

Factors Influencing Participation of the Local Community in Natural Resource Conservation: a Comparative Study of Chiro and Fiche, Ethiopia

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Abstract

Most of the Ethiopia's poor people live in rural areas and make their living largely through the land on which they live. Their enterprises and households collectively account for much of the land, water and labor engaged in agricultural production. The rural poor contribute greatly to the economic growth of their country. They play a critical role in managing and conserving the natural resources. At the same time, they are often constrained to farm degraded land that is increasingly unable to meet their needs, or mismanage productive land because of lack of appropriate tools or knowledge. Thus the cycle of poverty /environmental degradation/remain unbroken. Conservation of natural resources is now usually embraced in the broader conception of conserving the earth itself by protecting its capacity for self-renewal. However, natural resource degradation is one of the most serious environmental problems in Ethiopia. The main problem to be addressed in this article was factors influencing active participation of the local communities (farmers) in watershed development and other natural resource conservation efforts which are in progress. Data were collected using survey instrument from 304 head of households sample population in Fiche and Chiro areas within Ethiopia. Binomial logistic regression model was utilized to identify factors that determine active participation of the local communities within the above mentioned locations. Comparison of the two study areas investigated that active participation of the local communities in natural resource conservation depends on a host of factors such as leaders' knowledge and commitment of the leader for resource conservation; availability and accessibility of forage yields and equitable benefit sharing; participation of the local communities in decision-making processes related to benefit sharing; lack of support from the government. Among the total sample population, the model correctly predicted 88.8% and 71.7% of the observations in Chiro and Fiche respectively.

Keywords: watershed development, community participation, natural resource conservation

1. Introduction

Located in the horn of Africa, Ethiopian is one of the largest countries both in terms of land area (1.1 million km²) and population (greater than 80 million). The country's 85% of the labor force; 90% of export revenue and 50% of GDP depend on agriculture. Across Sub-Saharan Africa, natural resources remain central to rural people's livelihoods. However, low productivity characterizes Ethiopian agriculture. The poor conservation outcomes that followed decades of disturbing natural resource management strategies and planned development have forced policy makers and scholars to reconsider the role of local communities in resource use and conservation (Agrawal, 1999). Current writing champions the role of local communities in bringing about decentralization, meaningful participation, cultural autonomy, and conservation (Etzioni, 1996). Participating farmers and local people who live around the natural resources is critical for conservation (Badege, 2009). As quoted in the following paragraph, there are planner-centered and people-centered approaches to local community participation (Michener, 1998).

In the planner centered, participation is seen as facilitating local people's acceptance of new technologies promoted by outsiders; indigenous knowledge and local labor can be exploited and in-kind contributions to program. In the people centered, it is the process which empowers poor people by enhancing local management capacity, increasing confidence in indigenous potential and raising collective consciousness, as well as meeting local needs and priorities.

Other scholars also developed different typologies of participation: continuum between nominal and transformative participation (White's, 1996); and continuum between passive and active participation (IIED's, 1994). Several scholars recognize that real, people centered, active participation leads to development which is truly empowering, whilst planner centered participation tends to be nominal with local people acting as the passive recipients of development (TWYMAN, 2000). The assumption is that local populations have greater interest in the sustainable use of natural resources around them than distant government (Tsing et al., 1999).

They are recognized with having vested interest to their environment and are thus seen as more able to effectively manage natural resources through local or 'traditional' practices (Leach et al., 1999 and Tsing et al., 1999). Similar goals of environmental conservation were also proposed by international agreements such as the UN Convention to Combat Desertification and Convention on Biodiversity and National Governments North and South as evidenced by the number of countries signed up to the sustainable development goals of Agenda 21 (UN, 1995; Forsyth and Leach, 1998).

Scholars also found out that effective natural resource conservations must be linked with issues of equitable access to natural resources and the promotion of sustainability through participatory and empowering processes of development (Forsyth and Leach, 1998). This study is based on people centered participatory frameworks developed by Michener's (1998). From the environmental policy of Ethiopia, it seems that conservation and decisions on the conservation of natural resources are transferred to local communities as well as to private actors with the aim of bringing its sustainable conservation. Regarding to the environment and participation of local communities in the conservation and preservation of their environment, the environmental policy of Ethiopia has the following objectives (FDRE, 1998).

