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ORIGINAL ARTICLE

Which type of producer organization is (more) inclusive? Dynamics of farmers' membership and participation in the decision-making process

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Abstract

Producer organizations (POs) provide benefits to smallholders by alleviating market access challenges. However, whether all farmers benefit from a PO is still a question. Limited evidence is available on whether POs are inclusive of poor farmers. Even if the poor join, do they participate in decision-making? We conducted interviews with 595 smallholder dairy farmers in Kenya. We distinguish three groups; members of a bargaining PO, members of a processing PO and non-members. We show that membership is related to the structural characteristics of the organization: processing POs favor membership of farmers that are wealthier, more educated and more innovative. As to participation in the decision-making process: older, male and specialized farmers have a higher chance of being involved than poor farmers. Factors distinguishing farmer participation in decision-making between bargaining and processing POs are highlighted. We find that a bargaining PO is more inclusive of all groups of farmers, while women and poor farmers are excluded from decision-making in a processing PO. Our findings contribute to policymaking on inclusive development.

KEYWORDS
dairy farmer cooperative, inclusiveness, membership participation

JEL CLASSIFICATION
M14, O13, Q13

1 | INTRODUCTION

Policymakers promote producer organizations (POs) as mechanisms for inclusive smallholder development in the agri-food markets of emerging economies (FAO, 2017). POs are supported because of the increasing concentration of downstream and upstream actors in the food chain, which negatively impacts the position of the farmer in negotiating better terms of trade (Reardon et al., 2019). It is argued that by acting collectively, smallholders can cope more effectively with marketing challenges, leading to improved livelihoods (Markelova, Meinzen-Dick, Hellin, & Dohrn, 2009). However, from a rural development perspective, the question is whether all farmers benefit from the organization? Are the poorest farmers, that is, those with few assets, and the vulnerable groups in terms of age, gender and location included in PO membership? Even if all farmers are members, do they have an equal chance to express their interests through participation in the decision-making process? In short, are POs inclusive?

A skewed distribution of inclusion in POs presents a problem for policymakers. If the PO is not inclusive of poor and vulnerable groups of farmers, it may not be the appropriate organization to support those groups. The inclusion debate in POs revolves around two issues. First, it is about inclusiveness versus competitiveness. Some authors indicate that a PO should be selective in accepting members when seeking to strengthen its economic position (Lutz & Tadesse, 2017). In a market economy in which buyers not only impose stringent transaction conditions on smallholders, but also often change delivery requirements, POs need to adopt competitive strategies (Blanc & Kledal, 2012). However, a competitive strategy may lead to the exclusion of poor households when those farmers cannot comply with buyer requirements (Bijman & Wijers, 2019).

The second debate refers to the participation of members in the governance of the PO (Bijman, Hanisch, & Sangen, 2014; Meier zu Selhausen, 2015). Members' participation in the decision-making process promotes accountability of PO management, which improves PO performance (Jussila, Goel, & Tuominen, 2012). It is argued that participation of the poor in the decision-making process has the potential of alleviating poverty (Thorp, Stewart, & Heyer, 2005). Do POs include the poor in the decision-making process? While in theory POs operate on the democratic principle of one-member-one-vote, in practice participation in the decision-making process may be in the hands of a few individuals (Liang & Hendrikse, 2013). If so, the interests of the non-participating farmers may not be considered, and the PO may pursue strategies that are mostly in the interest of the more resourceful farmers.

Researchers have documented the theory of inclusion and exclusion in POs, but there is surprisingly little empirical information on whether and to what extent POs are inclusive, and under what conditions they can become (more) inclusive. The objective of this paper is to provide empirical evidence on two inclusiveness outcomes: membership and involvement in decision-making. Most research on farmers' inclusion in the decision-making process has modelled various forms of participation independently (Cechin, Bijman, Pascucci, Zylbersztajn, & Omta, 2013). Our study contributes to the literature by employing a dynamic model that relates membership to participation in decision-making. The investigation takes the sequential nature of the different stages of participation into account; to participate in a given stage a farmer must pass the previous stage. For instance, to speak up in

the Annual General Meeting (AGM), as one form of participation, a farmer must attend the AGM. In exploring the determinants of participation, we use a sequential logit model to account for the sequential nature of participation decisions.

While most studies do not make any distinction between organizational structures of POs, we seek to understand inclusiveness patterns in different types of organizations. Because POs differ in their organizational structure and functionality, we expect to see different inclusiveness outcomes (Groot Kormelinck, Bijman, & Trienekens, 2019). We consider two types of POs; the bargaining PO, which does collection and bulking and coordinates the sale of farmers' products, and the processing PO, which processes the farm products into final consumer products. Using farm-level data from 595 smallholder dairy farmers in two regions in Kenya, we answer the following research questions. What determines membership in a PO? Are these determinants different for bargaining versus processing POs? What determines participation in the decision-making process of POs? Is there a difference in factors of participation between bargaining and processing POs? Understanding the determinants of membership and of participation in decision-making is vital for designing policies for improving the inclusion of smallholders in these organizations as well as for strengthening the internal and external legitimacy of the strategies the organizations pursue.

In the remaining sections, we present the rationale for inclusion, followed by a description of the context and the conceptual framework in Section 2. The data and methods are presented in Section 3. Section 4 describes the results and discussion. In Section 5 we conclude with the academic contribution, policy implications limitations, and further research.

2 | BACKGROUND

2.1 | Rationale for inclusion in POs

The term inclusiveness is mostly used within the concept of inclusive development. Inclusive development can be defined as development that aims to reduce poverty and inequality (Gupta, Pouw, & Ros-Tonen, 2015). The discussion on inclusiveness can refer to different groups of disadvantaged or marginalized people. As our focus is on POs as inclusive organizations, we will particularly explore the inclusion of different types of farmers as beneficiaries of the goods and services provided by these organizations. From a development perspective, discussions on inclusion are centered on whether poor farming households have access to PO services. We define inclusion as the participation of those farmers with few land and livestock resources and those that are vulnerable in terms of age, gender, and location (Gupta et al., 2015). For simplicity, we refer to both groups as the poor.

We address inclusion in POs using two dimensions suggested by Bernard and Spielman (2009): (i) membership that is inclusive of the poor and (ii) a decision-making process that represents the interests of the poor. Households make four decisions about their participation in a group (Agarwal, 2001). These include (i) nominal, or just membership, (ii) passive, which relates to attending the meetings, (iii) active, that is speaking up in meetings, and (iv) pro-active, that is having a voice in group decisions. The latter form of participation is attained by serving on the board of the PO.

Empirical and case studies present a different picture concerning the inclusion of smallholders in POs. The literature emphasizes the incentives and barriers associated with membership as the main determinants of inclusion. Concerning the membership of vulnerable groups, Minah and Malvido Perez Carletti (2019) show that the cost of membership fees and share contribution is inversely associated with membership of female-headed households in Zambian POs. The authors indicate that by venturing into processing, the organizations accrue additional funds which are used to offer financial

services to assist vulnerable members in paying membership fees. The findings contradict the common argument that higher participation costs discourage the inclusion of poor farmers (Latynskiy & Berger, 2016). Better-off farmers, that is, older, educated, socially networked and farmers living in accessible geographical locations, are more likely to join POs in Ethiopia (Mojo, Fischer, & Degefa, 2017). Regarding inclusion in the decision-making process, Fischer and Qaim (2014) demonstrate that wealthier farmers benefit more from group services than poorer farmers, leading to the exclusion of the latter in attending meetings in banana groups in Kenya.

