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To cite this article: Yenenesh Tadesse, Conny J. M. Almekinders, Denis Griffin & Paul C. Struik (2019) Collective Production and Marketing of Quality Potato Seed: Experiences from Two Cooperatives in Chench, Ethiopia, Forum for Development Studies, 47:1, 139-156, DOI: [10.1080/08039410.2019.1635523](https://doi.org/10.1080/08039410.2019.1635523)

To link to this article: <https://doi.org/10.1080/08039410.2019.1635523>



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Published online: 26 Jul 2019.



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Collective Production and Marketing of Quality Potato Seed: Experiences from Two Cooperatives in Chencha, Ethiopia

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Abstract In spite of many initiatives to set up community or farmer-group-based seed production, there is little empirical evidence about the group functioning in producing and marketing quality seed. This article therefore aims to contribute to better understanding of the process and practice of seed potato cooperatives' formation and operation in Chencha, Ethiopia. Our study specifically focused on why and how farmer groups organize, produce and market quality seed potato. We collected primary data from two seed potato cooperatives in three phases through interviews, focus group discussions, and field assessment and store inventories on bacterial wilt incidence. We found that the support to the establishing of the two seed potato cooperatives focused more on improving the members' seed potato production capacity and less on building good governance in the seed chain. The experiences showed the tensions between prescriptive rules, collective action and individual interests which made it very hard to maintain quality seed standards and friendship at the same time. In general, the root of having weak seed cooperatives may not be the lack of intent towards building durable farmer groups. Rather, development practitioners did not take the set-up of strong farmer groups as an evolving process, which continually engages in diagnosis and responds to the emerging social as well as material challenges. The set-up of farmer-group-based seed production, therefore, needs to shift from 'standard production models' to an evolving model: an open and flexible model guided by trials, challenges and existing socio-technical and institutional realities.

Keywords: bacterial wilt; collective action; group-based seed production; seed quality control; seed marketing

Introduction

Despite the mixed results in the past, there is a renewed interest in supporting farmers to organize themselves in community groups or local cooperatives (Bernard et al., 2010; Getnet and Anullo, 2012). These efforts aim to facilitate farmers' market participation (ATA, 2012; Shiferaw et al., 2011). Farmer group organization is also fostered in the

area of seed production, especially in countries like Ethiopia where seed sector development is currently high on the agenda (ATA, 2012; CDI, 2016). In seed production, the principal reason to promote collective efforts stems from the failure of the public sector to arrive at a sustainable seed sector that provides farmers with quality seed of improved varieties, the Ethiopian potato seed sector being a case in point (Hirpa et al., 2010). Currently, decentralization and private sector participation are presented as effective strategies to increase availability and access of quality seed to smallholder farmers (Almekinders et al., 2019; Louwaars and De Boef, 2012; Scoones and Thompson, 2011). Farmer groups, cooperatives and other forms of community seed production are seen as sitting in between the formal and informal seed systems, being able to bridge the traditional with the commercial seed supply (FAO and ICRISAT, 2015). In addition to decentralization of the multiplication of seed, also alternatives to the quality control are explored. In most countries, seed certification is a service provided by the public sector: its centralized nature and the complicated logistics – especially in the case of bulky and perishable vegetatively propagated crops like potato – renders the certified seed as too expensive for most smallholder farmers. Potato seed production in Ethiopia is a case in point. Most smallholder potato farmers rely heavily on the informal seed system. With potato being a vegetatively reproduced crop, this increases the risk of using seed tubers with poor physical, physiological and genetic qualities and the spreading of seed- and soil-borne diseases (Gildemacher et al., 2009; Hirpa et al., 2010; Thomas-Sharma et al., 2016). In addition, the informal farmer-to-farmer seed potato sharing may not always give equal access to farmers of different socio-economic status (Tadesse et al., 2016). In this context, community-based seed production is promoted as a complementary strategy that serves the dual purpose of improving seed quality¹ and seed system efficiency² (FAO and ICRISAT, 2015; Schulz et al., 2013).

In spite of many initiatives to set up community or farmer-group-based seed production, there is little empirical evidence about farmer group functioning in producing and marketing quality seed (Almekinders et al., 2019; FAO and ICRISAT, 2015). For potato seed production in Ethiopia, Oumer et al. (2014) showed how potato seed production empowered female farmer groups. Abebe et al. (2010) studied the economic advantages of two seed potato cooperatives in comparison to two ware potato cooperatives. None of these two studies addresses the collectiveness of the group of farmers in their effort to produce quality seed and the potential threats of the collectiveness of the quality of the seed, and, consequently, of the threat of the spreading of the diseases.

