Analysis of Cooperative Member Participation in Agricultural Input and Output Marketing: The Case of Damote Gale District of Wolaita Zone in Ethiopia

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Authors' contributions

This study was conducted in collaboration between both authors. Author TL designed the study, wrote the first draft, collected data and carried out analysis. Author BK supervised and guided each step, edited and proof read the manuscript. Both authors read and approved the final manuscript.

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ABSTRACT

This study was conducted to identify determinants of cooperative member participation in agricultural input and output marketing at *Damote Gale* district of *Wolaita* Zone in Ethiopia. A multi-stage sampling technique was used to obtain a sample size of 120 cooperative members. Quantitative data from primary sources were collected through household survey while qualitative data were collected through key informant interview, focus group discussions and personal observations. Data were analyzed using liquidity ratio, debit ratio, profitability ratio and binary logit model. The result showed that 42% of cooperative members were participants in agricultural input and out marketing whereas 58% were non-participants. With regard to debt ratio and profitability ratio, *Buge, Gacheno* and *Ade Charake* cooperatives performed below the desirable rate. For example, the profitability ratio of *Buge* and *Gacheno* marketing cooperative was negative that couldn't satisfy bank interest rate of financial institutions from which they borrowed money. The

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binary logit model result showed that participation decision of cooperative members in agricultural input and output marketing was significantly determined by household size, landholding, credit access, input and output marketing outlets, distance to cooperative marketing center from member home, perceived satisfaction of members due to joining of cooperative, distance from member home to extension office and off farming activities. Out of 8 significant explanatory variables, perceived satisfaction of members due to joining cooperative, distance from member home to extension office, distance from member home to cooperative marketing center and household size determined participation decision of members in agricultural input and output marketing negatively and significantly while the other four variables determined positively and significantly. Limiting the increasing population pressure, promoting income-generating activities, enhancing share capital contribution, enhancing micro-financing efficiency, infrastructural facilities and information dissemination, educating and training of members in cooperative marketing were recommended to enhance member participation in agricultural input and output marketing.

1. INTRODUCTION

Majority of poor people in developing countries live in rural areas where their livelihood and food security are dependent on agriculture. Several studies indicated that agricultural productivity of rural people in many developing countries is decreasing due to natural resources overuse and the effect of climate change. Considerable loss also occurs with the products due to poor post-harvest handling practices and limited use of appropriate post-harvest technologies [1].

In addition, weak performance of agricultural markets (both input and output markets) in Ethiopia has been described in various studies as a major barrier in boosting agricultural sector and the overall economy [2]. With an inefficient marketing system, the surplus resulting from increased production benefits neither the farmers nor the country [3]. The agricultural markets in the country are highly influenced by the production system itself. That is, most of the agricultural production is undertaken by small scale producers who are scattered all over the country, engaged in different agricultural enterprises without specialization, and with limited marketable surplus (Ibid).

Ethiopia began transforming its agriculture by formulating a development strategy centered on agriculture. The strategies such as Agricultural Development Led Industrialization (ADLI) and Growth and Transformation Plan (GTP) set out agriculture as a primary stimulus to increase output, create employment and generate income for the people, and as the springboard for the development of the other sectors of the economy [4,5]. Depending up on these strategies, the government has given emphasis to the development and promotion of cooperatives to facilitate agricultural marketing activities. Promotion of cooperatives has significant contribution in enhancing rural development through supplying agricultural inputs and marketing outputs.

Annual abstract of *Wolaita* Zone cooperative department [6] reveals that cooperatives provide a wide variety of services. These include grain marketing, consumer goods supply to members at reasonable prices, marketing agricultural products, supplying and distributing agricultural inputs (fertilizers, improved seeds and agro-chemical), providing credit services, grinding mill and storage services. In addition, some cooperatives are involved in seed multiplication and distribution, veterinary medicine distribution, and technical skills development. Cooperatives have also found a clear niche in the production of high value export cereals and the packaging and distribution of fertilizer [4]. The same report also justified that the total number of primary cooperative societies are 661, of which four of them are cooperative union. Primary cooperatives are multipurpose cooperative societies (MPCs) having 137,358 total members with their annual total accumulated capital of ETB, 14,520,812 (USD, 699,798.68). Hence, significant amount of input and output marketing activities were undertaken by multipurpose cooperatives in the Zone [6]. From the above information, it is possible to infer that multipurpose cooperatives have wider base in membership in agricultural input and output marketing.

