"Can Adaptation Practices in response to Climate Change in Agricultural Sector be explained by Socio-economic variables?"- A case from Nepal

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Outlines

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3. Objectives of the study
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5. Findings
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Introduction

- Climate change is the global issue and Nepal is also exposed to CC in terms of various aspects.
- Frequent droughts, erratic rainfall, extreme temperature have been experienced in Nepal and reported as one of vulnerable country (Alam and Regmi 2004; ADS, 2014)
- Consequences have been observed in agricultural sector: increased disease and pest infestations, low production etc.
- To overcome these issues, it is farmers who are suggested to adopt adaptations measures (Smit J., 1996; Tol et al, 1997; Smith et al., 2000; Fankhauser, 1997; Poudel and Kotani, 2013; ADS 2014)
- Formulation and implementation of National Adaptation Program of Action (NAPA), Local Adaptation Plan of Action (LAPA), National Adaptation Plan (NAP), and Climate Change Policy (CCP) and ADS-2014 that includes CC as one of the 13 key issues of agricultural sector of Nepal - evidences of governmental interventions in response to CC

Statement of the problem

- Very limited studies that have explained about the adaptation process in Nepal
- Questions such as what is the driving factor and under what context farmers are influenced to adapt and increase the adaptation behavior are yet to be answered
- Need of studies that can empirically answer these questions about the contextual factors that alter the adaptation process at the farm level

Objective of the study

Major objective

- To assess and explore the farmers' adaptation behavior of Nepalese agricultural sector.

Specific objectives include:

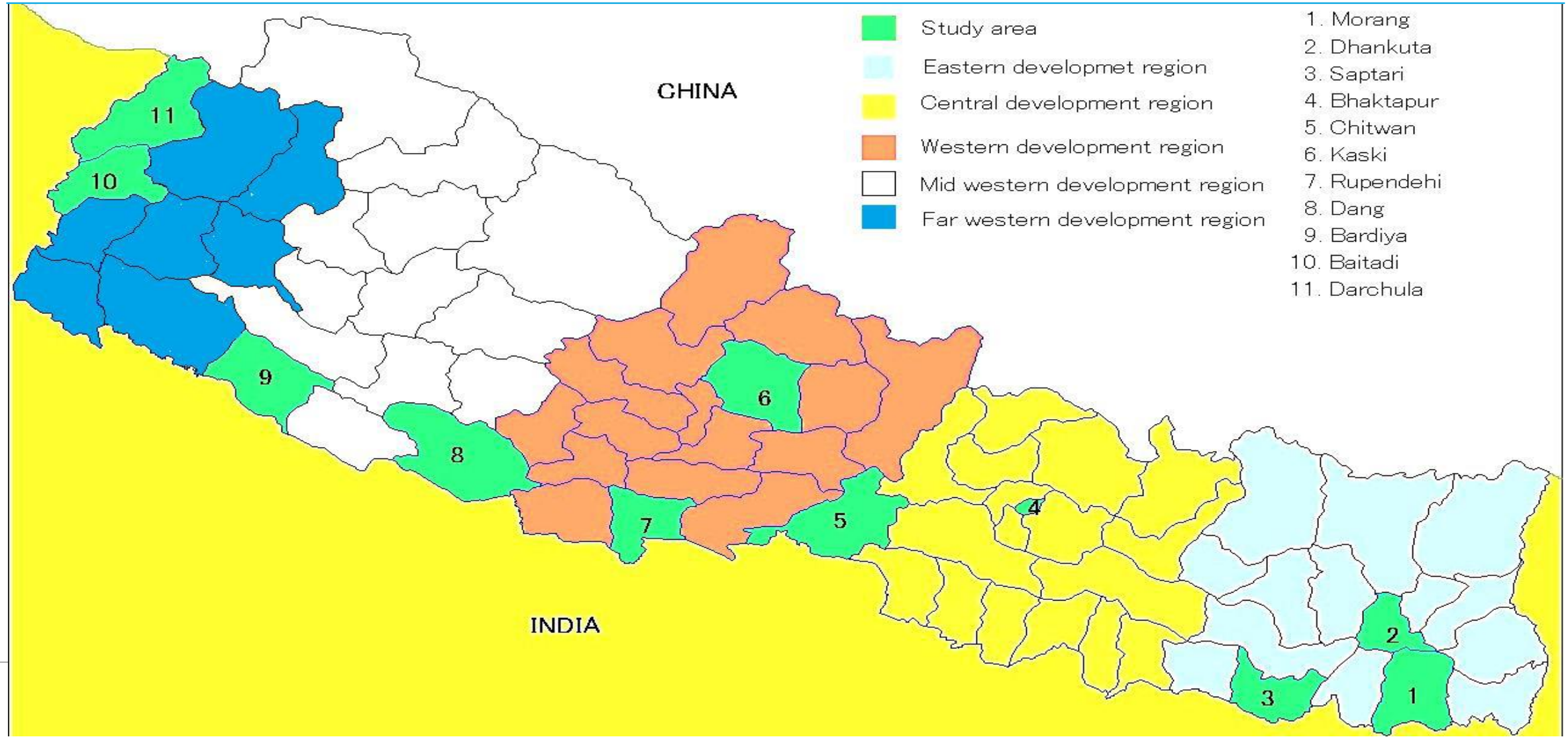
- To examine factors that determine the adoption of the frequency of adaptation practices
- To examine how household income is associated with number of adaptation practices adopted by the HHs.
- To examine how access to information is associated with numbers of adaptation practices adopted by the HHs.