It is against this background that we studied the experiences of two young potato seed cooperatives from Chench, Ethiopia. The article describes how seed cooperatives

1 Seed quality refers to ‘attributes of the seed tuber that affect its value: genetic purity, physical condition, health condition and physiological age’ (Thomas-Sharma et al., 2016).

2 Seed system efficiency refers to seed system that function in the best possible manner to ensure in time availability of affordable quality seeds to farmers.

functioned around seed potato production and marketing with the support from an Ireland-based Non-Governmental Organization (NGO), Vita. In analyzing how collective action by a group of farmers combines with efforts to maintain seed quality, we asked the following questions:

- How farmer groups organize, produce and market quality seed potato?
- What factors play a role in the collective effort to maintain seed quality?

Data were collected through exploratory interviews, focus group discussions and semi-structured interviews with the cooperative members and executive committees. The article discusses the implications for decentralized quality seed supply.

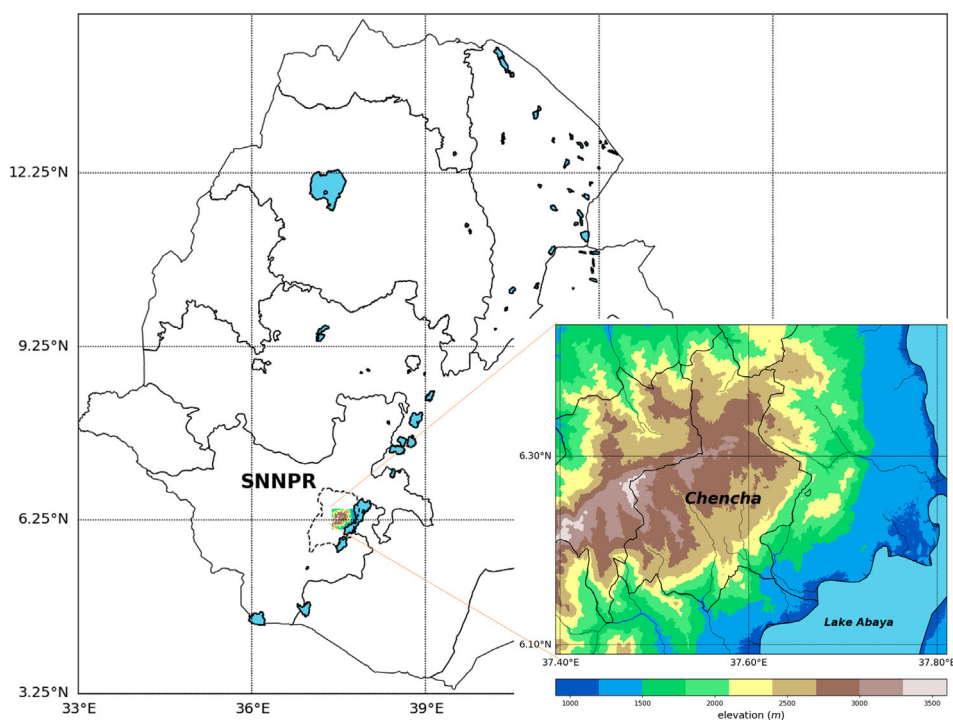
Collective action

The theory of collective action is at the basis of advocating cooperative and group functioning. By pooling their resources, farmers can reap benefits of economies of scale: it can reduce transaction costs (with improved access to information and new technologies) and improve the negotiation position with other value chain actors, leading to increased productivity (Bernard et al., 2010; Shiferaw et al., 2011). The extensive literature on common pool resource management has shown that collective efforts are always threatened. Group composition, lack of trust, solidarity, good governance (equality of distribution of costs and benefit) and profitability play an important role and explain failures in many situations, including in Ethiopia (Brass, 2007; Engdawork, 1995; Francesconi, 2008; Shiferaw et al., 2011). Community-based management of the common resource is also influenced by group or community-specific social conditions and resources. In addition, many collective action challenges have a greater level of complexity than expected (Leeuwis et al., 2018).

Study site and project context

The study focused on two cooperatives and their member-farmers in the Chenchä *Wereda*, Southern Nations, Nationalities and Peoples Regional State (SNNPR), Ethiopia (Figure 1). Chenchä is located almost entirely in the highlands of the Gamo Gofa Zone of the SNNPR, Ethiopia and comprises 45 *kebeles*, the smallest administrative units in Ethiopia. Crop cultivation and livestock rearing are the dominant economic activities in the Chenchä *Wereda*. The main crops of farmers in Chenchä are wheat, barley, potato, enset (*Ensete ventricosum*) and apple. Chenchä *Wereda* has good potential for both ware and seed potato production (Mazengia et al., 2015) but the average potato yield is very low at 2.4 t/ha (Menza et al., 2014). Households engage in various off-farm activities (weaving, selling wood and labor) for a complementary income.

