



Assessment of the Malting Barley Market System in Ethiopia

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Overview

The Business Innovation Facility (BIF) is a £40m private sector development programme funded by the UK Department for International Development (DFID). BIF's objective is to enable low-income producers and consumers to benefit at scale from their engagement with commercial markets. To achieve this, BIF collaborates with large companies in developing products and services that benefit poor people in one or more of DFID's priority countries.

For this assessment, BIF is investigating the malting barley market in Ethiopia following discussions with Diageo plc, which recognised that a more systemic approach could increase the domestic supply of malting barley and displace imported product. This assessment looks at Ethiopia's malting barley market system, including a review of the contract farming models used by some brewers. It identifies opportunities for interventions that would sustainably benefit large numbers of smallholder malting barley farmers.

The assessment was commissioned by BIF and undertaken by Offspring Consulting Group and Kadale Consultants (UK) Ltd.

Objectives of the assessment

The objective of this assessment has been to:

'Research the bottlenecks and constraints within the smallholder value chain and broader market for barley in Ethiopia in order to: identify and implement new approaches to doubling barley farmer productivity, increase the livelihoods of low income producers, and enable commercial brewers to increase sustainable procurement of local inputs.'

Key findings

The mapping of the malting barley market identified underperforming areas that constrain smallholder farmers' benefits from the market. The most important constraints that could be addressed are:

- Low returns for smallholders, which is a function of poor productivity and low prices;
- Insufficient seed supply of higher-yielding seed varieties;
- Limited capacity in malting (which is being partially addressed through new investment) and
- Lack of a consistent supply of quality barley for malting.

In response to these constraints, a set of potential interventions are proposed. These interventions take into account continued governmental interest and involvement in the market system as policy maker and economic participant.

Potential interventions

Intervention 1: *Improving the seed system: Convene key stakeholders to develop a roadmap on how to increase efficiency in the seed system to deliver varieties that increase smallholder yields and quality*

Intervention 2: *Increase access to mechanisation through promoting leasing models*

Intervention 3: *Strengthen contract farming design and operation to improve access to productivity enhancing production inputs and improve quality and supply of malt barley*

Recently announced investment in malting capacity by Boortmalt will go a long way to address the shortfall in current malting capacity. The need for malting investment analysis may need further review if demand continues to grow.



Introduction

The Business Innovation Facility (BIF) is a £40m private sector development programme funded by the UK Department for International Development (DFID). BIF's objective is to enable low-income producers and consumers to benefit at scale from their engagement with commercial markets. In addition to country programmes in Myanmar, Malawi and Nigeria, BIF collaborates with large companies that are developing new products and services that benefit poor people in one or more of DFID's priority countries. Through conducting market assessments, BIF aims to understand markets and find ways to transform these that benefit both the poor and the private sector, recognising the co-dependence of these two groups.

This document is a synthesis of a longer market assessment conducted by BIF in May 2016 and updated in December 2017. It provides information on how the malting barley market system operates, on key constraints and on options for interventions that could lead to sustainable, scalable change in the market for the benefit of smallholder malting barley growers and other market players.

This assessment combines data and information from other studies, interviews with market players and stakeholders including government agencies, and focus group discussions with malting barley smallholder farmers. The assessment draws on a study carried out by the International Food Policy Research Institute (IFPRI), as part of the GoE's initiative to strengthen the sector. The IFPRI report provides considerable detail on the malting barley value chain, sets out constraints and recommends interventions at national and regional levels. The BIF market assessment leverages those findings, focusing in on intervention areas which more directly affect and/or require engagement of market actors. General agronomic practices, extension support and the coordination of agronomy stakeholders are therefore not comprehensively addressed here. Considerable detail on these can be found in the IFPRI report.¹

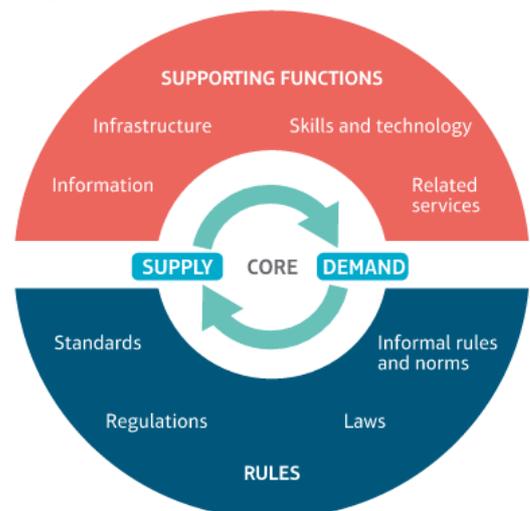
Methodology

BIF employs a market systems approach which locates the transactions within a wider system that either constrain or facilitate the functioning of the market, as represented in the 'market systems donut' in Figure 1.

The 'core', where supply meets demand, can be equated to a value-chain showing the progressive transformation of a combination of inputs, such as seed and fertiliser, into a crop, which is traded and ultimately transformed in to a final product for consumption. The 'core' transactions are enabled (or constrained) by 'supporting services' that determine how well the core functions. The core is underpinned and enabled (or constrained) by the 'rules' that govern the system, such as laws, standards and regulations, as well as by informal rules such as cultural norms.

This report applies a market systems assessment to the malting barley chain from seed through to beer production. To do this, it presents the actors at the core of the malting barley system, namely farmers, traders, malters and brewers, as well as reviewing the supporting service providers and rules to identify systemic constraints and opportunities for change.

Figure 1. The Market Systems 'Donut'



Source: M4P Operational Guide (2015)

