Future Agricultures

Working Paper

Farmer-Based Seed Multiplication in the Ethiopian Seed System: Approaches, Priorities and Performance

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1. Introduction

At the advent of Ethiopia's new economic development plan, the Growth and Transformation Plan (GTP) 2010 - 2015, the Farmer-Based Seed Multiplication (FBSM) programme has increased hopes in the strengthening of the country's national seed system. Although FBSM engages in various strategies and numerous actors across Ethiopia (Dawit and Spielman 2006), the primary function of FBSM involves the organisation of farmer groups at local levels throughout Ethiopia to produce seed that can either be conditioned (cleaned and bagged) or left in raw form, and provided both for sale to the formal sector or for local exchange. The overall goal of FBSM is contributing to the target of doubling agricultural production through improving access to and use of quality seeds of improved crop varieties along with sustaining the availability of germplasm of local varieties.

The principle advantages of FBSM are identified as follows: (i) improved seed production of locally demanded varieties; (ii) production of crop seeds for which there are less commercial interest; (iii) production and marketing of seed within communities for the purpose of reducing seed cost; and (iv) the possibility of serving as seed demonstration sites to encourage the adoption of alternative crop varieties. Although these advantages are appealing, the current implementation of FBSM demands considerable supervision from extension personnel, suffers from low quality seed recovery rates from participating farmers, places local seed supply under exactly the same climatic risks as local grain production, and its financial sustainability is unproven.

This study examines FBSM efforts across Ethiopia and critically analyses the roles of its actors. The narratives, priorities, and agenda approaches of the actors promoting FBSM are documented through a series of case studies, all of which reflect a diversified demand for seed that is based on differing agro-ecological and socio-economic contexts and different sets of actor-networks. The study examines the operation of FBSM initiatives, exploring who is involved and who benefits from the programme. Links to the informal (illegal) private sector and the commercial sector are investigated, including FBSM associations with national and regional seed enterprises. The limits of FBSM initiatives are also documented.

2. FBSM Drivers, Actors and Interests

This paper defines farmer-based seed multiplication (FBSM) as any form of seed production and supply conducted with or by farmers. It does not extend this definition to include the marketing of the seed, either by farmers or through other means, such as contract seed production. It is important here to note that a variety of federal and regional organisations and donor agencies within Ethiopia are involved in FBSM implementation.

In recent years the capacity of FBSM work has increased considerably, which is generally attributed to the diversity of interests of the actors involved in the Ethiopian Seed System and their determination to see the range of farmer-based seed multiplication activities expanded. The main drivers of actor interests can be categorised as follows: (i) genetic resource conservation and seed security; (ii) improved access and adoption of new crop varieties; (iii) increased seed production and profitability; and (iv) promotion of local commercial seed enterprises (Table 1).

Genetic resource conservation and seed security are largely promoted by the Institute of Biodiversity and Conservation (IBC) and conservation and seed security-

Table 1. FBSM Drivers, Actors and Interests

Drivers	Actors	Interests
Genetic resource conservation and seed security	- Institute of Biodiversity and Conservation (IBC) - Relief Society of Tigray (REST) - Catholic Relief Services (CRS) - Ethio-Organic Seed Action (EOSA)	- To ensure the conservation of Ethiopian landraces alongside the utilisation of improved varieties - To ensure seed security in case of disaster
Improved access and adoption of new crop varieties	- Ethiopian Institute of Agricultural Research (EIAR) - Regional Agricultural Research Institutes (RARIs) - Agricultural Higher Learning Institutes (AHLIs)	- To improve access to released crop varieties - To enhance the adoption of the released varieties - To enhance Ethiopian landrace improvement in an effort to repatriate farmer varieties - To demonstration research impact
Increased seed production and profitability	- Ethiopian Seed Enterprise (ESE) - Amhara Seed Enterprise (ASE) - Oromiya Seed Enterprise (OSE) - South Seed Enterprise (SSE)	- To overcome land shortage - To increase volume of certified seed produced to reach more farmers - To maximise profit
Promotion of local seed enterprises	- Royal Netherlands Embassy	- To promote the transition of farmers' group seed production schemes into commercial businesses at micro level

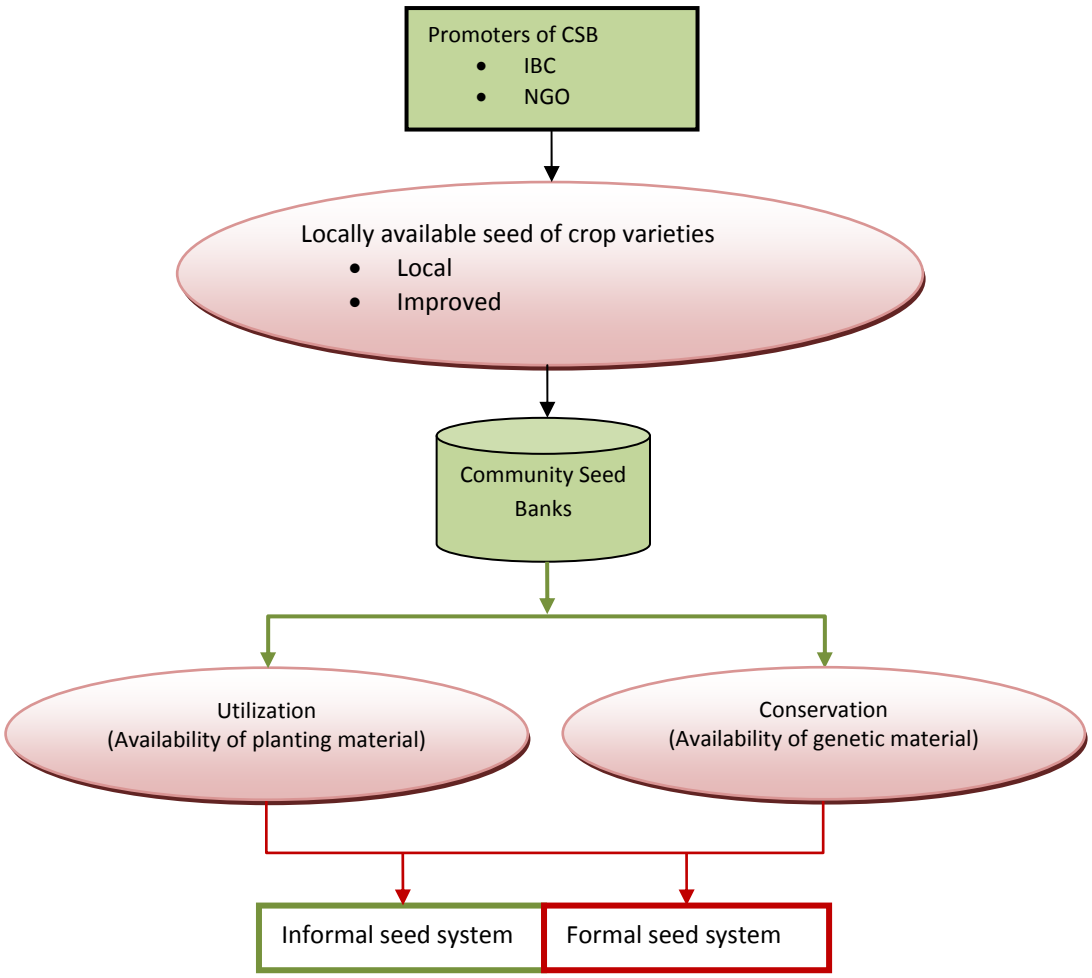
oriented NGOs, whose main objective is to conserve the landraces of different crops. The belief behind this objective is that landraces are more compatible and tolerant to adverse conditions such as drought, disease out-break, and the like. Ethiopian research organisations, on the other hand, are promoting FBSM to ensure improved access and adoption of new crop varieties. They are also keen to demonstrate the research impacts of improved crop traits. Public Ethiopian seed enterprises (ESE, ASE, OSE, and SSE) are interested promoting FBSM through increasing the production of the certified seed of popular crop varieties to boost the availability of this seed to farmers. Certified seed is seen as having the greatest output impact, and is especially desired in light of the limited farm land owned by these enterprises. Finally, with the support of the Royal Netherlands Embassy (since 2009), a project entitled Local Seed Business Project (2009) is promoting a transition of farmers' group seed production schemes into commercial seed businesses to boost the development of an integrated seed sector.