Vita is an NGO that supported the establishment of two potato seed cooperatives in 2010 as part of a larger potato project that aimed to (1) strengthen potato farmers'

Figure 1: Map of study site.

productive capacity and (2) improve access to market and to agricultural services in general and (3) access to improved potato seed in particular. The project organized farmers in groups for training in potato seed production. By working together farmers would be able to label their seed and become active participants in potato seed distribution. This would contribute to making quality seed more available and affordable for other farmers in and around Chencha. An underlying assumption was that peer learning and peer pressure among farmers would improve seed quality. Farmers were predominantly producing for home consumption and had little experience with a market-oriented production. A particular challenge was the recently discovered presence of bacterial wilt (*Ralstonia solanacearum*) in the area. Bacterial wilt is a highly contaminating seed- and soil-borne disease that limits potato cultivation causing heavy crop losses (Ajanga, 1993; Bekele et al., 2011).

Study design, data collection and analysis

The methodological bases for this research are two case studies: the two cooperatives. These two cases are relevant to the formulated research problem and allowed to generate understanding of the involved phenomena in their context through observation and interviews (Tellis, 1997; Yin, 2014). We used multiple sources of evidence as the way to construct validity: individual interviews, focus group discussions, field assessment and store inventories. The two potato seed cooperatives, Yoyera seed cooperative

and Gendo Gembella seed cooperative, were the cooperatives that had received Vita's financial and technical support.

These two potato seed cooperatives were studied in three phases between January 2013 and May 2015. The first phase (January, May and August 2013) studied the history and functioning of the cooperatives. It consisted of six exploratory interviews with randomly sampled cooperative members and, for each cooperative focus group discussions were held with the executive committee ($n = 7$ each) and with the quality assurance and controlling committee ($n = 3$ each). For the second phase (March to October 2014) 48 members of the two cooperatives (24 members each) were asked about seed production and marketing experiences over the last four years, using a pre-tested semi-structured questionnaire. Members had been selected at random from the list of members provided by the chair persons of each cooperative. In addition, six farmers whose seed lots had been rejected were interviewed. Complementary information was collected through group discussions with the quality assurance and controlling committees of the Yoyera ($n = 5$) and Gendo Gembella ($n = 6$) cooperatives, and attendance of several cooperative management meetings.

The last phase (February to May 2015) explored the effect of bacterial wilt incidence on the cooperative performance. For this purpose, two group discussions were held with members of the cooperative management, one in each of the cooperatives. Thirteen farms and 11 seed storages were visited to assess the incidence and management of bacterial wilt on-farm and in seed storages. The farm assessment included: the proportion of plants wilted, how members explain the reasons for wilting, and the type of actions taken by farmers for controlling the disease. Store inventory included estimating loss of seeds in storage and actions taken to minimize the loss. The specific plots were selected based on the discussion the first author had with members; plots were affected seriously with wilting.

All individual and group interviews, field assessment and store inventories on bacterial wilt incidence were recorded in audio and writing. Data collection and analysis were inter-woven right from the first phase of data collection onward.

Results

Functioning of the cooperatives

The Yoyera and Gendo Gembella cooperative both started out in 2010 with 30 members who were identified and invited by the NGO staff in collaboration with *Wereda* Cooperative Office. In each cooperative, members lived in the same local community, implying that many of them were family, friends or neighbors of each other. To become a member of the seed cooperatives, the NGO in collaboration with *Wereda* Cooperative Office had defined the conditions. A farmer had to be known as diligent and had to own at least 1.5 ha of land (relatively large in the Chenchu context). In addition, a farmer had to be able and willing to pay an individual share of the

cooperative (100 Birr, equaling approximately €4) and sell the potato seed via the cooperative for cash. The NGO supported the construction of a Diffuse Light Storage (DLS), for which the farmer had to supply the local materials. In 2011, the NGO staff in collaboration with *Kebele* Administration staff identified 30 additional farmer-members for each cooperative. In 2013–2015, 11 per cent and 8 per cent of the members of the Yoyera and Gendo Gembella cooperatives were female farmers, respectively. In the group interviews, none of the participants qualified any of the members as poor. Farmers indicated that the basic reason for joining seed cooperatives was that membership provided them with better access to (1) financial and technical supports from different institutions, (2) high quality seed from first generation seed producer cooperatives and (3) seed markets that were previously not accessible for them and which paid a better price than when seed was sold otherwise.

