Eucalyptus Woodlot Adoption and its Determinants in Mecha District, Northern Ethiopia

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INTRODUCTION AND JUSTIFICATION

❖ The area of Eucalyptus plantations has now expanded greatly and growing Eucalyptus at a farm level in a form of woodlot primarily for income generation has become popular among Ethiopian smallholder farmers.

❖ Despite this expansion, the participation and intensity of planting by farmers is not equal and

❖ The reason why some of the farmers are not participating and why the intensity of planting among farmers differs is equivocal and undocumented.

❖ Moreover, studies and systematic documentation on the adoption and economic significance are scarce to inform evidence-based policy making.

Objective:

➢ To investigate factors affecting adoption decision and intensity of adoption of Eucalyptus woodlot in Mecha District, Northern Ethiopia

Figure 1. *Eucalyptus* woodlot adoption. Photo by Autor

METHODOLOGY

➢ **Study area :** Mecha district, located 30 kms away from Bahir Dar city and 525 km away from Addis Ababa.

➢ **Study design :** Cross sectional survey with quantitative and qualitative approaches

➢ **Sampling technique and procedure**

✓ Multistage stratified random sampling procedure
- *Enashenifalen, Addisameba* and *Rim* purposively selected
- Participant and non-participant households identified and stratified
- Sample respondents selected using random sampling technique
- A 186 households (130 woodlot adopter and 56 non adopter)

➢ **Data collection:** household interview, focus group discussion, key informant interview, filed observation

Fig.2 KII   Fig.3 FGD

➢ **Data analysis:** descriptive statistics, and econometric model were applied

- The **double-hurdle model**, originally developed by **Cragg (1971)** was used for this study.
- Two decisions: whether to allocate land to establish *Eucalyptus* woodlot and the area/intensity of land allocated for *Eucalyptus* woodlot.

RESULTS

A). Socio economic characteristics of respondents

Table 1: Descriptive statistics for the continuous explanatory variables

Characteristic of the household head		Min	Max	Mean	Std. Dev.	T-value
EDUC	Adopter	0.00	10.00	1.90	2.85	2.088*
	Non-adopter	0.00	6.00	0.75	1.70	
	Total	0.00	10.00	1.75	2.74	
FSIZE	Adopter	1.00	13.00	5.65	2.11	2.928**
	Non-adopter	1.00	12.00	4.36	2.48	
	Total	1.00	13.00	5.44	2.22	
LHOLDING	Adopter	0.25	4.00	1.30	0.73	4.891***
	Non-adopter	0.10	1.75	0.62	0.38	
	Total	0.10	4.00	1.19	0.75	
PARCEL	Adopter	1.00	5.00	2.20	0.94	5.57***
	Non-adopter	1.00	2.00	1.21	0.41	
	Total	1.00	5.00	2.06	0.89	
TLU	Adopter	0.00	11.02	4.88	2.12	2.742**
	Non-adopter	1.00	8.68	3.72	1.93	
	Total	0.00	11.02	4.7	2.13	
INCOM	Adopter	3,250.00	46,000.00	18,349.36	8,561.20	3.822***
	Non-adopter	5,500.00	25,100.00	12,253.45	5,179.19	
	Total	3,250.00	46,000.00	17,398.93	8,413.22	

Note: educational level (EDUC), family size (FSIZE), land holding (LHOLDING), parcel of land (PARCEL), Livestock holding (TLU), Farmers perception towards *Eucalyptus* woodlot production (PROD), income (INCOM), adjacent farm (ADFARM), off farm work (OFFWORK)

RESULTS CONT'D...