However, there should be clear understanding on the bottlenecks in implementing agricultural input and output marketing by cooperatives. With

tremendous growth in size and operations and complexity of agricultural marketing, cooperatives are facing challenges which emerged from their members, management, and their competitors. It is found that agricultural cooperatives have had limitations in terms of meeting the needs of their members' efficiency. Besides, cooperatives have failed to meet members' demand or ceased to participate in their members economic activities (buying and selling of input and output marketing, using available loan and etc,) or to make democratic decisions (attending annual meeting, approving the law and audit report, etc). Thus, the major challenges faced by agricultural cooperatives are on how to operate and meet the needs of members efficiently keeping in mind the basic principles of cooperatives.

Cooperatives are considered as an appropriate tool for rural development even though they are facing critical problems, which constraint them from their positive role. These multifaceted problems make very difficult for the overall activities of multipurpose cooperatives in general and agricultural input and output agricultural marketing cooperatives in particular. Hence, members were usually price takers due to the fact that they have poor marketing skill and limited bargaining power.

As to the knowledge of the authors, none of the studies undertaken so far in the study area focused on agricultural input and output marketing cooperatives. Therefore, this study was initiated to identify determinants of cooperative member participation in agricultural input and output marketing. Besides, the study is meant to generate empirical evidences and accordingly contribute to the knowledge and understanding of development actors in their future planning and promotion of input and output marketing cooperatives.

This paper was organized into sections. The first section presents introduction. The second section describes methodology used to achieve the objective. The third section presents results and discusses findings in which financial ratio and binary logit model results were used. The last section concludes and recommendations for future improvement.

2. METHODOLOGY

2.1 Descriptions of the Study Area

Damote Gale district is one of 12 districts in *Wolaita* Zone. The capital of the district, *Boditi*

town, is situated at 18 km to the north of *Wolaita Sodo* town, the capital of Zone. The total number of rural households in the district is 29,930 out of which 93.6% are men headed and 6.4% are women headed households. The total population of the district is estimated to be 153,611 out of which 49.27% are male and 50.73% are females. The population density of the district is 636 persons per Km^2. The average household size is 5.1 and dependency ratio is 96. The total geographical area of the district is 2,355 Km^2 out of which 65.80% is used to grow annual crops, and 13.3% for perennial crops. The rest of the land is used for grazing, forest, degraded and small portion of land for other communal purposes.

The district is predominantly rural, and depends on agriculture [6]. The major economic activity is rain fed farming. Major crops grown in the district include cereals, pulses, fruits, root crops and cash crops like coffee. Wheat and maize are the dominant cereal crops grown in the district. However, the area is known for its low productivity due to land scarcity, erratic rainfall and prevalence of pests. As a result, income from non-farm and off-farm activities is the second most important source of livelihood. Especially, small trading plays an important role in generating income. Apart from trading, income from daily labor and seasonal workforce movement during harvest time is another source of income to the farmers.

2.2 Sampling Technique

In the study area, farming households are responsible for making day to day decision on farm activities. Thus, households were the basic sampling unit. A multi-stage sampling technique was used to generate the required primary data. At the first stage, *Damote Gale* district was selected purposively because it is one of the largest numbers of multipurpose cooperatives in the Zone. In the second stage, out of 54 multipurpose cooperatives, four multipurpose cooperatives (*Ade Charake, Fate, Buge* and *Gacheno*) were selected by simple random sampling techniques. From these multipurpose cooperatives, sample size was determined by using simplified formula provided by [7]. A probability proportion to size was employed to determine sample size from each multipurpose cooperative and finally 120 households were selected by using systematic random sampling without replacement technique (Table 1).

