

Does Market Inclusion Help Farmers to Eat Better?: Evaluation of LOOP Aggregation Scheme in Bangladesh



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(the MINI project)**

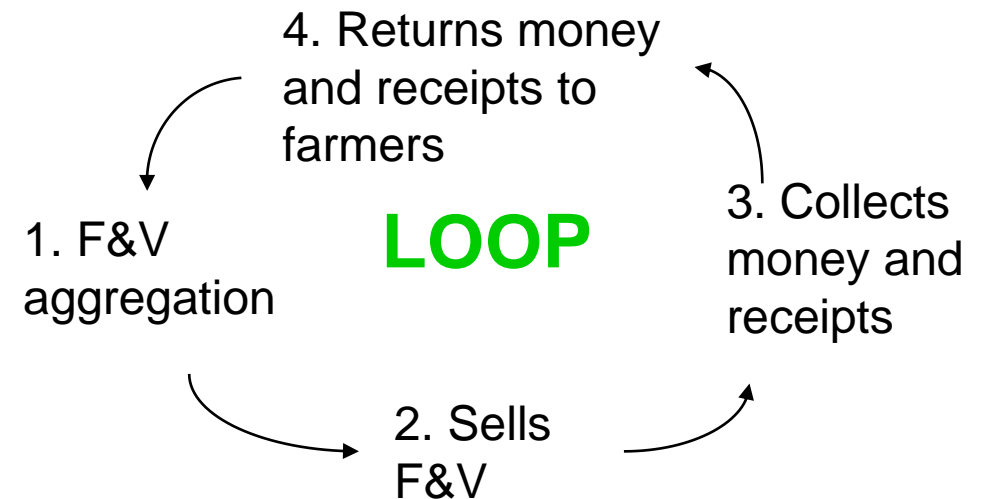
The LOOP intervention

Digital Green: formed in 2006 as a spin-off of Microsoft Research

LOOP: mobile-based F&V aggregation service used by ~ farmers

Key research questions:

1. Implications of the current LOOP scheme for the availability and affordability of F&V in nutritionally vulnerable markets?
2. How can the scheme be made more nutrition-sensitive, equitable and safe?



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Supply-side

Fragmented supplies

Seasonality

Transportation costs

Wastage

Market



Commission
Price transparency

Demand-side

Nutritional awareness

Food safety

Seasonal availability & pricing

Household distribution of decision-making and F&V consumption

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Literature Review

- Collective action by farmers has been found to improve agricultural development through efficient use of purchased input, increased production and income, improved market access and degree of commercialisation ([Ankrah Twumasi et al., 2021](#); [Chagwiza et al., 2016](#); [Holloway et al., 2000](#); [Ma & Abdulai, 2016](#); [Mojo et al., 2017](#); [Priscilla & Chauhan, 2019](#); [Rao & Qaim, 2011](#)) .
- [Shumeta and D'Haese \(2016\)](#) and [Ofori et al. \(2019\)](#) find no significant impact of cooperative membership on farmers income and production in Ethiopia and Cambodia respectively.
- Although there are many advantages of collective action by farmer groups and cooperatives, there are trade-offs too ([Bernard and Spielman \(2009\)](#); [Stoian et al. \(2012\).](#))
- Age, gender, education, income, access to extension services, access to credit, farm size, farming experience were found to significantly influence technology adoption ([Abebe & Mammo Cherinet, 2019](#); [Dhraief et al., 2018](#); [Gecho & Punjabi, 2011](#); [Kelebe et al., 2017](#); [Khalid et al., 2017](#); [Khandker & Thakurata, 2018](#); [Krell et al., 2020](#); [Mafimisebi et al., 2006](#); [Michels et al., 2020](#); [Ofuoku et al., 2008](#); [Simões et al., 2020](#) ; [Veisi, 2012](#); [Zhou et al., 2008](#)) .