- a. *To ensure that all phases of environmental and resource development and management, from project conception to planning and implementation to monitoring and evaluation are undertaken based on the decisions of the resource users and managers;*
- b. *To reorient management professionals employed in natural resource and environmental extension programs to embrace participatory development, and to strengthen their communication skills so as to more effectively disseminate both the results of scientific research and the practical experience of local farmers;*
- c. *To develop effective methods of popular participation in the planning and implementation of environmental and resource use and management projects and programs;*
- d. *To develop the necessary legislation, training and financial support to empower local communities so that they may acquire the ability to prevent the manipulated imposition of external decisions in the name of participation, and to ensure genuine grassroots decisions in resources and environmental management;*
- e. *To authorize all levels of organization to raise funds locally from the use of natural resources to fund the development, management and sustainable use of those resources;*

The policy objectives clearly indicated that there is a need to participate and empower local community in the conservation of natural resources. It is a policy that follows people centered frameworks of participation proposed by Michener (1998). It assures that the government shall provide the necessary technical, material and financial supports to empower and participate local communities in resources and environmental management. The empirical studies conducted in Ethiopia at different time since 2000 have clearly shown that natural resources conservation approaches were not based on genuine community participation.

Studies conducted by Daniel (2002) and Abera (2003) have found out that local communities' knowledge, experience and attitudes are not considered in planning, design and implementation of natural resource conservation measures. This may be one of the reasons for the limited success in the conservation practices of Ethiopia. Other similar studies by Tadesse and Belay (2004) and Tola and Woldeamlak (2007) have also disclosed that in the adoption of resource conservation, farmer's perception and their socio-economic factors/differences have not taken into consideration. Study conducted by Tilahun (2003) also found that there are problems of conserving the natural resources indicating that comprehensive approach that combines local and scientific knowledge through community participation, capacity building of the local actors through farmers' participatory research is important. Even the recent study (Tsehaye and Mohammed, 2013) investigated that while planning, designing and implementing natural resources conservation measures, analysis of farmers' attitude is important. Gobeze, et al., (2009) and Mekbebe, et al. (2007) have focused on the need to build the capacities of the local community and its institutions. The researchers assert that the state should show its commitment to supporting the efforts of communities and their institutions to responsibly manage these resources by creating enabling environments and ensuring technical and legal support to these institutions in their efforts to become strong and accountable to communities.

Furthermore, the existing empirical evidences are not holistic in a sense that they were focused on specific natural resource conservation measures. Some of these studies focus only on soil conservation whereas, some focused on water conservation. Study on determinants of active participation of the local communities on watershed development does not exist. Therefore, this study was conducted in view of bridging this gap. Hence, the purpose of this study was to assess major factors influencing active participation of the local communities in watershed development works in Chiro and Fiche, Ethiopia. Section II of this study deals with the research design and methods of data collection and analysis. Section III discusses the findings of the study. The final section summarizes the findings and discusses their policy implication.

2. Research Design and analytical method

2.1. Description of the study areas

One of the study areas, Chiro and more specifically Lencha Edessa Village, is found in West Hararghe. The Hararghe area is situated in the eastern part of Ethiopia, 200 to 450 KMS east of the capital city Addis Ababa, some 300 KMS south of Djibouti and 250 KMS west of Hargeisa towns. The agro-climatic range includes lowland (30-40%), midland (35-45%) and highland areas (15-20%), with lowest elevations at around 1,000 m above sea levels, culminating at 3,405 m, at the top of Gara Muleta Mountain. There are two rainy seasons, the small *belg* and the main *meher*. *Belg* production is limited within the highland zone and part of the wetter midland, but *belg* rains are widely used for land preparation and seeding of long cycle *meher* crops (sorghum & maize). Annual rainfall averages range from below 700 mm for the lower *kola/hot* to nearly 1,200 mm for the higher elevations of midland & highland zones. The variability of rainfall from year to year and its often uneven distribution during the growing seasons give place to a wide range of climatic hazards which farmers have to deal with. The main staple food includes sorghum and maize, as well as sweet potato, which is extensively cultivated during bad years to improve food security. Other food crops include barley, wheat, *teff* and pulses. Cash crops like *chat* (a popular, mild narcotic) and coffee have a long standing tradition, complemented by Irish potatoes, onions/shallots and some other vegetables. They are mainly cultivated in the midland zone, with some extension into the lower highland. Another study area, Fiche and more specifically Girar Jarso Village, is found in North Showa. The North Showa area is situated in the central part of Ethiopia, 150 KMS north of the capital city Addis Ababa. The agro-climatic range includes lowland (10-20%), midland (50-65%) and highland areas (10-15%), with lowest elevations at around 1200 m above sea levels, culminating at 2,455 m highest. There are two rainy seasons, the small *belg* and the main *meher*. *Belg* production is limited within the midland zone and part of the wetter midland, but *belg* rains are widely used for land preparation. Annual rainfall averages range from below 900 mm for the lower *kola/hot* to nearly 1,400 mm for the higher elevations of midland & highland zones. The data for this study were collected from local communities who were involved in watershed developments since 2006. As part of its strategy to popularize the intervention, community based participatory watershed development works were initially started in Chiro area via food for work scheme. Food for work scheme is the strategy whereby the local communities participate in the conservation works while the government gave them some amount of food stuff such as wheat and oil.

