Development in Practice

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cdip20

Contract farming, cooperatives and challenges of side selling: malt barley value-chain development in Ethiopia

Dawit Alemu, Alice Guinan & Judith Hermanson

To cite this article: Dawit Alemu, Alice Guinan & Judith Hermanson (2021) Contract farming, cooperatives and challenges of side selling: malt barley value-chain development in Ethiopia, Development in Practice, 31:4, 496-510, DOI: 10.1080/09614524.2020.1860194

To link to this article: https://doi.org/10.1080/09614524.2020.1860194

Published online: 28 Dec 2020.

DEVELOPMENT IN PRACTICE
2021, VOL. 31, NO. 4, 496–510
https://doi.org/10.1080/09614524.2020.1860194

Routledge
Taylor & Francis Group

Contract farming, cooperatives and challenges of side selling: malt barley value-chain development in Ethiopia

Dawit Alemu, Alice Guinan and Judith Hermanson

ABSTRACT

This paper presents the experience of malt barley value-chain development through cooperative-based contract farming. The descriptive and qualitative analysis used primary data collected from the actors involved and secondary data. The results indicate that side selling is a major challenge, estimated at about 30%. Promoting the role of cooperatives and avoiding side selling by addressing both farmer- and system-level issues requires considering the dynamic nature of the malt barley market, involvement of all relevant stakeholders, capacitating cooperatives rather than providing handout-type support, and promoting market-based disincentives and incentives for the misconduct and conduct of actors.

ARTICLE HISTORY
Received 4 July 2019
Accepted 3 August 2020

KEYWORDS
Environment (built and natural) – Agriculture; Labour and livelihoods – Poverty reduction; Sub-Saharan Africa

Introduction

It is well recognised that group action, chiefly through a cooperative approach, helps smallholder farmers to safeguard their interests and enhances their integration to value chains for improved performance. Accordingly, the promotion of farmer cooperatives and their unions has been a core agricultural public intervention in Ethiopia (Alemu et al. 2011; Ayelech 2010).

Although the number of established farmer cooperatives is increasing yearly, their performance, especially in terms of ensuring timely aggregation of member produce, value addition, and ensuring access to better markets, remains weak overall but with promising potential for smallholders. Cooperatives engaged in high-value agricultural commodities, such as coffee, sesame, fruits and vegetables, honey and dairy are reported to be among the better performing cooperative types, especially in terms of ensuring better access to markets (Alemu et al. 2011). An empirical study in malt barley value-chain performance indicated positive relationships between coordination of activities and performance and between joint decision-making and performance at the farmers-cooperatives interface (Watabaji 2016).

The main mechanism through which cooperatives access these high-value markets is contract farming arrangements, and the key guiding principles for sustainable contract farming are: (i) trust among contracting parties, (ii) equal status in negotiations, especially in the design process, (iii) the existence of felt incentive/benefits for both parties in cases of dispute, and (iv) sharing potential risks (Bezabeh 2018; Otsuka, Nakano, and Takahashi 2016; Da Silva 2005).

In general, the success or failure of contract farming arrangements depends on two major factors. The first is related to how cooperatives are managed, which is itself related to cooperative governance issues such as: (i) member participation and the independence of board members in decision making, (ii) managerial competence and expertise, and (iii) the board's and manager's relationship to wider stakeholders and to cooperative members. The second is how contract arrangements are established and enforced, which is specifically related to: (i) the prevailing regulatory framework for contract

CONTACT Dawit Alemu dawit96@gmail.com

farming,[1] (ii) the details of contract specifications that govern the contract farming agreement and whether they are governed by law or not, (iii) dispute resolution mechanisms, and (iv) the capacity of both parties to fulfil their duties under the contract (Giel et al. 2018 ; Alemu et al. 2011; Prowse 2007).

This study is based on experiences of cooperative unions and the farmer members of the cooperatives who have been provided with technical support by Self Help Africa (SHA), an international NGO, through a project implemented from 2012 to 2017, which aimed to increase the income of malt barley farmers using more effective cooperative-based contract farming as key component of the value-chain development.

The project has supported these cooperative unions and their respective primary cooperatives to ensure efficient aggregation of products, better access to markets for the purchase of inputs and product sale, and better prices. Through the project, member farmers of Galema and Raya Kejewa cooperative unions, with a total of 66 primary cooperatives, are selling about 90% of their malt barley to traders rather than to, and through, cooperatives. In addition, approximately 90% of their sales are immediately after harvest rather than at a later time when prices are higher.

The side-marketing of malt barley seems to have been exacerbated by the unions and cooperative governance-related challenges, as well as by inefficient contract arrangements.[2] Recognising the huge potential of cooperatives in safeguarding the interests of smallholder farmers, this paper presents: (i) an overview of the key actors and their behaviour in Ethiopian malt barley markets, (ii) the role and performance of contract farming, (iii) the extent of side selling and its determinants at household and systemic levels, and (iv) concluding remarks in relation to recommendations for improved performance of contract farming through cooperatives.

Approach and methodology

The study was conducted in Digelu Tijo, Limu Bilbilo and Kofele Districts of Arsi and West Arsi Zones of the Oromia region and focused on Galema and Raya Kejewa cooperative unions and their respective member primary cooperatives.

The study used both primary and secondary data collected in December 2015. The primary data from farmers were collected using a semi-structured questionnaire. Additional primary data were gathered from unions and cooperatives management, traders, and representatives of the Assela Malt Factory, Dashen Malt Factory (Heineken and Diageo breweries), *Woreda* offices of agriculture, and *Kebele* offices of agriculture through FGDs (focus group discussions) and KII (key informant interviews) using checklists prepared for each stakeholder. Secondary data were generated from malt factories, breweries, cooperatives and unions. In addition, market intelligence contributed important facts related to the marketing behaviour of all stakeholders in the malt barley value chain.