2.3 Data Sources and Methods of Data Collection

Both qualitative and quantitative data were collected from primary and secondary sources. Quantitative data from primary sources were collected through household survey while qualitative data were collected through key informant interview, focus group discussions and personal observations. The relevant data were collected from 120 sample households. An interview schedule was prepared in English and translated into local language *Wolaytena* to ease communication during the data collection. The interview schedule was pre-tested before going to actual data collection and made necessary corrections. Four enumerators were recruited based on their proficiency in communicating local language, educational background and prior exposure to similar works. Training was given to enumerators on the content of the interview schedule and procedures to follow while conducting interview. The survey focused on socioeconomic, demographic, institutional and natural factors of cooperative members. Secondary data were collected from different sources such as *Wolaita* Zone cooperative promotional department, Journals, and Central Statistical Authority (CSA) publications, published and unpublished documents, etc.

2.4 Data Analysis Methods

2.4.1 Liquidity ratio

Financial ratios were used as tools in identifying areas of strengths or weakness in cooperatives. Financial ratios enable to make comparison of cooperative's financial conditions over time or in relation to other cooperatives. Cooperative intends to remain viable business entity must have enough cash on hand to pay its debts as they come due. In order to determine whether this is the case is to examine the relationship between a cooperative's current assets and current liabilities. Liquidity ratios are quick measure of cooperative's ability to provide sufficient cash to conduct business over the next few months. According to [8-10] one of the most commonly used liquidity ratio is the current ratio that is computed by dividing current asset by current liabilities.

Current Liquidity Ratio = Current Asset/Current Liability………. (1)

2.4.2 Financial leverage management ratio

Whenever, a cooperative finance a portion of asset with any type of financing such as debts, the cooperative is said to be using financial leverage. According to [9,10] financial leverage management ratio measures the degree to which a firm is employing financial leverage. According to these authors, of the several types of financial leverage ratio and debt ratio are commonly used. It measures the portion of a firm's total asset that is financed with creditors' fund. It is computed by dividing Total Debt by Total Asset

Debt Ratio = Total Debt/Total Asset…… (2)

2.4.3 Profitability ratio

Profitability is the net effects of policies and decisions. Profitability ratios measure how effectively a firm's management was generating profits on sales, total assets and most importantly stockholders' investment [8,10]. These authors also suggested that the most commonly used profitability ratio is return on total asset, which is computed by dividing net income by total asset.

Return on Total Asset = Net Income/ Total Asset………………….... (3)

2.4.4 Model specification

A probabilistic model was specified with participation decision in input and output marketing cooperatives as a function of series of socioeconomic, psychological, institutional and household characteristics. The dependent variable is dummy variable that takes a value of zero or one depending on whether or not a cooperative member is participating in input and output marketing. Here, the main purpose is to determine the probability that an individual with a given set of attribute fall in one choice rather than the alternative, i.e., participating member or non-participating member of the cooperatives households.

Linear Probability Model (LPM), logit or probit models of regression are used to estimate the dependent dichotomous variable. Although linear probability model is the simplest method, it is not logically an attractive model in that it assumes that the conditional probability increases linearly with the value of explanatory variables. Unlike linear probability model, logit model guarantee that the estimated probabilities increase but

Table 1. Sampling technique

District name	Name of MPCOs	Members		Total Members of MPCOs	Sample size
		Males	**Females**		
Damote Gale	Ade Charake	234	22	256	63
	Fate	76	-	76	20
	Buge	56	18	74	19
	Gacheno	71	-	71	18
Total		**437**	**40**	**477**	**120**

Source: Damote Gale district of cooperative office (2015)

never step outside the 0 – 1 interval and the relationship between probability (P_i) and explanatory variable (X_i) is nonlinear [11]. Thus, a logistic model was used to identify determinants of cooperative member participation in agricultural input and output marketing. Where P_i = is a probability of participating or non-participating which ranges from 0 to 1

$$L_{ij}= Ln \left(\frac{P}{(1-P)}\right) =P_{ij}=\beta_0+\sum_{i=1}^{j} \beta_i X'_i+U_{ij} \quad i = j = 1, 2 \ldots 14 \ldots\ldots\ldots (4)$$

Where L_{ij}= is log of the odds ratio which is equal to Z_{ij}, which is not only linear in X_i but also linear in the parameters. It shows how log odds in favor of input and output marketing change as the respective independent variable change by a unit and X_i= vector of relevant explanatory variables; B_i= vector of unknown coefficient; U_i = error term. The parameters were estimated by using maximum livelihood techniques.

