

The Political Economy of Ethiopian Cereal Seed Systems: State Control, Market Liberalisation and Decentralisation

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The Political Economy of Cereal Seed Systems in Africa

Preface

This *FAC Working Paper* is part of the first phase of a collaborative research project of the Science, Technology and Innovation (STI) Theme of the Future Agricultures Consortium (FAC). It was funded through a grant from the UK Department for International Development (DFID). The project explored the political economy of cereal seed systems across five distinct country contexts – Ethiopia, Kenya, Malawi, Ghana and Zimbabwe – during 2009-10. The evolution of seed research and development programmes and processes has varied greatly across these countries. In each case, a unique set of public and private actors and interests has been involved in defining priorities in seed policy and implementing projects, each seeking to influence those agendas to their advantage. Moreover, each country has a different reliance on 'modern' hybrid (or sometimes biotech) varieties and associated R&D and supply systems and an independent informal sector, involving networks of farmer experimenters and seed bulkers and suppliers, with varying degrees of capacity and .

As calls for a 'Uniquely African Green Revolution' gain momentum, the focus on seeds and seed systems is rising up the agricultural policy agenda. Much of the debate stresses the technological or market dimensions, with substantial investments being made in seed improvement and the development of both public and private sector delivery systems. But there is currently much less emphasis on the wider policy dimensions – and particularly the political economy of policymaking in these diverse agricultural contexts.

Experience tells us it is these factors that often make or break even the best designed and most well intentioned intervention. And since investment in seed improvement and supply was last emphasised as a major priority in agriculture (in the 1970s and 80s), contexts have changed dramatically. The collapse of national public sector breeding systems has been dramatic, and this has only partially been compensated for by the selective entry of the private sector. Large multinational seed and agricultural supply companies are increasingly dominating the global scene, and there are many claims made about the promises of new technologies (notably transgenics) transforming the seed sector through a technological revolution. While informal breeding and seed supply systems continue to exist, and indeed have been extensively supported through NGOs and other civil society groups, they are often under pressure, as drought, corruption and conflict take their toll and economic transformation and livelihood change continues apace, or they are ignored or excluded from policy circles.

The focus on *cereal* seed systems allowed this project to concentrate on a similar set of crops across the five study countries with a key influence on food security at household and national levels. Given the political reverberations of the 'food crisis' of 2007-08, this enabled timely analysis of the implications of the policy processes shaping the breeding, production, marketing and distribution of cereal seeds. As this *FAC Working Paper* shows,

whether grown for local subsistence or traded commercially, the significance of cereal crops to national politics (and therefore arguments about food security and sovereignty), commercial interests and local livelihoods is profound.

To gain clear insights into the policy actors, networks, interests and narratives at play, this project sought to test the hypothesis that contrasting politics and different configurations of interests will affect the way cereal seed systems operate and shape how a 'New Green Revolution' will ultimately play out. As such, the five country studies analysed their respective national seed policy processes by asking:

- How do seed policies get created, and by whom?
- How do ideas about what makes a 'good seed policy' change over time?
- How are boundaries drawn around seed problems and policy 'storylines' elaborated?
- Whose voices are taken into account in the seed policy process? And whose are excluded?
- What spaces exist for new ideas, actors and networks? How can these be opened up?

The underlying implication in all these cases is that politics matter and that by engaging critically with seed policy processes, we can begin to define and then deliberate among different framings and interests to shift the focus of the debate beyond the usual technical/market fix.

John Thompson and Ian Scoones, Project Co-ordinators (August 2010)

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Acronyms

ADLI	Agricultural Development Led Industrialisation
AGP	Agricultural Growth Program
AGRA	Agricultural Green Revolution in Africa
APARI	Afar Pastoral and Agro-pastoral Research Institute
ARARI	Amhara Regional Agricultural Research Institute
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASE	Amhara Seed Enterprise
BoARD	Bureau of Agriculture and Rural Development
BPR	Business Process Re-engineering
COMESA	Common Market for Eastern and Southern Africa
CSA	Central Statistical Agency
CSMP	Crash Seed Multiplication Program
CYMMT	International Maize and Wheat Improvement Center
EIAR	Ethiopian Institute of Agricultural Research
ESC	Ethiopian Seed Corporation
ESE	Ethiopia Seed Enterprise
ESGPA	Ethiopian Seed Growers and Processors' Association
FAO	Food and Agriculture Organisation of the UN
FBSPPMS	Farmers-Based Seed Production and Marketing Schemes
GARI	Gambella Agricultural Research Institute
GDP	Gross Domestic Product
GoE	Government of Ethiopia
HLIs	Higher Learning Institutes
IBC	Institute of Biodiversity Conservation
MoARD	Ministry of Agriculture and Rural Development
NAIA	National Agricultural Input Authority
NARS	National Agricultural Research System
NCIC	National Crop Improvement Committee
NFIA	National Fertiliser Industry Agency
NSIA	National Seed Industry Agency
NSMDC	National Seed Multiplication and Distribution Committee
NVRC	National Variety Release Committee
OARI	Oromiya Agricultural Research Institute
OPV	Open Pollinated Varieties
OSE	Oromiya Seed Enterprise
PASDEP	Plan for Accelerated and Sustainable Development to End Poverty
QDS	Quality Declared Seeds
RARIs	Regional Agricultural Research Institutes
SARI	South Agricultural Research Institute
SNNPR	Southern Nations, Nationalities, and People's Region
SoRARI	Somali Pastoral and Agro-pastoral Research Institute
SQIL	Seed Quality and Inspection Laboratories
TARI	Tigray Agricultural Research Institute
WFP	World Food Program

1. Abstract

This paper presents the political and economic processes governing Ethiopian cereal seed systems by analysing the overall policy context, as well as the main interests driving seed policy formulation and implementation and the roles and interaction of the different public and private actors. It also examines how these interests and interactions are related to the performance of the system on the ground. The nature of the Ethiopian agricultural sector, the historical evolution of the seed system and the seed specificities for each cereal crops has resulted in a wide range of actors with diverse linkages and policy processes. The analysis of these processes has identified a number of constraints faced by the Ethiopian cereal seed system. These constraints are a result of a economic and political drivers, including top-down state driven initiatives, agricultural liberalisation and the private sector and political-administrative decentralisation, all of which pull in different directions. While contrasting interests in federal and decentralised state level activities exist, ultimately it is the state-driven imperatives that define what private sector activity is possible. Centrally-directed, state-supported efforts, including numerous campaigns, special projects and programmes along with ad hoc crash programmes, create numerous blockages in the supply and distribution of seed. These 'pull-push' factors have brought about severe strains within the system. Thus, it is important that the technocrats, politicians, international donors and supporters understand these political economic drivers of change in the Ethiopian cereal seed system. By addressing these conflicts and contradictions, they may improve their chances of designing and implementing more technically effective and socially appropriate policies. This in turn will help establish a vibrant seed system which offers real choices for farmers in terms of seed type, quantity, and quality and delivery time at reasonable prices.

2. Introduction

This paper is concerned with understanding the political and economic processes governing Ethiopian cereal seed systems. It does this by analysing the overall policy context, along with the main interests driving seed policy formulation and implementation and the roles and interaction of the different public and private actors. It also examines how these interests and interactions are related to the performance of the system on the ground.

By focusing on three key political economic drivers of change within the seed system – state control, market liberalisation and decentralisation - the paper tries to answer: (i) How are seed related policies and implementation guidelines are created? (ii) How do ideas about what makes a 'good' policy and implementation guidelines evolve and change over time? (iii) Whose voices and views are taken into account in the policy processes? (iv) What are the key arguments for the choice of actions? (v) What spaces exist for new ideas, actors, and networks, and how can these be opened up? and finally, (vi) What urgent national/regional seed policy issues and processes need to be considered for creation of vibrant seed system in the country?

Along with the establishment of the formal agricultural research system in late 1950s, the formal seed system in Ethiopia started with public sector support mainly targeting the then state owned farms. Even following the era of market liberalisation in the early 1990s, the formal seed system is still dominated by the public sector even though different actors, including the private sector, with different incentives and motives are playing increasingly important roles. The decentralisation of the political system together with the intent of establishing a decentralised seed system, the existing policy support to and emergence of the private sector in the seed system, and the associated political will and efforts to fill the huge rift between demand and supply are the main issues that necessitate better understanding of the political economy of the Ethiopian seed system, in order to improve the design and implementation of interventions for further strengthening the still embryonic system and creating a vibrant seed sector in the country.

The seed sector is of paramount importance to Ethiopia, where the state pursues an Agricultural Development Led Industrialisation (ADLI) strategy, the agricultural sector plays a dominant role in the economy, representing about 45 percent of GDP and 85 percent of export earnings, and where the livelihoods of 85 percent of the population of 79 million people are based on agriculture. Therefore, one can associate the growth in the agricultural sector directly or indirectly with the overall performance of the wider economy of the country. The real GDP for Ethiopia has risen by 48 percent, in real terms since 2002/03 and this economic growth has been strongly associated with the good performance of the agricultural sector, particularly from 2004 (FAO and WFP 2008). Even though different sources give different reasons for this growth, area expansion along with the increasing trend in input use (mainly improved seeds, fertiliser and other agro-chemicals) are commonly cited contributing factors (FAO and WFP 2008; Tadesse 2008; Byerlee et al. 2007).

In recent years, there has been a growing recognition in some policy circles of the existence of agricultural technologies that can considerably improve productivity and the limited access of these technologies to farmers. In addition, there is a substantial improvement in the level of farmers' awareness about the use of those improved technologies. With considerable variability among the different crops, the total supply of improved seed in the country was only 27 percent of the officially estimated demand in 2005 (Byerlee et al. 2007; Alemu and Spielman 2006). The supply still is far below the increasing demand even though there are a many efforts under way aimed at increasing production and distribution by strengthening the public and private sectors and also promoting community-based seed systems.

Through analysis of the history and evolution of the Ethiopian agriculture sector, particularly the formal seed system, along with the specifics of the key cereal crops, the prevailing seed policies and politics, and the actors, decisions and their linkages, this paper identifies three political economic drivers that affect the way seed policy is played out in Ethiopia. These centre on: (i) the central role of the public sector in maintaining strategic control over the seed sector through top-down, state-led

initiatives and coordination; (ii) the policy consequences of economic liberalisation and the opening up of the seed sector to private actors; and (iii) the challenges and opportunities associated with decentralised political administration and efforts to establish a truly decentralised seed system. The analysis was based on the information generated from secondary data sources and from primary key informant interviews from a diverse group of actors in the system, including farmers, researchers, experts at Ethiopian Seed Enterprise (ESE) and regional seed enterprises, as well as the Ministry of Agriculture and Rural Development (MoARD) and the Bureau of Agriculture and Rural Development (BoARD).

The remainder of the paper is organised into seven major sections. In the first section, the nature of the Ethiopian agricultural sector and the current seed system is presented. The second section examines the specifics of the different cereal crops related with their respective seed system. Historical perspectives on policies and politics of the seed system in Ethiopia are presented in section three, while section four documents the structure, decisions and linkages of the seed system with a focus on interests and networks. Section five depicts the federal and regional cereal seed system structure, identifying the actors, decisions and linkages within. Finally, section six examines the political economic drivers in some detail, while the concluding section synthesises the overall political economy of the cereal seed system in the country and sets out some policy implications.

3. The nature of Ethiopian agriculture and seed systems

In the dominant subsistence and crop-livestock mixed farming system of Ethiopian agriculture, cereals play a dominant role. According to the Central Statistical Agency of Ethiopia CSA (2009) estimates, about 12 million smallholder farmers¹ are engaged in the production of cereal crops in the 2008/09 production season and cereals covered 78.23 percent (8.8 million hectares) of the total grain crop area. Among cereal crops, teff, maize, wheat and sorghum are important dominant (Table 1).