¹ Available at: <http://www.ifpri.org/publication/barley-value-chain-ethiopia>



Malting barley market system

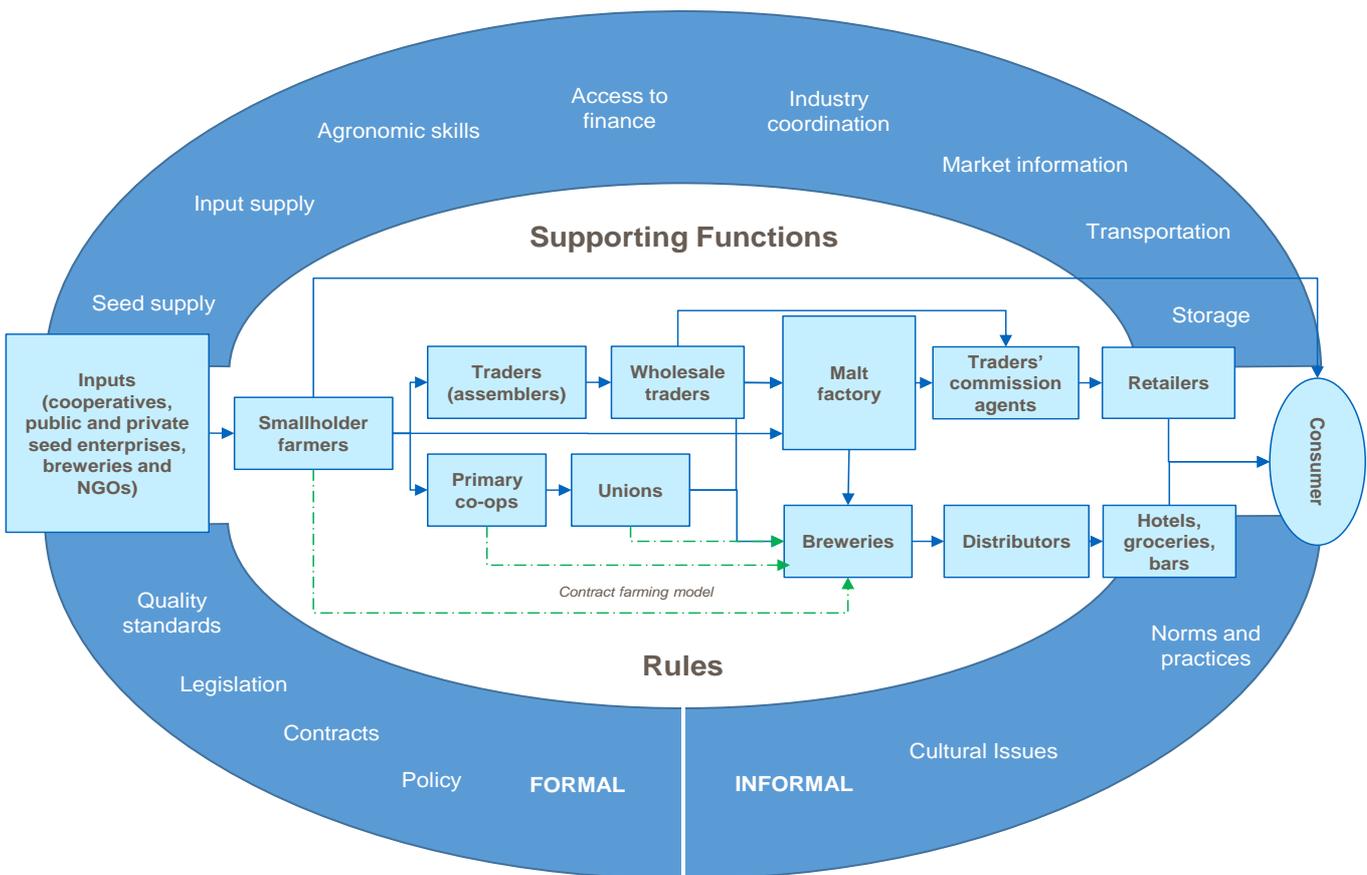
Definitions used throughout this report are:

- **Malt** – processed grain;
- **Malting barley** – unprocessed grain.

The steps taken to transform malting barley into malt are grading, steeping, germination, kilning, and finally grading and cleaning.

An overview of the malting barley market, using the market systems approach is set out below:

Figure 2. Overview of Malting Barley Market System

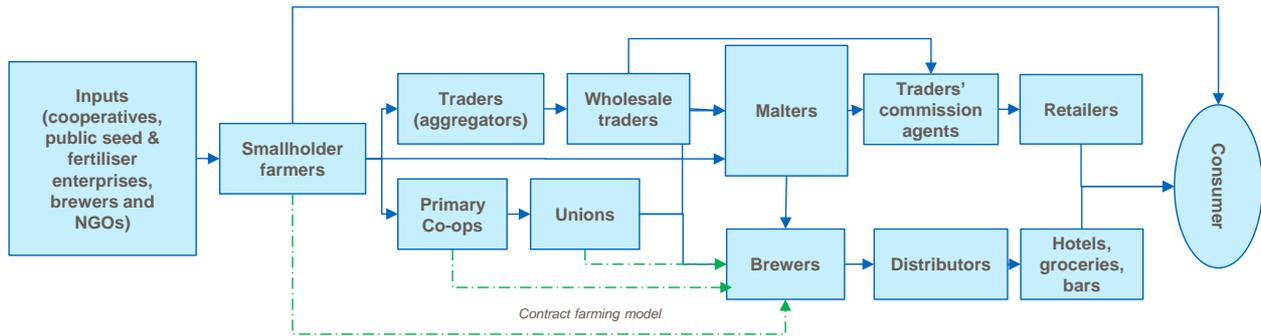


Core functions

Malting barley requires key inputs to grow, notably seed and fertiliser, on land provided by farmers, mostly smallholders. Smallholders belong to Primary Co-operatives (PCs), who have a dual role to supply inputs to their members and to buy malting barley (and other crops). Private traders operate in growing areas and buy from smallholders who are not members of PCs, as well as from those who are members of PCs but who prefer to sell to traders. The PCs sell to a Federal Co-operative Union (FCU), to traders or direct to brewers. FCUs can sell to wholesale traders, brewers or a malter. Brewers arrange for their own purchased malting barley to be converted to malt by the malter (a potential system bottleneck) or import malt, which is processed into beer for onward distribution and sale.



Figure 3. Core functions in the chain



The key players in the malt barley core chain are reviewed in turn below.

Smallholder farmers

Barley is widely grown by smallholders as a staple food and as a source of cash income. It is concentrated in the Oromia and Amhara regions, which contribute 53% and 30% of national production respectively. Production is 95% rain-fed with 5% on irrigated land, so production is dependent on weather conditions.

Barley is one of the staple food crops in Ethiopia, accounting for 6% of per capita calorie consumption. It is also important for smallholder livelihoods. In the 2016/17 Meher (rainy) season, almost 4.2 million smallholders allocated 960,000 hectares to barley cultivation, which is 10% of total cereal area. From this land area, barley production was just over two million metric tonnes (mT), around 8% of total cereal production (Central Statistical Agency (CSA), 2017).

Table 1. Barley Growing by Region, 2016/17

Region	No Of Smallholders	Area in hectares	Production in mT	Yield mT/ha
TIGRAY	387,359	95,462	169,572	1.776
AMHARA	1,334,770	323,655	608,069	1.879
OROMIA	1,659,195	454,662	1,093,944	2.406
BENISHANGUL-GUMUZ	5,435	773	1,119	1.448
S.N.N.P.R	779,937	84,037	151,506	1.803
National Total	4,170,003	959,273	2,024,921	2.111

Barley production increased at an average annual growth of 5% between 2009/10 to 2013/14, below the rate of other major cereals. Productivity growth accelerated between 2015/16 to 2016/17 to 7.4%, however, more land was allocated to teff (+5.3%) relative to barley (+1.57%) or other cereals (+1.14-1.89%).



Table 2. Average cereal production, land area and yield by crop (2015/16-2016/17)

Crop	Area cultivated (million ha)			Production (million mT)			Yield (mT/ha)		
	15/16	16/17	% Change	15/16	16/17	% Change	15/16	16/17	% Change
Cereals - All	10.0	10.2	2.5	231.3	253.8	9.75			
Teff	2.9	3.0	5.3	44.7	50.2	12.3	15.6	16.6	6.7
Barley	0.9	1.0	1.6	18.6	20.2	9.1	19.7	21.1	7.4
Wheat	1.7	1.7	1.9	42.2	45.4	7.6	25.4	26.8	5.5
Maize	2.1	2.1	1.1	71.5	78.5	9,7	33.9	36.8	8.5
Sorghum	1.9	1.9	1.5	43,2	47.5	10.0	23.3	25.3	8.3

Source: CSA (2017) – no data provided on yields for all cereals

According to CSA (2017), the net result of increased land area and yield was that barley production increased by 9.06% from 2015/16 to 2016/17, which is a positive development for the market players. The outstanding question is whether this level of increase can be sustained, otherwise growth in malting barley production can only come from increasing the land area cultivated for malting barley from unused land or switching to malting barley from other crops, which are often seen by smallholders as easier to grow.

Barley yields in Ethiopia are higher than the African average. Though they are increasing, during the past decade barley yields in Ethiopia have averaged 1.43 mT/ha, which is still less than half of barley yields in the two best performing African countries of Kenya (3.26 mT/ha) and South Africa (2.93 mT/ha), and well below yields in the highest-performing countries, such as France, Germany and the Netherlands, with average barley yields over 6 mT/ha. Thus, despite recent growth in yields, barley yields in Ethiopia remain lower than potential (Rashid et al., 2015).