Both seed cooperatives were organized according to the recommendation of the NGO staff which followed the general format for cooperatives in Ethiopia as provided by the *Wereda* Cooperative Office. They both had five different committees, elected by the general assembly on the basis of one member one vote. The quality assurance and controlling committee was in charge of making sure the various committees and members performed according to the cooperative bylaws. The executive committee was responsible for the overall planning and implementation of all activities as well as for maintaining relationship between the cooperative and seed buyers. The remaining three committees were in charge of, respectively, credit, selling and purchasing.

In 2010, the experts from *Wereda* Cooperative Office had implemented 3-day training on cooperative concepts and management skills for all members. Within the last five years each cooperative had held two annual meetings and one financial audit. Meeting among executive committees and other committees was on an ad-hoc basis: whenever they felt they needed to meet and discuss. During fertilizer distribution and seed marketing they had frequent meetings in order to decide the amount of fertilizer to be purchased and distributed to the members, to look for market opportunities, and to decide on the price for seed and the amount of cash that had to be saved in the cooperatives' bank account after seed had been sold.

Seed potato production

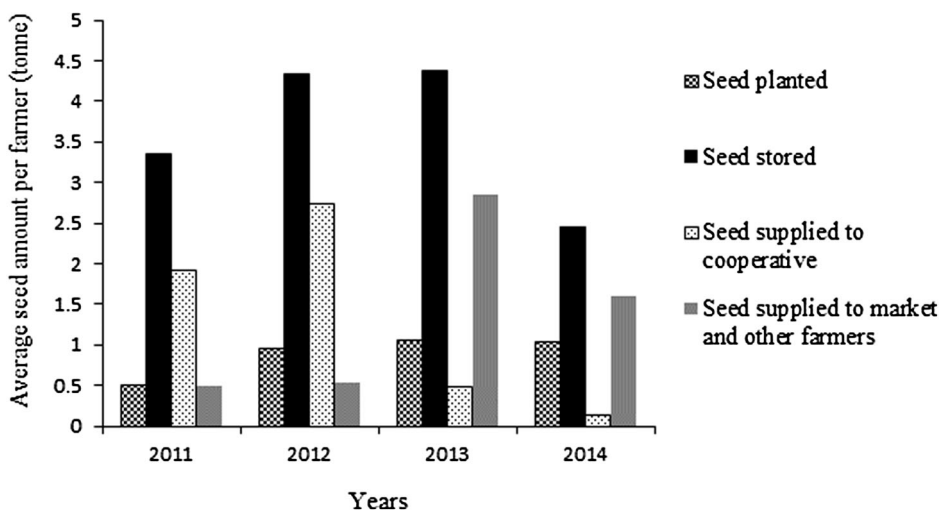
In the first year of operation (2010), the NGO technicians provided each farmer-member with 500 kg of quality seed of the improved variety Gudene. Members also received intensive classroom and field training from the NGO staff on seed potato production practices. As part of the field training, members pooled all their labor and jointly practiced the agronomic tasks in their production plots. This created an opportunity for learning and to undertake activities which the household might not easily do by its own, like land preparation and planting in ridges. At the same time, for the NGO staff it was a way of making sure the production practices of each member were in line with their recommended production and storage practices. In the same year, to build the cooperatives' financial

capacity, the members produced seed potatoes on a common production plot and the money from the sold seed tubers were saved in the cooperative's bank account.

In the second year, the average quantity of seed tubers planted per member in both cooperatives was increased (see Figures 1 and 2). Both cooperatives had arranged an internal credit scheme where members could borrow cash for synthetic fertilizers without paying interest. The aim was to increase the members' fertilizer application. The credit schemes were the initiative from the executive committees. The financial sources were: registration fees (100 Birr per member), and selling seed potatoes planted on a common production plot and commercialized seed through the cooperatives (50 Birr per 100 kg of seed). The credit facility was open for all members. The request for credit was based on the amount of synthetic fertilizer they wanted to purchase using the money from the credit service. The support from NGO technicians continued through this second year, although less intensive. Pooling labor for cultivation activities on individual plots continued although farmers mentioned that the contributions from the members varied. The number of members who participated in the joint cultivation activities in the first year was higher than the number participating in this second year. There were also members who, once their plot was prepared, did not show up in the next joint labor activity. Participation of male members was also lower in plots owned by female farmers because they felt that the women's labor which they would get in return did not match the male labor contribution. In addition, members' number doubled while cooperatives had the same management capacity which made the organization of the labor pooling more challenging.

In 2012, the NGO staff also arranged an exposure visit for some selected members and leaders of the two cooperatives to successful seed cooperatives in Jeldu area, near

Figure 2: Seed production and marketing in Yoyera seed cooperative ($n = 24$).



