Intensity of water conservation technology adoptions in Nepal

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Invited presentation at the 2018 Southern Agricultural Economics Association Annual Meeting, February 2-6, 2018, Jacksonville, Florida

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Outline

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- Conclusions

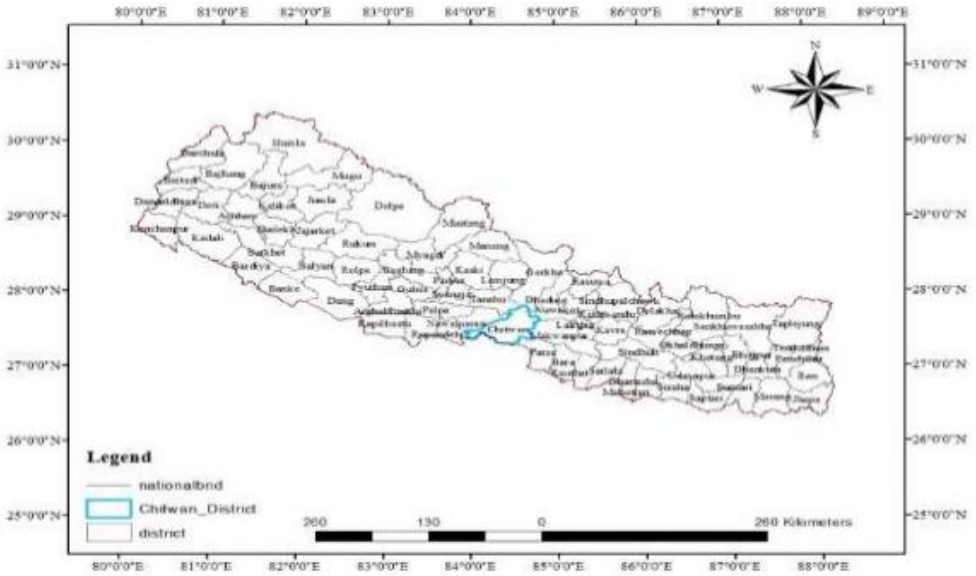
Introduction

- Water scarcity is a critical concern in agriculture production throughout the world.
- Demand for water from competing sources will impact agricultural production (Molden et al. 2001).
- Water conservation technology adoption is on the rise around the world (Johansson 2000).

Objectives

- To examine the determinants of intensity of water conservation technology adoption using parametric Poisson quasi likelihood (PQL), and semiparametric and nonparametric models.

