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People's Participation in Development: The Actors and Factors Shaping People's Participation in Environmental Conservation Initiatives in Eferatena Gidem District, Ethiopia

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Abstract
As of the mid-1990s, the notion of Public participation in development has been gaining momentum as an essential ingredient of development interventions in Ethiopia, following the failure of past development model to bring in the desired results. Despite the recognition and policy reform that encourages participation, achieving sustained and active community participation in practice remains a challenge in the country. This study is, therefore, an attempt to examine the nature and determinants of smallholder farmers' participation in government-led community-based environmental conservation initiatives (PECI) in Eferatena Gidem district, Ethiopia. The data for the research project was collected using a structured questionnaire survey by interviewing 261 randomly selected smallholder farmers. The data collected using the survey method was coded and analysed using both descriptive and inferential data analysis techniques, including a participation index, t-test, Chi-square test, and Binary Logistic Regression Model using SPSS. Results of the study revealed that the majority of the respondents had a good level of awareness about environmental problems in their vicinity. However, a statistically significant difference was observed among respondents concerning their perception and attitudes towards government-led PECI. The findings also indicated that despite the process offered some degree of power to the local people following policy reform and institutional restructuring, the participation of farmers, particularly in the decision-making process, were found to be still limited. This is confirmed by the results of the participation index analysis, which revealed that the vast majority of the respondents had a low-to-moderate level of participation. In addition, the study also revealed that farmers' participation in PECI was dominantly guided by extension workers and government officials indicating that the decision-making process is still manipulated by traditional power holders. Furthermore, the results of the Binary Logistic Regression Model revealed that out of the eleven demographic, socio-economic and institutional explanatory variables hypothesized to influence farmers' level of participation, the age of the household head, farmers' attitude towards PECI, tailor-made training, extension contact frequency and membership of farmers in peasant associations were found to be significant factors that positively influenced farmers' decision behaviour. Whereas, farmers' active involvement in off-farm employment was found to be a negative and significant determinant of farmers' decision to participate. In general, this study provides an insight into the nature and determinants of farmers' decision behaviour to participate in PECI, which needs to be considered in any attempt aimed at increasing their level of participation.
Keywords: participation, environmental conservation initiatives, smallholder farmers

1. Introduction

Over the past three decades, the effects of rapid population growth, climate change, and land degradation are increasingly converging in unprecedented ways. According to the ELD Initiative & UNEP (2015), land degradation is the most pressing and widespread global environmental concern affecting a quarter of the earth's land surface and reinforcing other environmental problems. A recent global assessment report revealed that land degradation is costing the world approximately 300 billion dollars a year. It also found that about 3 billion people reside in degraded lands (Nkonya *et al.,* 2016). The problem is worse in developing countries, particularly in sub-Saharan Africa countries, as their economies are heavily dependent on the natural resource base to which Ethiopia is no exception.

Governments in developing countries have long been trying, in collaboration with international development agencies, to address the problem through natural resource management (NRM) initiatives. However, results of many of the interventions were not satisfactory for reasons associated with, among others, the top-down approach of the intervention, which disregarded active participation of the local community (Mansuri and Rao, 2012; Darghouth *et al.,* 2008).

Even though the concept of participation in development has evolved as of the 1960s, it has received considerable attention beginning from the early 1990s, following the poor performance of large scale rural development interventions in developing countries. Today, the major concern in NRM is not whether to make the intended interventions participatory or not; it is rather more about achieving sustained participation of key

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stakeholders in the process (Cornwall, 2008). Particularly, the challenges of achieving active participation of the community in the process have increasingly become a focus of research attention in developing countries. This study, therefore, focuses on Ethiopia to examine determinants of farmer's participation in environmental conservation initiatives. The following section provides very brief background information about the case country's political economy and environmental situation.

1.1 Statement of the Problem

Ethiopia's economy is heavily dependent on the agriculture sector for growth and development. Although agriculture's share of GDP has been declining steadily over the past decade, it continues to be the backbone of the country's economy, contributing greater than 40% to GDP, nearly three-quarters of employment and two-thirds of export earnings in 2012/13 (Wondifraw *et al.,* 2014; World Bank, 2013). However, the productivity of this sector is seriously threatened by environmental degradation. Since the 1980s, very ambitious large scale efforts have been made in different corners of the country to stop further degradation and rehabilitate the degraded environment. During those years, rural development planning followed a highly centralized approach and environmental conservation initiatives, in general, were considered the responsibility of specially created line agencies of the national government (GIZ, 2015). According to Hoben (1995), this environmental rehabilitation initiative was backed by the World Food Programme and other international development agencies offering food-for-work packages, which as described by the author was the second largest subsidized conservation programme of its kind in the world.

Studies and evaluation reports indicated that most of the NRM interventions in the 1980s and 1990s were *not* particularly effective (Tongul and Hobson, 2013; ENTRO, 2006). As pointed out in these studies, the 'top-down' nature of the conservation approach, poor linkage with different aspects of livelihoods of the rural community and poor planning were among the major reasons for the failure of the interventions. Consistent with this, Pretty and Shah (1997) forwarded a complementary view that people's participation during this period was either compulsory through local administrative structures of the government or motivated by the food-for-work subsidy as workers, not as key stakeholders of the development intervention.

The lessons gained from this heavily subsidized and centralized approach encouraged the government and international development partners to initiate a more participatory approach, which recognizes and encourages the community to actively participate in NRM initiatives. After a regime change in 1991, the new government has pursued different policies, strategies and institutional reforms to facilitate implementation of participatory development initiatives (GIZ, 2015). However, in practice, it was found that rural people, who are supposed to be at the centre of the process, are still not actively participating (Gebrelibanos *et al.,* 2013; Ogbaharya and Tecle, 2010: Haileslassie *et al.,* 2009).

Despite policy and institutional reform to facilitate active participation of the people in development interventions in Ethiopia, achieving the policy goals in practice is still a challenge in the country (Ogbaharya and Tecle, 2010). So far, few studies have attempted to analyse and understand the process of participation, either theoretically or empirically in the country. This research is, therefore, an attempt to fill this gap, particularly an attempt has been made to identify determinants of community participation in the government-led participatory environmental conservation initiatives (PECI) in Eferatena Gidem district, Ethiopia.

