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Farmer's Perception of Productivity and Profitability of Organic and Conventional tef [Eragrostis tef (Zucc.)Trotter] Production: Tigray, Northern Ethiopia

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ABSTRACT

A total of 50 respondents were identified through stratified sampling of organic and conventional farming users and interview schedule was developed and used. The objective of the study was to evaluate teff productivity and profitability under organic and conventional approach and to assess farmers' perception and preference of organic and conventional teff production. The respondents of both farming systems had common perception on some attributes of organic farming that it makes the soil more fertile, tolerant to shortage of rain fall, stores more moisture, it is good habitat for soil macro organisms and its straw is preferred by animals as compared to that of conventional farming system. It was also found out that both organic and conventional teffs have no grain storage problem and they experience also similar disease or insect pest occurrence. Organic farming has a profound vitality from the strategic importance of agro-ecological and environmental health point of view, and sustainable crop production system. The farming communities should be encouraged, trained and supported by the government.

Key words: Organic Farming, Conventional Farming, Productivity, Profitability, tef, Eragrostis tef.

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INTRODUCTION

Conventional crop production uses large quantities of chemical pesticides and fertilizers. They are harmful to the environment as they kill beneficial insects and pollute soil and water. In the organic farming, the absence of chemical sprays and increased biodiversity result in a better eco-balance between pests and beneficial insects. Chemical pesticides can cause poisoning as well as long term effects on human health. Whereas organic farming is free of chemical pesticides and produces safe and healthy food crops. Frequent use of chemical fertilizers and narrow crop rotation can cause declining soil fertility, while organic farming improves soil fertility through rotating leguminous crops like chickpea and field pea (Andre, 2013). Productivity and profitability persist to be the two most important indicators in assessing the success or failure of crop production. But high levels of productivity (though not necessarily profitable) have been and continue to be achieved through heavy use of energy-based cultural inputs together with fertilizer-responsive high-yielding crop varieties, farm mechanization which facilitates timeliness of field operations, and irrigation which help the crop from any yield-depressing effect of water deficit during the sensitive growth stage (Mendoza, 2002).

Tef has an advantage to farmers, and as a result the

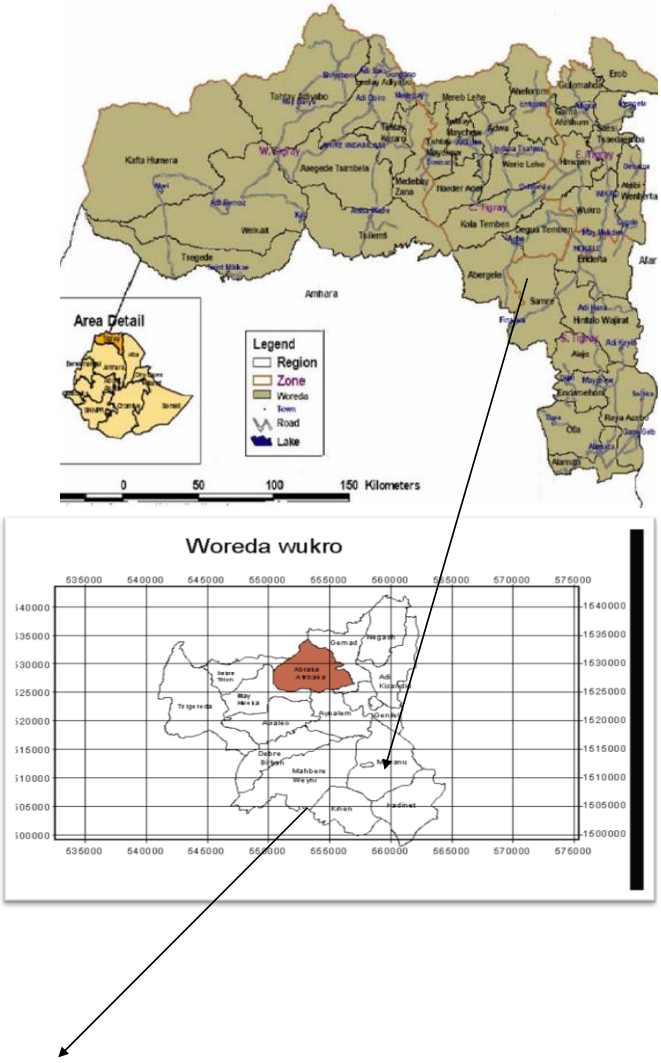

Figure 1. Location Map of Abreha -we- Atsbeha.Source: BoARD, 2007,Un published document.

cultivation it increases year to year. It is one of the major income sources for the majority of farmers. High market value and many other desirable characteristics, including higher nutritional value, low incidence of damage by insects, better adaptation to drought, adaptive to poor drainage and high straw value have made tef attractive for cultivation (Seyfu, 1997). While numerous studies have been conducted in Ethiopia to examine the determinants and the resulting economic impact of chemical fertilizer, improved seeds, and physical conservation structures (Dercon and Christiansen, 2007; Kassie et al., 2008), no attempt has been made to comparatively analyze the yield gap between organic and conventional farming, soil fertility, profitability and farmers perception of organic and conventional tef production in the country in general and in Tigray Regional State, in particular. Therefore, the aim of this research was to evaluate farmer's perception of productivity and profitability of organic and conventional tef production under rainfed conditions.