2.2 Sampling design

Currently, there are large number of community based watershed developments that are being carried out by the local communities in Oromia Regional State of Ethiopia (the researcher could not get the exact number of the watershed developments). But, according to Agriculture Bureau of Oromia, some of the watershed developments were successful in their implementation as compared to the other. Among the successful watershed developments are those which are found in West Hararghe, Chiro area, more specifically in Lencha Edessa Village. In this Village, there are two successful community based watershed developments, namely, "Gaara Arguba" and "Gaara Dubayya". Among the unsuccessful watershed developments are those which are found in North Showa, Fiche area, more specifically in Girar Jarso Village. In this village, there are also two unsuccessful community based watershed developments, namely, gaara qarchacha and gaara usmani. Hence, four watershed developments (two successful and two unsuccessful) were chosen partly on the base of judgment and partly on the base of convenience. Chiro area watershed developments were judgmentally sampled because of its good successful history in the conservation works whereas Fiche area watershed developments were judgmentally and conveniently selected because of their poor successful history in the conservation works. It is important and mandatory that the sample size be representative of the target population so that meaningful analysis and conclusion can be made. Accordingly, 304 household heads/farmers (152 from each study area) were randomly selected. The following Table 1 describes sample size distribution of the respondents.

Table 1. Sample Size Determination

Study area	Total household heads in each Village	Sample size (24%)
Fiche	632	152
Chiro	612	152
Total	1244	304

2.3. Method of data collection

Field survey was conducted from January to February 2014. The questionnaire was pre-tested by administering it to selected respondents. On the basis of results obtained from the pretest, necessary modifications were made on the questionnaire. Besides, some discussions were made with key informants including active community members and development workers. These informal techniques helped to acquire useful and detailed information, which would have been difficult to collect through the questionnaire survey.

2.4 Analytical approach

Complex set of factors that are related to socioeconomic, demographic and institutional influence farmers' decision

to participate or not in the conservation of environmental resources. Modeling farmers' response to actively participate in natural resource conservation activities, therefore, becomes important both theoretically and empirically. Analysis of the relationship between active participation of the local communities and its determinants involves a set of qualitative data. The response (dependent) variable is dichotomous data taking on two values, 1 if the event occurs and 0 if it does not. Estimation of this type of relationship requires the use of binomial logistic regression model. In the case of qualitative response models, probit and logit models are preferred than the other models. Probit and logit models give similar parameter estimates (Aldrich and Nelson, 1990). However, as Gujarati (1988) explained logistic and cumulative normal functions are very close in the mid-range, but the logistic function has slightly heavier tails than cumulative normal function; that is, the normal curve and approaches the axes more quickly than the logistic curve. Because of the fact that the binomial model is easier to estimate and simpler to interpret, it was used in this study.

2.5. Variable Specification

The variables that were used in the binomial logistic model of this study are presented as follows. The dichotomous dependent variable for local community participation model indicates whether or not local communities actively participate in the natural resource conservation activities. $ParticiD=1$, for participants who actively participated and $ParticiD=0$ for participants who passively participate. The independent variables were those which are hypothesized to have association with active participation of the local communities in natural resource conservation. The existing theoretical explanation and the author's knowledge of the study area were used to select 20 explanatory variables. Factor analysis was used to categorize the variables into a few factors (components). The potential explanatory variables included transparency of management in the conservation (SIVQ9), leaders' commitment to conserve the resource (SIVQ16), knowledge and skill obtained from the conservation program (SIVQ12), adequacy of consultations obtained from experts (SIVQ10), consumption of farmers' personal time by the conservation program (SIVQ13), expectation of benefits from watershed developments (SIVQ17), leaders' consideration of members' idea (SIVQ19), lack of support from the government (SIVQ20), the right to participate in the decision-making processes regarding benefit sharing (SIVQ1.1), right to participate in the decision-making processes regarding resource management (SIVQ1.3), communities' right to use resources in the watershed development areas (SIVQ11), clearly defined objectives regarding natural resource conservation (SVQ5), availability of local resource for natural resource conservation (SVQ6), leader's knowledge and skill required to mobilize local resources (SVQ9) and communities' satisfaction with watershed development activities (SIVQ5). As the following explanatory variables have binary categories (yes/no), they were not included in the factor analysis. These included shortage of forage due to area closure for watershed development (SIIQ7_NEW), use of forage yields and other benefits from watershed development areas (SIIQ10_NEW), problem in sharing the benefits (SIIQ8_NEW), satisfaction with local communities' plan for resource conservation (SIVQ8_NEW), and communities' satisfaction with leaders' fulfillment of their resource conservation needs (SIVQ3_NEW).