The yield gap is a function of many factors including:

- Barley smallholders have not adopted modern inputs like fertiliser and improved seed varieties that help increase production (CSA, 2014; Mulatu and Grando, 2011). Based on data from the CSA, only 0.6% of barley growers use modern seed varieties, far less than for other cereals, except sorghum.
- Research shows that from 2003 to 2013, two thirds of the smallholders did not apply any fertiliser to their barley plots. Even though more smallholders used fertiliser on barley in recent years (up to 42% in 2014), the rate is far below other cereals, except sorghum. A similar trend is observed in fertiliser application rates (dosage). On average, barley growers applied 30kg of fertiliser per hectare (ha), far lower than other cereals, except sorghum. Two studies argued that proper application of fertiliser could double barley yields in Ethiopia (Mulatu and Grando, 2011; Rashid et al 2015).
- Many emerging countries in sub-Saharan Africa and Asia, use more than 1 kiloWatt (kW) mechanical power index per ha in agriculture, in contrast to 0.1 kW/ha in Ethiopia. There are 2.24 tractors per 100 square kilometres in Ethiopia, which is much lower than neighbouring countries, such as Sudan and Kenya, where 9.6 and 26.3 tractors are available per 100 square kilometres respectively (ATA).

Despite the high growth in the demand for malting barley, and some recent acceleration, smallholders have not sufficiently expanded production to meet that demand. From a review of available literature, field interviews with smallholders and meetings with government and stakeholders, the following factors were noted to explain why smallholders have not switched to or increased malting barley production:

- Improved varieties of certified seed are not always available through PCs or via contract farming schemes. Many smallholders use their own recycled seed or buy it from the informal market;
- Applying pesticide is more important for high productivity barley compared to other grains, but the cost of pesticide and spraying equipment is high;



- There is a lack of input credit to buy improved seeds, fertiliser and crop protection chemicals, which have to be paid for upon purchase, where a farmer is not part of a contract farming scheme;
- Smallholders say that barley is more labour intensive than maize and wheat. For example, the recommended ploughing is four passes to bring nutrients up from lower levels of the soil. Limited availability of mechanised services in barley producing regions and the cost make this difficult to do;
- As barley grains hang closer to the ground and are grown in highland areas on slopes, mechanised services providers prefer to focus on wheat and other crops that are easier to harvest;
- Market prices are not attractive enough to overcome the additional labour for increased ploughing, weeding and other practices to meet the quality requirements of the brewers and malters; and
- Smallholders met for this assessment get lower malting barley yields than for food barley and wheat.

Around 80% of food barley is consumed by the households with the balance sold for income or retained for planting. In contrast, 70-80% of the malting barley produced is sold, with the balance for home consumption and for seed. Malting barley is predominantly grown as a cash crop, so market access is very important.

Demand for malting barley has been growing as a result of increased urbanisation and rising incomes contributing to growth in beer consumption. The main use for malting barley is for commercial beer brewing, but malting barley is also a desirable food source, notably as sa injera (fermented thin bread), porridge or roasted. It is also used for making local alcoholic beverages and there is a growing demand for bread made from malting barley, mainly in Addis Ababa. While most malting barley ends up being used for commercial beer brewing, there are competing demands for it.

Farmer Organisations

PCs and FCUs are important actors in agriculture, as the majority smallholders belong to these officially sanctioned bodies. Cooperatives serve a dual role as economic agents for members, but also as agents of central/regional government to implement its social/reform agenda. They are seen by GoE as the means to ensure that smallholders can access necessary farming inputs and for their important consumption needs.

PCs are the main actors who supply smallholders with key agricultural inputs, particularly improved seeds, fertiliser and pesticides. PCs also aggregate crop to supply either FCUs or directly to malters and brewers through a contract. Cooperatives receive a commission from 10-40% for aggregating, but have to wait for payment, which means their cash resources become stretched, since members want to be paid quickly.

The cooperative system has been and continues to be a focus for agricultural sector reform efforts. While PCs play important roles providing inputs, aggregation and negotiation with larger buyers and end users, evidence suggests they are constrained by their capacity and by limited capital that prevent them from serving as effective intermediaries. These constraints lead to problems in the timely provision of inputs, collection of crops and payment to members for their crops. Unlike private traders, cooperatives are less flexible to revise prices in response to prevailing market conditions. This lack of flexibility makes selling to cooperatives less attractive for smallholders compared to selling to traders. According to Alemu et al. (2014), cooperatives, particularly in some districts of the Oromia region, have a limited role in marketing malting barley, with only 6% of marketed crops channelled through them.

An ATA-sponsored study by Rashid et al. (2015) identified comparative roles of small traders and cooperatives in the marketing of barley. At the national level, traders are the largest actors in the marketing of barley, handling 70% of the marketed surplus. The reasons listed for this generalised practice include:

- *Traders offer better prices:* cooperatives' prices are set by their boards and there is less flexibility to adjust these to market conditions;



- *Co-operatives have limited capital to purchase:* With financial capacity limitations, cooperatives may not always buy and/or buy only a limited amount;
- *Co-operatives are unable to provide upfront payments:* many cooperatives are unable to secure bank credit to purchase/aggregate produce. Traders generally have more financial flexibility to pay upfront, which is very attractive to smallholders;
- *Traders offer more flexible terms and/or can schedule pick up closer to their farms:* traders can offer collection/transport, which many co-operatives cannot.
- *Cooperatives have warehousing constraints:* Limited capacity means many cooperatives cannot hold stock for long. PCs store a range of crops, of which malting barley is only one and may not be regarded as so important.

As a result, smallholders often prefer to sell their produce to traders than to co-operatives. According to Alemu et al. (2014), individual traders (local aggregators and wholesalers), account for more than 70% of sales from smallholders, with sales directly to the Asela Malt Factory (AMF) and other brewers representing another 24%. Smallholder product sales to cooperatives account for just 2% of total traded surplus.

Private traders

Traders are the major players in the marketing of malting barley. From our field work, most of the product received at AMF in recent years, over 90% during some periods, was supplied by traders.

There are several categories of traders. Some are full time, changing their focus depending on the harvesting time for each crop, so barley is one of several crops they trade. Others are larger-scale farmers who aggregate the output of smaller growers. In both cases, being more actively engaged in marketing means traders have more insights into market and price trends, so they negotiate based on better information than smallholders. Traders offer lower prices to smallholders just after harvesting time, when supply is greatest to take advantage of the limited storage capacity and finances of cooperative and unions to buy when these bodies are not able to. They can also obtain better selling prices as they can sell to a broader range of buyers, including malter, brewer and consumer markets. Since they can have several sources of revenue, they have greater flexibility in holding stocks in pursuit of higher prices.

Many smallholders sell malting barley to traders because they offer more competitive prices as the season progresses, can make immediate payments and can pick-up more flexibly than cooperatives. This is why some brewers involve traders as agents in implementing their contract farming models.

Despite the important role they play, many traders lack technical know-how on grain quality management and store grain in poorly designed, low quality warehouses, which compounds grain quality problems.

Malters

There are two malters currently operating: Asela Malt Factory (AMF) and Gondar Malt Factory (GMF).

AMF's production capacity is 36,000 mT per year. On average, it purchases 20,000 mT of domestic malting barley and imports the balance. AMF reports challenges getting malting barley of a sufficient quality from farmers, co-operatives and traders. Because of a shortfall in production, AMF's output is shared by allocation to brewers, based on their production capacity, decided by a committee.

