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The Role of Agricultural Cooperatives in Promoting Food Security and Rural Women's Empowerment in Eastern Tigray Region, Ethiopia

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Abstract
Freedom of association and the right to form organizations that are genuinely accountable and advance poor people's interests may contribute to sustainable poverty reduction and food security. Cooperatives can help in assuring farmers to have access to inputs, credit, output markets, and opportunities to engage in more diversified, higher value crop production. These organizations can reduce the transaction costs of accessing markets and improve the bargaining power of small farmers' vis-à-vis large buyers and sellers.This study was conducted to assess the meaningful contribution of agricultural cooperatives in promoting food security and women's empowerment in Eastern zone of Tigray Regional State, Ethiopia. The study has adopted purposive sampling for the selection of the target woreda and multi stage random sampling for the selection of multipurpose cooperatives and respondents and the data analysis employed various statistical tools like percentage, mean, standard deviation and regression analysis.The study result indicated that while cooperatives are serving the rural community, they are contributing a lot in improving the standards of living of their members residing in rural areas. They undertake various economic activities which help the members in promoting food security and gender equality. However, because of poor implementation capacity and low managerial, financial and operational competence, multipurpose cooperatives have not been able to strengthen and expand their business operations as per the expectations. The study recommended that concerted efforts are needed to organize seminars and campaigns to create awareness about cooperatives.
Keywords: Agricultural cooperatives, food security, women empowerment, income, awareness

BACKGROUND AND JUSTIFICATION

Cooperatives play vital role in Ethiopian Socio- economic betterment. 85 percent of the people are living in rural Ethiopia. They are engaged in agricultural activities. Thus agriculture forms the back bone of the countries economy, providing about 80% of all employment.

Agriculture growth is seen as a guarantee against food insecurity in the country. According to MEDAC (1999) the food security of Ethiopia is based on three important aspects.

a) Increasing food and agricultural production
b) Improving food entitlement; and
c) Strengthening capacity to manage food crises.

In line with the poverty reduction program, different strategies and programs have been drafted and implemented by government to back the economy of the country on track. Among these development programs, organizing different classes of people through cooperatives that enable them to solve their common economic and social problems is given more attention. Generally, it is believed that production and productivity can be improved through expansion of cooperatives as a base line for development.

Agricultural cooperatives play a great role not only in promoting food security but also in build is the national economy since the economy of the country depends up on agriculture. But this is likely to ensure only when they operate effectively towards the interest of the society.

Food security is a situation that exists when all people at all times have physical , social and economic access of sufficient, sate and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Agricultural cooperatives, therefore, have the capacity to improve the living standard of the rural people especially women and promote food security of the country.

Cooperative institutions and especially the agricultural cooperatives are the agencies which hold enormous potential for the development of women, and more particularly the rural women.

Regardless of the level of development achieved by the respective economies, women play a pivotal role in agriculture and in rural development in most developing countries.

Evidently there are serious constraints which militate against the promotion of an effective role for women in development in those societies which were bound by age-old traditions and beliefs.

Patriarchal modes and practices motivated by cultures and/or interpretations of religious sanctions and illiteracy hinder women's freedom to opt for various choices to assert greater mobility in social interactions. Resulting

from these situations, women's contribution to agriculture and other sectors in the economy remain concealed and unaccounted for in monitoring economic performance measurement. Consequently, they are generally invisible in plans and programmes. They were, in fact, discriminated against by stereotypes which restrict them to a reproductive role, and denied access to resources which could eventually enhance their social and economic contribution to the society.

In dealing with the problem of food insecurity and poor living standard of rural women, one of the aspects that the government is following is that food, agricultural production and improved income of women and thereby mitigating the food insecurity and problem of women through promotion and development of different classes of cooperatives that enable them to solve their common economic and social problems.

In Tigray region, formation of primary agricultural cooperatives is not a new phenomenon. Based on the existing statues and the bylaws of the societies, the established cooperatives have providing services to their members. The major issue here is that are these agricultural cooperatives are really solving the socio-economic problems of the farmers and thereby promoting food security and rural women's empowerment or not? This requires investigation of the efficiency and effectiveness of the performance of agricultural cooperatives.

It is, therefore, from the above general conditions that the need arose to conduct this socio-economic assessment (survey) to be able to see the present concrete situation of low status of women and food insecurity of target area, identify the roles of agricultural cooperatives in promoting food security and rural women's empowerment and to propose development interventions in the localities of the people that possibly improve the future socio-economic mechanisms of the members.

Objectives of the study

The general objective of the study is to assess the role of agricultural cooperatives in promoting food security and women's empowerment in Eastern zone of Tigray.

METHODS AND MATERIALS

Study area Description

Tigray region is one of the 9 federal regional states of Ethiopia located in the northern part of the country. It has seven zonal administrations, namely, Western, North-Western, Central, Eastern, South-Eastern, Southern and Mekelle special zones. According to CSA 2007 census (2008), it has a population of 4,314,456, where over 19.53% of the population resides in urban areas. In terms of sex distribution, close to 50% of the population are females. Amongst the urban residents, the female population amounts to 52.76%. This number is slightly greater than females that reside in rural Tigray, 50.26%. Considering age cohort, 51.87% of Tigray population is aged between 15 and 64; whereas over 60% of the urban population is in the working age group.

