



Final report to RVO

Institutional mapping & needs assessment of Ethiopia's public seed sector services

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Institutional mapping & needs assessment of Ethiopia's public seed sector services

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In its attempt to transform agriculture, the Ethiopian Ministry of Agriculture (MoA) focuses on increasing agricultural productivity, ensuring food and nutrition security, while promoting exports and import substitution in a sustainable manner. The Netherlands and Ethiopia collaborate to achieve, a.o. by a joint approach to transforming the Ethiopian seed sector. This project provides the basic analysis and recommendations for future activities to establish an efficient, well-regulated and dynamic seed sector that meets quality standards, adapts to climate change and market conditions, has transparent and inclusive governance and maintains biodiversity. The study focuses particularly on the needs of federal and regional seed authorities in terms of technical know-how, institutional capacity and mandates, skills, knowledge and resources.

Keywords: seed regulatory services; institutional mapping; capacity needs; Ethiopia

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It can also be found at <https://www.rvo.nl/onderwerpen/internationaal-ondernemen/landenoverzicht/ethiopi%C3%AB>. For an overview of all projects funded or commissioned by RVO in Ethiopia please visit <https://projects.rvo.nl/section/development-cooperation/?countries=1275>



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Executive summary

Rationale, objectives and method of assessment

Improvements of seed regulatory services by the Government of Ethiopia have not been successful to date, especially not at federal level. This comes mainly as a result of a lack of task division and mandates at institutional level; as well as the capacity, resources and incentives at staff level. And they are also very much related to frequent changes in government structure, changing the roles and responsibilities of the various departments and agencies. This study aimed to investigate the gaps both at institutional level (mapping who is responsible for what), and at staff level (knowledge, skills, resources and incentives), and provides recommendations on how to overcome these. In summary, the objectives of the needs assessment were:

1. To describe the seed regulatory framework
2. To undertake a needs assessment of key regulatory institutions
3. To provide recommendations for a comprehensive capacity strengthening programme

For detailed analysis, primary data were collected from the following sources: federal regulatory department of the Ministry of Agriculture (MoA); the Oromia Agricultural Input Regulatory Authority (OAIRA); and three seed testing laboratories established under OAIRA. In addition, secondary data were collected from the regulatory authorities of Amhara and SNNPR, and from the department responsible for seed quality assurance in the Tigray regional Bureau of Agriculture (BoA). Six seed producing companies were interviewed regarding their level of satisfaction with regulatory services.

Conclusions

The main conclusions of the study are summarised as follows.

Leadership: a need for more emphasis by senior management and policy priority

Seed regulatory staff at the federal Ministry and the regional Authorities feel that there is a lack of understanding of their work by senior management, and as a result there is limited guidance and support. The concerned experts demand technical leadership from their management whereas in practice most of them do not have a professional background in the subsector. The poor support from senior management coupled with a strong reporting culture, have eroded the motivation of experts to deliver. Overall, there is a need for more support and attention from the senior management of the federal Ministry and regional Bureaus for the work of the regulatory services.

Human Resources: a need for more, qualified and motivated seed experts

For several seed regulatory services, the number of employed technical staff is too low. This is especially the case for Oromia, but also in other regions the number of staff budgeted for does not correspond well with the actual workload. Regardless of the number of staff, a common problem for all the institutions is the staff's limited technical capacity. Seed quality assurance and other regulatory services are a very technical field of work, while only a few staff are experts in the area. Aggravating the problem is the high staff turnover and a lack of proper (on the job) training. Related to this is the limited professional career perspective offered. Overall, there is a need for a clear human resource system for all seed regulatory staff, with a transparent career pathway (based on merit), job incentives and training opportunities.

Physical resources: mobility is key and support for equipment maintenance & use

Physical resources include vehicles, buildings, and field and laboratory equipment. The inspection services are hampered by transport facilities. Given the size of the workload for the field inspectors and the often-remote areas they must visit, vehicle availability is the biggest obstacle for their

functioning. As a result, they often cannot inspect the fields in time. At the seed testing laboratories most experts feel that there is enough equipment. The main challenge for the seed testing laboratories is that most of the newly obtained equipment is not in use. Some of the equipment is not even installed while for other equipment the experts do not know how to use it. As such, the main need is to ensure that the staff at the seed testing laboratories is being trained (on the spot) on how to use the equipment and that there is a maintenance system in place on how to service and repair the equipment.

The special case of the variety release system: a strong need for drastic change

Now, especially for seed companies, the most serious challenges are experienced with the variety release system. Both domestic and international companies experience difficulties with the costly and time-consuming process of variety testing and registration and the poor implementation of performance trials. This is related to the fact that the implementer of the performance trials, often the Ethiopian Institute for Agricultural Research (EIAR), does not see trial implementation as its mandate, but rather a burden to its human and physical resources. Therefore, there is a need to drastically change the variety release system and to start with a pilot in which the implementation is done by the Ministry itself – with dedicated staff to implement the trials.

The quality assurance system needs digitization, post-control & international benchmarking

Currently there are doubts about the accuracy of the information provided by field inspectors. In cases where seed was positively certified, a second check showed that the seed produced was not true-to-type. Given the shortage of manpower and vehicles, there is a strong suspicion that in many cases the actual inspection might not have taken place. In case disagreement arises between the seed producer and the laboratory there is no internationally accredited laboratory available in Ethiopia that can arbitrate. In addition, seed exports (for cereals) becomes difficult without an internationally accredited laboratory. Therefore, there is a need to introduce a system of greater accountability which can be achieved through digitizing the system. In addition, the example of Amhara, where post-control grow-out tests are done, should serve as an example for other regions. Lastly, Ethiopia should move towards accreditation for its federal seed testing laboratory which can then serve as a reference laboratory for the regionally operating seed testing laboratories.

Recommendations

The recommendations consider the most pressing challenges in the regulatory environment as presented in the conclusions above, their likelihood of being accepted by government (the low hanging fruit), and whether they are already taken up in the existing plans of development organizations and projects.

Establish an independent federal regulatory authority

Most of the gaps discussed above are related to the capacity of the regulatory structure to provide adequate and efficient services to the main stakeholders in the seed sector: inter/national seed companies, local seed producers and farmers. These services include seed quality assurance, phytosanitation, variety testing and registration and plant variety protection. Providing these services effectively can enhance the availability of quality seed of a large portfolio of superior varieties, which in turn leads to higher agricultural productivity and income for farmers. A strong regulatory system further provides credibility to the international community both for the import and export of seeds. Given the current lack of priority for seed regulatory services within the Ministry and the low salaries that can be provided for highly qualified staff, there is a strong recommendation to develop a seed regulatory authority. This authority should be an independent government organization dedicated to the four-abovementioned seed related services, with competent, specialized staff and sufficient budget to implement its activities. Main advantages of the Authority are:

- Impartiality from the regulator. Now the Ministry both develops regulations and implements them, this can lead to a conflict of interest. Furthermore, for the overburdened senior management of the Ministry, the change can be appreciated as well, as they don't have to decide on very technical implementation issues anymore.

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- For the staff involved in the seed regulatory services it will first and foremost provide recognition for their work. Through a more dedicated institutional environment that has professional services at the heart of it, recruitment of qualified staff will be made easier as authorities can have higher paying salary scales than the Ministry.
 - Another advantage of the legal entity of an authority is that an authority can collect revenue for the services provided. As such the fees for the field inspections, seed tests and variety trials can flow back into the organization, and hence be reinvested in equipment, staff training and/or staff incentives.
 - More efficient services, especially those related to variety release, plant variety protection and phytosanitary services, can attract more (domestic and international) companies to invest in Ethiopia. Now the costly process of variety testing and registration and absent plant breeders' right protection in Ethiopia discourage companies from entering the sector.

Start a pilot for an effective variety testing service under MoA

As a means to an end, piloting improved delivery of variety testing and registration services will in part serve as proof of concept of the viability of an independent federal seed regulatory authority. The pilot will be implemented under the management of the Ministry to demonstrate how a dedicated structure for variety testing can provide better service, generate revenue and encourage domestic and foreign direct investment in the seed sector in Ethiopia. The design of the pilot should be done in such a way that the trials are undertaken on a cost recovery basis and generate income that is re-invested in the service.