2.5 The Dependent Variable

Participation Index (P_{ij}): is the yardstick or standard to measure the decision of member participation in agricultural input and output marketing. Moreover, index of participation of members in cooperative was a complementary dependent variable, which is useful to identify determining factors that affect member participation decision. In order to measure participation decision of members in marketing, the most important indicators of participation were identified. Accordingly, indicators such as members participation in economic and democratic decision were selected: (1) attending annual meeting, (2) approving by-law and amendment, (3) approving annual plan and budget, (4) approving audit report, (5) determining share values, (6) sharing responsibilities of members, (7) buying and

selling input and output, (8) using available loan, (9) utilizing the services rendered, and (10) buying additional share capital. The qualitative nature of the indicators measured by scoring was organized to develop participation index, by simply adding the score, weighting and then dividing to the total possible maximum score in order to identify whether the member was participating or not. Some researchers further suggest that member participation is more accurately represented when it considers multiple democratic decision right and economic participation indicators and their corresponding determinants [12]. The score of these dimensions is calculated by the following composite index:

$$\text{Participation Index } (P_{ij}) = \sum_{i}^{10} \frac{Ri}{N} \ldots\ldots\ldots (5)$$

Participation Index (P_{ij}) means participation decision which is calculated for each household i with j activities. R_i is a dummy variable that takes value 1 if the item is checked by the members and 0 otherwise. N means the total number of items used to measure participation of members. Therefore, the dependent variable of the logit model is dichotomous nature representing the observed decision of member participation in cooperatives affairs including in agricultural input and output marketing. Depending on the index result of each member, they were categorized as participating and non participating members. The members who scored 0.5 and above values were grouped as participating members while those who scored below 0.5 values were grouped as non participant members. The variable representing participation of members in input and output marketing is a dummy variable that take a value of 1 for participant members and 0 for non- participant members. On the other hand, the independent variables, their description, measurement and expected sign are given in Table 2.

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Table 2. Independent variables and their expected sign

Variable Code	Description and measurements	sign
MEDUC	Member education in categorical level	+
MAGE	Age of household heads (in years)	+
MHHS	Households size in Adult Equivalent(AE)	-
MSEX	Sex of cooperative member (1=male, 0 otherwise	-
PMSC	Perceived satisfaction of a member in joining cooperatives	+
MCRED	Member accesses to credit (1= if accessed and 0 otherwise)	+
MEXP	Farming experiences of a member in years	+
MLDC	Cultivated land size owned by a member in hectare	+
MTLU	Total livestock owned by member in TLU	+
MCIOM	Market outlet choice of members (1= if chosen cooperative and 0 otherwise)	+
MDIEX	Distance from member home to extension office in Km	-
MDMRK	Distance from member home to cooperative marketing centre in Km	-
MONFAR	On-farm income of the households in Birr	+
MOFFFA	Off-farm income of the households in Birr	+

3. RESULTS AND DISCUSSION

3.1 Liquidity Ratio

Table 3 depicts satisfactory rate of current ratio that is accepted by most lenders as condition for financial ratio of input and output marketing. The result indicates that granting or continuing commercial loan is greater or equal to two. With this yardstick, when the reference year (2012/13) was observed, all of *Buge, Fate, Gacheno* and *Ade Charake* input and output marketing primary cooperative performed above the desirable standard with an average liquidity ratio of 4.7, 5.6, 2.11 and 4.12. Hence, lenders are highly interested to provide them loan as their current asset is rising higher than their current liability. Compared to the other primary input and output marketing cooperatives, the figure of *Fate* primary input and output marketing cooperative was much higher in its current ratio. The lenders might prefer this cooperative to provide more amount of short term loan compared to its counterparts.

3.2 Debt Ratio

As given in table 3, the average Debt-Asset Ratio of *Ade Charake, Fate, Buge and Gacheno* input and output marketing cooperative were 93%, 2.2%, 69% and 87.6% respectively for the year 2013/14. These figures showed the way cooperatives were financed and as a result creditors supplied on average 60.5% of cooperative finance. The greater proportion of Debt-Asset Ratio (in most cases >50%) of the total asset financed by the creditors, the larger the risk that the firm is unable to pay its debt [10]. Having higher proportion of asset financed by the creditors fund may lead cooperatives to the risk of bankruptcy if the management seek to increase the debt any further by borrowing additional funds. With this higher Debt-Asset Ratio, it is very difficult for cooperatives to apply for loan to expand their activities.