Primary cooperatives were purposively selected to ensure the consideration of diverse situations related to marketing performance, proximity to buyer (i.e. Assela Malt Factory) and involvement in seed production. Accordingly, three primary cooperatives from Hayato Raya Kajewa FCU were selected: Garmama primary cooperative (a better performer), Abdi Boru primary cooperative (a medium performer), and Burka Abosa primary cooperative (a poor performer). From Galema FCU, Mede Bora primary cooperative, which is located closer to its potential market centre, Koma Kara primary cooperative, which is located further from the potential market, and Limu Dima primary cooperative, which is involved in seed production in addition to grain production. Total sample size was 121 respondents, which is about 20 farmers from each cooperative (Table 1). For the FGD, the number of participants ranged from two to six depending on the availability of relevant individuals in the respective category of respondents.

Data analysis

Market intelligence-related data analysis often requires triangulation given the obvious conflicts of interest among the diverse market actors that serve as sources of data. Accordingly, a range of

Table 1. Data sources, tools used and sample sizes.

Primary data sources	Tool	Sample size	
		Indicator	Number
Cooperative member farmers	Semi-structured questionnaire	No of farmers	121
Union and cooperatives management staff	FGD at Coops	No of FGD	6
	FGD at Unions	No of FGD	2
Traders	KII at Assela town	No of KII	4
	KII at Bekoji town	No of KII	4
	KII at Kofele town	No of KII	4
Assela Malt Factory	FGD	No of FGD	2
Other malt factories	FGD/KII	No of FGD/KII	2
Breweries	FGD at BGI Ethiopia	No of FGD	1
	FGD at Heineken Brewery	No of FGD	1
	FGD at Diageo plc	No of FGD	1
Woreda Office of Agriculture	FGD	No of FGD	1
Kebele Office of Agriculture	FGD	No of FGD	1

Note: The Number of participants in each FGD ranged from two to six.

market actors were included as respondents, and the data generated analysed using both qualitative and quantitative methods. To ensure the validity of the raw and synthesised data, a triangulation approach and expert opinion consideration were employed.

Factors that affect side selling were identified using a probit model.[3] In this study, side selling is defined as "a household that sold malt barley fully or partly in 2014 to buyers other than primary cooperatives and/or cooperative unions as per the contracts". Given the binary nature of the dependent variable, their marketing decision is represented by a dummy variable 1 if a household sold to other buyers (farmers, assemblers, and traders) and 0 otherwise. A probit model was used to capture the marketing decision behaviours of farm households. Following Greene (2008), the model can be specified as follows:

$$Y_i^* = \beta X + \mu_i \tag{1}$$

where Y^* = an underlying latent variable that indexes farmer decisions of malt barley side selling, i = 1, 2, 3 … n (observations), βi = regression coefficients to be estimated, ui = a disturbance term, and X = covariates.

The marginal effects of the coefficients generated from the model, through maximum likelihood estimates, present the effect of a small change in the explanatory variables on the probability of being a side seller. Marginal effects are used to interpret the magnitude by which a one-unit change in an independent variable will change the outcome on the dependent variables.

It is hypothesised that socio-demographic characteristics of the farm households, resource ownership, malt barley production characteristics, household product marketing behaviour, perceptions about advantages, service and relationships with market actors, and access to services influence the side-selling decision of malt barley producers (Table 2).

Results and discussion

Malt barley market behaviours and actors

Following the expansion of the number of breweries from three in the early 2000s to about 10, the yearly demand for malt barley is increasing significantly. Accordingly, the number and type of market actors are also increasing. Market behaviour is similarly changing along with the emergence of different marketing strategies, including direct contract farming with farmers through cooperatives to secure supplies of the required quality and quantity of malt for breweries.

The main actors in the malt barley grain market are smallholder farmers, farmer traders, primary cooperatives, cooperative unions, private traders, malt factories (Assela Malt Factory and Dashen Malt factory), breweries (Diageo and Heineken), and public service providers. Apart from traders,

Table 2. Description of hypothesised variables of household's malt barley side selling decision.

Category of variables	Variable description (values)	Mean / proportion	Std.
Socio-demographics	Years of formal education of the household head	2.13	0.96
	Age of the head of the household	42.61	11.46
	Family size of the household	10.31	5.20
Resource ownership	Total size of the farm operated in ha	2.71	1.72
	Total number of livestock owned in TLU	16.04	8.16
	Total number of oxen owned	2.30	1.27
Malt barley production characteristics	Size of land allocated to malt barley in ha	0.88	1.25
	Malt barley yield in qt/ha	23.36	12.76
Market behaviour	Purchase of seed of malt barley from cooperatives (1 = yes, 0 = no)	0.82	–
	Number of years in the cooperative as member	8.16	6.60
	Volume of malt barley consumed in qts	2.40	3.14
	Volume of malt barley sold in 2014 in qts	7.50	8.66
	Sale of malt barley immediately after harvest (1 = yes, 0 = no)	0.32	–
	Sale of malt barley after storing for some months (1 = yes, 0 = no)	0.81	–
	Sale of malt barley late before next production season (1 = yes, 0 = no)	0.33	–
Perceptions	Perceived unit price advantage provided by cooperatives (1 = better than others, 0 = otherwise)	0.51	–
	Perceived price negotiation advantage provided by cooperatives (1 = better than others, 0 = otherwise)	0.49	–
	Perceived time of payment by cooperatives (1 = better than others, 0 = otherwise)	0.35	–
	Perceived trust in quality determination with cooperatives (1 = better than others, 0 = otherwise)	0.60	–
	Perceived long-term marketing partnership with cooperatives (1 = better than others, 0 = otherwise)	0.33	–
	Perceived long-term marketing partnership with union (1 = better than others, 0 = otherwise)	0.07	–
	Perceived exchange of information with cooperative (1 = better than others, 0 = otherwise)	0.53	–
	Perceived exchange of information with union (1 = better than others, 0 = otherwise)	0.08	–
	Perceived market proximity of cooperative (1 = better than others, 0 = otherwise)	0.59	–
	Perceived timing of purchase by cooperatives (1 = better than others, 0 = otherwise)	0.31	–
	Perceived credit service provided by cooperatives (1 = better than others, 0 = otherwise)	0.54	–
	Perceived credit service provided by union (1 = better than others, 0 = otherwise)	0.07	–
	Perceived advice service provided by cooperative (1 = better than others, 0 = otherwise)	0.61	–
	Perceived advice service provided by union (1 = better than others, 0 = otherwise)	0.10	–
Access to services	Distance to FTC in km	3.24	2.38
	Distance to product sale market in km	6.11	6.63
	Distance to seed purchase market in km	3.89	4.46