Equip and modernize the quality assurance system

One of the main challenges for the field inspections is the limited mobility of inspectors. To address this, major investment in the procurement and maintenance of vehicle for the inspectors of the thirteen (soon to be fifteen) seed testing laboratories is required. Investments in hardware must be accompanied in the investment 'software', the technical capacity of the inspector to professionally implement the inspections. In addition, a system of post-control in each of the regions needs to be developed that organizes grow-out tests (on small irrigated plots) for already certified seeds. With respect to the laboratory tests, priority should be given to operationalize the existing laboratory equipment and to provide training to the lab experts. The one federal seed testing laboratory should become ISTA accredited and serve as a reference laboratory for regional seed testing laboratories.

Improve quarantine services for import and export of seed

Specifically, for the seed phytosanitary services, some modest investments are required. In particular a few inspectors within the much larger phytosanitary services team should be assigned to seed phytosanitation specifically. These inspectors should be trained on the main seed-borne diseases and pests that can accompany seed and have the resources required to perform their function, including manuals and equipment.

Establish seed regulatory platforms for improved information exchange and problem solving

As the earlier paragraphs highlighted differences can occur between regions and between seed testing laboratories. To come to nationally agreed standards, and to develop a system with reference points and sufficient checks and balances, several platforms for the seed regulatory services are proposed. These include a platform for the seed testing laboratories and field inspection staff, a platform for seed trade, and a platform for policy and regulatory issues.

1 Introduction

In its attempt to transform agriculture, the Ethiopian Ministry of Agriculture (MoA) focuses on increasing agricultural productivity, ensuring food and nutrition security, while promoting exports and import substitution in a sustainable manner. Key interventions to realize these objectives are: increasing public investment in agricultural research, input supply, irrigation and mechanization while reducing post-harvest losses. The ministry also commits itself to encourage and support private sector investments in agriculture.

Ethiopia and the Netherlands underscore the objectives of the guiding document ‘Transforming the Ethiopian Seed Sector: Issues and Strategies’¹. The vision for the transformation of the Ethiopian seed sector is: “An efficient, well-regulated and dynamic seed sector that meets quality standards, adapts to climate change and market conditions, has transparent and inclusive governance, and maintains biodiversity”. Further, the seed sector provides farmers with certified seed of improved varieties of key crops in sufficient quantity and quality, at a required place and time, with affordable price through multiple production and marketing channels.

In the months of September to December 2019, Wageningen University & Research led a study on the structure and performance of Ethiopia’s seed regulatory service. The study was implemented by a team of Dutch and Ethiopian seed sector experts. This report presents the results and conclusions of that study, which also provides detailed strategies, including:

- Strengthening a federal seed regulatory structure that is directly responsible for variety release, plant variety protection (PVP), and seed import and export, with enhanced human and infrastructure capacity;
- Strengthening the regional state seed regulatory authorities responsible for ensuring quality of seed supplied in the domestic market;
- Attracting more domestic and international private investment in seed production in Ethiopia.

1.1 Rationale

Improvements of seed regulatory services by the Government of Ethiopia have not been successful to date, especially not at federal level. This comes mainly because of a lack of task division and mandates at institutional level; as well as the capacity, resources and incentives at staff level. And they are also very much related to frequent changes in government structure, changing the roles and responsibilities of the various departments and agencies. The topic of this study is rather complex as the regulatory services are governed by a detailed set of laws and regulations, reducing degrees of freedom for implementation as well as a multitude of institutions that share responsibilities: federal government; regional government; research; and the private sector. This study aimed to investigate the gaps both at institutional level (mapping who is responsible for what), at staff level (knowledge, skills, resources and incentives), and provides recommendations on how to overcome these.

¹ MoA. 2019. Transforming the Ethiopian Seed Sector: issues and strategies. Government of the Federal Democratic Republic of Ethiopia. Addis Ababa.

1.2 Methodology

The objectives of the needs assessment were:

1. To describe the seed regulatory framework
2. To undertake a needs assessment of key regulatory institutions
3. To provide recommendations for a comprehensive capacity strengthening programme

Specific activities that were undertaken for each of the three objectives include:

1. Description of the current seed regulatory framework:
 - 1.1. Map of the federal and regional state institutes responsible for variety registration, PVP, seed quality inspection and certification, seed phytosanitary services and seed trade;
 - 1.2. Sketch of their organizational structures;
 - 1.3. Description of their physical/infrastructural capacities;
 - 1.4. List of the key functions (and vacancies) of experts employed at the federal and regional state institutes;
 - 1.5. Description of current plans to reform these institutes, their status and likelihood to succeed in the next few years.
2. Needs assessment of regulatory institutions:
 - 2.1. Interviews with a number of experts assessing their understanding of their jobs and misinterpretations of their job descriptions;
 - 2.2. Inventory of skills, incentives and facilities needed for their effective implementation of their tasks as described in their job descriptions;
 - 2.3. Assessment of the extent to which the current staff are capable to achieve the objectives of the institution (regarding their number and competencies);
 - 2.4. Focus group discussions with key staff of a selected number of institutions.
3. Recommendations for a comprehensive capacity strengthening programme:
 - 3.1. Analysis of the results and recommendations on what type of capacity strengthening activities can address the identified skill and infrastructural gaps;
 - 3.2. Recommendations, in addition to those just mentioned, on possible reforms to staff, their responsibilities, and incentives (so as to increase staff retention and better achieve institutional objectives);
 - 3.3. Methods/programmes for capacity strengthening, including staff secondment, short-term trainings, longer-term trainings or education, exchange visits, among others.

For detailed analysis, primary data were collected from the following sources: federal regulatory department of the Ministry of Agriculture (MoA); the Oromia Agricultural Input Regulatory Authority (OAIRA); and three seed testing laboratories established under OAIRA.

In addition, secondary data were collected from the regulatory authorities of Amhara and SNNPR, and from the department responsible for seed quality assurance in the Tigray regional Bureau of Agriculture (BoA). Six seed producing companies were interviewed regarding their level of satisfaction with the regulatory service.

2 Results

2.1 Current structure and intended functions

Structure

At federal level, regulatory services are provided by two directorates accountable to the State Minister of Agricultural Development (Appendix 1). These are the Plant Variety Release, Protection and Seed Quality Control Directorate, and the Plant Health and Quality Control Directorate. The Plant Variety Release, Protection and Seed Quality Control Directorate has a laboratory to provide services under its auspices. This National Seed Laboratory is also supposed to serve as a reference laboratory (see *Assuring seed quality* under *Functions* below) and arbitrator for disputes between seed producers and laboratories in the regional states. With regards to seed, the Plant Health and Quality Control Directorate focuses on the quarantine of seed moving across the national border.

At regional level, seed regulatory services are provided by semi-autonomous authorities operating under the technical supervision of the BoAs in Amhara, Oromia and SNNPR, and from department level within the BoA in Tigray. In fact, the bulk of seed available in the country is produced in the first mentioned three regional states, and that of Tigray is insignificant. The regional authorities are not only responsible for seed, but also for other agricultural inputs. This is evident in the organogram of OAIRA presented in Appendix 2. The regional regulatory authorities and BoA in Tigray have branch offices managing laboratories. Currently, there are 13 functional seed laboratories in the four regional states. Four of the 13 are in Amhara, four in Oromia, three in SNNPR, and two in Tigray. Two more laboratories are currently under construction in the regions of Benishangul-Gumuz and Gambella. Already mentioned above, one laboratory functions under the auspices of the MoA, whilst quarantine services are supposed to take place at strategic import and export outlets in the country (borders and airports).

