Demonstration of Common Bean Varieties (Dursitu and Chercher) in the Gurawa and Kurfa Chele Districts, East Hararghe Zone, Oromia Region, Ethiopia.

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Abstract

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Common bean is becoming increasingly important in eastern Ethiopia because of the recurrent late-onset and early termination of rainfall. It is an important crop under various intercropping systems. The major problems of common bean production in Eastern Ethiopia are inaccessibility to improved common bean varieties, low extension intervention, and inferior performance of local varieties. Hence, its specific objectives were to demonstrate the two improved common bean varieties (Dursitu and Chercher) with the local one; to evaluate their performances and identify a variety that meets farmers' criteria. Gurawa and Kurfa Chele districts were identified from Eastern Hararghe Zone using purposive sampling technique based on common bean production potential. Two kebeles were identified from each district. Three model farmers were selected from each kebele depending on common bean production potential. Training is one of the important extension methods to enhance and integrate the farmers' indigenous knowledge and skill with improved practices. Field days were organized in June for Belg and September for the Maher seasons. The common beans were compared and prioritized based on participants' criteria. Chercher variety was selected first, Dursitu second and the local common bean third based on their maturity dates, colour and market demand. In general, participants' capability and skill on the improved common bean production technologies increased. The ground for further popularization and dissemination of the two improved common bean technologies was established.

Key Words

Demonstration
Field days
Improved Common Beans
Training

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1. Introduction

Common bean is becoming increasingly important in eastern Ethiopia because of the recurrent late-onset and early termination of rainfall, which force the farmers to use short-duration crops. It is an important component of crop production in Hararghe under various intercropping systems. It is used as soil fertility management, as emergency and security crop and as a supplemental animal feed ([1] [2]).

The major problems of common bean production in Eastern Ethiopia are inaccessibility to improved common bean varieties, low extension intervention, and inferior performance of local varieties.

To address these constraints, Haramaya University (HU) developed eleven improved common bean varieties along with its improved practices during the last 10-15 years, of which eleven are food beans (Gofta, Ayenew, Haramaya, Dursitu and Kufanzik, Tinike, Hirna, Babile, Fedis, Hundane and one navy (white) variety (Chercher). The merits of the new varieties include high yield (17-40 qts/ha on research

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stations and 13-21qts/ha on-farmers' field), tolerant to major diseases, excellent growth habit, early maturing (82-114 days) and adaptive to wider agroecology of 1300-2000 m.a.s.l. [1] [2][3].

Most of the technologies developed were not demonstrated and transferred to the end-users through appropriate extension methods to complement the work conducted on research stations, and to provide a more realistic evaluation of the new technology under farmers' condition. The process also provides an excellent opportunity for farmers to learn, evaluate, and participate in the recommendations drawn on the specific technology. Furthermore, it can encourage and strengthen researchers – extension – farmers – stakeholders and policymakers' dialogue and provide an opportunity to jointly identify research thematic area, participatory technology generation, transfer and utilization. Hence, the objective of this project was to demonstrate the two recently released common bean varieties (Dursitu and Chercher) with the local one in Gurawa and Kurfa Chele districts during Belg and Maher to select the variety (ies) that meet farmers' criteria and thereby increase target farmers common bean production from 10.5- 21 qts/ha.

2. Material & Research Methods

2.1. Description of the Study Area

Eastern Hararghe Districts (kurfa chele and Gurawa) are situated at an altitude of 1357-3200 m.a.s.l. Their annual rainfall ranges from 500 to 1200 mm. They have bimodal rainfall distribution, the small rainy season which occurs in February and the main rainy season that occur between June and September. The major crops grown in the districts are sorghum, maize, teff and haricot beans, groundnut, coffee and chat. Eastern Hararghe farmers grow common bean twice per year (during Belg and Maher especially in Gurawa). The Belg production is sol and larger, whereas Maher is mostly intercropping with various major crops. They usually sow teff after the harvest of Belg on the common bean fields in Gurawa.