Note: The conversion factor of TLU is based on Kossila (1988).

the main mechanism for ensuring planned supply and trade of malt barley among these actors is through contract farming arrangements. The main contractual relationships currently in operation are (i) Assela Malt Factory (AMF) with unions and primary cooperatives, (ii) breweries with unions and primary cooperatives, (iii) breweries with farmer traders, (iv) unions with primary cooperatives, and (iv) breweries with AMF. Therefore, the market behaviour is basically governed by the provisions in these contracts. The contents of the different contracts are similar. However, the additional interventions deployed by the different actors creates variability in the contract implementation.

Increased competition has forced malt buyers to engage seriously with unions and member cooperatives and provide additional services like training, packaging, transport and, in some cases, closer follow up of the production process by assigning experts who work with cooperatives.

AMF expanded its processing capacity from 22,000 tonnes to 36,000 tonnes in 2012 to satisfy the increasing demand for processed malt barley from brewery industries. The factory needs 500,000 quintals (50,000 tonnes) of quality raw malt barley to produce 360,000 quintals (36,000 tonnes) of malt per year. The potential for further expansion of the brewery industry is enormous given the emergence of new breweries like Raya and Habesha. As a result, demand for processed malt barely is expected to continue to exceed the available processing capacity of AMF and the Dashen Malt Factory. According to the Ethiopian Revenue and Customs Authority (ERCA), the country imported 59,000 tonnes of malt barley in 2014 with an estimated value of US$41 million.

In the last two years, a minimum price of malt barley was determined by a committee composed of farmer representatives, AMF, breweries and the Oromia Market Development, which was established through the Malt Barley Stakeholders Platform and facilitated by the Ethiopian Agricultural Transformation Agency (ATA). Additional premiums above the minimum price are agreed upon based on quality and place of delivery (transport). As per the contract agreements, the usual place of delivery is the designated warehouses of the buyers (AMF or the brewery). However, breweries provide an additional incentive by collecting the malt barley at primary cooperative warehouses and paying the set minimum price (10.15 birr/kg) to primary cooperatives without deducting the cost for transport.

The amount of malt barley purchased by AMF from different producers in Arsi and West Arsi zones is presented in Table 3. The amount supplied by traders in 2014/2015 was about 78% and malt barley coming to the factory directly through farmers and cooperatives was about 8%. Although the direct supply channel through the cooperatives offers advantages for both producers and the factory, it is under-exploited due to financial constraints on the cooperatives and management skill gaps.

Unlike Diageo and Heineken, AMF does not cover transport and loading/unloading expenses and the cost of transport is usually deducted. Therefore, the net price farmers receive is less than that from Heineken and Diageo.

In 2015, there were six breweries with a total capacity of about 10 million hectolitres per annum. This requires over 100,000 tons of malt barley per year. However, AMF's share of the malt supply market now stands at 30% and the rest is met through imports (personal communication, AMF).

Both Galema and Raya Kejewa unions have contractual arrangements with AMF and with two breweries (Heineken and Diageo). Established in 2000 (1992 EC), Galema union currently has around 90 primary cooperatives as members. Through its member cooperatives, it serves around 47,000 individual farm households. As one of the key actors in the malt barley value chain, Galema union has a high level of influence and plays a crucial role in the aggregation of malt barley by mobilising malt produce from its member primary cooperatives.

Raya Kejewa union, established in 2010, has been engaged in malt barley marketing since 2013. It has 19 primary member cooperatives. The unions act as brokers between primary cooperatives and buyers such as Diageo, Heineken and AMF. The role of the union is to facilitate the purchase process by negotiating contractual agreements with the buyers, and facilitating the delivery of inputs and transfer payments to primary cooperatives. The union does not engage in the actual collection or

Table 3. Sources of malt barley for AMF (2013/2014–2014/2015).

	2014/2015		2013/2014	
Source	Amount in quintals	%	Amount in quintals	%
Farmers	4381.00	2.3%	5404.98	2
Union	17,586.89	9.4%	1104.34	–
Cooperatives	9923.00	5.3%	4456.38	2
Traders	146,182.17	77.9%	233,452.67	96
Others	9543.89	5.1%	–	–
Total	187,616.95	100%	244,418.37	100%

Source: Based on figures provided by AMF for 2015. .

purchase of malt barley, nor does it conduct any grading or quality control. This situation led to resentment among primary cooperatives who consider the union a non-value adding actor that expropriates benefits that should go directly to the primary cooperatives.

Contracts and contents

In general, all contract agreements are expected to be regulated by the Ethiopian civil and commercial codes. The contract documents contain the following key provisions:

Purpose of the agreement: In all cases, the purposes are clearly stated to ensure the production of quality malt barley in the agreed quantity and to supply it at the specified time to the purchasers as per the agreement;

Place, time and number (lots) of deliveries: Place of delivery is at the designated warehouses of the contract providers and transport costs are covered by the union. The time of delivery starts immediately from the time of harvest (January) to the end of June with three possible times for delivery. The agreements provide for delivery extensions given prior notification to the contract provider and the Oromia Trade and Market Development Bureau with acceptable reasons.