MATERIALS AND METHODS

Study Site

Abreha -we-Atsbeha Watershed is one among the 21 *Kebelles* of Kilte Awlaelo woreda located in the Eastern Zone of Tigray at a distance of 15 km from Wukro town to the west (Figure 1). The watershed is geographically located between 39^0 30′ E to 39^0 45′ E longitudes and 13^0 45′ N to 14^0 00′ N latitude. Rainfall distribution is largely mono-modal that spreads from June to first week of

September. The mean annual rainfall distribution varies from 350 to 600 mm. Moreover, the annual average temperature ranges from 16 to 27°C. The soil types of the study area are dominated by Arenosols (67.25%), followed by Fluvisols (25%) and Vertisols (7.75%). The land use pattern of the study area is classified as cultivated land (1047 ha; 15.5%), forest land and area closure (4325 ha; 64%), grazing land (206 ha; 3%), and the rest (1188.25 ha; 17.5%) is occupied by houses, roads, waterways, etc. The main economic source of the area is agriculture and mixed farming is widely practiced. It has a population of 4,845 with average land holdings of 0.76 ha/ household. The prevailing agro-climatic condition of the watershed favors farmers to grow a wide variety of crops. Smallholder farmers of the area grow a variety of food crops as a source of food and income. The main food crops grown are: tef, barley, maize, wheat, chick pea, sorghum, finger millet and linseed.

Study Site Selection Criteria

The study site was selected based on the presence of organic farming practitioners, and conventional farming practitioners. From field experience, the watershed is known to be relatively homogenous in terms of agro ecology, access to resources, history of extension and others.

Farm Profitability Analysis

Before running the Cost-Benefit Analysis, a detailed costing of all the inputs and valuing of all the benefits were done. Likewise, the cost items mainly included material costs of seed, fertilizer, manure and farm tools, whereas labor costs were accounted for land preparation, sowing, weeding, chemical spraying, fertilizer/manure application, harvesting, threshing, loading/unloading and transport of produce and inputs. All these were treated based on prevailing and actual prices of 2014.

Assessment of Farmers' Perception on Organic and Conventional Tef Production Systems

A list of organic farming practitioners and conventional farming practitioners was obtained from village leaders and extension agents and sample farmers were randomly selected from the provided list. Interview was conducted using pretested semi-structured questionnaire to capture data pertaining to costs, revenue, perception, demographic aspects and agronomic practices. In selecting farmer respondents, a stratified random sampling was used.

Statistical Analysis

The data analysis focused on two domains namely, productivity and profitability of the two farming systems. Descriptive statistics like percentages were used to describe farmers' perception, constraints of tef production and profitability on organic and conventional farms.

RESULTS AND DISCUSSION

Farmers' Perception on Organic and Conventional Tef Production

Farmers perception on the attributes identified was assessed among farmers practicing organic and conventional farming in the study area. Out of the total respondents practicing organic farming, (24) preferred organic farming; whereas (14) of those who practice conventional farming preferred organic farming and the remaining (11) preferred the conventional farming system. In most of the attributes, organic and conventional farming respondents have the same perception on organic farming, that is, they agreed that organic farms resist shortage of rain fall, store more moisture in the soil, are good habitat for soil macro organisms and, organic straw is preferred by animals for feed as compared to that of the conventional farming system.

In regard to comparison of organic tef yield to conventional tef yield, about (9) of organic farm respondents believe that organic tef is superior, while (5) of them said tef yield from conventional farming is better, whereas about (11) of them said that there is no difference in yield of both systems. Meanwhile, of the total conventional farm respondents, about (3) opted for organic farming, (10) for conventional, and (12) said that there are no differences in yield of both systems. In the case of tef straw yield, for (3) and 17 of the organic tef farm respondents, high straw yield was obtained from organic and conventional systems, respectively while for (5) of the organic farm respondents, there is no difference in straw yield between the two. On the other hand, from all the conventional tef farm respondents, about (5), (8), and (12) of them opined that tef straw yield is higher for organic, conventional and no difference, respectively. In relation to tenure issue, (25) of organic producers had land ownership, whereas about (12) of conventional producers owns' their land and about (13) of them had shared and rented land. Thus land ownership is a major constraint for being organic or conventional producer (Table 1).

Tef Production Constraints As Perceived By Farmers

As regards the pests and insects occurrence in the production season, the highest number (22) of organic tef respondents said "no" where as in the case of conventional tef farm respondents, (23) gave such answer. Likewise, out of the total respondents from the organic farm group, (7) said that shoot fly damages are common in organic farms,

Table 1. Farmers' perception of organic and conventional tef production.