The informal seed system under Ethiopian context is defined as seed production and distribution along with the different actors where there is no legal certification in the process. This includes retained seed by farmers, farmer-to-farmer seed exchange, cooperative based seed multiplication and distribution, NGO based seed

multiplication and distribution etc. The formal seed system on the other hand is a system that involves the production and distribution of basic seed mainly by the research system or certified multipliers (like ESE, the regional seed Enterprises and also recently licensed private seed companies like ANO and Agri-Ceft Ethiopia) and the production and distribution of certified seed along with all actors involved in the production, marketing and regulation.

Overall, the dominant portion of seeds used is local seeds from the informal sector. During the 2008 main meher growing season, it is estimated that at least 95 percent of all seeds used were local seeds carried over from the previous harvest either by the farmers themselves (through the traditional on-farm selection process whereby the farmer identifies next year's seed stock while it is still maturing in the field and gives it special protection) or by buying from preferred seed stock kept by other farmers in the same locality (FAO and WFP 2009). The average contribution of the formal seed sector as a percentage of land covered by seeds from the formal sector is 4.31 percent with considerable variability among different crops in 2008 production season (NSPDC 2009). In the same year, about 5.24 percent for cereals, 0.71 percent for pulses, 0.54 percent for oilseed crops was covered with improved seed. Among the major cereals, 18.98 percent of the maize area, 6.37 percent of the wheat area and 0.85 percent of teff areas was covered with seed from the formal sectors (ibid). Even though, the formal sector is a small component of the seed systems it plays an important role in disseminating improved varieties of different crops along with increased productivity. Much of the politics around cereal system seeds revolves around the formal seed sector, as it is assumed to be the sector which will narrow the gap in productivity levels between the current (~12 quintals/ha for cereals) and the potential productivity levels (~30 quintals/ha for cereals). As the informal sector does not have as much political attention, this paper will focus on the formal sector.

4. The importance of the different cereal crops and seed system

The formal seed system in Ethiopia is dominated by few cereal crops mainly due to the perceived productivity gains, availability of improved varieties, and commercial interests of the different actors. The discussion below gives the importance of the individual cereal crops in

Table 1. Importance of cereals in terms of area and production (2008/09 production season)

Crop	Area		Production	
	ha in million	% of grain land	Qt in million	% of grain production
Teff	2.5	22.13	30.28	17.69
Maize	1.8	15.77	39.32	22.97
Wheat	1.5	12.97	25.37	14.83
Sorghum	1.6	14.41	28.04	16.38
Total Cereals	8.8	78.23	144.96	84.69

Source: CSA (2009)

terms of the trends in area allocated and productivity based on the Central Statistical Agency (CSA) of Ethiopia. Data and the detailed figures for each of these cereal crops is summarised in Annex Table 1. This section also provides details the seed related specificity of the different crops.

4.1. Maize

Under Ethiopian context, seed politics is dominated by maize, specifically hybrid maize. Policy-makers consider maize as a crop where huge productivity gains can be obtained to boost domestic production. Also, due to the fact that it cannot be recycled, there is huge demand by farmers, and all public and private seed companies are engaged in its multiplication creating competition among these actors. The seed for OPV maize is produced by the Ethiopian Seed Enterprise (ESE) only in limited volume whereas the seed for hybrid maize is produced by both the public and private sector.

The demand for hybrid maize under Ethiopian agricultural production system is very variable due to the agro-ecological diversity with considerable dependence on weather conditions. It is at the start of the production season that the farmers decide what type of crop variety seed they would like to use even though, the revealed demand may have been something else. If the rains come a bit late they usually shift to early maturing varieties, which may not be available as the seed for such type of varieties may not be multiplied. Thus, they will opt for local low yielding varieties even though there are better yielding early maturing varieties in the hands of the NARS (Alemu et al. 2008). For instance, during the 2008/09 production season, when the demand for hybrid maize was covered by less than 30 percent, there was certified hybrid maize seed leftover mainly in the Rift Valley area

Overall, the area allocated and the productivity level of maize has been increasing since 1994. The area allocated in 1994 was about one million ha, which has increased to about 1.8 million ha of land in 2008. Similarly, the average national productivity of maize has increased from about 15 qt/ha in 1994 to about 22 qt/ha in 2008/09 mainly due to the strong public push of improved seed and fertilizer (CSA 1994; 2009). Policy makers believe this average can be increased to 80 quintals/ha if improved hybrid varieties along with the recommended agronomic practices are applied. In the major maize producing areas (East and West Wollega and East and West Gojjam), the average productivity levels under farmers' condition ranges from 60 to 90 quintals/ha due to better use of hybrid maize varieties and associated inputs (MoARD 2009).

4.2. Wheat

Wheat is another key staple crop in Ethiopia, as well as a source of input for the expanding food industry in the country. The improved varieties have the required qualities for bread and pasta making, which is expected to boost their marketability. Even though, there is no data on the proportion of wheat area allocated for durum and bread wheat, the demand for the two is increasing in a similar manner due to the expansion of bread flour and pasta making factories in the country.

The seed of the improved varieties for both bread and durum wheat is produced by the ESE and also recently by the regional seed enterprises. Farmers normally practice recycling of wheat seed ranging from 3 to 5 years.

As a result of its potential marketability wheat production has expanded from about 0.8 million ha in 1994 to about 1.5 million ha in 2008. Similarly, the average national yield has increased consistently from about 13 quintals/ha in 1994 to about 17 quintals/ha in 2008 (CSA 1994 - 2009). The improved varieties can give up to 60 quintals/ha under farmers' fields with appropriate agronomic practices (MoARD 2008a).

4.3. Teff

Teff (*Eragrostis tef*) is a significant crop in Ethiopia where its production exceeds that of most other cereals. The word teff comes from the Amharic language meaning 'lost', a reference to the fact that the grains are so small that dropped grains will be impossible to find. The fine grains grow on long, delicate stems of an annual grass in the lovegrass group, the genus *Eragrostis*. The grains of teff are in fact so small that enough seeds to sow an entire field can easily be held in the hand or in a small bag, making teff an extremely portable crop.

Teff can be grown across a range of agroecological regions, from intermediate to lowland areas. Due to teff's unique quality in making gluten-free bread and the increasing demand in the international market, increased productivity has become a priority.

The seed of teff is generally multiplied by research centres and Ethiopian Seed Enterprise. In addition, it is multiplied by cooperative unions and their respective member primary cooperatives in addition to farmers' tradition multiplication and farmer-to-farmer exchange. As in the case of wheat, the seed of the improved varieties for teff is produced by the ESE and more recently by the regional seed enterprises as well. Farmers normally practice recycling of teff seed for more than 3 years.

The area allocated for teff has increased from 1.8 million ha in 1994 to about 2.5 million ha in 2008. The national average yield has also increased from 7 quintals/ha to about 12 quintals/ha during the same period (CSA 1994 - 2009). The use of improved teff varieties along with the agronomic recommendation is believed to increase its productivity from the national average yield of about 12 quintals/ha to 20 quintals/ha (CSA 2009; MoARD 2008a).

4.4. Barley

Both the food and malt barley are produced in the country. Recently, the demand for malt barley is increasing considerably due to the expansion of brewery factories in the country, replacing the food barley. An example of the private sector financing research is observed with malt barley, where the Assela Malt Factory has started funding the research and extension programme of the national barley research programme at Kulumsa Research Centre. The seed of improved malt barley are distributed by ESE and regional seed enterprises. In addition, the national barely research programme is extensively promoting the varieties by linking farmers with the Malt factory through cooperatives.

Even though, the increase in the area allocated is not high (about 1 million ha in 2008), the average national yield increase is considerable: from about 10 quintals/ha in 1994 to about 16 quintals/ha in 2008 (CSA 1994, 2009).

4.5. Sorghum

The unique characteristic of sorghum is that it is commonly grown in drought prone and food insecure areas like Wello, Hararghe, and Somali areas. This implies the important role of sorghum seed system in addressing the food security issues in drought prone areas.

Sorghum seed multiplication is very limited and farmers dominantly use their local varieties. However, due to the serious impact of both biotic and abiotic stresses, including water stress and striga problem on the production and productivity of the crop, the demand for recently released tolerant varieties is increasing considerably.

The seed of improved sorghum varieties are mainly produced by ESE in limited amount. Project based sorghum seed production and dissemination is also undertaken by NARS mainly for drought and striga tolerant varieties. The recently released hybrid sorghum varieties are not yet multiplied by any seed producers. However, if the demand for them is created, both the public and private seed companies are expected to be involved in their seed production.

The area allocated for sorghum has increased from about 0.9 million ha in 1994 to about 1.6 million ha in 2008. Similarly, the average yield has increased from about 13 quintals/ha in 1994 to about 17 quintals/ha in 2008 (CSA 1994 - 2009).

4.6. Millet

Millet is a traditional crop dominantly produced using local varieties. It is mainly characterized for its drought tolerance and the ability to store for long period of time due to its resistance to storage pests. The seed of improved millet varieties is not multiplied by the formal sector but it is promoted by NARS. The total area allocated for millet has doubled from about 0.2 million ha in 1994 to about 0.4 million ha in 2008. However, the national average productivity, which is about 30 quintals /ha, has not changed over the last decade (CSA 1994 - 2009).]

4.7. Rice

Rice is a recent introduction to Ethiopia with huge potential. A recent National Rice R&D Strategy estimates the potential to be about 1.3 million ha (0.8 million for rain-fed and 0.5 million for irrigated rice). Based on CSA estimates, the rice area has increased from 8,365 ha in 2000 to 35,088 ha in 2008 with a average yield increase from about 18 quintals/ha to 20 quintal/ha, respectively (CSA 1994-2009; 2009). However, the existing varieties with the recommended practice can give more than 60 quintals / ha under farmers' condition.

The rice seed was under multiplication by ESE and also regional seed enterprises in 2009 production season. Similarly, farmers-based rice seed multiplication is promoted by SG 2000 and JICA Ethiopia. Considering the declaration of rice by the government as the 'Millennium' crop, its seed system will get due emphasis

along with the implementation of the just crafted National Rice Research and Development Strategy (MoARD 2010).

4.8. The strategic importance of cereal seeds

The Ethiopian agriculture sector is central to the country's economy, and all cereals are of strategic importance. Given the challenges of feeding a growing population and the need to boost revenues from the agricultural sector, it is no surprise that the government sees increasing production as a major priority. This means seeds and politics are intimately intertwined.

As the next section shows, this has long been the case, but in the last decades this has taken on a new character. Since the late 1980s, and particularly following the establishment of the new Ethiopian People's Revolutionary Democratic Front (EPRDF) led government in 1991, there have been attempts to liberalise the economy, including the agriculture sector. This period has also coincided with a major decentralisation process, with regions having autonomy in a range of areas including agricultural and food policy. However, this dual process of economic liberalisation and political-administrative decentralisation process has highlighted some of the major tensions in policy making in Ethiopia. In particular this has been between state control and centralised direction and private entrepreneurship and decentralised approaches.

In the following sections therefore the paper will explore the historical evolution of policies, as well as their current institutional configurations and political economic significance.