Table 2: **Descriptive statistics for dummy explanatory variables**

Variables	Characterstics	Adopter		Non-adopter		Combined		χ2
		N	%	N	%	N	%	
OFFWORK	Yes	60	38.20	5	17.20	65	34.90	**4.737****
	No	97	61.80	24	82.80	121	65.10	
ADJFARM	*Eucalyptus*	126	80.30	9	31.00	135	72.60	**29.799*****
	Another crop	31	19.70	20	69.00	51	27.40	
PROD	Positive	122	77.70	9	31.00	131	70.40	**25.603*****
	Negative	35	22.30	20	69.00	55	29.60	
MARKATACC	Yes	104	66.24	5	17.24	109	58.60	**24.227*****
	No	53	33.76	24	82.76	77	41.40	

❖Adopter of *Eucalyptus* woodlot found to differ from their counterparts in various demographic, socio-economic, physiological and institutional related perspectives.

B). Determinants of eucalyptus woodlot adoption and level of adoption

Table 3: Probit estimates of the factors affecting adoption of *Eucalyptus* woodlot

Variables	Coef.	Robust Std. Err.	P-value	Marginal effect
Age of the houshold	0.0116	0.0164	0.481	0.0012
Educational level	0.2207***	0.0846	0.009	0.2365
Family size	0.1025	0.0881	0.245	0.0109
Land holding	0.2756	0.5596	0.622	0.0295
Income of the household head	0.4839	0.2881	0.093	0.0518
Livestock holding in TLU	-0.0462	0.0916	0.614	0.0049
Distance from the nearest weather road	-0.0071	0.0196	0.718	0.0007
Number of parcels of land	0.8218*	0.3580	0.022	0.088
Sex of the houshold	0.4502	0.3656	0.218	0.05091
Off farm work engagement	0.9808*	0.4309	0.023	0.1023
Adjacent farm	0.4589	0.3481	0.187	0.0512
Farmers perception towards *Eucalyptus* woodlot production	1.1743***	0.3887	0.003	0.1403
Access to training	0.4408	0.6602	0.504	0.0438
Access to market	0.3806	0.3835	0.321	0.0412
Credit availability	0.7984**	0.3592	0.026	0.088
_cons	-7.9780**	2.9841	0.008	-
Wald chi2 (15)	47.03			
Prob > chi	0.000			
log likelihood	-36.1931			
Pseudo R2	0.5504			
No. of observations	186			

Table 4: Truncated regression estimates for adoption intensity of *Eucalyptus* woodlot.

Variables	Coef.	Robust Std. Err.	P > /Z/	Marginal effect
Age of the household head	-0.0016	0.0017	0.348	-0.0016
Educational level	0.0048	0.0057	0.397	0.0048
Family size	-0.0334***	0.0105	0.001	-0.0334
Land holding	0.4728***	0.0607	0.000	0.4728
Income of the household	-0.0821	0.0463	0.076	-0.0821
Livestock holding in TLU	-0.0037	0.0104	0.722	-0.0037
Distance (the nearest road)	0.0010	0.0021	0.648	0.0010
No. of parcels of land	0.1060***	0.0241	0.000	0.1060
Sex of the houshold	-0.0016	0.0449	0.972	-0.0016
Off farm work engage.	0.0725	0.0420	0.084	0.0725
Adjacent farm	0.1872***	0.0555	0.001	0.1872
Farmers perception on woodlot production	0.0774***	0.0705	0.042	0.0774
Access to training	0.0920	0.0651	0.157	0.0920
Access to market	0.1978***	0.0488	0.000	0.1978
Credit availability	0.0417	0.0353	0.238	0.0417
_cons	0.3420	0.4228	0.418	-
Wald chi2 (15)	250.4			
Prob > chi	0.0000			
log likelihood	61.67			
Number of observations	156			

*,** and *** indicates the significant level at 10%,5% and 1%

➢ Educational level (p=0.09), number of parcels of land (p=0.022), farmers perception towards Eucalyptus woodlot production (p=0.003) and credit availability (0.026) significantly and positively influence household adoption decision.

➢ Family size (negatively), land holding size, number of parcels of land, adjacent farm, farmers perception towards Eucalyptus woodlot production and access to market (positively) and significantly influencing the adoption intensity of Eucalyptus woodlot.