Specific objectives

1. To assess the perceptions of farmers towards environmental conservation initiatives
2. To find out the nature and level of participation of the local farmers in environmental conservation initiatives; and
3. To identify determinants of farmers' decision behaviour to participate in PECI in the study area

2. RESEARCH METHODOLOGY

2.1 Source of Data for the study

Both primary and secondary sources of data were used for the study. Primary data was collected using structured interview schedule. Since it is important not to rely heavily on one data source, given the high likelihood of individual bias and imperfections during data collection, data from KI and FGD were also used to augment the primary data.

2.2 Sample Size and Sampling procedure

The survey for the study employed a combination of purposive and stratified systematic random sampling procedures to select respondents drawn from Eferatana Gidem district, one of the district affected by land degradation in the country (FDRE, 2015).The study employed a formula given by Kothari (2004) to determine the sample size for the survey as it provides acceptable levels of margins of error and makes the sampling procedure more scientific. Therefore, a sample size of 261 was considered in this study using the formula given by Kothari (2004:179). In this study, household heads were targeted as respondents of the survey. However, due

to the absence of some selected household heads during the survey period, about 13.79% of the respondents were substituted by randomly selected household heads in the neighbourhoods.

2.3 Data Collection Instrument and Enumerator Recruitment

A structured questionnaire was prepared for the survey in consultation with experts in the area. Since respondents of the study are speakers of 'Amharic' language, the questionnaire was translated into the language, and the interviews were conducted by trained enumerators who speak the language and knew the area and culture of the community. Doing so was very important for it enabled the respondents to understand the questions easily and express their ideas comfortably.

2.4 Methods of Data Analysis

The data collected using the survey method was coded and analysed using both descriptive and inferential analysis techniques, including T-test, Chi-test, Fisher's exact probability test, crosstab, Participation Index and Logistic Regression Model using the Statistical Package for Social Studies (SPSS). As explained in White (2002), integrating data analysis methodologies help towards a better discussion, confirming and explaining the findings of the study thus resulting in a better analysis.

Participation Index: Explanatory analysis using a participation index was used to describe and characterise the level of farmers' participation in the major activities of the PECI in the study area. The key activities of the intervention were identified and included in the questionnaire in consultation with development experts working in the area. The Participation Index of each farmer is calculated using the following formula .

$$PIi = \frac{\sum_{j=1}^{N} Yij}{N} 100$$	Where, 'PIi' = Participation Index for the i^{th} farmer 'Yj' = 1, if the farmer has participated in the jth activity; = 0, if the farmer has not participated in the j^{th} activity 'N' = Total number of activities taken up in the government-led PECI. Source: Badal *et al.* (2006)

Binary Logistic Regression Model: The Logistic regression model was used to identify the major factors that determine farmers' participation in environmental conservation initiatives in the study areas. Logit, Tobit and Probit models are amongst the most popular econometric techniques widely employed to identify determinants of a given dummy dependent variable, which in this case is the farmers' decision to participate in PECI. These models are very close to each other and using one, or the other will not result in substantial differences. In so many cases, Logit is preferred to the others due to its simpler interpretability and its capability to bring out patterns in the data that might be obscured (Mukherjee *et al.,* 2013; Maddala, 1983). Thus, this study employed the logistic regression model to investigate the major factors determining farmers' participation in government-led PECI in the study areas.

2.5 Ethical considerations

The study followed the research code of practice for ethical research. To this end, all the potential respondents of the study were briefed about what the research is concerned with, the type of information required, the way the data would be handled and used, and their rights during and after data collection as a participant. An informed verbal consent was obtained from all participants prior to the interview.

3 Result and Discussion

3.1 Respondents' perceptions of sources of risk

Evidence in the literature indicated that people's decision behaviour whether or not to participate in any development initiatives is largely influenced by their perceived source of risk, their level of awareness and perception about the risk and their attitude towards the response strategy to address the risk (Sulewski and Kłoczko-Gajewska, 2014; Borges and Machado, 2012). In this regard, this paper attempted to find out the most important perceived source of risk in the study area prior to a detailed investigation of the topic under consideration. Accordingly, farmers' perceived sources of risk were assessed using a list of potential sources of risks on a five point likert scale from 1(not important) to 5 (extremely important). In the course of analysis, emphasis is given to characterising and comparing participant and non-participant respondents of the government-led PECI.

As results of the survey revealed, agricultural production risk associated with climate variability was ranked as the most important perceived source of risk in the district followed by risk from the consequences of land degradation and risk from unexpected variability of input prices with a mean value of 4.65, 4.30, and 4.16

respectively. The standard deviation scores in each category of participation for these sources of risk were found to be less than one, which suggests that farmers in each category of participation have relatively similar perception about the source of risk they are exposed. However an independent t-test conducted to compare the risk source scores between the two groups revealed the existence of a statistically significant difference between participant and non-participant farmers regarding the second source of risks(t=1.029, P=.001). As the result depicted in the Table 1 shows, the two groups under consideration have no statistically significant perception difference on the remaining sources of risk. In line with this, FGD and KI participants also mentioned that land degradation and rainfall variability are the most important source of risk in their vicinity compared to others.

Table 1; Ranking of respondents' perceived source of risk

Source of Risk	Overall (n=261)			Participant (n=187)			Non-Participant (n=74)			Test of diffrence
	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	
Risk from deficiency in rainfall causing drought	4.65	.694	1	4.68	.691	1	4.58	.702	1	.305
Risk from the consequences of land degradation	4.30	.725	2	4.39	.658	2	4.07	.833	4	.001
Risk from unexpected variability of input prices	4.16	.802	3	4.16	.859	3	4.16	.642	2	.986
Risk from unexpected variability of product prices	4.05	.677	4	4.03	.718	4	4.11	.563	3	.415
Risk from diseases and pests	3.85	.981	5	3.82	1.02	5	3.93	.865	5	.387
Risk from unexpected variability of yields	3.67	.992	6	3.73	.981	4	3.51	1.01	6	.117
Risk from high level of debt	3.41	1.15	7	3.40	1.18	6	3.42	1.09	7	.911
Conflict in the use of resources (such as water and grazing lands)	2.98	1.44	8	2.98	1.47	7	2.96	1.379	8	.902
Risk from changes in government agricultural strategy, laws and policies	2.71	1.21	9	2.66	1.23	8	2.84	1.18	9	.283

3.2 Respondents' level of awareness and perception about environmental degradation

Results of the survey revealed that more than three-fourths of the study respondents were found to be aware of susceptibility of their farm and vicinity to environmental degradation and its consequences. Compared to participants, a relatively higher percentage (35.2%) of non-participant farmers did not perceive the danger of climate change and land degradation in their locality, while majority of participant farmers (73.4%) were found to be aware of the danger as depicted in the Table 2 below.