Holeta, to demonstrate advanced potato seed production practices, including the use of diffuse light storage and breaking dormancy. Application of these practices allowed two potato plantings per year. When visiting the cooperative in Jeldu, farmers were also able to note the success of the chairman. One attendant noted:

This man plants a large volume of seed potatoes by renting land. He has a truck and other businesses established because of seed potato. And he has employees to run the businesses. This means that if we work hard on seed potato we can diversify our means of livelihood.

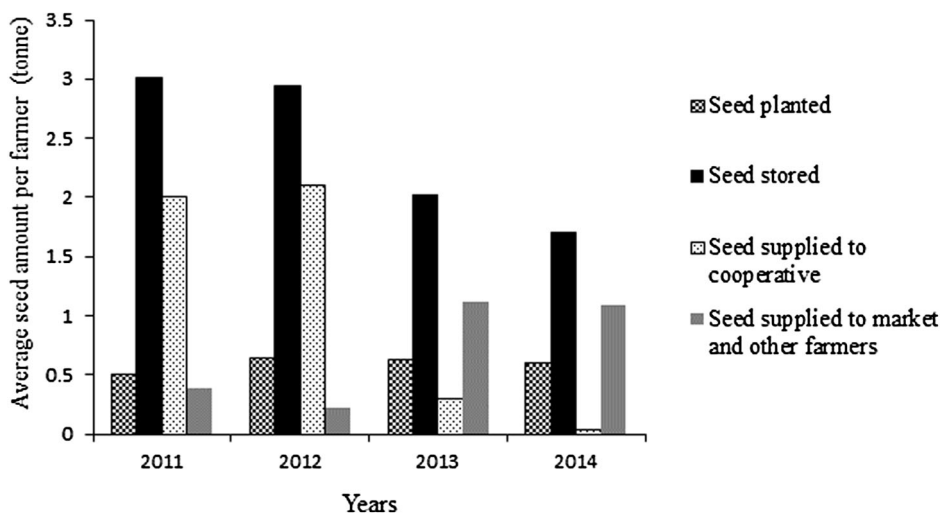
How cooperatively farmers produced and disseminated quality seed potatoes was not part of the main lessons mentioned.

From the third year onwards, there was no more support from NGO staff. This was because the project was designed for two years with the assumption that the cooperative office would provide the necessary support to the cooperatives upon demand until they became fully independent. Each member produced potatoes on his or her own; pooling of labor had stopped because many of the members preferred to work individually. They also no longer jointly produced seed potatoes to generate capital for the cooperative credit fund (Figure 3).

Collective seed quality assurance

Both seed cooperatives had a quality assurance and controlling committee formed by the chairperson and two members. One of the responsibilities of the committee was inspecting the quality of the crop in the field and of the seed in the stores. They also functioned as an intermediary between members and buyers. The committee

Figure 3: Seed production and marketing in Gendo Gembella seed cooperative ($n = 24$).



members had been elected on the basis of their experience in different leadership roles in the community. According to the members of the two quality assurance and controlling committees, there were no specific criteria defined for rejecting a seed crop in the field or seed lot in store. The committee members also did not have special training or written manuals that supported their activities. They directly and indirectly checked all farms: the tillage frequency, previously planted crops, and disease incidence in a seed potato crop (at flowering stage) and in storage. With regard to bacterial wilt, the committee members said they rejected a seed lot when the number of wilted plants in the field at the time of flowering was 'large', plants with symptoms of bacterial wilt were close together or when the wilting continued after sanitation measures had been taken. If the wilted plants were widely separated (10–15 m), they recommended a sanitation measure: removing the wilted plants from the field was thought to be able to save the crop. The up-rooted infected plants were mostly disposed along the edges of the field (personal observation of the first author). Farmers were not asked to up-root plants around the wilted plants if they were quick in removing the wilted plants and wilting did not continue. If wilted plants were close to each other, the plot was to be rejected as a source for seed because it was considered that neighboring plants would very likely be infected as well. The committee members normally shared their decision with the farmer-member at the end of their inspection visit.

In the first two years, the quality assurance and controlling committees of Yoyera and Gendo Gembella seed cooperatives rejected the seed lots of respectively seven and ten members. The reasons were that more than half of the crop was wilted, and/or tubers were too large and had cracks. None of the farmers was compensated for the seed rejected because compensation was not part of the bylaw and the cooperatives did not have sufficient financial capital to do so. As mentioned by the quality assurance and controlling committees, a third reason was that they expected when members knew they would be compensated, they might not give sufficient attention to the quality of their seed production. Farmers with rejected seed lots were not happy with the decisions of rejections. One member who saw his seed crop rejected explained:

When I benefit, the cooperative also benefits. But, for some reason the cooperative overlooks the loser. To pay back the credit I took for buying fertilizer and new seed, I was forced to sell my sheep.

