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Farmers' Evaluation of Upland Rice Varieties in Fogera District, South Gondar, Ethiopia

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Abstract

The study was conducted in Fogera district, South Gondar zone, Amhar National Regional State. Three Kebeles among the 15 Kebeles of upland rice growers of the district were selected purposively and a total of 60 selected households were interviewed to generate primary data. Preference ranking technique was employed to identify farmers' improved upland rice varieties evaluation criteria. The result of the preference ranking shows that market demand, grain yield, taste, drought resistance, and early maturity are the five most important traits required to adopt improved upland rice variety in the study area. Therefore, attempts to promote transformation in agriculture through improved upland rice variety could be successful if these evaluation criteria are taken in consideration.

Keywords: Upland rice, Fogera, Evaluation, NERICA-3 & 4

Introduction

Rice is among the most important cereals and root crops grown in different parts of Ethiopia as food crop. It is reported that the potential rice production area in Ethiopia is estimated to be about thirty million hectares (MoARD, 2010). The inability of farmers to achieve high yield levels has been blamed on many different sources. The researches lack of understanding of the farmer problems and the conditions under which they operate may result in the development of inappropriate technology (Franzel and van Houten, 1992) and the way they assess new technologies (Van Veldhuizen et al., 1997). In many countries, extension recommendations are developed by researchers on experiment stations whose work is aimed at maximizing the yields per unit of land area and researchers criteria for evaluation of new technologies are much different from those farmers, whereas the objectives of researchers is often to maximize yields or profit, farmers seek to maximize their welfare, which in addition to yield and profit may include minimizing risk and seasonal distribution of food supply. Farmers may have different

priorities depending on their socio-economic positions, or sex, or age, and their preferences may change over time, for example, due to change in household situation or market conditions. Agricultural scientists on research stations were frequently successful in dramatically increasing yields per hectare under controlled, experimental conditions, but their technologies often were not adopted by farmers because of constraints farmers faced or because the technologies did not meet farmers needs. For example, in Ethiopian high yielding sorghum varieties were rejected by farmers because they are susceptible to damage by birds; and farmers lacked the labour required to protect the varieties (Franzel and van Houten, 1992). Farmers identify and select the types of crops most likely to do well in their areas. Selection is normally preceded by extensive discussion both within the farm family and with neighbours. It is also mentioned farmers technology evaluation criteria such as growth habit, yield, and colour of grain, main uses in the diet, processing and storage qualities, marketability, cost ease of sale, desirability for home consumption, compatibility with existing practices, taste nutritional value, cooking

quality and resistance to pests (van Veldhuizen et al., 1997).

Research Methodology

The Study Area

The District is located at an average altitude of 1820 above-sea-level in south Gondar zone, Amhara region, Ethiopia. The study area has registered an average annual rainfall of 1284mm and temperature ranging from 10.3-27.5°C. A total of 220,421 people live in Fogera. The number of households in the district amounts to 44,168, out of which 10% are female headed households. Topography of the area is mainly characterized as a flat land (i.e. accounts for 76% of the total land in the district). Soil texture of 65 % of the district is black soil (FWoARD, 2010)

Sampling and Data Collection

Both primary and secondary data sources were used. Discussion with farmers and agricultural extension staff was done to generate information. Key informants were also used as information source from different actors. A two stage sampling procedure was used to select the Kebeles and sample households. In the first stage, three Kebeles were selected purposively from 15 Kebeles where upland rice was producing, based on their potential of improved upland rice production and their relative access to past extension support. In the second stage, after lists of farmers were obtained from the district Agriculture and Rural Development office, farmers who were cultivating upland rice in three Kebeles that was all 60 sample household heads were taken as respondent using Probability Proportional to Size (PPS).

Analytical Framework

The analysis frame for farmers' evaluation criteria of upland rice varieties were conducted through Farmers' Group Discussions (FGD) which is one of the techniques of Participatory Rural Appraisal (PRA) and analyzed using Preference Ranking Method (PRM).

Result and Discussion

Introduction

This study intended to examine the farmers'

evaluation criteria of improved upland rice varieties in the study area, Fogera district.

Some Issues on Upland Rice Production in the Study Area

The following information was collected from farmers' group, the development agents working in sampled kebeles and from district agricultural office technical staff.