A chi-square test was carried out to test if there was any systematic dependency between farmers' level of awareness and their participation status and the result showed no statistically significant relationship between these two categorical variables (χ^2=1.565, p = .211). This shows that the absence of a significant awareness difference between participant and non-participant farmers. Contrary to this result, Vignola et al. (2010) in Costa Rica found that farmers' level of awareness about their farmland susceptibility to land degradation strongly influenced their decision to engage in conservation activities.

Table 2: Respondent's Awareness about Environmental problems in their vicinity

		Participation category		Total	Chi-square test	
		Participant	Non-participants		χ^2	P-value
Do you think that your farm land is undergoing or else prune to land degradation?	**Yes**	152	55	207	1.565	.211
		81.3%	74.3%	79.3%		
	No	35	19	54		
		18.7%	25.7%	20.7%		
	Total	187	74	261		
		100.0%	100.0%	100.0%		

Studies reviewed in this paper suggested that farmers who are aware of environmental problems are more likely to have a positive perception of the conservation potentials (e.g. Nuraeni et al., 2013). In this regard, respondents of this study were asked about their perception as to whether the influence of climate variability and land degradation can be controlled or not and the result indicated that about 76.6% of the respondents replied positively that it was possible to control land degradation in their locality. Out of which majority of the respondents (three-fourths) were found to be participant farmers as depicted in the Table 3 below. Whereas, a considerable proportion of non-participant farmers (42.6%) believed that the aforementioned environmental problems are caused by a natural phenomenon that could not be controlled with the current PECI.

A chi-square test was conducted to check if this perception of farmers about climate change and land degradation influenced their level of participation. Results of the test revealed the existence of a statistically significant relationship between these two variables (χ^2=7.980, p=.005). This implies that farmers who believe that the prevailing environmental problems can be controlled were more likely to participate in the current government-led PECI than those who did not. The findings of this study resembled that of Hayati et al. (2009) who also found a significant relationship between farmers' environmental perception and their level of participation in farm-based conservation initiative in Iran.

Table 3: Perception of respondents on land degradation

			Participant	Non-participants	Total	Chi-square test	
						χ^2	p-value
Do you think that land degradation can be controlled?	Yes	Count	152	48	200	7.980	.005
		% within row	76.0%	24.0%	100%		
		% Total	58.2%	18.4%	76.6%		
	No	Count	35	26	61		
		% within row	57.4%	42.6%	100%		
		% Total	13.4%	10.0%	23.4%		
	Total	Count	187	74	261		
		% within row	71.6%	28.4%	100%		

In addition, asked about who should take the responsibility for natural resource conservation in their locality, a considerable proportion of respondents (45.6%) stated that it was the sole responsibility of the government while about 27.6% of the respondents mentioned both the government and the community as equally responsible. Only one-fifths of the total respondents believed that the local community was more responsible for the conservation and development of the natural resources in the vicinity.

As depicted in Table 4 below, there is a distinct difference between participant and non-participant respondents regarding conservation responsibility. Among non-participant farmers, about 71.6% believe that conservation of the environment was the sole responsibility of the government while only 35.5% of participant farmers held this view. Results of the chi-square test performed to check if there exists a systematic dependence between respondents' perception about conservation responsibility and their status of participation in PECI confirmed the presence of a statistically significant relationship (χ^2=28.461, p=.000). This result implies that although the government policy and intention was to stimulate the proactive engagement of the local community in development interventions as reflected in the country's environmental conservation policy, a considerable proportion of the study participants felt that the government was more responsible for conservation initiatives, reflecting a sign of dependency. Such conservation perception of the local community, as outlined in Patil (2016), in one way or another influences the effectiveness and sustainability of the intervention.

Table 4: Respondents perception about responsibility of conserving the natural resource

		Participant (n=187)	Non-participant (n=74)	Total (n=261)
Who do you think is responsible for the conservation of natural resources in your locality?	Government	35.3%	71.6%	45.6%
	NGOs	7.5%	2.7%	6.1%
	The community	25.1%	9.5%	20.7%
	The community with development partners	32.1%	16.2%	27.6%
	Total	71.6%	28.4%	100.0%
Chi-square test result ($\chi^2 = 28.461$, P = .000)				

Regarding respondents' experience in practicing conservation measures both on their farmland and on communal land, about 61.3% of the total respondents were found to having participated in such measures as depicted in the Table 5 below. Compared to participant farmers, a relatively higher proportion of non-participant farmers (63.5%) were found to have had prior experience. However, the chi-square test performed to check their systematic dependence indicated that the difference was not statistically significant (χ^2=.213, p=.645), reflecting that respondents prior conservation experience had a weak relationship with farmers' decision to participate in PECI. This may be due to their attitude towards the current PECI in relation to its immediate benefit. In line with this, findings of Thakadu's (2005) study in Botswana showed that people who received benefits from their prior engagement in conservation practice were found to have a positive conservation attitude and showed an interest to continue to actively participate in the programme. In this regard, study participants were asked about their general attitude towards the current PECI in the study area. The survey result revealed that majority of the respondents (68.6%) believed that the current government-led PECI would facilitate the rehabilitation of the environment and improve their livelihoods through improving agricultural productivity, while a quarter of the respondents reported as they have doubts about its tangible benefits. The remaining 7% of the respondents believe that the current PECI have no tangible benefits to their livelihood.

Table 5: Respondents conservation experience

			Participant	Non-participants	Total
Have you ever practiced conservation measures in your locality before the reform (pre 1995)?	Yes	Count	113	47	160
		% within PC	60.4%	63.5%	61.3%
	No	Count	74	27	101
		% within PC	39.6%	36.5%	38.7%
	Total	Count	71.6%	28.4%	100.0%
Chi-square test result (χ^2=.213, P= .645)					

As results of the survey depicted in Table 6 shows, among non-participant farmers the majority (about 54.1%) were found to have either doubts or they do not believe about its tangible benefits in improving their family livelihoods. On the other hand, the vast majority (about 77.5%) of participant farmers believed that the current government-led PECI would facilitate the rehabilitation of the environment and improve their livelihoods through improving agricultural productivity. A chi-square test conducted to check the strength of their association revealed that there is a positive and statistically significant association between farmers attitude towards PECI and their participation in implementing government-led PECI (χ^2= 26.288, p= .000). The result implies that the likelihood of farmers to participate in environmental conservation initiatives in their locality is largely conditioned by their attitudes towards the initiatives.