3.3 Profitability Ratio

The profitability ratio demonstrates how well the firm is making investment and financing decisions. According to [10] firms need to earn return on their asset that enables them to pay the interest of the money they borrowed i.e. they need to have return on their asset which is equal or better than the interest rate of the money they borrowed. One can observe from Table 3 that Profitability Ratio of cooperatives under investigation was too much low. When we look at the earning of cooperatives under investigation, the average Profitability Ratio for *Fate* input and output cooperative was 10.1%, while that of *Ade Charake* was 0.5%. Even though there was improvement in Profitability Ratio by *Fate* cooperative (10.1%), both *Gacheno* and *Buge* cooperatives had loss in their operation as their Profitability Ratio shows combined effects of liquidity, asset management and financial management. Especially for *Gacheno* and *Buge* cooperative showed loss and they couldn't achieve the Profitability Ratio which is equal or better than the interest rate (15%) with which they borrowed money from the financial institutions. The plausible reasons for the difference in profitability among cooperatives lies on how effectively the cooperative management

is generating profit on sales, total assets, money they borrowed and most importantly members' investment (share capital).

3.4 Socio-Economic Characteristics of Members

The socioeconomic characteristics of cooperative members indicated that about 54.1% of members were within the age range of 25-45 years. This indicates that members are expected to be very active on farm activities being more responsive to extension programs. This could also lead to a boost of agricultural activities with the fact that young people are energetic and have the capacity to use innovations. About 14.2% of household heads were female and the rest 85.8% were male headed households. Only 14.2% of household heads did not have any formal education, 80% had gone through primary and secondary education whereas only 5.8% had their higher diploma. The education status of

rural households enable them acquire knowledge and skill and this in turn increase their productivity. The majority of households (92.5%) owned less or equals to 1 hectare of land and 5.8% of households owned between 1 and 2 hectares. The small proportions of landless cooperative members account for about 1.7% which is nearly similar to the figures in many studies (Table 4).

3.4.1 Household size

It refers to the total members in a household measured in adult equivalent. It was assumed that households with larger size consume more of what is produced and little will remain to be marketed. The average households' size of members was 5.36 and 6.6 for participants and non- participants, respectively. The average household size of *Wolaita* Zone (5.1) was lower than average finding of this survey. This result coincides with the findings of [14]. It was

Table 3. Financial Ratios of the Input and Output Marketing Cooperatives

Cooperatives	2012/13	2013/14	2012/13	2013/14	2012/13	2013/14
	LR	LR	DR	DR	PR	PR
Ade Charake	1.103	4.12	0.903	0.93	0.021	0.0058
Fate	5.77	5.6	0.019	0.022	0.047	0.101
Buge	1.318	4.7	0.691	0.69	0.013	-0.0054
Gacheno	1.044	2.11	0.869	0.876	0.008	0.0095

Source: [13], LR- Liquidity Ratio, DR-Debit Ratio, PR-Profitability Ratio

Table 4. Socioeconomic characteristics of members

Variables	Categories	Frequencies	Percentage
Age in years	25-35	25	20.8
	36-45	40	33.3
	46-65	55	45.9
Household size in adult equivalent	2- 4	30	25
	5- 7	70	58.3
	8-10	18	15
	Above 10	2	1.7
Education level	illiterate	17	14.2
	1-8	66	55
	9-12	30	25
	Dip and above	7	5.8
Sex of the households	Female	17	14.2
	Male	103	85.8
Land owned by households	Landless	2	1.7
	≤ 0.5ha	76	63.3
	> 0.5-1.00ha	35	29.2
	>1.00-2.00ha	7	5.8
Total		**120**	**100**

Source: Household survey (2015)

expected to have negative effect on households' decision to participate in the agricultural input and output marketing. The independent t-test between participant and non-participant members shown statistically significant (t =3.67) relationship.

3.4.2 Livestock holding

The non- participants and participants average livestock holding size were 3.48 and 4.01 TLU, respectively and the overall average for the sample was 3.69 TLU (Table 5). This shows that the average livestock holdings of participants was greater than that of non- participants. The mean difference between the two was statistically significant. This means participant members were in better position with respect to livestock holding than non- participants.