Figure 1: Location Map of the study area

According to Household, Income and Consumption Expenditure (HICE) 2004/05 survey (CSA, 2007), average household size in Tigray is estimated at 4.6. Approximately, 45% of male population is illiterate and slightly below 70% of the female population is illiterate. Agriculture is the mainstay in Tigray which accounts to more than 75%; the rest are engaged in handicraft, manufacturing, construction, petty enterprise and service-related activities (CSA, 2006).

Research Methods

To investigate and evaluate the role of agricultural cooperatives in promoting food security and women's empowerment; field survey method was adopted for the study. The study areas as well as respondents for the

study were selected by using a multi-stage sampling and random sampling procedure.
Hence, from the eastern zone of Tigray region three woredas were selected by random sampling procedure and the cooperatives from the selected woredas were selected using random sampling method based on the number of members in the cooperatives.
To select the house hold's for interview, systematic random sampling (from the list of membership file) were adopted and a minimum of 30 house hold members of agricultural cooperatives was selected form each woreda with a total of 108 households and Considering the objectives of the study, and representativeness of the sample, probability proportionate to the size has followed to select the non- member of respondents (30 respondents).
This is to compare the impact of cooperatives at house hold level and to identify the obstacles which block individual not to be members of cooperatives.

i. Members of cooperatives (57 males)
ii. Women members of cooperatives (51 women)
iii. Non-members of cooperatives (30 males)

The target groups have interviewed individually and data has gathered.
Besides, Focus group discussion with the key communicators and NGOs has conducted to gain an insight in the changing nature of food security and gender equality and women's empowerment, in which women's find themselves, past or present.
Interviews of the respondents were conducted by investigators who are specially trained in cooperatives.
To come with the desirable results the study was used primary data and secondary sources of data.
The result was interpreted using descriptive statistics and graphs, and tables using SPSS 12.0 Package.

Model Specification

The joint effect of a group of independent variables on promoting food security is studied by framing the multiple regression equation of the variable "Y" on the other independent variables. The following model with 16 independent variables is used in model specification. The critical issue after the model specification was the way of analysis and interpretation. In classical regression model, each estimate gives the partial effect of a coefficient with the effects of other X variables being controlled.

$Y= a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8$

Where: Y=income after membership period
a = Intercept (constant)
b_1 to b_{16} = Regression coefficients
x1= Age (in years)
x2= Family size
x3= Land size (in hectare)
x4= Education
x5= membership period
x6 = Agricultural inputs

RESULT AND DISCUSSION

In dealing with the problem of food insecurity and gender inequality, different policies and programs are adopted by the federal government of Ethiopia. One of the aspects given attention by the government is to improve food and agricultural production and increase income level through the introduction of modern inputs and extension packages. To this end, the government is promoting the development of different classes of cooperatives that enable people to pool their resources and solve their common economic and social problems. The existing cooperatives promotion system has been advocated for the introduction of better technological packages and agricultural inputs to positively impact the transformation of rural livelihoods from subsistence to self reliance (PASDEP, 2006).
This household level survey was intended to investigate the important results of agricultural cooperatives in promoting food security and women's empowerment through a closer look at the efficiency of the services they are providing to members and production changes for sustaining their livelihoods in the study area. An interview schedule has been prepared to collect information from household heads. Accordingly, primary dada was collected from 108 cooperative members who were randomly selected and interviewed and 30 form non-members. According to the survey result, almost all the respondents become members of agricultural cooperatives with the objective of getting different services from their cooperatives such as access to input, credit, technical support and other services.
To answer the research questions, quantitative analysis of the data was important. Hence, for each research question, cross tabulation and statistical analyses of the collected data has been conducted using SPSS version 12. The results of the analysis are presented as follows:

Agricultural Cooperatives and Food Security

House hold Food security — "Access by all people at all times to enough food for an active, healthy life. Food

security includes at a minimum:
(1) The ready availability of nutritionally adequate and safe foods, and
(2) An assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, or other coping strategies)."
In the reverse when we talk about food insecurity, it means that — "Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways."
Thus, agricultural cooperatives play a very vital role in promoting food security of house holds in the rural areas.
Three dependent variables have been used, corresponding to three different indicators of food security:

(i) Productivity of household respondents
(ii) The current level of food consumption within the household, and the change in the level of consumption before and after membership period of the agricultural cooperatives, and
(iii) The change in the ability to cope during lean seasons.