3. Linkages, Modalities and Performance of the Different FBSM Drivers

3.1 FBSM Links with Genetic Resource Conservation and Seed Security

FBSM purposefully promotes genetic resource conservation in an effort to ensure landrace seed security by engaging in the formation of Community Seed Banks (CSBs) across Ethiopia. A CSB refers to a collection of seed that is maintained and administered by community for its community, and has the following objectives: i) to ensure the availability of planting material (relatively large samples of seed); and ii) to ensure the availability of genetic material in situations in which varieties are lost (relatively small samples of seed). Both objectives aim at increasing local seed security, thereby contributing to the possibilities of continued utilisation of locally important genetic diversity.

Figure 1. The CSB FBSM Model and its Links with the Formal and Informal Seed Systems



CSBs have a great deal of potential for mobilising local collective action towards promoting the conservation and utilisation of plant genetic resources at the grassroots level. Such mobilisation would encourage synergy between the formal and informal seed systems and the provision of sustainable livelihood options for resource-poor households (Almekinders 2000; Almekinders 2001; Louwaars and De Boef 2012). This particular type of FBSM is mainly located in areas that are prone to drought, such as parts of Tigray and the central rift valley of Oromiya. The main CSB links shared by FBSM with the formal and informal seed systems is depicted in Figure 1.

There are 16 CSBs spread across Central, Eastern and Southern Tigray, all of which are supported by Relief Society of Tigray (REST), a local NGO. The seed banks were initially established as a solution to the prevailing seed shortage problem brought on by natural disasters. The seed bank relieved farmers from rural money lenders who exploited seed insecurity and furthered aggravated vulnerable rural livelihoods. As local institutions, however, CSBs also offer the potential for mobilising collective action towards promoting biodiversity conservation and the utilisation of plant genetic resources at grassroots level.

The Catholic Church, in collaboration with woreda (district-level) Bureaus of Agriculture, is promoting community-based maize seed multiplication of the Melkassa 1 variety in the Meki and Ziway areas. The Catholic Church in Alem Tena and Meki is also involved in promoting the market bargaining power of farmers through the establishment of farmer-owned local cereal banks. The main role of cereal banks is to improve farmers' access to local seed markets by increasing the availability of different types of seed, especially drought-tolerant seed. Seed varieties are offered at the time of harvest, ensuring the highest quality of seed, and therefore a premium price for farmers (Dawit and Spielman 2006; Dawit, 2011).

The CSB models of FBSM, however, also face distinct challenges relating to the need to link the seed banks with formal organisations. The need for an initial injection of seed supply and continued technical and financial assistance creates a relationship of dependence between the CSBs and their supporting formal organisations.

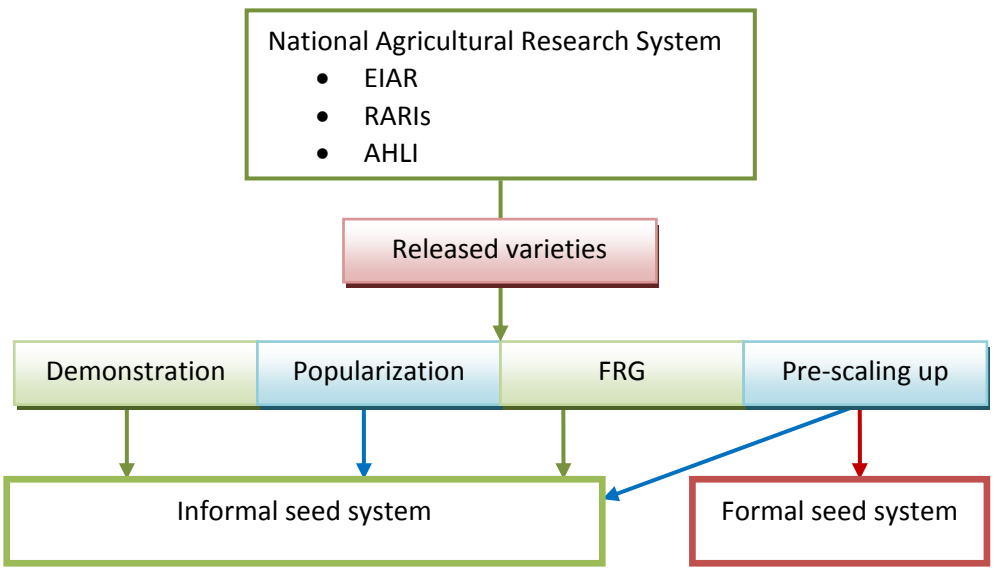
3.2 Research-based FBSM

3.2.1 Dissemination Techniques for Newly Released Varieties: Demonstration and Popularisation

The research-based FBSM models focus on the introduction of new crop varieties into the local seed system, with the involvement of researchers, agricultural extensionists (development agents and other subject matter specialists) and farmers.