5. The Ethiopian cereal seed system: policies and politics

5.1. History and evolution of the Ethiopian seed sector

The historical evolution of the formal seed system has a direct impact in the design and implementation of seed policies, in terms of institutional setup, type of actors and way of regulation and enforcement. At the early stage, the Ethiopian seed system, dominated by selected cereal crops, was run by the then higher learning institutes, namely Ambo Agricultural School in the late 1930s, Jimma Agricultural Technical School in 1942, and Alemaya College of Agriculture (now Haramaya University) in 1954. With the growing understanding of having formal agricultural research system, the then Institute of Agricultural Research now Ethiopian Institute of Agricultural Research (EIAR), joined the system in 1966. During this phase, the production and distribution of seed was not coordinated (Zewdie et al. 2008).

During the Derg regime (1975-1987), the need for nationally coordinated seed production and distribution was realised especially to fulfil the seed demand of the expanding state farms and emerging Agricultural Producers' Cooperatives, which lead to the establishment of the National Crop Improvement Committee (NCIC) in 1976. The NCIC then setup the National Seed Council (NSC) to formulate recommendations for the production and supply of released variety seeds, which led to the establishment of the Ethiopian Seed Corporation (ESC)

in 1979 (now called Ethiopian Seed Enterprise) and institutionalized seed production, processing, distribution and quality control of improved varieties of cereals, legumes and oilseed crops. In addition, the NCIC had handled the responsibility of variety release and registry until the establishment of the National Variety Release Committee (NVRC) in 1982 (Belay 2002). The NVRC is still functional and performs the coordination and the evaluation of variety verification trials and suggestion for release approval but the approval and registration is the responsibility of the Animal and Plant Health Regulatory Directorate of the Ministry of Agriculture and Rural Development (MoARD).

The current Government of Ethiopia has also realised the importance of further strengthening the seed system and established a National Seed Industry Agency (NSIA) in 1993 along with a National Fertiliser Industry Agency (NFIA) with the support of International Development Association (IDA) and International Fund for Agricultural Development (IFAD) Seed System Development Project. For creation of institutional synergy, the NSIA and NFIA were merged in 2003 and established the National Agricultural Input Authority (NAIA), which was functional only for about one year (Alemu et al. 2008). In 2004, the NAIA was integrated to the Agricultural Input Quality Control and Inspection Department and the Agricultural Input Market Department of the Ministry of Agriculture and Rural Development (MoARD), which has continued after the institutional transformation in early 2006 (after the Business Process Re-engineering-BPR) even though the names has changed namely, Animal and Plant Health Regulatory Directorate and Agricultural Marketing Directorate of MoARD (MoARD 2008c).

Today, the Ethiopian seed sector is governed by policies stipulated in the different public proclamations and regulations that were put in place since the early 1990s. These are Proclamation No. 56/1993 passed for the establishment of NSIA, the Seed Regulation No. 16/1997, which was amended in 2000 by Proclamation No. 206/2000, the Plant Protection Decree (No. 56/1971), the Plant Quarantine Regulation (No. 4/1992), the Plant Breeders' Rights Proclamation (No. 481/2006), and Access to Genetic Resources and Community Knowledge and Community Rights Proclamation (No. 482/2006). The national seed proclamation no 206/2000 is very specific to the seed sector as it stipulates (i) the creation of a legal framework for the interests of all actors in the system, (ii) designating government agencies which support, advise and control individuals or organisations engaged in the production and marketing of seed, and (iii) supporting the use of quality seed through a smooth, effective and quick supply system (Bishaw et al. 2008)

In addition, proclamations and regulations put in place to govern other public organisations involved in the national formal seed system are also part of the national seed policies. These include Regulation No.154/1993 passed to establish and frame the role and responsibility Ethiopian Seed Enterprise (ESE), Proclamation No.79/1997 passed to establish the former Ethiopian agricultural research organisation (EARO), now EIAR, Proclamation No.120/1998 passed to establish and frame the role and responsibility of the Institute of Biodiversity Conservation (IBC), and Proclamation No. 380/2004 passed to authorise

MoARD to supervise all government and non-government organs dealing with seed production, distribution and regulation (ibid).

The main responsibility of implementing these policies is given to MoARD at the federal level and to Bureau of Agriculture and Rural Development BoARD at regional level. Overall, the main targets of the policies are related with: (i) streamlining evaluation, release, registration and maintenance of varieties developed by the National Agricultural Research System (NARS); (ii) developing an effective seed production and supply system through participation of public and private actors; (iii) encouraging the participation of farmers in germplasm conservation and seed production; (iv) creating functional and efficient institutional linkages among seed industry development players; and (v) regulating seed quality, seed import-export trade, quarantine and other seed related issues.

While the formal seed system has all the elements – production, distribution, regulation (FDRE 2000; 2006), there remains a critical shortage of quality seed in Ethiopia. Supply nowhere matches overall potential demand and despite numerous programmes, led by donors and government alike, the uptake of improved seed in the Ethiopian agricultural sector remains very low. This inevitably constrains agricultural productivity and the opportunities for technology-led intensification which is central to the government's policy thrust.

In the last two years, a new effort has been initiated by the government, led by the Minister of the MoARD, with the knowledge of the Prime Minister's office. This is the Crash Seed Multiplication Programme (CSMP) (MoARD 2009). The CSMP was designed with the main objective of alleviating the serious supply shortage of improved seeds as compared to demand mainly for hybrid maize. It started in 2008/09 production season through mobilisation of all relevant public sector institutions including MoARD, EIAR, ESE, and state farms in multiplication of hybrid maize varieties starting from breeder, pre-basic, basic, and certified seed, targeting the production of 730,000 quintals of certified hybrid maize seed for the 2010 production season (MoARD 2009). The programme is run by a National Seed Multiplication and Distribution Committee (NSMDC) composed of three members from three institutions i.e. from the Ethiopian Institute of Agricultural Research (EIAR), Ethiopian Seed Enterprise (ESE) and Agricultural Marketing Directorate of MoARD. The overall programme is overseen by the Board of ESE, the State Minister for Agricultural Marketing sector and by the Minister of MoARD.

Hybrid maize was selected due to the huge rift between demand and supply and the realised huge productivity gain if farmers use the seed. It is assumed that if half of maize producers achieve the productivity level achieved under farmers' condition using hybrid seed and recommended practices, the commercial imports of grain could be covered by domestic production.

The specific measures undertaken in the CSMP are (i) assigning Bako Agricultural Research Centre, the national centre of excellence for maize research, to focus on the production of breeder and pre-basic seed, (ii) strengthening the capacity of relevant research centres to

produce breeder, pre-basic and basic seed, twice per year using irrigation (iii) bringing on board state farms in basic seed and certified seed multiplication during off-season and main season. Accordingly, from the planned nearly 20,000 ha of land, about 10,000 ha was prepared for planting and about 37 percent of the prepared land i.e. 6,525.23 ha was under hybrid maize seed multiplication using irrigation. This is expected to increase the supply of certified hybrid seed by threefold for the 2009/10 planting season (MoARD 2008a).

5.2. Recent efforts to build a vibrant seed sector

As the previous section shows, the broad policy framework for the support of a vibrant seed sector in Ethiopia has been established, but it has so far failed to deliver on the scale required. A centrally-directed initiative led by the federal government has attempted to deal with the major shortage of seed in the country, but there are other more structural issues to be addressed as well.

The seed policy process is also being influenced by the donors and development partners who are interested in strengthening the national seed system through different programmes. These include PASS, the Program for Africa's Seed System of the Alliance for a Green Revolution in Africa (AGRA), an initiative of the Bill & Melinda Gates and Rockefeller Foundations, and AGP, the Agricultural Growth Program of the World Bank (World Bank 2009), specifically targeting the Ethiopian seed system through technical support and investment. Some of these development partners are focusing on the issue of seed security in rain-fed agricultural systems associated with unreliable rainfall, an area which has had limited attention from the public sector.

Seed policy issues at the regional level are also being addressed which will have a direct bearing on Ethiopia's seed sector. For example, ASARECA, the Association for Strengthening Agricultural Research in Eastern and Central Africa, which represents the National Agricultural Research Systems, together with the Common Market for Eastern and Southern Africa (COMESA), which promotes regional trade and investment, is fostering the harmonisation of seed policies in the region. As a member of these regional organisations, Ethiopia has started reviewing the way its seed policy will be harmonised with those of neighbouring countries. A national committee for harmonisation composed of researchers from EIAR is participating in the regional debates and discussions and there is a strong belief that the Ethiopian Seed Growers and Processors Association (ESGPA) should take the lead in pushing the harmonisation together with the East African Seed Traders' Association (EASTA).

The following sections look at each element of Ethiopia's seed system – from breeding and variety release, source seed multiplication, certified seed production and distribution to pricing. They examine how the system works in practice, who is involved, what networks of actors are formed with what interests, where the bottlenecks are and what the policy challenges might be if the broader vision of realising a Green Revolution for Ethiopia is to be achieved.

6. The cereal seed system structure, decisions and linkages

The type and number of actors in the formal seed system in general, and cereal seed system in particular, have been changing along with the institutional and policy changes in the system. At present, the formal seed sector comprises the National Agricultural Research System (NARS), seed producers, seed distributors and regulators. The role of the different actors in the seed system is summarised in Table 2.

6.1. Actors, decisions, and linkages in crop breeding, breeder and pre-basic seed multiplication

Under the Ethiopian context, the crop breeding, multiplication of breeder and pre-basic seed are the responsibility of the public agricultural research, which has been decentralised since 1997 along with the decentralised political system into federal and regional research institutes. Therefore, the agricultural research agenda setting in general and crop breeding in particular also follows a decentralised decision making at a federal and regional level (Figure 1).

At the federal level, the Ethiopian Institute of Agricultural Research (EIAR) is responsible for running crop breeding programmes that have relevance to more than one region along with the national coordination of research to avoid redundancy of efforts. EIAR is accountable to the federal Ministry of Agriculture and Rural Development (MoARD). The research agenda setting and funding comes from the federal government. Even the limited externally funded research projects have to go through formal approval of the Ministry of Finance and Economic Development (MoFED). EIAR requests each year for funding the federal government through MoFED, which goes through the long process of approval through the Prime Minister's office and federal parliament.

Following EIAR's institutionalisation under the MoARD in 2008, research priorities have started to be discussed by the Federal Agricultural and Rural Development Partners' Linkage Advisory Council (FARDPLAC) which is composed of relevant governmental, non-governmental and also private stakeholders involved in the sector. FARDPLAC meets twice a year regularly, sets priorities and also assigns responsibilities to the different stakeholders for the issues that emerge each time. The council serves as a platform, where major constraints are raised and brought to the awareness of stakeholders especially policy makers.

Similarly, the Regional Agricultural Research Institutes (RARIs) and Agricultural Higher Learning Institutes (AHLIs) follow the same procedure of research agenda setting and funding. At present there are seven RARIs, namely, Tigray Agricultural Research Institute (TARI), Amhara Regional Agricultural Research Institute (ARARI), Oromiya Agricultural Research Institute (OARI), South Agricultural Research Institute (SARI), Afar Pastoral and Agro-pastoral Research Institute (APARI), Somali Pastoral and Agro-pastoral Research Institute (SoRARI), and Gambella Agricultural Research Institute (GARI). The AHLIs, which are currently engaged in Agricultural

Table 2. Major actors in the seed system and their role

Components of the seed system	Institutions	Regulatory bodies	Regulatory measures
Plant breeding	EIAR, RARIs, and HLIs	MoARD	Targets in terms of crop, improvement targets
Variety release	NVRC	MoARD	Distinctiveness, uniformity and stability, uniqueness, value for cultivation
Breeder seed production	EIAR, RARIs, and HLIs	Variety Maintaining Research Centre	Seed quality control
Pre-basic seed production	EIAR, RARIs, HLIs and ESE, OSE, ASE		Seed quality control
Basic seed production	ESE	MoARD	Seed quality control
Basic seed distribution and sale	MoARD		Fair distribution among regions
Certified seed production	ESE, OSE, Private seed companies	MoARD	Seed quality control
Farmers based seed production	ESE, BoARDs, NGOs and farmers	BoARDs	Seed quality control
Seed distribution and sales	ESE, OSE, ASE, Co-operatives, BoARDs	BoARDs	Price, quantity to respective buyers
Overall sight on the seed system	National Seed Production and Distribution Committee	MoARD / EIAR	Planned production Fair distribution of different classes of seed

Source: adapted from Bishaw et al. (2008)

Research, are Haramaya, Mekelle, Hawasa, and Jimma Universities. This implies the possibility of having region-specific crop breeding and breeder seed multiplication programs.