The respondents were asked about the land size they owned, land fertility, utilization of agricultural inputs. Their responses have been takes to measure the level of their productivity which is main indicator of food security. They were also asked about the accesses of food supply to the house hold consumption which they have enough cereals to feed their families reasonably well after they become member of the agricultural cooperatives. Their answers have been taken as the measure of the *current level* of food security. They were also asked about the situation before membership period, and the reported change in the number of months during which they had enough cereals has been taken as the measure of the *change in the level* of food security. Finally, their responses to the question of whether their ability to cope during lean seasons had gone up, gone down, or had remained unchanged over the periods of before and after membership of agricultural cooperatives have been used as the indicator of the *change in their coping ability*.
Among the possible determinants of food security, current and previous household income is the only important variable on which the survey has collected only annual income data, and it has collected information on how household income changed, in the opinion of the respondents, in the period of after and before membership of agricultural cooperatives.

Productivity

Growth in agricultural production can result from extending the agricultural land base and/or intensifying production per unit of land. Given economic and environmental constraints on cropland expansion, however, the bulk of increased crop production will need to come from increased yields on existing cropland. Yields depend on the availability and quality of resources.
In low-income, food-deficit countries, the dominant resources are land and labor.
Inputs that require capital, such as fertilizer, machinery, and irrigation technology, are not widely used in these regions. Purchased inputs and the use of new technologies can increase production efficiencies and resulting yields if the farmers get the access of these agricultural inputs.
The level of agricultural cooperatives contribution to increase productivity is measured by the following factors:

Land size and Production level

Regarding land use pattern, the study result indicated that 21.1 per cent of the respondents are leasing out their farmland in 2007/08 crop year. Sharecropping was the dominant form of land rental arrangement in the study area accounting 63 % of land lease transfers. The other terms of lease contract include mixed cash and crop contract (26%) and cash renting (11%) for the respondents.
The reasons for leasing out of land are diverse. The main reasons were lack of productive assets including oxen, shortage of family labour and seed. Farmers do face a combination of the stated constraints such as lack of oxen and shortage of family labour and women headed households. This gives a clue for addressing the major constraints of production and why farmers are contracting out their farmlands for others.

Table.1: Total Available Land in ha vs. Total Cereal Production

SI. No	Land size	Range of total cereal production in Quintal						Total	Percentage
		No production	Up to 10 Qt	10.01 -15.0 Qt	15.01 – 20 Qt	20.01 – 25 Qt	Above 25 Qt		
1	Landless	4	5	5	3	0	0	**17**	**15.74**
2	Less than 0.5 ha	0	2	6	5	4	6	**23**	**21.30**
3	0.51 – 1 ha	1	9	13	4	6	2	**35**	**32.40**
4	1.01 – 2 ha	1	2	6	8	6	4	**27**	**25.00**
5	2 ha and above	0	2	3	1	0	0	**6**	**5.56**
	Total	6	20	33	21	16	12	**108**	**100.00**
	Percentage	**5.56**	**18.52**	**30.56**	**19.44**	**14.81**	**11.11**	**100.00**	

Source: Primary data collected through field survey

From Table 1, we can realize that from a total 59 respondents who are producing up to 15 quintals, 45 respondents (76.27 per cent) are either landless or having less than one ha of land. On the other hand, from a total of 49 respondents who are producing more than 15 quintal, 19 respondents (38.78 per cent) are having above 1 ha farmland. These indicate that there is positive relationship between size of farmland and agricultural production which supports our hypothesis.

Application of Agricultural Inputs

The application of inputs for agricultural activities was assessed on the basis of whether a household uses fertilizer or not. The major types of inputs used in the study area were DAP, UREA, improved seed and manure. Information was collected on the utilization of inputs for three consecutive years and the findings were analyzed. Accordingly, more than 87 percent of the respondents were using agricultural inputs for their farming activities. This means that only 12.9 percent (9 per cent women and 3.9 per cent male) of the respondents didn't use any agricultural inputs in 2005/06 to 2007/08 crop years.

Utilization of Improved Seed

The utilization of improved seeds was also considered in the study, as it has a direct influence on promoting agricultural production. When we see the utilization of improved seeds it was observed that a total of 21 respondents were not using improved seeds for the period of study under consideration. The users of improved seed fertilizer were found to be 5.56 per cent, 15.74 per cent, 20.37 per cent, 12.04 percent and 26.85 percent that utilize on average below 25 KG, 26 to 50 KG, 51 to 75 KG, 76 to 100 KG and above 100 KG respectively (Table 2). The average utilization of improved seeds was found to be 50.55 KG for 2004/05 crop year, 50.78 KG for 2005/06 crop year and 79.22 KG for 2006/07 crop year. This indicates that the average consumption of improved seed is increasing specially in 2006/07 crop year.

Table 2: Average Utilization of DAP, UREA and Improved Seed

S.No	Utilization of Inputs in KG	DAP		UREA		Improved seed	
		Count	Per cent	Count	Per cent	Count	Per cent
1	No purchase	22	20.36	21	19.44	21	19.44
2	Below 25	13	12.04	23	21.30	6	5.56
3	25 to 50	19	17.60	34	31.48	17	15.74
4	51 to 75	14	12.96	26	24.08	22	20.37
5	76 to 100	19	17.60	2	1.85	13	12.04
6	Above 100	21	19.44	2	1.85	29	26.85
7	**Total**	**108**	**100.00**	**108**	**100.00**	**108**	**100.00**

Source: Primary data collected through field survey

Level of food Access

We can ensure that Individuals have adequate food access; when they have adequate incomes or other resources to purchase or barter to obtain levels of appropriate foods needed to maintain consumption of an adequate diet/nutrition level. To have proper food consumption when food is properly used; proper food processing and storage techniques are employed; adequate knowledge of nutrition and child care techniques exists and is applied; and adequate health and sanitation services exist.