The Ethiopian Agricultural Research System (EARS) utilises demonstration and popularisation techniques to create awareness and encourage the dissemination of new crop varieties and generated/adapted agricultural technologies into the farmer-based seed system. Researcher-led demonstration activities are undertaken on farmers' fields in an effort to engage with farmers, development agents and other stakeholders, facilitating the knowledge transfer of the use and application of improved and appropriate technologies, such as agronomic and crop protection practices. Popularisation is an activity that follows demonstration by which the particular innovation or technology (.e.g. improved seed) that was demonstrated is made available to users in a larger quality to create wider awareness and increase demand for that technology. The purposes of the pre-extension demonstration and technology popularisation activities are twofold: (i) to demonstrate

Figure 2. The Research-based FBSM Model and its Links with the Formal and Informal Seed Systems



agricultural technologies under farmers' contextual environments in order to create awareness about the technology's advantages and to increase access to these technologies; and (ii) to popularise these technologies through farmer training, extension visits to areas where the technologies are being demonstrated, and the use of media (both print and mass-media).

All EARS actors, such as the research centers of the Ethiopian Institute of Agricultural Research (EIAR), Regional Agricultural Research Institutes (RARIs), and Agricultural Higher Learning Institutes (AHLIs), have been promoting existing agricultural technologies through the demonstration and popularisation approach in their respective mandate zones. The other approach is The Farmers' Research Group (FRG) approach, which is meant to bring on board end-users in the process of technology generation and selection in order to promote the uptake of the technologies in later stage. In addition to these approaches, since 2008 research centers have also undertaken a pre-scaling up of agricultural technologies, such as new seed varieties, mainly outside of their nearby mandate zones with the objectives of: (i) reaching different agro-ecologies, production areas and regions that have limited access to available technologies; (ii) triggering both the formal and informal seed systems in these areas for these adaptable technologies; and (iii) creating functional links among the different actors in the research-extension continuum.

Pre-scaling up activities were launched by the research centres in support of the national initiatives of the 'scaling up of best practices' (a general application) and the 'scaling up of agricultural technologies' (a specific application). These activities were designed to ensure that: (i) different agro-ecologies, production areas and regions that have limited access to available technologies will be reached; (ii) both the formal and informal seed systems in these areas are linked to available technologies; and (iii) functional networks among the different actors in the research-extension continuum are created. The model of the research-based FBSM, with its links to the formal and informal seed systems, is depicted in Figure 2.

3.2.2 Participatory Plant Breeding and Participatory Variety Selection

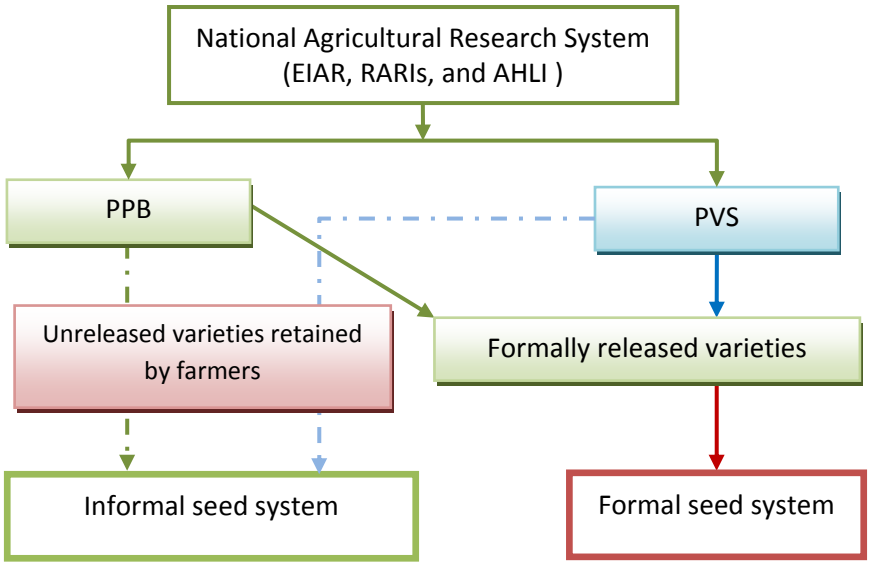
The involvement of EARS in participatory research has had a direct impact on the promotion of farmer-based seed production, specifically in injecting new crop varieties at the local level. This research was initiated in large part due to the poor adoption of improved varieties that are developed on research stations (Belay et al 2008; Witcombe 2005). The two approaches that EARS has undertaken in its research endeavours are Participatory Variety Selection (PVS) and Participatory Plant Breeding (PPB). Different terms are used to describe these approaches, namely: 'market-led', 'client-oriented', or 'farmer-centered' breeding (Almekinders et al 2007). Whereas PPB concerns the entire breeding process, PVS is limited to the testing of finished varieties (Witcombe 2005). FBSM plant breeding and selection approaches and their links with formal and informal seed systems are depicted in Figure 3.

The main target of the PPB and PVS approaches is to promote better adoption of new varieties through: (i) increasing farmers' awareness about different crop variety traits; (ii) building participating farmers' capacity in evaluating the crop varieties for different traits; (iii) improving access to different germplasm pools for farmers' own experimentation and selection; and (iv) creating business opportunities in seed marketing for small-scale farmers using well-accepted varieties. In their use of the PPB and PVS approaches, the Debre Zeit and Melkassa research centres of the Ethiopian Institute of Agricultural Research (EIAR) showed the increased participation of farmers in teff and haricot bean seed production, respectively, along with the increased adoption of the accepted varieties (Belay et al 2008; Assefa et al 2005). Farmers involved in the PVS approach used 40 distinct criteria in their selection of haricot bean varieties, demonstrating the diversity of variety characteristics farmers consider in the seed selection process for their agro-ecological and productive systems. Additionally, during the selection process farmers advanced the work of FBSM in the localities where the PVS activities were undertaken in an effort to increase awareness of the work that FBSM promotes (Assefa et al 2005). Similarly, farmers engaging in the PPB approach for teff breeding promoted the widespread dissemination and adoption of the popular variety Quncho, simultaneously promoting local FBSM work. The Quncho variety of teff was made possible by PPB, as the approach allowed the farmers, who had better judgment of the criterion for the variety, to make decisions over the EIAR researchers (Belay et al 2008). The variety is now formally released by the researchers is the most popular variety nationwide.

The main advantages of the PPB/PVS approach to FBSM include: (i) supporting quick dissemination of the selected varieties through farmer-to-farmer exchange; and (ii) promoting better knowledge among farmers about the main attributes of the seed of selected varieties in relation to the local agro-ecological and socioeconomic circumstances. However, there are specific challenges that this FBSM model faces, the first being that of limited sustainability. Even though the varieties introduced will remain with farmers, once the PPB/PVS implementation is over there is no follow-up or replacement of the seed. Secondly, there is a limited number of research centres engaging in FSBM, restraining the coverage of the PPB/PVS programmes and the distribution of their techniques.