Expected Functions

The main functions of the regulatory structure as described in several official documents are:

1. Variety release and registration
2. Providing and protecting plant breeders' right
3. Phytosanitary services
4. Assuring seed quality
5. Issuing certificates of competence (CoCs) to seed businesses (license to operate)

Variety release and registration

Variety release and registration and providing and protecting plant breeders' right are the sole responsibilities of the regulatory body at federal level. The major activities involved in variety release and registration are: processing applications; assessing applicant varieties' value for cultivation and use (VCU); and conducting national performance trials (NPTs). The regulatory team is expected to compile data and report to a technical committee. The technical committee (TC) evaluates candidate varieties on trial in the field for VCU, and reports to the National Variety Release Committee (NVRC). The NVRC meets twice a year during which the report of the technical committee is presented, and the decision is made whether to recommend the variety for release or not. Once a variety is recommended by the NVRC for release, the team is expected to register the variety in the Crop Variety Register of Ethiopia, which is published annually, and to print and distribute the register to all users.

Providing and protecting plant breeders' right

Like variety release and registration, providing and protecting plant breeders' right is the sole responsibility of the federal regulatory structure. In case of providing plant breeders' right, the directorate accepts applications for protection and conducts Distinctness, Uniformity and Stability (DUS) testing in accordance with UPOV formats. Upon completing the test, they are expected to give certificate and register the variety on the PVP catalogue.

The three remaining services (phytosanitary and quarantine service, seed quality assurance and issuing CoCs) are given both at federal and regional levels with different purposes.

Phytosanitary services

The quarantine section at federal level is responsible for the inspection of plant and plant products intended for import and export. They specifically look at threats to plant health. Activities for export products include detection of pests and diseases indicated in the quarantine guidelines of importing countries. Whenever required, upon checking for quarantined pests/diseases, the regulatory structure can provide phytosanitary certificates for the export product concerned. In the case of plant or plant product import, the regulatory structure advises Ethiopian importers on the list of pests and diseases that Ethiopia considers as quarantines. Importers are required to obtain phytosanitary certificates from the country of origin and present these to the inspectors. Inspectors may choose to check whether the certificate is accurate by inspecting the product. If there is no reason to quarantine the consignment, inspectors can issue customs release. If inspector suspect the consignment for any quarantine pest, sample will be taken and checked in the laboratory.

The phytosanitary services at regional level are related to seed movement within the country. This is to protect against the spread of pests and diseases within the country. For example, the parasitic weed *Striga* is common in some parts of the country and quarantined from other areas. Thus, regional regulatory structures are responsible to detect and prevent the flow of quarantined pests.

Seed quality assurance

Both federal and regional regulatory bodies assess seed quality by inspecting seed production fields and testing seed lots in the laboratory. They are expected to follow similar processes and standards to certify seed. In addition, there are provisions for post-control that include grow-out tests of seed in the market to verify the genetic purity of certain seed samples.

The federal regulatory structure is only responsible for export seed, which implies that the bulk of seed produced in the country is certified by the seed regulatory authorities in Amhara, Oromia and SNNPR and the Bureau of agriculture in Tigray. The task division between federal and regional regulatory bodies is clearly defined in the 2013 Seed Proclamation, which was also elaborated in more detail in the 2016 Seed Regulation. In addition to the abovementioned division of responsibilities, the federal structure is also assumed to be responsible for strengthening the technical capacity of regional inspectors. Also, for arbitrating disputes between seed producers and regional inspectors, the national laboratory serves as reference. Unique to Oromia is the inspections on agricultural input trade, where a designated team is employed to prevent the illegal trade of agricultural inputs including seed.

Issuing certificates of competence (CoCs) to seed businesses

Responsibilities for issuing certificates of competence for seed businesses (involved in the production, processing and/or distribution of seed) are also implemented by both between the federal and regional regulatory bodies. The federal and regional bodies check the capacity of applicants in line with the criteria stated in the 2016 Seed Regulation and subsequently approved directives. Applications at federal level are only for those businesses that intend to operate in more than one regional state or are foreign companies. Regional authorities process applications exclusively under their jurisdiction. At both levels, authorities are responsible to process applications for CoC renewal each year.

2.2 Current performance

2.2.1 Regulation

Ethiopia does not have an official seed policy, except for a draft that was prepared in 1992. Recently, attempts have been made to draft and approve a seed policy, but it is pending the decision to be incorporated in the agricultural development policy. With regards to laws and regulations, the Seed Proclamation No. 782/2013, Seed Regulations No. 365/2016, Plant Breeders' Right Proclamation, No. 1068/2017, as well as several Ministerial directives are in place. Amendments to the Seed Proclamation and Regulations have been drafted and the regulations for the Plant Breeders' Right

Proclamation are being prepared. Moreover, the Plant Quarantine Regulations No. 4/2002, which were enacted more than a decade ago, have been revised and is expected to be approved soon.

Despite some small gaps and pending approval of amendments, regulatory officials at different levels do not consider regulations to be a constraint to seed sector development². Major challenges instead lie in the capacity to implement what is written on paper.

With regards to structure, there have always been competing opinions to (re)organize regulatory services at both federal and regional levels. Many argue that the services should be independent and autonomous from MoA and the regional Bureaus³. Before 2005 greater autonomy was in place at federal level when the Agricultural Input Authority was responsible for plant variety release and protection, and seed quality control. In 2005 the Authority was dissolved, and its functions were handed over to the MoA. Phytosanitary services were always part of MoA. The general sentiment is that the seed regulatory services functioned better in the past. The National Seed Industry Agency (predecessor of the Agricultural Input Authority prior to its merger with the Fertilizer Industry Agency) and now-defunct Shola Plant Health Laboratory are still associated with strong performance of seed quality control and quarantine respectively.

Today, regulatory staff feel that their positions are rather marginalized within the MoA. They observe that the agricultural extension department receives far greater attention. The recently proposed reorganization of the ministry reinforces that point of view. If the reorganization materializes, regulatory staff will lose their directorate and be demoted to the status of 'case team'. Many staff complain that despite the challenges discussed regularly in important stakeholder consultations and forums, they are not taken seriously. Staff capacity and continuity is also low. For instance, the National Seed Laboratory has been managed by one person for a very long time, and the responsible person is officially retired. However, no successor has been identified in time and only recently two young graduates were hired to replace them. This indicates a certain level of neglect for the important role of the regulatory functions.

In the three largest regional states of Amhara, Oromia and SNNPR the seed regulatory services are organized independently (through semi-autonomous authorities). Amhara was the first to reorganize in 2013 and Oromia was the most recent to do so in 2018. In Tigray, services remain embedded within the BoA. Staff of OAIRA indicate that the current structure and human resources plan are adequate for providing quality regulatory services. OAIRA plans to establish more laboratories and hire more staff given the relatively large area under its jurisdiction. In contrast, staff employed at the SNNPR seed regulatory authority express concerns that the capacity at the three laboratories is too limited. This has been attributed to failure of leadership of the regulatory authority to convince the regional government to increase the budget. Similarly, inspectors in Amhara are overstretched to cover seed fields during peak inspection period.

2.2.2 Variety release and registration

For a variety to be multiplied in Ethiopia, Article 4(1) of the Seed Proclamation indicates that registration is mandatory⁴. The precondition for registration is the national performance trials (NPT), which needs to be conducted on three sites for two seasons or six sites in one season. During these trials, varieties are evaluated for their value for cultivation and use (VCU). Currently, variety registration for breeders' right is not yet done. Regulation 361/2015⁵ lists the service charges for conducting both tests. Officially, it costs € 375 per variety per season per site for VCU and € 125 per

² Should be noted that in the ministry and bureaus, seed is considered foremost for local consumption, whilst export is a secondary priority.

³ MoA. 2019. Transforming the Ethiopian Seed Sector: issues and strategies. Government of the Federal Democratic Republic of Ethiopia. Addis Ababa.

⁴ HoPRs (House of Peoples' Representatives), 2013. A proclamation on seed. Proclamation No. 783/2013. Federal Negarit Gazette of the Democratic Republic of Ethiopia. Year 19, No. 27. Addis Ababa.

⁵ CoM (Council of Ministers), 2015. Rates of Fees for Seed Competency and Related Services. Council of Ministers Regulation. Council of Ministers regulation No. 361/2015. Federal Negarit Gazette of the Democratic Republic of Ethiopia. Year 22, No. 13. Addis Ababa.

variety per season for DUS testing. Given the fact that a variety must be tested at six locations for VCU, the total cost goes up to € 2,250 per variety.