2.2 Sampling Technique

Gurawa and Kurfa Chele districts were identified from Eastern Hararghe Zone using purposive sampling technique based on common bean production potential. Two kebeles were identified from each district. Three model farmers were selected from each kebele depending on common bean production potential, full interest to participate in the project during the two seasons (Belg & or Maher), ability to allocate the required land for the three common bean varieties (two improved and one local variety). The name of the target farmers, their respective districts and peasant associations (PAs) is indicated in Tables 6.3 and 6.4.

2.3 Training

Training is one of the important extension methods to enhance and integrate the farmers' indigenous knowledge and skill with improved practices. Accordingly, training need assessment before and after technology demonstration was made. Six development agents (4 in Gurawa and 2 in kurfa chele districts), 2 district extension experts one from each district, and 12 target farmers (6 from Gurawa and 6 from kurfa chele districts) attended the training on the common beans agronomic practices before sowing (Tables 6.1 and 6.2). Each target farmer provided 10mx20m of land for the two improved common beans and one local common bean varieties demonstration in Belg and Maher. Necessary packages were distributed together with the varieties. The varieties were sown in April for Belg and in late July for Maher because of the late onset of rainfall in both seasons. Field days were organized in June for Belg and September for the Maher seasons. The performance of each improved common bean varieties was evaluated against the local check-in each kebele in terms of their yield performances, diseases tolerance, maturity dates and market demand (Tables 6.3, 6.4, 6.5 and 6.6).

3. Result and Discussion

Table 6.1 shows that target farmers' knowledge and skill on improved common bean agronomic practices was very low but increased after training.

Table 6.2 shows those development agents' knowledge and skill on improved common bean agronomic practices to be quite low before the training, which was greatly improved after undertaking the training.

3.1 Farmers Days

Farmers' days were conducted at flowering stage and at harvesting stage. At the flowering stage, crops resistances to different diseases and drought tolerance ability were evaluated. At the harvesting stage, the yield performances were evaluated (Figure 6.1.). During the Belg season, a total of twelve target farmers, 4 development agents, 2 district extension experts and 55 follower farmers participated in Gurawa and Kurfa chele districts.

3.2 Evaluation at harvest

During the Maher season, a total of twelve other target farmers, 2 development agents, 2 districts' extension experts, 63 follower farmers participated at both districts. The common beans were compared and prioritized based on participants' criteria as follows:

Table 6.1. Training needs assessments before and after training on the target farmers

Training Need Assessments								
Questions	Farmers Before Training				Farmers After Training			
	M	F	Total	%	M	F	Total	%
Land preparation	3	-	12	25	11	-	12	91.6
Row planting	-	-	12	0	10	-	12	83.4
Spacing	-	-	12	0	10	-	12	83.4
Weed control	6	-	12	50	12	-	12	100
Disease control	-	-	12	0	11	-	12	83.4
Harvesting	4	-	12	33.3	12	-	12	100
Post-Harvesting Mgt.	-	-	12	0	9	-	12	75
Crop rotation	6	-	12	50	12	-	12	100
Soil fertility	6	-	12	50	12	-	12	100

Table 6.2. Training needs assessments before and after training for development agents

Training Need Assessments								
Questions	Farmers Before Training				Farmers After Training			
	M	F	Total	%	M	F	Total	%
Land preparation	3	-	6	50	6	-	6	100
Row planting	2	-	6	33.3	6	-	6	100
Spacing	3	-	6	50	6	-	6	100
Weed control	4	-	6	66.7	6	-	6	100
Disease control	3	-	6	50	6	-	6	100
Harvesting	1	-	6	16.7	6	-	6	100
Post-Harvesting Mgt.	1	-	6	16.7	6	-	6	100
Crop rotation	4	-	6	66.7	6	-	6	100
Soil fertility	4	-	6	66.7	6	-	6	100

Table 6.3. Name of target farmers, and grain yield of common bean varieties during Belg season in Gurawa and Kurfa chele districts

