Knowledge on Improved Practices of Teff by Smallholder Farmers in Ethiopia

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ABSTRACT

Teff is one of the most important crops for farm income and food security in Ethiopia. Despite the importance of teff in Ethiopia, yields are remarkably low mainly due to low adoption of improved agricultural technologies. Technical knowledge is not only valuable as an outcome impact indicator but could also serve as a reasonably reliable predictor of the adoption of management practices, particularly for crops and technologies where there is a relatively long-time lag between adoption and impact. Therefore, this study was carried out during 2016-17 to assess the knowledge of farmers on improved production practices of teff. The study used both quantitative and qualitative research approaches. Cross sectional survey research design was employed to collect data. Chaliya district was purposively selected because this district has only 46 ha under improved practices out of 6815 ha of land under teff cultivation, which is very low when compared with the other 18 districts of West Shoa zone. By using Probability Proportional to Size (PPS) and random sampling technique, 239 respondents were selected from the eight villages. The data were collected using well-structured interview schedule, key informant interviews and focus group discussions. The collected data were analysed using descriptive statistical tests. The findings revealed that majority of the respondents had no knowledge on row planting/ sowing, transplanting, stages of application of Urea, optimum depth at which fertilizer is to be applied and quantity of Urea to be applied at each stage. Therefore, it is very much imperative to educate the farmers on row planting, transplanting and urea application. The extension agency must formulate the extension messages on the knowledge component of row planting, transplanting and fertilizer application while transferring the know-how.

INTRODUCTION

Teff *(Eragrostis teff)* indigenous to Ethiopia furnishes flour for *Injera*, sour dough pancake-like bread that is the principal form in which grain is consumed in the highlands and in urban centres throughout the country. It accounts for

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about 15 per cent of all calories consumed in Ethiopia. Approximately 6.9 million households grow teff (CSA, 2017) and it is the dominant cereal crop in over 30 of the 83 high-potential agricultural districts (Bekabil et al., 2011). Teff is one of the most important crops for farm income and food security in Ethiopia and the second most important cash crop (after coffee), generating almost 500 million USD income per year for local farmers. In the major agricultural season of 2016-17 (meher), teff was grown in 24 per cent of the total grain crop area i.e., 3,017,914.36 hectares, ranks first among the grain crops in area under cultivation (CSA, 2017).

Despite the importance of teff in Ethiopia, yields are remarkably low. While in 2016-2017, teff land productivity reached 16.64 quintals per hectare (CSA, 2017), this is rather low when compared with on-farm research trial yields (2200-2800 kg/ha) (Abewa et al., 2014). Low yield due to low adoption of improved agricultural technologies is believed to be the main factor affecting the agricultural production in Ethiopia.

According to previous studies in Ethiopia, low adoption of improved production technologies was attributed to unavailability of improved technologies, unavailability and high cost of required inputs, lack of access to and high interest rates on credit and policies that discourage improved technology adoption such as promotion of state farms (Hailu and Chilot, 1992; Bekele et al., 2000; Getahun et al., 2000).

Farmers' adoption behaviour, especially in low-income countries, is influenced by a complex set of socio-economic, demographic, technical, institutional and biophysical factors (Feder, Just & Zilberman, 1985). Adoption rates were also noted to vary between different group of farmers due to differences in access to resources (land, labour and capital) and information and differences in farmers' perceptions of risks and profits associated with new technology. The determinant of degree and direction of impact of adoption are not uniform; the impact varies depending on type of technology and the conditions of areas where the technology is to be introduced (Legesse, 1998). Farmers' decision to adopt new technologies can also be influenced by factors related to their objectives and constraints. These factors include farmers' resource endowments as measured by (1) size of family labours, farm size and livestock ownership, (2) farmers' socio–economic circumstances (age and formal education) and (3) institutional support system available for inputs (CIMMYT Economics Program, 1993).

But, the information an individual has about a new technology forms the basis of the perceptions and attitudes this individual develops towards the technology. The perceptions of farmers about an innovation are very closely

related to the knowledge they have about the innovation. Knowledge refers to factual information and understanding of how the new technology works and what it can achieve, whereas perception relate to the views of farmers about the technology based on their felt needs and prior experiences; and these do not necessarily align with reality. The knowledge and perceptions about an innovation then together determine the attitude towards it (Meijer et al., 2014). The agricultural innovation literature suggests that knowledge only translates into adoption if a set of enabling factors and conditions exist, including farmers' positive perception of the technology's benefits (Adesina and Zinnah, 1993). Technical knowledge is not only valuable as an outcome impact indicator but could also serve as a reasonably reliable predictor of the adoption of management practices, particularly for crops and technologies where there is a relatively long-time lag between adoption and impact. Therefore, this study was carried out to assess the knowledge of farmers on improved production practices of teff.

METHODOLOGY

Research Approach and Design

The study used both quantitative and qualitative research approaches. Cross sectional survey research design was employed to collect data.