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Research Objectives

1. Identify the determinants of LOOP participation
2. Determine the economic and nutritional outcomes of LOOP participation

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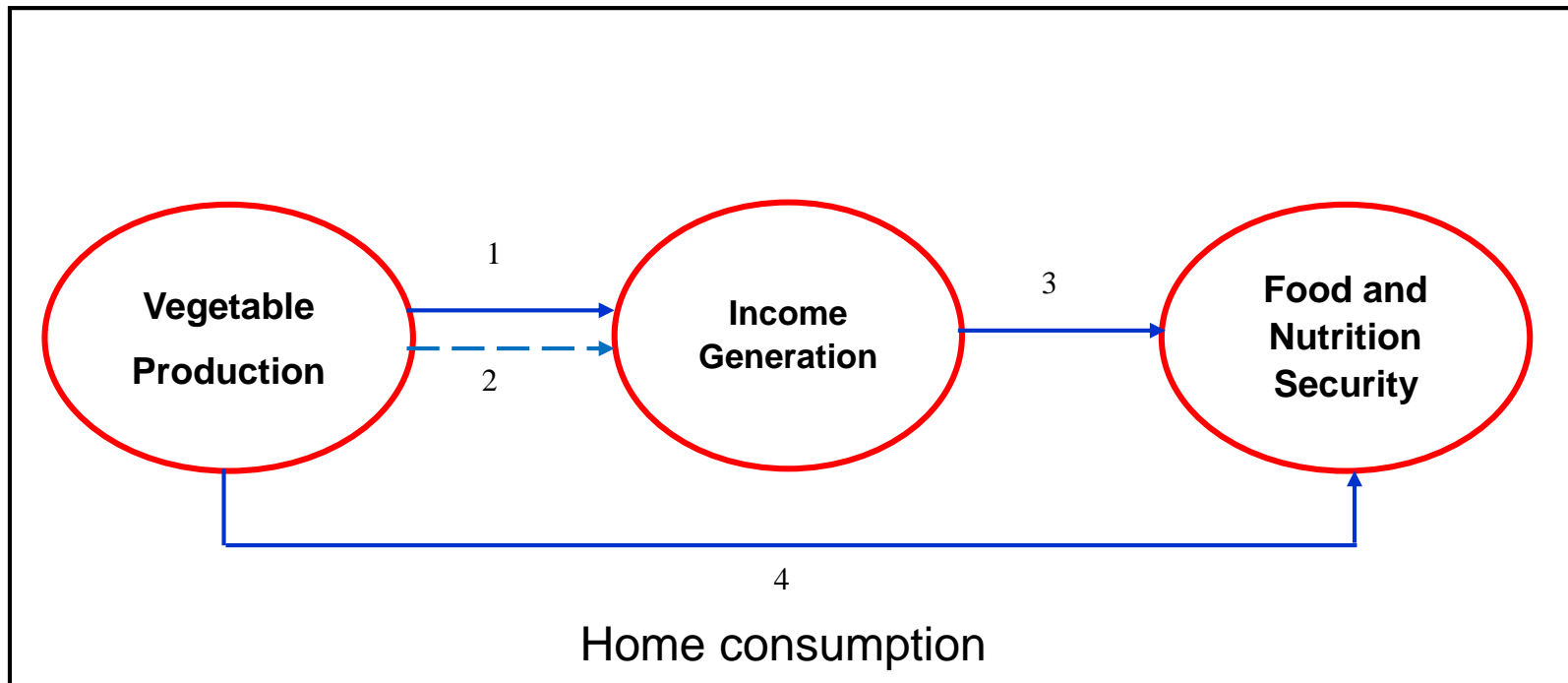
Conceptual framework

Aggregators
selected by
farmers



*Trust
*Transaction
costs

*Trade-off?