Some authors use the new institutional economics framework, particularly transaction costs economics, to explain participation. Blanc and Kledal (2012) report that the balance between the time Mexican farmers spend in coordination and exchange practices in the PO, and the income received in return is unsatisfactory. What appears as benefit to some farmers, such as creating social ties and participative decision-making, is experienced as high coordination and transaction costs by others. Further, due to stringent and specific transaction conditions imposed by buyers, members of POs experience opportunistic behavior (Blanc & Kledal, 2012). Several transaction conditions lead to the exclusion of poor farmers from both membership and decision-making.

Having both men and women contributing to management and leadership can improve PO performance (Baltenweck, Omondi, Waithanji, Kinuthia, & Odhiambo, 2016). Coleman and Mwangi (2013) find that improved women's participation in the decision-making process in forest organizations leads to better governance practices. Yet, women are often absent in decision-making positions in agricultural organizations because of their lack of time, unfavorable locations of meetings, women's multiple commitments and sometimes lack of interest (Pini, 2002).

POs may have good reasons not to include everyone. This is often true for organizations in which the majority of the members prioritize competitiveness over inclusiveness. When a PO chooses a competitive strategy, issues of increasing product quantity and quality, as well as increasing investment for innovation, product development and marketing, all become important (Bijman & Iliopoulos, 2014). Poor farmers may not be able to contribute to PO investment.

What is evident from this literature is that most studies focus on inclusion in terms of membership. Little effort has been made to understand inclusion in the decision-making process. Furthermore, most studies consider POs to be of one type. Recently, authors have argued that there are substantial differences in organizational structures and functionality of POs and that studies on the performance of POs should pay more attention to those differences (Bijman, Muradian, & Schuurman, 2016; Michalek, Ciaian, & Pokrivcak, 2018; Zhong, Zhang, Jia, & Bijman, 2018). We fill a knowledge gap by providing evidence on the dynamics of inclusion of the poor in two types of POs in the Kenyan dairy sector: the bargaining and the processing PO.

2.2 | Context: Producer organizations in Kenya

A PO is defined as a rural business, owned and controlled by producers, and engaged in collective marketing activities (Penrose-Buckley, 2007). POs play a critical role in the dairy sector in Kenya, handling about 40% of marketed milk (Muriuki, 2011). Most PO members are smallholder farmers (KDB, 2016), together owning over 80% of the dairy herd, with each cow producing 7 to 8 liters of milk per day (Kilelu, Koge, Kabuga, & Van der Lee, 2018). POs in Kenya can be primary POs, with individual farmers as members, or unions, whose members are primary POs (Wanyama, 2009). They may have various legal forms: self-help group, cooperative, or farmer-owned company (Mutinda, Baltenweck, & Omondi, 2015). Dairy POs may focus on bargaining only or also do processing (Grashuis & Cook, 2013). In the following paragraphs, we provide a detailed description of the POs in our study context, using the distinction by economic function.

The bargaining PO collects, bulks, and coordinates the sale of raw milk. Membership is open, membership size is small (< 500 smallholders), the daily volume intake is small (< 2,000 kg) and resources are few. The legal form is typically a self-help group. The bargaining PO acts as intermediary between farmers and processors or traders. In this role, the organization improves the negotiation position of farmers in obtaining a better price and contract terms. Farmers benefit from milk collection, organized at central milk collection points close to the farm. The bargaining PO does not provide technical assistance and has only minimum quality requirements. Members receive payment for products after 35 days. The cost of membership includes a fixed membership fee of about KES 150. A fixed KES 50 per member and about KES 3 per kg of milk is deducted from the monthly milk payment to cover administrative costs.

The internal governance structure of the bargaining PO consists of a General Assembly (GA) and a board. The GA convenes once a year in the AGM, where members make major decisions on a one-member-one-vote basis. During this meeting, the GA elects the board. The board sets policy directions and develops a vision for the PO. Besides the daily management activities of individual board members, the full board meets roughly once a month. The board sometimes hires staff to coordinate sales and keep records.

A processing PO does actual milk processing, either directly or in partnership with a private company. We observe two types of processing POs. The first type is a two-tier federated structure. Individual farmers form a primary PO, which collaborates with other primary POs to form a cooperative union. The union is taking care of processing on behalf of the primary POs. The second type is a joint venture between a primary PO and an investor, where they jointly own a processing plant.

Processing POs operate on a large scale, have a large membership size, ranging from 2,000 to 20,000 smallholders, (indirectly) own physical assets, and take the legal form of a cooperative. As a cooperative, the PO experiences a considerable degree of government intervention, as state officials supervise cooperative elections, monitor accounts and authorize capital expenditures. The processing POs organize milk collection at the farm gate. They provide technical assistance, credit, veterinary services and artificial insemination. Product quality is important to the extent that a processing PO has its own brand to protect. Food safety and quality checks are carried out at milk purchase, bulking, and processing points. However, product quality does not determine the price of milk, as farmers are paid only on the basis of the quantity delivered. The processing PO pays its members after 35 days. Members pay a fixed fee of about KES 500, a capital contribution of at least KES 2,500 and in some cases make monthly share contributions. A monthly fee of about KES 3 per kg of milk is charged for administrative costs.

Regarding internal governance, the processing PO has a GA, a board, a supervisory committee, and a management staff. As the GA takes the major decisions during the AGM, members need to participate in this meeting. The board meets once a month to discuss current developments and future strategy. It provides oversight of the management staff, sets policy direction, and presents a vision. The board appoints the manager, who manages the day to day activities. The supervisory committee acts as the internal auditor by checking the work of the board and the management staff (Rademaker, Koech, Jansen, & Van der Lee, 2016b).

2.3 | Conceptual framework

We now turn to the question of what factors explain farmers' inclusion in POs. Economists apply the rational decision-making model, which postulates that all costs and benefits of action can be attributed to a specific value. A rational individual will weigh the costs and benefits of membership in deciding whether to join or not. Once they are members, farmers choose how to participate in the decision-making process.

This research borrows from the study of Fischer and Qaim (2014) on the costs and benefits of participation in marketing groups. We first discuss factors of inclusion in membership, then we move to the decision-making process. Costs of membership include membership fees, share contribution, delayed payment and specific investments in producing according to the safety and quality requirements of the PO. Benefits are access to markets, technical training, inputs and credit. The costs of membership are independent of the cost of participating in the decision-making process, as members have access to services even if they do not attend meetings.

The type of PO affects farmers' membership decision. Because a bargaining PO has low investments, the membership fee is low and thus attractive for poor farmers. Given its more substantial assets, a processing PO requires a higher contribution from its members and/or even ownership of shares, which is difficult for poor farmers. If a processing PO sells under a brand name, it is necessary to guarantee quality and monitor users (Ménard, 2004).