GMF was established in 2013 by TIRET, a regional development group that also owns Dashen Breweries, with capacity to process 16,000 mT of malt annually. GMF is primarily focused on supplying Dashen, which has two breweries in Debrebrehan and Gondar. The management of GMF does not expect being able to sell to other breweries in the near future, particularly with plans to quadruple the production capacity at Dashen from 1 million hl/year to 4 million hl/year.



GMF also reports challenges with domestic supply of malting barley, specifically quality, quantity and contract delivery by cooperatives and directly with smallholders. Both malters receive most of their domestic malting barley from traders with limited supply from cooperatives.

Table 3: Current malting capacity and malting barley demand of Ethiopia (2013)

Malting Factory	Malt Production Capacity (mT/year)	Malting Barley Demand (mT/year)
Asela Malt Factory	36,000	60,000
Gondar Malt Factory	16,200	21,000
Total	52,200	81,000

It is widely accepted that malting capacity is far below current demand, which is likely to worsen without new investment, necessitating continued, and potentially increasing, importation of malt and malting barley. Similarly, both AMF and GMF regularly import around 40% of their malt and/or malting barley requirements.

Imports of malt rose considerably from 3,000 mT in 2000 to over 40,000 mT in 2012. In 2015, malt imports reached 66,000 mT which was 65% of the total annual demand, valued at US \$38 million (ICARDA, 2016). Data from the Ethiopian Revenue and Customs Authority shows approximately 90,000 mT of imported roasted and unroasted malt in 2016. On current growth trends, malting barley and malt import could exceed \$400 million by 2025, compounding Ethiopia's structural foreign exchange deficit. The allocation system of malt by AMF makes importation more attractive, as brewers seek certainty of supply. Overall, domestic supply meets only half the demand from the six brewers with the rest having to be imported.

There should be reduced need for importation of malt with investment in domestic malting capacity. In November 2017, Boortmalt, a subsidiary of French company Axereal, signed an agreement with the GoE to build a 60,000 mT malting factory opening in 2018. The company is also testing three new barley varieties (Polar, Rina and Fatuma).

Brewers

Between 1995 and 2012, Ethiopia experienced the highest growth in per capita beer consumption in Africa (Rashid et al., 2015). The expansion of beer consumption has been driven by urbanisation, population growth and rising incomes. As a result of increasing consumption, the beer brewing industry has grown rapidly in recent years, with average annual growth of around 27% from 2007 to 2012 (Alemu *et al.*, 2014). Recent reports point to continued growth in the demand for malt barley, driven largely by increased demand for beer. The Ethiopian beer market has grown rapidly (10-15%/year) and, in 2016, total market consumption of malt was around 120,000 mT, and expected to grow to 200,000 mT by 2020.

Brewing is dominated by the two malters and six brewers. All but one brewer, BGI which is the owner of St. George, buy malt from the two malters. Market players recognised that domestic procurement faces quantity and quality challenges with the malting barley and malt supply. Brewers regularly import processed malt or raw malting barley, with the latter processed domestically. Based on planned expansion by brewers, the heavy reliance on imported malt/malting barley is likely to intensify.



Table 4: Brewers' capacity and demand for malt, 2016

Brewers	Location	Current plant capacity (hl/year)	Current malt demand (mT/year)	Share of industry total (%)
Raya (40% owned by BGI)	Maychew	600,000	6,960	5.1
Habesha (Bavaria NV 40%)	Debrebrehan	650,000	7,500	5.4
Diageo	Meta	1,700,000	20,000	14.7
Heineken	Bedele	600,000	35,000	25.7
	Harar	900,000		
	Waliya	1,500,000		
Dashen (Duet Vasari Beverages 50.1% & Tired 49.9%) UK partner	Gondar	750,000	32,000	23.5
	Debrebrehan	2,000,000		
BGI	Addis Ababa	3,000,000	35,000	25.6
	Kombolcha			
	Awassa			

Source: interview with breweries and malting factories

Together, the six brewers have an annual production capacity of 11.7 million hectolitres. Total derived malt demand is around 136,000 mT per year, which means existing malting capacity is only able to meet 35% of current demand though the Boormalt investment will add considerably to capacity. This does not include the plans by several brewers to expand production capacity in the near future.

Contract Farming Models

Of particular interest has been the development of contract farming as a means by which brewers can secure smallholder malting barley.

Diageo was the first to introduce a contract farming model as part of a broader domestic procurement initiative in 2012, followed by Heineken and Dashen. Each model provides a package of support to smallholders so as to become better/more reliable suppliers of malting barley. Diageo's and Dashen's models emphasise collaboration with cooperatives as key intermediaries, while Heineken's focuses on relationships with larger, lead farmers.

Based on the perceived successes of contract farming, other brewers have expressed interest in developing contract farming models e.g. Raya Breweries, in Tigray, has signed a Memorandum of Understanding (MoU) with ATA for development of a contract farming model. Habesha, has also piloted contract farming with farmers in Debrebrehan and Asela. GoE has tried to facilitate further growth by developing legislation designed to provide greater transparency and predictability in how such models are to be implemented.

There is general acceptance that contract farming can increase smallholder production and improve livelihoods of farmers, while providing brewers with higher-quality domestically-grown malting barley.

This review covered the Diageo and Heineken models, which follows below:

Diageo's model

Diageo's interest in the malting barley market is driven by a commitment to improving the livelihoods of smallholder producers and a business imperative to hedge against fluctuation in price and availability of foreign exchange required to import malt and other necessary inputs. From either perspective, it is likely that Diageo will maintain a long-term commitment to building its domestic procurement programme from malting barley smallholders.



Diageo produces and distributes the Meta range of lagers and has committed to sourcing 80% of its agricultural inputs in Africa locally by 2020, which in Ethiopia mainly comprises malting barley. To achieve this, the Meta Brewery smallholder farmer partnership was formed. The objective is to increase the productivity and incomes of smallholders and enable 100% of agricultural raw materials in the Meta Brewery supply chain to be locally sourced.

Meta Brewery has worked with TechnoServe to provide smallholder farmers with a comprehensive support package referred to as the 'Meta Package'. The programme started in 2013 and works mainly in South West Shoa, Arsi and West Arsi, with around 6,000 smallholders. The programme is implemented via 31 PCs and 5 FCUs representing these farmers. The scheme has the following features:

- Direct contracts between Meta and each smallholder, with a commitment to a guaranteed market price. While not intended as a legally binding agreement, the intent is to reinforce the commercial relationship and commitment of both parties. Reported non-compliance or breach of contract is less than 10% according to Diageo/TechnoServe representatives.
- Capacity building of farmers to improve their skills and collective buying power. Extension support is provided to groups of 25 farmers, while general business advisory is provided from Addis Ababa.
- Pre-financing inputs are delivered via cooperatives with some subsidy. This package includes malt barley seed, fertiliser and packaging. Meta recognised the productivity limitations of the Holker variety and has since improved access to more attractive varieties, such as Traveler.
- Grain is aggregated at the PCs and FCUs.
- Two quality assurance companies work with Meta to classify produce by the level of observable attributes, colour and impurities into A, B, C, and D grade, with the price based on quality.

Diageo and TechnoServe consider the programme to be successful, particularly in terms of expanding the productivity and participation of smallholders with some indicators of success as follows:

- The programme has been successful in attracting new farmers, with plans to increase participating farmers to 20,000; productivity and quality of smallholder malting barley have reportedly improved.
- There is very little direct subsidy in the programme as over 91% of all costs are recouped.
- The 'contract' with smallholders, while loosely structured, has been effective in limiting side selling. Enforcement is assured by disengaging with those who breach the contract.
- The input package seems appropriate to attract and sustain farmer engagement. This includes funding by Diageo to participating farmers for limited mechanised support.

