Collective Entrepreneurship and Rural Development: Comparing Two Types of Producers' Organizations in the Ethiopian Honey Sector

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Abstract This paper deals with the comparison of two types of honey producers' enterprises in the Masha district, western Ethiopia. Cooperatives and private limited companies (PLCs) are both collectively owned by a group of farmers, but the former do not face a legal restriction regarding the number of members, are strongly regulated by the government, and their shares are not tradable. We argue that the collective entrepreneurial capacity varies significantly among the two types of organizations. We found that members of PLCs have higher productivity and income derived from honey, are more prone to adopt new technologies, as well as receive higher dividends and price per kilo of honey. Additionally, the incentive scheme exercised by the PLCs was more market oriented. Furthermore, as compared to cooperatives, PLC members market a higher proportion of honey through their organizations. These results are relevant for the design of development interventions aiming at enhancement of market integration of small farmers in Ethiopia.

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1 Introduction

The way farmers groups function and relate with downstream value chain players (processors, traders, retailing, etc.) are important determinants of economic rents, and therefore they influence the prospects of rural economic development. In agricultural markets dominated by small-scale farmers, producers' groups might play a critical role both reducing transaction costs for the downstream players, as well as enhancing the market opportunities of growers through economies of scale (Mangus and Piters 2010). However, the fact of being "organized" is not enough. The manner in which farmers are organized is also critical. In the same market, the type/form of producer organization might have a strong influence on the economic performance of members. In this study, we seek to assess the relationship between the form of organization and the capacity to seize wealth creation opportunities by members. For doing so, we compare two types of collective enterprises; cooperatives and "private limited companies" (PLCs) involved in the production and commercialization of honey in Ethiopia. The overall objective of this study is therefore to compare the levels of collective entrepreneurship between cooperatives and PLCs, and to discuss how such variation is related to the institutional and structural differences between these producers' groups.

In the study area, both, cooperatives and PLCs are producers-owned and run enterprises, with a formal legal status. Both have a board of directors, which is elected by the farmers and both market the largest part of their honey production through a single (the same) processor. Just like cooperatives, a PLC is formed and collectively owned by a group of farmers to pursue their economic goals. The main differences between these two groups are however: (1) *the size of membership*: primary cooperatives can have several hundreds of members while the PLCs are allowed to have a maximum of 50 members; (2) *the level of external regulation*: the cooperatives are strongly regulated by the government through district cooperative offices, while PLCs hold a higher degree of freedom from the government in their operation; (3) *organizational layers*: primary cooperatives are organized into unions, while the latter level of organization does not exist in the case of PLCs; (4) *the ownership structure*: PLC members can buy shares, while shares in cooperatives are not tradable. It is important to note that a PLC is also a type of producers' group formed as an alternative to the cooperatives, and the latter have operated in the area for a much longer period of time; (5) *the functions*: the cooperatives considered for this study are multi-purpose. In addition to honey, they also market other commodities such as peas, beans and spices, while the considered PLCs specialize in the marketing of honey.

In the following section we define collective entrepreneurship and discuss its determinants. Section 3 provides a brief background of the Ethiopian honey sector. Section 4 presents the sampling techniques, type of data collected and the methods used for data analysis. Empirical results and the discussion of results are presented in Sect. 5. Finally, conclusion and suggestions for further research are elaborated in Sect. 6.

2 Collective Entrepreneurship

Collective entrepreneurship (CE) is the process through which the organizational and governance structure as well as the attitudes of members are translated into economic performance and benefits. Yan and Sorenson (2003) also defined CE as a process by which agents are able to identify and seize economic opportunities by means of collective action. CE therefore is determined by social norms, values, and networks for the production of goods or services (Connell 1999) and the ability to take collective risks (Trompenaars and Hampden-Turner 2002). Stewart (1989) suggests that collective entrepreneurship might result in an increase in the ability of each member of the group to create and reap opportunities for economic development, as compared to agents that operate by their own. CE changes market conditions by means of building and modifying the organization's resources, competences, and organizational architecture to respond to opportunities and influence market relations (Bratnicki 2005). Cook and Plunkett (2006) point out that for any form of a collective organization to achieve a higher level of performance, members' decisions about their own (in this case on-farm) activities and investments should be aligned with the cooperative. CE can also be defined as the ability to align these two levels of decision making.

CE is a property of collective enterprises, reflected in their ability to exercise efficiency and accrue rents whenever they are faced with opportunities. The performance of producers' groups depends to a large extent on their level of collective entrepreneurship. In this type of organizations, individual skills and attitudes are integrated into the group in order to achieve a common economic goal (Dana and Dana 2007). Collective entrepreneurship is a property of the group, which however is determined by individual behavior. That is, CE results from the interaction between individuals when they face a common economic dilemma (collective action situation). We argue that institutional and structural differences between groups may cause differences in the way in which producer groups react to opportunities and innovations.