3.4.3 Land holding

Land is one of the most important determinants of agricultural production. It plays a central role in producing crops and rearing livestock. Moreover, access to land offers a privilege to utilize agricultural extension services and new agricultural inputs. The result showed that livelihood of population is almost entirely based on land. Findings revealed that overall average of land holding of members was 0.56 ha with standard deviation of 0.34. Moreover, the corresponding average land holding size for participants and non- participant was 0.67 and 0.46 hectares, respectively. According to independent t- test, the difference in mean land holdings between participants and non-participants was significant at less than 1 percent probability level (t= 3.56).

3.4.4 Participation in off-farm activities

Off-farms are important activities through which rural households get additional income. The income obtained from such activities helps members to purchase farm inputs and sell outputs. The mean annual off-farm income of non participants was 3,645 birr ($=176) and that of participants was 6285 birr ($=304). The independent t- test shows significance difference between participants and non participants at less than 5% significant level (t=2.85).

3.4.5 Participation in on-farm activities

On-farm activities are important activities through which rural households get income and use for consumption. The income obtained from such activities helps members to purchase farm inputs and outputs. The mean annual on-farm income of non- participants was 6485birr ($=313) and that of participants was 8445 birr ($=407). The independent t-test shows significance difference between participants and non-participants at less than 5% significant level (t =2.39).

3.4.6 Education level of members

As given in Table 6 only 14.2% of household heads did not have any formal education whereas 80% of them had gone through primary and secondary education and 5.8% had diploma and above. The education status of rural households enable them acquire knowledge and skill and this in turn increases their productivity. In addition, education level of farmers was assumed to increase their ability to obtain agriculture information and their participation in agricultural input and output marketing. Comparison between participants and non-participants respect to education was statistically significant at less than 5% level (X2= 8.69).

3.4.7 Access to credit services

Access to rural credit is vital in improving productivity of resources through purchasing agricultural inputs, filling consumption gap when

Table 5. Mean of input and output marketing by cooperative members

Variables	Non-participant (N=70)		Participant (N= 50)		Total (N= 120)		p-value	t-value
	Mean	SD	Mean	SD	Mean	SD		
MHHS	5.36	1.71	6.6	2.08	5.76	2.06	0.001	3.67***
MLDC	0.46	0.28	0.67	0.39	0.56	0.34	0.001	3.56***
MTLU	3.48	1.22	4.01	1.73	3.69	1.40	0.050	1.98*
MONFAR	6485	3421	8445	4987	7327	4836	0.023	2.39**
MOFFAR	3645	1876	6285	4120	4337	4106	0.005	2.85**

Source: Household Survey (2015)

Table 6. Proportion of input and output marketing by cooperative members

Variables	Categories	Participant (50)	Non- participant (70)	p-value	Chi-square
MCRED	Yes	21	21	0.002	9.40***
	No	29	49		
	Illiterate	2	16	0.059	8.69**
	1-8	38	38		
MEDUC	9-12	15	14		
	Diploma	1	2		

Source: Household Survey (2015)

it occurs, and availing resources for meeting social obligations, etc. The major formal credit providing institutions are cooperatives, which provide both long-term and short-term loans. Frequently, members depend on credit to purchase farm inputs. In addition, findings show significant difference between participants and non participants at 1 percent probability level (Chi-Square = 9.40, P=0.002) (Table 6).

3.5 Determinants of Member Participation in Agricultural Input and Output Marketing

The model result shows that binary logit model correctly predicts 80% of input and output marketing cooperatives. The model chi-square value with 91.684 shows that inclusion of the explanatory variables contributed to improvement in fit of full model. The Cox and Snell and Nagelkerke pseudo R-square values were 0.468 and 0.689, respectively. The Hosmer - Leme show test result reports chi-square value of 10.1 with p-value of 0.904 which is greater than 0.10 and 0.05 levels showing that there is no difference between the observed and the predicted values and hence estimates of the model fit the data very well in an acceptable level. As a result, out of the hypothesized variables which were included in the binary logit model, 8 variables were statistically significant. These are household size, access to credit, distance from member home to extension office, cultivable land size, perceived market outlets for input and output marketing, off farming income, distance from member home to cooperative marketing center, perceived satisfaction of members in joining cooperative marketing (Table 7).