The result of the study was found consistent with Bagherian et al. (2009) findings in watershed management practice in Iran. The result was also found to be in line with Fishein and Azan's (2010) argument about individual's attitudes in relation to the Theory of Planned Behaviour. According to the authors, the attitude of individuals towards a specific behaviour, which in this study is farmers' positive or negative evaluation of the current PECI, have the potential to strongly influence their decision to engage in the behaviour.

Table 6: Respondents' attitude towards environmental conservation initiative

		Participant (n=187)	Non-participants (n=74)	Total (n=261)	Chi-square test χ^2	p-value
Do you believe that the current PECI can improve the situation and help ensure the sustainability of the natural resource base in the locality?	Yes	77.5%	45.9%	68.6%	26.288	.000
	I have doubts	18.7%	39.2%	24.5%		
	No	3.7%	14.9%	6.9%		
	Total	100.0%	100.0%	100.0%		

Furthermore, result of the survey also indicated that a large proportion of non-participant respondents (64.9%) prefer a higher production now than getting improved and sustained production in the future through practicing intensive conservation activities. As shown in the Table 7 below, about 39% of participant respondents also confirmed the same.

Table 7: Respondents' perception about sustainable agricultural production system

		Participant (n=187)	Non-participants (n=74)	Total (n=261)	Chi-square test χ^2	p-value
A high production now is preferable to getting improved and sustained production in the future	Strongly Agree	5.30%	5.40%	5.40%	18.377	0.001
	Agree	39.00%	64.90%	46.40%		
	Uncertain	14.40%	12.20%	13.80%		
	Disagree	29.40%	8.10%	23.40%		
	Strongly disagree	11.80%	9.50%	11.10%		
	Total	100.00%	100.00%	100.00%		

Only less than one-fifths of non-participant respondents (8.1% disagree and 9.5% strongly disagree) were found to disagree about it. Results of the chi-square test indicated that there is a statistically significant difference between participant non-participant respondents of the study regarding their perception about conservation farming (χ^2=18.377, P-value=.001) as shown in the Table 7 above.

Consistent with this, when asked about whether farmers should be paid or provided with any kind of incentives for participating in any kind of conservation practice on their farmland and on the communal land, about 62% of non-participant farmers (4.1% strongly agreed and 58.1% agreed) and 32.6% of participant respondents (3.2% strongly agreed and 29.4 agreed) replied that they should get some kind of incentive for their engagement. Only a quarter of non-participant respondents were found to have the perception that farmers should not be paid by external agents for what they did to improve the productivity of their farmland, as shown in the Table 8 below. A chi-square test conducted to check if there exists a statistical difference between these two groups of respondents revealed the presence of a significant difference (χ^2=21.755, P-value=.000).

Table 8: Respondents' perception about sustainable agricultural production system

		Participant (n=187)	Non-participants (n=74)	Total (n=261)	Chi-square test χ^2	p-value
Farmers should be paid for any conservation measures practiced in their farms	Strongly Agree	3.20%	4.10%	3.40%	21.75	.000
	Agree	29.40%	58.10%	37.50%		
	Uncertain	6.40%	1.40%	5.00%		
	Disagree	58.30%	32.40%	51.00%		
	Strongly disagree	2.70%	4.10%	3.10%		
	Total	100.00%	100.00%	100.00%		

This may be due to subsistence farmers' preference to invest their limited resources, including their time and labour in those activities that would bring immediate and tangible benefits than in those that could bring better but long-term returns, as a matter of priority for feeding their families (Darghouth et al., 2008). The

result of this study was found consistent with Chellappan and Sudha's (2015) finding in India, where non-availability of subsidies was mentioned as one of the top three constraints for implementation of the conservation measures in the Nilgiris district.

3.3 Nature and level of participation

In order to assess the nature and level of farmers' participation in the government-led PECI in the study area, all the major activities of the intervention were identified and farmers' participation at the three conventional stages of development intervention; planning, implementation and evaluation, were assessed. The results of the survey are presented in the following section.

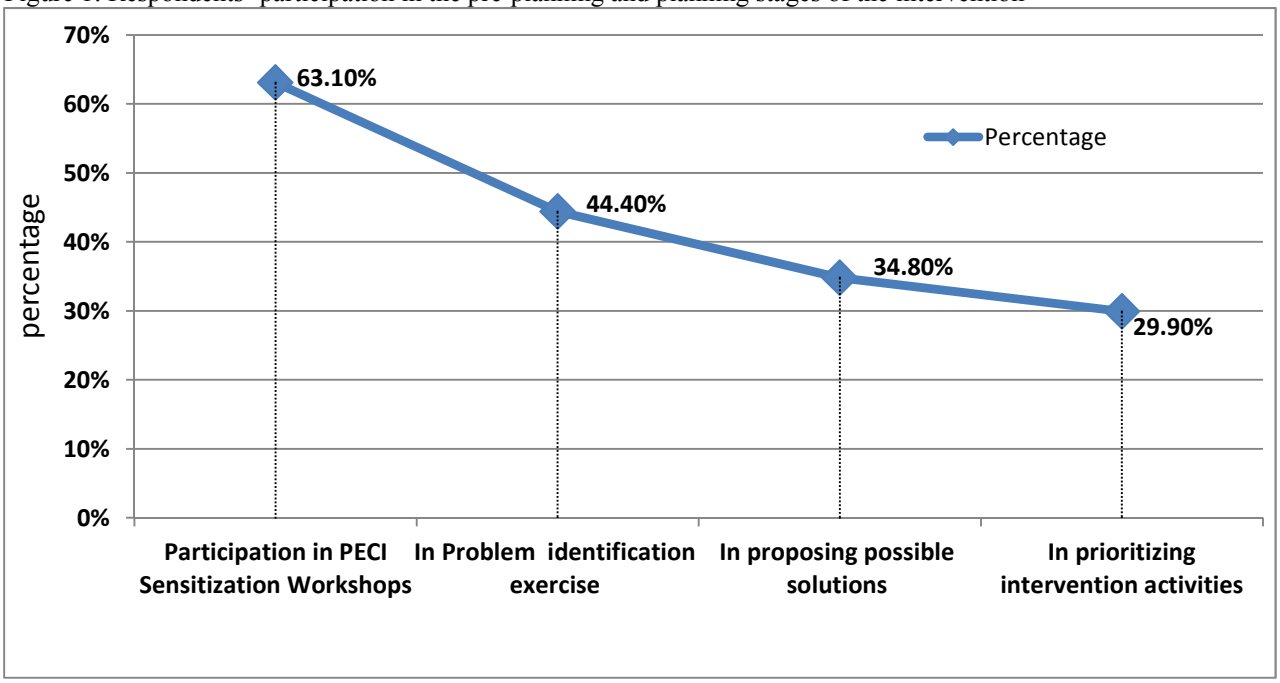
3.3.1 Participation in PECI planning stage