Diageo has identified areas for further review:

- There is a need to introduce mechanisation and more tailored financial products to cover the subsidy element and/or support more successful smallholders to progress further. This is particularly in the Arsi/Bali area where mechanised farming is well-established.
- The lack of malting capacity is a clear bottleneck in the system.
- While the programme employs private quality assurers, there are only two providers in the country.
- Diageo and TechnoServe consider the current phase as developmental and an opportunity to establish baseline information for a more comprehensive impact assessment, including a better understanding of productivity improvements and full cost recovery of the subsidy in the programme.



Heineken's model

Heineken's contract farming scheme based around large lead farmers. This reflects in part the financial and administrative inefficiencies of working with the cooperative system. To implement the programme, Heineken received a matching grant from the Dutch government for a four-year programme (2013 – 2017).

Prior to rolling out its programme, Heineken carried out field trials over a 2-3 year period to determine the seed varieties most suitable for the targeted growing regions, working with the Ethiopian Agricultural Research Centre to get a license to introduce 'Traveler'. Most stakeholders agree that the Traveler variety is more productive than the Holker variety that is commonly used in most regions.

Heineken's package includes bagging and packaging equipment for partner farmers and centralised collection points, whether at the compounds of the PCs, FCUs or lead farmers. Heineken use the services of the two quality assurance companies to classify malting barley into grades A to D.

Heineken is active in the Arsi, West Arsi and Bali. The programme started with 3,000 farmers and the number of participating farmers stands at 10,000, with plans to expand to 20,000 farmers. Heineken hopes to secure domestic sourcing of about 20,000 mT of barley.

Representatives from Heineken report very significant improvements in the yield of malting barley to their target farmers, improving from around 2 mT/ha to over 6.5 mT/ha. This improvement is linked to both the improved seed variety and the targeted extension services provided via EU-CORD. Heineken credits its success in introducing the Traveler to collaboration with regional research, multiplication enterprises, specifically Oromia Seed Enterprise, Holeta Research Centre and Ethiopia Seed Enterprise.

The following were identified as bottlenecks to expansion of the Heineken programme:

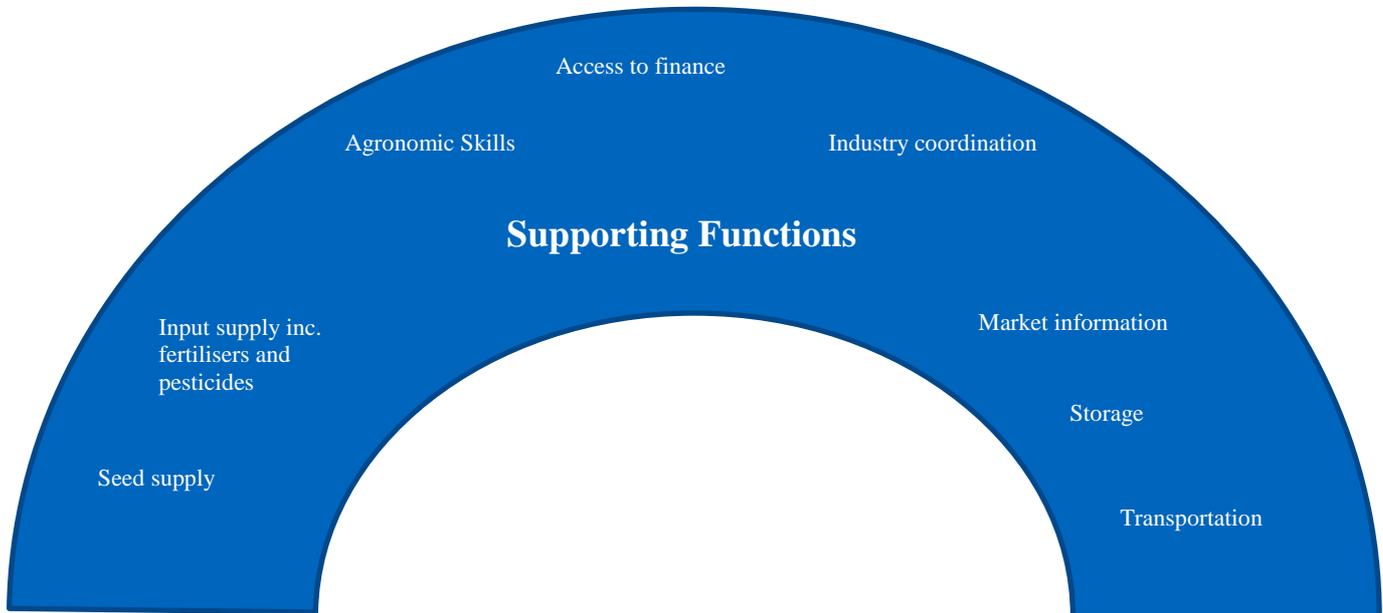
- Limited malting capacity, and high fees at around five times the price for similar services in Europe.
- It is still cheaper for Heineken to import malt, which reflects continued inefficiencies in the supply chain, and that its parent company can bulk purchase from international suppliers at lower prices.
- Limited financing for smallholders. Regional microfinance organisations (ACCI/DESCO) are often the only active lenders, but their products are not suitable to farmer needs and cashflows.
- Limited capacity of extension services and FCUs, which are hampered by several constraints, including financial/management expertise, warehousing space and a lack of understanding of the terms and conditions of contract farming agreements.
- Contract enforcement is weak, so some smallholders sell to traders after receiving inputs from Heineken, which is why Heineken prefers to deal with larger farmers who understand contract obligations.



Supporting functions

Supporting functions are key facilitating inputs and services that enable or constrain transactions in the core chain.

Figure 5: Malting Barley Market System - Supporting Functions



Seed supply

Some of the main actors in the seed sector include: the Ethiopian Seed Enterprise (ESE); the Ethiopian Institute of Agricultural Research (EIAR); the Regional Agricultural Research Centres (ARC) and multiplication agencies; and Agricultural Cooperative and Unions.

Based on data from the CSA, only 0.6% of barley growers use modern seed varieties, far less than other cereals, except sorghum. The shortage of improved barley varieties is associated with both the research system, which is required to generate primary or early generation seeds, and the seed enterprises that produce and distribute seeds. For instance, in the Amhara region, there is a coordination issue between the regional research institute and the seed enterprise, as only 1 out of 12 improved varieties were under production. The seed enterprise indicated that there is a shortage of basic barley seeds and so they tend to distribute third-generation seeds as improved seed. Of the total seed marketed by the Regional Seed Enterprises (RSE), only 4% are barley varieties, which compares with 18%, 63%, and 13% for teff, wheat, and maize, respectively (Rashid et al., 2015).

During the study field work, smallholders said lack of improved seed was a key constraint in their willingness to expand malting barley production. Smallholders noted that only a few malting barley varieties are widely available, and named Holker, Miskal, and Beka, released in 1970s and are no longer productive. Farmers expressed interest in replacing Holker with Traveler.

The seed sector is dominated by government actors in regulation and supply. The GoE continues to implement reforms in the seed sector, which seek to partially open it up to private investment. The GTP II strategy has laid out potential interventions on agricultural research and seed quality. ATA is working with the Ministry of Agriculture to design new initiatives where private actors will get involved in direct seed marketing. Some of the initiatives being developed include: direct seed marketing (DSM), direct input marketing (DIM) and farmers service centres (FSC). According to representatives at Debrebrehan Agricultural Research Center there is also a plan to engage primary cooperatives in seed producing and marketing.