3.5.1 Households size (MHHS)

As expected, household size showed negative sign with significant influence on member participation in input and output marketing at less

than 5% level probability. Other variables kept constant, as household size in adult equivalent (AE) decreases by a unit, the probability of participating in input and output marketing increases by a factor of 1.486. This result shows that households with larger family size consume more of what is produced and small amount is left to be marketed. This finding agrees with findings of [15].

3.5.2 Participation in off-farm activities (MOFFFA)

As expected, off farm income depicted a positive sign with significant influence on member participation in input and output marketing at less than 5% probability level. The result of logit model signified that having extra income from off-farm activities provide financial freedom to members which, in turn, positively influence to invest in purchase of inputs and outputs. According to this finding, ceteris paribus, an increase in off-farm income by one birr increases the probability of member participation in input and output marketing by a factor of 1.10. The finding on this variable is in-line with findings of [15,16].

3.5.3 Access to credit (MCRED)

Credit helps to improve cooperative members' ability to purchase input and output for marketing at critical times. The model result confirms that credit is statistically significant at less than 1% probability level. The influence of credit on member participation in input and output marketing is very high when compared to most of the other variables in the model. This is because credit directly influences input and output marketing. Besides, credit used for agricultural inputs improve productivity and increase farm income and wealth status. Those members with better wealth status participated in input and output marketing. While keeping other variables constant, the odds-ratio in favor of input and

output marketing increases by a factor of 27.05 as member access to credit increases by one unit. This result indicated that members who had access to credit were more likely participated in marketing than members who had no access to credit. This finding agrees with findings of [17].

3.5.4 Distance from member home to cooperative marketing center (MDMARK)

As hypothesized, the relationship between distances from member home negatively and significantly associated with member participation in input and output marketing at less than 10% probability level. The implication is that the longer distance from member home to cooperatives input and output marketing centers, the lower probability of member participation in agricultural input and output marketing. Market access through cooperative is very important for input and output purchase as it facilitates easy sale of outputs produce in relatively large quantities and assists them to procure necessary inputs at fair price. Proximity to market also reduces marketing costs. The result indicates that as distance from member home to cooperative marketing center increases by 1 km, the probability of member participate in agricultural input and output marketing decreases by a factor of 0.695. The findings agree with the finding of [16].

3.5.5 Cultivable land owned by members (MLDC)

As hypothesized, landholding was positively and significantly associated with participation in input and output marketing at less than 1% probability level. That is, members with larger farm size tend to be engaged more in input and output marketing than with smaller size, and vice versa. This is possibly because the size of landholding is a proxy for a host of factors that include wealth, access to credit, capacity to beer risk and income. Larger farms are associated with greater wealth and income and increased availability of capital, which increase the probability of investment in purchase of farm inputs that increase food production and ensuring food security. They pointed out that the smallness of landholdings deters use of modern inputs due to lack of purchasing power in hands of small farmers. The odds ratio for the variable implies that holding other variables constant, increasing cultivable land by one hectare leads to increase the probability of member participation by a

factor of 24.86. Therefore, land ownership is an important variable in the input and output marketing participation and agrees with the finding of [16,17].

3.5.6 Perceived satisfaction of members in joining cooperatives (PMSC)

Members with perceived satisfaction due to joining cooperative have negative and significant relations with participation at less than 10% probability level. This condition may be due to the fact that increment of income of the household leads to the member participation in marketing activities that shift from the usual practice or cooperative business thinking to owner entrepreneur kinds of business thinking and practices. This study coincides with the findings of Alema [18].

3.5.7 Distance from member home to extension office (MDIEX)

The logit model estimates indicated that this variable is negatively and significantly related to member participation in input and output marketing at less than 10% probability level. This result may be due to the fact that members, who live relatively nearer to extension office, have more chance to participate in marketing. This could be due to the fact that it is more convenient to extension services and cooperative promoters in giving training and support than distant households. Furthermore, the cooperative promoting agents focus in helping in creation of awareness may be concentrated on the nearest members to extensions office because currently one cooperative promoter has responsibility of three villages. The odds ratio revealed that as distance increases by a Km, member participation in agricultural input and output marketing decreases by 0.717 and this study result coincides with the finding of [16,17].