In general, when the seed of a new variety reaches farmers, especially following a formal evaluation process for its characteristics and performance under local conditions, it is then treated like other seeds of local varieties. This ensures that the variety is maintained with the farmers even though its genetic potential may deteriorate through continuous use. In addition, farmers will tend to give a new local name to the newly introduced

Figure 3. The PPB and PVS Approach FBSM Models and their Links with the Formal and Informal Seed Systems



variety, placing their own stamp on it and integrating it into the local system.

3.3 Public Seed Enterprise-based FBSM Model

The Farmer-Based Seed Multiplication programme has been widely promoted by public seed enterprises, due in large part to the reduction of farmland and an ever-increasing demand for seed. The Ethiopian Seed Enterprise (ESE), a major public seed enterprise that has been in operation for a number of years, has taken the lead in promoting FBSM programmes. The more recently-emerged regional seed enterprises, Oromiya Seed Enterprise (OSE), Amhara Seed Enterprise (ASE), and South Seed Enterprise (SSE), are also involved in FBSM programmes on a contract basis, following the approach led by ESE.

In general, the public seed enterprises deal with formally-released varieties in FBSM through formal contracts with farmer clusters that have been formed for the purpose of quality maintenance. Working with farmer clusters also simplifies logistics concerning enterprise-to-farmer supervision and support. Under the agreed contract arrangements, participating farmers may retain sufficient seed to fulfil their own demand and the remaining seed must be sold to the seed enterprises so that it can legitimately enter the formal seed sector.

Figure 4. The Public Seed Enterprise-based FBSM Model and its Links with the Formal and Informal Seed Systems

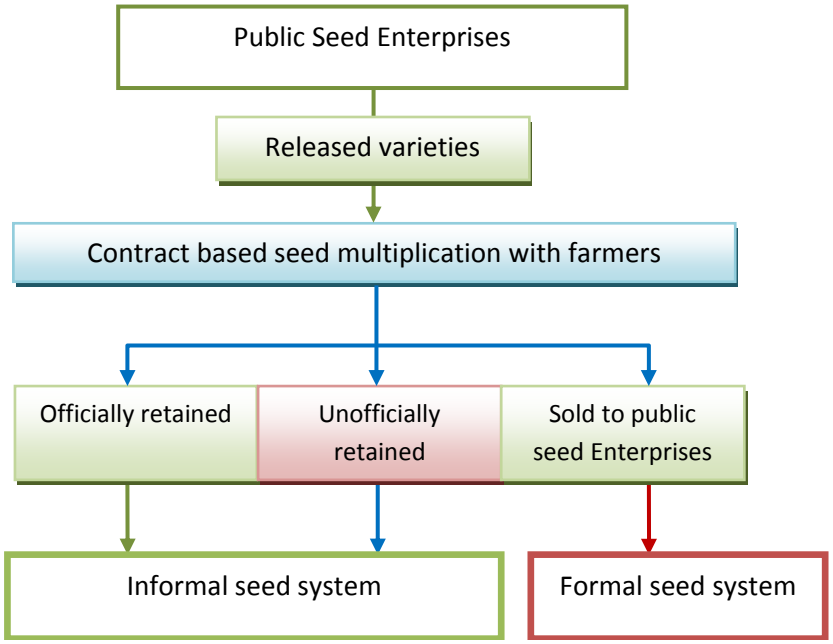


Table 2. The Importance of FBSM in the Overall Seed Production of ESE (2009/10 Production Season)

Crop type	Share of seed produced under FBSM of the total certified seed produced by ESE					Total actual certified seed production			No of varieties under production	
	Plan		Actual							
	Area (ha)	Production (Qt)	Area (ha)	Total Produced (Qt)	Total Collected (Qt)	Total area (ha)	Total Produced (Qt)	Total Collected (Qt)	FBSM	Total
Hybrid Maize	0.03	0.02	0.01	0.02	0.02	7,270.22	76,578.51	76,568.51	2	8
Composite Maize	0.08	0.13	0.09	0.39	0.36	347.47	2,658.30	2511.30	1	3
Bread Wheat	0.54	0.51	0.42	0.47	0.21	19,009.25	457,657.67	308,068.29	10	13
Food barley	1.00	1.00	1.00	1.00	1.00	268.68	5,461.00	220.67	4	4
Malt Barley	0.45	0.45	0.42	0.63	0.13	1,192.25	20,655.57	8,773.17	2	2
Barley both	0.62	0.62	0.52	0.71	0.15	1,460.93	26,116.57	8,993.84	6	6
Teff	0.90	0.90	0.95	0.96	0.87	3,293.22	37,223.20	12,457.77	5	5
Sorghum	0.44	0.30	0.44	0.00	0.00	136.45	1201.01	1,201.01	1	3
Finger Millet	0.00	0.00	0.00	0.00	0.00	42.38	703.20	703.20	0	2
Haricot Beans	0.61	0.55	0.19	0.43	0.09	430.19	1,848.87	1,156.82	2	3
Faba Bean	0.39	0.36	0.13	0.27	0.00	707.49	4,515.68	3,293.21	3	4
Field Pea	0.91	0.94	0.52	0.88	0.18	78.93	570.96	83.50	2	2
Lentil	1.00	1.00	1.00	1.00	1.00	70.50	987.00	540.00	1	1
Chickpea	0.93	0.94	0.92	0.93	0.75	554.48	8,016.22	2,143.53	5	5
Linseed	0.00	0.00	0.00	0.00	0.00	63.70	244.40	244.40	0	2
Total	-	-	0.39	0.47	0.19	34,926.14	644,438.16	426,959.22	44	63

Source: ESE 2010

many farmers in violation of the contracts. This retained seed may then directly or indirectly enter the informal seed system (Figure 4).

The importance of FBSM in the overall seed production of ESE is presented in Table 2. The major proportion of seed for teff and barley (cereals) and for haricot beans, field peas and lentils (pulses) was produced under FBSM. A comparison is made between the types of varieties multiplied under FBSM and those produced under formal seed multiplication system, with fewer types produced under FBSM.

is identified as 39 percent in the total area cultivated and 47 percent in the total production, although the actual data collected by FBSM showed only a 19 percent contribution of the total ESE seed production. Additionally, of the total 63 crop varieties produced by ESE, 44 of these were also produced under FBSM (Table 2).