Methodology

Data

- Structured questionnaire were employed in 1000 households
- 11 districts including (ecological belts, hills and terai, five regions) – 100 households for each district
- December 2013-January 2014
- In-depth households questionnaire were pre-tested and deployed

Study sites


CHINA
INDIA
Study area
Eastern developmet region
Central development region
Western development region
Mid western development region
Far western development region
1. Morang
2. Dhankuta
3. Saptari
4. Bhaktapur
5. Chitwan
6. Kaski
7. Rupendehi
8. Dang
9. Bardiya
10. Baitadi
11. Darchula

Model used

Poisson regression model to examine what factors contribute to influence the level of frequency of adaptation practices

$$\Pr(Y = y) = \frac{e^{-\mu}\mu^{y}}{y!}, \quad y = 0,1,2 \ldots, N \qquad \text{----------(1)}$$

Where μ is the average number of adaptation practices adopted by a household

Findings and discussions

Descriptive analysis

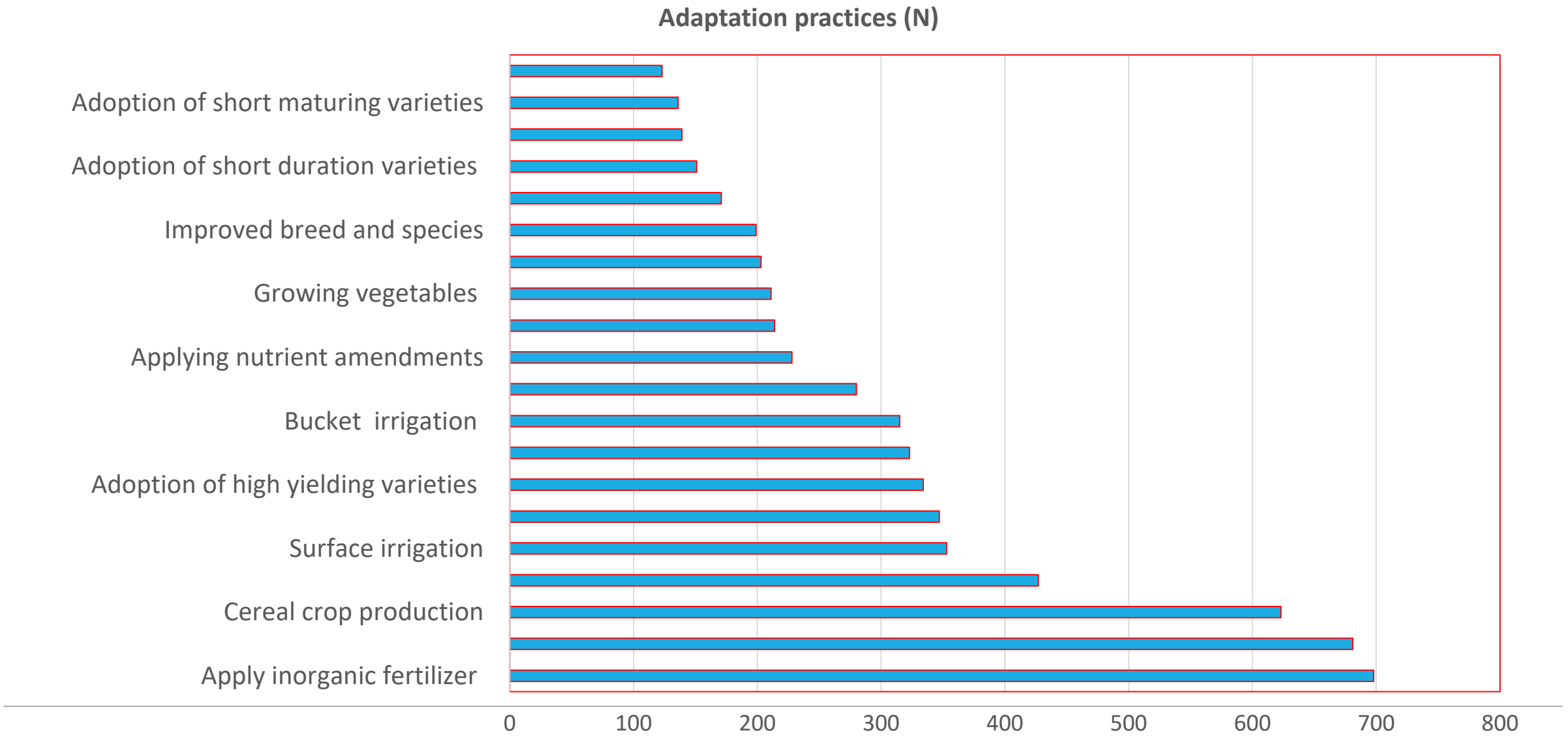
Household characteristics and summary statistics