Agricultural cooperatives work towards improving the living standard of the farmers and reduce poverty of house holds. This can be ensured if the frames have full and adequate access to food consumption. Otherwise, it will be hard to say poverty is reduced and farmers are food secured. Table 3 shows that household respondents access to food consumption level.

Table 3: Household Food security Access Scale

NO.	QUESTION	Response Options	Before membership		After membership	
			Number	Percentage	Number	Percentage
1.	Did you worry that your household would not have enough food?	Yes No Sometimes Total	79 13 16 108	73.15 12.04 14.81 100.00	37 62 9 108	34.26 57.41 8.33 100.00
2.	Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	Yes No Sometimes Total	89 19 0 108	82.41 17.59 0.00 100.00	57 40 11 108	52.78 37.04 10.18 100.00
3.	Did you or any household member have to limit the variety of foods you ate because of lack of resources?	Yes No Sometimes Total	97 4 7 108	89.82 3.70 6.48 100.00	52 29 27 108	48.15 26.85 25.00 100.00
4.	Did you or any household member eat food that you preferred not to eat because of a lack of resources to obtain other types of food?	Yes No Sometimes Total	67 30 11 108	62.04 27.78 10.18 100.00	31 50 27 108	28.70 46.30 25.00 100.00
5.	Did you or any household member eat a smaller meal than you felt you needed because there was not enough food?	Yes No Sometimes Total	102 2 4 108	94.44 1.85 3.71 100.00	74 25 9 108	68.52 23.15 8.33 100.00

Source: Primary data collected through field survey

As the result of the study indicates, that 73.15 percent and 14.81 percent of respondents were worried about getting enough food to the household consumption frequently and sometimes, respectively before they become member of agricultural cooperatives. Only 12.04 percent of respondents didn't worry about getting enough food to the household consumption before they become member of the agricultural cooperatives.

However, the numbers of respondents who were worried frequently and sometimes before their membership period have reduced after membership period to 34.26 percent and 8.33 percent, respectively. And the number of respondent who didn't worry about getting enough food to household consumption had increased to 57.41 percent.

Thus, agricultural cooperatives improve the probability of households to get enough food to the consumption of their family.

About 82.41 percent of household respondents agree on not able to eat a kind of food they preferred before their membership period but the numbers of respondents who are agree on not able to eat preferred food reduced to 52.78 percent after membership period. Those who don't agree before and after membership period are 17.59 percent and 37.04 percent, respectively.

Only 10.18 percent of respondents said that they are not able to get preferred food sometimes after membership period but before membership period none of them said this.

According the respondents answer 89.82 percent of respondent were limit the variety of food they ate due to lack of resources and 6.48 percent of respondent did this sometimes. Only 3.70 percent of respondent didn't limit the variety of food they ate due to lack of resources before their membership period.

After membership period 48.15 percent of respondent limit the variety of food they eat due to lack of resources and 25 percent of respondent agree on this sometimes and 26.85 percent of respondent do not limit the variety of food they eat due to lack of resources.

Before membership period, respondent who were ate the kind of food which they didn't preferred to eat because of a lack of resources to obtain other types of food are 62.04 percent and those who some times ate a food they don't preferred are 10.18 percent. Only 27.78 percent of respondent ate the kind of food they preferred before membership period. How ever, after membership period the umber of members who eat a kind of food they preferred are increased to 46.30 percent. The respondent who eat the kind of food they don't preferred to eat because of a lack of resources to obtain other types of food are reduced to 28.70 percent after membership period. Only 25 percent of respondents suffer with such situation after membership period.

The majority of respondent 94.44 percent were ate a smaller meal than they felt they needed because there was not enough food frequently before membership period and 3.17 of respondent face with such situation sometimes. Only 1.85 percent of respondent didn't suffer this before membership period. But after membership period, only 68.52 percent eat a smaller meal than they felt they needed because there was not enough food

frequently and 8.33 percent still suffer sometimes. The numbers of respondents who do not suffer with this situation currently are 23.15 percent. Hence, agricultural cooperatives increase the access level of food consumption to the household members and ensure food security.

The ability to cope during lean seasons

Member respondent were asked for how long they are able to stay with adequate access of food consumption after harvest time.

Table 4 indicates that the number of months which respondents can stay with access of food consumption to their family after harvest time before and after membership period.