The continuous public funding of the research in Ethiopia makes it unique as compared to other African countries, which are often dependent on foreign funding. However, the regional government funding for most of the regional research institutes seems limited as most of these institutes still suffer from lack of skilled manpower and necessary facilities. The same is true with the agricultural HLIs except the well established universities (Haramaya, Hawassa, Jimma and Mekelle). Therefore, much of the burden especially in the multiplication of pre-basic and basic seeds lies on EIAR and the three strong regional research institutes (OARI, ARARI and SARI).

Overall, the national crop breeding programmes seems well funded by the public sector and there is a good trend in decentralisation of the research system along with a number of good crop varieties released. However the system still remains weak, mainly due to (i) the limited overall coordination for effective utilisation of research resources both human and physical among the different actors of the National Research System (EIAR, RARIs, and AHLIs), and (ii) the limited agro-ecological coverage of the breeding programme due to the huge agro-ecological diversity in the country (there are 18 major agro-ecological zones relevant for agricultural production (IFPRI and CSA 2006).

6.2. Actors, roles and linkages in cereal variety development, release, maintenance, and promotion

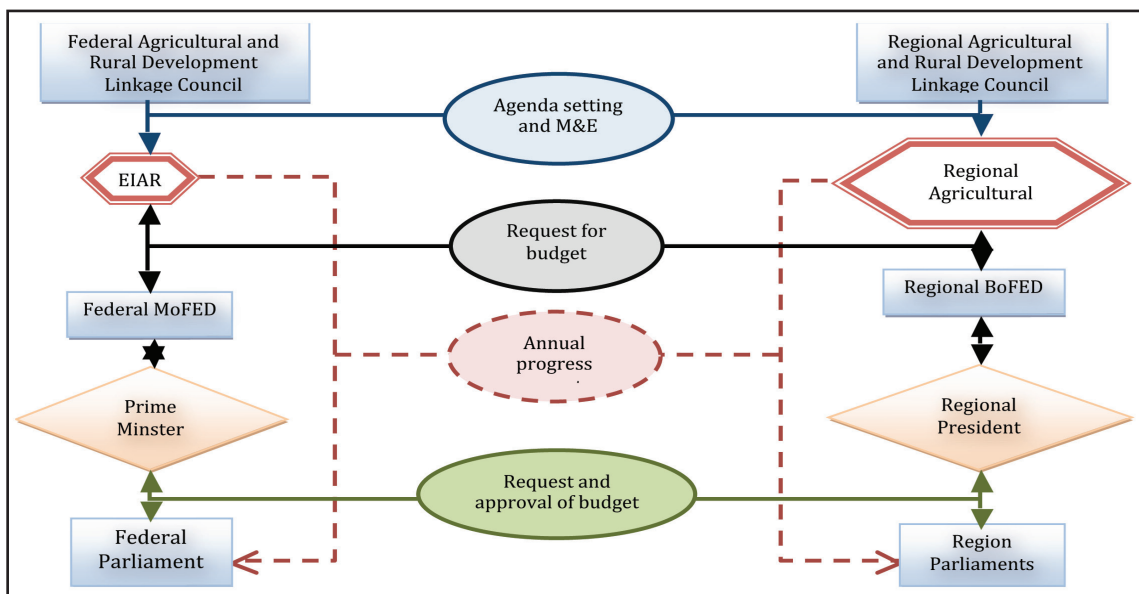
6.2.1. Adaptation and generation of new cereal crop varieties

The agricultural research system has been engaged in adaptation and generation of different improved varieties for most of the cereal crops. Since the start of formal crop improvement programme in early 1950s, there has been strong exchange of cereal germplasm especially through a close collaboration with International Agricultural Research Institutes (CGIAR centres). For example, the Ethiopian wheat and maize improvement programme has been collaborating with the International Maize and Wheat Improvement Center (CIMMYT), which has resulted in release of considerable number of varieties. Direct linkages with National Research Organisations like KARI have also helped the germplasm exchange. The emphasis given in the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) for importation and adaptation of technologies is in line with the long ago started effort in the crop improvement programmes (MoFED 2006).

6.2.2. Verification and evaluation of candidate variety and release approval

The release of candidate varieties has a formal procedure. Generally, the researcher(s) or importing seed company applies for evaluation of candidate variety either for national or regional release along with a report on the agronomic performance to the standing National Variety Release Committee (NVRC) of the Animal and Plant Health Regulatory Directorate (APHRD) of MoARD. The

Figure 1. Actors, decisions, and linkages in crop breeding, breeder and pre-basic seed multiplication



NVRC committee members are senior researchers nominated from relevant research institutes mainly from EIAR, RARIs and AHLIs. The NVRC nominates an ad hoc technical committee by drawing members from different institutions to report on variety performance after examining the data and field visits. The report covers performance data evaluation, field performance evaluation and recommendations for the NVRC. The NVRC may release a variety not only on superior yield, but important characters such as grain colour, early maturity, etc. compared to existing commercial varieties. Upon the release of the new variety breeders will provide small quantity of seed to the chairman of the NVRC, who will forward it to the Institute of Biodiversity Conservation (IBC) for the long-term storage.

The release of a variety could be national or regional and the approval and registration is at national level by the NVRC. This resulted in multiple requests for release at both national and regional level, especially after the decentralisation of the research system. Some regional researchers were requesting for regional release using germplasm under national variety trails from which a variety for national release is expected. In order to avoid such problem, the NVRC used to request the approval of the national commodity leader.

Even though the country has the institutional and policy framework for variety release and register, there are limitations and challenges in the system which can result in the release and use of poor performing varieties. There is limited capacity for verifying the authenticity of imported certified seeds to the one that is released. Technical committees also vary in skill and experience, resulting in inconsistency in the evaluation of different candidate varieties. In line with this, Belay (2008) confirms that the evaluation and release mechanism is not very strict, which may result in the release of poor performing varieties.

Such an occurrence has been indicated by the recent row among farmers in West Gojjam, the Amhara BoARD, and a private seed company on the poor performance of an imported hybrid maize variety from South Africa, which was officially released. The farmers are demanding

official compensation for the poor performance of their maize field in 2009 production season since the use of the variety was through the recommendation of the BoARD.

6.2.3. Maintenance, demonstration and popularisation of released varieties

Once the variety is released the research centre where the variety was generated takes the responsibility of maintaining the breeder and pre-basic seed. Demonstration and popularisation activities are performed in selected target areas for creation of awareness among farmers and also development partners for wider promotion of the released variety.

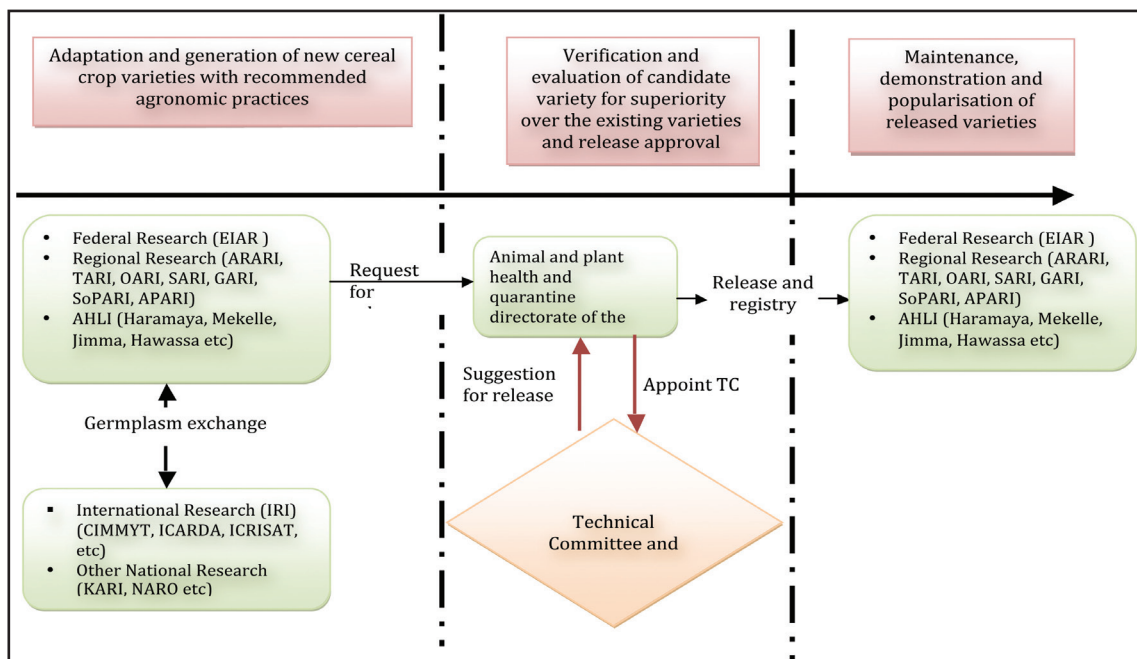
One of the major factors for the limited uptake of released varieties is reported to be the limited demonstration and popularisation of the varieties to relevant stakeholders including farmers and extension workers. Demonstration and popularisation activities are meant to strengthen the interface between research and development (formal extension) within the agricultural sector. In general, these activities use to concentrate around research centres, where the varieties are generated. However, recently started initiatives for the pre-scaling up of agricultural technologies by EIAR and RARIs are targeted to demonstrate and popularize improved varieties to less reached areas of the country. There is a need for these initiatives to formalised and promoted for better popularisation and adoption of the currently available improved crop varieties.

6.3. Actors, decisions, and linkages in basic seed production and distribution

The list of actors and their role in the production and distribution of basic seed is presented in Figure 3. Basic seed for cereals are produced by respective research centres of EIAR and RARIs, the ESE, OSE and ASE, and licensed private seed companies.

Of the different cereal crops, the shortage of basic seed for hybrid maize has been dominating the debate about the seed issue in the country. Bako Agricultural Research centre of OARI was the only producer of basic

Figure 2. Actors, roles and linkages in cereal variety development, release, maintenance, and promotion



seed for hybrid maize that were developed by the National Research System and the pre-basic seed was supplied by National Maize Project at Bako of EIAR. However, starting from the 2008/09 production season, Adet Agricultural Research centre of the Amhara Regional Agricultural Research Institute (ARARI) and Hawassa Agricultural Research Centre of the Southern Agricultural Research Institute (SARI) from the public sector and Agri-Ceft Ethiopia and ANO PLC from the private sector are licensed for basic seed production of most of the popular public hybrid maize varieties. Of course, Pioneer Hi-bred Ethiopia, which is a multinational seed company, has its own hybrid maize varieties that are evaluated and released through the formal procedure in Ethiopia.

The procedure to get a license for the production of basic seed for hybrid maize includes: (i) completing an application to the Agricultural Marketing Directorate (AMD) of the MoARD, (ii) evaluation of the application by a team of experts from APHRD of MoARD in terms of the suitability of the farmland for multiplication of the parental lines and the human capacity, (iii) approval letter by the AMD of MoARD, and (iv) agreement with EIAR.