According to the regulations, the MoA is responsible to conduct NPTs to register varieties. However, at present, MoA only facilitates the process of variety testing. They accept applications and approve if the varieties qualify to be candidates for release. If the applicant is a private company, the MoA will write a letter of request to a research institute or university to conduct the NPT. If it is an application by a research institute or university that the MoA approves, then that knowledge institute will conduct the national performance trial itself.

Private companies often complain about the high cost of NPTs. Currently the cost is not based on regulation 361/2015. Instead, the research centres can decide the cost by themselves, still not centralized. Allegedly, these can vary from € 4,680 – € 28,000 per variety, depending on crop type. For instance, data from companies on the prices they paid for the testing and registration of malt barley varieties range between € 5,800 – € 6,600, which is at the lower end. Costs for horticultural crops are usually more expensive⁶. Much to the companies' frustration, the quality of NPT management at field level is often poor and requires further supervision and support by the companies themselves. MoA reportedly advises companies to directly follow the status of their variety trials, to observe whether they are being managed appropriately or not (adding to the overall costs). Some of the companies indicated that regardless of the payment they manage the trials. Due to a lack of attention to important agronomic practices, it is not surprising that candidate varieties fail to demonstrate a clear added value for cultivation and use in several cases. It also prevents companies from registering crops with lower market demand like broccoli, cauliflower and eggplant; as registration costs are higher than potential revenue.

Researchers are poorly incentivized to conduct NPTs. The money also doesn't necessarily make its way to the field of the trial or the researchers responsible for its management. While they receive no additional payment for managing the trials, they also do not see variety testing as part of their job description. In some cases, the research institutes lack the human resources to conduct NPTs. It is also important to note that there is a potential conflict of interest of researchers providing the service to private companies. They may undertake breeding for the same crops themselves, and out of a sense of competition can be biased in their observation and data recording.

Given the fact that MoA considers its responsibility to be limited to facilitating variety release and not conducting NPTs directly, their current capacity of three staff members is sufficient. Regardless, funds are a constraint to hire more staff members, pay the costs of the TC to evaluate NPT data, and convene the NVRC. They bring experts from different organizations to form the TC for variety evaluation on an almost voluntary basis. What they can afford to pay in terms of per diem and travel costs is insufficient, which poorly incentivizes participation. They are also short of funds to convene the NVRC in a timely manner. E.g. last year (2019) the NVRC only took place once instead of the officially scheduled two meetings per year. This delays introduction of new varieties for farmers and frustrates seed business. There is a tendency to look for external funds to bridge the funding gaps. Projects and programmes including the Agricultural Growth Program (AGP) are willing to support with funding, but this is unsustainable. To date, MoA doesn't charge a fee that can cover for all the facilitation costs.

While some officials consider variety release to be the sole responsibility of the research system, others raise the question why new varieties are released at all when the country hasn't exhaustively used what has been released so far. In the currently proposed reorganization of MoA, variety release and registration are omitted from the suggested directorate and case team title, although it is there as a function. In conclusion, significant changes would have to be made for MoA to carry out variety release and registration sustainably and effectively. Maintaining the status quo will require accepting potential conflicts of interest with the research system, a low number of new varieties released every year and discouragement for international seed companies to invest in Ethiopia.

⁶ Broek, J.A. van den, 2015, Business Opportunities Report Seed #4, in the series written for the "Ethiopian Netherlands business event 5-6 November 2015, Rijswijk, The Netherlands."

2.2.3 Plant breeders' right

Protection of plant breeders' right has been pending enforcement since 2006, when the Plant Breeders' Right Proclamation was enacted. Amendment was approved in 2017 after nearly eight years of revision. Yet MoA has not yet initiated the implementation of plant breeders' right, apart from drafting regulation. Both expertise (human resources) as well as facilities are required for its implementation. To make it work, MoA would need a bigger budget to recruit technical experts. Now, the current capacity is too low to offer these services. While there is demand from company side to register their varieties for protection, no clear registration procedures are in place. The main constraints provided by experts in MoA are their lack of autonomy and land. Since varieties cannot be protected at present, international breeding companies are disinclined to bring their varieties to Ethiopia or start seed production activities locally.

Staff positions for managing the system have been created but remain vacant as the salaries offered are unattractive for the level of staff required. It is difficult to improve this within the scales and human resources policies of the Ministry. Now, research institutes offer better salaries for highly educated staff than the Ministry. If services would be organized independently in an authority, it would be possible to negotiate higher salaries, like the research institutes. Another advantage of an independent federal seed regulatory authority would be the opportunity to generate revenue for the services it provides (through fees). However, given the current political situation in the country, it is generally accepted that no new structure will be established before the current budget year comes to an end in June 2020.

2.2.4 Phytosanitary services

With regards to phytosanitary services, no difference can be discerned between seed and other plant products. Attention is given mostly to the control of pests listed for quarantine for Ethiopia's main export destinations (i.e. the EU). For export products, the phytosanitary team of MoA conducts physical inspections and issues phytosanitary certificates. For imported products, the phytosanitary team conducts pest risk analysis and based on the results advises importers to request phytosanitary certificates for specific pests from the countries of origin. Pest risk analysis involves physical inspection of imported products and if suspected to contain quarantined pests, samples are sent to the Ethiopian Institute of Agricultural Research (EIAR), as MoA does not have a functioning laboratory for plant health inspection. Given that EIAR provides the service on voluntary basis, phytosanitary services only submit samples if there is a strong suspicion of pest incidence.

The Japan International Cooperation Agency (JICA) has supported MoA's quarantine team to set-up a mini laboratory for plant health inspection in the compound of EIAR. Recently a lab attendant was assigned and is expected to start conducting inspections shortly. While MoA expressed the opinion that phytosanitation is primarily based on trust and reputation (through the paperwork system), pest outbreaks need to be avoided at great cost. At present, it is felt that the capacity to protect the country from the introduction of a new pest is limited. Staff members themselves express their dissatisfaction with the quality of services provided. They even mentioned that there were some cases when they issued custom release even though they suspected quarantine pests, to not overload EIAR.

For internal quarantine services in the regional states of Oromia, Tigray and SNNPR, there are vacant positions at the branches of the regional regulatory authorities. An expert is assigned in Amhara but has yet to exercise any specific measure of quarantine. Guidance of what measures ought to be taken are also not clearly defined.

For export seed companies physical (actual) inspections by MoA staff are important to ensure the seed lots are free of quarantine pests and potential seedborne diseases. Now the vegetable seed export companies support the phyto inspectors to visit their farms and undertake the inspections. But the companies must send the samples outside of Ethiopia to produce evidence that the product is free from quarantine pest. The Ethiopian authorities must use the results of the laboratory to give a phytosanitary certificate for the product. Seed companies want to have inspectors to have more knowledge of the pests and diseases specific to their crops and issue reliable certificates.

2.2.5 Seed quality assurance

To certify seed, both field and laboratory standards must be met. For field inspections the standards focus on genetic purity and inspectors aim to assure that the variety is true-to-type. They need to check whether genetic contamination has occurred during production; contamination which can arise from the early generation seed used and cross pollination adjacent crops. Inspectors must ensure that isolation distances are maintained. Inspectors check that there is no varietal mixture in the field as well as no symptoms of seed-borne diseases. In doing so, inspectors follow a set of rules and procedure.

After the field inspections laboratory tests are conducted. The common tests, which are used to determine quality, are physical purity, moisture content and germination rate. Purity ought to be at least 97-98%, whilst the minimum rate of germination for cereals is 85%. While officially laboratories are also expected to conduct seed health tests, no standards are provided. Those laboratories that have plant pathologists and the right facilities simply monitor disease and report internally. There are no legal grounds to reject seed lots based on their seed health findings.