Price setting: Given the quality standard of the produced malt barley and type of variety, minimum market prices are determined by a committee composed of representatives from the breweries, the Ethiopian Agricultural Transformation Agency (ATA), malt factories, the Oromia Trade and Market Development Bureau, and cooperatives. Once prices are determined, a 7–10% premium is provided. For instance, an agreement signed by Galema and Heineken includes a 10% price premium, whereas an agreement between Galema cooperative union and AMF indicates a 7% premium. In addition, the agreements set out how the premium price will be distributed between the farmers, primary cooperatives and unions. As per the agreement between Galema and AMF, the share for farmers is 4%, for primary cooperatives 1.5%, and for unions 1.5%, all from the total 7% price premium. The agreement between Galema and Heineken grants a 3% share for the union.

The government's role in price setting and contracting among malt barley chain actors concerns the foreign currency burden associated with malt imports along with ensuring improved income for farmers.

Technical and other supports provided by contract providers: The agreements indicate the provision of technical support in terms of: (i) training to farmers in quality malt barley production, (ii) supply of quality seed of selected varieties of malt barley by the contract provider to be purchased by the union; in case of financial shortage, the contract provider delivers seed on an interest-free credit basis, (iii) technical backstopping during production through field visits, (iv) branded packing bags, and (v) technical backstopping for post-harvest management and storage.

Product grading and sampling: The agreements indicate the sampling methods to be followed for product grading. The quality parameters are determined by the contract provider. Some contract providers have an agreement with unions where the contract provider is entitled to reject the delivery based on quality parameters; others have agreements where the grade provided can be rechecked by a third party if the contract taker is dissatisfied with the grading.

Linkages between contract provider, union, member primary cooperatives and member farmers: This is a crucial area that the Heineken contract agreement covers but the AMF agreement does not. The agreement between Heineken and the union is based on forward marketing so that unions with their respective member primary cooperatives sign an agreement and primary cooperatives sign an agreement with member farmers.

Dispute settlement and force majeure: The contract agreements recognise *force majeure* for both parties as per the country's Civil Code; a party affected by *force majeure* has to notify the other party and the Oromia Trade and Market Development Bureau. Similarly, to help resolve disputes, the agreements suggest consultation using the Oromia Trade and Market Development Bureau as mediator. If it is not possible to settle through consultation, the matter may be taken

to court. Dispute settlement becomes complicated given the number of layers of agreements and the number of actors, especially with agreements between primary cooperatives and member farmers.

Duration of agreements: All agreements indicate that the duration is for one production season until the produced malt barley is supplied to the contract provider.

A summary of key contents and provisions of the contract agreements for AMF, Heineken and Diageo are presented in Table 4. Although the contents are more or less similar, there is a considerable difference in magnitude and mode of implementation among the three contract providers.

Current performance of contract arrangements in malt barley markets

Table 5 presents the performance of contracts with primary cooperatives and cooperative unions for the 2014/2015 production season and the respective contract providers. AMF and Heineken had contract arrangements with unions and with primary cooperatives, whereas Diageo engaged only with cooperative unions. The performance of the contracts in terms of the proportion of actual supply from the amount agreed upon indicates Diageo has better performance with the unions, where it managed to receive about 97% of the quantity stated in the agreement. Heineken received

Table 4. Summary of key contents and provisions of contract agreement by contract provider.

Contents of the contracts	Contract providers		
	AMF	Heineken	Diageo
Price	MBGP + 7% premium	MBGP + 10% premium	MBGP + 20% premium
	Every 45 days market price revision	No revision	No revision
	Price vary by variety and quality	Price vary by grade	Price vary by grade
Place of delivery	AMF designated warehouse	Heineken designated collection points	Diageo designated collection points
Time of delivery	Up to 8 May	End of June	End of April
Number (lots) of deliveries	Three lots with minimum volume per lot (>50qt)	Three lots with specified volume (20% by end of January, 50% end of March and 30% end of June)	No minimum amount requires. Purchase any time of working day throughout the season
Quality assurance	No variety specification	Specific varieties	Specific variety (Holker)
	Facilitation role for access to quality seed	Use of certified seed from OSE	Use of certified seed from OSE and ESE
	Supervision once in a month	Expert assigned at each *kebele* level for continuous supervision	Expert assigned at each *kebele* level for continuous supervision
	Provision of training on quality malt barley production at the start of the season	All time experts visit and training	All time experts visit and training
Product grading	Quality test at the time of product delivery	Pre-set quality standards (moisture content, gain size, foreign matter and admixture, and genetic varietal cleanness)	Pre-set quality standards (moisture content, gain size, foreign matter and admixture, and genetic varietal cleanness)
	Supplier has right for quality retest	Supplier has right for quality retest	Supplier has right for quality retest
	Quality determination made by AMF	Quality determination made by Heineken	Quality determination made by Diageo
Commission to unions	No	12 birr/qt	18 br/qt
Technical and other support	Provision of training to farmers	Provision of training to farmers	Provision of training to farmers
	Provision or facilitation of access to inputs (seed, fertiliser, and chemicals)	Pre-finance purchase of certified seed and credit repayment after product delivery	Pre-finance purchase of certified seed and credit repayment after product delivery
Duration	One production season	One production season	One production season

Notes: MBGP – Malt barley grain price; OSE – Oromia Seed Enterprise; ESE – Ethiopian Seed Enterprise.
Source: Contract documents, FGDs and KIIs.

Table 5. Contract arrangements and their performance in malt barley production and supply (2014/2015 production seasons).

	Amount malt barley bought (qtls)								
	Cooperative unions			Primary cooperatives			Total contract		
Buyers	Agreed quantity	Actual supplied	% of side selling	Agreed quantity	Actual supplied	% of side selling	Agreed quantity	Actual supplied	% of side selling
Assela Malt Factory	39,844	17,587	55.86	12,237	9923	18.9	52,081	27,510	47.18
Diageo	60,000	58,000	3.33	–	–	–	60,000	58,000	3.33
Heineken	8740	4580	47.60	24,790	12,210	50.75	33,530	16,790	49.93
Total buyers	108,584	80,167	26.17	37,027	22,133	40.22	145,611	102,300	29.74

about 52% and AMF received only 38% of the volume under the agreement with the unions. Diageo's contractual better performance is associated with better engagement with cooperatives and a relatively better price offer (0.05 birr/kg). On the other hand, the quantity supplied by the primary cooperatives was about 81% for AMF and about 49% for Heineken of the quantity stated in the agreement. These trends indicate the relatively large gap between the volumes stated in the agreement and those actually supplied, which is a good indicator of the challenges in contract enforcement linked with the side-selling activities of member cooperatives for the unions and member farmers for the primary cooperatives.