The suggested allocation of the produced basic seed among the different regions is one issue that has been decided at the state ministerial level of the Agricultural Marketing Sector of MoARD each year. The Board of Directors of ESE has an important role in suggesting the distribution of the produced basic seed among regions. Of course, the distribution to regional level is only made after deducting the amount required by ESE. The different regions then distribute the allocated basic seed to different programmes and actors including the private seed companies.

The distribution of basic seeds produced in 2008/9 production season has been mainly targeted for the public seed production due to the Crash Seed Multiplication Program-(CSMP) and the 'scaling-up activities' planned by the public sector for the 2009/10 production season. This has limited the participation of most of the private seed companies in hybrid seed production.

Even though, the licensing of additional actors from both private and public sector for the multiplication of parental line is appreciable in boosting competitive supply of certified hybrid maize seed, the priority given to the CSMP in basic seed allocation seems to crowd out of the private seed companies from the involvement in certified hybrid maize seed production eroding the thrust between the private and public sectors.

6.4. Actors, decisions, and linkages in certified seed production and distribution

The interaction of the different actors in the production and multiplication of certified seed is depicted in Figure 4. For simplicity, the seed producers, quality control and certification, and the distribution among and within regions are discussed below.

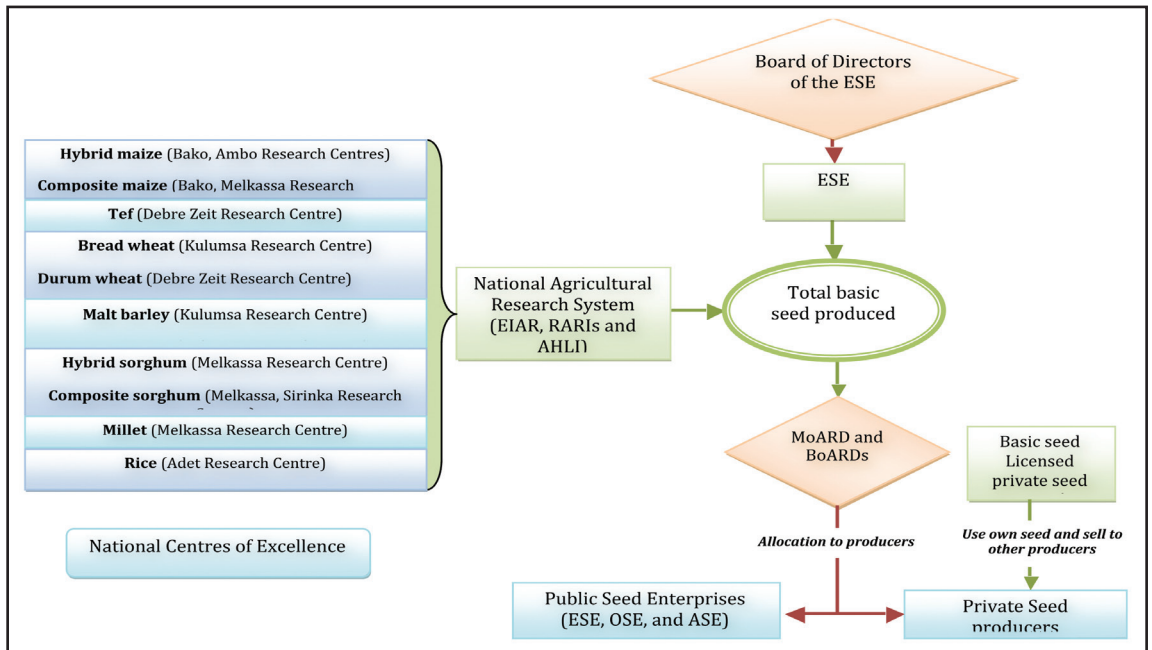
6.4.1. Seed Producers

Seed producers are both public and private. The public seed production is dominated by Ethiopian Seed Enterprise (ESE) and since 2008 regional seed enterprises (RSEs) have come into the picture, at present there are two RSEs, Oromiya Seed Enterprise (OSE) and Amhara Seed Enterprise (ASE). There are about 30 licensed private seed companies mainly involved in the production of hybrid maize seed.

The role of cooperatives in seed multiplication is increasing from time to time. They are already engaged in seed production, cleaning and trading of Quality Declared Seeds² (QDS) of OPV varieties with technical support from woreda BoARD.³ However, the supply of basic seed of adapted improved crop varieties is in shortage for such program.

The ESE produces certified seed through contract arrangement on state and private commercial farms, on farmers' fields along with the production on own farms. Similar approach is followed by the newly established regional seed enterprises. It is expected that the emergence of regional seed enterprises will promote the

Figure 3. Actors, decisions, and linkages in basic seed production and distribution



production of seed for crops that are not so far produced through the formal system.

An additional alternative in increasing the seed production capacity, the public seed enterprises are promoting farmers-based seed production and marketing schemes and considerable achievements have been made. For instance, the Amhara Seed Enterprise (ASE) has promoted Farmers' Based Seed Multiplication Scheme (FBSMS) immediately after its establishment in early 2009 with a focus on potential areas for seed multiplication and clustering approach. The focus on potential areas helps in reducing the cost of production and also helps to get quality seed. The clustering helps to ease the management and supervision of the seed production process. In general, it is estimated that about 70 percent of the supply of certified seed in the region was from FBSMS in 2009 production season.

The arrangement of the FBSMS is that the basic seed is supplied by Seed Enterprises i.e. by ESE and/or regional seed enterprise and required training is given to participating farmers along with area selection and clustering. Then, the seed enterprises purchase the seed by adding premium prices (market price plus 15 percent). The major challenges in the FBSMS are the limited capacity of the seed enterprise both ESE and regional SE to purchase timely from farmers, limited capacity of facilities like harvesting and threshing, cleaning and grading facilities, and storage. Wheat, malt barley, teff and rice are the main cereals where FBSM is promoted.

6.4.2. Quality control and certification

The public seed enterprises (ESE, OSE, and ASE) have their own internal seed quality assurance system and thereby their own certification. However, the private seed companies need to have the two evaluations/verifications by respective regional Seed Quality Inspection Laboratory (SQIL), which are assigned by MoARD or BoARD. The first evaluation is made immediately after emergence and the second during detasseling. The issues considered during these evaluations/verifications are:

(i) source of basic seed; (ii) required isolation of fields; (iii) crop emergence and vigour; and (iv) detasseling. Even though, the SQILs are important in certifying the quality of seed produced, their human and physical capacity is very limited. There is considerable complaint by private seed companies for difficulty of having the SQIL to visit respective farms timely.

The SQILs are accountable to the Animal and Plant Health Regulatory Directorate (APHRD) of the particular regional BoARD in that area where there are such departments and directly to the BoARD. For instance, in Amhara region, there are four Seed Quality and Inspection Laboratories (SQIL) with respective mandate area. These are Gonder, Dur Bete, Dessie, and Debre Markos SQIL. These laboratories are under the supervision of the APHRD of the Amhara BoARD.

Based on the evaluation report from the respective SQILs, the Agricultural Marketing Department of respective regions issues a Seed Quality Result Certification with a code number of the produced seed. The seed producer is then mandated to put a seed tag in every bag (Tag A outside the bag and Tag B inside the bag) as indicators of certification. The Seed Reference number on the tags and quality certificate should be the same.

6.4.3. Distribution of certified seed

Distribution among regions: Due to the shortage of supply of certified seed, the allocation of the produced certified seed among the different regions is normally made by the policy makers. The most important criteria used for the allocation are the regional importance in the national production of the crop, the size of the revealed demand, and also regional equity. So far the allocation of certified seed produced by both public and private companies among the different regions is the responsibility of the Agricultural Marketing Sector of MoARD.

The distribution of seed among regions is highly related with the size of cropped areas in the different regions, although some variability does exist. Table 3

Figure 4. Actors, decisions, and linkages in certified seed production and distribution

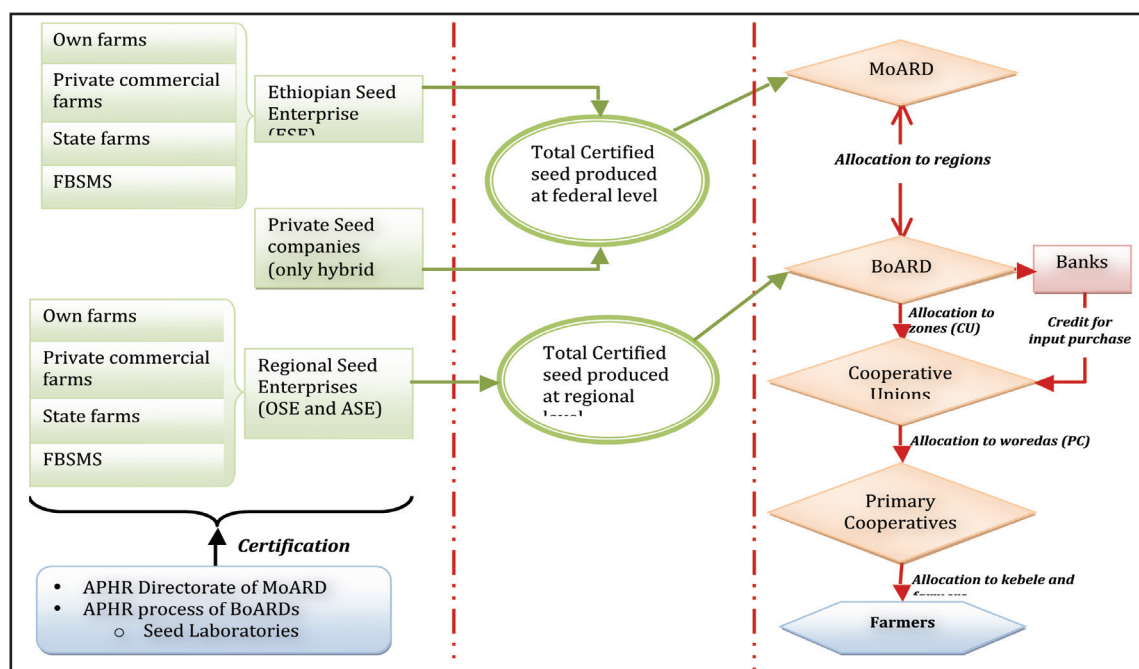


Table 3. Regional distribution of 2007/08 produced seed and cropped area

Regions	Crop area (2007/08 production season)		Cereal area (2007/08 production season)		Produced Seed distribution(2007/08 production season)	
	ha	%	Ha	%	quintals	%
Ethiopia	11,210,501.00	100.00	8,770,118.00	100.00	257,075.00	100.00
Oromiya	5,073,271.00	45.25	4,064,069.00	46.34	118,488	46.09
Amhara	3,973,611.00	35.45	2,959,084.00	33.74	56,678	22.05
SNNP	964,379.20	8.60	785,304.40	8.95	31,449	12.23
Tigray	885,835.10	7.90	707,376.40	8.07	28,047	10.91
Afar	17,423.26	0.16	16,714.64	0.19	42	0.02
Harari	10,166.34	0.09	8,021.33	0.09	50	0.02
Addis Ababa					128	0.05
Somali	75,142.24	0.67	72,451.94	0.83	777	0.30
Dire Dawa	7,908.71	0.07	7,406.07	0.08	170	0.07
Benishangul Gumuz	192,422.46	1.72	139,633.03	1.59	47	0.02
Gambella	10,342.12	0.09	10,057.29	0.11		
Crop seed types not request from regions					21,521	8.37

Source: CSA (2008) and MoARD (2008b)

summarises the proportion of seed distributed among regions as well as the proportion of cropped areas and areas allocated for cereals. For instance, Oromiya's share from the total cropped areas is about 45 percent and from area allocated for cereals is about 46 percent, which is similar to its total seed received. On the other hand, Amhara, Somali and Benishangul-Gumuz seem to get lower proportion and Tigray and SNNP receive a higher proportion as compared to their share in the total cropped area and area allocated for cereals. This can be partly explained by the variability of farmers' demand for seed across the different regions, which is reflected in the regional demands presented each year to MoARD.