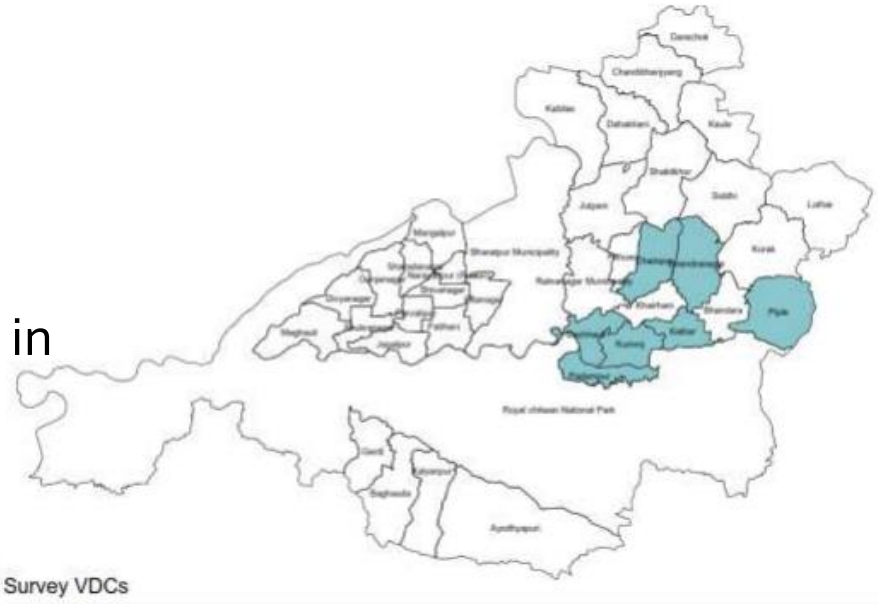
Data



- HH survey conducted in Eastern Chitwan, Nepal

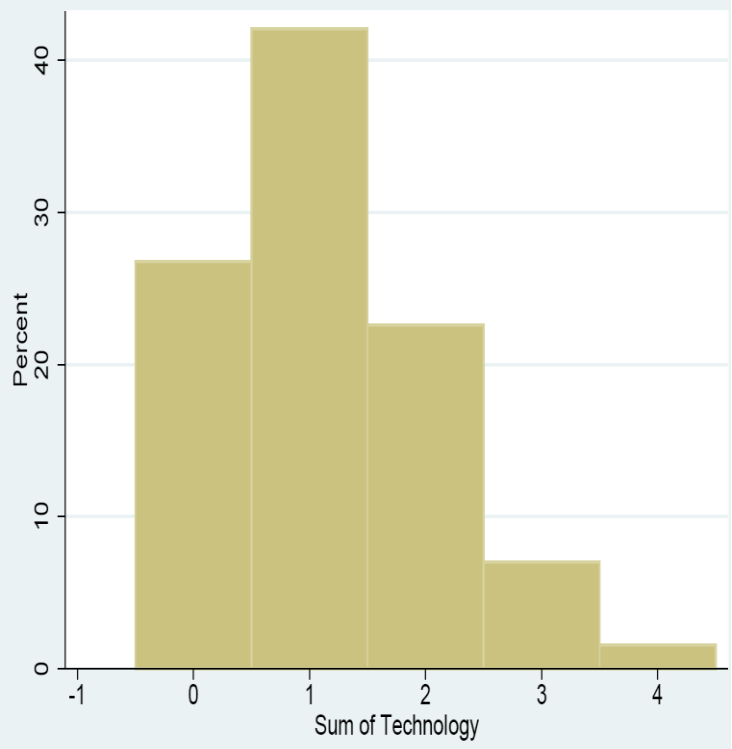
- 385 houses were randomly selected for interview

- Focus group of testing of questionnaire in Kumroj and Pithuwa VDCs



Data

Technology	Number of farmers adopting the technology
1. Establishment of permanent water ways	66
2. Use of digging pits	20
3. Farmer-managed irrigation system	181
4. Rainwater harvesting system	31
5. Drip irrigation system	1
6. Wastewater reuse for agriculture	122
7. Plastic mulching in vegetable plot	15
8. Building dams	5



Methods

- In many studies, technology adoption is modeled using a binary dependent variable model (Fernandez-Cornejo et.al 2001)
- When farmers adopt multiple technologies and if the goal is to explain the intensity of technology adoption, we need to use variants of the Poisson model
- Parametric
  - Negative binomial
  - Zero inflated negative binomial
  - Poisson Quasi Likelihood
- Semiparametric
- Nonparametric