The overall extent of side selling is estimated at 29.74%, with considerable variability across buyers. It was highest for Heineken with about 50%, followed by AMF with about 47%, and Diageo with 3.3%.

Side selling: extent and farmers' characteristics

The preferences of farmers in the possible decision of buyer selection and the extent of reported side selling are explained in this section. This is followed by a characterisation of how farmers consider their side-selling behaviour in terms of the importance of malt barley production, farmer resource ownership, access to services, and social capital. With the objective of reducing the number of tables in the article, detailed figures are not reported.

The extent of side selling

Malt barley buyers are engaged in contract arrangements with unions and primary cooperatives. In turn, unions and primary cooperatives enter into contract farming with cooperative member farmers. In terms of side selling, we identified four categories of farmers who have been engaged in the contracts:

(1) Farmers who sold no malt barley (they either consumed it or stored it for next season).
(2) Farmers fully engaged in side selling, which indicates that they failed to honour their contract (sold all their malt barley to traders and farmer traders).
(3) Farmers partly engaged in side selling, which means that they partly fulfilled their contract requirement (sold both to the contract providers and to traders and/or farmer traders).
(4) Farmers not engaged in side selling, which means they fulfilled their contract requirement.

About 29% of the cooperative member farmers involved in malt barley contract farming are fully engaged in side selling. This means that they failed to honour their contracts: 26% are partly side selling and only 31.4% selling as per their contract arrangement (Table 6).

The Chi-square test result indicates that there is a statistically significant difference between market season and extent of engagement in side selling at $p < 0.01$ significance level (Table 6). A majority of farmers who are not engaged in side selling sold their malt barley in one season after

storing it for some months. Similarly, the majority of those farmers who are fully involved in side selling also sold in one season after storing for some months. Of those farmers who are partly engaged in side selling, the majority sold their malt barley in more than one market season.

The malt-barley marketing behaviour of the farmers varies by marketing season. Of the 32.23% of farmers engage in selling immediately after harvest, 10.7% reported that they side-sold their entire crop immediately after harvest, 14.7% side-sold some of their crop and the remaining 6.6% sold to the contract provider without side selling. Of the 80.17% farmers who sell after storing for some months, 25.6% reported that they are fully engaged in side selling, 18.2% partly engaged in side selling and 36.4% in selling to a contract provider without side selling. Of the 33.06% of the farmers who sell late in the season but before the next production season, 14% reported full engagement in side selling, 14% partly engaged in side selling and only 5% in selling to a contract provider.

Importance of malt barley

The importance of malt barley in terms of land allocated for malt barley as a proportion of total land operated by each household indicates that, on average, 40% of the land operated is allocated for malt barley, with a statistically significant difference ($p < 0.05$) among farmers with different marketing behaviours (ANOVA). The highest proportion of land (62%) was allocated by farmers who are partly engaged in side selling, followed by farmers who are not so engaged (37%). On average, the total operated land is 2.7 ha per household with no significant difference across households with different market behaviours.

Farmers' resource ownership by market behaviour

The main resources for farmers are farm size and livestock numbers. In the study area, the average total farm size operated by a household is estimated at 2.71 ha, with no statistically significant difference among farmers with different market behaviours. However, the size of rented in land was, on average, statistically different ($p < 0.05$) among farmers with different market behaviours. Farmers not engaged in side selling owned and operated larger areas of land (1.03 ha), followed by those fully engaged in side selling (0.63 ha) and then by those partly engaged in side selling (0.55 ha).

The average size of livestock owned by a household is estimated at 16.04 livestock units (TLU) with a statistically significant difference ($p < 0.1$) among farmers with different market behaviours. Farmers who are not engaged in side selling owned larger livestock sizes, estimated at 19.11 TLU, followed by those who are fully engaged in side selling, estimated at 14.96 TLU, and by those who are partly engaged in side selling, estimated at 14.42. A similar ownership pattern was estimated for oxen ownership. In the study area, oxen are the principal source of draft power.

Table 6. Market seasons and engagement of cooperative member farmers in side selling (% of farmers in 2014/2015 production season).

	Market seasons (%)			
Engagement in side selling	Not engaged in any market season	Engaged only in one market season	Engage in more than one market season	Total
No selling in all market seasons	13.2	0	0	13.2
Fully engaged in side selling	0	21.5	7.4	28.9
Partly engaged in side selling	0	5.8	20.7	26.4
Not engaged in side selling	0	25.6	5.8	31.4
Total	13.2	52.9	33.9	100.0
Chi square test	155.5***			

Notes: Market seasons are immediately after harvest, after storing for some months, and before next production seasons. *** indicates significance at 1%.
Source: Survey data (December 2015).

Access to services

The main services to which farmers have access are an agricultural extension, credit and cooperative-based input provision. In terms of access to general extension services, there was no statistically significant difference in terms of access to an extension service among farmers with different market behaviours, and almost all cooperative farmers reported that they meet development agents for extension advice. Similarly, 96.7% and 91.7% of respondents had received extension advice on malt barley production and marketing, respectively. This is in line with the expectation that the public agricultural extension service has been expanded to all *kebeles* through the allocation of development agents in the areas of crops, livestock and natural resource management. Moreover, SHA has provided associated services to unions and primary cooperatives in the study area by engaging experts from *woreda* offices of agriculture. This has contributed to increased access to services. The assistance provided by SHA in warehouse construction, training for cooperative experts, and the overall sensitising of actors to the important role of cooperatives has been instrumental in boosting access to services to member farmers and their cooperatives. With experts from cooperatives and offices of agriculture, FGDs indicate that SHA plays a crucial role in facilitating access to services and associated inputs, especially to improved varieties of malt barley seed. Thus, the higher level of access to services reported by farmers is a cumulative result of SHA, *woreda* and *kebele* offices of agriculture, and contract providers.

