

Pre-Extension Demonstration and Evaluation of Improved Hot Pepper Technology in Babile District of Eastern Hararghe Zone

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ABSTRACT

The study was conducted in the Babile district of East Hararghe Zone. The objective of this activity was to evaluate the profitability of adapted and high-yielder hot pepper varieties. The activity was undertaken for the consecutive two years (2017-2018) of the main cropping season. A total of 30 farmers were directly benefited from the technology. Mareko Fana and Melka Awaze improved hot pepper and local check varieties were used on a plot size of 10mx10m. The target farmers, Development Agents, and Experts of the district were trained before starting the activity. Awareness creation was done through different extension approaches and using extension materials such as field day, Field visits, manuals, and leaflets. The result showed that the Marako Fana variety gave a high grain yield of 23.73 qt/ha followed by Melka Awaze (22.82 qt/ha) and local check (15.38 qt/ha). Moreover, the varieties were identified and ranked based on the criteria set by farmers (Early maturity, yield, disease tolerance, pod size, pod diameter. As a result, both Mareko Fana and Melka Awaze varieties were recommended for more promotion in the area and other similar agroecology.

KEYWORDS: Hot pepper, Demonstration, Mareko Fana and Melka Awaze, Babile district

INTRODUCTION

Hot pepper (*Capsicum annum* L.) production worldwide in 2016 was 34.5 million tonnes with 17.79t ha⁻¹ average productivity (FAO, 2016). Hot pepper productivity in Ethiopia is 6.11 t ha⁻¹ (FAOSTAT, 2018). Hot pepper is an important commercial crop, cultivated for vegetable, spice, and value-added processed products (Nalla *et al.*, 2017). Vegetables are sources of vitamins, minerals, and income for those involved in production and marketing. Having first-hand information about vegetable production and marketing system is essential to devise appropriate strategies aimed at enhancing vegetable extension development. Commercial vegetable production is concentrated in the Rift Valley areas of Ethiopia, primarily due to the availability of irrigation facilities, accessibility, and closeness to agro-processing industries (Alemayehu *et al.*, 2010). It is important to the processing industries (coloring agents) and in the local dishes Karia and Berber (Shimeles, 2018)

In Ethiopia particularly in western Oromia, hot pepper (*Capsicum annum*) grows in well-drained, fertile silt loam or sandy loam texture, warm and humid weather conditions, and the best fruit is obtained with Rainfall 900-1300 mm. It is extensively grown in most parts of the country, with the major production areas concentrated at altitudes of 1000 to 1800m.s.l. (MoARD, 2009). A hot pepper adaptation trial was conducted at Fadis agricultural research center. Four improved hot pepper varieties (Mareko Fana, Melka Awaze, Melka Zala, and Melaka Shote and one local check variety were evaluated for productivity, adaptability, and drought tolerance. The parameters used for evaluation were plant height, average number of main branches per plant, canopy width, average number of pods per plant, and stand count at harvest. Among the five varieties on the bases of their productivity, adaptability, tolerance to pests and diseases, and farmer's preference Melka shote and Melka awaze were recommended for

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further production. This project aimed to evaluate improved hot pepper varieties in the farmers' field by promoting adapted technologies to the end users.

Objectives

- To evaluate the productivity and profitability of hot pepper technology under farmers' management
- To create awareness regarding the improved hot pepper technologies.
- To strengthen linkage among key stakeholders

Methodology

Description of the study area

Babile is located at a distance of 31 km from Harar in the direction of the county's Eastern part. It is bordered by Babile in the Northern, Fedis in the South, a small region in the eastern, Harari region and Fedis in the West, and Jarso in the North West district. Erer Ibada is located at a distance of 33 km from the Harari region and 09° 10' 41.5" north of latitude, 042° 15' 27.3" east of longitude, and elevation of 1274m a.s.l. The physical property of the soil in the study area is sandy loam (the majority of the soil in the area). The climatic condition of this area is almost dry land. It has bimodal nature of rainfall. The socio-economic character of the population in the

study area depends on subsistence agriculture. These study areas are the potential for the production of horticultural crops both during the main and off-season.

Sites and farmers' selection

The activity was conducted in a selected district of East Hararghe Zone for the consecutive two years of the cropping season. Babile district was selected based on the potentiality of hot pepper production. 1 representative potential kebele was selected purposively in collaboration with experts and development agents of the agriculture office based on accessibility and potentiality for hot pepper production. From kebele, 1 FRG (Farmer Research Group) members considering gender and youth consisting of 15 farmers were established. Farmers were selected purposively based on their interests, land provision, interest in cost-sharing, and willingness to share experiences with other farmers. The selected farmers were grouped in the form of Farmer Research Group (FRG) with the member of 15 farmers per kebele in consideration of gender issues (women, men, and youth). In the FRG 5 farmers (3 male and 2 female) were trial farmers and 10 farmers worked with trial farmers.