A vast literature on management of natural resources has already addressed the factors that are likely to affect collective action, and this body of literature offers numerous lessons that can be applied to collective action in marketing (Markelova and Meinzen-Dick 2009). Social and economic heterogeneity, group size, and the level of autonomy in setting the rules have been highlighted as important variables determining the ability of groups to solve social dilemmas (Poteete and Ostrom 2004; Agrawal 2000). Group size has been identified as a key factor influencing the performance of groups (Olson 1965; Agrawal and Goyal 2001; Hussi et al. 1993). The effects of size on performance have been often explained from the perspective of transaction costs. Olson (1965) hypothesized that "unless the number of individuals in a group is small, rational, self-interested individuals will not act to achieve their common or group interests unless certain conditions are present". In order to solve this free-riding problem, Olson (1971) proposes to create incentives that will induce individuals to contribute to a collective good as a by-product of
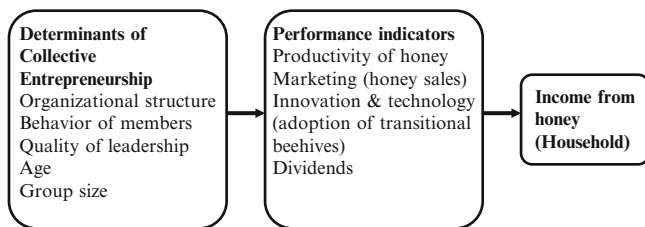
Determinants of Collective Entrepreneurship
Organizational structure
Behavior of members
Quality of leadership
Age
Group size

→

Performance indicators
Productivity of honey
Marketing (honey sales)
Innovation & technology
(adoption of transitional
beehives)
Dividends

→

Income from honey (Household)

Fig. 1 Operationalization of collective entrepreneurship

their pursue of individual interest. The free-riding problem generates monitoring costs. Agrawal and Goyal (2001) and Hussi et al. (1993) argue that the cost of monitoring rise more than proportionately as group size increases. In the same vein, Bandiera et al. (2005) argue that the institutional features that make collective action successful, such as monitoring, are more easily accrued in small groups. Due to the higher monitoring costs, the possibilities of free-riding are higher in large groups. In the same line, Hardin (1982) argues that the larger the number of people who must be coordinated, the higher the costs of organizing them to an effective level. However, the relationship between group size and performance is not as straight-forward as we might expect according to the transaction costs literature. The advantages offered by economies of scale in large groups might compensate higher transaction costs.

Apart from size, other factors such as resource characteristics and diversity among members influence the transaction costs of collective action (Ostrom 1994). Furthermore, social norms and values, such as trust and loyalty, can play a role in the economic performance of collective enterprises, and mediating the relationship between size and group performance. In groups with high levels of social capital, members will forego opportunistic behavior, thereby lowering transaction costs and increasing the group and individual returns (Kirsten 2004; O'Brien et al. 2005). In addition to the factors discussed above, Aiken and Hage (1971) identified age as another important variable that can hinder innovation in a collective firm or organization. According to these authors, the older the organization, the more bureaucratic and the less receptive it is to innovation. Younger organizations are believed to be in a better position to embrace new technologies and to be more willing to innovate than older organizations. In the current study, we refer to technological innovation as improvements in the way commodities are produced or transformed (Devaux et al. 2007).

The conceptual framework is presented in Fig. 1. We consider the organizational structure (rules and regulations; degree of autonomy), group size, the behavior of members (social capital), the quality of leadership and age as the main determinants of CE. The level of CE is reflected in performance indicators, both at the individual and group levels. We considered honey productivity, honey sales, dividends provided, and the level of innovation (adoption of transitional beehives) as the most important performance indicators for comparing members of cooperatives and PLCs. These factors, we argue, have a significant influence on the income derived

from honey, and therefore on the prospects of rural economic development in the study area. Based on the theoretical considerations summarized above, we adopted the following working hypotheses: (1) PLCs hold a higher level of collective entrepreneurship than cooperatives and (2) honey producers in PLCs reap higher income from honey, as compared to their peers in cooperatives.

3 The Ethiopian Honey Sector

Beekeeping is a traditional and important farming activity in Ethiopia (Agonafir 2005). Ethiopia's total honey production is approximately 39,700 tons per year (GDS 2009). The country is one of the five biggest wax exporters, with an average annual export estimated at 3,000 tons (EEPD 2006). Ethiopia is one of the leading honey producers in Africa and one of the ten largest honey-producing countries in the world. However, honey exports have started only recently, facilitated by interventions of the international cooperation. Currently, the main importers of Ethiopian honey are the USA, Japan and the EU.

Different stakeholders (the government, non-governmental organizations, etc.) have initiated development interventions in the country as a whole and the study area (Masha district) in particular in order to promote the production and export of honey. The government has given attention to the promotion of improved hives (transitional and modern), which have been provided at subsidized prices through the Ministry of Agriculture and Rural Development. This policy has triggered the participation of women in beekeeping activities since the management of these types of hives requires less physical efforts (they can be placed in the backyard instead of hanging on trees as the traditional hives use to be). The NGOs have facilitated the adoption and use of low-cost and appropriate hive technologies and have provided training to the beekeepers.

