F4: Grain Legumes Seed Systems: Annual Report 2016

1. Introduction

ICARDA is implementing bilateral projects in Ethiopia, Iran and selected countries in West Asia and North Africa region with financial support from USAID, Government of Islamic Republic of Iran and EU-IFAD support, respectively. In Ethiopia, two projects on faba bean and chickpea entitled '*Deployment of malt barley and faba bean varieties and technologies for sustainable food and nutritional security and market opportunities in the highlands of Ethiopia'* and *Better livelihoods for small holder farmers through knowledge based technology interventions in the highlands of Ethiopia: Increasing the productivity of chickpea in wheat-based cropping system* were implemented in four major fab bean and chickpea growing areas of the country with financial support from USAID. In Iran under the project *Increasing the Productivity of Cereal-based Systems to Enhance Food Security* was started in 2016-17 with financial support from the Government of Islamic Republic of Iran with focus in rianfed areas of four provinces i.e East Azerbaijan, Kermanshah, Kurdistan and Lorestan provinces. The EU-IFAD project, entitled *Enhanced small-holder wheat-legume cropping systems to improve food security under changing climate in the drylands of West Asia and North Africa*, NARS was implemented in selected target countries from West Asia and North Africa Region (Algeria, Egypt, Morocco, Tunisia and Egypt).

Under the bilateral projects, NARS partners and key stakeholders of target countries together with national seed suppliers, agricultural extension services and farmer groups were involved in the several variety and seed related activities including popularization and demonstration of integrated crop management to create awareness and demand for new legume technologies and engaged in early generation seed multiplication (breeder, pre-basic and basic) as well as certified/quality seed production through formal or farmer-based seed production schemes and small seed pack distribution for scaling-up legume technologies. For example, in Ethiopia, the project partnered with federal and regional NARS; federal and regional seed enterprises; seed producer cooperatives and Bureaus of Agriculture of target districts in four major faba bean and chickpea growing regions in Amhara, Oromia, Southern Nations, Nationalities and Peoples (SNNPR) and Tigray. For faba bean the project was implemented in 62 districts of 21 zones of four major regions working with 28 licensed and 7 non-licensed seed producer cooperatives. For chickpea, the project was implemented in 42 districts of 14 zones of four major regions working with 20 licensed and one non-licensed seed producer cooperatives.

The following key areas were covered primarily under bilateral projects of USAID, EU-IFAD, and ICARDA-Iran projects:

- Faba bean seed system study jointly with CRP-DS (including DNA finger printing) to analyze varietal adoption, farmer's perception, seed sources, etc to understand systemic constraints and recommend solutions in Ethiopia
- Accelerated early generation seed production (breeder (G_0), pre-basic (G_1-G_3) and basic/elite (G_4) seed) by NARS and farmer seed producer cooperatives particularly for basic seed in Ethiopia during the main season and off-season using irrigation
- Small seed pack distribution for on-farm quality seed production and scaling-out of grain legume technologies through revolving seed scheme in Ethiopia

- Popularization and demonstration of new grain legume technologies like new improved varieties and integrated crop management technologies including bio-fertilizers in Ethiopia
- Strengthening capacity of NARS partners, stakeholders and farmers for acquiring knowledge and skills for effective project implementation and provision of facilities where feasible
- Forging an effective partnership existing public, private and farmer-based actors for effective project implementation.

2. Variety popularization and ICM demonstration

Popularization of grain legume varieties and associated integrated crop management practices were demonstrated both under USAID projects in Ethiopia and EU-IFAD projects in WANA. In Ethiopia, both improved legume varieties and ICM technologies including parasitic and broad leaf weed control using herbicides and fungicides for gall disease control were demonstrated to compare the benefits of new technologies to the farmers.

For faba bean demonstration included improved varieties combined with pre-emergence herbicide (Dual Gold and Primagram), integrated management for Orobanche (tolerant variety + glyphosate + fertilizer at 100 kg DAP/ha), fungicides (Ridomil Gold, Bayleton) for gall and chocolate spot diseases. About 162 (30 female) and 130 (20) demonstrations were planted with farmers for faba bean and chickpea, respectively in 42 and 31 districts in the same order. For faba bean a total of 10 field days were organized and 4645 participants attended. This includes 3,897 farmers (905 female farmers. 23%) including members of farmer associations and/or cooperatives as well as 748 technical staff (86 female staff, 12%) from partner and stakeholder institutions including researchers, seed specialists, development agents, agriculture and cooperative specialists from district, zonal and regional Bureaus of Agriculture and NGOs and the private sector from federal and regional states. Similarly, for chickpea six field days orgnaized and 639 farmers (96 female, 15% female) and 378 stakeholders (55 female, 14.6%) in chickpea value chain participated in various field days. The field days were attended by farmers from within and surrounding districts; federal, and regional NARS and seed enterprises; subject matter specialists and development workers from Zonal and District Bureaus of Agricultural Development, Cooperatives Promotion and Administration; representatives and members of Farmers' Cooperatives Unions and development projects, and above all the mass media. Field days were organized with a variety of demonstration plots, on-farm community seed production fields and participatory variety selection plots (Table 3 and Figure 2).

Under EU-IFAD project, demonstrations were carried including FFS to create awareness of grain legume technologies in Egypt, Sudan and Tunisia. The new grain legume technologies including improved varieties and ICM technologies showed outstanding yield advantage over existing technologies by increasing productivity and reducing the yield gap. Field days and travelling workshops were organized to create awareness in target countries and reached about 8,370 farmers (Table 3 and Figure 2). In Egypt, 10 and 4 demonstrations planted for faba bean in Beni Suef (old land) and Nubaria (new reclaimed lands) governorates in 2015/16 season. Average yield in demonstration fields was 3.56 t compared to 1.6 t ha^{-1} in neighboring farmers (old land) and 4.32 t compared to 3.4 t in new lands showing better performance of improved varieties and crop management technologies. About 455 farmers attended the field days. In Sudan, demonstrations were carried out for faba bean in Northern and River Nile States and Gezira Scheme. About 31 faba bean demonstrations (1.5 ha each) were conducted in four locations on

33.5 ha was planted and gave average yield of 2.3 t compared to 0.94 t ha^{-1} compared to the neighboring farmers. Similarly, for chickpea 18 demonstrations were conducted 30.7 ha; and in Gezira demonstration plots average yield was 2.37 t compared to 1.47 t ha^{-1} in neighboring farmer's fields. About 877 participants attended the 19 field days organized. In Tunisia two field days organized and 244 farmers attended.

Table 1. Popularization and demonstration of grain legume technologies

Country	**Type of demonstrations and field days**	**No of participants**	**Remarks**
Ethiopia	**Field days (16)**	**5284**	1142 female farmers (21.6%)
Egypt	Field days (9)	135	
	Farmer's day (1)	320	
		455	
Sudan	Field days (19)	877	71 and 67 are extension and researchers; 17 for faba bean only
Tunisia	Field days (2)	244	
	EU-IFAD-total	**1,576**	
	Grand total	**6,860**	

Note: Algeria (report pending) and Morocco (no report due to crop failure)

Faba bean demonstration with pre-mergence fundgicide by Alemata ARC (left: var Hashenge) and Bayletion treatment against gall disease by DBARC(right)


Field day on faba bean gall disease incidence in North Shoa Zone by DBARC (Left: field visits and right: discussion)


Field days of chickpea seed production organized by DZARC (left) and by DBARC (right)