Farmers' characteristics such as age, gender and assets ownership influence the costs and benefits of membership. In terms of gender, female farmers may face time and norm-related constraints, which may negatively influence their membership in collective activities (Quisumbing et al., 2015). Physical assets, such as land and livestock, are important in increasing production which contributes to lower average costs of membership. Education and age increase 'the ability to perceive, interpret and respond to new events' (Schultz, 1961). Although a farmer is not required to adopt improved breeds when becoming a member, access to artificial insemination and related extension is one of the advantages of membership (Twine, Rao, Baltenweck, & Omore, 2018), and therefore farmers with improved breeds are more likely to be members. Membership in social groups, which indicates social capital, facilitates information exchange and trust-building, thereby reducing transaction costs (Fischer & Qaim, 2014). Investment in milk production requires cash to buy inputs and adopt improved breeds, which underscores the importance of access to credit. The geographical location of a farmer affects the benefits of membership. Farmers incur transportation and opportunity cost of time in milk collection activities, and these costs increase with increasing distance to the milk collection point. Regions with alternative buyers tend to have low collective action because of the higher bargaining power of individual farmers (Abate, 2018).

Farmer participation in the decision-making process is influenced by various factors. The costs involve time and money to attend meetings. In return, farmers benefit from representing their interests in the PO. Another benefit is the creation and reinforcement of networks of information exchange. The characteristics of the PO are important in influencing farmers' participation. In a bargaining PO, the number of members is low. A small membership is associated with a higher level of trust among members and their leaders, leading to higher member participation (Feng, Friis, & Nilsson, 2016). Being almost entirely controlled by the members, the bargaining PO requires the active participation of members in the AGM and the board. However, the cost of participation may be beyond the means of poor farmers. In processing POs, a large number of members inplies a more anonymous membership. Anonymity leads to a lower level of trust among members and between members and leaders (Nilsson, Svendsen, & Svendsen, 2012). A high number of members may also imply more heterogeneity in member interests, which leads to higher costs of collective decision-making. Also, conflicts may arise due to the separation of decision rights between members and professional managers (Bijman et al., 2014). Low trust, conflicting interests, and high costs entail weak incentives to become involved.

Household characteristics influence the costs and benefits of participating in the decision-making process (Weinberger & Jütting, 2001). Age, gender, physical and human assets are determining factors. Older farmers have more time to attend meetings because younger members of the household take care of the farm activities (Cechin et al., 2013). Women are mostly involved in household chores and therefore have less time to attend meetings (Birchall & Simmons, 2004). The high opportunity cost of time in small dairy farms work as a disincentive to engage in PO meetings. Benefits from the PO,

such as access to inputs and extension on credit, provide incentives for participation in governance (Grashuis & Su, 2018). Previous experience with collective action is important in determining present behavior (Ostrom, 2000). Experience in managing collective activities will influence farmers' willingness to participate in the decision-making process. High trust between PO members and the management reduces the transaction costs in monitoring PO management (Tadesse & Kassie, 2017). The geographical location of the farm is a determinant. Farmers living in remote areas face higher costs in engaging in collective action (Abate, 2018). Costs associated with time and transport are significant barriers to attending meetings.

3 | METHODS AND DATA

3.1 | The estimation techniques

Our empirical approach to examining membership in POs is modelled as a choice, given the households' social and economic characteristics. We apply the random utility framework, which states that a given household chooses to be a PO member if the utility from being a member is larger than from being a non-member. Following Field (2013), a household is hypothesized to prefer a particular sales arrangement if the utility from supplying to that sales arrangement exceeds the utility of choosing a different type of sales arrangement. A household has three choices; to supply to a trader, to a bargaining PO or to a processing PO. However, the sales arrangements cannot be ordered, and a household can select only one of the available choices. A multinomial logit model is employed dealing with the multiple choices that are not ordered.

Once a farmer has joined a PO, he/she is expected to participate in decision-making. In modelling farmers' participation decisions, several alternative modelling techniques such as ordered, multinomial and nested logit models can be considered, but these are not appropriate for our dataset. For example, the multinomial and nested logit models do not account for the ordering of the decision-making process. The conventional approach would be to apply an ordered probit/logit model. However, the decisions are not only ordered but also sequential. Attending the AGM (passive) is conditional on being a member (nominal), speaking up in the AGM (active) is conditional to attending the AGM (passive), and serving on the board (pro-active) is conditional on speaking up in the AGM (active). There is self-selection for each higher level of participation in the decision-making process. An ordered probit estimate would be biased since it does not take the conditional sequence or the self-selection involved in these decisions into account.

We adopt a sequential logit model as proposed by Fullerton (2009). The model explores the association between household characteristics and the PO type on the decision to move from one stage to the next. The decision to move to the next higher stage is correlated with the previous decision, and the subsequent decisions are subject to selectivity with respect to earlier decisions. A key advantage of the sequential logit model is that it clarifies previous empirical and theoretical explanations for participation by considering that decisions are driven by household characteristics and PO type at each stage. Knowing the influence of household characteristics and PO type on each stage gives a complete picture of how inequalities in participation come about, describing the disparities in the process, rather than in the outcome. However, the sequential model cannot eliminate latent variable bias that derives from an individual's unobserved motivation to participate.

3.2 | Farm survey

We conducted a survey in Kenya between October and December 2018. Purposive sampling was used to select Meru and Nyandarua Counties, which are among the main milk sheds in Kenya (Rademaker

et al., 2016b). The counties have a high number of dairy POs but differ in market structure. Meru County, which is located 270 km from Nairobi, has a cooperative union as the main processor. Meru is not within the immediate reach of traders in and around Nairobi, although the city itself is home to many traders. Nyandarua is located 100 km from Nairobi and enjoys a high demand for milk from many processors and traders (Van der Lee, Klerkx, Bebe, Mengistu, & Oosting, 2018). High demand for milk comes from the urban population from nearby cities, including Nairobi, Nakuru, Naivasha and Nyahururu.

We purposively selected one sub-county in Meru and two sub-counties in Nyandarua, targeting those having a mixed pattern of collective and individual milk marketing systems. At the sub-county level, we used stratified sampling with three strata; bargaining POs, processing POs and non-members. We purposively selected the POs based on the accessibility and receptiveness of the PO staff. Two processing POs out of seven and one bargaining PO out of seven in Imenti-south sub-county in Meru were chosen. One processing PO operating in Kinangop and Ol-Kalou sub-county in Nyandarua was selected as it was the only one available and had members in both sub-counties. We picked one bargaining PO out of the seven present in Ol-Kalou sub-county in Nyandarua. The processing and bargaining POs selected are representative as they share similar characteristics with the population of POs in terms of size, resource capacity and services. We used reports from the Kenya Dairy Board, Agriterra (Kagathi, 2014), and Wageningen University and Research and the FAO (Ton, Haddad, Bijman, Sraïri, & Mshenga, 2016) as well as journal articles (O'Brien & Cook, 2016) to verify the representativeness of our sample. Further support information was given by the government staff from the selected counties.