Small-scale producers are the most important honey producers in Ethiopia. The main buyers for the honey produced in Masha are private traders (local merchants), local *Tej* (Ethiopian traditional honey liquor) brewers, and the lead firm Bezamar, a honey processing, trading and exporting company. A lead firm can be described as a firm that has forward and backward commercial linkages with a number of small-medium enterprises within the value chain and holds a significant market share and power in the sector. Contracting relations between the private sector and honey producers and their organizations (e.g. farmers' groups) is considered essential to effectively align production, processing, and the specific demands and standards of the international market. Thus, in order to satisfy the market requirements on quality and volumes producers (suppliers) and buyers (processors) need to closely coordinate their activities. As a result, their degree of interdependence is increasing. The owner and manager of Bezamar is one of the key entrepreneurs who have facilitated the transformation of the honey sector in Ethiopia. The Dutch development agency SNV promoted a mutually beneficial relationship between the producer groups and the lead firm through the provision of grants for training on quality, technology transfer; and business development services.

Table 1 Average yield potential per each hive type

Hive type	Farmer's average yield (kg/hive)	Research center[a] yield (kg/hive)
Traditional	5.0–7.0	NA
Transitional (intermediate)	15.0–25.0	25
Framed (boxed)	30.0–45.0	40

Source: Global Development Solutions, LLC (2009)

[a]Research centre refers to the centre built for scientific research

Beekeeping requires techniques that can be easily managed and it does not require investment to acquire big land size, which is often a constraint for the poor rural dwellers (Debela 2010). In Ethiopia, there are three types of bee husbandry systems namely traditional, transitional and modern beekeeping. In the traditional way of beekeeping, the hives are made out of logs, bark, reeds, gourds and clay pots. The hive has to be hanged on top of a tree (in the forest). The number of traditional beehives a household might handle is very high (up to 200) but yield per hive is very low. Kerealem et al. (2009) report that about 95 % of bees are still kept in traditional hives. The term "transitional beehive" refers to a hive technology that is between the traditional and the modern one, and it is managed at the backyard. Transitional hives are made of local wood, and they have typically a higher honey yield, compared to the traditional hives. They provide also a mechanism for monitoring the maturity of honey, thus enabling harvest at optimal time. Finally, modern hives are created from rectangular and square boxes of better quality wood. These include Langsroth and Top Bar hives. The modern hives are more complex and difficult to build but they are easily transportable and generate greater quantities of better quality honey, which will command higher prices (Mehari 2007).

The three types of bee husbandry systems described above have different costs, harvesting techniques and productivity expectations (GDS 2009). By adopting the transitional and framed (modern) types of hives, alongside with proper training on management of the honeybees, producers can harvest higher yields. The average potential yield for each type hive is shown in Table 1.

4 Methodology

This section describes the study area and the sampling strategy applied in the selection of the respondents, as well as the procedure for data collection, source of data, the kind of data collected and the methods used for data analysis are also described.

4.1 Description of the Study Area

Fieldwork was carried out in the Masha district, South west part of Ethiopia. Masha is one of the 77 woredas in the Southern Nations, Nationalities and Peoples' Region of Ethiopia (SNNPRs). Different nationalities are found in this zone, including
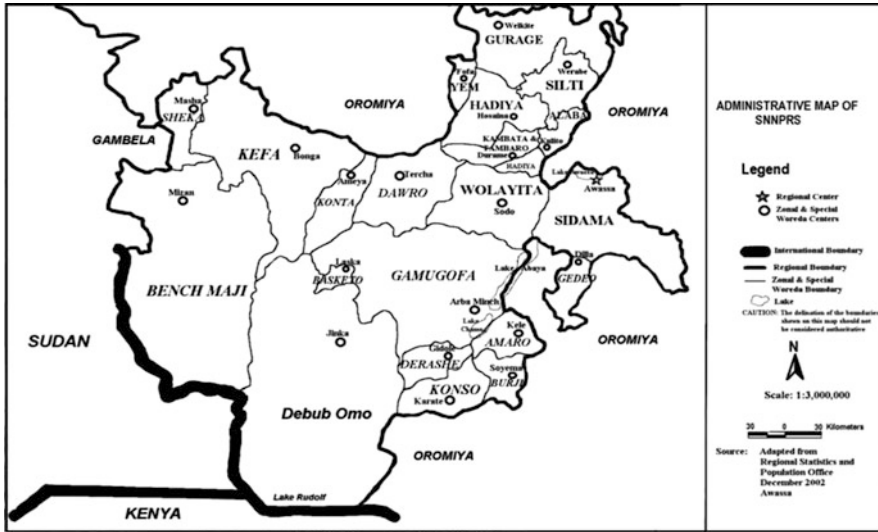
Fig. 2 Map showing the study area Masha-Sheka Zone (Abbute 2003)

Shekicho, Sheko, Megzenger, Keficho, Amhara, Oromo and Guraghe. This woreda falls under the Sheka Administrative Zone (see Fig. 2). More specifically, Masha is the administration center of Sheka Zone and is located 676 km south west from Addis Ababa, along the Addis-Jimma road. Geographically, the zone lies between 7°24′–7°52′ N latitude and 35°13′–35°35′ E longitude.