Regulation 361/2015 lists the costs for seed regulatory services. This includes the cost of applying for a CoC, field inspections, sample collection and laboratory tests. Field inspection costs € 0.63/ha or € 0.93/ha for hybrid varieties. Laboratory tests cost € 0.63 for purity, € 0.78 for moisture test and € 1.25 for germination per sample. Service charges for field inspections and seed tests are a relatively new phenomenon to Ethiopia, and the costs indicated in the regulation is a first start of standardized payment system. Otherwise, experts in the system feel that the charges are too small to recover for all the costs of the services.

Field inspection

Most of the produced seed comes from Oromia. In 2018, OAIRA inspectors inspected 35,327 ha of seed production fields. In terms of acreage, this is followed by Amhara (11,717 ha), SNNPR (9,780 ha) and Tigray (2,849 ha). For MoA there is no report on their inspected fields, which is not surprising as negligible amounts of seed were exported.

Companies are expected to apply for inspection one month before sowing, after confirming they obtained basic seed from a reputable source. The application includes: plot history, source of basic seed, area and location, which helps the regulatory services to plan the inspections. However, it does occur that applications arrive late, in some cases during planting or even after. As a result, selected fields are not approved on forehand. This is permitted on the grounds that it is partly the responsibility of producers themselves to control quality. It is also a result of a lack of concern expressed by inspectors. In Tigray, producers submit their plan in time and inspectors also randomly visit plots before sowing takes place, which is good practice in comparison with the other regional states.

Looking into the workload of each of the 13 branches of the regulatory bodies across the four regions, Oromia has by far the largest responsibility. OAIRA's four branches each inspect 8,832 ha on average as compared to 2,929 ha in Amhara, 3,293 ha in SNNPR and 1,425 ha in Tigray. This provides justification for OAIRA's plan to establish more branches. The situation is further aggravated by the fact that human resources capacity at OAIRA is only 20% of what is planned. In other regions, this capacity is at over 75%. Moreover, most of the vehicles in the regulatory authorities are not functional. Many of them were bought during the establishment of the branches 16 years ago. There is serious shortage of vehicles across all regional authorities, which limits their provision of inspection services. The capacity constraints mentioned seriously affect the frequency and intensity of field inspections. With around 3,000 ha of seed production fields per branch, Amhara is better situated than Oromia, but still faces difficulties to inspect all fields in its jurisdiction. This is mainly due to production occurring on smallholder fields which are fragmented and dispersed. Field inspection staff indicate that at least two fully functional vehicles are needed per branch to inspect all fields adequately.

Table 1 Average area of seed production inspected per branch and technical staff member in 2017/18

Region (branches)	Technical staff members		Vehicles*	Total area (ha)	Average area (ha)	
	Positions	Capacity (%)			Per branch	Per staff member
Amhara (4)	38	76	8	11,717	2,929	404
Oromia (4)	74 [#]	20	8	35,327	8,832	2,355
SNNPR (3)	26	77	8	9,780	3,293	489
Tigray (2)	10	80	Shared	2,849	1,425	356
Fed. seed quality	82	15	Shared			
Fed. quarantine	130	37				

* Total count (some vehicles located at head office and others partially functional); # 17 in each branch and 6 at head office

Despite the critical constraints in capacity, there is no report from the regions of failure to inspect the required fields. Even in Amhara, where there is a serious shortage of vehicles and where seed production is dispersed and fragmented, there is no such report. In this context, gaps are being filled through support of other offices. There was a time when the Agricultural Transformation Agency (ATA) rented vehicles for some of the branches and more recently the authorities have taken to borrowing vehicles from other organisations. BoA and AGP lend vehicles for field inspections for longer periods of time. Many seed producers complain about the delayed inspections of their fields. In Oromia and Amhara, public seed enterprises use their own vehicles to transport inspectors to the field. Although gaps are filled in these ways, it is also important to note that reporting positively is a common practice in Ethiopia.

Regulatory officials claim that they have improved their services in recent times, and that incidences of late inspection are less than in the past. At the same time, they indicate that inspectors are forced to rush during peak periods, which obviously has implications for the quality of their services. This is further evidenced by reports from the Amhara regional authority, which randomly double checks 10% of the fields that are already inspected by their local branches. The supervisory checks sometimes result in rejections of fields that were accepted by the inspectors. One of the reasons provided in such case is inadequate isolation distance, which is one of the easiest standards to inspect. This either suggests that fields were inspected unprofessionally or not at all. Although the signatures of both the inspector and owner of the field can be found on inspection records, there is no guarantee that the field was inspected.

One of the major limitations is checking for quality during harvest and storage. For example, inspectors are not able to monitor if maize cobs are properly sorted; if combine harvesters are cleaned prior to harvesting wheat or barley seed; or if raw seed was collected directly from outgrowers or stored in their homes first. In general, inspectors do not follow what happens subsequently to the last round of field inspections. Another potential oversight is that the inspectors have difficulties to link seed lots in the market (ready for sales to farmers) to the fields they've inspected. This is particularly challenging in the case of contractual seed production by outgrowers on small farmers field.

Another important gap is determining whether varieties are true to type. Often field inspectors lack the morphological descriptors and/or skills to accurately identify varieties in the field. Some effort is made by laboratories in Amhara and SNNPR to conduct grow-out tests at regional level to determine genetic purity. Grow-out tests conducted in 2017 in Amhara reveal relatively high rates of varietal mixture (13.7% for maize and 17% for teff). In 2018, this improved when rates dropped to 5.4% for maize and 9.5% for teff. Variety mixture not necessarily has to come because of management practices but can also arise from the source of early generation seed. This can be rouged out during production and picked up during field inspections if done properly. In Oromia, no branches are currently carrying out grow-out tests. In 2016 and 2017, Assela and Ambo laboratories conducted grow-out tests at the sites of farmer training centres, but they have discontinued the practice since. Realizing that OAIRA was only established one year ago, it will take some time before the authority can take up these responsibilities.

Laboratory testing

Samples destined for the seed testing laboratories are usually taken by the field inspectors or samplers. The samples are coded and submitted to the laboratory technician. The laboratory technician tests the sample and submits the results to the certification group. The certification group decodes the result and shares the decision in a letter to the seed producer. Seed producers must request the inspector to have the samples taken. There are peak periods of demand for the services of the laboratories, though timing can be unpredictable as well. Public seed enterprises normally first must clean small amount of their total seed stock and the laboratories will only take samples for certification from cleaned seed. Before cleaning the rest, they first want to ensure that there is a demand for the seed. This causes a delay in getting subsequent batches sampled and tested in time. Although Oromia Seed Enterprise (OSE) attributes the problem to limited storage space, this may also be related to the issue of reducing cost, if in the end the seed must be sold as grain because of overproduction.

There are also challenges from the laboratory side. Differences exist between the performance of the seed testing laboratories. Some laboratories receive more complaints than others. For instance, Ambo Laboratory has a relatively small work space so only a limited number of samples can be tested at a time. Assela Laboratory faces frequent breaks in power, which interrupt the process causing the technician to have to throw away the sample and start over. Shashemene Laboratory has no power connection at all, making it impossible to sterilize the medium for germination tests. They resort to conducting germination tests in odd locations. In some cases, complaints are related to the challenges just mentioned, but these may also extend to the competencies of the technicians. For example, several seed producers disputed the results of germination tests conducted on sorghum seed samples by a laboratory. It turned out that tests were conducted at too low temperatures for sorghum resulting in low germination rate. That may also reveal a gap in the technical knowledge from the technical side. Due to high staff turnover, new recruits often lack the experience required to perform test adequately. Such challenges are not only limited to the laboratories in Oromia but extend to most other laboratories with varying degree.

For standardization of results and as an additional level of control, attempts are made to check the results of laboratories. Each laboratory sends a duplicate of 5% of their samples to the National Seed Laboratory on voluntary basis, and the sample is analysed for physical purity and germination. As indicated in Table 2, the results of the analyses are not encouraging as 29% of the samples taken in 2018 are out of the tolerance range for germination. This raises the question whether all laboratories apply the same standards including the national laboratory. The system would benefit from ISTA accreditation of the National Seed Laboratory – to ensure the national reference laboratory applies internationally acceptable standards and practices. Because of the lack of international accreditation, Corteva Agriscience (formerly Pioneer Hi-bred) had to bring inspectors from Kenya to undertake field inspections.