Table 1: Summary of selected site and farmers with area coverage of the experiment

District	Kebele	No. of trial farmers	FTCs	Area covered
Babile	Erer	10	1	10m x 10m for each plot
Total		10	1	

Source: Own computation 2017/18

Research Design

Two improved treatments (Marako Fana and Melka Awaze) hot pepper varieties and one local check replicated across five trial farmers per kebele per year. Two improved and one local check was sown on 10 farmers land. 10m*10m of land from individual trial farmers for each experiment/variety used. 80cm spacing between rows and 40 cm between plants used. A seed rate of 1.2 kg/ha and fertilizer rate of 200 kg/ha DAP and 100 kg/ha Urea were used.

Data Collection

Both quantitative and qualitative data were collected through personal field observation, individual interviews, and Focus Group Discussion by using a checklist. Quantitative data such as the number of farmers who participated in FRG, yield performance, and number of stakeholders who participated in training and field days were collected while qualitative data like farmers' perception toward the new technology, and farmers' technology selection criteria were collected.

Data analysis

Quantitative data were summarized using simple descriptive statistics (mean, frequency, and percentage) while the qualitative data were analyzed using narrative explanation and argument. Finally, data from different sources were triangulated to get reliable information.

Result and Discussion

Agronomic and Yield performance

The performances of the hot pepper varieties during their growing season together with their total yields were collected and analyzed. The result showed that the Marako Fana variety gave a high grain yield (23.73 qt/ha)

followed by Melka Awaze (22.82 qt/ha) and local check (15.38 qt/ha). Both improved varieties used for the experiment showed better mean yield over the local check.

Table 2: Yield performance of early maturing Hot pepper varieties

Kebele	Varieties	Mean	Maximum	Minimum
Erer	Mareko Fana	23.73	24.90	22.80
	Melka Awaze	22.82	23.93	21.77
	Local	15.38	16.35	14.39

Source: own computation, 2017/18

Summary of yield advantage of the varieties

The percentage increases of the improved hot pepper varieties over the local check were 54.42 % by Melka Awaze and 48.37 % by Marako Fana under farmer conditions. This showed that improved hot pepper varieties had advantages over the local check.

Table 3: Summary of yield performance in study areas. 1

Varieties	Average yield qt/ha	Yield advantage over the local check (%)
Mareko Fana	23.73	54.42
Melka Awaze	22.82	48.37
Local check	15.38	-

Source: Own computation 2017/18

Table 4. Profitability of the technology per hectare

No	variables	varieties	
		Merako Fana	Melka Awaze
1	Yield (in qtl/ha)	23.73	22.82
2	Price (ETB/qtl)	900	900
3	Gross returns (1*2)	21,357	20,538
4	Seed purchase (qtl/ha) ETB/ha	1,400	1,400
5	Fertilizer purchase (200kg DAP/ha)	3,000	3,000
6	Labor cost	2,000	2,000
7	Land preparation (ETB/ha)	2,000	2,000
8	Total variable cost (Σ 4-7) for ETB/ha	8,400	8,400
9	Fixed costs (Costs of land) in ETB/ha	3,000	3,000
10	Total cost (Σ 8+9) ETB/ha	11,400	11,400
11	Net return (3-10)	9,957	9,138
12	Cost-benefit ratio(11/8)	1.19	1.1

Source: own computation, 2017/2018

The varieties were profitable as compared to the local variety. Their benefit-cost ratio is more than 1.

Farmers' Opinion/Perception

Farmers' selected the best-performing improved hot pepper varieties by using their criteria. The major criteria used by farmers were fruit yield, fruit length, fruit diameter, disease tolerance, fruit number per plant, and maturity. Based on the above criteria; farmers evaluated the varieties and ranked Melka Awaze first because farmers in the study area prefer smaller fruit diameters and followed by the Marako fana variety.

Table 5: Ranks of the varieties based on farmers' selection criteria.

Crop varieties	Farmers rank	Reasons
Melka awaze	1 st	Good Fruit yield, medium Fruit length, medium fruit diameter, good disease tolerance, Good fruit number per plant, and Early maturing
Mareko Fana	2 nd	Good Fruit yield, fruit length, high fruit diameter, disease tolerance, fruit number per plant, and early maturing

Local check	3 rd	Lower Fruit yield, lower fruit length, lower fruit diameter disease tolerance, lower fruit number per plant, and late Maturing
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Table 6: Direct Matrix Ranking

S. no.	Traits	Melka Awaze	Mareko fana	local	Total	Rank
1.	Fruit yield	4	4	1	9	4 th
2.	Fruit length	5	3	4	12	1 st
3.	Fruit diameter	4	4	2	10	3 rd
4.	Disease tolerance	3	2	2	7	6 th
5.	Fruit per plant	3	3	2	8	5 th
6.	Maturity	4	4	3	11	2 nd
7	Total	23	20	14		

Discussion

The major variety selection criteria of farmers in the location were particular criteria such as fruit yield, fruit length, fruit diameter, disease tolerance, fruit number per plant, and maturity.

Conclusion and Recommendation

Based on the result, the Marako Fana and Melka Awaze varieties had yield advantages of 54.42 and 48.37% over local varieties respectively. Farmers preferred the Melka Awaze variety for its outstanding, disease tolerance, fruit number, and yield. Therefore, both Mareko Fana and Melka Awaze well performed and are recommended for further promotion in the study area and similar agro-ecology.

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