The altitudinal range of the areas in the zone is between 900 and 2,700 m above sea level, and it receives a high amount of rainfall, with an average of 2.000 mm annually. This woreda is notable for its relatively high forest cover as compared to other parts of Ethiopia. In general, the area is characterized by dense forests and woodlands containing diverse plant species that provide nectar and pollen to foraging bees. However, this important attribute is threatened by the high rate of deforestation in the area, which has aggravated in recent years due to increased conversion to monoculture plantations such as coffee and tea.

4.2 Sampling Strategy and Data Collection

Out of the five cooperatives (one per kebele)[1] producing honey in the district, three primary cooperatives (Genobay, Akach and Degele) were selected for the study. Accessibility was taken into consideration in selecting these primary cooperatives. Sixty producers (20 from each cooperative) were selected randomly from a list

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[1] A *kebele* is defined in Ethiopia as the smallest administrative unit, below the municipality-district level.

Table 2 Number of members in the producers' groups that participated in the study

Organization	Total no. of members	No. of participants/group
Gada PLC	14	12
Chiefdale PLC	17	15
Shatto PLC	19	16
Akach primary cooperative	445	19
Degele primary cooperative	270	19
Genobay primary cooperative	451	20

obtained from the cooperative marketing office. Fifty-eight producers participated in the survey and the remaining two could not participate due to various reasons. All the members from the three operational PLCs in the district (Chiefdale, Gada and Shatto) were included in the survey, since the smaller membership size of the PLCs allows interviewing all the members. In total, 43 PLC members were interviewed. The total membership (group size) and number of members of the collective enterprises that participated in the survey are shown in Table 2.

Data was collected from March to April 2011, through a household survey applied to 101 households, as indicated above. A semi-structured questionnaire was designed to generate information in the following fields: duration of membership, main source of income, dividend, annual income from honey, number and type of beehive owned, constraints of beekeeping, perceptions of the producers on the transitional beehives, amount of honey harvested, price received per kilogram of honey, year of adoption of transitional beehives and beekeeping experience. Face-to-face interviews were also conducted with the management teams of the producers' organizations (cooperatives and PLCs), private traders, and the processor (Bezamar). More relevant secondary information and data were gathered from various institutions, including the zonal and woreda sector offices. Documents from NGOs (SNV and NTFP) active in the study area were also consulted and reviewed.

Data was analyzed using the Statistical Package for Social Scientists (SPSS) 19.0 for Windows. T-test and χ^2 were employed to test the significance of differences between groups for continuous and discrete variables, respectively. We ran a regression on income from honey sales, in order to assess the explanatory power of different independent variables.

5   Empirical Results

The presentation of results on the comparison of the two producers' groups (cooperatives and PLCs) is guided by the hypotheses proposed in the previous section.

Table 3 Distribution of respondents according to age and education

Variable	PLCs (43)		Coops (58)	
	Count	%	Count	%
Gender				
Female	9	20.9	2	3.4
Male	34	79.1	56	96.6
Total	43	100	58	100
Age groups				
24 & below	1	2.3	1	1.7
25–34	9	20.9	7	12.1
35–44	14	32.6	21	36.2
45–54	14	32.6	13	22.4
55–64	5	11.6	15	25.9
65 & above	0	0	1	1.7
Total	43	100	58	100
Education level				
Never been to school	10	23.3	12	20.7
Primary school	8	18.6	15	25.9
Secondary school	19	44.2	24	41.4
High school	6	14.0	7	12.1
Total	43	100	58	100

Sources of income	Count		%	Count		%
First choice	Honey	25	56.8	Kocho	22	62.9
Second choice	Kocho	13	46.4	Honey	19	61.3
Third choice	Livestock	18	51.5	Livestock	17	48.6

5.1 Socio-Economic Characteristics of Respondents

The frequencies of several socio-economic indicators are summarized in Table 3. Most of the households interviewed were male-headed. Across the two types of producers' group (coop and PLCs), most beekeepers (83 %) were 34 years or older. 78.3 % of respondents went to school, and the majority has completed the primary education. About 23 % of respondents indicated that they have never been to school. We did not find significant differences in education levels between members of cooperatives and PLCs.

About 72 % of all the respondents report beekeeping experience of 20 years or more. The minimum and maximum numbers of years of experience indicated by respondents were 2 and 48, respectively. Forty-nine percent of the respondents have been members of their organizations for 8 years or more. The longest time of membership by cooperatives members was 19 years. PLC members ranked honey as their main source of income, followed by kocho (banana-like tree whose stems are edible) and lastly livestock. For cooperative members, their main source of income was kocho, followed by honey and then livestock.