Table 2 Result of analysis of duplicate sample from regional laboratories

Region	Purity		Germination	
	# of samples	Out of tolerance (%)	# of samples	Out of tolerance (%)
Amhara	16	6.2	16	6.2
Oromia	40	0	43	39.5
SNNPR	9	0	12	25
Tigray	8	12.5	8	25
Total	73	2.7	79	29.1

MoA's regulatory directorate is expected to provide technical support to the regions on seed quality assurance. It is also their responsibility to arbitrate disagreements between the regional state regulatory services and seed producers. Although there is no administrative link between the four regional state seed regulatory services, MoA has created an informal platform through which technical support is provided. MoA inspectors sometimes travel to the field to monitor the regional seed inspection and certification activities. Since 2014, effort is made to standardize the procedures for

seed certification across the country, which also includes experience sharing between regions. In addition, there are biannual meetings of experts from laboratories to discuss procedures and achievements. During these meetings they also set targets for improvements and they monitor progress made. Lastly, MoA is often central in obtaining funds from development partners and NGOs. Whenever they can, they donate equipment to the regions. As a case in point, AGP recently offered support to further equip the laboratories.

2.2.6 Import and export

For international breeding companies, Ethiopia is increasingly becoming an interesting country to produce seed. Now, three companies have started local production of vegetable seed: Hazera-Limagrain; Nunhems-BASF; and Syngenta. The companies are at various stages of development, with Nunhems and Hazera most advanced and already engaged in commercial production of seed and export. All three companies largely focus on the production of seed of tomato, capsicum and crops of the Cucurbitaceae family. The three companies together intend to invest more than € 10 million, generate the same amount annually in foreign currency and employ more than 2,000 people. As such, the sub-sector provides an interesting proposition for Ethiopia's quest for youth employment and forex.

Vegetable breeding companies that wanted to produce seed (for export) in Ethiopia have faced different challenges. The major one was importing and (re-)exporting unregistered varieties. After long delay the directive that allows for the import of unregistered varieties for export purpose was approved in December 2019. What remains are effective phytosanitary service and variety protection. For international trade, an accurate phytosanitary certificate is a *conditio sine qua non*. This requires competent inspectors who can facilitate fast and accurate inspections and issue reliable phytosanitary certificates. Recently, digital certificates are very much preferred, and the Ethiopian government needs to develop the capacity to issue these. Lastly, the absence of PBR in the country is also discouraging some investors of establishing seed production activities.

Over the past four years, the programme on Integrated Seed Sector Development in Ethiopia (ISSD Ethiopia) has worked with several vegetable seed companies both in project activities and through its facilitation of the Ethio-NL Seed Committee, a forum between the companies and MoA. In 2018, ISSD Ethiopia conducted a survey on the challenges most prominently faced by these companies, especially focusing on seed sales. A summary of the main findings of the survey is as provided below:

- The lack of foreign currency and delays in obtaining hard currency for local distributors to import the products of these seed companies are seriously hampering their sales. Even though seed has been placed on a list of priority items for import, distributors often wait six or more months to obtain the required currency. A vibrant black market for (hybrid) seed has emerged with excessively high-priced seeds (often sold at twice the price of Kenya), often with poor quality.
- The second most important challenge for vegetable seed companies is variety release and registration. This is costly and time consuming. Companies often need to employ additional agronomists to oversee and guide NPTs. Varieties that have performed well under similar conditions in other countries or are even the market leader in those countries have been rejected in Ethiopia. There is a strong plea by the companies to exempt (certain) vegetables from variety registration, as varietal turnover is high, market size is small, and vegetable growers operate as commercial outfits.
- The lack of PVP has been said to limit the introduction of new varieties of seed potato, OPVs and legumes. PVP can prevent theft (of parental lines) and subsequent illegal multiplication of varieties. The lack of enforcement of PVP in China has caused many seed companies to leave the country and reorient towards East Africa for seed production. In time, a strong PVP system can incentivize (foreign) seed companies to start breeding activities in Ethiopia as well.

2.3 External support for seed regulatory services

In addition to government organisations, there are also several development partners and NGOs that support seed sector development in Ethiopia. The Agricultural Transformation Agency (ATA) and Agricultural Growth Programme (as managed by the World Bank) have funding available to support

the seed regulatory system. In specific, ATA has been instrumental in facilitating seed quality assurance standards. And in some cases, ATA and AGP provided financial support for the operational costs of field inspections, variety evaluations and convenings of the NVRC. Recently, AGP has purchased equipment for the seed testing laboratories. These included polymerase chain reaction (PCR) machines for identification of varieties. However, no laboratory has yet been trained on how to use the machines. These recent investments in hardware should cover a large share of the requirements of seed laboratories. In addition, ATA is also leading the drafting of the regulation for Plant Breeders' Right.

The Alliance for a Green Revolution in Africa (AGRA) recently started a project focusing on seed quality assurance and variety registration. As part of the support activity AGRA will donate five cars to alleviate the mobility constraints of the seed inspectors. They also plan to introduce a digital tagging and tracing system for seed inspection and testing. In addition, there is the plan to pilot private seed inspector accreditation.

Supporting Sustainable Agricultural Productivity in Ethiopia (SSAP), a GIZ project, recently purchased some laboratory equipment including growth chambers. In addition, an MoU has been signed to establish a relationship between the Ethiopian and German seed regulatory services. Yet an actual plan of action is to be developed. The current phase of SSAP will end in 2020, but a new phase is expected to start in 2021. Tentatively proposed intervention areas for the new phase are: quality standards and laboratory procedures for phytosanitation; harmonization with international seed quality standards; variety release and registration; and plant variety protection.

ISSD Ethiopia also provided support to seed regulatory services in the country. The programme was influential in the establishment of the independent authorities in Amhara, Oromia and SNNPR, and has been training regulatory services' staff at both federal and regional state levels. Modest investments have been made in the facilities of the authorities, for example in purchasing moisture meters, weighing balances and GPS. ISSD Ethiopia also contributed to the regulatory and institutional reforms and the development of seed sector strategies that in part aim to improve the long-term performance of the regulatory system of the country.

Table 3 Seed sector support projects and division of labour

	Variety release and registration	Protecting plant breeders' right	Phytosanitary services	Seed quality assurance	Issuing import and export permits
ATA		- Drafting regulations		- Standardization - Bridging costs - Lending vehicles	
AGP	- Bridging costs of variety evaluations and NVRC		- Donating equipment	- Donating equipment - Lending vehicles	
AGRA				- Donating vehicles - Tracing inspection - Accrediting private inspectors	
GIZ	- Initiating variety trial by the ministry	- Training and knowledge sharing		- Training and knowledge sharing - Donating equipment	
JICA			- Donating mini laboratory		
ISSD Ethiopia		- Training and knowledge sharing		- Donating equipment - Facilitating institutional reform - Training and knowledge sharing	- Brokering partnerships - Facilitating Ethio-NL Seed Committee - Support for directives

The above comparative analyses show that there is relatively more attention for seed quality assurance. In addition, quite several activities are envisaged for the support to establishing a strong system for protecting plant breeders' right. Specific gaps that can be observed are:

- Limited attention is paid to the plant variety release system, both in terms of hardware and staff capacity.
- Though it is a relatively small activity, there is hardly any support for the Ministry's capacity to implement seed phytosanitary services (for seed imports and seed exports).
- More at governance level none of the projects focus on improving the overall institutional framework and coordination mechanisms between the seed regulatory services.