The biggest challenge in a cross-sectional survey is to obtain a random sample of households. We could not identify members from the PO register because the contact details of the members were either missing or not updated. To ensure a random sample, we obtained a list of milk collection routes from the POs. Enumerators followed a different route every morning. The first enumerator started to identify households at the start of the collection route. The remaining enumerators proceeded on the same route with each enumerator starting to identify households at least four kilometers from where the previous enumerator had stopped. When the first household was identified, enumerators were instructed to skip four to five households before picking the next household. Enumerators repeated this process until the targeted number of respondents was reached. For the selection of non-members, enumerators followed the routes of traders, using a similar identification procedure as for PO members. We sampled 375 PO members (112 in bargaining and 263 in processing POs) and 220 non-members. Data was collected using the one-on-one interviewing technique. The sampling procedure is summarized in the Appendix, Figure A1.

3.3 | Variables

Our dependent variables include membership, captured by asking a farmer to indicate whether he/she is a member of a dairy PO (1 = yes). Attending the AGM is determined using a Likert scale in which members rated the extent to which they agree with the statement 'I regularly attend annual general meetings' on a scale of 1 to 7, where 1 is 'completely disagree' and 7 is 'completely agree'. Speaking up in the AGM is measured on a similar Likert scale where the following statement was asked 'I always express my ideas during AGMs'. Lastly, about serving on the board, a question of whether a member serves on the board is asked (1 = yes).

We draw our explanatory variables from the literature. We consider the type of PO that a farmer belongs to by using a dummy variable, where membership in a processing PO = 1. About 70% of the members sampled belonged to the processing PO. Age, education and hired labor are used as indicators of human capital. Since we expect participation to decrease with age, we also include a squared term

of age. We include a variable male as a control variable. The main physical assets in dairy households include land and livestock measured as farm size and the number of cows owned. We add cow breed, indicating whether any of the cows are pure breed as a measure of innovation adoption, and the number of hours spent in the dairy farm signifying specialization. Social capital variables include networks which are measured indirectly, by asking whether farmers are members of other groups, such as church and saving groups. Other measures are membership trust and leadership trust. We use two measures of access to credit. Access to a loan from financial providers like banks is considered to be an indicator of financial capital. Only 25% of the sampled farmers had access to a loan. We use access to credit from the PO, which is observed when a farmer buys feeds, extension, and veterinary services on credit terms, as a measure of the benefits of membership.

The distance to the PO office, distance to the milk collection point, terrain, county, and the number of traders are used to capture geographical location variables. A dummy variable for terrain and a dummy for the county are included. The number of traders indicates the market structure that the farmers face. The explanatory variables are summarized in the Appendix, Table A1.

4 | RESULTS AND DISCUSSION

4.1 | Summary statistics of variables used in empirical analysis

Table 1 presents the basic summary statistics of variables used in the empirical analysis. Slightly over 60% of the households belong to a PO, with most households being members of a processing PO. Male farmers represent 50% of the members. On average, member households have high trust in other members and leaders. Regarding farm characteristics, the households represent smallholder dairy farmers owning two cows and on average less than four acres of a farm.

4.2 | Household characteristics of members and non-members

We present the statistical differences between members of bargaining and processing organizations and non-members, and between members of bargaining and processing POs (Table 2). Both members of bargaining POs and processing POs are more likely to be man, older and with hired labor compared to non-members. In addition, members of a processing PO are likely to be more educated, own pure breed cows and are located close to the milk collection point compared to non-members. Ownership of improved breeds and hiring of farm workers indicate entrepreneurial behavior. Some distinctions can be seen between members of bargaining and processing POs. Members of a processing PO have a significantly higher level of education and are located in less remote areas implying that they have fewer constraints in accessing information.

4.3 | What determines membership in POs?

Table 3 presents the determinants of membership in a PO. The goodness-of-fit tests indicate that the selected covariates provide good estimates of the conditional density of membership. The explanatory variables are jointly statistically significant (LR $\chi 2$ test statistic = 177.910; $p = 0.000$). We explain the average marginal effects. An additional laborer on the dairy farm increases the likelihood of membership in a bargaining PO by 7.5 percentage points compared to non-membership. Owning a pure breed cow increases the chances of joining a processing PO by 8.8%, indicating a higher ability to innovate. Additionally, a farmer with more cows is likely to be a member of a processing PO versus being a non-member. The results point to the importance of assets. A large dairy farmer faces higher transaction costs, thus needs assurance of having a buyer (Pascucci, Gardebroek, & Dries, 2011).

TABLE 1 Summary statistics of variables used in empirical analysis

Variable	Mean	Standard deviation	Minimum	Maximum	Observations
Dependent variables					
Membership	0.63	0.48	0	1	595
Attending the AGM	4.61	2.51	1	7	375
Speaking up in the AGM	4.10	2.47	1	7	375
Serving on the board	0.08	0.27	0	1	375
Processing PO	0.70	0.45	0	1	375
Independent variables					
Age	49.11	13.24	22	96	595
Education	9.37	3.53	0	20	595
Hired labor	0.42	0.42	0	1	595
Male	0.50	0.50	0	1	595
Farm size	3.61	1.06	0.13	120	595
Number of cows	2.22	1.81	1	20	595
Hours spent in dairy	3.62	2.18	0	12.25	595
Pure breed cow	0.52	0.50	0	1	595
Group membership	0.63	0.48	0	1	595
Access to loan	0.25	0.43	0	1	595
Distance to the PO's office	7.05	7.63	0.01	35	595
Distance to the milk collection point	0.74	1.85	0	22	595
Hilly terrain	0.54	0.50	0	1	595
Nyandarua County	0.53	0.50	0	1	595
Number of traders	4.97	1.89	1	7	595
Membership trust	5.75	1.15	1	7	375
Leadership trust	5.67	1.43	1	7	375
Credit from PO	3.77	2.65	1	7	375

The distance to a milk collection point is not associated with the decision to be a member of a bargaining PO, but it does explain the decision to join a processing PO. Consistent with Ngeno (2018), a one unit increase in the distance decreases the chance of joining a processing PO by 8.2 percentage points. The strong negative relationship could be explained by the increasing cost of transportation.

Our findings, consistent with Abdul-Rahaman and Abdulai (2018), show that having access to loans increases the chance of a farmer to be a member of a processing PO over non-membership. Access to finance helps farmers to procure inputs. In this regard, a processing PO seems to exclude the poor.

So far, we have shown which variables influence membership in a PO as opposed to non-membership. However, the factors of membership in a processing PO versus a bargaining PO have not been compared. A post-estimation of the multinomial logit using the likelihood ratio test helps us to see this relationship (Appendix Table A2). Highly educated farmers are more likely to join a processing PO than a bargaining PO. The processing PO supplies to modern agri-food chains that have relatively higher food safety and quality standards (Ledo, Hettinga, Bijman, & Luning, 2019); knowledgeable farmers are better able to comply with the production and delivery requirements. Additionally, educated farmers could be more receptive to technologies and innovations of a processing PO. Group

TABLE 2 Statistical differences of household characteristics between members and non-members