Distribution within regions: The distribution of allocated certified seed to the different regions is undertaken

through farmers' cooperative unions and their respective member primary cooperatives. Each cooperative union is informed about the amount of certified seed allocated by the regional BoARD by source, i.e. the amount allocated from the different seed companies including the private companies. Similarly, the seed companies are informed to which cooperative union they should submit the produced certified seed. Each union and primary cooperative is attached to a respective zone and *woreda* as their mandate area of service provision. Therefore, the unions work closely with zonal BoARD and the primary cooperatives with *woreda* BoARD and *kebele* administration.⁴

The primary cooperatives distribute seeds to farmers. While seeds in ample supply are given to any interested

farmers, seeds that are in shortage, such as hybrid maize, are allocated to select farmers. The selection of farmers who will get the seed is made by the development agents in close consultation with the *kebele* administration.

The distribution of certified seed used to be undertaken through credit along with fertiliser as a package. In recent years, however, the distribution is totally through cash payment. The shift in the mode of distribution was generally due to the considerable amount of defaults by farmers, which was putting considerable number of primary cooperatives in financial crises.

With all its advantages, this type of planned distribution system seems to hinder the different seed companies to invest in distribution channels and retail outlets, which could contribute in improving the efficiency of the system. The main advantage of this system to seed companies is that the whole marketing risks are transferred from the seed companies to the distributors (cooperatives), whereas the disadvantages are related with the limitation of seed companies to benefit more from branding and quality premium.

6.4.4. Actors and process of price setting of certified seed

Figure 5 presents the interaction of different actors in the process of price setting for certified seed. The core decision on seed prices is made by the board of directors of Ethiopian Seed Enterprise (ESE), which is composed of the Director General of EIAR as chair, two ESE representatives, Director of Agricultural Extension, Director of the Agricultural Marketing, and Director of the Planning and M&E Directorates of MoARD as members. The set price is then communicated to the Agricultural Marketing Directorate (AMD) of MoARD. The AMD gives a direction on the price setting mechanism and communicates along with the amount appropriated and purchase price to regional agricultural marketing department of the respective regions.

The private seed companies are asked for their offer price and the price is set through negotiation with regional BoARD. The different cooperative unions purchase the certified seeds at these different prices from both public and private seed companies. The highest price is normally offered by private seed companies that have their own parental lines (those who produce their own basic seed). The 2009 prices ranged from 988.55 for ESE to 1936 ETB/quintal for Pioneer Hi Bred hybrid maize.

The prices of cereal seeds are similar whether they are sourced from public or private seed company except the difference due to overhead, transportation and profit margins of the different unions and primary cooperatives. The profit margins are determined by the AMD of BoARD within the respective regions and varying slightly across regions. For instance, the profit margin for cooperative unions in Amhara is about 5 ETB/quintal, whereas it is 2.50 ETB/quintal in Oromiya. Similarly, the profit margin for primary cooperatives is 6.00 ETB/quintal in Amhara and it ranges from 2.50 to 3.00 ETB/quintal in Oromiya. In general, the selling price of hybrid maize was within the range of 1100 – 1300 ETB/quintal.

The current price setting mechanism has both advantages and disadvantages. The advantages are (i) it limits the entrance of excess intermediaries in the market,

which helps farmers to get seed at reasonably better prices, (ii) it enables farmers with limited access to markets (those in distant areas with poor road) to purchase seed equitably, and (iii) it promotes group marketing especially through membership in cooperatives. The disadvantages are: (i) it transfers the cost incurred due to the inefficiency of union and primary cooperatives to farmers, (ii) it limits the competitions among the different seed producers, (iii) it creates disincentive for seed producers to work and invest on their own distribution systems, and (iv) it is liable to corruption and promotes black market for seed.

In the 2009 production season, the price of hybrid maize in the black market was more than 5000 birr/quintals, which gave the different maize seed market actors and others outside of the seed system an incentive to join the black market and not comply with their respective contracts. Thus, the price setting mechanism seems to shift the economic benefit created due to the rift between demand and supply from those who are in the seed system to other actors outside the system, limiting the possibility of increased investment by the actors in the system.

6.4.5. Actors, decisions and linkages in a partial-liberalised cereal seed system

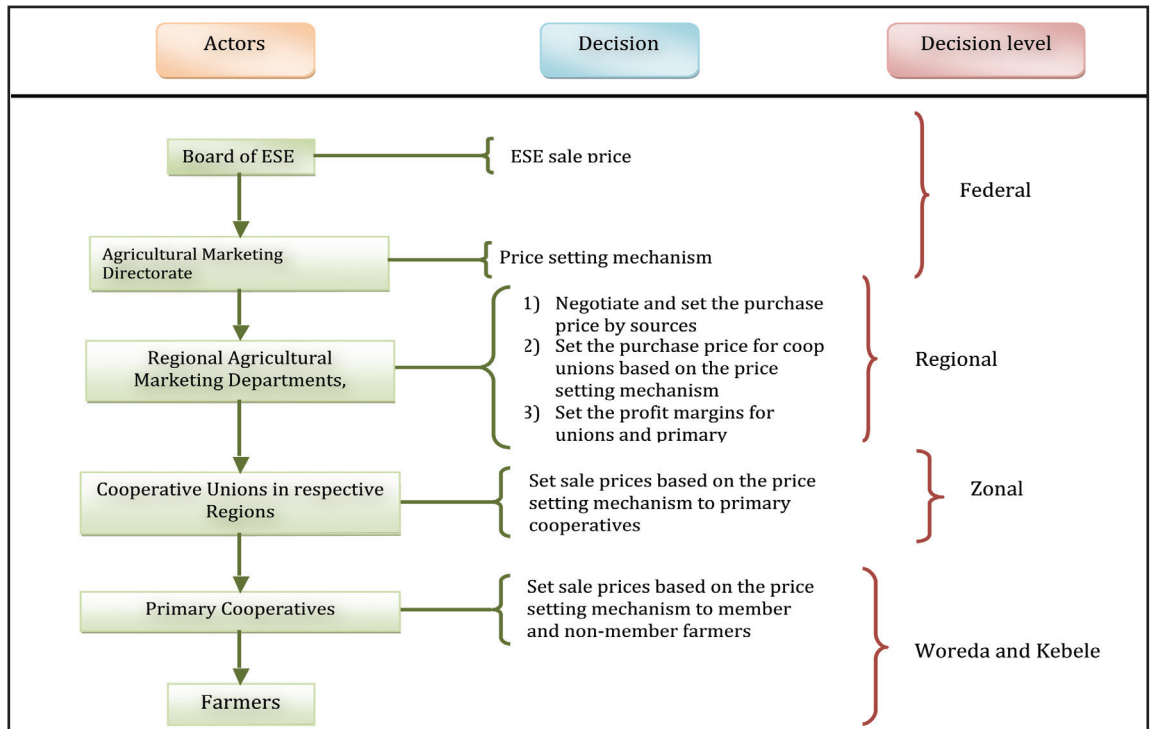
There has been much discussion about the liberalisation and reform in the agricultural sector. Consequentially, the government of Ethiopia has been implementing a series of policies mainly seeking to generate: (i) a more supportive macroeconomic framework; (ii) liberalised markets for agricultural products; and (iii) a strong extension- and credit-led push for intensification of food staples production through the use of modern inputs, especially seed and fertiliser (Byerlee et al. 2007; Jayne et al. 2002), as there has been limited progress to liberalise the input sector. As a nationally strategic sector, maintenance of control over production and food security is seen as an important priority.

The multitude of notionally private organisations are strongly influenced by the state through direct involvement and broader regulation. This has forced the private sector in the seed system to operate marginally, which has resulted in limited private investment, unavailability of retail networks, and above all limited option for the farmers to access demanded seed at the required time and volume. Liberalisation is thus partial, yet at the same time centralised state control is not complete.

Partial liberalisation is particularly the case because of the decentralisation of state functions, and the more flexible and heterogeneous arrangements found in the regions. For instance, some regions, like Amhara, have distributed the basic seed of hybrid maize allocated for the region to some of the private seed companies, which was not the case in other regions. Thus there is a wide range of interpretations of federal level regulations in the regions, and a range of activities that are not always formally sanctioned. Here policy in practice means a much more varied response, with a variety of innovations, usually from private sector players operating at the margins.

This uneven liberalisation as mediated through the particular form of Ethiopian political-administrative

Figure 5. Actors and their role in seed price setting



decentralisation and intent of creating a decentralised seed system has a number of consequences. This results in some severe bottlenecks and constraints in the seed system. These include:

- the weak overall coordination of the different actors of the national research system (EIAR, RARIs, and AHLIs) for effective utilisation of both human and physical research resources
- limited uptake of released varieties, partially a result of the limited demonstration and popularisation of the varieties to relevant stakeholders including farmers and extension workers
- the lack of coordination and synchronisation mechanisms for activities among ESE, OSE and ASE implies the need for strong national coordination and synchronisation of seed production and marketing activities for efficiency and creation of synergy and avoidance of the expected unnecessary competition of among these actors for the same resource like facilities, human resources, and markets.
- the priority given to the Crash Seed Multiplication Program (CSMP) in basic seed allocation seems to crowd out the private seed companies from the involvement in certified hybrid maize seed production eroding the trust between the private and public sectors and long term investment in the systems
- the planned distribution system seems to hinder the different seed companies to invest in distribution channels and retail outlets, which could contribute in improving the efficiency of the system
- the seed pricing mechanism, which is not based on supply and demand seems to be the real economic incentive to actors not involved in the seed system, thus draining the resources that can be invested back in the system.

7. The economic and political drivers of the Ethiopian cereal seed system

The analysis of actors, linkages and policies presented above has identified a number of constraints faced by the Ethiopian cereal seed system. These are the result of a number of core economic and political drivers. Three drivers pull in different directions: these are top-down state driven initiatives; agricultural liberalisation and the private sector and political-administrative decentralisation.

7.1. Driver 1: Top-down, state-driven initiatives

With agricultural production and food security so high up on the political agenda, at present, perhaps the main driver in the seed systems of the country is related to the political decisions to increase and sustain the agricultural growth that has been achieved in the last five years, where the sector has been growing more than 10 percent annually. The result has been a series of top-down initiatives coming from federal level and supported at the highest political levels. These highlight the importance of technical and institutional change – and the central role of improved seeds in this. A major effort has revolved around ‘Agricultural Technology Scaling up’ as part of the national initiative of ‘scaling up of best practices’, which includes wider dissemination of already available agricultural technologies (mainly improved crop varieties and fertiliser) and continuous packaging and validation of technologies; promoting the involvement of the private sector, and working together with donors and development partners.

Along with the scaling up of best practices policy, there is a strong commitment that such activities should have political leadership. Thus, starting from the 2008/09

production season, top policy makers at all levels (federal, regional, zonal, woreda and kebele) are given as their number one responsibility in promoting the scaling up of best practices in the agricultural sectors the priority to ensure that improved technologies (in particular, seeds and fertiliser) reach farmers. This form of 'command agriculture', linked to centrally-defined targets, is embedded in the evaluation criteria for government officials, and in turn linked to budget allocations and performance assessments. With such strong political backing this becomes perhaps the number one driver of the seed system. Directed by and through the central state, it reinforces state control over the agricultural system, and acts to pull into line regional differences and diversity in a centrally managed planning system.