Table 4: Respondent's ability to cope with adequate food consumption after harvest time:

SI.No	Number of months	Before membership		After membership	
		Number	Percentage	Number	Percentage
1	2 – 4 months	49	45.37	12	11.11
2	5 – 7 months	24	22.22	28	25.93
3	8 – 10 months	23	21.30	34	31.48
4	10 – one year	9	8.33	18	16.67
5	Above one year	3	2.78	16	14.81
Total		108	100.00	108	100.00

Source: Primary data collected through field survey

The result of the survey indicates that 45.37 percent and 11.11 percent of respondent are reported that they cope up with food consumption after harvest for the months between 2 and 4 months before and after membership period, respectively. Those who cope with for the months between 5 and 7 months are 22.22 percent and 25.93 percent before and after membership period, respectively.

Respondents who can cope with for the months between 8 month and one year are 29.63 percent and 48.15 percent before and after membership period.

Respondents who cope with more than one year after membership period are 14.81 percent, while only 2.78 percent of respondent are bale to cope with before membership period. Thus, agricultural cooperatives have a significant role in promoting food security and reduce poverty level of farmers.

Agricultural cooperatives and Women Empowerment

Empowerment is tricky concept difficult to measure and define properly. It could usually be identified only when it is experienced. Susy Cheston and Lisa Kuhn(2002) defined empowerment as "a process change by which individuals or groups with little or no power gain the power and ability to make choices that affect their lives" It is about change, choice and power. Here the perception of empowerment of the respondents before and after joining the agricultural cooperatives is measured in order to assess the role of agricultural cooperatives in empowering women and its progress. In connection to this the women members of the three cooperatives in the selected woredas were asked various questions regarding decision making in the household with respect to resources and some other household issue. These are discussed in the following part.

Women's leadership

In the previous time, not only the role of women on leadership was limited but they didn't have the freedom to express their ideas and needs due to social, economic and cultural constraints. However, as many literatures reveled that, cooperatives are gender sensitive and play a vital role in ensuring gender equality through increasing women's income, social status, and create opportunity to play leadership role in management of their cooperatives and family.

The result of the study according the respondents is women become a member of management as well as other committees of the cooperatives. Table 5 shows the participation of women on the cooperatives activities:

Table 5: Women's participation in different position of the cooperatives:

SI. No	**Women's participation**	**Total number**	**Number of participation women**	**Percentage**
1	Management Committee	7	3	42.86
2	Control Committee	7	3	42.86
3	Group leadership	5	2	40
4	Decision making	8	4	50
5	Implementation of decisions	15	6	40
6	Monitoring and evaluation	10	4	40
7	Regularity in attending meeting	51	45	88.24

Source: Primary data collected through field survey

As the result indicates, that women have a good position in the management and leadership of cooperatives. From Seven members of management committee, three of them (42.86 percent) are women and the same in

members of control committee.

In the agricultural cooperatives, women's play a significant role in making decision (50 percent) and monitoring and evaluation (40 percent) of the decision made. Around 88.24 percent of women attend all the meetings held by the cooperatives. This ensures that women can express their ideas about the cooperatives and needs they want to get.

Thus, it can be conclude that, agricultural cooperatives play an important role in empowering women on the leadership aspect.

Women's participation in income generating activities

Research in Africa, Asia and Latin America has found that improvements in household food security and nutrition are associated with women's access to income and their role in household decisions on expenditure. This is because women tend to spend a significantly higher proportion of their income than men on food for the family. In our country Ethiopia, for example, when grain grown by men is in short supply, income earned by women from the sale of eggs, cheese, fresh and processed fruit, vegetables and small stock contribute significantly to household provisions.

Women's wage income from farm and non-farm employment, and from other income opportunities, is of particular importance for landless and near-landless rural households. Women's purchasing power may not only be used to buy food and other basic assets for themselves and their families, but also to pay for inputs used in food production. Since food crops are consumed, the inputs for these have to be provided from income earned in other agricultural enterprises or non-farm income generating activities. Thus, to improve food production for the household, greater priority has to be given to increasing women's participation in market production as well as other income-generating ventures. As per the study result, table 6 indicates that women's involvement in income generating activities is increased after membership period of the agricultural cooperatives.

Table 6: women's involvement in income generating activities:

SI.No	Responses	Before membership		After membership	
		Number	Percentage	Number	Percentage
1	Yes	17	33.33	38	74.51
2	No	30	58.82	9	17.65
3	Some times	4	7.85	4	7.85
Total		51	100.00	51	100.00

Source: Primary data collected through field survey

The result of the survey indicates that involvement of women's before membership period was 33.33 percent, but this number increased to 74.51 after membership period. The number of women respondents who were not participated in income generating activities was 58.82 percent, but after membership period only 17.65 percent of women respondents don't participate in income generating activities. The number of women respondents who participate sometimes in income generating activities are the same before and after membership period. Thus, agricultural cooperatives play a vital role in increasing women's income and their empowerment.

Decision to Borrow

Women were asked various questions regarding decision making with respect to economic activity like decision to borrow, use of profit and type of economic activity they undertake, and decisions on land use, etc.

Table 7 shows that women do in fact feel associated with decisions affecting their economic activity as decision to borrow.