As in the case of extensions, access to credit is also high among respondent farmers, with no statistically significant difference across farmers with different marketing behaviours. Among farmers, 90% report that they have access to credit if they so wish.

Access to market often plays an important role in influencing the marketing behaviour of farmers. In this case, the mean difference test in the distance to product and input markets shows that there is no statistically significant difference in the average distance to market for farmers with different marketing behaviours. The average distance to product market is estimated at 6.11 km, to fertiliser market 2.72 km, and to seed market 3.89 km.

In terms of access to inputs from cooperatives, the results indicate that there is a statistically significant difference among farmers in the category of side-selling marketing behaviour for access to input provision services by cooperatives. However, the data gives no clear indication of the difference between those who are fully engaged in side selling and those who are not. This indicates that accessing the required inputs (fertiliser, seeds of other crops and malt barley seeds) may not be an effective incentive for contract enforcement. In general, most farmers, about 89% and about 82%, purchase fertiliser and other crop seeds/malt barley seeds from cooperatives, respectively. However, it will be important to consider preferential access to inputs in the following seasons based on contract fulfilment.

Determinants of side selling

Farmer-level determinants: probit model estimates

The dependent variable for the probit model is binary representing 1 if the household is a side seller, zero (0) otherwise. Table 7 presents both estimated coefficients and the marginal effects along with the level of significance. Likelihood ratio statistics, as indicated by the χ^2 statistics, is highly significant ($p < 0.0$) and suggests the model's strong explanatory power.

Among socio-demographic variables, the age of the head of the household is found to have a positive impact on the chances of a household being a side seller. The probabilities of being a side seller increase by 2.2% for every one-year increase in the head-of-household's age. This indicates that older farmers are more likely to be engaged in side selling than younger farmers.

Farmers with more owned resources in terms of land operated and livestock are less likely to be engaged in side selling than those with fewer resources. One hectare increase in total land operated is estimated to decrease the probability of side selling by 8.1% and, similarly, a one unit increase in

Table 7. Determinants of malt barley side selling of smallholder contract farmers: probit model estimates .

Category of variables	Variables	Coef.	Std. Err.	Marginal effect (dy/dx)
Socio-demographics	Years of formal education of the household head	0.227	0.326	0.043
	Age of the head of the household	0.118***	0.047	0.022
	Family size of the household	0.030	0.053	0.006
Resource ownership	Total size of the farm operated in ha	−0.431*	0.246	−0.081
	Total number of livestock owned in TLU	−0.074*	0.045	−0.014
	Total number of oxen owned	−0.099	0.368	−0.019
Malt barley production characteristics	Size of land allocated to malt barley in ha	1.336*	0.742	0.250
	Malt barley yield in qt/ha	0.028	0.022	0.005
Market behaviour	Purchase of seed of malt barley from cooperatives (1 = Yes, 0 = no)	1.024	0.669	0.192
	Number of years in the cooperative as member	−0.049	0.050	−0.009
	Volume of malt barley consumed in qts	0.121	0.085	0.023
	Volume of malt barley sold in 2014 in qts	−0.102**	0.050	−0.019
	Sale of malt barley immediately after harvest (1 = yes, 0 = no)	0.389	0.767	0.073
	Sale of malt barley after storing for some months (1 = yes, 0 = no)	−1.472**	0.719	−0.276
	Sale of malt barley late before next production season (1 = yes, 0 = no)	1.342*	0.788	0.251
Perceptions	Perceived unit price advantage provided by cooperatives (1 = better than others, 0 = otherwise)	0.797	0.753	0.149
	Perceived price negotiation advantage provided by cooperatives (1 = better than others, 0 = otherwise)	0.404	0.716	0.076
	Perceived time of payment by cooperatives (1 = better than others, 0 = otherwise)	0.071	0.746	0.013
	Perceived trust in quality determination with cooperatives (1 = better than others, 0 = otherwise)	−0.559	0.676	−0.105
	Perceived long term marketing partnership with cooperatives (1 = better than others, 0 = otherwise)	0.136	0.804	0.025
	Perceived long term marketing partnership with union (1 = better than others, 0 = otherwise)	1.285	1.231	0.241
	Perceived exchange of information with cooperative (1 = better than others, 0 = otherwise)	−0.544	0.596	−0.102
	Perceived exchange of information with union (1 = better than others, 0 = otherwise)	−0.092	1.271	−0.017
	Perceived market proximity of cooperative (1 = Better than others, 0 = otherwise)	−0.867	0.747	−0.162
	Perceived timing of purchase by cooperatives (1 = Better than others, 0 = otherwise)	−0.484	0.889	−0.091
	Perceived credit service provided by cooperatives (1 = Better than others, 0 = otherwise)	−0.368	0.545	−0.069
	Perceived credit service provided by union (1 = Better than others, 0 = otherwise)	−3.201*	1.715	−0.599
	Perceived advice service provided by cooperative (1 = Better than others, 0 = otherwise)	−0.203	0.627	−0.038
	Perceived advice service provided by union (1 = Better than others, 0 = otherwise)	2.242	1.459	0.420
Access to services	Distance to FTC in km	0.274**	0.123	0.051
	Distance to product sale market in km	−0.049	0.030	−0.009
	Distance to seed purchase market in km	0.008	0.042	0.002
Location (woreda)	Digalu Tijo	2.661**	1.364	0.420
	Kofele	1.662	1.055	0.285
	Constant	−4.150*	2.532	
Number of obs		109		
LR $chi^2(34)$		63.6***		
Prob > chi^2		0.00		
Pseudo R^2		0.46		
Log likelihood		−36.62		

Note: *** significance at 1%, ** at 5% and * at 10%.