	Non-members (1) $N = 220$		Bargaining PO (2) $N = 112$		Processing PO (3) $N = 263$		*t*-test (2)-(1)	*t*-test (3)-(1);	*t*-test (3)-(2)
Variable name	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	***t*-value**	***t*-value**	***t*-value**
Age	47.28	14.22	51.29	13.28	49.72	12.20	2.483**	2.034**	−1.106
Male	0.44	0.50	0.56	0.49	0.52	0.50	2.184**	1.854*	−0.737
Hired labor	0.32	0.47	0.50	0.50	0.46	0.50	3.181***	3.096***	−0.707
Education	8.85	3.53	9.16	3.74	9.90	3.37	0.732	3.327***	1.881*
Pure breed cow	0.45	0.50	0.51	0.50	0.59	0.49	0.937	2.890***	1.369
Hours spent in dairy	3.23	1.93	3.96	2.32	3.80	2.27	3.025***	2.935***	−0.616
Number of cows	1.76	1.19	2.40	1.23	2.52	2.32	4.555***	4.384***	0.513
Farm size	3.33	10.05	3.43	2.83	3.92	4.89	0.099	0.819	1.000
Group membership	0.63	0.48	0.57	0.50	0.67	0.47	−0.984	0.873	1.735*
Nyandarua County	0.55	0.50	0.52	0.50	0.51	0.50	−0.476	−0.704	−0.081
Distance to the milk collection point	1.12	2.69	0.65	0.88	0.44	1.09	−1.712*	−3.756***	−2.005**
Distance to the PO office	6.80	8.55	3.91	4.63	8.60	7.43	−3.341***	2.472**	6.188***
Hilly terrain	0.57	0.50	0.60	0.49	0.49	0.50	0.444	−1.889*	−1.984**
Number of traders	5.56	1.61	4.71	2.18	4.60	1.86	−4.040***	−6.021***	−0.491
Access to loan	0.10	0.29	0.25	0.43	0.37	0.48	3.824***	7.326***	2.243**
Credit from PO			3.44	2.65	3.91	2.64			1.592
Membership trust			5.84	1.25	5.71	1.12			−1.017
Leadership trust			5.79	1.47	5.62	1.41			−0.983

*, **, and *** denote significance at the 10%, 5%, and 1% level, respectively; SD means the standard deviation.

TABLE 3 Multinomial logit results for determinants of membership

Variables	Bargaining PO Coefficient (SE)	Processing PO Coefficient (SE)	Non-membership Marginal effects (SE)	Bargaining PO Marginal effects (SE)	Processing PO Marginal effects (SE)
Age	0.104* (0.060)	0.112**(0.053)	−0.024**(0.011)	0.007 (0.009)	0.018 (0.012)
Age squared	−0.001 (0.001)	−0.001*(0.001)	0.000**(0.000)	0.000 (0.000)	0.000 (0.000)
Male	0.193 (0.268)	−0.063 (0.229)	−0.004 (0.047)	0.038 (0.039)	−0.034 (0.050)
Education	0.024 (0.038)	0.089***(0.033)	−0.015**(0.007)	−0.004 (0.005)	0.020***(0.007)
Hired labor	0.640**(0.279)	0.336 (0.241)	−0.095**(0.048)	0.075*(0.041)	0.020 (0.051)
Pure breed cow	0.019 (0.259)	0.366*(0.219)	−0.057 (0.045)	−0.032 (0.038)	0.088*(0.047)
Hours spent in dairy	0.156**(0.063)	0.127**(0.055)	−0.030***(0.012)	0.014 (0.009)	0.017 (0.011)
Number of cows	0.200*(0.102)	0.218**(0.095)	−0.047**(0.021)	0.012 (0.011)	0.035**(0.017)
Group membership	−0.307 (0.267)	0.269 (0.233)	−0.017 (0.048)	−0.079*(0.041)	0.096*(0.049)
Distance to the milk collection point	−0.130 (0.087)	−0.382***(0.100)	0.067***(0.019)	0.015 (0.014)	−0.082***(0.023)
Hilly terrain	−0.087 (0.273)	−0.856***(0.233)	0.134***(0.046)	0.067*(0.038)	−0.201***(0.048)
Number of traders	−0.277***(0.073)	−0.373***(0.064)	0.076***(0.013)	−0.010 (0.010)	−0.066***(0.013)
Access to loan	0.969***(0.337)	1.518***(0.289)	−0.260***(0.043)	−0.005 (0.041)	0.265***(0.050)
Constant	−3.618**(1.627)	−2.845**(1.39)	–	–	–
Observations	595				
LR $\chi 2$ test statistic	177.910				
P-value	0.000				

The base outcome for multinomial logit is non-membership; *, **, and *** denote significance at the 10%, 5%, and 1% level; SE is the standard error.

membership increases a farmer's chance to join a processing PO as opposed to a bargaining PO. Having more social networks increases access to information which is important for managing the farm.

Farmers who are situated far from the milk collection point and located in hilly terrain have a lower likelihood of being members of a processing PO compared to a bargaining PO. Remote location often implies high transaction costs, which are not compensated by the margin received if the farmer is to join a processing PO. Our results corroborate the finding of Hung Anh and Bokelmann (2019) on the determinants of market preferences among smallholder coffee farmers in Vietnam. Access to loans, which indicates financial capability, significantly distinguishes between membership in a processing PO versus a bargaining PO. The role of geographical and financial factors underscores the importance of costs in a farmer's decision to join a PO.

4.4 | Participation in the decision-making process

We construct the dependent variable of participation for estimating the sequential logit model as follows. Likert scale variables measuring 'attendance to the AGM' and 'speaking up in the AGM' are dichotomized into 1 = a farmer attends the AGM, and 1 = a farmer speaks up in the AGM, respectively. The responses 'completely disagree' and 'mostly disagree' are allocated the value of 0 while the other responses are allocated the value of 1. After dichotomization, we create the participation variable following the conditional sequential restriction. Hence, simple membership = 1, attending the AGM = 2 (conditional to being a member), speaking up in the AGM = 3 (conditional to attending the AGM) and serving on the board = 4 (conditional to speaking up in the AGM). We acknowledge that the dichotomization of the Likert variables may lead to a loss of information (Royston, Altman, & Sauerbrei, 2006). However, as MacCallum, Zhang, Preacher, and Rucker (2002) note, dichotomization is justified if the distribution of the response is skewed so that there is a large number of observations in the extremes of the scale, as is in our case (see Appendix, Figures A2 and A3).

We then estimate the sequential logit model of factors associated with farmers' participation in the decision-making process. The sequential logit model estimates three decisions. The first decision is between 'simple membership versus attending the AGM or more'; the second decision is the choice between 'attending the AGM versus speaking up in the AGM or more' while the third decision relates to 'speaking up in the AGM versus serving on the board'. First, we model the sequential logit on the full sample using membership in the processing PO as one of the independent variables to test whether the type of PO is associated with participation (Appendix, Table A3). The model output shows some variance in the three stages of participation, which is an indication of the correlation between stages. Therefore, we cannot consider the participation stages as being independent, which supports our decision to use a sequential logit model. The model is highly significant, as shown by the p-value. Further, the robustness of the sequential logit model is shown by the Akaike Information Criterion (AIC). Lower values of AIC signify a better fit model (Cameron & Trivedi, 2005). Based on this test, we prefer the sequential logit model (AIC = 692.54) over the multinomial logit (AIC = 700.44).

In line with the theory, membership in a processing PO reduces the likelihood of speaking up in the AGM compared to membership in a bargaining PO. We link this to the tiered structure of the PO, where members have less influence as the union decides on many issues. The alternative organizational structure of joint ownership of the processing plant between members and a private investor has similar implications because members may have less control as the private partner takes most decisions. The reduced members' control and separation of decision rights weaken members' incentives to express opinions (Bijman, Hendrikse, & Oijen, 2013).