7.2. Driver 2: The private sector

As discussed above the Ethiopian government has long had a commitment to boosting the role of the private sector in agriculture (FDRE 2006). Along with the public strategy in promoting private sector, different incentives are provided to support the private seed companies either through the overall investment incentives and/or seed sector specific support. These incentives are related with better access to land, duty-free import of capital goods, grace periods of up to five years on land rents, and tax holidays (MoTI 2007). In addition, the government is supporting the organisation of the private seed companies to better voice their interests. Now, the Ethiopian Seed Growers and Processors' Association is functional. Though still weak, the association is improving the engagement of emerging private seed companies in the system.

While the private sector is growing it remains poorly integrated into the national seed production and distributions system and focuses only on particular seeds, i.e. hybrid maize in some regions. Under the current setup, all private seed companies, except the multinational private seed company, are dependent on the public supply of source seed (basic seed) and also have to align to the public distribution system. Even the currently licensed private seed companies who own parental lines for the popular hybrid maize varieties appear to remain aligned to the public distribution channels and pricing mechanism. This has created a disincentive for the private seed companies to invest in distribution channels and market outlets. This discouragement also seems the core reason for lack of seed shops and retail outlets in Ethiopia which are often found in other East African countries.

The only multinational seed company operating in Ethiopia is Pioneer Hi Bred Ethiopia, which has its own source seed and some distribution network. The major issue preventing increased participation of multinationals in the Ethiopian seed system is the financial regulation that limits the repatriation of foreign currency out of the country. This legislation has created a disincentive for most of multinationals interested to become involved in the country's seed system.

In terms of the overall narratives of policy, the role of the private sector and the importance of liberalisation attract much attention, even though the actual influence the private sector has in seed policy circles in Ethiopia remains weak. The emerging private seed companies

are constrained by publicly-dictated source seed supply, limited business opportunity in participating in OPV seed production due to low demand, and semi-liberalised seed markets. Thus in practice, despite much profile, the private sector driver remains weak and fragmented, and state interests – particularly those which are centrally directed with a strong political push – continue to dominate the formal seed sector.

7.3. Driver 3: The decentralised political-administrative system

Constitutionally, Ethiopia has a strong commitment to a decentralised political-administrative system. This means the agricultural and rural development efforts are decentralised to the respective regional states under the general national policy framework. As indicated above, along with the decentralisation of the political system, the seed system in the country is also becoming decentralised following the emergence of Regional Agricultural Research Institutes (RARIs) in late 1990s and Regional Seed Enterprises (RSEs) in early 2009, where the role of ESE as a sole public seed enterprise is ceasing. Two regional Seed Enterprises, namely the Oromiya Seed Enterprise (OSE) and Amhara Seed Enterprise (ASE) were established by their respective regional governments in December 2009. SNNPR also established the South Seed Enterprise in early 2010, and is currently in the preparatory phase. There only appears to be political will to have three Regional Seed Enterprises i.e. in Oromiya (OSE), Amhara (ASE), and in SNNPR (SSE) because of the scale seed production in those areas.

The experience so far shows that the decentralisation of the seed system has both opportunities and challenges on the national seed system. The opportunities are related to: (i) better research coverage the different agro-ecologies; (ii) improved possibility of expanding the production and marketing of seed for all crops; (iii) improving the human and physical capacity at regional level, (iv) improving the possibility of producing locally demanded crop varieties, and (v) the possibility of marketing at relatively lower cost due to reduced cost of transportation. The challenges are related to: (i) the need for strong national coordination of agricultural research and development, seed production and marketing activities for better efficiency and creation of institutional synergies; (ii) avoiding unnecessary competition among the three regional seed enterprises for the same resources, such as facilities, human resources and markets; and (iii) if the regional seed enterprises are to serve only their respective regions, the role of ESE will need to be redefined as a national seed enterprise.

Similarly, as stated in section 5, the country has a decentralised national agricultural research system (NARS) involving EIAR, RARIs and AHLIs. Even though the decentralisation will boost the capacity of the NARS in covering Ethiopia's diverse agro-ecology, the system requires alignment and coordination among the different actors for efficient utilisation of the meagre human and physical resources the country possesses. Although, the proclamations for the establishment of EIAR and RARIs set out their respective mandates and an agreement on the coordination modalities by establishing National Agricultural Coordination Council with a secretariat and

were established in April 2010, the precise roles and responsibilities of federal and regional research are still being debated.

8. The political economy of cereal seed systems in Ethiopia

The constraints of designing effective, centrally determined, special purpose programmes in developing countries are legendary. Depending on the circumstances, however, either centralised or decentralised approaches for reaching the poor can be adopted. The experiences in China with effective local programmes and Mexico with central government programs, both demonstrate successes even though considerable challenges and difficulties continue in both cases (Ahmad 2009).

Over many years, Ethiopia's agricultural policy framework has been dominated by a top-down, centrally designed, state-directed approach. This has been continuous from the Imperial regime, through the Derg, and to the current political setting. Whether the integrated rural development programmes of the 1960s, the package programmes of the 1970s, the villagisation efforts of the 1980s or the input supply programmes led by Sasakawa Global 2000 of the 1990s, all have seen a central role for the state in directing rural development, organising delivery and supplying technology. This remains the case today, with added challenges due to the decentralisation of the political and economic decision processes, and especially since 2001/02 when the government's decentralisation process was carried further to the woreda (district) level (Spielman et al. 2009).

The recent Crash Seed Multiplication Programme (CSMP) is among the prime examples of such centrally-directed efforts, which, in the context of the current setting, reveals tensions that can affect the way such programmes unfold in practice. While such politically-directed centralised initiatives are informed by technical expertise, such technical designs are sometimes overshadowed by political imperatives, creating tensions between the technocracy and the political system.

Since 2008, centralised approaches like CSMP have also come into tension with the decentralised political-administrative system and the decentralised seed system. While highly controlled in many ways (centrally set targets, central appropriation of source seeds etc), there remains room for manoeuvre within the regional system, with bureaus of agriculture and local regional politicians having some important areas of autonomy (like setting regional targets, independent planning for established regional seed enterprises, etc). Thus, parallel efforts may emerge with federal and regional state level initiatives running side by side.

Finally, tensions exist between the state and the emergent private sector. While there has been much policy rhetoric about the benefits of liberalisation in Ethiopia (UNCTD 2002), the state retains a strong hold over market actors, either through market disincentives (e.g. price setting) or limiting certain operations (e.g. distribution). Again, the argument of the strategic importance of food and agriculture and the perceived weak presence of the

private sector is deployed to argue for strong state control, even in notionally privatised operations.

On the other front, the donors' support through like PASS, the Program for Africa's Seed System of the Alliance for a Green Revolution in Africa (AGRA), an initiative of the Bill & Melinda Gates and Rockefeller Foundations, AGP, the Agricultural Growth Program of the World Bank and the East and Central Africa initiative to harmonize the respective seed policies are also playing important role in the process creating vibrant seed system in the country.

In the last two decades a strong central political leadership committed to growth through agricultural productivity has pushed a certain line which argues for a green revolution generated by state initiative, supported, in carefully controlled ways, by a partially liberalised private sector. This includes the development of high-yielding varieties of cereal grains, expansion of irrigation infrastructure, and distribution of hybrid seeds, synthetic fertilisers and pesticides to farmers. It is argued that this public-private arrangement is the most effective way of stimulating a green revolution, and ensuring broad-based agriculture led growth (MoFED 2006).

But there are limits to this very particular vision of an 'Ethiopian Green Revolution'. For example, in recent years following a number of major state-led efforts that have mobilised researchers, civil servants and regional officials across the country⁵, it was realised that there was a serious shortage of improved technologies, especially seed. The supply shortages arise from the limited capacity of both public and private seed producers and suppliers. Moreover, there is weak coordination and linkages among actors in the system for seed development, production, multiplication and distribution. Yet it is clear that highly productive technologies require intensive and effective mechanisms for complex coordination and exchange, to allow investment in and operation of different specialised activities. These mechanisms in turn require an effective institutional environment to govern them (Dorward et al. 2005). Currently, however, there is no workable national action plan for seed multiplication in Ethiopia. The seed quality control system as well as the distribution of breeder, pre-basic and basic seed by NARS are uncoordinated. Furthermore, there is inefficient demonstration and popularisation of newly released varieties by the national public system. Contracts are also poorly enforced within the system, especially those contractual agreements between the public sector and private seed companies, ESE and seed producing farmers, and seed companies and seed multiplying farms.

The problems with a green revolution vision are also exacerbated by the limited production and storage capacity the public seed companies, and the performance of the private seed companies. The public Ethiopian Seed Enterprise (ESE) has an insufficient availability of irrigable land and use of irrigation in seed production which results in a limited supply of seed especially during the Belg season.⁶ The private seed companies focus only on hybrid seed, especially hybrid maize, where there is a sizeable demand and an opportunity to turn a profit. The existence of leftover basic seed by some private companies and the sale of seed through

black market by underreporting the amount of seed produced also hinder the green revolution vision.

The prevailing critical shortage of seed has therefore attracted the attention and created an opportunity for policy makers and others at different levels to gain a better understanding of the challenges and opportunities in the seed system. This is driving new policy changes and also the involvement of different actors. The limits of centrally-directed, state-led planning have been realised, and the importance of private sector actors has been recognised by both state and non-state actors alike. This has led to important recent changes in policy and practice related to licensing out of basic seed multiplication to both public and private seed companies, expansion of the seed production capacity of public seed enterprises, and the promotion of specialisation in the production of the different classes of seed.

The Crash Seed Multiplication Programme (CSMP) has emerged out of these policy shifts and the growing awareness of the need to accelerate the production and distribution of cereal seeds across the country. In the short run, it aims to contribute to reducing the critical shortage of certified hybrid maize. However, it is unlikely to have any lasting impact on the emergence of a vibrant seed system in the long run. The CSMP will not address the main challenge of the seed system, as it does not allow farmers to have a choice of different varieties of crop seeds. CSMP also crowds out the emerging private sector, which is mainly involved in production of certified hybrid maize due to limited access to basic seeds. The resources mobilised for the CSMP could have been utilized in creating vibrant seed system through human and physical capacity building of the ESE, the emerging regional seed enterprises, the Seed Quality and Inspection Laboratories (SQIL) as well as the Animal and Plant Health Regulatory Directorate (APHRD) at federal and processes at the respective regional levels.

In support of the new direction for policy, a number of other measures have also been initiated. These include, firstly, the licensing of basic seed production of hybrid maize. This is really a unique measure in strengthening the multiplication of certified hybrid maize seed in a sustainable manner. The hybrid varieties were developed by the public research institute and those licensed private companies get the parental line almost for free. This measure is expected to considerably improve the supply of basic seed for hybrid maize in a sustainable manner.

Secondly there has been an expansion of seed production capacity in public seed enterprises. The seed production capacity of ESE is planned to increase from about 200,000 quintals of seed in 2008/09 production season to about 800,000 quintals in 2010/11 through the additional farms and expansion of contractual arrangement with different organisations like universities, schools, state farmers and also private commercial farmers. Similarly, the OSE and ASE are producing seed on their own farms and also through contractual arrangement on other farms.