When the results of each dimension were studied, it was noted that the women respondents stated that the decision to borrow was some what more than before, 29.41 percent of them responded, they decided the decision to borrow when they want to borrow during the pre-membership period and this figure has increased to 43.14 percent during the post-membership of the cooperatives period.

Table 7: Decision to Borrow

SI.No	Responses	Pre-Membership		After-membership of Cooperatives	
		Number	Percentage	Number	Percentage
1	Yes	15	29.41	22	43.14
2	No	30	58.83	24	47.06
3	Sometimes	6	11.76	5	9.8
Total		51	100	51	100

Source: Primary data collected through field survey

Another 58.83 percent responded a husband's or another person's full control on the decision-making to borrow during the pre-membership period and this figure has reduced to 47.06 percent during the post- membership period. Further, it is found that 11.76 percent of them responded that they have partially involved in the decision-making to borrow during the pre-membership period and this figure has reduced to 9.8 percent during the post-membership period.

Decision Making in Family

With respect to the decisions made concerning the family, family economic activities, family budget, child education and purchases of food are included.

Table 9: Decision Making in Family

SI.No	Responses	Pre-Membership		After-membership of Cooperatives	
		Number	Percentage	Number	Percentage
1	Husband	23	45.10	14	27.45
2	wife	13	25.50	18	35.30
3	both	15	29.40	19	37.25
Total		51	100	51	100

Source: Primary data collected through field survey

Before joining agricultural cooperatives, 45.10 percent of husbands had full control on the decision making concerning the family related activities during the pre-membership period and this figure reduced to 27.45 percent during the post-membership period. Wife had control on the decision making on family related activities accounting for 25.50 percent during the pre-membership period and this figure increased to 35.30 percent during the post-membership period. The reason to increased women's autonomy to decided on family case is because of some of them are divorced and some become widowed.

It is further found that, 29.40 percent responded that they decided jointly on family related activities during the pre-membership period and this figure increased to 37.25 percent during the post-membership period. Hence, it is possible to conclude that joining the cooperatives empowered women respondents with respect to the decisions made concerning the family.

Access to resources

Despite their role as the backbone of food production and provision for family consumption in developing countries, women have limited access to critical resources and services. While in most developing countries, both men and women farmers do not have access to adequate resources, women's access is even more limited due to cultural, traditional and sociological factors. Accurate information about men's and women's relative access to, and control over, resources is critical in the development of food security strategies (Harrison, 2003). How ever, the study indicates that women's access to resources shows some progress after membership of agricultural cooperatives.

Table 10 indicates that women's access to resources has increase from 41.18 percent before membership to 74.51 percent after membership. The limited access of women to resource has decreased from 58.82 percent of before membership to 25.49 percent of after membership. Thus, agricultural cooperatives play a vital role in enabling women to have access to productive resources.

Table 10 women respondents' access to resources

SI.No	Responses	Before membership		After membership	
		Number	Percentage	Number	Percentage
1	Yes	21	41.18	38	74.51
2	No	30	58.82	13	25.49
Total		51	100.00	51	100.00

Source: Primary data collected through field survey

Access to education, training and extension services

The available figures from the study area show that only 5.88% of extension services have been addressed to rural women before their membership period, however, this number increased to 86.27% after their membership period. Table 11 indicates that women's access to training, education and extension services shows great progress after they become member of agricultural cooperatives.

Table 11: women respondents' access to education, training and extension services:

SI.No	Responses	Before membership		After membership	
		Number	Percentage	Number	Percentage
1	Yes	3	5.88	44	86.27
2	No	48	94.12	7	13.73
Total		51	100.00	51	100.00

Source: Primary data collected through field survey

In addition, most extension services are focused on both cash crops and food and subsistence crops, which are the primary concern of women farmers and the key to food security and their empowerment through increasing their income level.

Access to research and appropriate technology

Women have little access to the benefits of research and innovation, especially in the domain of food crops,

which - in spite of ensuring food security at the household and community level - have a low priority in crop improvement research before membership as the respond tens indicates. In addition, women farmers' roles and needs are often ignored when devising technology which may cause labour displacement or increased workload. In eastern zone, during the pre-membership period, women's access to research and technology was about 7.84 percent, but after membership this increased to 35.29 percent. Though the agricultural cooperatives work in this regard but still it needs strong effort to enable women to have access to research and technology.

Research and technology enable our women to have opportunity to increase their income and productivity and help them to ease their burden of work load.

Table 12: women respondents' access to research and technology

SI.No	Responses	Before membership		After membership	
		Number	Percentage	Number	Percentage
1	Yes	4	7.84	18	35.29
2	No	47	92.16	33	64.71
Total		51	100.00	51	100.00

Source: Primary data collected through field survey

Regression Analysis

Regression analysis (table 13) was used to identify the relative importance of various factors which influence the income of the respondents after joining in agricultural cooperatives in the study area. As there are several factors which contribute to the post-membership period of income, the respondents in varying measures, linear regression is considered to be the most appropriate statistical tool to assess the influence of independent variables on dependent variable.