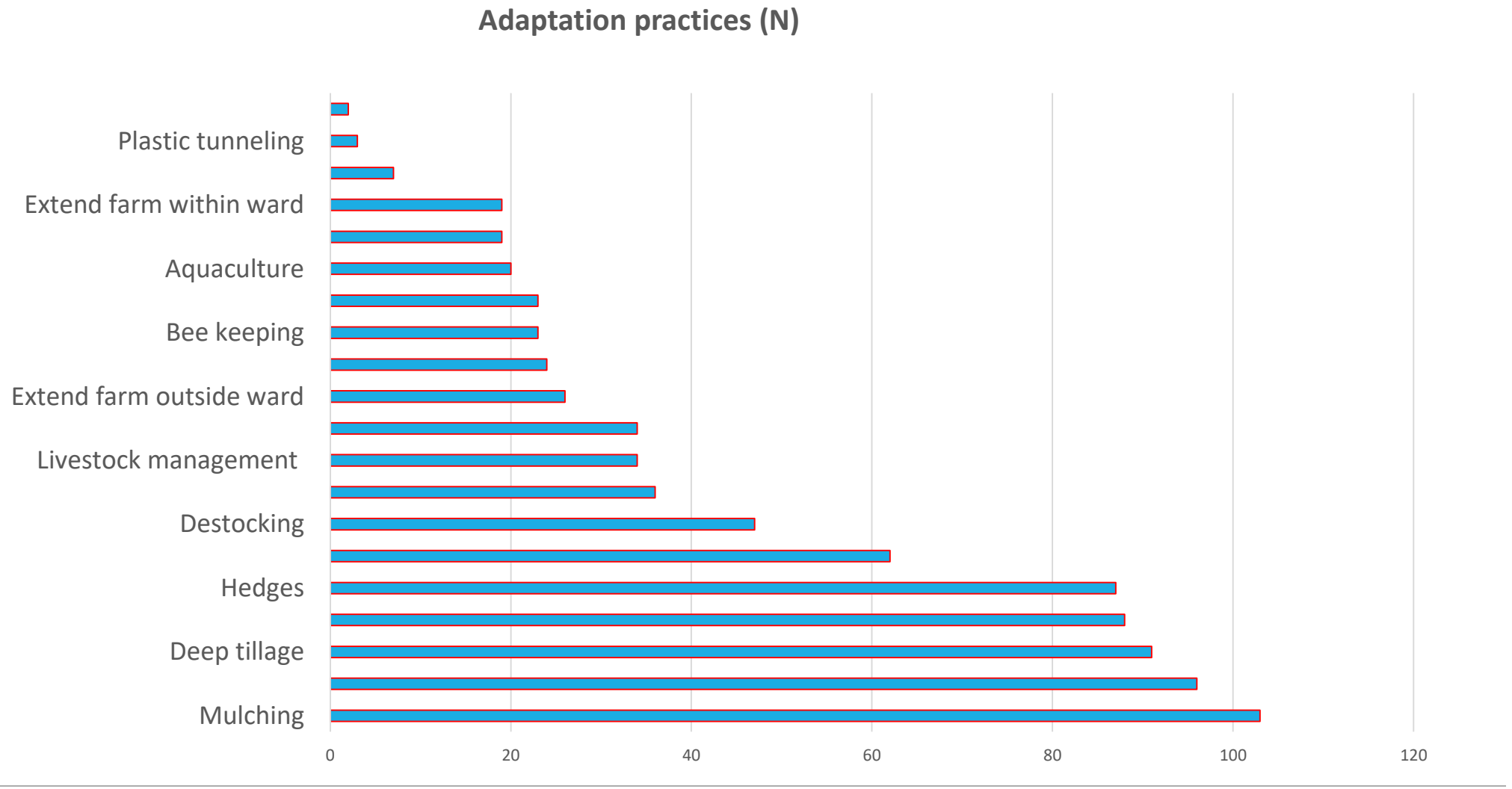
Variables	Observation	Mean	Std. Dev.	Min	Max
Adaptation practices(Number)-Dependent variable	999	8.2	4.3	0.0	25.0
Family size (Number)	1000	6.0	2.9	1.0	25.0
Log income (Nrs.)	963	12.3	0.9	6.9	14.4
Productive assets (Number)	1000	2.8	1.2	0.0	7.0
Agricultural vocational trainings taken by a farmer (Number)	1000	0.3	0.9	0.0	15.0
Access to information (Yes=1, Otherwise, 0)	1000	0.5	0.5	0.0	1.0
Social assets (Number)	1000	1.4	1.1	0.0	5.0
Experience (Years)	990	19.9	11.8	1.0	70.0
Land holding (Katha, 30 Katha=1 hectare)	1000	19.4	28.5	0.0	360.2
Access to irrigation (Yes=1, Otherwise, 0)	1000	0.9	0.3	0.0	1.0
Access to Credit (Yes=1, Otherwise, 0)	1000	0.3	0.5	0.0	1.0

