

INCOME CONTRIBUTION AND DETERMINANTS FOR ADOPTION OF APPLE BASED AGROFORESTRY SYSTEM: THE CASE OF DENDI *DISTRICT*, OROMIA REGIONAL STATE

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Introduction

One of the promising agroforestry technologies is integration of fruit trees into farmlands. Promoting fruit-based agroforestry will shift the conventional agroforestry system towards market-led 'trees for cash'. Temperate fruit trees like apple, plum and peach are the most important fruit trees known in the world. Ethiopia has a variety of fruit crops grown in different agro-ecological zones as a source of income as well as food. Beside climatic and biophysical suitability for temperate fruit production, central highlands of Ethiopia have a great opportunity for marketing of the produced fruits.

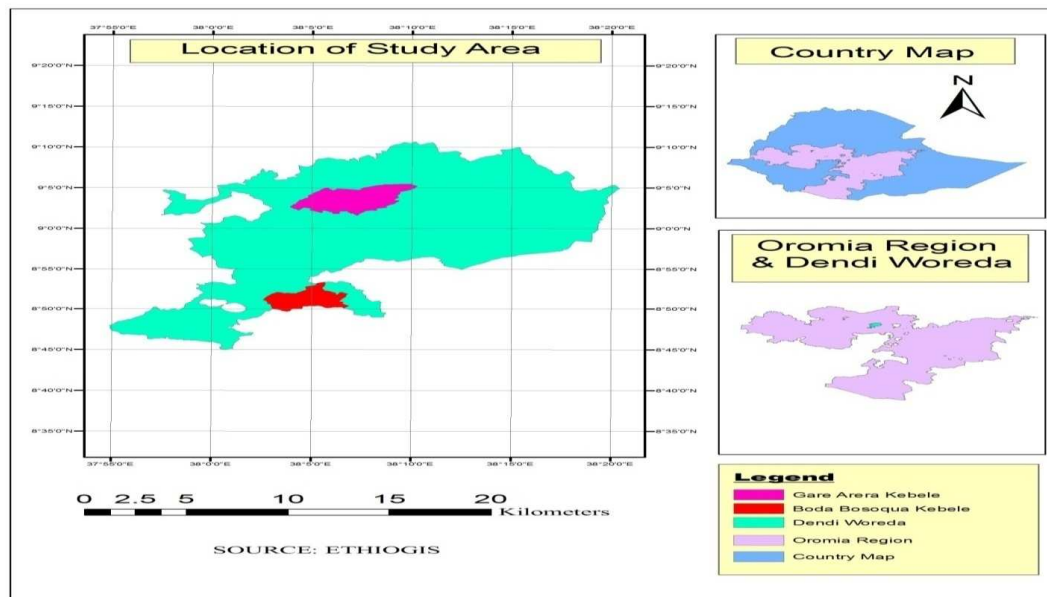
General Objectives

Materials and Methods

To estimate and compare households' income from apple-based agroforestry system and to identify factors that influence its adoption by smallholder farmers in *Dendi District*, Oromia regional state, Ethiopia.

Specific objectives

- Assess the income contribution of Apple-based agroforestry to the household economy
- Compare the household income of Apple-based agroforestry adopters and non-adopters and
- Assess factors influencing the adoption of Apple-based agroforestry system



Map of the study area

Sampling methods

Individual households in the area selected using one of rules-of-thumb that have been suggested to conduct multiple regression analyses. Thus, a rule-of-thumb that $N \geq 50 + 8m$, was used. The total of 250 farm households were selected randomly using proportional to sample size sampling techniques. The data analyzed using SPSS version 20.

Results

Households' Financial Return from Homestead Farmland

Adopters and non-adopters mean annual vegetable production in quintal per hectare.

Vegetables	Non-adopters		Adopters	
	Mean Production	Income in USD	Mean Production	Income in USD
Cabbage	96.77 ^b	715.71	195.11a	1435.90
Ethiopian cabbage	189.08	4761.10	212.5	3148.15
Potato	208.45	3088.16	213.75	6316.50
Carrot	98.87 ^b	2198.29	385.42a	8564.81
Tomato	127.29	2851.85	113.75	2527.78
Chili	73.63 ^b	5454.05	221.43a	4920.63
Onion	77.78	3703.70	382.82	14178.24
Garlic	56.46 ^b	7639.20	26.79a	3968.25
Leeks	55	2037.04	77.68	2876.98
Beetroot			21.72	472.22

The average number of apple tree in the adopters' homestead farmland were about 928.3 trees ha⁻¹ with the annual production of 3639.68Kg ha⁻¹yr⁻¹ and the gross financial returns of \$2,156.84 ha⁻¹yr⁻¹.

Mean Net income (USD ha⁻¹) adopters from vegetable + apple fruit and non-adopters income from vegetables.

Adoption	Mean	t-value
Non-adopters	6128.82	4.6***
Adopters	9,412.73	

Mean Net income (USD ha⁻¹) adopters from vegetable + apple fruit and non-adopters income from vegetables.

Adoption	Mean	t-value
Non-adopter	6,128.83 ^b	4.42
Adopter	11,569.58 ^a	

Conclusion

❖ The mean net annual income of adopters from vegetables + apple fruit was **2-fold higher** than non-adopters' income from vegetables.

Determinant factors of Apple Fruit Tree Adoption

Explanatory Variables	Coefficient
SEX	-1.683*
AGE	0.049*
NATIVE	1.415
FAMSIZE	0.220
TLANHOLD	-1.151***
DWATER	-0.504
FAMSIZE	0.220
DISEASE	1.209
LIVTLU	0.252**
DISMARKET	1.089***
CREDIT	0.417

❖ The mean gross annual revenue of adopters from solely apple fruit production constituted about 17 per cent of the total income obtained from vegetable + apple.

❖ Adoption of the system was significantly influenced by different factors. Age (+), formal educational levels (+), livestock holding (+), distance from market to home (+), sex (-) and total land holding (-).

Recommendations

- ❖ Policies and strategies that intend at improving the income of rural people and natural resource conservation should give attention to the contribution of Agroforestry in general and fruit tree-based agroforestry in particular.
- ❖ Additional research is also suggested to identify the various determinant factors limiting farmers in the production and utilization of fruit-based agroforestry systems.