In addition to the formal system, there is a vibrant informal seed system, known as the local or ‘farmers’ system, that is unregulated and characterised by farmer-to-farmer seed exchange. The informal seed system, either self-saved seed or farmer-to-farmer seed exchange, accounts for 90% of the seed used by smallholders (Rashid et al., 2015). Smallholders depend on the informal seed system primarily because it is cheaper and readily available in the smallholder’s locality, and seed is available when needed.

Fertiliser and pesticides

The import and distribution of fertiliser and pesticides is largely managed by government. The Agricultural Input Supply Enterprise (AISE) is the central procurement body and government monopoly tasked with importing chemical fertiliser to Ethiopia. FCUs and PCs serve as distributors of the fertiliser to members. Unfortunately, there have been delays and inefficiencies in the input supply system, with associated adverse effects on farm productivity and yields for most agricultural commodities.

Several government initiatives are specifically aimed at attracting private investment in the provision of inputs for smallholder farmers. However, price regulation can deter investment.

Mechanisation

Barley smallholders generally use traditional pre- and post-harvest practices that are time consuming, less labour-efficient and lead to high post-harvest losses during harvesting, threshing, cleaning, transporting and storing. This reduces the volume and quality of produce that the smallholder can sell.

According to the ATA, the use of agricultural mechanisation technology can increase production and productivity. Agricultural mechanisation solves the problems of insufficient human and/or animal labour at critical points in the production cycle of commodities.

Despite some progress in research on farm machinery, relative to other disciplines, the research focus and investment on mechanisation remains very limited. As a result, farm machinery such as broad bed-makers, small and medium-sized tractors, walking-tractors, row planters, cultivators, harvesters, threshers, cleaners, storage and artificial driers that are suitable to different agro-ecologies are not available to smallholders.

Mechanisation is an indispensable pillar for making farm operations efficient and productive, while also contributing to the efficiency and productivity of all the other inputs used in crop production, such as seeds, fertiliser, water, labour and time. As part of the GoE’s barley strategy, there are plans to amend the nationwide regulatory framework on mechanisation, to develop industry standards and to establish testing and certification facilities for agricultural machinery. Additionally, an important focus will be developing, testing and promoting business models for the effective provision of agricultural mechanisation services to the smallholders. Equally important will be building human and institutional capacity on mechanisation research and regulatory institutions, as well as linkage platforms at federal, and regional levels.

There is wide variation in the use of agricultural machinery across malting barley growing areas for land preparation, harvesting and threshing. In the Arsi and Bale areas of the Oromia region, barley farmers use tractors for land preparation, whereas this is not common elsewhere. Planting and harvesting farm machineries are not commonly used in malting barley production. Farmers use human labour for malting barley, harvesting and animal trampling for threshing.

Extension services

Malting barley producing farmers receive agricultural extension services through governmental agricultural extension workers in their communities. There are more than 17,000 Farmers Training Centres (FTC) throughout the country, mandated to provide extension advisory services through demonstrations and training. However, there continues to be capacity deficits, particularly in barley and specifically malting barley, which has not received much attention compared to wheat, maize and teff.

Diageo, Heineken, Dashen, AMF and GMF all use extension workers to advise and follow-up with their malting barley farmers. The gap is around smallholders outside contract farming schemes.



Storage / aggregation

Malting barley aggregation is usually conducted in FCU and PC compounds which serve as the major aggregation points (Rashid et al., 2015). There is a shortage of storage capacity across the value chain. In most of the kebeles and woredas, the largest storage facilities are owned by the cooperatives, and neither retailers nor wholesalers say that they have large storage facilities (Rashid et al., 2015).

At the national level, smallholders mainly store in 50 kg bags laid on concrete warehouses. This method exposes grain to infestation and quality deterioration, resulting in storage losses and lower value.

Storage is a significant constraint in malting barley and it is unlikely to be alleviated simply by capital investment to build additional warehouses. The entry of contract farming scheme providers may help alleviate the storage issue as ownership/management of barley crop moves away from farmers to end-users, but more change is needed.

Introducing warehouse receipt programmes, as well as encouraging private investment in storage, should be strengthened by appropriate and transparent rules and regulations (Alemu et al., 2014). During the past year, the ATA and World Bank have launched a project called CCF, the Commodity Collateralized Financing. This promotes the use of inventories in warehouses as collateral to access short term financing from formal lenders. While not exclusive to malt barley, the government aims to use the CCF model to contribute to increased capital flows to SMEs, agribusinesses, and producer organisations in the barley sector, including agricultural cooperatives.

Access to Finance

As is the case more broadly in agriculture, there is little formal credit available to barley smallholders for inputs, aggregation and storage. Similarly, the availability of leasing services for agricultural machinery is very limited. While government has long tried to encourage banks to develop agricultural based lending products, the sector is underserved with credit. The exceptions are the contract farming models where inputs are facilitated via pre-finance credit from the scheme providers.

A key focus of many government and development programmes is to promote increased production through the cooperatives to which many farmers belong. However, the evidence suggests that only a small share of traded barley is marketed via cooperatives and that many cooperatives lack the financial resources to pre-finance inputs or finance post-harvest aggregation. Access to finance for aggregation is a considerable constraint that limits cooperatives' effectiveness to compete with traders.

Financial Services

Agricultural players in Ethiopia face gaps in access to financial services, product quality, and quantity. In terms of products, gaps exist for all major product categories, including credit, savings, insurance, and payments, and all major types of agricultural players, including producers, traders, and manufacturers of all sizes. Key issues include insufficient input credit and weather insurance for smallholders, lack of inventory financing for traders, lack of export financing for exporters, as well as lack of long-term credit, cash-flow-based lending, attractive deposit products, and reliable payment products for all players. In terms of product quantity, the economy is credit constrained, with credit supply estimated to be US \$3 billion short of credit demand. Agriculture is heavily affected by this credit shortfall (AEMFI, 2012).

The umbrella organisation for microfinance in Ethiopia, the Association of Ethiopian Microfinance Institutions (AEMFI), carried out research to identify a set of root causes for these constraints. The observed constraints are grounded in three interdependent elements of the agricultural finance 'ecosystem':

- a) Structural: the diagnostic showed a diverse, but small sector, dominated by public institutions, with many players and low competition. A lack of bank-specific and general ICT infrastructure to build-up remote banking channels, gaps in agricultural finance regulation (no dedicated regulatory framework for financial cooperatives), and an inflationary environment, exacerbate the problem (AEMFI, 2012).



- b) Agriculture-specific constraints: several characteristics of the agricultural sector make it less attractive to financial institutions than other sectors. This includes low levels of profitability due to limited economies of scale, as well as high transactions costs. The latter, in turn, are determined by small transaction sizes, 'lumpy' repayments, illiquid and perishable collateral, risky cash flows with high covariance across borrowers, physically dispersed clients living in difficult to reach locations, and diverse sub-businesses with distinct dynamics (AEMFI, 2012).
- c) Capabilities of financial players: Financial institutions in Ethiopia have skill gaps in most key banking processes, especially in risk-management which leads to risk-averse practices that disadvantage agriculture. This leads to lending practices based on short term trade finance and higher collateral than in benchmark countries, which is a primary reason for limited access to credit (AEMFI, 2012).