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Methods

Empirical strategy

1. Probit regression

$$P(LOOP_i = 1|X_i) = \frac{1}{1 + [\exp(\alpha + \beta_i X_i)]}$$

2. Propensity score matching technique

$$\tau_{ATE}^{PSM} = E_{(P(x)|C=1)}\{E[Y(1)|C = 1, P(X)] - E[Y(0)|C = 0, P(X)]\}$$

3. Augmented inverse probability weighting estimator

$$ATE = \frac{1}{N_w} \sum_{i=1}^{N_w} [(\beta_1 - \beta_0) - (\alpha_1 - \alpha_0)X_i]$$

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Study Area



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Results

Table 1 Mean differences in characteristics between LOOP and non-LOOP participants

VARIABLES	LOOP participants	Non-LOOP participants	Difference
Gender	0.91 (0.03)	0.96 (0.02)	-0.05 (0.03)*
Age	45.00 (0.98)	49.76 (1.07)	-4.76 (1.45)***
Education	2.11 (0.07)	2.18 (0.08)	-0.06 (0.10)
Religion	0.79 (0.04)	0.78 (0.04)	0.02 (0.05)
Household Size	4.53 (0.12)	4.12 (0.12)	0.42 (0.18)**
Wealth index	0.33 (0.14)	-0.13 (0.15)	0.46 (0.21)**
Total income	221.55 (20.50)	223.69 (26.73)	-2.13 (33.68)
Cash crop	0.24 (0.04)	0.20 (0.04)	0.04 (0.05)
Food crop	0.87 (0.03)	0.92 (0.02)	-0.05 (0.04)*
Number of vegetables	3.03 (0.08)	2.42 (0.09)	0.61 (0.12)***
Agricultural network	0.53 (0.05)	0.20 (0.04)	0.32 (0.06)***
Financial network	0.29 (0.04)	0.31 (0.04)	-0.02 (0.06)
Distance to cooperative (km)	5.30 (0.60)	7.30 (0.60)	-2.00 (0.85)***
Distance to input market (km)	2.58 (0.17)	2.21 (0.17)	0.37 (0.25)*
Distance to output market (km)	3.21 (0.18)	3.04 (0.20)	0.17 (0.27)
Distance to road (km)	0.71 (0.06)	0.59 (0.06)	0.12 (0.09)*
Road quality	0.75 (0.04)	0.87 (0.03)	-0.12 (0.05)***

Note: Standard errors in parentheses;
 *** p<0.01,
 ** p<0.05,
 * p<0.1

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Economic outcomes	Loop Farmers	Non-Loop Farmers	ATT	SE
Production	12193.79	9459.39	2734.40	1568.18
Net Income	121384.15	82303.94	39080.21	19294.453**
Sales Revenue	159583.91	119684.91	39899.01	21900.623*
Food & Nutrition outcomes				
Dietary diversity	9.97	8.50	1.47	1.42***
Limit food	0.19	0.39	-0.20	0.072***
No food	0.06	0.34	-0.28	0.064***
Home consumption	241.27	190.37	50.90	75.407

Table 2: The impact of LOOP participation (Propensity Score Matching)

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Economic outcomes	ATE estimates		Percentage change in ATE	
	Coefficient	z-value	Coefficient	z-value
Production	2,127.71 (1163.39)*	1.83	0.24 (0.149)	1.61
Net income	37,798.53(16,021.25)**	2.36	0.519 (0.255)**	2.04
Sales revenue	39,870.8 (18,194.88)**	2.19	0.374 (0.195)*	1.93
Food & Nutrition Outcomes				
Dietary diversity	0.955 (0.359)***	2.66	0.107 (0.042)**	2.55
Limit food	-0.185 (0.060)***	-3.11	-0.510 (0.119)***	-4.29
No food	-0.248 (0.054)***	-4.60	-0.771 (0.097)***	-7.96
Home Consumption	18.62 (44.114)	0.42	0.086 (0.215)	0.40

Table 3: The impact of LOOP participation (AIPW)

Key conclusions



Aggregation scheme has been economically beneficial for participating farmers; they not only have higher vegetable production, but **earn higher revenue and net income** from selling vegetables



Loop farmers have higher food and nutrition security: Although the Loop farmers do not have higher vegetable consumption at home, they **have lower food insecurity and higher dietary diversity**

Future work: Market inclusion empowers women; low-carbon market participation **through Loop enhances their instrumental agency** and may result into **better nutrition outcomes for children**

He aha te mea nui o te ao What is the most important thing in the world?

He tangata, he tangata, he tangata It is the people, it is the people, it is the people

Maori Proverb

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