People's participation, particularly at the early stages of the process in most of the cases is considered as a building block for a development intervention that seeks to ensure ownership and sustained participation of the people in subsequent stages of the intervention (Darghouth *et al.,* 2008; Patil, 2016). The results of the survey, in this regard, revealed that the overall average participation index of respondents at the pre-planning and planning stages of the community-based PECI was found to be 43.05%. Of all the activities at this stage, a relatively higher proportion of respondents (63.10%) confirmed their participation at the conservation initiative sensitization workshops organized by the local government officials of the area.

Similarly, a slightly higher proportion of respondents (44.4%), compared to the overall average participation of respondents at the planning stages of the intervention, also confirmed their participation in problem identification and definition exercises. On the other hand, a relatively lower proportion of respondents (34.8%) were found to have participated in the decision-making process, including in proposing possible remedial actions and less than a third of the respondents stated that they participated in the ranking of the remedial actions prior to implementation as depicted below in the Figure 1.

In line with this, FGD participants and a review of survey respondents' remark about why their participation at this stage of the intervention was limited indicated that most community based NRM plans and implementation packages were prepared and managed centrally by the local government and extension agents working in the area.

Figure 1: Respondents' participation in the pre-planning and planning stages of the intervention



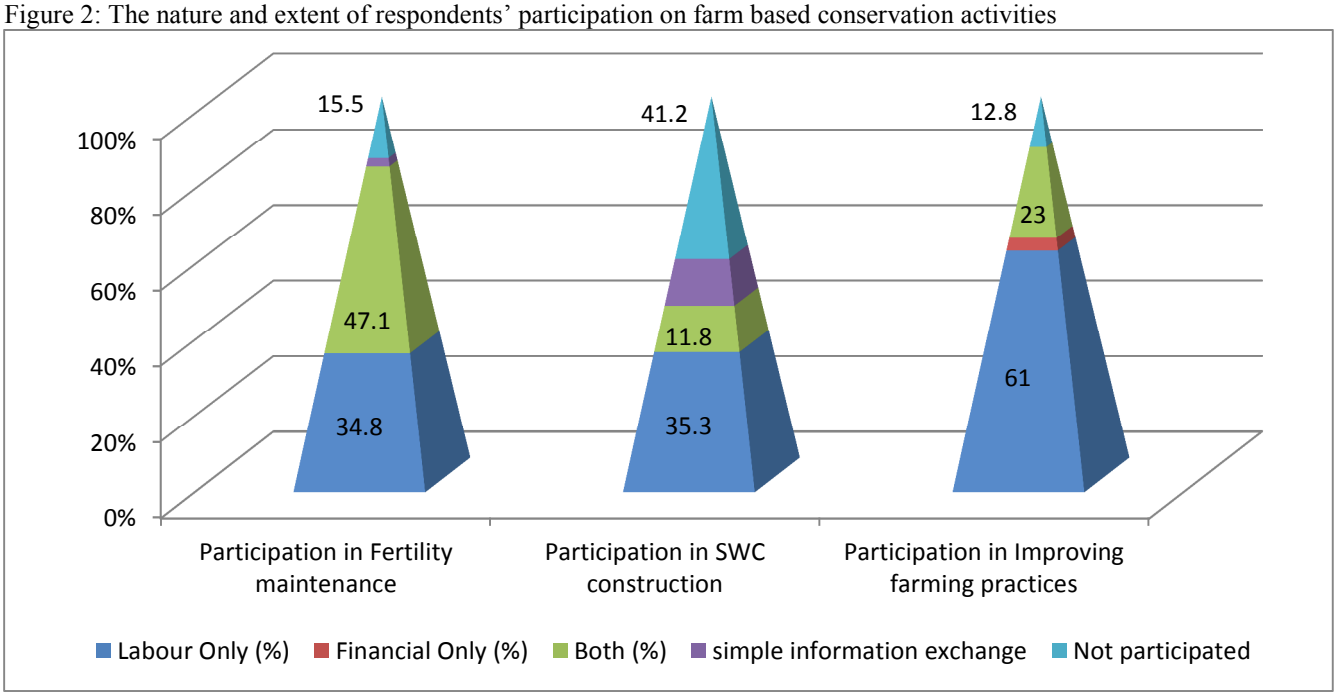
Contrary to FGD participants' reflection, most of the key informants mentioned that farmers were consulted and invited to actively involve at most stages of the initiatives through the local administrative structure of the vicinity. However, some of the key informants mentioned that most of the community-based consultative discussions were more of unidirectional and organized for the purpose of disseminating information and sometimes to secure legitimacy. This suggests that they were consulted more on ways of implementing the intended conservation measures than on the decision-making processes around what to do. In line with this, Patil (2016) and Aref (2011) argue that for NRM to be effective, farmers must feel that their priorities and concerns are being considered in the preparation of the action plan of the intervention. In this regard, more than half of the respondents (56.7%) felt that their concerns were not taken seriously in the preparation of the action plan,

particularly on the development of communal lands in the locality. Results of the study was found consistent with Bagdi and Kurothe (2014) and Khoshnam *et al.* (2015) findings in Maharashtra, India, and Miankouh watershed, Iran, respectively. However, the participation index score value of this study is relatively low, compared to the two studies.