For the quality assurance and controlling committee, the process of seed quality assurance was not easy and visiting each plot demanded a lot of time. Sometimes they had to seek support of other members to accomplish their tasks. In addition, the committee members reported:

Taking decisions after observing a seed plot is not simple. It makes one feel bad when a seed plot needs to be rejected or accept it while the quality is poor. It is very hard to have clean seed and friendship going together.

In Gendo Gembella, all rejections were plots or seed lots in which a major portion of the crop was found infected by bacterial wilt. At the time of marketing, however, some of these farmers selected and supplied seed to the cooperative that they thought was healthy. According to the farmers, they supplied seed from rejected plots to recoup part of the money they invested in the production. 'It was difficult for us to go further than this because we are living together,' the committee stated. Other members were aware and afraid this could affect their future market opportunities due to poor performance of the seed in the new places. In 2013 and 2014, the incidence of bacterial wilt increased. In 2014, 16 out of 60 members of Gendo Gembella lost a major portion of their potato seed crop. Based on the advice from the executive committee, they immediately sold what they harvested as ware potatoes. There was, however, no formal decision communicated to the members who saw no bacterial wilt incidence in their fields. These members complained about the lack of follow-up actions on bacterial wilt management either by the executive committee, NGO staff or *Wereda* Agriculture Office.

Seed marketing

After harvest, the cooperative's chairman, secretary and treasurer set the price at which the cooperative members would sell their seed, based on their information about the price for improved seed in the nearest local market found in Chenchä town. These three men also had the mandate of looking for potential buyers. Once buyers were identified, farmer-members carried or transported their seed by horse to an agreed place. Each member had equal share of the total amount of seed to be sold: the total amount of seed requested by institutional buyers was divided to the total number of members who were ready to sell seed through the cooperative. NGOs and Agriculture Offices in the nearby *Weredas* were the main potato seed buyers. The *Wereda* Ministry of Agriculture would in most cases function as a broker.

In the first year, all except five of the members in both cooperatives sold a major portion of their produced seed via the cooperative. The five farmers were in urgent need for cash while the cooperatives needed time to finish transactions with the buyers. 'In the first round, I supplied the seed potato to the local market because I was in urgent need of cash to pay the college fee of my child', a male farmer explained. Finding buyers for the seed was not difficult, because of the brokering by the NGO. Also the price resulted to be very attractive. In the second year, all members supplied the major portion of their seed to the cooperatives. Data from interviews indicated that the average amount of seed sold to cooperatives increased from 1.9 to 2.7 tons and from 1.9 to 2.1 tons in the Yoyera and Gendo Gembella seed cooperatives, respectively (Figures 1 and 2). The higher price that farmers got for the seed had been their main motivation to sell through the cooperative. The buyers were essentially the same ones as the previous year, and contact was facilitated through the NGO. The good prices and good yields because of the improved production technology contributed to the household income and enabled

some of the farmers to move to a new house with a roof covered by iron sheet. The income from potato also enabled few farmers to cover school expenses for their children, and start operating small businesses.

Financial (mis)management

In 2013 and 2014, members significantly reduced the amount of seed they sold through the cooperatives. Farmers referred to the mismanagement of the cooperative money as a reason. In 2012, for instance, many farmers in the Yoyera cooperative had not received the full payment for the seed they sold through the cooperative. They lost from 1800 to 6000 Birr per farmer. One of the female farmers explained:

Last year, when I requested the remaining money (6,000 Birr) the response from the chairperson was totally discouraging. The chairperson was hiding himself from members. This year I supplied only 100 kg of seed. I do not want to lose my membership. But I also do not want to lose more money.

The financial mismanagement made the members of the management committee very uncomfortable. Eventually, the cashier asked the *Wereda* Cooperative Office to assess the accuracy of the recorded financial accounts. The audit report did not, however, bring out the full picture. Members were not able to challenge the audit procedures, resulting in a further decline of members' confidence in accounting procedures. Finally, the cashier resigned, but the other members in different committees remained in place. The cashier stated:

I was not happy with the way our money was managed. I reported to the responsible government officials and requested for audit. I was waiting for the report that tells the actual situation and corrective action. What happened was the opposite.