Table 4 Summary of independent-samples t-test results

Variables	Cooperatives (58)		PLCs (43)		(Differences)	
	Mean	SD	Mean	SD	T-stat	P-value
Socio-economic variable						
Beekeeping experience (years)	26.29	11.06	26.23	10.15	−0.028	0.978
Duration of membership (years)	13.03	4.35	6.12	1.12	−11.610	0.000**
Production and income variable						
Number of transitional beehives in 2007 (unit)	0.31	1.08	2.09	3.06	3.654	0.001*
Number of transitional beehives in 2010 (unit)	1.48	1.64	4.56	3.71	5.080	0.000**
Production transitional 2007 (kg)	3.28	13.81	21.26	35.97	3.112	0.003*
Production transitional 2010 (kg)	12.47	21.05	53.51	56.38	4.545	0.000**
Production change transitional (kg)	9.10	17.50	32.26	62.01	2.37	0.022*
Productivity of honey (kg/hive)	2.47	1.83	3.48	2.14	2.560	0.012*
Income honey sales 2008 (Birr)	1,075.84	863.63	2,542.59	2,014.24	4.480	0.000**
Income honey sales 2010 (Birr)	1,615.50	1,229.49	4,060.21	2,740.78	5.456	0.000**
Dividend paid (second payment) (Birr)	14.93	46.18	276.95	308.72	5.520	0.000**

*significant at 5 %; **significant at 1 %

5.2   Performance at Household and Group Level

5.2.1   Level of Adoption of Transitional Beehives

In the study area, the use of transitional beehives was low across the sample. However, we found that PLC members owned a significant higher number of transitional beehives in 2007 and 2010, as compared to members of cooperatives (see Table 4). The beekeepers were asked whether they were willing to give up traditional beehives and focus only on transitional beehives. Eighty-nine percent of all the respondents answered "Yes". The results reveal that there is no significant difference between the two groups with regards to their willingness to give traditional hives up for transitional hives (see Table 5).

5.2.2   Dividend for Members and Incentives to the Management Team

Our results show that PLC members receive a significant higher amount of dividends (second payment), compared to members of coops (see Table 5). In addition, we found a statistically significant difference between the two groups in relation to the proportion of farmers that received dividends (see Table 6). Producers highlighted a number of reasons why they did not receive dividend from their organizations. The information was generated only from the members who indicated that they did not receive dividends (coop = 40, PLC = 21).

Table 5 Summary of Pearson χ^2 test results

	Coop (58)	PLC (43)		Asymp. Sig
Organization variables	Yes	Yes	χ^2 value	(2-sided)
Dividend	18	**22**	4.183	0.041*
Marketing channels				
(1) Own organization	43	**42**	10.26	0.001*
(2) Private traders	**37**	8	20.41	0.000**
(3) Neighboring coops	0	2	2.75	0.097
Willingness to give up traditional beehives	52	38	0.042	0.838
Advance payment from organization	0	**5**	7.095	0.008*
Receive equipment	10	**16**	5.150	0.023*

The underlined and bold figures are just there to show the group (PLC or coop) where there are many respondents who answered YES to the questions we asked during the interviews
*significant at 5 %; **significant at 1 %

Table 6 Marketing constraints as reported by the beekeepers

	Challenge	Number of respondents (coop = 58)	%
1	Low price of honey	15	26
2	Lack of access to credit	9	16
3	Lack of support from the union	8	14
4	Private trader cheats on price and weight	6	10
5	Lack of capital for organization to buy all our honey	5	9
6	Transport problem	5	9
7	Fewer buyers	3	5
8	Unable to get timely information	2	3
9	The organization does not buy honey on time	2	3
10	The coop cheat when weighing honey	2	3
		Number of respondents (PLC = 43)	%
1	Low price of honey	16	37
2	Lack of access to credit	7	16
3	Few buyers	6	14
4	Lack of capital for organization to buy all our honey	4	9
5	Unable to get timely information	3	7
6	Private trader cheats on price and weight	2	5
7	The organization does not buy honey on time	2	5
8	Transport problem	1	2

The most important reason given by members of both types of groups was the need to re-invest for the expansion of the business.

By incentives we refer to the payment or compensation given to the board members of an organization for their managerial tasks. The board members of the PLCs are entitled to 10 % of the net profits made by the organization. However, at the moment fieldwork was conducted they have agreed not to claim it, but to invest it

back into the organization. During the interviews, unlike in PLCs, all cooperative board members revealed that they are not entitled to receive incentives; rather they receive perdiems if they attend meetings or workshops. They mentioned as their main motivation to be a board member their willingness to contribute to societal goals and the common good.

5.2.3 Honey Productivity

Overall honey productivity was calculated as follows:

$$\text{Honey productivity} = \frac{\text{Quantity of honey (kg)}}{\text{Number of beehives (traditional + transitional)}}$$

The mean annual honey yield from transitional beehives (for the whole sample) in 2010 was 10.7 kg/hive/annum. The yield was far below the expected yield from transitional beehives: 15.0–25.0 kg/hive/annum (GDS 2009). For the traditional beehives, the mean annual yield was 2.1 kg/hive/annum, which is also below the expected yield of 5.0–7.0 kg/hive/annum (GDS 2009). Cooperative members reported significant lower quantities of honey produced from transitional beehives in 2007 and 2010, as compared to PLC members.

Our findings suggest that members of PLCs have higher honey productivity, as compared to members of cooperatives (see Table 5). In addition, we used the quantile method for classifying the households according to their productivity level. The data was arranged in descending order. The 101 households were grouped into 3 classes; high, medium and low, according to their productivity performance. The results from the comparison show that all the three PLCs (Gada, Chiefdale and Shatto) have higher percentages of their members in the higher ranks (33, 27 and 50, respectively) as compared to the three cooperatives (Akach, Degele and Genoby), with 21, 10 and 20, respectively.