Name of Farmers	District	PAs	Yield/plot (200m2) in qt.			Yield qt /ha.		
			Chercher	Dursitu	Local	Chercher	Dursitu	Local
Ahemed Sali	Gurawa	G/Gemachu	0.30	0.28	0.14	15.00	14.00	7.00
Abdalla Usman	Gurawa	G/Gemachu	0.36	0.20	0.12	18.00	10.00	6.00
TeshagerTeshome	Gurawa	G/Gemachu	0.42	0.33	0.90	21.00	16.50	4.50
Demisie Belachaw	Gurawa	Bedu	0.22	0.18	0.13	11.00	9.00	6.50
Toatal			1.30	0.99	0.48	0.65	49.5	24.00
Mean			32.5	24.75	12.00	16.3	12.40	6.00
*Mohamed Amin	Gurawa	Bedu	0.00	0.00	0.00	0.00	0.00	0.00
*Eshetu Kinfe	Gurawa	Bedu	0.00	0.00	0.00	0.00	0.00	0.00
Abraham Amed	Kurfa	Dawe	0.55	0.45	0.24	27.5	22.5	12.00
Ahemed Hasen	Kurfa	Dawe	0.30	0.16	0.15	15.00	8.00	7.50
Miftiha shekrashid	Kurfa	Dawe	0.50	0.34	0.18	25.00	17.00	12.50
Miftha Haji	Kurfa	Dawe	0.37	0.22	0.13	18.50	11.00	6.50
Alemayehu Kebede	Kurfa	Kerso	0.22	0.17	0.11	11.00	8.5.00	5.50
Debebe Makeshe	Kurfa	Kerso	0.75	0.40	0.28	37.50	20.00	14.00
Total			2.34	1.74	1.09	117.0	87.00	58.00
Mean			0.39	0.29	0.18	19.50	14.50	9.70

*Indicted that the common bean demonstrations on the two farmers' plots were affected by drought and there was no yield.

Dursitu improved common bean variety was selected first for its grain and biomass yield and Chercher for maturity date and drought resistances during summer in Gurawa district. But Chercher was rated first and Dursitu second in Kurfa chele district in both seasons based on yield performances and earliness in maturity. Dursitu variety needs more time to mature. The target

farmers and participants decided to share the available seed they harvested to other follower farmers and also decided to grow the two improved common bean varieties. But, they decided to grow Dursitu common bean only during the main rainy season as it needs an extended period of rain to fetch its full production potential.

Table 6.4. Name of target farmers, and yield performances of bean varieties in Maher season in Gurawa and Kurfa chele districts

Name of Farmers	District	PAs	Yield /Plot(200 m ²) in quintals.			Yield qts/ha.		
			Chercher	Dursitu	Local	Chercher	Dursitu	Local
Tasfa Demeke	Gurawa	Lafto	0.30	0.35	0.17	15.00	17.50	7.50
Hashum Usmael	Gurawa	Lafto	0.60	0.80	0.32	30.00	40.00	16.00
Mohamed Abraham	Gurawa	Lafto	0.50	0.50	0.28	25.00	25.00	14.00
Worku Endrias	Gurawa	Jiru Gamachu	0.40	0.65	0.24	20.00	32.50	10.00
Saniyo Ahimed	Gurawa	Jiru Gamachu	0.34	0.60	0.18	17.00	30.00	8.50
*Abdella Saniyo	Gurawa	Kufa Kas	0.00	0.00	0.00	0.00	0.00	0.00
Total			2.14	2.90	1.19	107.0	145.0	60.00
Mean			0.43	0.58	0.24	21.40	29.00	12.00
Megarsa Husien	Kurfa	Dawe	0.25	0.25	0.13	12.50	12.50	6.50
Hayati Ahimed	Kurfa	Dawe	0.40	0.25	0.18	20.00	12.50	9.00
Jafar Sirajo	Kurfa	Dawe	0.23	0.21	0.14	11.50	10.50	7.00
Shifaraw tadasa	Kurfa	Dawe	0.42	0.28	0.13	21.00	14.00	6.50
Amadin Yusuf	Kurfa	Kerso	0.00	0.00	0.00	0.00	0.00	0.00
Debebe Makeshe	Kurfa	Kerso	0.60	0.35	0.25	30.00	17.50	12.50
Total			1.90	1.34	0.83	95.00	67.00	41.50
Mean			0.38	0.27	0.17	19.00	13.40	8.30

*Indicated that the farmer' demonstration field was attacked by drought

Table 6.5. Summary of agronomic data of common bean varieties in the two districts during Belg season