Although the contributions of FBSM are modestly increasing, the initiative also faces several challenges: (i) the organisation of farmers; (ii) the requirement of intensive supervision; (iii) the reduced amount of seed supply due to quality rejection; and (iv) low quality seed recovery rates (the proportion of seed actually collected

Table 3. Challenges of FBSM Schemes Concerning the Crop Implementation Plan for the 2009/10 Production Season

Crop	Proportion of actual to planned area (%)	Proportion of approved to produced amount (%)	Proportion of approved to actually collected (%)	Actual areas planted (ha)	Total amount collected (Qt)
Hybrid Maize	0.74	0.99	1.00	103.00	1,888.56
Composite Maize	1.00	0.95	1.00	30.00	2,791.56
Bread wheat	0.62	0.89	0.34	12,919.00	65,675.13
Food barley	0.46	1.00	0.04	583.00	220.67
Malt barley	0.66	0.96	0.07	765.07	1,321.44
Teff	0.97	0.83	0.37	3,123.08	10,852.62
Cereal average	0.74	0.94	0.47		
Haricot bean	0.13	0.57	0.24	80.50	106.75
Faba Bean	0.23	0.80	0.00	89.55	3.03
Field pea	0.11	0.66	0.05	40.74	15.04
Lentil	0.13	1.00	0.55	70.50	540.00
Chickpea	0.40	1.00	0.21	509.48	1,603.53
Pulse average	0.20	0.80	0.21		

Source: ESE 2010

Table 4. SSE Seed Production under the FBSM Scheme for the 2010 Production Season

Crop	Expected production (qtls)	Expected to be purchased (qtls)	Expected cleaned seed (qtls)	Number of varieties multiplied
Wheat	78,887	67,054	60,348	4
Teff	10,152	8,629	7,766	2
Barley	11,313	9,616	8,654	3
Haricot beans	2,400	2,040	1,836	2
Chickpea	500	425	383	2
Faba bean	1,875	1,594	1,466	2

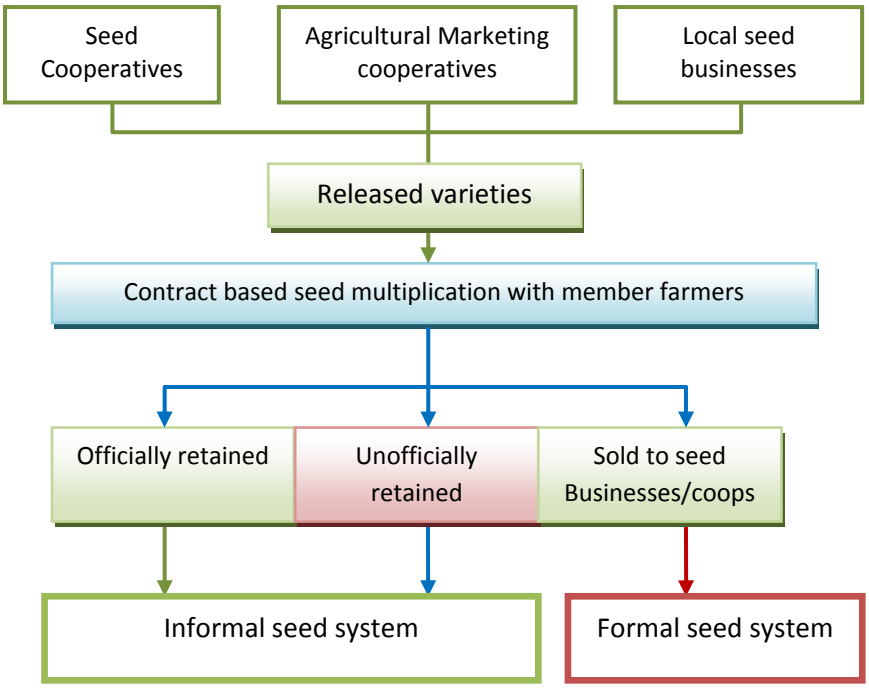
Source: SSE 2010

from farmers). As indicated in Table 3, the FBSM crop implementation plan experienced considerable variability in actual crop production, ranging from 46 percent for food barley to 100 percent for composite maize (among cereals) and from 11 percent for field peas to 40 percent for chickpeas (among pulses), demonstrating the difficultly of organising farmers in seed production. Whilst the proportion of quality seed that was approved from the total production is meeting with relative success, where on average 94 percent of the produced seed from cereals and about 80 percent from pulses was approved, the actual seed recovery rate is very low for most of the crops. This has serious implications for the current and future success of FBSM. In the 2009/10 production season, the ESE has recorded an average recovery rate of 47 percent for cereals and 21 percent for pulses. The major reason for the low recovery rates is linked with the limited price incentives that ESE contracts provide to participating farmers as compared to the prices offered to them in the black markets.

The low seed recovery rate has different implications for the actors functioning within the Public Seed Enterprise FBSM model. The ESE is negatively impacted, as low seed recovery rates reduce the amount of seed that can be marketed by the enterprise, decreasing the business's own profits. On the other hand, for farmers participating in the FBSM scheme retaining seed increases its local availability for their own use or for sale to local farmers. As such, low seed recovery for ESE means increased access to seed for farmers.

The FBSM scheme is also an important means of seed production for the South Seed Enterprise (SSE), which became operational in late 2009. SSE produces seed through two main approaches: (i) contract farming with commercial farms located in the region, focusing on hybrid maize; and (ii) through FBSM for OPV crops (wheat, teff and barley from cereals and haricot beans, chickpeas and faba beans from pulses), its sole producer of OPV varieties. As indicated in Table 4, the number of varieties considered for seed production under FBSM ranges from two (pulse crops and teff) to four (wheat).

Figure 5. The Business-oriented Seed Enterprise/Cooperative FBSM Model and its Links with the Formal and Informal Seed Systems



The overall challenges facing public seed enterprise-based FBSM model are as follows: (i) the dependence of farmers on rainfall patterns causing variability of production; (ii) the difficulty of having clustered farmers with similar soil characteristics; (iii) the dispersed nature of FBSM sites that create difficulty in supervision and quality control; (iv) the unwillingness of farmers to sell seed to the public seed enterprises once the seed is produced; (v) the limited ability of farmers to sell the seed to the enterprises as per the set schedule, which then considerably effects the enterprise logistics for seed purchase, seed pack assembly and use of seed cleaning facilities; (vi) the high demand for skilled labour for seed purchase, seed pack assembly and transport; (vii) the limited financial capacity of the enterprises to undertake timely planned purchases from farmers; and (vii) the limited facilities of the regional seed enterprises, especially seed cleaning facilities and storage warehouses, thereby increasing their overall cost of production.

3.4 Business-oriented Seed Enterprises and Cooperatives

In recent years, development partners have supported the growth of business-oriented seed enterprises and cooperatives, which include: (i) seed cooperatives; (ii) agricultural marketing cooperatives (that also involve the organisation of farmers for seed production); and (iii) local seed businesses that are linked both with FBSM and the formal seed sector. The links between the business-oriented FBSM model and the formal and informal seed systems are presented in Figure 5.