5.2.4 Honey Prices

Figure 3 presents how prices paid by cooperatives, PLCs and private traders have evolved across time. Producers delivering their honey to PLCs are consistently receiving better prices than those delivering to cooperatives and private traders. More interestingly, the figure shows that, except for 2007, the private traders are offering higher prices than cooperatives but less than PLCs.

In addition, an independent-sample t-test was used to compare means of the income obtained from honey for the years 2008 and 2010. Table 4 clearly shows that PLC members obtained significantly higher incomes from honey sales as compared to members of cooperatives.
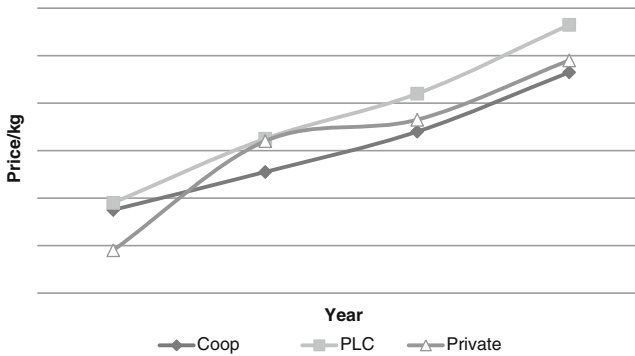
Fig. 3 Price variation among buyers across years

5.2.5 Perceptions About the Effect of Improved Hives and Training on Income

Respondents were asked to respond to the statement "I am very satisfied with my income over the past three years as a result of the training on beekeeping". Answers were ranked on a 5 point-Likert scale from strongly disagree to strongly agree. The results indicate that significant differences ($p < 0.05$) were observed between the responses from members of PLCs and cooperatives. Forty-nine percent of the PLC members tend to strongly agree with the statement as compared to only 24 % of cooperative members ($p = 0.01$).

The respondents were also asked to give their responses on the statement "As a result of the training and access to modern technologies on beekeeping, I would confidently say that my household income has. . ." For answers we used a 3 point-Likert scale with the following options; increased, slightly increased and remained the same. Across the two groups, about 65% of the whole sample indicated that their income has increased. However, significant differences ($p < 0.05$) were again observed between the means of PLC' and cooperative' producers.

5.3 Marketing

Three marketing channels were identified among respondents: own organization (cooperative or PLC), private traders and neighboring cooperatives. Choice and utilization of marketing channel varies significantly ($p < 0.05$) across producer organization (coop or PLC). Sixty-four percent of cooperative members are marketing a proportion of their honey through private traders, whereas only 19 % of PLCs sell part of their production through this channel (see Table 6). Bezamar (honey processing and exporting company) is the main buyer of honey from both the cooperatives and PLCs. Producer groups buy honey from their suppliers (members), bulk it and sell to the processor. The honey sales reported by both PLCs and cooperatives from 2007 to 2010 are shown in Figs. 4 and 5, respectively.
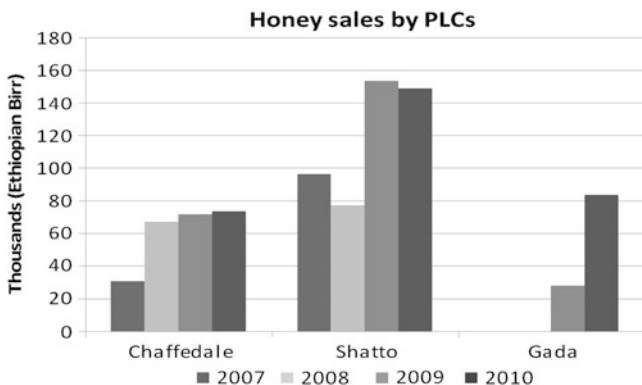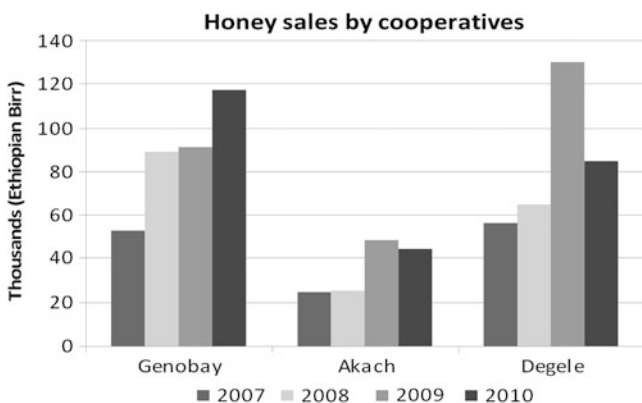
Fig. 4 Honey sales by PLCs

Fig. 5 Honey sales by cooperatives

5.3.1 Marketing Constraints

Despite all the benefits that honey can bring to the beekeepers in the area, the producers are confronted with a number of challenges and constraints that can potentially hamper the future of honey production and the economic contribution it brings to their livelihoods.

We present separately the constraints identified by cooperatives and PLC producers (see Table 6). Beekeepers of the two types of groups ranked low price, and lack of access to credit as the most important constraints. As the third most important constraint, cooperative members indicated that they lack support from the union, while the members of PLC stated that they would like to have more buyers.