Findings and discussions(cont..)

Descriptive analysis

Adoption of adaptation strategy


Adaptation practices (N)
Adoption of short maturing varieties
Adoption of short duration varieties
Improved breed and species
Growing vegetables
Applying nutrient amendments
Bucket irrigation
Adoption of high yielding varieties
Surface irrigation
Cereal crop production
Apply inorganic fertilizer
0
100
200
300
400
500
600
700
800


Adaptation practices (N)
Plastic tunneling
Extend farm within ward
Aquaculture
Bee keeping
Extend farm outside ward
Livestock management
Destocking
Hedges
Deep tillage
Mulching
0
20
40
60
80
100
120

Findings and discussions(cont..)

Empirical analysis

Results from Poisson regression

VARIABLES	Number of adaptations
Family size	0.0196***(0.00684)
Log of income	-0.0853***(0.0180)
Number of agricultural trainings	0.0646**(0.0268)
Access to information	-0.0648**(0.0322)
Membership in social groups	0.0642***(0.0151)
Access to credit	0.0735**(0.0331)
Education	0.0182***(0.00349)
Gender	-0.0672(0.0512)
Years of experience	0.000269(0.00140)
Landholdings	-0.000550(0.000594)
Access to irrigation	0.0425(0.0554)
Numbers of productive assets	-0.00492(0.0138)
Constant	3.027***(0.226)