3.3.2 Participation in PECI implementation

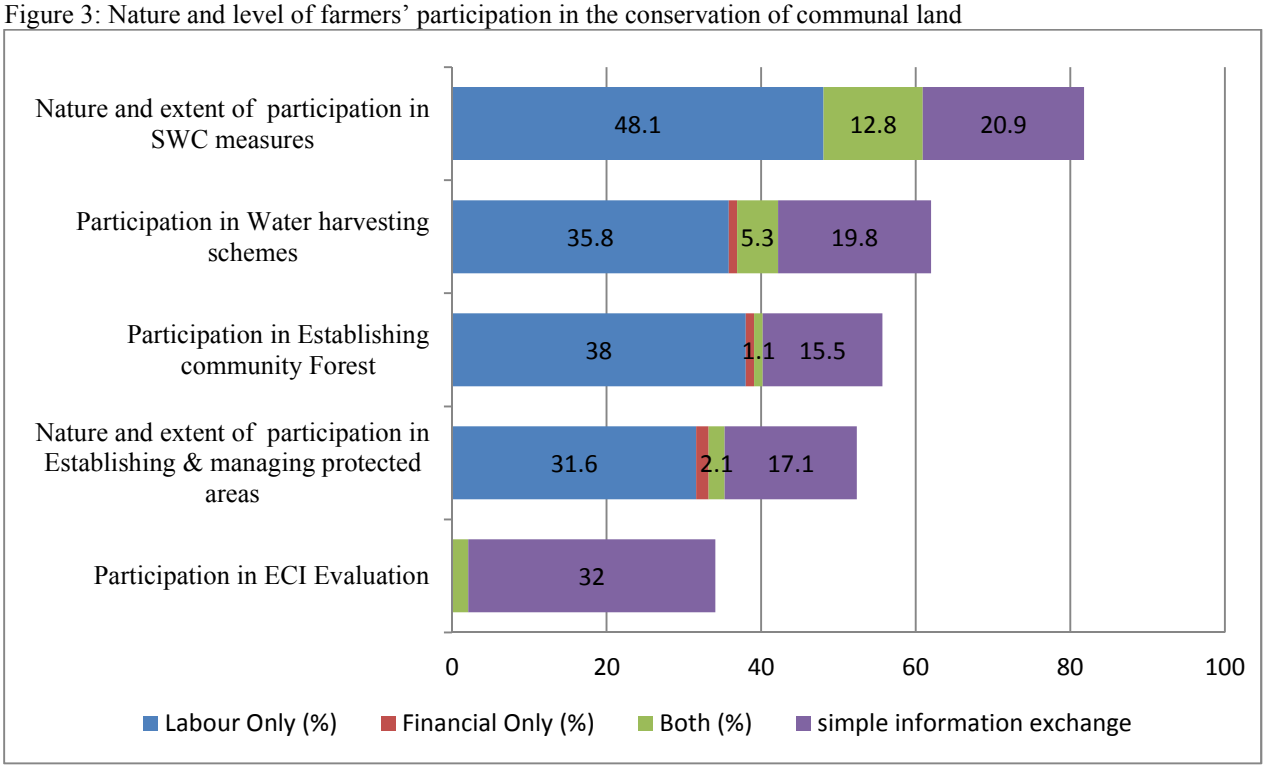
With regard to implementation stage of the intervention, farmers have shown a relatively higher level of participation in the conservation of their own farmland than communal lands. As results of the survey revealed, on average about 72% of respondents were found to have participated in implementing at least one major environmental conservation activity on their own farmland while less than half of the respondents (44.65%) confirmed their participation in communal land conservation activities. As depicted in the Figure 2 below, the majority of the respondents (greater than four-fifths) were found to have participated in improving their farming practices including maintaining the fertility status of their farmland as part of integrated NRM activity of the intervention. On the other side, a relatively less proportion of the respondents were found to have participated on the ongoing soil and water conservation initiatives. Chellappan and Sudha (2015) found similar results in Nilgiris district, India.

Figure 2: The nature and extent of respondents' participation on farm based conservation activities



Regarding participation of the respondents in the development of communal land, less than half of the respondents were found to have participated in development of water harvesting schemes, establishing and management of protected areas, and afforestaion related activities of the intervention as shown in the Figure 3 below. On the other hand, a relatively higher percentage (about 61%) of respondents mentioned that they had participated in soil and water conservation activities of the intervention, particularly in hill side reclamation. Findings of the study also showed that a relatively higher proportion of the respondents were found to have participated by way of labour contribution as it is clearly shown in the figure below. Although, it depends very much on the local context Badal *et al.* (2006) argue that the participation of the beneficiaries mainly by way of labour contribution cannot be taken for granted as a real commitment for the long-run, unless complemented by financial contribution that strengthens their stake in the intervention.

Figure 3: Nature and level of farmers' participation in the conservation of communal land



A review of the general remarks by those respondents who did not participate in communal land rehabilitation and development activities indicated that their households were less dependent on the resources from communal lands. Therefore, they were less interested to take part in the intervention. This reason from the farmers was in line with Badal *et al.* (2006) argument about the influence of the local community's resource dependency on NRM. According to the author, in areas where the community has less resource dependence and benefit from communal lands, development intervention is most likely to show poor performance and experience a low level of ownership by the community.

3.3.3 Participation in PECI Evaluation

Regarding monitoring, management and evaluation of the community based activities progress; only one-third of the respondents confirmed their participation. As remarks of farmers who did not participate at this stage indicated, most NRM activities were carried out through season-based campaign, facilitated by extension workers and local administrative officials to meet a predetermined annual plan based on government direction. According to the respondents, there were no regular monitoring and evaluation of the progress of the intervention. The data depicted in the Figure 3 above shows that the level of farmers' participation is very low compared to the implementation stage, which puts the issue of ownership and sustainability at risk. The result of the study was found to be contradictory to what had been found in India by Bagdi and Kurothe (2014). Findings of the author' research indicated that farmers showed an increasing level of participation in the later stages of the NRM intervention including monitoring, and maintenance activities following the availability of more irrigation water as the result of the intervention.

3.3.4 Respondents' overall Level of participation

Results of the participation index (PI) calculation revealed that the overall average PI score of participant respondents was found to be 57.40%, indicating that on average, each participant farmer participated in almost half of the major activities of the intervention. As depicted in the Table 9 below, the vast majority of the respondents (86%) scored below 76.85%, which is a cut-point to the category 'low-to-moderate' level of participation based on the normal distribution curve value of the survey data as suggested by Bagdi and Kurothe (2014). This implies that more than four-fifths of the respondents were found to have participated in less than 76.85% of the major activities in the intervention. Only 13.9% of the respondents had a higher level of participation with a score value of more than 76.85%. Results from a similar study by Pandey and Singh (2014) also indicated that the overall level of farmers' participation in the integrated watershed development initiative in Haryana state, India, was moderate and only less than a quarter of the beneficiaries had a higher level of participation.