Table 7 Variables and their expected signs

Dependent variable	Explanatory variables	Expected sign	Description of relationship
Income from honey	Education level	(+)	Knowledge and skills in production and marketing should influence positively income from honey
	Age	(+)	More experience in production and marketing is expected to translate into higher income from honey
	Gender (0 = female, 1 = male)	(+)	Males are expected to have better access to market information
	Duration of membership	(+)	Producers with more years of membership are expected to be more knowledgeable and experienced about the market, and hence able to reap higher income from honey
	Total number of transitional beehives	(+)	More transitional beehives translate into higher productivity, thereby increasing income from honey
	Productivity	(+)	Higher productivity results in an increase in income from honey
	Organization code (0 = PLC, 1 = coop)	(−)	PLC members are expected to have higher income from honey sales

5.4 Regression Results

In order to identify the determinants of income from honey sales, we ran a regression analysis (OLS) taking some household and organization characteristics as independent variables, according to the following model:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e \tag{1}$$

where Y is the dependent variable and X_1, X_2, X_3. ... are the explanatory variables. We present the dependent variables, explanatory variables, expected signs and the description of the expected relationships (see Table 7).

For this analysis, we used the income from honey sales for 2010 as the dependent variable. Our regression results show that 30 % of the variation in income from honey is explained by the considered explanatory variables (see Table 8). We checked for collinearity using the variance inflator factor (VIF) and the Durbin–Watson test.

Significant variables include organization code and productivity. Organization code (0 = PLC, 1 = coop) is negatively related to the income from honey sales. Productivity of honey has a positive relationship with the income derived from honey sales.

Table 8 Factors influencing income from honey sales (regression analysis)

Model	B	Std. error	Beta	t	Sig.
(Constant)	2,783.373	983.715		2.829	0.006**
Education level	−50.021	232.288	−0.021	−0.215	0.830
Total number of transitional beehives	37.984	26.826	0.145	1.416	0.160
Duration of membership	69.921	66.011	0.143	1.059	0.292
Gender of the respondent	145.067	676.945	0.019	0.214	0.831
Age	−3.507	225.978	−0.002	−0.016	0.988
Organization code	−2,194.744	671.394	−0.465	−3.269	0.002**
Productivity	107.271	37.015	0.262	2.898	0.005**

Dependent variable: income from honey sales (2010)

Durbin–Watson = 1.914

**significant at 5 %

5.5 Discussion of Results

In this section we will address two main overarching questions derived from the results presented above:

1. Why do PLCs hold in a higher level of collective entrepreneurship?
2. Why do cooperatives remain operational in the area?

We evaluated CE in two types of farmers' organizations by means of using a number of parameters characterizing the performance of collective enterprises, including, but not limited to, the rate of adoption of new technologies (process upgrading), member loyalty (in supplying output to his/her own organization), dividends and incentive schemes for board members. Based on these indicators, our main overall finding is that PLCs hold a higher level of collective entrepreneurship as compared to cooperatives. The difference in the level of collective entrepreneurship is expected to be influenced by a number of factors. As mentioned earlier on (see Sect. 2), group size is one variable that has been mentioned in the literature as an important determinant of group performance when they deal with collective action situations. Smaller groups tend to realize lower transaction costs as compared to larger groups. Institutional economists have argued long ago that transaction costs are a key element explaining the performance and survival of collective endeavors (North 1990). In addition, social capital features related to the performance of groups such as trust, commitment, participation and loyalty might be affected by the group size. For instance, Nilsson et al. (2009) report an inverse relationship between group size and membership satisfaction and trust in leadership among traditional cooperatives in Sweden. Furthermore, Jones (2004) argues that individuals in small groups can expect personal action to prove "significant" (for example, to affect the probability that others will contribute). In addition, previous studies (see Sykuta and Cook 2001; Chaddad and Cook 2004) have shown that a major problem associated with collective action in cooperatives is that members' property and decision rights tend to be vaguely defined in this type of enterprises. This causes social tensions amongst members. This is more likely in larger groups,

since they are more likely to experience higher levels of agency costs, free riding or apathy in terms of monitoring (Chambers 2007). Vague property rights are more pronounced in larger groups because of higher degree of heterogeneity of economic interests among members. In addition, as membership becomes more heterogeneous the degree of vaguely defined property rights increases (Chaddad and Cook 2004). In our case, PLCs, being smaller and more homogenous, have clearer property and decision rights (it is less costly to take collective decisions). In addition, property rights are flexible (shares can be bought).

However, contrary to the previous argumentation, Agrawal (2000) found a positive relationship between group size and success in raising resources needed to hire a guard for protecting forest resources (a typical collective action situation). In a similar vein, Agrawal and Goyal (2001) found medium-sized groups to be more effective than smaller and larger groups, in the management of common-pool resources. Nonetheless, Barham and Chitemi (2009) found no evidence of any relationship between the group size and performance of the group in Tanzania. The downside of small groups is that they often lack economies of scale, a particular advantage in marketing and for achieving efficiency (Markelova et al. 2009). As the studies mentioned above show, the relationship between group size and collective action is not always straightforward. Ostrom (1997) argues that the impact of group size on collective action is usually mediated by a variety of other variables. We deal with some of them below.