Results and Discussion

In this section demographic characteristics and the results of analytical findings are presented and discussed.

Table 2. Demographic Characteristics of the Respondents

		Chiro		Fiche	
		N	%	N	%
Gender	Male	105	69.1	124	81.6
	Female	47	30.9	28	18.4
Educational Level	Illiterate	34	22.4	76	50.0
	Primary education	86	56.6	71	46.7
	Secondary education & above	32	21.0	5	3.3
Family Size	0-3	39	25.7	31	20.4
	4-7	79	52.0	98	64.5
	8-10	29	19.1	17	11.2
	>10	5	3.3	6	3.9
Participant's Role	Leader	20	13.2	15	9.9
	Secretary & Cashier	19	12.5	7	4.6
	Member	113	74.3	130	85.5

Source: field survey, 2014

As indicated on Table 3, 229 or (75.3%) of the participants were males while 75 or (24.7%) were females. In terms of gender distribution, majority of the participants in both sites were males (69.1% in Chiro and 81.6% in Fiche). The proportion of female participants in Chiro (30.9%) was a bit greater than Fiche female participants

(18.4%). Regarding to educational level of the participants, there was variation in the two sites. This was evident that only 22.4% of Chiro's participants were illiterate while 50% of Fiche's participants were illiterates. The table also indicated that 56.6% of Chiro participants and 46.7% of Fiche participants completed primary education while 21% of Chiro and 3.3% of Fiche participants completed secondary education.

Regarding to family size of the participants, there was a little variation in the two sites. This was obvious that 25.7% and 52% of Chiro's participants and 20.4% and 64.5% of Fiche's participants have dependents ranging from 0-3 and 4-7 respectively. Similarly 19.1% and 3.3% of Chiro's participants and 11.2% and 3.9% of Fiche's participants have dependents ranging from 8-10 and >10 respectively. As indicated, the participant's role in the community based natural resource conservations (CBNRCs) was analyzed. According to the result, 13.2% and 12.5% of the participants in Chiro and 9.9% and 4.6% of the participants in Fiche were leaders and secretaries & cashiers respectively. Similarly, 74.3% and 85.5% of the participants in Chiro were members respectively.

Major factors determining participation of the local communities in NRCs

Goodness-of-fit test was analyzed to see the adequacy of factor analyses. Accordingly, the Kaiser-Mayer-Olkin (KMO) results which measure the sampling adequacy were 79.2% and 76.9% for Chiro and Fiche respectively. The percentages were higher than the minimum requirement (50%) for satisfactory factor analysis. Bartlett's test of sphericity was also very small indicating that there was strong relationship between the variables (Chi-Square: 815.334; P-value: 0.000 and df: 105) for Chiro and (Chi-Square: 873.260, p-value: 0.000 and df: 105) for Fiche. Rotated factor matrixes that indicate to which factor (component) the variables were substantially loaded were presented on Table 3 and 4. In case of Fiche, the total variance explained indicated that the first, second, third, fourth and fifth factors accounted for 29.2%, 17%, 9.8%, 8.1% and 6.9% respectively whereas the total variance explained indicated 33.2%, 12%, 8% and 7.2% for the first, second, third and fourth factor respectively for Chiro.