The low level of farmers' participation in the later stages of the intervention suggests that unless proactive measures are taken to increase the level of farmers' participation in the current PECI, achieving the

intended goal of environmental sustainability through citizens active participation, as reflected in the country's environmental conservation and related policy documents, will be at risk.

Table 9: Over all activity based participation index score of respondents

PI category based on normal distribution curve range[1]	Number of participant	Percent	cumulative
<37.93 (Low level of participation)	31	17%	17%
37.94 - 76.85% (Moderate level)	130	69.52%	86.10%
76.86– 100% (High level)	26	13.90%	100
Total	187	100%	

Regarding the extent of farmers' participation in the overall decision-making process of the intervention, only 38.5% of the respondents confirmed that they had played a role in the major decision-making process of the intervention, whilst 27.81% of the respondents mentioned that they had no major role in the decision making process. The remaining 34% of the respondents reported that they had a limited role in the process. In line with this, a large proportion of the respondents (68%), as shown in the Table 10 below confirmed that either government higher officials or extension workers working in the area mostly took the lead in making major decisions.

However, asked about whether their limited role in the decision-making process affected their commitment and level of participation or not, a considerable percentage (42.8%) of the respondents confirmed that their role in the decision making process did *not* affect their commitment and participation. As it is reflected by FGD participants, this is due to their perception that government officials and experts have a better understanding and technical expertise about the situation and a way to deal with it. However, in practice experts' technical knowledge and skills alone cannot take the intervention to the intended level unless complemented by the local community context referenced capabilities. In line with this, Egeru (2012) also asserted the importance of considering and building on the local capabilities for effective and sustainable development interventions.

Table 10: Extent of respondents' participation in decision-making process

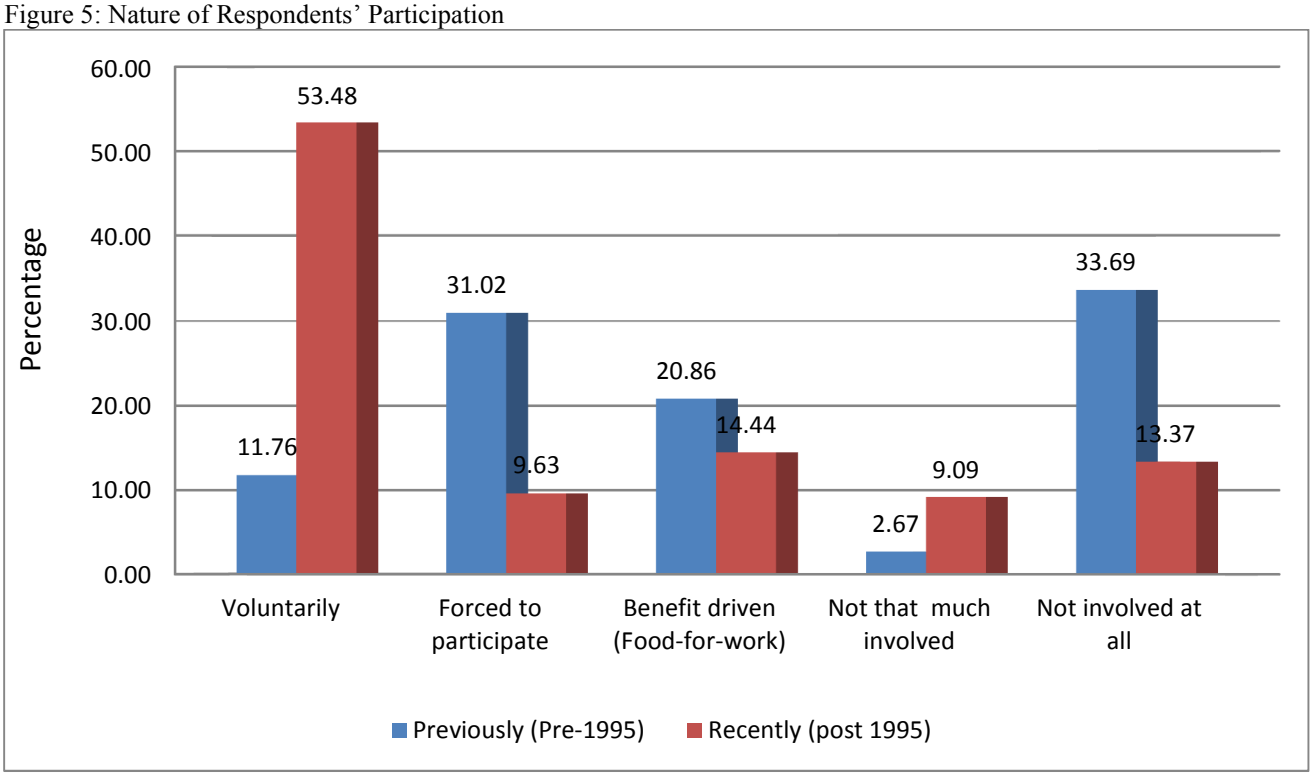
		% Total (n=187)	
Do you feel that you have a role in the decision making process?	Yes	38.5	
	No	27.81	
	Partially	33.69	100%
Who will take the lion share in passing major decision?	Government officials	59.36	
	The local community together with extension workers	30.48	
	Technical experts	8.56	
	Community leaders	1.6	100%
Do you think that your decision-making power in the process affects your level of participation in PECI?	Yes, fully	39.60%	
	Partially	17.60%	
	No	42.80%	100%

Regarding the nature of participation, about 31% of the respondents reported that their participation before constitutional and environmental conservation policy reform (pre-1995) were more of involuntary, which in some ways, forced on them by the local administrative structure in the study area. About 20.86% of the respondents mentioned that their participation is driven by the food for work incentive packages, while 0nly 11.76% of the respondents stated that their participation then was on a voluntary basis. The remaining 36% replied that they were not so actively involved in PECI under the previous regime as shown in the Figure 5 below. On the other hand, a comparatively higher proportion of respondents (53.48%) confirmed that after the reform (post-1995) their participation is relatively based on choice. Only 9.63% of the respondents felt that their participation was involuntary and based on administrative pressure.