The common practice of upland rice production

Upland rice is grown in rain fed, naturally well-drained soils without surface water accumulation. In Fogera district the cropping season for upland rice varieties begins in the month of end of May. In general, upland rice can grow in any environment with at least 15 to 20 mm of five days rainfall during the growing cycle. During germination and early growth stages, 15 mm per five days rainfall is sufficient. When dry NERICA seeds are sown directly, it takes five days for the seedlings to emerge. Farmers in Fogera use broadcasting sowing method and the seed rate is 80-100kg/ha. Majority of the farmers use organic fertilizer in the form of manure, compost and crop residues. First weeding is done within 2 to 3 weeks after emergence, farmers practice the second weeding 6 to 7 weeks after emergence and the type of weeding they use is hand weeding. They also weed for a third time, if necessary. Blast, brown spot, grain discoloration are among the diseases found in the upland rice growers and farmers control these diseases by using clean and healthy seeds.

Birds are damaging agents for the crop and farmers in this area use to erect scarecrows randomly in the field and discouraging birds from breeding by cutting nearby trees and destroying roosting sites. Farmers harvest the crop when the grains are hard and turning yellow, this is about 30-40 days after flowering. They use sickles to cut the stems and lay the harvested crop in upright position for drying before threshing. They thresh using oxen power or human labor to avoid losses. The small holders' rice farmers have not dehulling facilities; rather they bring to processors which are commonly located in production areas.

During the harvesting time both women and men are engaged.

Rice Marketing

After upland rice has been harvested, most farmers use storing as a marketing strategy and few of them sell immediately. Post harvest losses are including threshing, proper storage facilities and make it impossible to produce high quality upland rice that does not contain gravel, uneven grains and a lot of broken grains which prevent which prevent upland rice cannot compete effectively with imported rice as the consumers preferred choice.

There are few millers or processors which directly buy the products from the farmers in the area and these millers determine the market price acting as traders (wholesalers and retailers). The retailers are the petty shops found in the nearby town.

The major constraints in the rice marketing in the area are: lack of knowledge in grading, price seasonality, and lack of group marketing options (cooperative unions) lack of access to market information. Rice traders in the study area have three market outlets from Woreta town. These are Bahirdar 55km to south, Gondar 120km in the North, and Debretabor 45km to East of Woreta town.

Farmers' Evaluation Criteria of Improved Upland Rice Varieties

To improve the upland rice varieties, national efforts have been made and recently rice strategic plan has been established under the MOARD. Regional research centres like ARARI, Non-governmental organizations, JICA, SG-2000 are working collaboratively

with WOARD to boost production and productivity of rice as well as upland rice. NERICA (NERICA-3& 4 and SUPERICA-1) varieties are released and farmers living in non-water logging areas are benefiting from these varieties. However, among the released varieties NERICA-4 is widely adopted in different hill areas of the district. Despite the efforts of extension system and other stakeholders adoption of improved upland rice varieties in the study area is still low.

Farmers have their own preference criteria for adoption among the released varieties, which in most cases not considered by research and extension functionaries. The fair majority (90.0%) of sample farmers preferred NERICA-4 for its market demand, grain yield, taste and other favoured attributes. In the study area NERICA-4 variety performed better yield in upland and non flooding zones whereas SUPERICA-1 showed better performance on excess moisture available flooding zones. The respondents mentioned that the better yield performance had an implication on the increase in income of the farmers through the market demand.

Now-a-days, the importance of understanding farmers' technology preference becomes an important issue by the research and extension system. Many technologies disseminated to farmers are simply rejected by farmers due to inconsistency with preference criteria between technology generators and end users. The study results provided in Table 5 below clearly indicate that the farmers consider 19 attributes in deciding their preference criteria (evaluation) for adoption of upland rice variety (NERICA-4).

