

Farmers' Willingness to Pay for Improved Vegetable Extension Services: The Case of North West Ethiopia

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Introduction

- Demand for fruit and vegetable consumption in Ethiopia and elsewhere is growing rapidly due to urbanization, dietary awareness, and increased income of the people (Bekele, 2016).
- However, current agricultural advisory service (AAS) operates as a public mandate that does not meet the demand due to agents' overburdened, poor linkage with research, poor facilities at farmers' training centers (Guush B. et al, 2018).
 - Improved AAS can play a vital role in promoting productivity, quality, and commercialization of FV thereby improving rural livelihoods (IFRI, 2015).
- However, the AAS in Ethiopia does not bring expected result in the agriculture sector and the problem is worsening in the case of horticultural crops due to:
 - disease and pest not managed onetime
 - Out-dated inputs and agronomic information
 - Lack of improved storage and transportation systems and
 - poor market linkage
 - Low responsiveness of AAS to the diverse and dynamic needs of smallholders
- As the current AAS is mocked for inefficiencies, building a private, responsive, and demand-driven advisory service can play a vital role in addressing inefficiencies and transforming EFS
- Despite there are handful studies on farmers willingness to pay for an improved AAS, the type of services and associated WTP for improvement of AAS has remained less investigated
- Previous studies:
 - Only 10% farmers WTP for current AAS in East Ethiopia (Tolera et al., 2014)
 - Farmers assign a financial value to extension services suggesting that decision-makers should start thinking commercial advisory service
 Therefore, this study examined smallholder farmers' willingness to pay for enhanced vegetable extension services in Ethiopia.

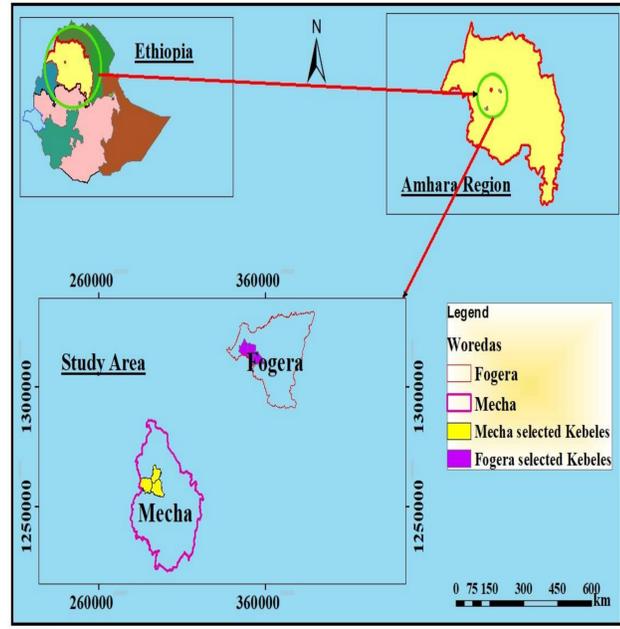


Fig. Study Area

Table: Choice set sample

Attribute	Vegetable advisory service option 1	Vegetable advisory service option 2	Opt-out
Main focus of vegetable advisory service	Focus on vegetable inputs	Focus on vegetable management	
Frequency of advisory service	Advice service Per two weeks	Advice service Per one month duration	
Approach of knowledge exchange	farmers go to one stop shops	Advice delivered On-field	
Types of Vegetables in the advisory service	Main focus Root and tuber	Main focus on Fruity vegetables	
Service fee for advisory	100 ETB per month	140 ETB per month	
.Choice question: which of the alternatives do you prefer?			

Estimation Strategy

- Sampling:** Combination of Purposive and Multistage systematic random sampling procedure was employed
 - Fogera and Mecha districts selected for their high vegetable potential
 - Three kebeles were selected randomly from each district
 - Likewise, households were randomly selected from each kebele
 - Total of 393 farm households, proportional to the population villages
- This study employs a Discrete Choice Experiments (DCE) constructed from statically designed choice sets that hypothetically define different extension service by varying five extension attributes and levels generating 7074 observations.
- Utility theory predicts that each individual will maximize her utility. When applied to consumer choice, this prediction means that a consumer will choose object j when the utility she or her gets from j is higher than the utility she obtains from other choices (Adamowicz et al., 1998) :

$$U_j > U_i \quad V_j \neq i \quad (1)$$

$$V_j + e_j > V_i + e_i \quad j \neq i$$
- Considering the five attributes in the present study, the resulting model specification for the deterministic component V associated with alternative j is given by:

$$v_j = ASC + \beta_1 MVAS + \beta_2 FAS + \beta_3 AKE + \beta_4 TVAS + \beta_5 P \quad (2)$$
- approximates the marginal willingness to pay for each attribute (Hanemann, 1984):

$$MWTP \text{ attributes} = (\beta_i(\text{attributes})) / (\beta_6(\text{price})) \quad (3)$$