TLU is estimated to decrease the probability of side selling by 1.4% (all other factors being constant). However, the size of land allocated for malt barley production increases the probability of a farmer being engaged in side-selling market positions and it is estimated that a hectare increase in the area of malt barley will increase the probability of a farmer being in a side-selling market position by 25%. This is highly linked to those who are more dependent on malt barley and are therefore expected to explore other markets and market actors, creating an opportunity of side selling.

Other factors being constant, the total volume of sold malt barley negatively affects the probability of side selling; it is estimated that a quintal increase in the volume of sold malt barley reduces the probability of side selling by 1.9%. This indicates that farmers with more malt barley to sell are expected to respect their contract commitments.

Time of sale significantly affects the probability of side selling market behaviour. We found that selling malt barley after a few months' storage reduces the probability of side selling by 27.6%, and selling late but before the next production season increases the probability of a farmer being a side seller by 25.1%.

Among those factors related to farmers' perceptions about malt barley buyers, only the perception about the provision of credit by cooperative unions for farmers in need was found to reduce the probability of being a side seller. It is estimated that the perceived improved service by unions decreases the probability of being a side seller by 59.9%.

Access to extension service among services was found to negatively affect the probability of being a side seller. It was estimated that the closer the farmer is to a farmer training centre, the lower the probability of being in a side-selling market position.

It was also found that the probability of being a side seller was location sensitive. It was estimated that the farmers in Digalu Tijo were more likely to be in a side-selling market position compared to those in Lemu Bilbilo, by 42% on average. The KII indicates that this difference is associated with the existence of more traders in a larger town, and the strength of cooperatives operating in the *woreda*, especially those linked with warehouse ownership.

Systemic determinants: market intelligence analysis

This section presents the systemic factors that create a favourable environment for farmers to engage in side selling, based on discussions with all market actors and service providers. The key factors are: (i) free rider problem, (ii) pricing, (iii) timing and place of purchase offered by cooperatives, (iv) the relationship between primary cooperatives and unions, and (v) limited skilled manpower and facilities.

Free rider problem: This is a crucial factor that affects contract enforcement. Contract providers often incur additional costs to ensure quality production of the required volume of malt barley, which has a direct effect on pricing. These costs are associated with the provision of training, supervision, and providing access to inputs. However, those actors not engaged in such investments can manipulate farmers through a minor price margin incentive. In addition, the proximity of market actors such as local assemblers and traders creates an opportunity to manipulate market information that can influence marketing decisions, which encourages farmers to engage in side selling.

Pricing: The approaches followed in price setting seem straight forward where a premium is added as an incentive for farmers, on top of prevailing set prices for different grades. The challenge in this regard is reported at two levels. The first is who determines the prevailing price, how and for which quality grades; and the second is who determines the quality standard supplied to the malt market. The approach followed to determine prevailing prices is through a committee composed of representatives from cooperatives, buyers, and government (the Oromia Trade and Market Development Bureau in the study area). The determination of quality standards is made at the final stage after the product is delivered to the designated sites as per the agreement and it is often the contract providers who determine the quality standard as per the procedures stated in the contracts. This approach is reported to create mistrust between the contract providers and the cooperatives, which can present an opportunity for misconduct given the limited incentive cooperative

representatives have. Thus, it is important to capacitate cooperatives to determine quality standards in terms of expertise and also required equipment. In turn, this should assist cooperatives to apply quality standards while buying from farmers, which has not been the case so far.

Another systemic problem is the late announcements of the purchase price by cooperatives. In general, the assessment revealed that farmers begin selling malt barley immediately after harvest in December–January, but that contract providers, especially AMF, set their prices at the end of January at a time when farmers have already sold their malt barley to other market actors, often to local traders at a lower price. The main reasons associated with the delayed announcement are a lengthy administrative decision-making process, increasing competition among market actors (AMF, breweries, farmer traders, and traders) and their intent on price manipulation, and a decreased readiness by farmers to sell to cooperatives. However, recent public engagement through ATA and the Oromia Trade and Market Development Bureaus aims to address this issue.

Timing and place of purchase: Cooperatives require farmers to sell at the cooperative designated site, which may not be convenient for many farmers. In addition, the time of purchase is not always convenient to farmers compared to the time offered by other market actors. A number of farmers who came to sell to cooperatives shifted to local traders because of lack of contact at the designated purchase site by cooperatives. The KIIs and FGD indicate that this is associated with: (i) the working procedures of cooperatives, (ii) the limited incentive for the purchase committee and/or hired workers to work throughout the week, (iii) the limited financial capacity of primary cooperatives to pay in cash at the time of sale, and (iv) limited storage facilities.

Relationship between primary cooperatives and unions: Primary cooperatives do not feel comfortable with many of the market arrangements they have with their respective unions, especially with the services the unions provide: facilitating the contract agreement, input delivery, payment and the extent of benefit sharing are reported to be unfair. Recognising this, some contract arrangements, such as that between Heineken and the unions, establishes the agreed share of premiums to be passed to unions and primary cooperatives. In some cases, primary cooperatives prefer to enter into a contract directly with potential buyers.

Lack of skilled manpower and facilities: Many research reports indicate that the principal challenges of cooperatives are associated with a lack of professional management of their activities. In addition, staff managing cooperatives have no incentive to make cooperatives profitable. Therefore, there is often a high probability that other market actors can manipulate cooperative decisions to their own benefit. In addition, the physical facilities, especially storage facilities, are often limited, which seriously affects the cooperatives' purchasing behaviour, especially in terms of the time of purchase. These issues were identified during the FGDs and KII with experts of *woreda* offices of agriculture and cooperative promotions, and union leaders.