3.4.1 Seed Cooperatives: The Edget Seed Production and Marketing Union

The Edget Seed Production and Marketing (ESPM) Union is the first formal cooperative of its kind in Ethiopia. The union has 15 primary seed production and marketing cooperative members that operate in three Silte zone woredas (Silti, Lafro, and Sankura) and three woredas in Guraghe zone of the Southern Nations, Nationalities, and People's Region (SNNP) (Sodo, Marako and Meskana), with six and nine cooperatives, respectively. These 15 cooperatives established the union in 2009 for the purpose of facilitating their access to input services and seed marketing and production. The NGO SelfHelp Africa (SHA) also played a key role in supporting the establishment cooperatives' union. The main actors involved in promoting the cooperative-based seed production and marketing union is summarised in Table 5.

The ESPM cooperative Union is primarily involved in wheat seed production and marketing. In the 2009/10 production season a total of 9,323.75 quintals of seed for two wheat varieties (HAR 1685 and HAR 604) were produced and marketed. In general, the seed production and marketing activities of the ESPM Union are constrained by limited infrastructure due mainly to the lack of seed cleaning facilities, storage warehouses, and transport. The timely supervision of the seed production activities is also a common compromise due to the difficulty of logistics linked with budget and facility limitation. These constraints are largely associated with

Table 5. The Actors, Activities and Collaborators for Cooperative-based FBSM

Cooperative level	Main activities	Collaborators
ESPM Union	Creating links with research to access released varieties	SFA, *SARI and EIAR
	Organizing training for the leaders of primary cooperatives and for farmers	SFA
	Provision of transport and storage services to primary member cooperatives	
	Providing credit to member primary cooperatives	*Regional BoA, SNNP Rural Finance Fund
	Provision of basic seed and other inputs	
	Provision of cleaning and packing services	
	Promotion of the produced seed	SFA, Regional BoA
Primary Cooperatives	Organizing farmers	SFA
	Timely purchase and distribution of required inputs	ESPM Union
	Supervision of seed production as per recommendations	SFA
Research (SARI, *HU, EIAR)	Provision of source seeds along with required training	SFA
SelfHelp Africa	Support the provision of training	Regional BoA, SSE, HU, SARI

*Note: South Agricultural Research Institute (SARI), Hawassa University (HU), Regional Bureaus of Agriculture (BoA)

the low prices for wheat seed, and therefore a low level of profitability.

3.4.2 Farmers' Marketing Cooperatives

Farmers' marketing cooperative roles encompass: (i) improving the bargaining power of member farmers in grain marketing; (ii) procuring and providing inputs and services at lower costs; and (iii) promoting modern agricultural technologies along with members' education and training. However, in recent years, some farmers' marketing cooperatives have started actively engaging in seed production, whereby specific groups of farmers are organised to produce and distribute seed to member farmers. The seeds produced are mainly dependent on the availability of source seed and are first and second generation certified seeds (called C1 and C2) of self-pollinated crop varieties, mainly teff and wheat for cereals and haricot beans, lentils and chickpeas for pulses. The farmers' cooperative unions of the Yerer and Lume-Adama in East Shewa zone, and Etosa in Arsi zone of Oromiya region involvement in seed production of these crops describe their important role in supplying the seeds of locally adapted and preferred crop varieties. The discussions that took place with key informants from these zones revealed that the major challenges of their seed production and marketing endeavours include: (i) difficulty in accessing quality source seed; (ii) limited capacity in ensuring quality seed production and purchase from participating farmers; (iii) difficulty of clustering farmers; and (iii) unclear links with the formal seed system under the current central distribution system.

3.4.3 Local Seed Businesses

Local Seed Businesses (LSBs) are a recent Dutch-supported project that aims to accelerate the transition from farmer-, community- or cooperative-based seed production towards a formal commercial approach to seed production (Fitiwy and Abay 2010). The initiative is piloting and promoting farmer-led LSBs in four regions in Ethiopia, it also seeks to support them in becoming autonomous in their operations within the Ethiopian seed system. During their initial set-up stage, LSBs may operate within a community/local setting where commercialisation takes place at kebele or district levels. At these levels, the seed quality may be of an informal status or it may be quality-declared. However, as the status of the LSBs increases they may gradually commercialise seed beyond district levels and enter the formal system, producing certified or other forms of quality-declared seed. In essence, the project aims to strengthen both farmers' organisationally independent role and the commercial orientation of local seed production within the local seed systems.

In terms of the performance, 24 LSB sites were established in late 2009, and 12 more new sites were identified and supported by the project by mid 2010. Most of the LSB sites established in each region had previous experience in seed production and marketing, but had not been organised as independent business entities. Prior to LSB establishment many farmers' seed production groups or cooperatives are approached by the Bureau of Agriculture and Rural Development (BoARD) or seed enterprises or unions to produce seed on a contractual arrangement. Although identified as a means of entering seed business in the future, these contracts may not come regularly, and therefore may often be seen by farmers as simply an alternative livelihood activity. The major goal of the LSB project, therefore, is to formally organise these farmers groups and cooperatives into legal business units, referred to as Seed Producer Cooperatives (SPCs). Classified as SPCs, the legally-established businesses are able to be supported on technical seed production, cooperative management and business development. For most of the SPCs established in 2009, business plans were prepared with the participation of each cooperative and with the approval of the General Assembly. As they currently function, many SPCs market their seed to one main organisation, such as a regional seed enterprise, whilst in other cases the cooperatives sell directly to farmers.

One major challenge to the success of SPCs is their attitude of dependency on public services in areas of business that do not need support. In order for SPCs to become self-sustaining, long-term business plans need to be both understood and implemented. In principle, business experts at the woreda level are supposed to support the establishment and functioning of the cooperatives. In practice, however, the business orientation capacity of experts at woreda level is very poor. In response to this lack of capacity, experts point cooperatives towards the public service, thereby deepening SPC dependency. For example, although there is sufficient seed demand in cooperative areas, SPCs face difficulties in finding customers in cases where they must market seed themselves, which is due in part to their imbalanced dependency on support and in part to a lack of training in taking on new business roles. Thus, a two-fold capacity building initiative is needed: (i) intervention for business experts at the woreda level is vital if cooperatives are to operate as legitimate businesses; and (ii) capacity building for farmers involved in SPC businesses should be designed in such a way that they are enabled to assume the responsibility of their own seed marketing.

4. Conclusion

In addition to assessing the different forms of Farmer-based Seed Multiplication strategies and approaches, this paper has critically examined the priorities and interests of the actors involved in promoting them in different parts of Ethiopia. Moreover, the direct and indirect links that FBSM shares with the formal and informal seed system were also considered, with particular focus on the role of FBSM in providing improved crop variety seeds to Ethiopian farmers.