Besides, members of a processing PO have a lower probability of serving on the board. From our observations, there are delivery requirements to be met, such as a minimum quantity of milk,

TABLE 4 Determinants of participation in decision-making in bargaining and processing POs

	Bargaining PO			Processing PO		
	Simple membership vs attending the AGM, speaking in the AGM and serving on the board	Attending the AGM vs speaking in the AGM and serving on the board	Speaking in the AGM vs serving on the board	Simple membership vs attending the AGM, speaking in the AGM and serving on the board	Attending the AGM vs speaking in the AGM and serving on the board	Speaking in the AGM vs serving on the board
Variables	**Coefficient (SE)**	**Coefficient (SE)**	**Coefficient (SE)**	**Coefficient (SE)**	**Coefficient (SE)**	**Coefficient (SE)**
Age	0.115 (0.132)	0.442 (1.228)	0.091 (0.255)	0.034 (0.101)	0.079 (0.165)	1.089**(0.447)
Age squared	−0.001 (0.001)	−0.002 (0.012)	−0.001 (0.002)	−0.000 (0.001)	−0.001 (0.002)	−0.010**(0.004)
Male	−0.679 (0.594)	1.391 (1.922)	1.249 (1.064)	1.104***(0.370)	1.179*(0.625)	0.937 (0.787)
Hired labor	0.88 (0.606)	0.875 (1.803)	1.395 (1.063)	0.079 (0.412)	0.413 (0.653)	2.214**(0.944)
Education	0.017 (0.077)	0.574 (0.436)	−0.235*(0.131)	0.012 (0.055)	0.079 (0.084)	−0.074 (0.129)
Pure breed cows	2.09***(0.666)	−0.657 (1.795)	0.797 (1.038)	0.277 (0.350)	−0.425 (0.642)	−0.382 (0.821)
Number of cows	0.645**(0.280)	−0.228 (0.872)	0.602 (0.461)	0.231*(0.131)	−0.051 (0.107)	0.310***(0.118)
Farm size	−0.23**(0.113)	0.059 (0.485)	−0.089 (0.168)	−0.030 (0.037)	0.342**(0.156)	−0.684*(0.367)
Distance to PO office	−0.006 (0.069)	−0.063 (0.236)	−0.395 (0.378)	−0.034 (0.035)	0.216***(0.076)	−0.178 (0.175)
Nyandarua County	−2.34***(0.720)	−1.058 (2.310)	−1.324 (1.335)	−2.451***(0.584)	−3.012***(0.935)	0.800 (1.895)
Credit from PO	0.039 (0.110)	0.321 (0.444)	0.01 (0.207)	0.198***(0.066)	0.173 (0.111)	0.302*(0.173)
Membership trust	0.27 (0.242)	1.973**(0.933)	0.472 (0.586)	−0.016 (0.160)	0.397 (0.257)	0.256 (0.450)
Leadership trust	0.607*** (0.225)	0.446 (0.922)	1.097 (0.809)	0.365***(0.133)	0.400**(0.236)	0.126 (0.334)
Group membership	0.878**(0.543)	4.556 (3.061)	2.614**(1.229)	0.676*(0.373)	2.021***(0.631)	2.628**(1.277)
Constant	−8.447 (4.188)	−34.584 (37.029)	−15.402 (8.376)	−3.151 (2.678)	−9.493**(4.752)	−37.415***(13.689)
Observations	112	74	67	263	179	158
Variance (SE)	0.200 (0.028)	0.002 (0.006)	0.009 (0.011)	0.198 (0.017)	0.076 (0.026)	0.003 (0.004)
P-value	0.000			0.000		

Figures in parentheses are the standard errors; *, **, and *** denote significance at the 10%, 5%, and 1% level; SE is the standard error.

for a farmer to qualify as a board member of a processing PO. Most farmers are too small to meet the requirements. Additionally, the political interference of the local government can explain low participation in the management of processing POs. Previous research relates low member participation in African POs to high state interference, where PO support is framed in political interests as opposed to member interests (Wanyama, 2013; Wedig & Wiegratz, 2018).

Knowing that membership in a PO affects participation is not sufficient for understanding participation dynamics. Table 4 presents the factors that determine farmers' participation in bargaining and processing POs. Age is not important in explaining farmers' participation in the decision-making process in a bargaining PO, but it positively and significantly relates to a farmer's decision to serve on the board of a processing PO. The culture of respecting seniors may contribute to having older members serving on the board. Cechin et al. (2013) further suggest that farmers, as they get older, may seek to pursue political careers through cooperatives. Given that age squared is significant in influencing the decision to serve on the board of a processing PO, very old and very young farmers are excluded. Maybe, very young farmers have not yet built up the social capital necessary to become elected.

Even though gender is not significant in influencing membership in a processing PO, once farmers join, women are excluded from the decision-making process. National culture may affect the willingness of men to accept a woman's contribution. As noted by Grillos (2018), while women in Kenya are more likely to attend community decision-making meetings, they are not likely to speak at those meetings. Additionally, farmers require time to seek knowledge to make meaningful contributions to the AGM's discussions. Bryceson's (2019) study in sub-Saharan African countries shows that rural women have longer working hours with less flexibility for reducing their labor input compared to men. Due to these constraints, women view organizational labor as a burden on their time, which limits their ability to fully participate in PO governance (Lyon, Mutersbaugh, & Worthen, 2016).

Large farmers are more advantaged for participating in the decision-making process in a processing PO than in a bargaining PO as they are likely to attend the AGM, speak up in the AGM and serve on the board of the processing organizations. The lower probability of participation of small farmers could partly be because of their expected lower marketable surplus, which in turn makes the benefit from participation only marginal. While access to credit from the PO does not relate to the farmers' decision to participate in the bargaining PO, this factor positively relates to the decision to attend the AGM and serve on the board of a processing PO. Perhaps more importantly, results suggest that having access to credit from the PO increases the benefits to farmers motivating them to be involved. Gyau, Mbugua, and Oduol (2016) found that the intensity of participation in group activities among avocado farmers in Kenya depends on the farmer's perceived economic benefits of the group.

Consistent with Barraud-Didier, Henninger, and Akremi (2012) and Tadesse and Kassie (2017), the relationship between farmers' leadership trust and their participation in POs is positive and significant. Trust increases a member's chance to attend the AGM of a bargaining PO and to speak up in the AGM of a processing PO. Membership in other groups positively correlates with farmers' decision to attend the AGM, speak up in the AGM and serve on the board of a processing PO. Groups are platforms for information exchange. Farmers who belong to other groups are likely to participate actively, probably because they are more outgoing or see more benefits in building social capital.

5 | CONCLUSION

5.1 | Academic contribution

An increasing number of studies document the benefits of POs in terms of improving smallholders' welfare (Mojo et al., 2017; Ngeno, 2018). However, the question of whether all farmers in an area where

the PO operates benefit from the organization has not been addressed. This study looks at the inclusion of farmers in bargaining and processing POs. We examine inclusion in membership and participation in the decision-making process. Based on the analysis of 595 smallholder dairy farmers in Kenya, we find that farmers are more likely to be members of a bargaining PO if they have hired labor and live in remote locations. Farmers who are more educated, own pure breeds, and have a large number cows are likely to belong to a processing PO. These factors indicate an entrepreneurial behavior that is likely to be present among members of a processing PO. Furthermore, farmers who are located in less remote areas are more likely to be members of a processing PO.