Results

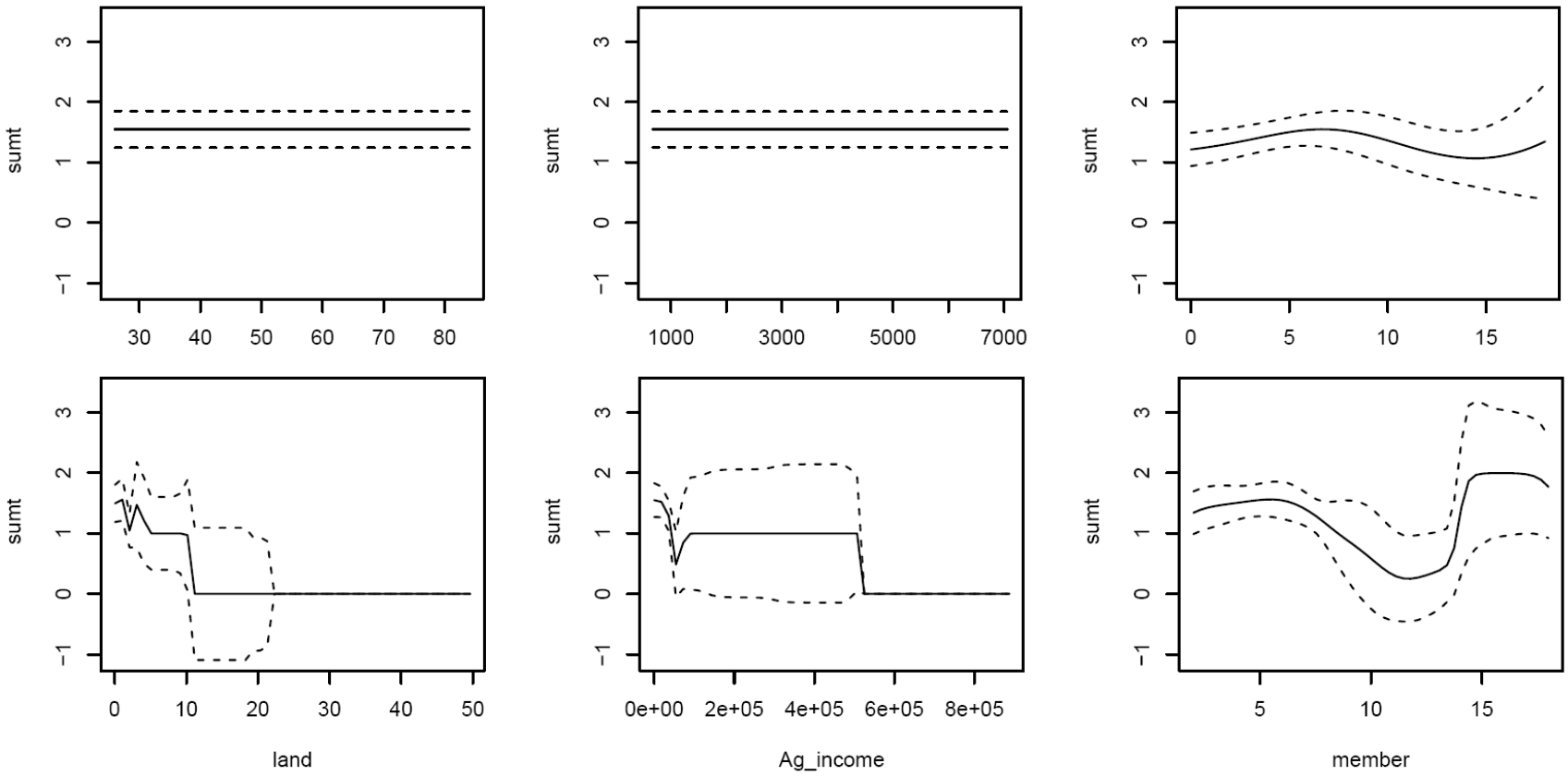
Marginal effects from parametric models

Variables	Negative Binomial	Zero Inflated Negative Binomial	Poisson Quasi Likelihood
Age	-0.0498**	-0.0498	-0.0544**
	(0.0246)	(0.0368)	(0.0241)
Age(sq)	0.000421*	0.000421	0.000474**
	(0.000222)	(0.000342)	(0.000220)
Edu	0.0140	0.0140	3.676
	(0.0154)	(0.0176)	(6.210)
Land	-0.0613	-0.0613	-0.0656
	(0.0529)	(0.0780)	(0.0521)
Ag Income	-0.00000619	-0.00000619	-0.00000571
	(0.00000571)	(0.00000708)	(0.00000557)
Is Ag main source of income?	0.318**	0.318**	0.336**
	(0.130)	(0.156)	(0.132)
Food sufficiency last year?	0.366**	0.366*	0.320**
	(0.150)	(0.198)	(0.152)
Ag Ext. Visit	-0.148	-0.148	-0.142
	(0.159)	(0.167)	(0.159)
Land frag	0.0843	0.0843	0.0836
	(0.0640)	(0.0900)	(0.0637)
Family labor	0.0105	0.0105	0.00896
	(0.0106)	(0.0193)	(0.0105)
Constant	1.264*	1.264	2.628***
	(0.690)	(0.983)	(0.942)