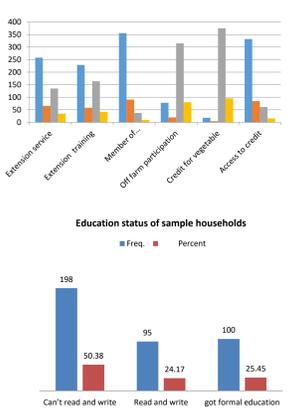
Result

Table 1. Mixed logit estimates of determinants for advisory service preference

VARIABLES	Mean	SD
Monthly Advisory fee	-0.0072*(0.0042)	
educstatX Input based	-0.961***(0.424)	
educstatX Freq. Adv. Service	0.00314*** (0.0009)	
educstatX Root crop focus	-0.386* (0.223)	
landforvegX FV	0.688** (0.342)	
landforvegX Root crop focus	0.0827 (0.404)	
Input based advisory service	0.719(0.482)	1.024*** (0.335)
Frequency of Adv. Service	0.0134*** (0.0048)	0.0046*** (0.0008)
Advisory through mobile phone	-0.937*** (0.283)	0.995*** (0.169)
Advisory through one-stop-shops	-0.727** (0.300)	0.0651(0.233)
Fruit vegetable focus adv. serv	0.824*** (0.188)	0.769*** (0.142)
Root crop focus adv. serv	1.795*** (0.235)	1.328*** (0.147)
Observations	7,074	7,074

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

- The study found that the total cultivated landholding size in the study area ranges from a minimum of 0.08 hectares to a maximum of 5.75 hectares.
- On average, each sampled household has a land size greater than one hectare (1.194 hectares). The total land operated for vegetables ranges from a minimum of 0.007 hectares to a maximum of 2 hectares, with an average of 0.389 hectares.
- Out of the total sampled households, 50.38% cannot read and write, while 25.45% have formal education. During the survey period, 24.17% of the sampled households were able to read and write.



Variable	Obs	Mean	Std. Dev.
Age of HH	393	43.7	11.977
Family Size	393	7.4	2.078
Farm exper	393	22.9	12.107
Working fam	393	3.8	1.551
TLU	393	5.2	2.337
Total land	393	1.19	0.604
Land for vegetable	393	0.39	0.268

Conclusion

- Vegetable producers in Mecha and Fogera highly value frequent visits from advisory providers, likely due to the susceptibility of vegetables to disease, pests, and other calamities.
- Practical advisory types, accompanied by expert field-level visits, are more preferred by vegetable producers than technology-assisted services such as mobile-assisted and one-stop-shop services.
- Vegetable producers are willing to pay more for practice-based advisory services that prioritize leafy vegetables and agronomic management-oriented services, and once they begin receiving the desired information and practices, the frequency of the practice becomes less important.

Acknowledgment

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Table 2. willingness to pay for Vegetable Advisory Service (N = 393)

	Inp. based adv. Serv	Freq Adv. Serv	Adv. Thr. Mob	Adv. Thr. 1-stop	Frut veg foc. adv. serv	Root veg foc. adv. serv
wtp	25.47	1.89	-119.39	-50.14	120.89	203.94
Lower limit	-78.28	1.13	-264.53	-142.42	4.88	3.08
Upper limit	129.22	2.65	25.75	42.15	236.90	404.80

Table 2. institutional participation (N = 393)

Variables	Yes		No	
	Freq.	Percent	Freq.	Percent
Extension service	258	65.65	135	34.35
Extension training	229	58.27	164	41.73
Member of association	356	90.59	37	9.41
Off farm participation	78	19.85	315	80.15
Credit for vegetable	18	4.58	375	95.42
Access to credit	332	84.48	61	15.52

- The results of a mixed logit model showed that all selected advisory service attributes (frequency of advisory, mode of advisory, vegetable focus, and monthly advisory fee) significantly influenced the type of service preferred by vegetable-producing farmers.
- In Mecha and Fogera, vegetable producers highly preferred frequent visits from advisory providers, with a 1% level of significance. This may be due to the susceptibility of vegetables to disease, pests, and other calamities.
- Practical advisory types, accompanied by expert field-level visits, were more preferred by vegetable producers than mobile-assisted and one-stop-shop services, with 1% and 5% levels of significance, respectively. This result contradicts current efforts in Ethiopia to replace field-level advisory visits with technology-assisted services in the long run.
- As hypothesized, vegetable producers responded to increases in advisory fees by shifting to self-management and traditional options.
- Vegetable producers demonstrated a higher willingness to pay for advisory services that prioritize leafy vegetables, practice-based advisory services, and agronomic management-oriented services.
- They were willing to pay twice as much for practice-oriented services compared to input-oriented services.
- The results revealed that once farmers began receiving the desired advisory information and practices, the frequency of the practice was not considered a highly desirable feature, as indicated by the relatively low level of willingness to pay.