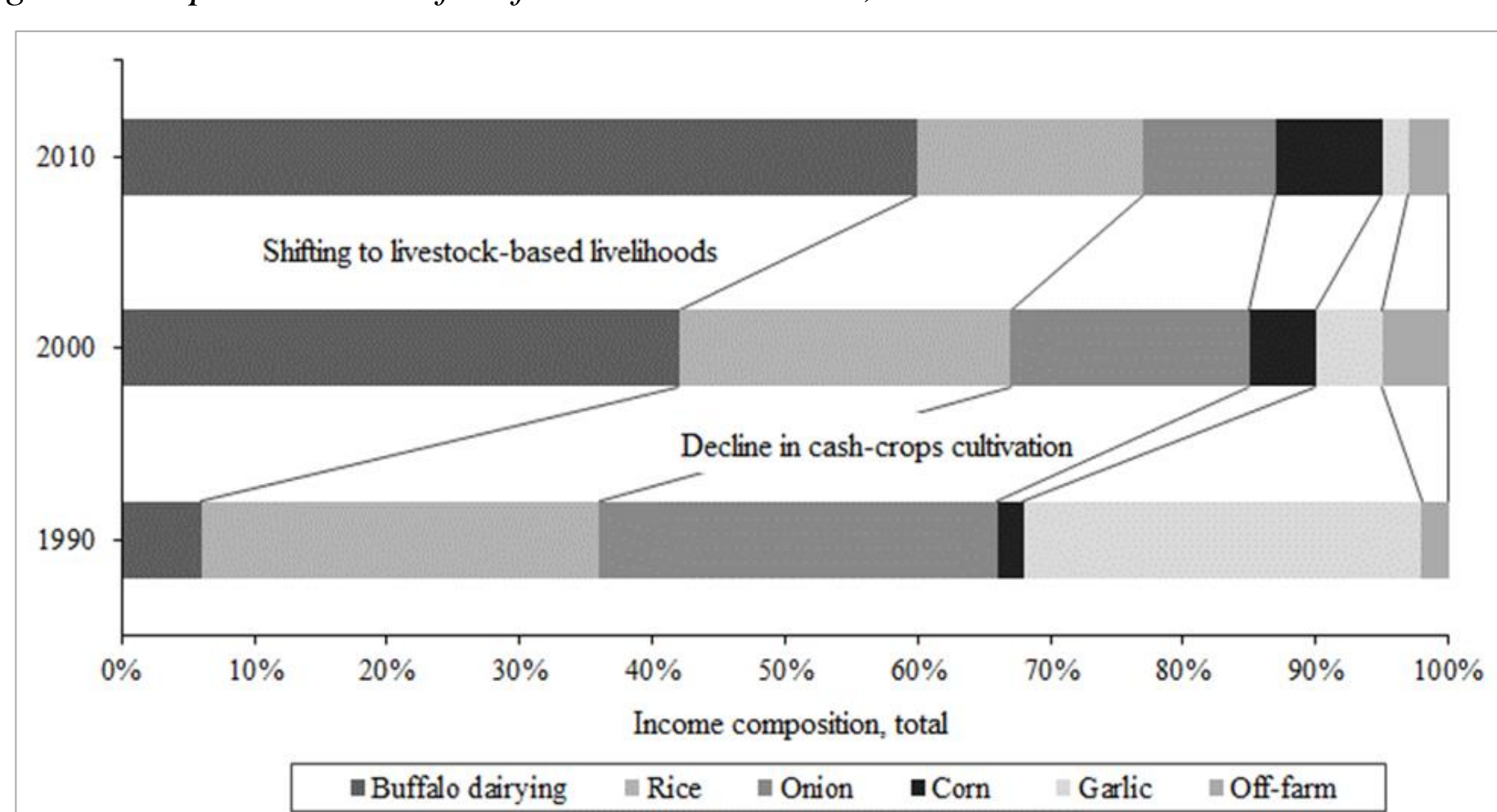
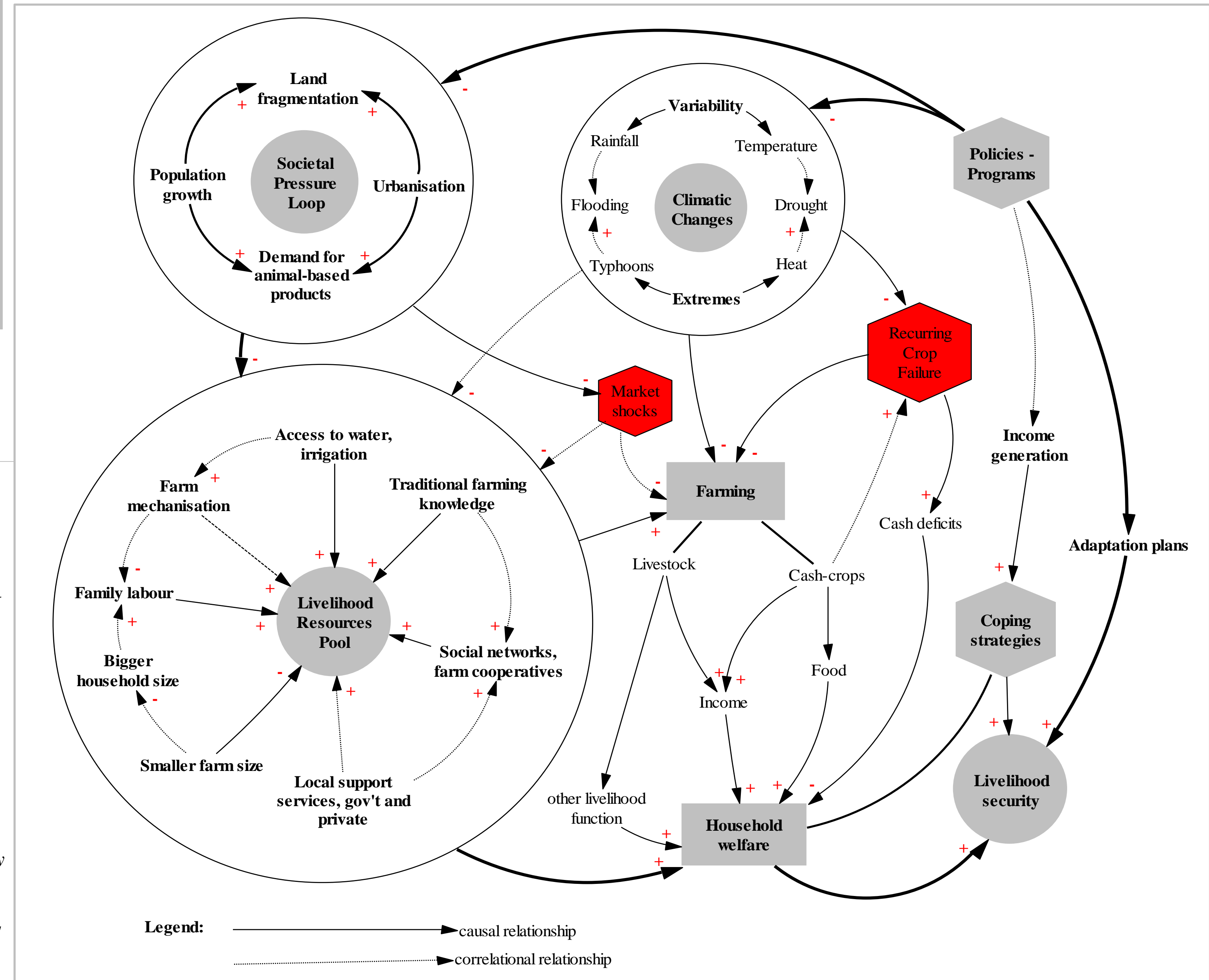


Figure 4: Reliance on farming and evolution of major contributors to total household income, Nueva Ecija, N=298 (data source: HH survey)

Figure 5: The interplay of causal drivers to farming livelihoods, highlighting pattern of relationships and link for livelihood security of farmers in Nueva Ecija province, Philippines.

(Positive polarity on the arrows indicates variables are directly proportional to each other (e.g. when farm income increases, household welfare increases). A negative polarity shows opposite direction of change in the next variable (e.g. when extent of societal pressure increases, livelihood resources pool decreases)



6. Conclusion and study implications

- This research contributes to the greater scientific understanding of a livelihood adaptation process under the context of small-hold farming context. Shifting from crop cultivation to buffalo dairying is a voluntary adaptation response by farmers, reflecting the dynamics of their livelihoods, and depending on the resources and options available.
- Therefore, the adaptation process to climate change does not need from the scratch. The study suggests that climate change adaptation need be integrated into livelihood development programs. Positive adaptive actions need be encouraged such in livelihood activities that fosters farmers' capacity building and reduces their vulnerabilities.