Rules

From a rules perspective, it is important to note that GoE is a rule setter and a key economic actor in malting barley production. The GoE and affiliated actors, are present throughout the malting barley sector as market actors and as supporting service providers. This section focuses on GoE's role as rule maker and enforcer.

The strong demand for malting barley in recent years, along with the failure of smallholders to respond, has led to increased importation of processed malt and malting barley. In response, the GoE has decided to prioritise malting barley production as part of its economic planning agenda. Importantly, the agriculture pillar of GTP II calls for a market-oriented approach and commercialisation with the following objectives:

- Ensure specialisation of smallholder production in higher-value strategic commodities;
- Market oriented production by farmers to ensure supply of sufficient quantity and quality of raw material inputs for agro-processing;
- Establish market systems to ensure efficient aggregation and supply of production, with farmers getting the right income for their produce;
- Increase export-oriented commodities so smallholders benefit from international markets; and
- Ensure raw material supply for four agro-industry parks to be established during GTP II.

In support of the unfolding barley strategy, the GoE commissioned a study of the barley sector. Led by the ATA, a draft report of this study is being discussed at various levels of government. The broad aim is to identify policy options to address the bottlenecks in the barley value chain. The study objectives were:

- Understand the production, area, and yield growth of barley compared to other major cereals, including examining the extent of modern input use and access to extension services.
- Map the major market routes from local to terminal markets, exploring aggregation and storage infrastructure, access to markets, processing/value-addition, and distribution.
- Examine the proportion of production marketed by smallholder barley producers and the main challenges that deter the growth of marketable surpluses.
- Identify the major actors in the barley value chain and their requirements for quantity and quality.
- Examine the margins of smallholder barley producers and other value chain actors.
- Identify the obstacles that have prevented a competitive barley sector relative to imports.

The study prioritises potential interventions, as well as likely partners. It highlights the need for coordination among key actors at both the national and regional levels. Support for regional agricultural bureaus and extension service providers, research and seed multiplication and improvements in the cooperative system are among the important national objectives laid out in the study. The study highlights other potential interventions, particularly those relating to private sector engagement, such as contract enforcement.



Constraints analysis

The objective of this assessment has been to review key markets and sub-markets in the malting barley market chain focusing on how improvements in those functions can positively affect the incomes and livelihoods of smallholders, while giving market players sufficient returns on their investments to bring forward further investment. The assumption is that if smallholders *supply higher volumes and better quality of malting barley at competitive prices, there will be an improvement in their income levels and livelihoods.*

There is clear evidence of strong and growing demand for malting barley, yet an insufficient supply response by smallholders, resulting in increasing quantities of malt being imported. With considerable haulage costs and challenges around imports, particularly forex shortage risks and delays in the port, logic suggests there ought to be interest in, and potential to, increase domestic malting barley production.

Investment to increase malting barley production has been limited, though contract farming schemes offer a means by which additional inputs can reach farmers. There is a recognition that the barley/malting barley sector is underperforming and a desire by the GoE for improvement, hence the substantial efforts to develop a strategy for change.

From a market system perspective, four over-arching constraints were identified:

1. Low returns for smallholders, which is a function of poor productivity and low prices.

Although malting barley gets a 15% premium over wheat and food barley, this has not been a sufficient incentive to smallholders to substantially increase malting barley production. There is encouragement from GoE to increase production, but smallholders grow other crops, partly as a diversification strategy and because the investment required for these other crops, such as wheat, is lower and the returns better based on a lower cost of production.

There is a complex mix of factors behind the low returns for smallholders. The most important ones are:

- i. **Predominance of low yielding varieties**, particularly Holker, which appears to have lost its 'vigour'. Where smallholders can access the newer Traveler variety, they get up to twice the output under similar conditions growing conditions. The constraints on Traveler have been its current limited availability and distribution compared to Holker, though this is reportedly changing. However, Traveler needs an altitude of 2,500 metres or more; Holker can perform at slightly lower altitudes.
- ii. **Certified seed, fertiliser and necessary crop protection inputs² are not readily available** and/or delivered on time. The supply chain of these key inputs is managed by governmental bodies. There have been positive developments, such as the introduction of new seed varieties and a major expansion of seed multiplication for these varieties is underway. Contract farming schemes have helped with the availability of seed, fertiliser and crop protection inputs. But delays in supply lead to late planting, late application of fertiliser and late use of crop protection measures, which all reduce yields.
- iii. **Malting barley is more expensive to produce than comparable crops** as it requires a more intensive farming regime, ideally with multiple deep ploughing, multiple weeding and more labour-intensive harvesting, since the grain is low to the ground. Malting barley is more susceptible to pests and fungal diseases, so application of crop protection chemicals is necessary. This means that growing malting barley requires a higher investment compared to wheat or other crop options, so farmers need a higher price to offset the additional costs. The current pricing mechanism provides for a premium of around 15% over wheat; however, based on the low productivity of traditional malting barley varieties, this premium is not sufficient to attract enough farmers to meet the demand.

² Herbicides, pesticides and fungicides.



- iv. Related to the relatively high cost of growing malting barley, ***the smallholder has to pay for inputs and services in advance*** of harvesting and selling. Contract farming schemes have helped address this cashflow problem by providing access to seed and fertiliser on credit; however, there are still problems for smallholders to find the cash to pay for the remaining inputs/services that could improve yields and quality. Without this access, they face sub-optimal productivity and lower overall returns.
- v. ***Mechanisation is needed for malting barley production, but is not accessible***. Lack of access is widespread; however, even where there are mechanised equipment providers, they prefer to provide services to wheat farmers, who grow on flatter ground and which is easier to harvest due to higher yields and taller stems. If the availability of mechanisation were greater, providers might see malting barley as an acceptable market, but at this point, it is a lower priority. The returns on malting barley do not justify the farmers bidding up the price to secure the available services.
- vi. ***Information on appropriate production practices ('agronomy') is not sufficiently available***. Smallholders are not sufficiently aware of key practices that make a difference to yield and quality. Services from governmental bodies have given malting barley more priority in recent years, but the technology transfer from research through governmental extension providers to smallholders does not function sufficiently well. The supplementary efforts of contract farming schemes to provide extension has been beneficial, but tend to use more expensive and limited reach 'extension officer' models, than more efficient and extensive lead/model farmer models. As a result, there is insufficient coverage of malting barley smallholders with insufficient depth of service.
- vii. ***High post-harvest losses from poor on-farm storage*** reduce the returns to smallholders through damage from rodents and damp. These losses are not specific to malting barley smallholders and are the same for other grains. Reducing losses would improve returns, but that would not make malting barley more attractive compared to other crops.
- viii. ***Poor quality malting barley is widespread in the supply chain*** as there are inadequate quality control points. The situation is different with contract farming, as buyers use quality checks at the point of purchase (sieves, visual inspection, emptying out bags, etc.) in a transparent process with the smallholders watching, followed by moisture checks on arrival at the depot. This pro-active approach helps communicate to the smallholders that quality is checked transparently. This encourages smallholders to only bring product that is going to pass the immediate checks. In contrast, there is less attention to quality in the sales channel via the PCs/FCUs, and through traders, so product bought through these channels has more quality problems. The preponderance of poor quality malting barley in the system results in a general discounting of prices.

The combination of the above factors results in lower returns for growers and in turn reduces smallholders' incentives and resources to invest in more land for malting barley and using more inputs. This results in substantially lower overall production and poorer quality than is possible.