Conclusions and recommendations

With increased globalisation and market liberalisation and emergence of expanded lucrative markets in many developing countries like Ethiopia, there is a growing concern that smallholder farmers could be marginalised from emerging market opportunities. Contract farming has been widely recognised by policymakers as a strategic approach with the potential to link smallholder farmers to emerging market opportunities. This paper presents the performance of contract farming considering domestic market for malt barley. It specifically presents the prevailing contract arrangements to ensure the supply of requisite quality malt barley in the required amount, the current status of side selling in malt barley, the major characteristics of side-selling marketing behaviour of farmers, the determinants of side selling at farmer and system levels, and what needs to be done to minimise side selling.

The evidence indicates the key factors of success along with the challenges which importantly includes the risk of side-selling. The key considerations that increase the likelihood of side-selling include point of sale, proximity to other market actors, timing of sale. Credit and age of farmers,

possibly related to education and/or social capital, appear to decrease the likelihood of side-selling, as does the value of owned resources. By the same token, however, the higher the proportion of the farmer's land in malt barley production, the greater the likelihood of side-selling.

It was outside the scope of this study to undertake farmer interviews, which would provide a more nuanced understanding of the contributing factors to side selling. Nonetheless, the data provide important insights into side-selling motivation and behaviour, which in turn suggest a suite of interventions that will strengthen the cooperative actors and their smallholder members within the value chain.

Strategic interventions for malt barley and other agricultural value chains will also require: (i) considering the dynamic nature of the malt barley market in Ethiopia in terms of continuously emerging new market actors who can considerably affect established market arrangements, (ii) ensuring wider stakeholder engagement, including farmers, their representatives (cooperatives), public organisations, private actors, and traders; (iii) minimising resource handouts to cooperatives and instead facilitating access to finance for investment in required facilities to ensure the suitability of interventions; (iv) considering awareness-creation activities about opportunities and challenges for all relevant actors at all levels; and (v) considering and targeting incentives for the conduct and disincentives for the misconduct of actors.

Notes

1. The regulatory framework governs various aspects of the content of contracts and stipulates the role of specific public regulatory organisations in their enforcement. Contracts between unions and breweries indicate how quality and price will be assessed, how emerging disputes will be settled, which public organisations will be involved, and which public law will be considered.
2. Cooperative governance is defined as the "establishment of policies, and continuous monitoring of their proper implementation, by the members of the governing body of a cooperative/union, which includes the mechanisms put in place to balance the powers of the members (with the associated accountability), and their primary duty of enhancing the prosperity and viability of the cooperative/union".
3. Probit and logit are appropriate for identifying the factors affecting side selling. We found that the probit model was a better fit in overall significance level and opted to use it. However, the estimated results were more or less similar.

Acknowledgements

This work was commissioned as part of the research project "Increasing the Income of Malt Barley Farmers in Ethiopia through More Effective Cooperative Management". The research was supported by Self Help Africa (SHA) and the US Overseas Cooperative Development Council (OCDC) through USAID's Cooperative Development Program. This paper is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this paper are the sole responsibility of the authors and do not necessarily reflect the views of USAID or the United States.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The research was partially funded by OCDC through a partnership agreement with Gorta-Self Help under subaward number CDP009-2016-0l from National Cooperative Business Association (NCBA) and award number 7200AA18CA00029 from US Agency for International Development (USAID).

Notes on contributors

Dawit Alemu is an Agricultural Economist with wide experience in agricultural research and development.

Alice Guinan is a Programme Manager with extensive experience in agriculture, enterprise development, disaster risk reduction and natural resource management.

Judith Hermanson is Research Director of the US Overseas Cooperative Development Council. She oversees a global research portfolio that seeks to link evidence both to policy and to practice in order to ensure better outcomes for cooperative members.

References

Alemu, D., T. Anulo, B. Tesfaye, A. Hagos, and A. Feyissa. 2011. *Performance, Challenges and Proposed Solutions to Cooperatives and Supportive Bodies in Ethiopia* [in Amharic]. Addis Ababa: Ethiopian Institute of Agricultural Research.

Ayelech, T. 2010. *Contract Farming in Ethiopia: An Overview with Focus on Sesame*. Accessed July 23, 2020. www.wur.nl/upload_mm/4/5/9/5753d95f-5d41-4872-9a68-b4520d3a5cfa_Report5Tiruwha28062010a.pdf .

Bezabeh, A. 2018. "Malt Barley Commercialization Through Contract Farming Scheme: A Systematic Review of Experiences and Prospects in Ethiopia." *African Journal of Agricultural Research* 13 (53): 2957–2971.

Da Silva, C. A. B. 2005. *The Growing Role of Contract Farming in Agri-Food Systems Development: Drivers, Theory and Practice*. Rome: Food and Agriculture Organization of the United Nations.

Giel, T., W. Vellema, S. Desiere, S. Weituschat, and M. D'Haese. 2018. "Contract Farming for Improving Smallholder Incomes: What Can We Learn from Effectiveness Studies?" *World Development* 104: 46–64.

Greene, W. H. 2008. *Econometric Analysis*. 6th ed. Upper Saddle River, NJ: Prentice-Hall.

Kossila, V. 1988. "The Availability of Crop Residues in Developing Countries in Relation to Livestock Populations." In *Plant Breeding and the Nutritive Value of Crop Residues. Proceedings of a Workshop Held at ILCA, Addis Ababa, Ethiopia, 7–10 December 1987*, edited by J. D. Reed, B. S. Capper, and P. J. Neate, 29–39. Addis Ababa: ILCA .

Otsuka, K., Y. Nakano, and K. Takahashi. 2016. "Contract Farming in Developed and Developing Countries." *Annual Review of Resource Economics* 8: 353–376.

Prowse, M. 2007. *Making Contract Farming Work with Co-Operatives*. ODI Opinion Paper 87. London: Overseas Development Institute (ODI).

Watabaji, M. D. 2016. "Value Chain Structure, Integration and Performance: The Malt barley Value Chain in Ethiopia." PhD diss., Ghent University, Belgium.