Table 3. Rotated Factor Matrix Results

Components (Chiro)				
Leaders' knowledge and commitment; benefits obtained and its distribution; communities' involvement in major decision-making areas (Factor1)	Conservation objectives; Local resource and satisfaction with watershed developments (Factor 2)	Consumption of farmer's personal time by the conservation programs and lack of support from the government (Factor3)	Benefit expectation and consideration of members' idea (Factor4)	
SIVQ1.1, SIVQ9, SIVQ12, SIVQ16, SVQ9	SIVQ1.3, SIVQ10, SIVQ11,	SIVQ5, SVQ5, SVQ6	SIVQ13, SIVQ20	SIVQ17, SIVQ19

Source: own, 2014

Table 4. Rotated Factor Matrix Results

Components (Fiche)				
Conservation objective, Leaders' government support and consideration leaders' knowledge (Factor1)	Leaders' idea and communities' satisfaction with WD (Factor 2)	Benefits and knowledge obtained adequacy consultation given (Factor3)	and Transparency management and availability of resources (Factor4)	of Expectation of benefits and local consumption of personal time (Factor 5)
SIVQ1.1, SIVQ16, SVQ5, SVQ9	SIVQ20, SIVQ5, SIVQ19,	SIVQ10, SIVQ11	SIVQ12, SIVQ1.3, SIVQ9, SVQ6,	SIVQ13, SIVQ17,

Source: own, 2014

As mention above, the maximum likelihood method of estimation was used to obtain the parameter estimates of binomial logistic regression model and statistically significant variables were identified in order to measure their relative importance on participation of the local communities. The regression required 6 iterations to generate the parameter estimates. The value of Pearson Chi-Square indicated the goodness-of-fit test for the fitted model. The Chi-Square value for Omnibus Tests of Model coefficients was 114.055 with 5 degree of freedom and p-value of 0.000 indicating the hypothesis that all the coefficients except the intercept are equal to zero is rejected.

Another measure of goodness of fit was based on a scheme that classifies the predicted value of the dependent variable, ParticiD, as 1 if $P(i) \geq 0.5$ and 0 otherwise. The model correctly predicted 88.8% and 71.7% of the observations in Chiro and Fiche respectively.

The maximum likelihood estimates for the binomial logit model for Chiro is presented on Table 5.

Table 5: The maximum likelihood estimates for the binomial logit model (Chiro)

Variable name	Estimated coefficient	Wald statistic	Sig.	Odds Ratios	95% C.I. for EXP(B)	
					Lower	Upper
SIIQ8_NEW	-.344	.472	.492	.709	.266	1.891
SIIQ10_NEW	.496	.914	.339	1.643	.594	4.546
SIVQ8_NEW	1.149	4.998	.025**	3.156	1.152	8.646
SIVQ3_NEW	1.185	4.872	.027**	3.270	1.142	9.364
SIIQ7_NEW	1.185	2.667	.102	3.270	.789	13.559
FACT1CH_CODED	2.043	13.767	.000***	7.713	2.621	22.691
FACT2CH_CODED	.576	1.594	.207	1.778	.728	4.346
FACT3CH_CODED	.837	2.479	.115	2.310	.815	6.550
FACT4CH_CODED	1.061	4.859	.028**	2.890	1.125	7.428

***: significant at less than 1% probability level

**: significant at less than 5% probability level

Source: Model output

As indicated on Table 5, in the case of Chiro, out of the five categorical variables hypothesized to influence active participation of the local community, only two variables (SIVQ8_NEW and SIVQ3_NEW) were found to be significant at five percent of probability level. The first variable, SIVQ8, is satisfaction of the participants with local community plan for natural resource conservation. It affected participation of the local communities positively and significantly. This means, the more the participants are satisfied with resource conservation plan, the more they likely they participate in the conservation of environmental resources. The high satisfaction of the participants with the conservation plan in Chiro might be because of the fact that the plan reflects resource conservation needs and goals of the local communities. This could also indicate the high involvement of the local communities in the preparation of watershed development design/plan. The second significant variable, SIVQ3_NEW, is related to leaders' fulfillment of resource conservation needs of the local communities. As expected, this has positively and significantly affected participation of the local communities in the resource conservation. The idea is that the more the leaders strive to fulfill resource conservation needs of the communities the more likely those local communities would like to participate in the resource conservation. The possible reasons for greater leaders' effort in Chiro were that they have better knowledge and skill in mobilizing local resources and better community bylaw that demand the efforts of the constituents. As depicted on Table xxx, factor one (FACT1CH_CODED) and factor four (FACT4CH_CODED) also indicated the positively and significantly affected participation of the local communities. Factor one is related to components such as transparency of the natural resource conservation and managements; commitment of the leader's in the resource conservation; adequacy of consultation/advice obtained from the experts; communities' participation in decision making related to benefit sharing and resource management; communities' right to use resources from the watershed areas; leaders knowledge and skill to mobilize local resources and knowledge and skill obtained from the program by the local communities. Factortwo is related to expectation of benefits from the watershed developments and leader's considerations of communities' idea have also positively and significantly affected participation of the local communities.