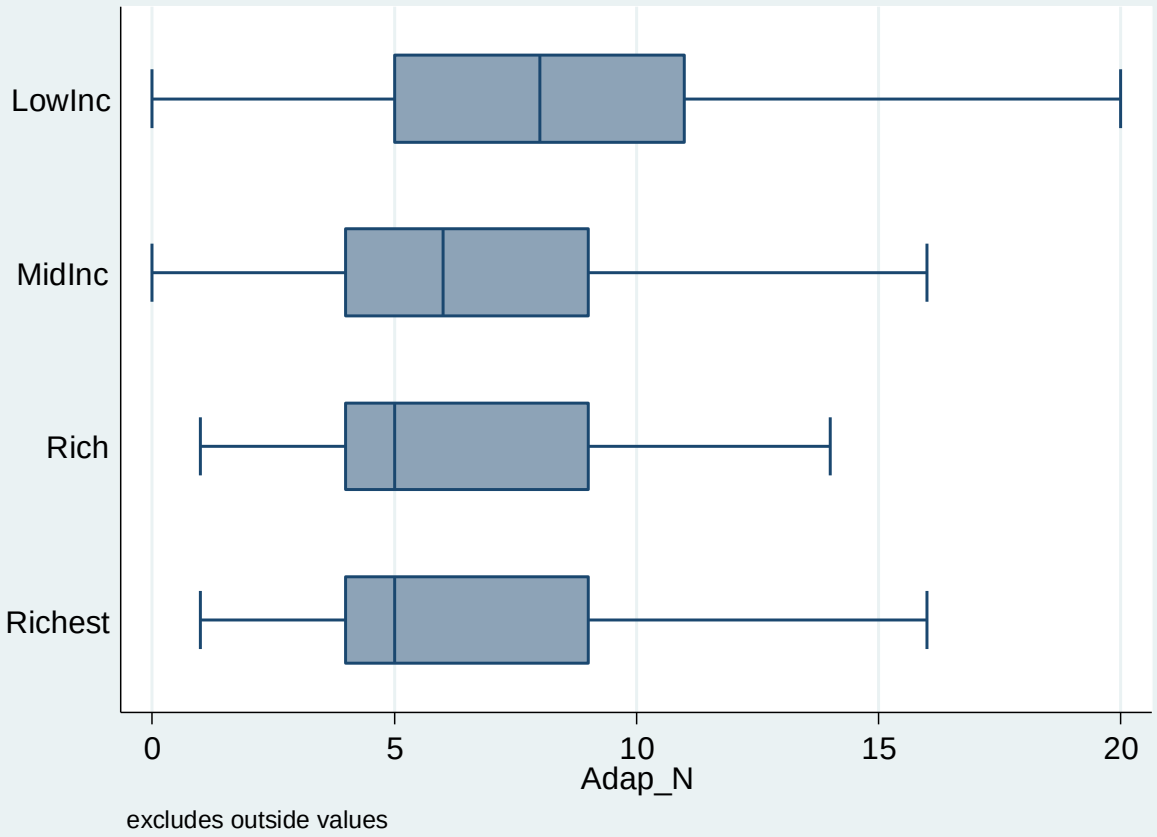
Findings and discussions

- Family size is important factor in household's decisions
- The result for family size is consistent in the case households' adaptation behavior
- One unit increase in family members is associated with two percentage additional adaptation practices by households
- More households size → ↑ exposure to food insecurity → Diversify crops → Diversity the adaptations
- ↑ family size leads to ↑ no. of adaptation practices in response to CC in agriculture

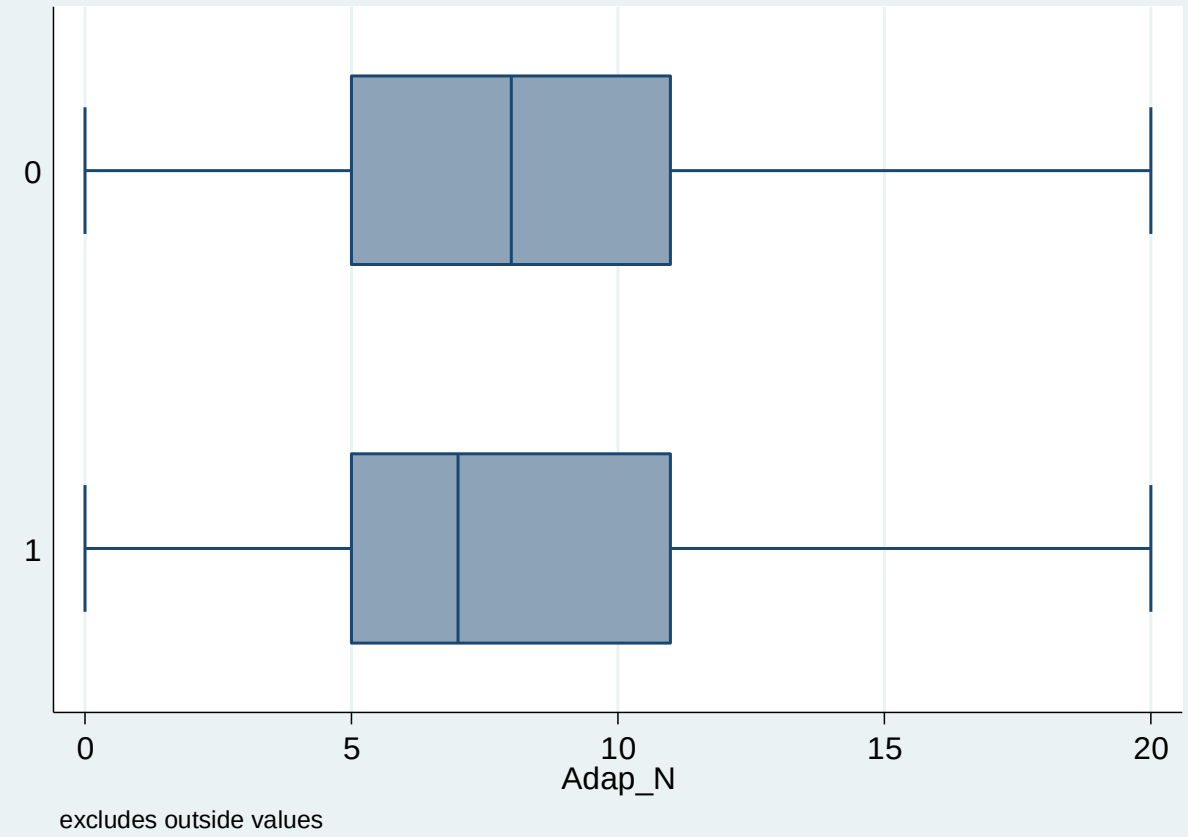
Consistent with Olayemi (2012), (Dolisca et al., 2006; Nyangena, 2007; Anley, 2007; Birungi, 2007)