Attributes	Organic farmers n=25	Conventional farmers n=25
Farm preference		
Organic	(96)24	(56)14
Conventional	(4)1	(44)11
Resistance to shortage of rain fall		
Organic farm	(100)25	(100)25
Conventional	(0)0	(0)0
More moisture storage		
Organic farm	(100)25	(100)25
Conventional	(0)0	(0)0
More soil macro organisms		
Organic farm	(100)25	(100)25
Conventional	(0)0	(0)0
Comparing organic yield vs conventional		
Organic	(36)9	(12)3
Conventional	(20)5	(40)10
The same	(44)11	(48)12
More straw		
Organic	(12)3	(20)5
Conventional	(20)5	(32)8
The same	(68)17	(48)12
Straw preference by animal		
Organic straw	(100)25	(100)25
Conventional straw	(0)0	(0)0
Tenure		
On	(100)25	(48)12
Share	(0)0	(44)11
Rented	(0)0	(8)2

*Figure in bracket indicates percentage of the total sample HH; n - number of respondents.

(4) said that it is common in conventional and (14) of them the occurrence is the same in both types of farm. But the difference could be attributed to the fact that if high amount of organic fertilizer is applied, it damages organic farms and if high amount of chemical fertilizer is applied it damages the conventional farm. Moreover, concerning lodging problem, (12) of organic farm respondents is of the opinion that this happens in the organic farms,(2) of them that there are no storage problems for tef produced from both farm systems (Table 2).

Farmers' Response to Profitability of Organic and Conventional Tef Production

Organic farm respondents said, the most profitable farming system is the one they currently practice (19), while only said that it occurs in the conventional farm only, while (11) said it occurs in both farm types. On the other hand, regarding conventional farm respondents, (4) of them stated that lodging happens in organic farm only; for (5) of them it occurs in conventional farm only, whereas for (16) of the conventional farm respondents it occurs in both farm types. As regards grain storage problem, (24) each of respondents from both types of farms were of the opinion (1) of them opined that conventional farming is better than theirs. However, (5) of these respondents said that both farming types are equally profitable. In the case of conventional farming, out of the total respondents (16) of them replied that organic farming has better profitability; (8) of them said that conventional farming brings better profits and (1) of them said both are equally profitable. In relation to some important differences observed in both farming systems, (14), (5) and (6) of organic tef farm respondents

Table 2. Tef production problems at Abreha- we-Atsbeha.

Attributes	Organic farmers n=25	Conventional farmers n=25
Disease or insect pest occurrence		
Yes	(12)3	(8)2
No	(88)22	(92)23
Shoot fly Hylemya arambourgi occurrence		
Organic	(28)7	(28)7
Conventional	(16)4	(20)5
The same	(56)14	(52)13
Lodging problem		
Organic	(48)12	(16)4
Conventional	(8)2	(20)5
The same	(44)11	(64)16
Grain storage problem		
Organic	(0)0	(0)0
Conventional tef	(4)1	(4)1
No problem in both	(96)24	(96)24

*Figure in bracket indicates percentage of the total sample HH; n - number of respondents.

Table 3. Farmers' response to profitability of organic and conventional tef production.

Attributes	Organic farmers n=25	Conventional farmers n=25
Profitable farming		
Organic farming	(76)19	(64)16
Conventional farming	(4)1	(32)8
No difference	(20)5	(4)1
Superiority in Taste	(56)14	(52)13
Threshability	(20)5	(36)9
Quantity of straw	(24)6	(12)3
Special market for organic		
Yes	(0)0	(0)0
No	(100)25	(100)25
Certification of organic product		
Yes	(0)0	(0)0
No	(100)25	(100)25

*Figure in bracket indicates percentage of the total sample HH; n - number of respondents.

observed better taste, good threshability and increased quantity of straw in organic farming, respectively. From the conventional farming respondents' point of view, nearly (13) observed better taste; (9) observed better threshability and (3) of them got better quantity of straw from conventional farming. Regarding the market and certification of organic products, (25) each respondents from both farming types replied that there is no special market and certification of organic products in the study area (Table 3).

CONCLUSIONS

The survey result showed that land ownership had effect on being organic producer or not. Those farmers who did not own land but have leased-in plots, preferred to practice the conventional way of production using inorganic fertilizer rather than improving the productivity of soil using organic fertilizer as they might not use the land permanently. Most of the farmers who practice conventional farming in the study area has small farm lands far away from their

homesteads; as a result, they need to use chemical fertilizer and minimize labor requirement for transporting manure and compost. In the study area, there is no special market for organic teff and certification of organic products to motivate the teff producing farming community. The respondents of both organic and conventional teff farming had common perception of some attributes of organic farming: resistance to shortage of rain fall, holding of more moisture, being good habitat for soil microorganisms, production of straw preferred by animals and being more profitable than the conventional farming system.

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