The maximum likelihood estimates for the binomial logit model for Chiro was presented on Table 6.

Table 6: The maximum likelihood estimates for the binomial logit model (Fiche)

Variable name	Estimated coefficient	Wald statistic	Sig.	Odds Ratios	95% C.I. for EXP(B)	Lower	Upper
SIIQ8_NEW	-2.826	14.917	.000***	.059	.014	.249	
SIVQ8_NEW	-1.292	6.504	.011**	.275	.102	.741	
SIVQ3_NEW	-1.241	6.744	.009***	.289	.113	.738	
SIIQ7_NEW	.147	.013	.909	1.158	.095	14.126	
FACT1FI_CODED	-1.317	6.203	.013**	.268	.095	.755	
FACT2FI_CODED	-.441	.725	.395	.644	.233	1.775	
FACT3FI_CODED	-.832	2.899	.089	.435	.167	1.134	
FACT4FI_CODED	-.763	3.581	.050**	.466	.211	1.028	
FACT5FI_CODED	-1.127	4.616	.032**	.324	.116	.906	

***: means significant at less than 1% probability level

**: means significant at less than 5% probability level

Source: Model output

As indicated on Table 6, in Fiche, out of the four categorical variables hypothesized, three variables were found to be statistically significant at one percent of probability level. The first variable, SIIQ8_NEW, is related to problems in sharing the benefits. It has negatively and significantly affected participation of the communities in natural resource conservation. The second variable (SIVQ8_NEW) is concerned with satisfaction of the participants with local community plan for natural resource conservation. This variable has affected participation of the communities in natural resource conservation negatively and significantly. The third variable, SIVQ3_NEW, was related to leaders' fulfillment of resource conservation needs of the local communities. In Fiche, this variable has negatively and significantly affected participation of the local communities in the resource conservation. There were also other multiple factors that have negatively and extremely significantly affected active participation of the local communities in natural resource conservation. These included transparency of management in the conservation; leaders' commitment to conserve the resource; consumption of farmers' personal time by the conservation program; expectation of benefits from watershed developments; lack of support from the government; the right to participate in the decision-making processes regarding benefit sharing; right to participate in the decision-making processes regarding resource management; clearly defined objectives regarding natural resource conservation; availability of local resource for natural resource conservation; leader's knowledge and skill required to mobilize local resources.

Conclusion

This study attempted to investigate major factors influencing participation of the local community in watershed developments. It was a comparative study between successful and unsuccessful community based watershed development activities. The comparison has investigated important factors determining participation of the local communities. Unlike Chiro area participants, Fiche area participants were not satisfied with community plan for natural resource conservation. Leaders did not satisfy communities' resource conservation needs as they were not committed for the conservation of environmental resources. This might be because leaders in Fiche area did not have the requisite knowledge and skill to mobilize local resources. Although not significant, problem of sharing the benefits has negatively affected participation of the local communities in Chiro; the variable has negatively and significantly affected community participation in Fiche. Leaders in Fiche were not transparent as compared to Chiro. In Fiche area, unlike in Chiro area, local communities' expectation of benefits from watershed developments activities has negatively and significantly affected participation of the local communities. There was lack of support from the government and this has affected participation of the community negatively and significantly. There were also other possible causes for the variations between the two study areas. Local communities in Fiche area did not have defined objectives regarding resource conservation and this has adversely affected participation of the communities. Lack of communities' right to involve in decision-making processes related to benefit sharing and local resource management in Fiche were also other possible factors which have significantly and negatively affected participation of the local communities in natural resource conservation. Furthermore, analytical result indicated that limited local resource for natural resource conservation negatively and significantly affected participation of the local communities.

One implication of the results presented in this study is that genuinely building capacities of the local communities and their leaders play paramount importance in shaping and changing attitudes of the local

communities and thereby bring the development at the local level. The results also imply that community based conservation programs need to take into account direct and visible benefits to the local communities otherwise participation comes slowly. Another implication of the findings of this study is the need to increase farmer's participation in the identification of needs for resource conservation. This is because the sustainability of watershed management development depends on the level of participation, which requires effective planning and implementation. Participation builds ownership of the people over the resources being managed in the program. The results of this study also pinpoint the need to conduct research on indigenous approaches to local community participation in the conservation of natural resources, which was significantly successful in some areas.

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