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results

Non-parametric model partial regression plots



Results

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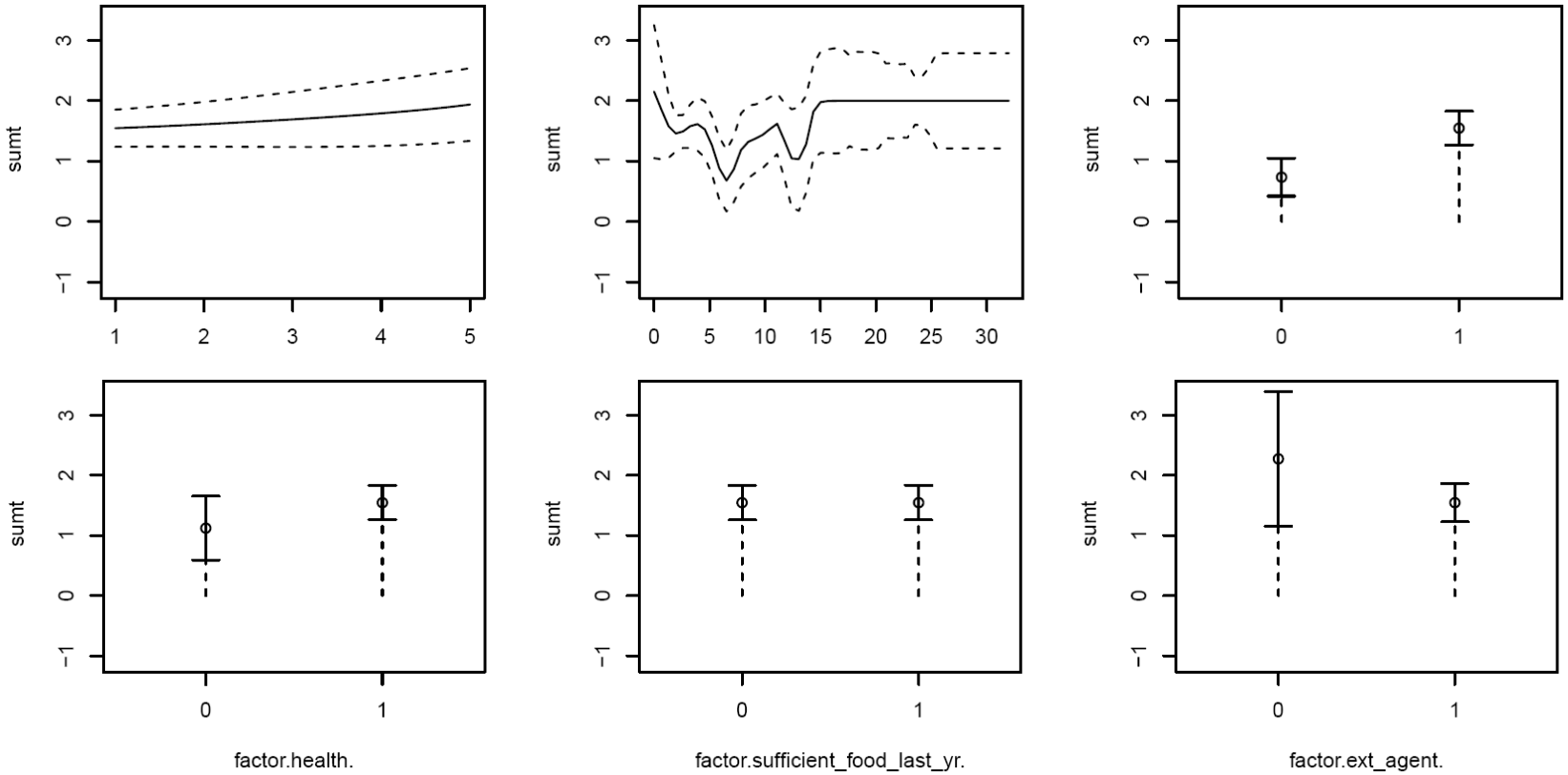

Results

Semi- parametric regression

Variables	Estimate
Age	-0.04 (0.04)
Age square	0.00
Health	-0.34 (0.31)
Ag main source of income	**0.32 *** **(0.16)**
Sufficient food availability in the previous year	**0.39 *** **(0.20)**
Constant	1.07 (0.97)

Conclusions

- Water conservation practices can help to overcome water scarcity in cultivable seasons.

- Farmers with sufficient food supply in the previous year and farmers with majority of income coming from agricultural sources adopt more conservation technology.

- Parametric model is misspecified.
- A semiparametric model is a better model to understand the factors affecting the intensity of water conservation practices adoption.

THANK YOU!

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