Findings and discussions

Income vs Adaptation numbers (N)

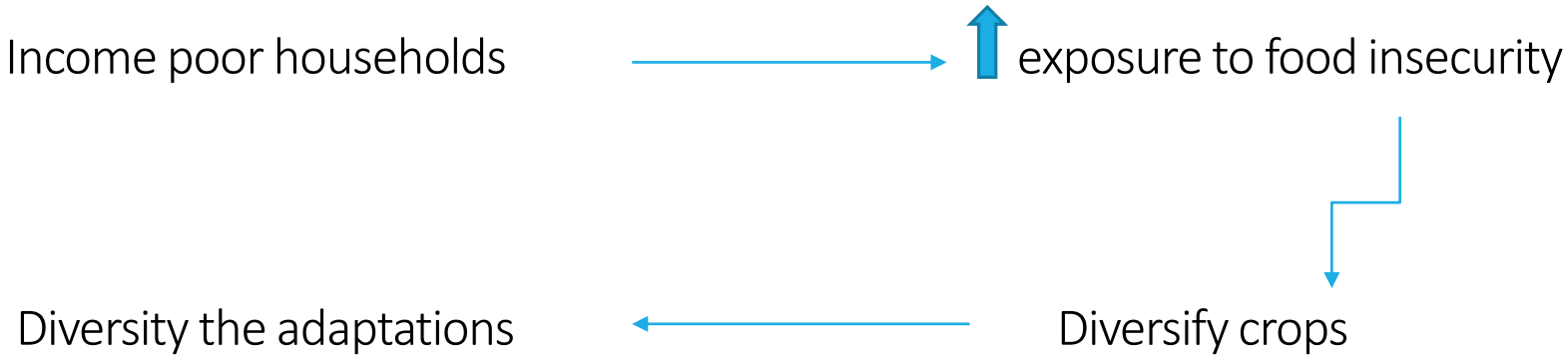


Information Access vs adaptations (N)



Findings and discussions

- Income plays a pivotal role household's decisions
- Result shows one percentage change in HHs income is **negatively** associated with **nearly eight and half percentage change** in numbers of adaptations practices



- Chambers (1989) that concluded poor (in our case income poor) usually seek to minimize vulnerability not by maximizing income, but by developing and diversifying their portfolio of capital assets.
- Chambers (1989) also found that "most poor people do not choose to put all their eggs in one basket", and thus, tradeoffs exist between security and income.

- Farmers with access to information are less likely (nearly 6 percentage) to adopt more number of adaptation compared to farmers without access to information.