Third, there has been promotion of Farmers-Based Seed Production and Marketing Schemes (FBSPMS). Currently, the ESE in collaboration with the respective regional BoARD is implementing the schemes. The newly established seed enterprises are also following suit in

promoting seed production mainly for OPV crop varieties through a similar scheme. These schemes improve the possibility of seed production of locally demanded varieties and crops for which there is less commercial interest. There is also an increased possibility of producing and marketing seed within communities that will reduce cost seed purchase (Sahlu et al. 2008). Production sites can also serve as demonstration sites, thereby possibly enhancing the adoption of crop varieties. FBSPMS have several advantages which can improve seed production and adoption rates.

Overall, there has been a policy emphasis on the specialisation in the production of different classes of seed. To help improve supply, there has been greater strategic focus given to the role of public seed enterprises in supporting the multiplication of basic seeds for openly pollinated varieties (OPV) and certified hybrid maize on their own farm and to promote certified seed production through Farmers-Based Seed Production and Marketing Schemes (FBSPMS) and contracting with commercial farms for different classes of seed. On the other hand, the different research institutes to focus on the multiplication of breeder and pre-basic seed along with basic seed for hybrid crops.

In summary, a major driver of the seed system has been the political economy of hunger and poverty in the country. This has focused considerable political attention at the highest levels of government on increasing economic growth and food security through improved agricultural productivity, with seeds playing a central role in that agenda. This increased political commitment has resulted in a number of centrally directed research and development programmes to improve, multiply and distribute new cereal seed varieties, largely focused on state institutions for delivery from regional to woreda levels. To date, these programmes have had a limited impact due to the lack of availability of high quality seed. However, the state's capacity – increasingly in alliance with farmer-led initiatives, especially multiplication programmes – has been boosted through new investments and policy efforts from the state and highly influential global philanthropic institutions (e.g., Gates and Rockefeller Foundation through PASS AGRA) and multi-lateral donors (e.g. World Bank through AGR). While much of this should be welcomed, inappropriate public research and a growing dominance of the state and certain non-state actors – in practice and in culture – means that there could be a narrowing of research priorities and potentially 'lock-in' to a limited set of technological solutions serving particular interests to the exclusion of others. Technology pathways in Ethiopia are increasingly being fashioned by global funding and special interests, sometimes resulting in a lack of involvement of wider stakeholders. Thus, there is a danger that the diverse livelihood pathways and associated agricultural technology demands of the country's millions of smallholder farmers may not be served by these new arrangements for agricultural innovation.

While new investments are made and programmes are adjusted, the high political profile of such efforts sometimes means that politics overshadows technical analysis. For this reason, continuous monitoring and evaluation and greater transparency and accountability

are required so that appropriate solutions can be found. But this will require greater willingness to collect and share high-quality data and institute performance and impact assessment procedures than is apparent at present.

Events that occurred in previous years have created a hidden mistrust between the public and private sector engaged in the seed system. These include the sale of grain maize treated with chemicals and packed in labelled bag as hybrid maize seed; under reporting of the produced certified hybrid maize seed and participation in the black market; reported theft of labelled seed bags of certified seed producers are all issues that have created mistrust on the private sector by the governments. Whereas the private sector mistrusts the government due to the limited provision of basic hybrid maize seed, and primary concern is the trend in crowding out of the private seed producers through the strengthened engagement of the public seed producers in situations where the private companies have a commercial interest.

Experiences from other developing countries show that there are clearly defined roles in the seed production for the public and private seed producers (Muhammad et al. 2003). In general, the public sector engages in the production of seed of crop varieties for which there is limited commercial interest for the private sector. In the Ethiopia context, private seed companies are exclusively engaged in hybrid maize production by sourcing the basic seed from the public sector. However the public sector, through ESE and regional seed enterprises, is also a key player in hybrid seed production. Even though the current level of participation of the private seed companies is limited taking into consideration the huge national demand, precaution needs to be taken not to crowd out the engagement of the private sector.

In this regard, the Ethiopian Seed Growers and Processors' Association (ESGPA) needs to find ways to build greater awareness and trust through promotion of member discipline, working closely with the relevant public organisations for better understanding of the role of the private seed companies. The ESGPA must also address infighting among its fellow members, who sometimes pursue a 'hit-and-run' approach to the production and marketing of seed, which only serves to tarnish the reputation of all players in the seed sector.

9. Conclusions

The percentage of land planted under formal seeds in Ethiopia is very modest, covering only 4.3 percent of the arable area in 2008, with considerable variability among different crops (NSPDC 2009). Nevertheless, although the formal sector represents a relatively small proportion of the national seed system in the country, it exerts considerable influence over the rest of the system. In particular, it plays an increasingly important role in producing and distributing improved seed for a number of strategically important cereal crops, especially wheat and maize (where it provides 80 percent of hybrid maize).

The historical origins of the current top-down, centrally designed state-directed approach to seed production and distribution can be traced from the Imperial regime through the Derg period to the current political setting. In all modern political eras, the Ethiopian cereal seed

system has followed the same approach, with the public sector dominating the formal seed system. The principal target of the system was to serve the needs of large-scale state farms and farmers' cooperatives and fill the gap left by a weak private sector. This bias is still influencing overall policy and planning within the national seed system.

Recently, the type and number of actors in the Ethiopian formal seed system in general and cereal seed system in particular have been changing following the introduction of new institutional and policy changes in the system. These have been brought about by a combination of political concerns about addressing widespread hunger and food insecurity, stimulating agricultural-led growth and investing in infrastructure and technical capacity with the aid of international donors. At present, the formal seed sector comprises the National Agricultural Research System (NARS), public and private seed producers, seed distributors and regulators.

The Ethiopian seed sector is governed by policies stipulated in the different public proclamations and regulations that were put in place since the early 1990s. The main responsibility of implementing these policies has been with MoARD at the federal level and to BoARD at the regional level. Overall, the main targets of the policies are related with: (i) streamlining evaluation, release, registration and maintenance of varieties developed by the National Agricultural Research System; (ii) developing an effective seed production and supply system through participation of public and private actors; (iii) encouraging the participation of farmers in germplasm conservation and seed production; (iv) creating functional and efficient institutional linkages among seed industry development players; and (v) regulation of seed quality, seed import-export trade, quarantine and other seed related issues.

As indicated above, across each of the elements of the seed system – from breeding, to source seed maintenance and multiplication, to basic seed and certified seed production and distribution to price setting – a wide range of actors are involved. These are dominated by the state which has the mandate for production and distribution as well as regulation. The private sector is encouraged to play a more active role in the system, but in reality its efforts have been fairly circumscribed due to market disincentives or limitation of certain operations.

The analysis carried out for this study shows that there are three key drivers of the political economy of the seed system in Ethiopia, which are integrated considerably affect the way seed policy and implementation guidelines are played out. These are: (i) the top-down state-driven initiatives; (ii) the policy intent of private sector promotion associated with liberalisation of the economy; and (iii) the challenges and opportunities associated with the decentralised political administration and, with it, a decentralised seed system.

These 'pull-push' factors have brought about severe strains within the system. Tensions exist between the technocracy and the political system due to the fact that technical designs are sometimes overshadowed by political imperatives, sometimes misdirecting priorities and investments away from the people and places that

need them the most. Centralised approaches have also come into conflict with the decentralised political-administrative system which has sought to promote a decentralised seed system, in part due to the emergence of parallel federal and regional state level seed R&D initiatives running side by side. These have led to duplication of effort, wasting of limited resources and unnecessary turf battles. Finally, tensions exist between the state and the emergent private sector as the state seeks to liberalise the sector while retaining a strong hold over the market, failing to recognise the contradiction of trying to have it both ways at once.

Thus, it is important that the technocrats, politicians and their international donors and supporters understand these political economic drivers of change in the Ethiopian cereal seed system. By addressing these conflicts and contradictions, they may improve their chances of designing and implementing more technically effective and socially appropriate policies and help establish a vibrant seed system that offers real choices for farmers in terms of seed type, quantity, and quality and delivery time at reasonable prices.

End Notes

¹ CSA (2009) estimated that the total number of agricultural households is 13,943,372, which shows that almost all smallholder holder farmers are engaged in production of one or more types of cereal crops

² There is no standard yet for QDS

³ A woreda is an administrative division of Ethiopia (managed by a local government), equivalent to a district

⁴ A kebele is the smallest administrative unit of Ethiopia similar to ward, a neighbourhood or a localised and delimited group of people. Sometimes referred to as a peasant association, it is part of a woreda or district.

⁵ This efforts are mainly related with the interventions related with the implementation of the government directive 'scaling up of best practices'

⁶ There are three main seasons in Ethiopia; from September to February is the long dry season known as the Bega. This is followed by a short rainy season, the Belg, in March and April. May is a hot and dry month preceding the Kremt the long rainy season in June, July and August. The kremt season, under normal circumstance, is a primary source of rainfall for significant parts of the country.

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Appendix 1

Annex Table 1 Trends in area and productivity of major cereal crops (1994 – 2009)

Year	Teff		Barley		Wheat		Maize		Sorghum		Millet		Oat	
	Area (000 ha)	Yield (qt/ha)	Area (000 ha)	Yield (qt/ha)	Area (000 ha)	Yield (qt/ha)	Area (000 ha)	Yield (qt/ha)	Area (000 ha)	Yield (qt/ha)	Area (000 ha)	Yield (qt/ha)	Area (000 ha)	Yield (qt/ha)
1994/95 (1987 EC)	1843.76	7.04	879.17	9.64	769.34	13.31	1104.70	15.15	886.01	12.66	228.53	6.70	34.50	10.45
1995/96 (1988 EC)	2097.40	8.35	825.54	10.57	882.06	12.20	1280.68	19.83	1252.41	13.75	269.35	8.96	45.11	14.46
1996/97 (1989 EC)	2167.77	9.23	697.67	10.64	772.23	12.97	1316.87	19.23	1399.95	14.34	290.66	10.19	43.41	11.05
1997/98 (1990 EC)	1747.19	7.48	681.95	11.53	787.72	14.05	1100.61	17.53	957.74	11.20	289.74	8.93	39.93	10.26
1998/99 (1991 EC)	2091.34	7.85	830.18	9.26	987.07	11.28	1303.10	18.55	1042.39	12.67	446.68	8.54	43.97	8.96
1999/00 (1992 EC)	2123.47	8.09	794.10	9.34	1025.31	11.83	1407.27	17.95	995.41	11.87	360.23	8.87	41.67	10.33
2000/01 (1993 EC)	2182.53	7.96	874.01	10.82	1139.72	13.79	1719.73	18.25	1332.89	11.54	346.78	9.12	40.98	12.11
2001/02 (1994 EC)	1818.38	8.95	771.52	12.08	1005.00	14.37	1323.04	21.16	1132.50	13.65	281.46	10.88	29.86	11.77
2003/04 (1996 EC)	1989.07	8.43	920.13	11.73	1098.91	14.69	1367.12	18.60	1283.65	13.57	304.76	10.01	30.05	12.89
2004/05 (1997 EC)	2135.55	9.48	1095.44	12.12	1398.22	15.57	1392.92	17.19	1253.62	13.69	312.93	10.64	45.13	12.56
2005/06 (1998 EC)	2246.02	9.69	997.87	12.73	1459.54	15.20	1526.12	21.87	1468.07	14.81	333.03	11.92	44.40	9.05
2006/07 (1999 EC)	2404.67	10.14	1019.31	13.27	1473.92	16.71	1694.52	22.29	1464.32	15.82	374.07	12.95	32.80	11.05
2007/08 (2000 EC)	2565.16	11.67	984.94	13.76	1424.72	16.25	1767.39	21.22	1533.54	17.34	399.27	13.47	30.56	11.97
2008/09 (2000 EC)	2481.33	12.20	977.76	15.54	1453.82	17.46	1768.12	22.24	1615.30	17.36	408.10	13.73	30.60	13.98

Source: Different publication of CSA (1994 – 2009)

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