There are several institutional factors that influence the performance of groups when dealing with collective action problems. North (1990) defined institutions as humanly devised constraints, formal (rules, laws, constitutions) and informal (norms of behavior, conventions and self-imposed codes of conduct) that structure human interactions, and their enforcement characteristics. An important set of institutional factors have to do with the type of rules that, according to Coleman (2009), are used to effectively manage long-term collective endeavors. Moreover, the rules that govern an organization influence the extent to which collective entrepreneurship is realized. Absence of rules or poor monitoring of rules is consistently associated with poor performance of common-pool resources (Ostrom and Nagendra 2006). For instance, Coleman (2009) highlights that issuing harvesting rights to local users provides incentives to invest in the common forest and results in good forest condition. Well structured incentive schemes and the right to buy shares within the PLCs are some of the rules that can facilitate collective entrepreneurship. Unlike PLCs, all cooperative board members do not receive monetary incentives for the work they do and during the interviews they justified their unpaid managerial tasks as a contribution to the common good and a social duty. Furthermore, the possibility to buy shares gives PLC members an incentive to be loyal to their organization, to increase honey sales and consequently to reap higher economic benefits derived from collective action. In this line, Chambers (2007) states that loyalty may be a form of selective social incentive or social coercion that maintains a collective business.

Livelihood strategies might be another important factor influencing the level of collective entrepreneurship. Cramb (2000) suggests that farmers in the same

environment may have different objectives and livelihood strategies, and so respond differently to a given technology or innovation. The fact that PLC members consider honey to be their highest source of income (whereas kocho is the main source of income for cooperative members) might explain the differences in the rate of adoption and use of transitional beehives. PLC members have clearer incentives for their adoption. Another factor that might contribute to explain the differences between PLCs and cooperatives is the level of external influence on the organizations. There is a much higher level of external influence (government control) on cooperatives, as compared to PLCs. During our interviews, some PLC members pointed this as one of the advantages of their organizations. In this regard, Coleman (2009) argues that externally imposed rules and monitoring institutions have often failed in inducing effective management of common pool resources.

Nevertheless, the differences we have found in the level of collective entrepreneurship might also be due to selection bias. It could be the case that more productive and entrepreneurial producers tend to prefer join PLCs. However, our data does not allow us to assess the importance of selection bias in explaining the results. In any case, it is likely that a better performance attracts more entrepreneurial farmers, inducing virtuous cycles among PLCs.

If PLCs hold a higher degree of collective entrepreneurship and seem to be dominating in the supply of honey, one may wonder then why the cooperatives still remain operational in the area. There are several reasons that can explain this phenomenon. Firstly, one possible explanation has to do with the multipurpose nature of cooperatives. Besides marketing of honey, the cooperatives also engage in trading of other agricultural commodities like peas, beans and spices. During our interviews, the cooperative members highlighted this multipurpose nature as an important feature of cooperatives. The farmers are able to market their various commodities at one place thereby reducing transaction costs that arise from searching for buyers and transportation. The lower level of efficiency in the marketing of honey might be offset by the other services offered by the cooperative.

Secondly, there might be an information gap/inadequate information amongst the cooperatives members about the performance of other collective enterprises that they could join. For example, cooperative members might lack information about how PLCs are functioning and performing. The third and final reason has to do with the high start-up costs. The initial investments required to set up a collective enterprise in the study area are high. PLCs were heavily subsidized (financially, as well as through capacity building and other services) during their establishment by the international cooperation. It is likely that without this financial support it is extremely difficult to set up new collective enterprises.

Our findings shed light on the importance of organizational features, such as group size, rules and incentives, for the successful implementation of rural development interventions. Some policy recommendations can be derived from our study. For instance, the division of large cooperatives into smaller subgroups might facilitate collective entrepreneurship. Additionally, very likely cooperatives will reap efficiency gains if they change their incentive mechanisms. For example, they could adopt a system where board members benefit from the organization's

profits, as a way of motivating them to invest in the common good. They could also allow members to trade shares. However, we should be careful about generalizations. The conclusion that PLCs are more entrepreneurial than cooperatives should not be generalized across all sectors and regions. The relationship between organization type, size and performance among collective enterprises run by farmers is a subject that requires much further research in Ethiopia before we can arrive to robust policy recommendations.

6 Conclusions

Producers groups in the Ethiopian honey sector have the potential to promote exports of honey from the area (capitalizing on supplying organic and forest honey) and improve the livelihoods of the rural households through increased income from honey sales. This has attracted the attention of the government, non-governmental organizations and private players in the sector. However, the way farmers are organized (organizational type) influences the performance of these collective enterprises. We addressed empirically these issues by comparing the levels of collective entrepreneurship between cooperatives and PLCs, and discussed how such variation is related to the institutional and structural differences between the two types of groups. The analysis shows that PLCs demonstrated a higher level of collective entrepreneurship as a result of some qualities (specialization, member loyalty, incentives, social capital with buyer; and group size) that they possess over their counterparts, cooperatives.

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