In the case of the Gendo Gembella, the main reasons for reducing the amount of seed sold through the cooperative during the last two years were bacterial wilt and lack of commitment among leaders. Farmers with seed plots infected by bacterial wilt were forced to sell their crop as ware potatoes immediately after harvest. Farmers who produced seed free from bacterial wilt could not access the market through the cooperative because the cooperative leaders did not try to find buyers. There was, however, no formal communication on the decisions of the cooperative leaders. At the time of submitting this publication, mid-2017, the Gendo Gembella cooperative had suspended its seed production and selling activities. Yoyera cooperative was still commercializing seed potatoes with the same management committee in place.

Discussion

Interventions by outside actors that aim to support farmers in organizing themselves on cooperative in order to access market and reap benefits from pooling resources continue

to be broadly advocated. Also in the context of Chenchu and potato seed production it was a logical strategy to engage smallholder farmers into a high-quality potato-seed market. As pointed out by Bijman (2016), the external support to the farmer organization proved important: the provision of improved seed, construction materials for building improved seed storages and training in agronomic and storage practices by extension professionals, and the organization of pooled labor for agronomic activities by the NGO staff all contributed to collective seed potato production and marketing. The commercialization of quality seed brought substantial economic benefits to the cooperative members. However, the support during the first two years was not sufficient to sustain the proper functioning of both cooperatives, which negatively affected the quality of seed. It is important to reflect on the experiences of these two cooperatives in order to understand the potential of farmer cooperatives in general, and decentralized seed production groups in specific in increasing the availability and access of quality seed to smallholder farmers.

The membership criteria did first of all result in relatively well-to-do farmers composing the cooperative. These farmers had better land holding and financial capacity in that they could produce seed potato by hiring labor and could market their seed from home or in the local market. For them, the attractiveness of jointly working on the land was not obvious. Their other experiences with potato seed production also did not point to the importance of collective action. The exposure visit of the cooperative near Holeta, cooperative leaders saw the apparent success of cooperative members who had diversified their business with use of the profit made on the selling of seed potatoes. The need to work together to achieve such success was not so obvious. In addition, in the first years of the seed production initiative there was not an existing market or effective demand for the seed: nobody knew about the initiative and farmers normally used their own on farm saved seed. The NGO functioned as a broker: it did the promotion, sought buyers and their support to the cooperative group was for the buyer (often another development project) a guarantee for the seed quality as well. As a result, in the first two years they sold all the seed they had produced without much effort and for good prices. This led them to question the value of going through the cooperative structure with the associated procedures and delays in payments. This might also negatively influence their initiative and commitment to cooperation. In the meantime, some name for potato seed from Chenchu already established, individual commercialization on the local market became an easy attractive alternative.

Maintaining high level of seed quality represented a major challenge to the two cooperatives. In this respect, potato seed multiplication is quite challenging and requires knowledge, well-developed infrastructure (storage, transport) and a high level of collective discipline to control seed- and soil-borne diseases. In this case, the outbreak of bacterial wilt (*Ralstonia solanacearum*) resulted in a rather unexpected high pressure on the farmer cooperative groups, adding to the more common pressure of virus diseases and late blight (*Phytophthora infestans*). The inspection committees were not sufficiently staffed and trained to assess seed plots during flowering and follow up on the stored seed lots. There was no specific manual on quality assurance.

It also resulted that the bylaws had no provisions for issues associated with seed production and seed quality maintenance. There were no threshold values for number of diseased or wilting plants in the field or affected tubers in storage that the quality assurance and controlling committee should apply. No rules existed for the disposal of rogued plants, nor were there rules formulated in relation to financial compensation for the affected producers. The elimination of low quality seed lots is crucial to maintaining the seed quality and is in the long run important for the reputation of a seed cooperative. However, if this importance is not well understood and rules are not clear, the elimination of low quality seed lots affects social relations and puts pressure on the solidarity among the members. By the time these became important issues for the cooperatives, the support from the NGO project had ended, and the *Wereda* Cooperative and Agricultural Offices did not offer solutions either.

Members' satisfaction and active participation, and effective communication between members and management are essential for the success of farmer-owned cooperative organizations (Bhuyan, 2007; Wadsworth, 2001). In the studied seed cooperatives, the main mechanisms for building transparent and accountable communication within cooperatives were not optimally utilized. Meetings among committee members and annual meetings among all members, for instance, were not held on a regular basis. These meetings were missed opportunities for responding to members' needs and satisfaction. Some of the members also did not get the full price for the seed they supplied to the cooperative and their claim for the remaining money was ignored by the cooperative executive committee, thereby undermining one of the most important incentives for cooperation in producer organization, i.e. the economic gains (Shiferaw et al., 2016). There was also no space for members to demand change of leadership and claim for the prescribed elections or audits. This case confirms the importance of participatory and democratic governance in building trust among the new generation of producer organizations as argued by Shiferaw et al., (2011).