The relationship between membership in a processing PO and participation in decision-making is negative. Members of a processing PO are less likely to speak up in the AGM or to serve on the board. We find that farm assets such as ownership of pure breed cows, number of cows and farm size are positively associated with attending the AGM of a bargaining PO, implying that poor farmers are excluded from these meetings. Young farmers and women are likely to be excluded from the decision-making process of a processing PO. Likewise, the probability of small farmers and those with low social capital to participate in the processing PO is low.

This study contributes to the research on the inclusiveness of POs. First, our study extensively assesses farmers' membership decisions and their participation in the decision-making process, particularly in the context of African countries. We show that studying inclusion in membership is necessary but not sufficient in explaining farmers' involvement in POs. To promote inclusion, it is important to consider participation in the decision-making process. For instance, this study indicates that although men and women have an equal chance of joining a PO, the decision-making process excludes women.

Second, the relationship between the type of PO and farmer participation in decision-making is an important aspect of this study. Being a member of a bargaining PO is positively associated with participation which implies that this PO considers the interests of a wide range of members. In contrast, a member of a processing PO is less likely to be involved in the decision-making process. Processing POs often strengthen the autonomy of the professional managers and reduce member influence on operational decisions (Bijman & Iliopoulos, 2014).

Third, we contribute to the debate on the representation of the interests of different sections of a community in POs (Bernard & Spielman, 2009). We have shown that older, male, specialized farmers with a high level of trust are more likely to participate in the decision-making process. Our study points towards the exclusion of the poor, in terms of physical and social capital, and of women farmers from the decision-making process. A discerning contribution of this paper is the establishment of factors that distinguish farmers' participation in bargaining and processing POs. Previous studies did not make this distinction. We add to the broader debate about the inclusiveness versus competitiveness objectives of farmer organizations (Lutz & Tadesse, 2017). We show that a bargaining PO is more inclusive of poor farmers, but a processing PO favors membership of entrepreneurial farmers. The latter are better able to adapt to the strict delivery conditions of a processing PO. The situation observed in this study is in line with Lutz and Tadesse (2017): community-oriented organizations are more inclusive while entrepreneurial organizations are more selective.

5.2 | Policy implications

Development agencies and policymakers increasingly support POs as institutions for improving smallholder participation in the modern agri-food value chain. POs are expected to compete with other buyers by capitalizing on economies of scale and bargaining power. The competition requires growth of POs either horizontally, thus focusing on bargaining power, or through vertical integration into processing. In Kenya, both the national and the county governments have increased funding to POs

to make them shift from bargaining to processing (Rademaker, Bebe, Van der Lee, Kilelu, & Tonui, 2016a). However, we show that the focus on a vertical integration strategy leads to the exclusion of poor farmers. Our results suggest that for inclusion of different groups of farmers, POs should focus on bargaining only.

Our second policy recommendation is on farmers' participation in the decision-making process. We argue that policies supporting the participation of all groups of farmers, in an equitable way, may produce broader benefits to the organization and the participants. It has been reported that including the poor in groups can provide a route out of chronic poverty (Thorp et al., 2005). Based on this, we suggest that wherever possible, decision-makers in POs could pay attention to the needs and interests of those farmers that may not be able to participate adequately. Policies to support higher and equal participation could focus on lowering the costs of participation for the poor, and on considering women's workload in setting the location and times for PO meetings. Women's confidence in speaking in meetings may be enhanced by strengthening participatory methods (Pandolfelli, Meinzen-Dick, & Dohrn, 2008), including organizing a separate meeting for women.

5.3 | Limitations and further research

The main limitation of our study is that we consider only two types of POs. Other types, such as dairy hubs, are not included because of financial and time constraints. Those other models could perhaps provide a different picture of farmers' inclusion. Besides, we do not directly predict the causal relationship between social and economic characteristics of farmers and membership or participation in POs because of the limitations of the empirical models used. The POs were purposively selected, which means that we need to be careful about making broader recommendations.

We do not capture the role of farmers' personal motives, like political ambitions, in influencing decisions to join POs and participate in the decision-making process. These factors have been considered important for participation in cooperatives in Europe (Kronholm & Wästerlund, 2013; Morfi, Nilsson, & Österberg, 2018). Our study focuses on POs in Kenya. Since the characteristics of smallholders in Kenya are similar to other East African countries (Jayne et al., 2016), this study may be used to understand PO development in East Africa. Generalization of the findings to other regions may not be applicable as contexts may differ. To support the debate on inclusion, we encourage future studies to assess the impact of the inclusion of the poor and women in the decision-making process on the performance of POs.

As suggested by one of the reviewers, our findings could also be relevant for producer organizations in the European Union context. The new EU policy to promote POs to help farmers gain a stronger bargaining position also gives rise to the question of which farmers will be included, and whether processing cooperatives are more or less inclusive compared to (new) bargaining POs. This is another opportunity for further research.

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APPENDIX

TABLE A1 The definition of variables used for analyis

Variable	Description
Dependent variable	
Membership	Whether a farmer is a member of a PO = 1, 0 = otherwise
Attending the AGM	I regularly attend the annual general meetings
Speaking up in the AGM	I always express my ideas during AGMs
Serving on the board	Whether a farmer serves on the board = 1,0 otherwise
Processing PO	Whether a farmer is a member of a processing PO = 1, 0 = bargaining PO
Independent variables	
Age	Age of the farmer in years
Education	Number of years of formal schooling of the farmer
Hired labour	Whether the household has a part-time or a full-time farm worker = 1, 0 otherwise
Male	If the farmer is male = 1, 0 otherwise
Farm size	The total size of the farm in acres
Number of cows	The total number of cows owned by the farmer
Hours spent in dairy	The average number of hours the farmer spends on dairy activities in the previous day
Pure breed cow	Whether any of the cows are pure breed = 1, 0 otherwise
Group membership	Whether the farmer belongs to another group apart from a dairy group = 1, 0 otherwise
Membership trust	Members of this PO trust each other (1 = completely disagree, 7 = completely agree)
Leadership trust	I trust the management capability of our PO leaders (1 = completely disagree, 7 = completely agree)
Access to loan	Farmer accessed loan from a financial service provider in the past year = 1, 0 otherwise
Credit from PO	If a farmer accessed credit from the PO in the past year (1 = completely disagree, 7 = completely agree)
Distance to the PO's office	Distance to the PO's office in kilometres
Distance to the milk collection point	Distance to the nearest PO milk collection point in kilometers
Hilly terrain	The terrain of the farmer's village is hilly = 1, 0 otherwise
Nyandarua County	Whether a farmer lives in Nyandarua County = 1, 0 otherwise
Number of traders	In this village, there are many milk traders (1 = completely disagree, 7 = completely agree)