In summary, the drivers and actors promoting FBSM in the context of the national seed system are identified

as follows: (i) genetic resource conservation and seed security, supported in large part by the Institute of Biodiversity and Conservation (IBC), the Relief Society of Tigray (REST), Catholic Relief Services (CRS), and Ethio-Organic Seed Action (EOSA); (ii) the improved access and adoption of new crop varieties, mainly supported by the Ethiopian Institute of Agricultural Research (EIAR), Regional Agricultural Research Institutes (RARIs), and Agricultural Higher Learning Institutes (AHLIs); (iii) increased seed production and profitability predominately promoted by public seed enterprises; and (iv) promotion of local seed enterprises, encouraged by the Royal Netherlands Embassy.

In general, FBSM is playing an important role in the national seed system in a country where there is only a nascent private seed sector with limited capacity and reach. In terms of the formal seed system, FBSM groups are the main source of seed for public seed enterprises. All of the emerging regional seed enterprises base the production of seed for OPV crops on FBSM efforts, and similarly, a considerable amount of seed for ESE is produced by FBSM. For those FBSM models that are not linked with the formal seed system, there is no seed quality certification that takes place, excepting the measures taken by farmers themselves based on their own knowledge of quality. Those seeds that reach farmers through the informal system tend to be considered local varieties.

Although the FBSM strategy has great appeal in improving the availability of seed formally and informally, the sustainability of the strategy faces definite challenges, which can be summed up as follows: (i) the dependence on the support of the different organisations involved in FBSM work; (ii) the need for intensive capacity building of farmers, including specific areas of training and supervision, which makes the strategy costly; (iii) the difficulty in enforcing contracts associated with genuine and/or fabricated weather shocks due to price incentives; and (iv) limited capacity within the formal seed sector for seed quality assurance, along with the risk of inferior quality seed introduced by the informal seed system.

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5 Annex

Crop type	Year	Share of seed produced under FBSMS of the total certified seed produced by ESE					Total certified seed production			No of varieties under production	
		Plan		Actual			Actual				
		Area (ha)	Production (Qt)	Area (ha)	Total Produced (Qt)	Total Collected (Qt)	Total area (ha)	Total Produced (Qt)	Total Collected (Qt)	FBSM	Total
Hybrid Maize	2005/06	0.00	0.00	0.00	0.00	0.00	2,126.32	37,341.89	37,341.89	0	7
	2006/07	0.00	0.00	0.00	0.00	0.00	2,132.94	56,490.38	55,429.18	0	6
	2007/08	0.04	0.03	0.02	0.02	0.01	1,888.58	39,434.91	39,302.80	1	8
	2008/09	0.08	0.08	0.14	0.10	0.06	1,560.96	31,975.40	30,731.49	2	7
	2009/10	0.03	0.02	0.01	0.02	0.02	7270.22	76578.51	76568.51	2	8
Composite Maize	2005/06	0.00	0.00	0.00	0.00	0.00	469.24	9,554.04	9,554.04	0	4
	2006/07	0.00	0.00	0.00	0.00	0.00	560.27	8,965.00	8,965.00	0	4
	2007/08	0.00	0.00	0.00	0.00	0.00	561.55	8,776.70	8,776.70	0	2
	2008/09	0.15	0.38	0.15	0.44	0.23	264.96	2,914.44	2,130.14	1	5
	2009/10	0.08	0.13	0.09	0.39	0.36	347.47	2658.30	2511.30	1	3
Bread Wheat	2005/06	0.47	0.40	0.46	0.37	0.18	3,987.27	107,376.77	82,366.60	11	16
	2006/07	0.54	0.47	0.52	0.47	0.25	4,074.21	101,444.57	72,039.36	9	13
	2007/08	0.43	0.37	0.46	0.38	0.23	5,802.44	153,724.79	124,801.51	10	13
	2008/0	0.55	0.51	0.56	0.49	0.30	8,397.30	211,595.39	152,726.88	9	10

Crop type	Year	Share of seed produced under FBSMS of the total certified seed produced by ESE					Total certified seed production			No of varieties under production	
		Plan		Actual			Actual				
		Area (ha)	Production (Qt)	Area (ha)	Total Produced (Qt)	Total Collected (Qt)	Total area (ha)	Total Produced (Qt)	Total Collected (Qt)	FBSM	Total
	9										
	2009/10	0.54	0.51	0.42	0.47	0.21	19009.25	457657.67	308068.29	10	13
Durum Wheat	2005/06	0.03	0.02	0.03	0.03	0.02	146.40	3,231.98	3,213.62	2	5
	2006/07	0.09	0.07	0.04	0.03	0.00	44.61	1,229.10	1,189.00	4	6
	2007/08	0.20	0.15	0.00	0.00	0.00	49.42	1,143.92	1,143.92	4	6
	2008/09	0.00	0.00	0.00	0.00	0.00	17.70	470.00	470.00	0	1
	2009/10										
Wheat Both	2005/06	0.45	0.39	0.44	0.36	0.18	4,133.67	110,608.75	85,580.22	13	21
	2006/07	0.53	0.47	0.52	0.47	0.25	4,118.82	102,673.67	73,228.36	13	19
	2007/08	0.43	0.37	0.46	0.38	0.23	5,851.86	154,868.71	125,945.43	14	19
	2008/09	0.55	0.51	0.56	0.49	0.30	8,415.00	212,065.39	153,196.88	9	11
	2009/10	0.54	0.51	0.42	0.47	0.21	19009.25	457657.67	308068.29	10	13
Food barley	2005/06	0.74	0.66	0.69	0.60	0.18	221.42	4,383.40	2,176.64	3	3
	2006/07	0.54	0.46	0.37	0.34	0.10	232.43	4,709.01	3,450.72	3	3
	2007/08	0.44	0.41	0.28	0.26	0.03	195.72	3,041.60	2,319.60	3	3

Crop type	Year	Share of seed produced under FBSMS of the total certified seed produced by ESE					Total certified seed production			No of varieties under production	
		Plan		Actual			Actual				
		Area (ha)	Production (Qt)	Area (ha)	Total Produced (Qt)	Total Collected (Qt)	Total area (ha)	Total Produced (Qt)	Total Collected (Qt)	FBSM	Total
	2008/09	0.72	0.70	0.71	0.73	0.34	400.16	7,444.06	3,006.92	3	3
	2009/10	1.00	1.00	1.00	1.00	1.00	268.68	5461.00	220.67	4	4
Malt Barley	2005/06	0.38	0.40	0.37	0.53	0.32	332.59	6,138.80	4,268.28	2	4
	2006/07	0.33	0.41	0.37	0.48	0.20	419.66	8,073.05	5,257.86	1	4
	2007/08	0.54	0.63	0.49	0.58	0.34	430.80	8,358.15	5,311.44	2	2
	2008/09	0.38	0.41	0.41	0.43	0.28	331.90	7,102.60	5,686.44	1	2
	2009/10	0.45	0.45	0.42	0.63	0.13	1192.25	20655.57	8773.17	2	2
Barley both	2005/06	0.54	0.51	0.50	0.56	0.27	554.01	10,522.20	6,444.92	5	7
	2006/07	0.43	0.43	0.37	0.43	0.16	1,120.35	10,957.29	6,063.86	4	7
	2007/08	0.50	0.55	0.43	0.50	0.25	626.52	11,399.75	7,631.04	5	5
	2008/09	0.57	0.56	0.58	0.58	0.30	732.06	14,546.66	8,693.36	4	5
	2009/10	0.62	0.62	0.52	0.71	0.15	1460.93	26116.57	8993.84	6	6
Teff	2005/06	0.87	0.87	0.88	0.88	0.69	1,065.76	8,449.96	3,260.05	5	5
	2006/07	0.89	0.89	0.90	0.95	0.91	1,120.35	10,957.29	6,063.86	5	5
	2007/0	0.94	0.94	0.91	0.95	0.93	1,109.15	9,925.46	7,750.23	5	5