Conclusions and implications

The set-up of farmer-group-based seed production demands resources and faces contextual challenges. It is not only the crop growing and storage practices that are important to maintain seed quality, but also the knowledge and discipline in the quality control. These elements are basically part of an education process through which farmers learn how to produce better quality seed, and recognize and understand the expression and spread of the locally important diseases (Thapa et al., 1999). The experiences of the cooperative reported in this study show that seed quality management goes beyond following technical knowledge and prescriptions: it requires collective action. Collective action asks not only technical capacity but also social capacity. Competent and committed leaders who have the capacity for organizing and leading group efforts are highly important (Ortmann and King, 2007). These can be partly captured in good

rules and regulations of the cooperation. However, in our case, these rules were not available on the inspection of plots and storages, nor for compensation of rejected seed lots. In a similar vein, the rules of cooperatives may be well described, but as long as they cannot be enforced, they are not functional either. Thus, interventions focused on building farmer groups' need to shift from 'standard production models' to an evolving model: an open and flexible model guided by trial, challenges and existing socio-technical and institutional realities. When farmer organizations develop gradually, through addressing the contextual challenges and meeting the needs of their members and leaders, they become strong, independent and successful. To do so, cooperative members and leaders need an opportunity for learning by doing, which helps create a balance between the external support and self-reliance.

Tension between the need to maintain high level seed quality and the collective action of members gets even more importance in the light of discussions around alternative seed quality regimes, like Quality Declared Seed and mechanisms based on 'branding' (FAO, 2010). Formal seed certification is highly centralized and expensive and thus, the Food and Agriculture Organization of the United Nations (FAO) in collaboration with the International Potato Center and a team of international experts proposed less formal and less costly mechanisms. This would leave the responsibility of seed quality control largely in hands of seed producing groups themselves. When farmer groups would be able to do so technically, it is not sure that they will be able to do it socially. This springs the need to understand community level dynamics and how interests of farmers can be accommodated and represent a threat to group initiatives. Eventually, the success and failure of these initiatives are not without consequence: in the case, we reported on, the spreading of bacterial wilt with the diffusion of contaminated potato seed beyond seed tuber producing areas has already been proven (Abdulrahman et al., 2017).

Acknowledgements

The authors gratefully acknowledge the contribution of farmers through sharing their potato farming and marketing experiences.

Funding

Financial support was provided by Wageningen University and Research; Vita (Irish Aid); and The Irish Agriculture and Food Development Authority (Teagasc) – Walsh Fellowships Post-graduate Programme.

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introducing potato technologies in Southern Ethiopia under the supervision of the Centre for Crop Systems Analysis and the Knowledge, Technology and Innovation group. Her PhD assessed the influence of technology introduction strategies, social networks and social differentiation on the adoption, dissemination and effects of potato technologies. For more than 13 years, Yenenesh worked within the rural development field in governmental and international nongovernmental organizations at different capacity. During those years, she had the opportunity to design, plan, implement and manage multi-sectoral rural livelihood programmes so as to meet the intended objectives, outcomes and outputs of the projects.

Dr. ir. Conny J. M. Almekinders is trained as a crop physiologist but now working as a social scientist at Wageningen University, Wageningen, the Netherlands. She has published on plant genetic resources, farmer-based seed systems and participatory breeding, and continues to do so with more sociological orientation. She aims to contribute to the emerging field of political agronomy, by studying technology-oriented interventions, which brings together her background in plant sciences with the social sciences.

Dr. Denis Griffin is a Potato Breeder working at the Crops Research Department in Teagasc, Oak Park Carlow, Ireland. He has released over twenty new potato varieties and his primary research focuses on the application of molecular DNA technologies to improve conventional breeding to produce more sustainable and resistant varieties. Dr Griffin also has interests in the influence of soil and genetics on accumulation of metals in a range of crops and the population dynamics of potato late blight (*Phytophthora infestans*). He has a particular interest in the development of potato in East African agriculture including adaptation to different agroecologies, understanding variety preferences amongst consumers and producers and the influence of potato seed systems.

Professor Paul C. Struik is an agronomist / crop physiologist working at Wageningen University, Wageningen, the Netherlands. In his research, he focuses on modelling of photosynthesis in C3 and C4 crops, genotype x environment interactions in monocots and dicots, and the agronomy and physiology of potato. Moreover, Dr Struik has studied seed systems of many different crops in various countries and has supervised many PhD students working on seed potato technology in Eastern Africa. In his research on seed systems, Dr Struik has been actively seeking synergy between natural and social sciences. Bridging the differences in scientific cultures of natural and social sciences has greatly influenced his view on science, especially during joint learning experiences with resource-poor farmers in Africa.

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