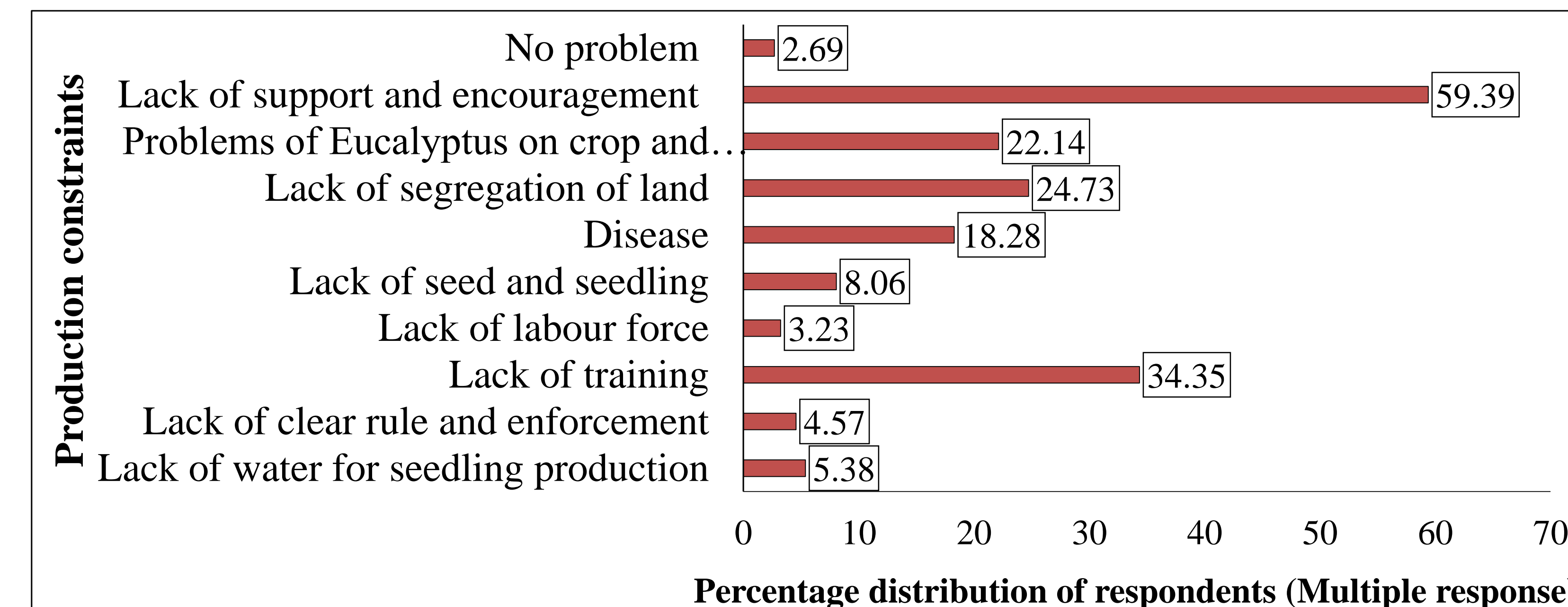### C). *Eucalyptus woodlot* production challenges

Figure 4: Constraints of *Eucalyptus* production

➢ Lack of support(59%), lack of trainings (34%), lack of segregation of land(22.14) and disease (18%) were the major constraints of tree growers

CONCLUSION

❖Most of the areas in the district is covered with *Eucalyptus* and still farmers are interested to continue planting it on their productive land; assigned for irrigation purpose.

❖household's decision to plant Eucalyptus has been influenced by several demographic, socioeconomic, institutional and physiological factors.

❖Improving productivity of land, cluster planting, providing alternative options, easing credit access, training on silvicultural management, implementing the existing policies and enforcing rules and regulations are areas that need policy attentions to improve the livelihood of the communities.

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