Crop type	Year	Share of seed produced under FBSMS of the total certified seed produced by ESE					Total certified seed production			No of varieties under production	
		Plan		Actual			Actual				
		Area (ha)	Production (Qt)	Area (ha)	Total Produced (Qt)	Total Collected (Qt)	Total area (ha)	Total Produced (Qt)	Total Collected (Qt)	FBSM	Total
	8										
	2008/09	0.92	0.92	0.91	0.93	0.86	1,885.70	17,960.51	9,301.88	6	6
	2009/10	0.90	0.90	0.95	0.96	0.87	3293.22	37223.20	12457.77	5	5
Sorghum	2005/06	0.89	0.89	0.81	0.76	0.00	62.00	722.80	172.80	1	3
	2006/07	0.77	0.80	0.48	0.55	0.19	31.05	541.96	297.73	1	5
	2007/08	0.71	0.71	0.00	0.00	0.00	40.25	852.65	852.65	1	5
	2008/09	0.49	0.45	0.49	0.43	0.43	102.25	2,210.16	2,210.16	1	5
	2009/10	0.44	0.30	0.44	0.00	0.00	136.45	1201.01	1201.01	1	3
Finger Millet	2005/06	0.00	0.00	0.00	0.00	0.00	2.00	26.47	26.47	0	2
	2006/07	0.00	0.00	0.00	0.00	0.00	17.00	317.44	317.44	0	2
	2007/08	0.70	0.65	0.00	0.00	0.00	17.31	251.25	251.25	2	2
	2008/09	0.00	0.00	0.00	0.00	0.00	19.00	393.00	393.00	0	2
	2009/10	0.00	0.00	0.00	0.00	0.00	42.38	703.20	703.20	0	2
Haricot Beans	2005/06	0.55	0.55	0.27	0.16	0.13	504.61	4,809.40	4,656.25	3	5
	2006/07	0.31	0.31	0.26	0.30	0.16	543.75	3,452.48	2,844.48	2	6

Crop type	Year	Share of seed produced under FBSMS of the total certified seed produced by ESE					Total certified seed production			No of varieties under production	
		Plan		Actual			Actual				
		Area (ha)	Production (Qt)	Area (ha)	Total Produced (Qt)	Total Collected (Qt)	Total area (ha)	Total Produced (Qt)	Total Collected (Qt)	FBSM	Total
	2007/08	0.15	0.12	0.18	0.25	0.24	534.49	4,525.55	4,468.55	1	5
	2008/09	0.18	0.16	0.13	0.11	0.02	595.01	4,786.68	4,369.18	1	3
	2009/10	0.61	0.55	0.19	0.43	0.09	430.19	1848.87	1156.82	2	3
Faba Bean	2005/06	0.56	0.62	0.20	0.29	0.03	381.08	2,703.00	1,965.05	3	4
	2006/07	0.39	0.42	0.22	0.24	0.07	452.12	5,695.58	4,660.22	3	4
	2007/08	0.40	0.39	0.22	0.17	0.16	42.75	424.50	365.64	4	4
	2008/09	0.40	0.41	0.34	0.27	0.14	515.50	6,225.24	5,331.30	3	4
	2009/10	0.39	0.36	0.13	0.27	0.00	707.49	4515.68	3293.21	3	4
Field Pea	2005/06	0.95	0.96	0.90	0.93	0.74	240.50	2,870.25	746.27	3	3
	2006/07	0.93	0.95	0.81	0.92	0.86	168.00	1,980.83	1,135.57	2	2
	2007/08	0.94	0.95	0.90	0.98	0.96	205.20	1,999.52	1,270.52	2	3
	2008/09	0.91	0.94	0.84	0.93	0.84	135.94	1,668.79	753.10	3	3
	2009/10	0.91	0.94	0.52	0.88	0.18	78.93	570.96	83.50	2	2
Lentil	2005/06	1.00	1.00	1.00	1.00	1.00	342.50	3,262.00	1,683.32	1	1
	2006/0	0.99	0.99	0.99	0.99	0.99	245.75	2,459.77	1,399.15	2	2

Crop type	Year	Share of seed produced under FBSMS of the total certified seed produced by ESE					Total certified seed production			No of varieties under production	
		Plan		Actual			Actual				
		Area (ha)	Production (Qt)	Area (ha)	Total Produced (Qt)	Total Collected (Qt)	Total area (ha)	Total Produced (Qt)	Total Collected (Qt)	FBSM	Total
	7										
	2007/08	0.99	0.99	0.99	0.99	0.99	245.75	2,459.77	1,399.15	2	2
	2008/09	1.00	1.00	1.00	1.00	1.00	183.00	2,442.75	1,509.54	1	1
	2009/10	1.00	1.00	1.00	1.00	1.00	70.50	987.00	540.00	1	1
Chickpea	2005/06	0.90	0.88	0.78	0.91	0.71	252.38	2,212.08	691.77	3	3
	2006/07	0.87	0.84	0.79	0.88	0.79	331.73	3,563.84	2,131.28	3	4
	2007/08	0.72	0.70	0.78	0.99	0.99	408.00	3,705.09	2,659.91	3	3
	2008/09	0.85	0.83	0.87	0.95	0.90	838.45	10,611.70	5,648.28	4	4
	2009/10	0.93	0.94	0.92	0.93	0.75	554.48	8016.22	2143.53	5	5
Linseed	2005/06	0.33	0.32	0.08	0.09	0.03	79.61	636.10	595.54	2	5
	2006/07	0.29	0.28	0.06	0.10	0.04	75.22	390.77	365.05	2	2
	2007/08	0.19	0.17	0.02	0.00	0.00	43.00	321.87	321.87	1	2
	2008/09	0.00	0.00	0.00	0.00	0.00	60.66	486.74	486.74	0	2
	2009/10	0.00	0.00	0.00	0.00	0.00	63.70	244.40	244.40	0	2

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