Findings and discussions

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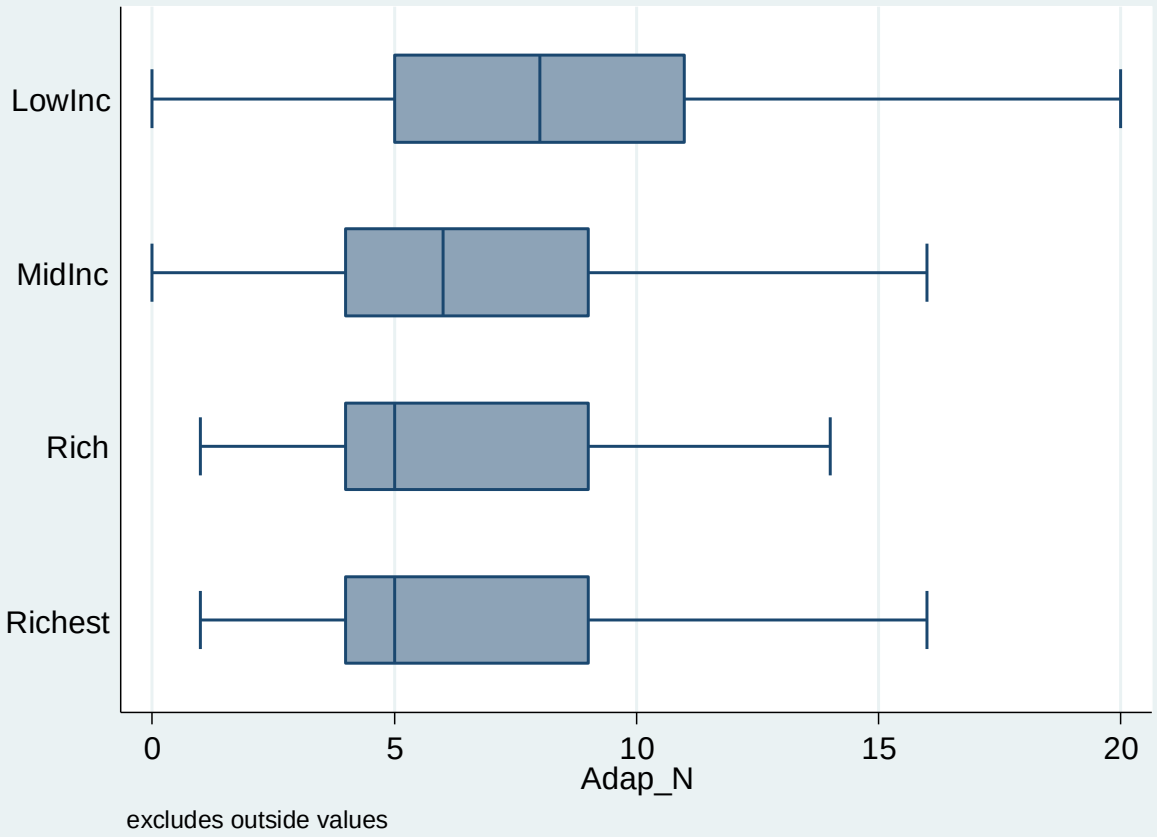