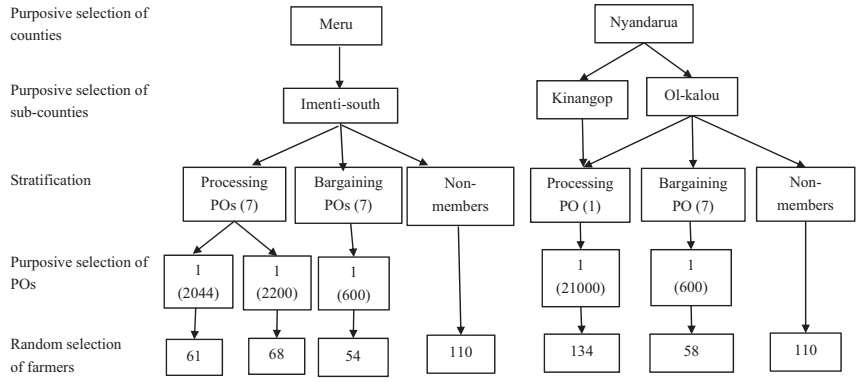

FIGURE A1 Sampling procedure

TABLE A2 Factors distinguishing membership in a processing PO versus a bargaining PO

	Processing PO vs bargaining PO	
Variables	***b***	***z***
Age	0.007	0.118
Age squared	−0.000	−0.169
Male	−0.256	−0.998
Education	0.064*	1.799
Hired labour	−0.303	−1.176
Pure breed cow	0.347	1.412
Number of cows	0.018	0.292
Hours spent in dairy	−0.029	−0.527
Group membership	0.576**	2.272
Distance to the milk collection point	−0.252**	−2.397
Hilly terrain	−0.769***	−2.996
Number of traders	−0.096	−1.524
Access to loan	0.549**	2.066

b = raw coefficient; *z* = *z*-score for test of *b* = 0; *, **, and *** denote significance at the 10%, 5%, and 1% level.

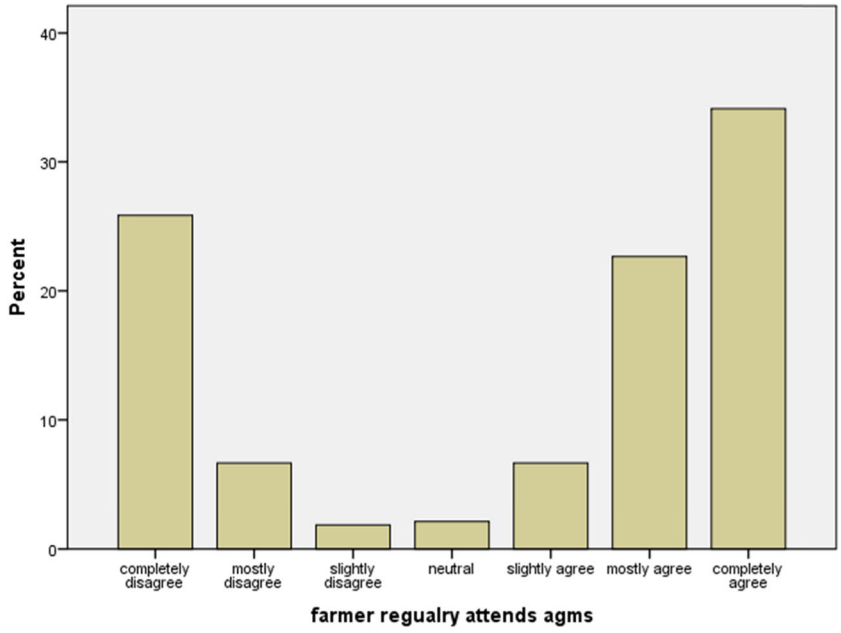

FIGURE A2 Likert scale response on attending the AGM, $N = 375$ [Colour figure can be viewed at wileyonlinelibrary.com]

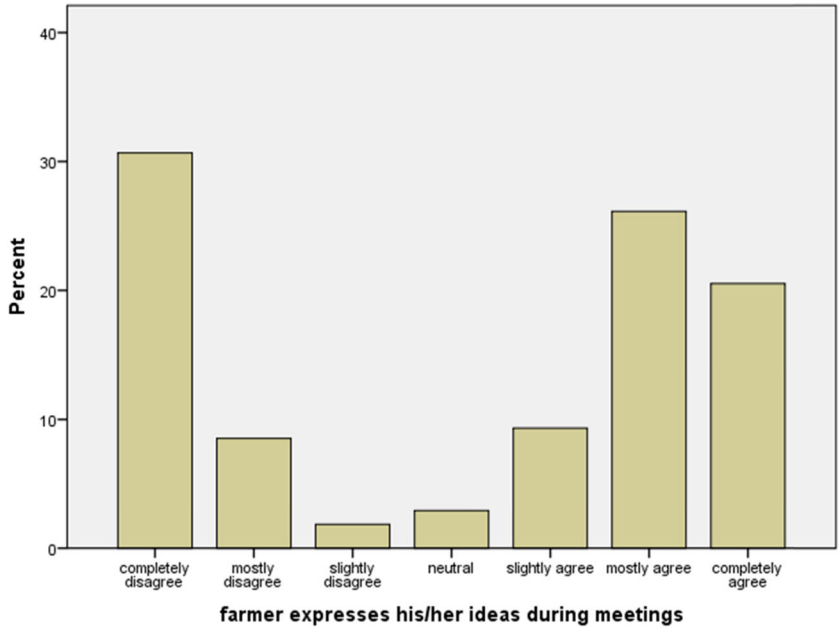

FIGURE A3 Likert scale response on speaking up in the AGM, $N = 375$ [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE A3 Determinants of participation in the decision-making process

Variables	Simple membership vs attending the AGM, speaking up in the AGM and serving on the board		Attending the AGM vs speaking up in the AGM and serving on the board		Speaking up in the AGM vs serving on the board	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Processing PO	0.186	0.333	−1.656**	0.655	−1.327**	0.559
Age	0.102	0.069	0.102	0.135	0.383**	0.171
Age squared	−0.001	0.001	−0.001	0.001	−0.003**	0.002
Male	0.507*	0.288	1.138**	0.516	1.024*	0.549
Hired labour	0.238	0.314	0.023	0.536	1.467**	0.583
Education	0.008	0.041	0.116	0.074	−0.111	0.073
Pure breed cows	0.812***	0.285	−0.491	0.542	0.191	0.543
Number of cows	0.271**	0.113	−0.039	0.1	0.217**	0.096
Farm size	−0.056	0.037	0.277**	0.129	−0.147	0.124
Distance to PO office	−0.025	0.026	0.118**	0.055	−0.23	0.148
Nyandarua	−2.183***	0.407	−1.820***	0.7	−1.175	0.868
Credit from PO	0.133**	0.052	0.112	0.092	0.153	0.105
Membership trust	0.031	0.121	0.523**	0.21	0.242	0.311
Leadership trust	0.380***	0.106	0.384*	0.207	0.394	0.319
Membership in groups	0.638**	0.29	2.066***	0.545	1.67**	0.674
Constant	−5.122***	1.965	−9.005**	3.97	−17.067***	5.443
Observations	375		238		206	
Variance	0.207	0.013	0.071	0.021	0.010	0.009
P value	0.000					

*, **, and *** denote significance at the 10%, 5%, and 1% level, respectively; SE is the standard error.