Sampling Procedures

Selection of the Study area

Chaliya district in Ethiopia was purposively selected because this district has only 46 ha under improved practices out of 6815 ha of land under teff cultivation, which is very low when compared with the other 18 districts of West Shoa zone. (Source: West Shoa Zone Agricultural Office, 2015)

Sample Size Determination

The total number of farmers in the Chaliya district is 26850. Almost all the farmers are cultivating teff in the district. Considering this as sampling frame, the sample size was fixed using the formula given by Kothari (2004).

$$n = \frac{Z^2.p.q.N}{e^2(N-1) + Z^2.p.q}$$

Where,

n= sample size

N= population (in this case, total households are 26,850)

Z= the value of the standard variate at a given confidence level (in this case, Z = 1.96 using

95% confidence level)

p= sample proportion, and q= 1-p, (p = 0.8)

e = the acceptable error (in this case 5% since confidence level is 95%)

The sample size of 243 was arrived out using the above-mentioned formula. At the time of data collection,

four farmers refused to participate in the research study. Therefore, the sample size was reduced to 239.

Selection of Farmers

The respondents to be selected from each randomly selected eight villages were determined based on Probability Proportional to Size (PPS). The respondents were selected from the eight villages by using random sampling technique.

Methods of Data Collection

Primary Data

The primary data were collected through: face to face interviews using a well-structured and pre-tested interview schedule, Focus group discussions (6) and key informant interviews (10). The key informants were six Development Agents from the woreda, two Village leaders, two Staff from Co-operative societies.

Secondary Data

Secondary data were obtained from published journal articles, books, national and regional policy documents, annual reports of concerned offices in the area, Central Statistical Agency Reports and relevant web sites, and the deficiencies in the present agricultural extension system were analysed.

Method of Data Analysis

This study employed descriptive statistical tests. The collected data were coded, tabulated and analysed using SPSS package version 23. Descriptive statistics like percentage and frequency were worked out to describe the findings.

FINDINGS AND DISCUSSION

Farmers' Knowledge on Improved Production Practices of Teff

Farmers' knowledge influences the decision of household to adopt improved technologies. A knowledge test was developed and the reliability and validity of the tests were established through test retest method and face validity respectively.

It was found that majority (75.31%) of the respondents possessed knowledge about the improved variety. Regarding land preparation, nearly one-third (27.61%) of the respondents had knowledge on optimum/recommended number of ploughings followed by 23.85 per cent with knowledge on interval (number of days) between each ploughing. Therefore, the knowledge on the interval between each ploughing has to be promoted.

With respect to herbicide application, majority of the respondents (64.85%) had knowledge on recommended herbicide, whereas 46.44 and 36.40 per cent alone possessed knowledge on time of application of herbicide and recommended quantity of herbicide/ha respectively. Hence, farmers should be educated about the time and quantity of herbicide application.

Table 1.
Farmers' Knowledge on Improved Production Practices of Teff (n=239)

Sl.No.	Item	Correct	
		No.	**%**
1	Knowledge on improved variety	180	75.31
Land Preparation			
2	Optimum/recommended number of ploughings	66	27.61
3	Interval (number of days) between each ploughing	57	23.85
Herbicide Application			
4	Recommended herbicide	155	64.85
5	Time of application of herbicide	111	46.44
6	Recommended quantity of herbicide/ha	87	36.40
Method of Planting/sowing			
7	Optimum spacing between the rows in line sowing	69	28.87
8	Optimum depth of sowing in line sowing method	69	28.87
9	Recommended seed rate /ha	64	26.77
Transplanting			
10	Day on which the seedlings are to be transferred to the main field from nursery	24	10.04
11	Spacing to be followed in transplanting method	24	10.04
12	Number of seedlings to be planted per hole	26	10.87
13	Number of tillers to be allowed per hill	25	10.46
Fertilizer Application			
14	Recommended fertilizer/ha	136	56.90
15	Fertilizers to be applied during sowing	155	64.85
16	Optimum depth at which fertilizer is to be applied	108	45.19
17	Distance at which Urea is to be applied from the plant	122	51.04
18	Depth at which Urea is to be applied	123	51.46
19	Stages of application of Urea	101	42.26
20	Quantity of Urea to be applied at each stage	109	45.61

The knowledge on optimum spacing between the rows in line sowing, optimum depth of sowing in line sowing method and recommended seed rate / ha was found to be possessed by 28.87, 28.87 and 26.77 per cent respectively. In general, majority of the respondents had no knowledge on method of planting/ sowing. Row planting is being promoted on a large scale by the agricultural department as it is proved in the research stations and farmers' holdings that the yield is increased by adopting row planting. Even though much efforts have

been put forth, the knowledge on row planting was limited. Therefore, it is very much imperative to educate the farmers on row planting.

Overall, the knowledge on transplanting was possessed by less number of respondents. Slightly more than half of the respondents had knowledge on various items mentioned under transplanting viz., day on which the seedlings are to be transferred to the main field from nursery, spacing to be followed in transplanting method (10.04%), number of seedlings to be planted per hole (10.87%) and number of tillers to be allowed per hill (10.46%).

Upon studying the knowledge on fertilizer application, it was found that the percentage of respondents with knowledge on stages of application of Urea (42.26%), optimum depth at which fertilizer is to be applied (45.19%) and quantity of Urea to be applied at each stage (45.61%) was low when compared with other knowledge items under fertilizer application. Therefore, the extension agency has to formulate the extension messages keeping more attention on these components while transferring the know-how.

CONCLUSION

Keeping in view the less knowledge level of respondents on the recommended practices of teff cultivation in the study area, extension strategies need to be streamlined to promote row planting, transplanting and balanced fertilization on massive scale due to its yield enhancing potential.

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