Where returns are insufficient, smallholders' normal response is to push for higher prices as the 'easiest' way to increase their returns. Yet, the returns for smallholders can be dramatically improved by switching to higher yielding varieties, with Traveler the clear choice. That smallholders use some grain from their Traveler crop to sell as seed via the informal market at a 25% premium suggests that they and other smallholders see this as the desirable production choice. Higher productivity would reduce the pressure to increase returns through price and enable smallholders to invest in the additional services and inputs out of their increased incomes.

Various contract farming schemes have improved the attractiveness of growing malting barley, by improving access to crop inputs through financing them and making them available. They have also offered the smallholders a safe/secure market, which encourages them to make this choice relative to some other choices where the market is less certain. It looks like these schemes are set to expand.



2. Seed supply is not meeting the demand for high yielding seed

The supply of key production inputs, notably seed and fertiliser does not operate sufficiently well to make these available to all smallholders. The seed distribution chain works through the FCUs and PCs, each with their own inefficiencies, shortage of capital and other capacity limitations. The seed system partly functions, but constrains farmers through the overall lack of available good quality seed.

Seed is a particularly key input that constrains the production of malting barley in two ways. Firstly, there is insufficient volume of seed available, which may be delivered late and not always of the right quality. Secondly, the researchers, breeders and seed companies have not brought forward higher yielding varieties suited to Ethiopia's market needs. This means that smallholders have until recently only be able to access traditional lower yielding varieties like Holker, which was first available in 1972.

On a positive note, the seed system has allowed the introduction of new international varieties, such as Traveler, which has proven to be a significant development due to its suitability for the agro-ecological environment combined with its high yield. However, more clarity would be welcome regarding the framework for introducing/gaining access to new/high-yielding varieties in the market.

Although Traveler is proven in the field, there are system risks in relying on one variety, such as monopolistic behaviour by the seed owner and by the seed distributor, as well as relating to genetic/pest/disease risks. These concerns, explain the leading role of the EIAR in the introduction of new seed varieties. Ethiopia needs additional high yielding varieties, that the seed system has not made available to smallholders.

3. Insufficient malting capacity to process domestic production

The analysis highlights that there has been a bottleneck in malting services to supply the estimated 115,000 mT/year demand, which continues to grow. AMF was the only malter, with around 36,000 mT of annual malt output capacity, until the investment of Dashen in its own malting plant (2011), with a capacity of around 16,000 mT/year. Capacity will increase with the realisation of an investment of Boortmalt in a 60,000 mT malting facility in 2018.

Insufficient malting capacity has been a constraint to increasing domestic malting barley production, but this is easing and will help reduce imports and encourage domestic supply. There may still be a case for further investment.

4. Lack of predictable quality supply of malting barley/malt for brewers

The demand for beer has grown faster than the domestic supply of malting barley and its conversion into malt. The GoE and the brewers have acted to address the shortfall in supply, recognising the cost to the country of importing large quantities of malt/malting barley on the one side (Government) and the risks to their supply chains on the other side (brewers).

These constraints on smallholder production, seed supply and malting mean that brewers (and malters) face significant challenges in realising a viable domestic supply chain that is more competitive than the alternative importation of malt/malting barley. Imports benefits from overvaluation of the Birr, such that imports are artificially cheaper than the market would otherwise determine it should. However, the flip side of overvaluation is that forex becomes scarce as parties want to buy it, and not sell it, at the official rates. In time, this results in forex shortages, and these can delay the flow of imports.

Imports for Ethiopia come via Djibouti, which is very congested, resulting in additional time clearing the port, reportedly up to one month. This is a cost to importers whose capital is tied up in goods in transit. It also reduces the responsiveness of imports to meet brewing factory demand, which can only be met either by keeping larger stocks, which in turn means more investment in warehousing and working capital, or seeking more domestic supply, which has not yet been responsive to undersupply in the market.



A further risk to good quality supply is the lack of warehousing close to production areas. Private warehousing to ensure quality and availability, using warehouse receipt programmes, could be considered, but could take time to develop due to the risk averse nature of banks.

Interventions

While there are many potential interventions, market system approaches look at how to catalyse the market system to fill gaps and repair broken/inefficient links *by itself*; otherwise problems re-occur over time. There are potential market system interventions to address these constraints.

Potential Market System Interventions

Intervention 1: *Improving the seed system: Convene key stakeholders to develop a roadmap on how to increase efficiency in the seed system to deliver varieties that increase smallholder yields and quality*

Convene a platform for key public/private stakeholders to gather with the aim of clarifying the framework for domestic development and importation of improved seed varieties. This would have to be done in coordination with the Ethiopian Ministry of Agriculture and the Agricultural Transformation Agency (ATA). An independent convener could play a catalytic role in helping the actors to properly define key challenges and arrive at potential solutions/improvements to the current framework and possibly stimulate a shift to longer term solutions, which might include greater private engagement/investment in the system. This could be expanded to include wider issues (e.g. frameworks/rules for contracting farming) and/or stakeholders, in a process that would be seen as supporting broader industry best practices, not solely an individual producer.

The key activities under this intervention would be:

- Convene a workshop with key public/private stakeholders;
- Define potential solutions/improvements to the current framework; and
- Agree an action plan/road map that stakeholders support and identify a player to finance/facilitate.

Intervention 2: *Increased access to mechanisation through promoting leasing models*

While the legal framework for leasing exists, there is presently very little financial and/or operational leasing activity being carried out in the country, particularly in agriculture. Further analysis of the leasing potential for mechanised services would be useful, followed by a suggestion of models as to how this could be further expanded, potentially beyond barley. This approach may benefit from recent legislation intended to promote/expand the leasing sub-sector in Ethiopia. Brewers could structure pilot programmes that would leverage their resources and stimulate even more supply of mechanisation services in targeted barley producing regions. This can be done possibly through vouchers or other mechanisms that will also strengthen the attractiveness of the contract farming package.

The key activities under this intervention would be:

- Perform further research on the leasing potential for mechanised services;
- Assess potential models for the expansion of leasing options; and
- Support the structuring of pilot programmes to stimulate supply of mechanisation services.

Intervention 3: *Strengthen contract farming design and operation to improve access to productivity enhancing production inputs and improve quality and supply of malt barley*

Current access to inputs is limited by the efficiency of the seed and fertiliser supply and distribution system to reach all smallholders. Contract farming schemes have provided smallholders with access to seed and fertiliser on credit, and crop protection via cash sales, supplementing the supply that comes through cooperatives. However, there is evidence that smallholders do not sell all their malt barley to the contract farming contractor for a range of reasons. There are models for incentive-based contract farming that more strongly reward compliance and deter non-compliance. These create tiers for accessing inputs and



incentives to encourage smallholders to comply and reward them for investing. They also create added value that increases the incentive to remain in the scheme, such as input insurance (weather related) bundled with life assurance and access to mechanisation. Brewers and malters need to continue to review their contract farming schemes to find ways to strengthen them and increase coverage, while reducing side-selling, based on learning from experience and best practices around the continent.

The key activities under this intervention would be:

- Support the review contract farming schemes of (willing) brewers to provide specific guidance on improvements that could be considered;
- Support participating brewers to enhance their contract farming schemes through supplier improvement programmes, including strengthen linkages with FCUs; and
- Support firms to pilot related initiatives, such as vouchers for mechanised services.

A further potential intervention is: *Keep malting capacity under review, potentially conducting a malting investment analysis*

The study found that malting is a key bottleneck, but the recently announced investment by Boortmalt of a 60,000 mT facility to open in 2018, will be a substantial step forward.

Given the importance of malting in the system, it would be prudent to keep the issue of capacity under review and take steps to encourage/incentivise more investment if demand continues to grow rapidly.



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