3 Conclusions

3.1 Needs assessment

Addressing the gaps in the overall regulatory system is not straightforward as there are many interlinkages between them. E.g. challenges in the performance of the seed quality assurance system are related to the staff's capacity and skills, which in turn are related to their salaries, facilities and incentives. This is again affected by the lack of attention that the regulatory system receives; which again is related to the lack of leadership and policy priority attached to the seed sector. Breaking down the various gaps separately we arrived at the following needs assessment:

Leadership: a need for more emphasis by senior management and policy priority

Seed regulatory staff at the federal Ministry and the regional Authorities feel that there is a lack of understanding of their work by the senior management, and as a result there is limited guidance and support. The concerned experts demand technical leadership from their management whereas in practice most of them do not have a professional background in the sector. Given the fact that seed regulatory issues belong to the most complex and diverse in the agriculture sector, directors-general or directors tend to shy away from the topic and focus on more straightforward policy areas like extension, phytosanitary services (for export crops), pest outbreaks or pesticide regulations.

The poor support from the senior management of both the Ministry and regional Authorities coupled with a strong reporting culture aimed at pleasing officials, have eroded the motivation of experts to deliver. Because of these two reasons (low priority, limited technical knowledge of management), staff turnover in the seed regulatory organisations is high, further negatively affecting the organisational culture. Overall, there is a need for more attention from the senior management of the federal Ministry and regional Bureaus for the work of the regulatory services.

Human Resources: a need for more, qualified and motivated seed experts

For several seed regulatory services, the number of employed technical staff is too low. This is especially the case of Oromia, but also in other regions the number of staff budgeted for does not consider the envisaged workload. At federal level, the number of positions does not yet correspond with the new responsibilities of the Ministry, which include variety registration and protecting plant breeders' right. Regardless of the number of staff, a common problem for all the institutions is the staff's limited technical capacity. Seed quality assurance is a very technical topic while only a few staff are experts in the area. Aggravating the problem is the high staff turnover and a lack of proper (on the job) training system, neither at federal nor at regional level. An example of the lack of system for seed experts, is the absence of morphological descriptors of varieties. Now inspectors identify varieties based on their experience, which further increases the possibility of making mistakes.

Added to the number and technical capacity gaps, is the internal motivation to provide adequate services. Although this is a common problem for most civil servants in Ethiopia, it is even worse for the seed sector experts. Related to this is the limited professional carrier perspective offered. Recent activities have improved the recognition of the job however. ATA organizes bi-annual meetings for laboratory staff at federal level, aimed at exchanging experience and problem solving. In addition, ISSD has organized on the job training for inspectors and laboratory staff, which has motivated them to improve performance. Overall, there is a need for a clear human resource management system for all seed regulatory staff, with a transparent carrier pathway (based on merit), job incentives and training opportunities.

Physical resources: mobility is key and support for equipment maintenance & use

Physical resources include vehicles, buildings, and field and laboratory equipment. The inspection services are hampered by transport facilities. Now, most branches have one old (>15 years old) car, which is not reliable to use (when it is not being serviced or repaired adequately). Other laboratories

even don't have a vehicle at all while again others have two. Given the size of the workload for the field inspectors and the often-remote areas they must visit, vehicle availability is the biggest obstacle for their functioning. As a result, often they cannot inspect the fields in time. Recently, AGRA ordered five cars, one car each for the four main regions and one for federal level. Whether those vehicles are assigned to head offices or made available to field inspectors will prove important for mobility.

At the seed testing laboratories most experts feel that there is enough equipment, and otherwise the missing equipment will be purchased soon. Recently, GIZ bought growth chambers for some of the laboratories, and currently, there is a purchase order by AGP for other equipment, which is expected to be finalized soon. The main challenge for the seed testing laboratories is that most of the newly obtained equipment is not in use. Some of the equipment is not even installed while for other equipment the experts do not know how to use it (e.g. for seed health). As such, the main need is to ensure that the staff at the seed testing laboratories is being trained (on the spot) on how to use the equipment and that there is a maintenance system in place (e.g. at federal level) on how to service and repair the equipment.

The special case of the variety release system: a strong need for drastic change

Now, especially for internationally operating companies, the most serious challenges are experienced with the variety release system. Private companies experience difficulties with costly and time-consuming process of variety registration and the poor implementation of the adaptation trials. This is related to the fact that the current implementer of the adaptation trials, often the research system, does not pay a lot of attention to its implementation as this is not their mandate. In addition, the National Variety Release Committee, that decides on the application, has only met once last year, leading to serious delays for the eventual variety registration. Interestingly, out of all the development partners and projects, only AGP provides some small support to this regulatory service (i.e. financial support for the National Variety Release Committee to convene). Therefore, there is a need to drastically change the national variety performance trail system and start with a pilot in which the implementation is done by the Ministry itself – with dedicated staff to implement the trials.

The quality assurance system needs digitization, post-control & international benchmarking

Currently there are doubts about the accuracy of the information provided by the field inspectors. In some cases where seed fields were positively approved a supervisory check showed that the field should have been rejected. Given the shortage of manpower and vehicles, there is a strong suspicion that in many cases the actual inspection might not have taken place. On the inspection forms only, the seed producer and the inspector sign which can easily be fabricated. In addition to this, comparative studies between tests held in different seed testing laboratories show differences in test results. In case disagreement arises between the seed producer and the laboratory there is no internationally accredited laboratory available in Ethiopia that can arbitrate. In addition, seed exports (other than vegetable) becomes difficult without an internationally accredited laboratory.

Therefore, there is a need to introduce a system of greater accountability which can be achieved through digitizing the system and including the seed testing lab's team leader in the approval process (to ensure physical checks have taken place). In addition, the example of Amhara, where double checks are done, should serve as an example for other regions. Lastly, Ethiopia should move towards ISTA accreditation for its federal seed testing laboratory which can then serve as a reference laboratory for the regionally operating seed testing laboratories. For now, it seems that there are quite several development partners and projects that could include these activities in their plans.

3.2 Recommendations

The recommendations consider the most pressing challenges in the regulatory environment as presented in the conclusions, as well as the potential for them being accepted by the government (the low hanging fruit), and whether they are not yet already taken up in the plans of existing development organizations and projects like AGP, AGRA, ATA, GIZ and JICA. As such they are activities that could be prioritized for Dutch support.

Establish an independent federal regulatory authority

Most of the gaps discussed above are related to the capacity of the regulatory structure to provide adequate and efficient services to the main stakeholders in the seed sector: seed companies, seed producers and farmers. These services include quality assurance, phytosanitary, variety registration and protecting plant breeders' right. Providing these services effectively can enhance the availability of quality seed of a large portfolio of superior varieties, which in turn leads to higher agricultural productivity and income for farmers. A strong regulatory system further provides credibility to the international community both for the import and export of seeds. Given the current lack of priority for seed regulatory services and the low salaries that can be provided for highly qualified staff, there is a strong recommendation to develop a Seed Regulatory Authority. This authority should be an independent government organization dedicated to the four-mentioned seed related services, with competent, specialized staff and sufficient budget to implement its activities, but still accountable to the ministry. As such, the services can be provided on a cost recovery basis. The Authority would follow well-respected examples like KEPHIS in Kenya and Naktuinbouw and NAK in the Netherlands. Main advantages of the Authority are:

- For the staff involved in the seed regulatory services it will first and foremost provide recognition for their work; through a more dedicated institutional environment that has professional services at the heart of it. In addition, recruitment of qualified staff will be made easier as Authorities can have higher salary scales than the Ministry.
- Another advantage of the legal entity of an Authority is that an Authority can generate revenue for the services provided. As such the fees for the field inspections, seed tests and variety trials can flow back into the organization, and hence be reinvested in equipment, staff training and/or other staff incentives.
- More efficient services, especially those related to variety release, breeders' right and phytosanitary services, can attract more (domestic and international) companies to invest in Ethiopia. Now poor trial management, high cost for the trial and absence of breeders' right protection are discouraging companies to invest.

Start a pilot for an independent variety testing service under MoA

The first recommendation is to organize a pilot under the management of the Ministry to demonstrate how a dedicated structure for variety testing provides a better service. The pilot can be implemented for a specific crop group (e.g. vegetables) and the Ministry could use land from the research centres to implement the trials. A dedicated agronomist or breeder needs to be assigned with a limited number of support staff to implement the trials. The design of the pilot should be in such a way that the trials are undertaken on a cost recovery basis; and the income the pilot generates should be ploughed back into its operations. Initially one vehicle and a few motorbikes need to be purchased to support the agronomist and its field staff.