3.5.8 Marketing outlet choice of members (MCIOM)

The logit model result indicated that the variable is positively and significantly related to member participation in input and output marketing at less than 1% probability level. The odds ratio revealed that as members access one more market alternatives, member participation in input and output marketing increases by a factor of 4.87, ceteris paribus. The finding of this study is in line with the finding of [15,17].

Table 7. Determinants of member participation in agricultural input and output marketing

Variables	B	S.E.	Wald	Sig.	Exp(B)
MAGE	.014	.033	.178	.673	.986
MEDUC	.234	.309	.572	.449	.792
MHHS	-.396	.158	6.260	.011**	1.486
MSEX	.667	.865	.596	. 440	1.949
MLND	3.213	1.041	9.529	.002***	24.865
MONFAR	.002	.001	.476	.490	1.200
MOFFFAR	.004	.002	4.134	.042**	1.100
MTLU	-.055	.245	.051	.821	.946
MEXP	-.001	.038	.001	.977	.999
MCRED	1.955	.602	10.559	.001***	27.063
MCIOM	1.584	.592	7.154	.004***	4.874
MDMAR	-.363	.190	3.662	.056*	.695
MDIEX	-.332	.200	2.758	.097*	.717
PMSC	-2.016	1.276	2.597	.104*	.133
Constant	-3.327	2.236	2.215	.137	.036
Log-likelihood ratio test				163.009	
Predicted Pearson chi-square				91.68	
Cox and Snell R2				54.8	
Negelkerke R2				68.9	
H-L model significant test result				10.1	
Correctly predicted over all sample (%)				84.2	
Correctly predicted passive participant (%)				88.6	
Correctly predicted active participant (%)				80	

***, **, * at 1, 5, and 10% significant level respectively, Source household survey (2015)

4. CONCLUSION AND RECOMMENDA-TIONS

The study was conducted to identify determinants of cooperative member participation in agricultural input and output marketing at *Damote Gale* district of *Wolaita* Zone in Ethiopia. The result showed that participation in the agricultural input and output marketing was significantly determined by household size, cultivable landholding, credit access, alternative market outlets, distance from member home to cooperative marketing center, perceived satisfaction of member due to joining of cooperatives, distance from member home to extension office and off farm activities. Out of the 8 significant explanatory variables perceived satisfaction of member due to joining of cooperative, distance from member home to extension office, distance from member home to cooperative marketing center and household size determined participation in agricultural input and output marketing negatively and significantly whereas the rest four variables determined positively and significantly. With regarding to debt ratio and profitability ratio three cooperatives in the study area perform below the

desirable rate i.e. even the profitability ratio of *Buge* and *Gacheno* marketing cooperative deserve negative profitability that couldn't reach bank interest rate with which they borrowed money from financial institution.

Based on the findings, the following are recommendations to improve the future participation of members in agricultural input and out marketing. Development practitioners should create awareness among members and encourage the use of family planning in order to limit household size. This can be achieved through integrated health and education services.

Access to credit has significant and positive effect on cooperative member participation. Moreover, the functionality of cooperatives is also constrained by shortage of capital and limited access to credit. An effective and sustainable cooperative movement requires overcoming major credit constraints and strengthening capacities of administrators and management. Besides, in practice effective performance of cooperative is constrained by shortages in skilled human resources (especially

in cooperative business development and financial management). Therefore, effort should be geared towards increasing qualified manpower in cooperatives, upgrading management capacity of cooperative management body (Board of directors, other employed workers and members) through education, improving financial capacity of cooperatives through member saving and sale of more shares, promoting government and civil society organization allocating additional budget, enhancing infrastructural facilities, and information dissemination in cooperative marketing.

Lastly, participation of members in input and output marketing was negatively affected by distances and this may be due to the fact that cooperative members who live far from the cooperative office and marketing center were far located to obtain training. Therefore, to support these members, offices of agriculture and natural resource, cooperative promotion and other concerned bodies should give attention to upgrade their technical and managerial knowledge through short term and long term training program in order to integrate members into the commercial agricultural economy.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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