In the linear regression model used in this study, post-membership income of the respondents is taken to be the dependent variable and quantifiable variables like education in number of years, age in years, number of family members of the respondents, martial status, land size, gender, membership period are taken to be the independent variables. The joint effect of a group of the independent variables on the post-membership income of the respondents is studied by framing the multiple regression equation of the variable **"Y"** on the other independent variables. The following model with six independent variables is used.

Justification for Selection of Variables

The seven variables selected as independent variables are generally bound to influence the income of the respondents. The justification for selecting these variables in this analysis is presented herein below.

Age(x1)

Age is an important factor in business promotion, as the young aged are more dynamic and take more risk; where as the middle aged are having a maturity to deal with difficult situations in the business.

Family size (x2)

Number of children in the family is also to be taken in to consideration, as some of the jobs are performed by children in petty business, most of which are home based. Thus the children can also be participating in income generating activities.

Land size(x3)

Land size which is directly proportion to income, has a significant and positive impact on income performance. This is because those respondents with larger cultivated land earn more income be it from crop production or livestock rising.

Education(x4)

It is assumed that education will help members to identify the economic opportunities better and they would deal with the changes in the business environment in a better way.

Membership period (x5)

Seniority at the agricultural cooperatives enables members to have more access to the services of the cooperatives as a result the income of the member will be improved. Hence, this is an important variable, which have a bearing on the income of the respondents.

Agricultural inputs (x6)

Agricultural inputs have large influence on increase productivity which has direct relation on increase income. Hence this is an important variable, which have a bearing on the income of the respondents. **Where**

Y= Post-membership income of the respondent
a= Intercept (Constant)
b1 to b9= Regression coefficient
x1= Age (in years)
x2= Family size
x3= Land size (in hectare)
x4= Education

x5= membership period
x6 = Agricultural inputs

The values arrived using the Statistical Package for Social Sciences (SPSS, version 12.0) are presented in the table 4.28. It shows regression coefficient of the independent variable estimated through regression analysis along with their **"t"** values and co-efficient of multiple determination **(R2).**

Table 13: Regression Model

Variable	**Regression coefficient**	**Std. error**	**"t" Statistic**	**Sig**
(Constant)	-2744.984	753.258	-3.644	.000
Age	39.751*	14.862	2.675	.009
Family size	318.465**	65.117	4.891	.000
Land size	1994.813***	199.957	9.976	.000
Education	222.677**	41.870	5.318	.000
Membership period	418.472**	144.120	2.904	.005
Agricultural inputs	53.268*	3.165	16.829	.000
Notes: * Significant at 0.1 level **Significant at 0.05 level ***Significant at 0.01 level **R2**. = 0 .669 **F** value = 28.920 **df** = 7 **P** valve = 0.000				

Source: Result of primary data analysis:

Discussion on the Significant Explanatory Variables

Out of the six variables hypothesized to influence the economic change by agricultural cooperatives, all of them (Age, Family size, Land size, Education, Agricultural inputs and Membership period) were found to be statistically significant.

The table 4.28 shows that the co-efficient of determination **(R2)** is 0.669.

It denotes that 66.9 percent of the total variation of the dependent variable **"Y"** (post-membership income of the respondents) is explained by the independent variables included in the regression analysis.

The **F** ratio is also found significant. From the value of **"t"** statistic corresponding to the regression coefficient, it is found that the six variables x1 (Age), x2 (Family size), x3(Land size), x4 (Education), x5 (membership period), and x6 (Agricultural inputs) are found to be statistically significant, indicating the importance of these six variables which influence an increase in the post-membership income of the respondents.

The independent variables such as Land size, Membership Period, Family size and education have significant positive relationship with the post-membership income, while the variables Agricultural inputs and age have lower significant positive relationship than the above variables with the post-membership income.

From table 4.28, it can be observed that one unit of increase in hectare of land *cetaris paribus* would increase the post-membership income by Birr 1994.81.

This implies that when the members have large land size ownership, this enables to absorb large amount of production level since in order to obtain high income is the major determinant factor.

One year of increased in education *cetaris paribus* would increase the post-income income by Birr 222.70. Level of education is found be a significant variable in increasing post- membership income, this is because as members become more educated their tendency to accept new technology and accept and implement the trainings and ideas given by extension experts to increase productivity.

As one person increased in the family size, *cetaris paribus* would increase the post-membership income by Birr 318.47. This is because of even the children under age might be participate in the income generating activities and the number of labour is increased in the family. Similarly as the year of membership increase by one year, *cetaris paribus* would increase the post-membership income by Birr 418.47. The members may become benefited and more experienced in using the services of the agricultural cooperatives.

When respondents' application of Agricultural inputs, and their age is increased *cetaris paribus* will bring up the post-membership income by Birr 53.268 and 39.751 respectively.