Equip and modernize the quality assurance system

One of the main challenges for the field inspections is the lack of mobility of inspectors. To address this, major investment is required in the vehicles of the thirteen (soon to be fifteen) seed testing laboratories. Investments in hardware must be accompanied in the investment 'software', the technical capacity of the inspector to professionally implement the inspections. This can be further supported using drones and digitization of the reporting forms and databases. To facilitate effective field inspections, morphological descriptors of varieties must be developed and provided to the inspectors. In addition, a system of post-control in each of the regions needs to be developed that organizes grow-out tests (with irrigation facilities) for already certified seeds. With respect to the laboratory tests priority should be given to operationalize the existing laboratory equipment and to provide training to the lab experts. The one federal seed testing laboratory should become ISTA accredited and serve as a reference laboratory for the other regional seed testing laboratories. Like for the variety testing service, the Quality Assurance system should move towards a system of cost recovery for the services provided.

Improve quarantine services for import and export of seed

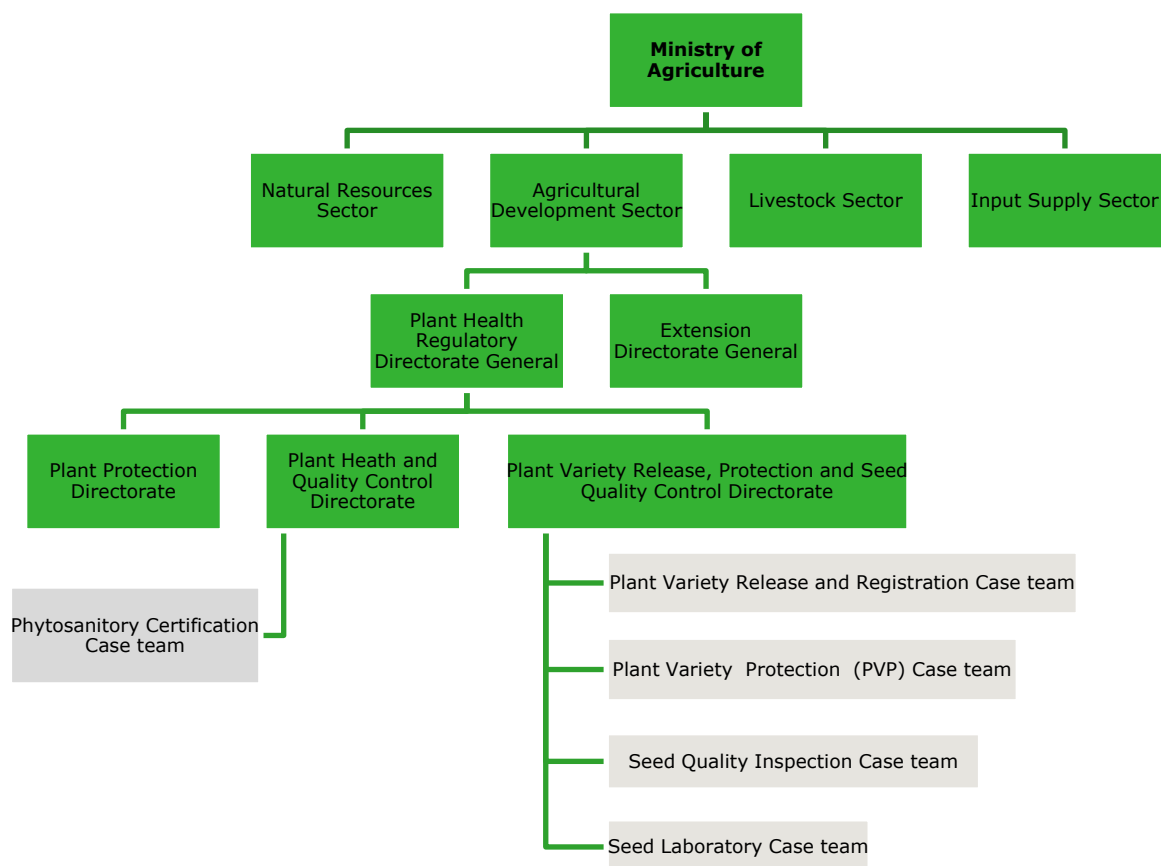
Specifically, for the seed phytosanitary services some small investments are required. In particular a few inspectors within the much larger phytosanitary services team should be assigned to seed phytosanitation specifically. These inspectors should be trained on the main pests that can carry with

seed, and diseases that can be transmitted by seed. Some small investments in a laboratory equipment can help the team to determine the pests and diseases. Specifically, experts need to be trained on which specific declarations are required for each of the crops (in line with internationally agreed standards), and how to inspect for these pests and diseases in the field. To facilitate this, manuals will be developed.

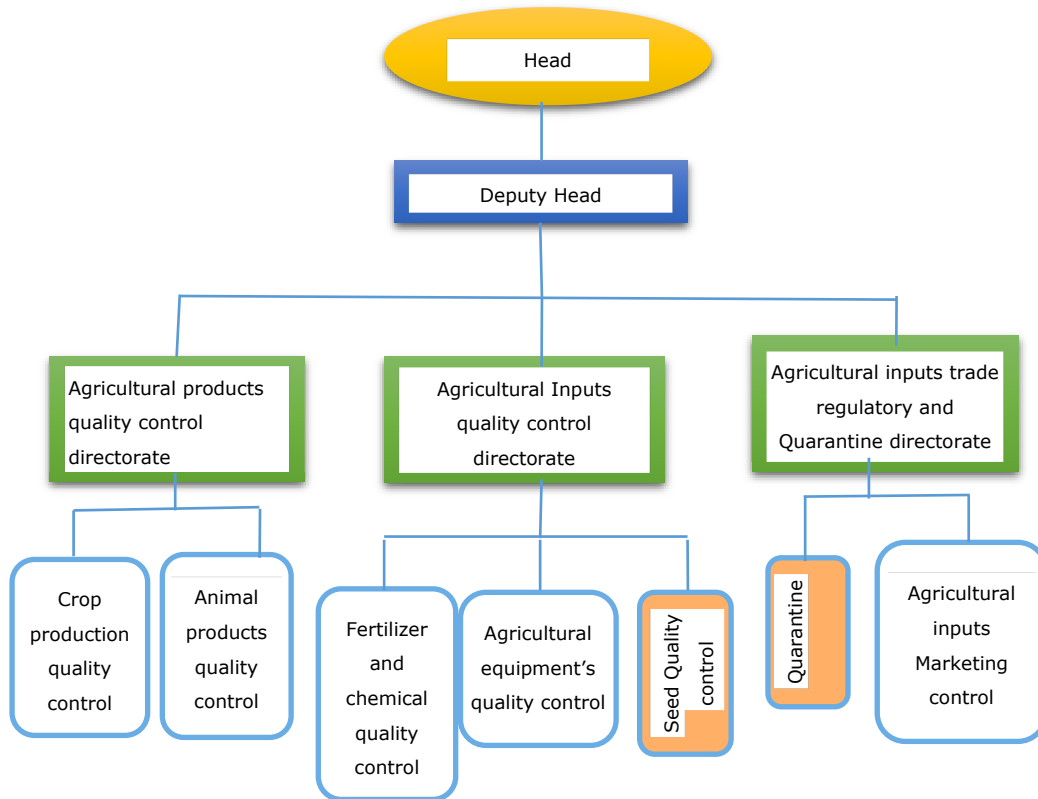
Establish seed regulatory platforms for improved information exchange and problem solving

As the earlier paragraphs highlighted differences can occur between regions and between seed testing laboratories. To come to nationally agreed standards, and to develop a system with reference points and sufficient checks and balances, several platforms for the seed regulatory services are proposed. These include a platform for the seed testing laboratories and field inspection staff, a platform for seed trade, and a platform for policy and regulatory issues.

Appendix 1 Organizational structure of MoA regulatory service



Appendix 2 Organizational structure of OAIRA-HQ



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Report WCDI-20-101

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