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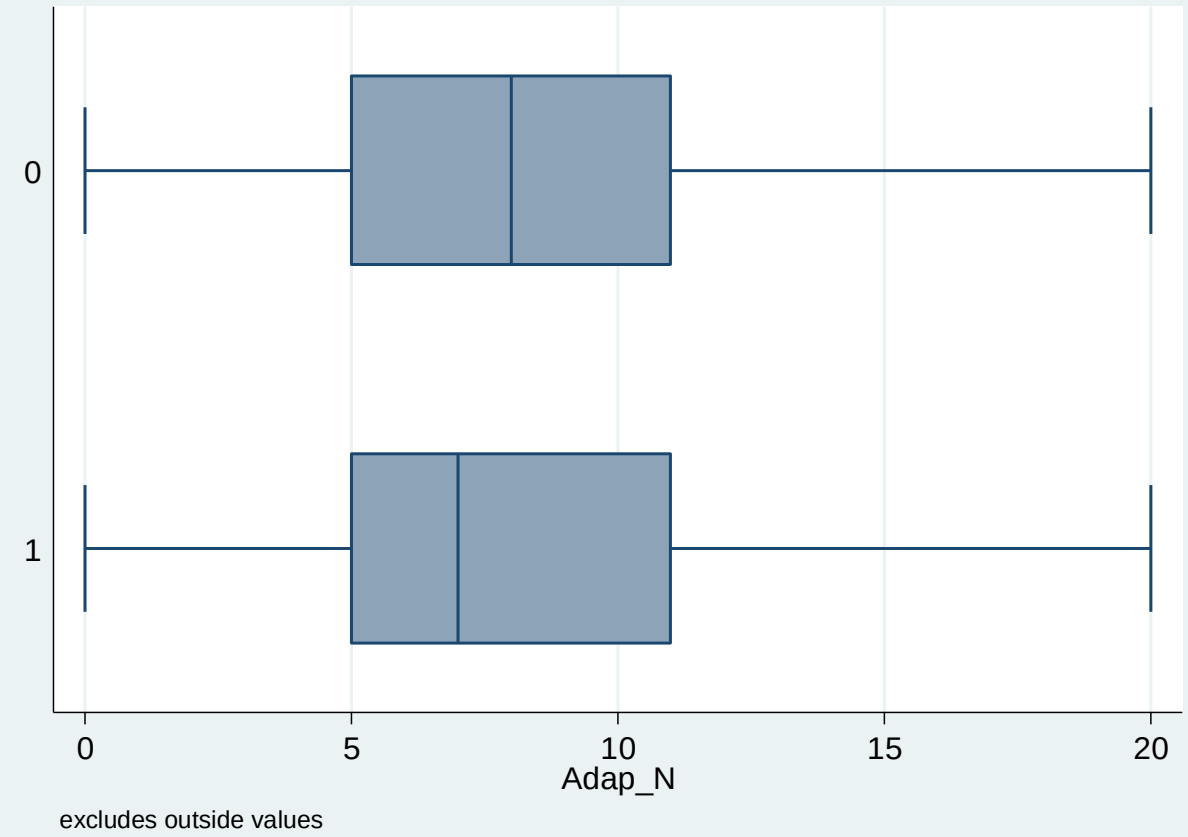
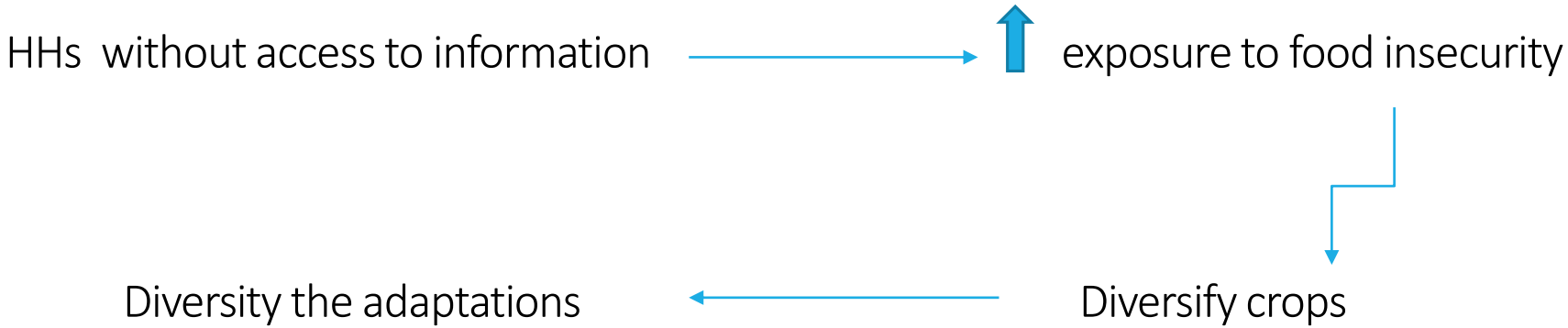


Findings and discussions

- Access to information is important variable for household's decisions
- Result shows Access to information is **negatively** associated with **nearly six and half percentage change** in numbers of adaptations practices



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Conclusions

- Descriptive analysis shows wider numbers of adaptations with the extended frequency , farmers adapted

- Family size, number of trainings by households head, association with social networks, access to credit are positively associated with number of adaptations adopted by farmers
-
- Log income, access to information are negatively associated with number of adaptations adopted by farmers

- Income poor and information poor households are more likely to diversify the adaptation strategies compared to rich farmers.

- Agricultural policy makers and development agencies can use the findings to the effective and efficient implementation of ADS and NAP objectives to reduce the vulnerability of climate-sensitive sector by increasing adaptive capacity and further integrate into future climate change budget codes in different tiers of governments.

Conclusions

Income poor and information poor households are more likely to diversify the adaptation strategies

Recommendations

Agricultural policy makers and development agencies can use the findings to make the effective and efficient implementation of (why) ADS and NAP objectives (what) to reduce the vulnerability of climate-sensitive sector by increasing adaptive capacity (why) and further integrate into future climate change budget codes in different tiers of governments.

Different sets of strategies and approaches are required to target various types of farmers. For instance: Income and information poor HHs need to be approached to diversify the crops compared to rich HHs instead of existing blanket approach where all farmers are treated in a similar fashion.

Thank you!

Open discussions/suggestions