Interpretation to the Significant Variables

Land size

The model estimates confirm that land size which is a proxy for post-income, has a significant and positive impact on the economic change in the study area. The coefficient is statistically significant at 1 percent level. This is because those respondents who have large size of land will have more level of production, which has directly related to high income of members of the agricultural cooperatives.

Membership period

The results of the regression model show that this variable influenced the economic change (post income) positively. This variable is statistically significant at 5 percent level. The coefficient, which indicates to us that for each year of the membership period, a house hold's predicted income will increase by Birr 418.47

Thus, the more senior in membership the more the member become benefited.

the higher the number of years associated with agricultural cooperatives, higher will be exposure through more

training and respondents who have these experiences and more knowledge to wards agricultural production and marketing and efficient utilization of the services of the cooperatives in production.

Family size

As indicated in the table 4.19 that the post-membership income **"Y"** is positively related to the number of individuals who are family member of the house hold. The coefficient, which indicates to us that for each person of the family, a house hold's predicted income will increase by Birr 318.47.

The coefficient is statistically significant at 5 percent level. It implies that the larger the family size showed higher improvement in post membership income than the small family size members.

Education

Results of the regression model tell that this variable had a significant positive influence on the economic change in respondents. The coefficient is statistically significant at 5 percent significance level. This might be because of the economic activities performed by the respondents such as modern farming system, following of the instructions of extension workers and immediate reaction to new ideas in the study area may require good educational status.

Knowledge and awareness of members of Agricultural cooperatives

Member's awareness and their good knowledge is a key factor to success of cooperatives. Members can actively participate in the over all activities of the cooperatives and stand to their cooperatives, only if they are aware and be informed of what cooperatives means and their mission in the socio-economic development. Otherwise, the result will be the reverse.

Awareness level of Members

Table 14: Awareness level of respondents:

SI.No	Attributes		Frequency	Percentage
1	Are you aware of the cooperative functions?	Yes	93	86.11
		No	15	13.89
		Total	108	100.00
2	Do you think that cooperatives promote gender equality?	Yes	97	89.81
		No	11	10.19
		Total	108	100.00
3	Do you think that cooperatives promote equity?	Yes	99	91.67
		No	9	8.33
		Total	108	100.00
4	Do you think that cooperatives reduce price fluctuation?	Yes	99	91.67
		No	9	8.33
		Total	108	100.00
5	Do you know that election is conducted in cooperatives based on " one vote, one member"?	Yes	78	72.22
		No	30	27.78
		Total	108	100.00
6	Do you think that active participation in cooperatives is important to you?	Yes	104	96.30
		No	4	3.70
		Total	108	100.00
7	Are you aware of the principles of cooperatives?	Yes	65	60.19
		No	43	39.81
		Total	108	100.00
8	Do you think that women's involvement in management and decision making is very important?	Yes	100	92.59
		No	8	7.41
		Total	108	100.00
9	Do you think that cooperatives should participate in social activities?	Yes	104	96.30
		No	4	3.70
		Total	108	100.00
10	Are you interested to participate in solving the problems of cooperatives?	Yes	81	75.00
		No	27	25.00
		Total	108	100.00

Source: Primary data collected through field survey

As table 14 above, indicates that the awareness of individual members towards the knowledge of cooperatives function, gender equality through cooperatives, equity, reduce price fluctuation, importance of active participation of members and about others, they are very aware. It is needless to say awareness of members play a significant role in success of cooperatives to achieve their objectives. However, in the area of election and knowledge of cooperative principles members are not much aware as they are aware the other areas. Hence the agricultural cooperatives should play its important effort in informing and aware its members regarding election

and principle of cooperatives.

Conclusion

The regression analysis was used to identify the relative importance of various factors which influence the income of the respondents after joining in agricultural cooperatives in the study area. As a result out of the nine variables hypothesized to influence the economic change by agricultural cooperatives, all the independent variables (education in number of years, age in years, and number of family members of the respondents, martial status, land size, gender, and membership period) were found to be statistically significant.

Therefore, one must look beyond the listed independent variables in order to find out factors influencing economic changes for the increases in post-membership income of the respondents, who have taken up economic activities.

All in all, multipurpose cooperative societies do play indispensable roles in providing fundamental benefits to the local communities in promoting food security. The study result indicates that the respondents anxious on not having enough food, eat a smaller meal than they felt they needed, limit the variety of foods they ate, eat food that they preferred not to eat, not able to eat the kinds of foods they preferred because of a lack of resources has reduced after they join in the agricultural cooperatives.

Thus, agricultural cooperatives have brought a meaningful change in the level of food access to house hold consumption.

Agricultural (Multipurpose) cooperative societies do provide a number of economic and social benefits to the local communities. Significant roles have been played by the these cooperatives either in improving the income (through patronage dividend) or access to services for the members and as a result they could be considered as the potential for improving agricultural production in particular and food security in general.

In the agricultural cooperatives, women's play a significant role in making decision (50 percent) and monitoring and evaluation (40 percent) of the decision made. Around 88.24 percent of women attend all the meetings held by the cooperatives. This ensures that women can express their ideas about the cooperatives and needs they want to get.

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