Agronomic Data	Common beans Varieties			Remark
	Chercher	Dursitu	Local	
Date of planting	Late April	Late April	Same	Rainfall delay
Maturity date	End June	End of June	End of June	-
Resistance to diseases	high	average	low	-
Resistance to drought	High	average	low	-
Harvesting Date	End June	Early July	Early July	-
Colour	white	brown	mixed	-
Market Demand	High	Average	low	-
Average yield	17.9	13.5	7.9	-

Table 6.6. Summary of agronomic data of common bean varieties in the two districts during Maher Season

Agronomic Data	Common Beans Varieties			Remark
	Chercher	Haramaya	Local	
Date of planting	Late July	Same	Same	Rainfall delay
Maturity date	Mid-Oct.	End Oct.	Late Oct.	
Resistance to diseases	High	Average	Low	
Resistance to drought	High	Average	Low	
Harvesting Date	End Oct	Early Nov.	Early Nov.	
Colour	White	Brown	Mixed	
Market Demand	High	Average	Low	
Average yield	20.2	21.2	10.2	

Table 6.3 shows that the highest mean yield/ha was recorded in kurfa chele during the Belg season by Chercher improved common bean (19.5qt/ha) which was followed by Dursitu (14.5qt/ha) and the local variety (9.7qt/ha), respectively and the order was similar in Gurawa district, but there was yield difference between the districts.

Table 6.4 shows that the highest mean yield/ha was recorded in Gurawa during the Maher season by

Dursitu variety (29 qt/ha) which was followed by Chercher variety (21.4 qt/ha) and the local variety (12 qt/ha). But, the highest mean yield/ha was obtained from Chercher variety (19 qt/ha) in Kurfa chele district which was followed by Dursitu (13.40 qt/ha) and the local variety (8.3 qt/ha) during the same season. The mean yield differences were due to the inconsistency in rainfall in both districts during the growing seasons.

Table 6.7. Farmers' selection criteria and responses' to the packages

Parameters	Farmers' Selection criteria Improved common bean cultivars vs local		
	Dursitu	Chercher	Local
Yield	High	V. high	Low
Date of Maturity	Late	Early	Medium
Drought Résistance	Medium	High	Low
Diseases Resistance	High	V. high	V. low
Colours	V. Good	Excellent	Mixed
Market demand	High	V. high	Low
Farmers' Rank	2	1	3

3.3 Farmers Decision

Target farmers have decided to grow the two improved common bean varieties and share the available seed to other follower farmers who eagerly follow the demonstration activities.

4. Conclusion

Common bean is becoming increasingly important in eastern Ethiopia because of the recurrent late-onset and early termination of rainfall, which force the farmers to use short-duration crops. It is an important component of crop production in Hararghe under various intercropping systems. The major problems of common bean production in Eastern Ethiopia are inaccessibility to improved common bean varieties, low extension intervention, and inferior performance of local varieties.

Eleven improved common bean varieties along with its improved practices during the last 10-15 years, of which eleven are food beans (Gofta, Ayenew, Haramaya, Dursitu and Kufanzik, Tinike, Hirna, Babile, Fedis, Hundane and one navy (white) variety (Chercher) to address these constraints. Among those two improved common bean varieties were compared with the local and both improved common bean varieties (Chercher and Dursitu) met the farmers' criteria. The variety that can be suitable for Belg and Maher seasons were also identified. Chercher variety is suitable for Belg season since it is early maturing and Dursitu variety for the Maher as it is relatively late maturing. Depending on rainfall requirement, yield potential and other quality attributes, however, Chercher variety was selected first by farmers'. This variety has high market demand, shorter maturity date and it is drought tolerant. It was learnt that a demonstration of new technology using appropriate

extension methods such as training and farmers' days are among the best approaches in technology transfer. Experiences were shared among target farmers, followers, researchers, agricultural development agents, and other stakeholders through group discussion on the specific improved practices during the farmers' days.

In general, participants' capability and skill on the improved common bean production technologies increased and thereby their common bean production increased from 8.0 qts/ha to 20.70 qts/ha as a result of the demonstration made on the two common beans technologies along with training and farmers days. The ground for further popularization and dissemination of the two improved common bean technologies was established.

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7. Acronyms

ha Hektar
qts Quintals
qts/ha Quintal per hektar