Table 1: Variety Selection Criteria Ranking and Variety Preference by Adopter Sample

	Rank given by respondents					N	Total weight	Rank position
	1	2	3	4	5			
Market demand	22	4	2	6	3	37	147	1 st
Grain yield	19	8	3	2	5	37	145	2 nd
Taste	2	11	10	9	9	41	121	3 rd
Drought resistance	6	13	7	-	2	28	105	4 th
Early maturity	6	6	6	4	4	24	84	5 th
Insect resistance	1	2	7	8	7	25	57	6 th

Straw yield	-	4	4	9	7	24	53	7 th
Easiness in harvesting	1	3	4	3	4	15	35	8 th
Ease of threshing	-	1	6	4	3	14	33	9 th
Swelling in cooking	-	3	3	4	4	14	33	9 th
Grain size	1	-	2	3	-	6	17	10 th
Cooking easiness	-	1	-	4	5	10	17	10 th
Color of grain	-	1	-	1	5	7	10	11 th
Disease resistance	1	0	1	1	0	3	10	11 th
Lodging resistance	-	2	-	-	-	2	8	12 th
Quality straw	-	-	1	2	1	4	8	12 th
Human labor requirement	0	0	0	0	0	0	0	13 th
High input requirement	0	0	0	0	0	0	0	13 th
Weed competition	0	0	0	0	0	0	0	13 th

Source: own survey, 2010

KEY: The total weight is the sum of rank order frequencies multiplied respectively by 5 for the 1st position, by 4 for 2nd position, by 3 for the 3rd position, by 2 for 4th position and 1 for the 5th position in the five point continuum.

In view of that, market demand, grain yield, taste, drought resistance, early maturity, straw yield, and easiness in harvesting were most preferred attributes of improved upland rice varieties in order as ranked by sample households (Table 1).

During group discussion, farmers mentioned that, market demand gives an opportunity to sell the production in a better price and improve their status of income and living condition. The second consideration to produce improved upland rice was its yield advantage as compared to other crops and taste is important attribute as per the market demand. Drought resistance was also other preferred attribute which reduces crop loss during unconditional rainfall pattern. Early maturity as preferred attribute, gives an opportunity to harvest earlier and solve their economical as well as social issues and also in some cases it helps them to plant the second crop on the same plot. In conclusion, the research and extension system of the country has to give more emphasis to participatory research which considers farmers' technology preference.

To compare and evaluate technological options, it is necessary to assess the importance of each of improved upland rice characteristics relative to each other (i.e., farmers' demand for these characteristics). Comparison of upland rice varieties was conducted through preference rating.

Based on scale: 1 = poor, 2 = good and 3 = very good with 60 farmers who adopted improved upland varieties. Non-adopters were not able to rate traits of improved upland rice since most of them did not know their important traits. According to the Woreda Office of Agriculture and Rural Development, the improved varieties that farmers currently use are NERICA-4 and NERICA-3. Unfortunately, farmers do not use specific names for the different improved varieties; they call them collectively as "Gobba" meaning "rice which is grown up hills". Hence, the improved varieties were handled as one variety and preference rating was conducted with two major local varieties, *X-jiigna* and *Gumara*. The results of preference rating are shown in Table 2.

Table 2: Average Ratings of Important Characteristics of Improved Upland Rice Variety and Local Rice Varieties

Characteristics	Improved (n=60)	Rank	X-jiigna n= 45	Rank	Gumara n=15	Rank
Market demand	2.67	1	2.34	2	1.20	5
Grain yield	2.64	2	2.54	1	2.02	2
Taste	2.20	3	1.45	4	2.19	1
Draught resistance	1.96	4	1.86	3	1.54	3
Early maturity	1.52	5	1.32	5	1.35	4

As indicated in Table 2 most of sample households prefer improved variety as best variety with its important attributes of market demand, grain yield, taste, drought resistance and early maturity.

The other point explained by the farmers in group discussion is that the major reasons why non-adopters are not cultivating improved upland rice varieties are: seed was not available on time, and not having typical soil type needed for upland rice production.

Conclusion and Recommendation

For the upland rice variety evaluation purpose, 19 different technology traits were identified through reconnaissance survey conducted with extension performers and farmers' selection and evaluation criteria of improved upland rice varieties were revealed through interview and group discussions. In this respect, the ranking exercise shows market demand, grain yield, taste, drought resistance, early maturity are the five most important traits to adopt improved upland rice variety in the study area.

Evaluation of improved upland rice traits ranking revealed that, farmers' technology choice is not based only on grain yield or profit

but also on some of traits such as grain yield, fodder yield, taste, drought resistance, early maturity, and ease of threshing. This yield-oriented approach is not relevant for technology adoption by itself, because farmers need a technology that has multiple advantages. Hence, in order to stimulate and gear up improved upland rice variety improvements in quality aspect of grain and fodder as well as resistance to environmental factors are utmost essential, and involving farmers in the process of technology development is also crucial.

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