The result of the study also revealed that about 14.44% of the respondents' participation was driven by benefit. About 7% of the respondents in their general written comment indicated that the nature of their participation had some form of administrative pressure.

[1] Low level of participation= < (Mean – Standard deviation (S.D), Moderate level= (Mean – S.D.) to (Mean + S.D) and High level participation = > (Mean + S.D.)

Figure 5: Nature of Respondents' Participation



In general, the finding shows that compared to pre 1995, farmers' voluntary participation has revealed an improvement though much is left to be done to increase the level of participation in each stage of the intervention. To this end, identifying the key factors that determine farmers' participation in the study area together with their relative strength is crucial for any effort to increase the level of participation. Therefore, the following section presents the major factors and discusses their relative significance in relation to farmers' decision to participate in PECI.

3.4 Determinants of farmers' participation in PECI

People's decision whether or not to participate in PECI is taken as the dependent variable and the demographic, socioeconomic, and institutional variables, which condition the dependent variables represent independent, explanatory variables in this study. The following Table briefly outlines the variable definition and the prior-hypothesis of the research based on theoretical and empirical literature.

Table 11: Summary of the definition and units of measurement of variables used in the model

Variable	Definition and measurement of variables	Hypothesized signs
Dependent variable		
HHparticipation	Household's participation in PECI, it takes 1 if the household is actively participating in the current PECI and 0 if otherwise	
Predictors/explanatory variables		
AgeHHhead	Age of household head (in years)	+/-
GenderHHheads	A dummy variable for gender of the household head, takes the value of 1 if male and 0 if female.	+
FamilySize	Family size (household members) in number	+
EduStatus	A dummy variable for educational status of the household head, takes1 if literate and 0 otherwise.	+
FarmSize	Farmland size under cultivation (in hectare)	+
OfffarmIncome	A dummy variable for household's involvement in Off-farm activities (1 if engaged, 0 if otherwise)	–
Training	A dummy for respondent's participation in environmental conservation training (1 if participated and 0 if not)	+
ExtensionContact	Dummy for extension contact frequency (1 if a household has established a regular contact and 0 if otherwise)	+
TenureSecurity	Dummy for land tenure security, takes the value 1 if the respondent feels a sense of security to use the land for long or 0 if otherwise.	+
FAmembership	Dummy for membership in farmers association (1 if member, 0 otherwise)	+
AttitudePECI	A dummy variable for farmers' attitude towards the government-led PECI, which takes the value of 1, if the farmer believes that PECI will benefit her/his household and leads to better future and 0 if otherwise.	+

3.4.1 Tests of multicollinearity and model fitness

Prior to running the model, a multicollinearity test was carried out to examine a potential multicollinearity problem associated with the data, which potentially causes a large standard error and leads to unstable estimates of the regression outputs. Therefore, prior to running the model, the problem of multicollinearity was checked using Variance Inflation Factor (VIF) for continuous variables, and contingency coefficient for dichotomous variables. The result of the analysis showed no significant colinearity issues. Results of the Hosmer and Lemeshow measures of 'goodness of fit test' revealed that the model fits the data quite well and can be used to conduct the analysis as shown in the model result Table 12. As results of the model output indicated, the model correctly classified 92% of cases overall, which makes it a good model for analysis.

3.4.2 Results of the model

Among the 11 explanatory variables entered in to the model, six of them (age of the household head, off-farm employment, tailored-made training, farmers attitude towards PECI, extension contact frequency and membership of farmers in peasant association) were found to be statistically significant predictors of farmers' participation in the current government-led PECI in the study area. The following section focuses on interpretation and discussion of these predictors.

Results of the model revealed that the age of the household heads was found to be a positive and significant predictor of respondents' decision to participate in PECI at 5% level of significance. The output show that compared to younger farmers, older farmers had better participation in the intervention. The odds ratio for age (Exp(B)= 9.43) depicted in the fourth column of Table 12 suggests that, keeping other factors constant, a unit increase in the age of the household head increases the likelihood of farmers to participate in the intervention by a factor of 9.43. This may be partly due to younger farmers' interest to engage in off-farm employment activities that generate immediate benefits to supplement their livelihood and due to young farmers less interest in agriculture as reflected by FGD and KI participants.

In line with this, results of the survey shows that a relatively higher percentage of younger farmers were found to be actively participating in off-farm income generating activities. This suggests that younger farmers have less time and interest to participate in PECI compared to their counterparts. These all keep the younger farmers away from farm-based conservation activities. The other probable explanation for the result may be related to older farmers farming experience, which potentially influenced older farmers to positively respond to PECI calls as hypothesised in this paper. The result was found consistent with findings of Nasrabadi, *et al.* (2013) and Dolisca *et al.* (2006), and contradictory to findings of Khalighi and Ghasemi (2004).

Table 12: Factors influencing farmers' decision to participate in PECI

	B[1]	S.E.	Wald	Sig.	Exp(B)
SexHHhead	1.075	.674	2.546	.111	2.930
AgeHHhead	2.244	.873	6.616	.011**	9.434
EduStatus	-.066	.626	.011	.916	.936
FSize	-.040	.167	.058	.810	.961
SizeLD	-.075	.238	.100	.752	.928
OffFarmIncome	-4.121	.747	30.398	.000***	.016
LDcontrol	1.915	.589	10.556	.001***	6.785
Training	1.759	.653	7.261	.007***	5.808
ExtensionContact	1.799	.624	8.301	.004***	6.041
FAmembership	2.298	.718	10.247	.001***	9.953
LandOwnership	.051	.771	.004	.947	1.053
Constant	-2.842	1.530	3.451	.063	.058
Model summary					
Overall Cases correctly classified= 92%					
Hosmer and Lemeshow Test (=10.619, P=.224)					

*** Statistically significant at 1% level of significance, ** at 5% and * at 10%

Farmers' involvement in off-farm income generating activities was the other factor that was found to have a strong interaction with the level of farmers' participation with a higher Wald value as shown in the Table 12 above. The negative sign of the coefficient (*B*= -4.121) as portrayed in the Table indicates that farmers' involvement in off-farm employment has an inverse relationship with the level of participation suggesting that an increase in farmers' involvement in off-farm employment would likely decrease the likelihood of farmers' participation. The result was found to be similar to the findings of Tenge *et al.* (2004) in Tanzania.

In line with this Nilsson *et al.* (2016:102) also argues that if the benefits of engaging in conservation activities do not "outweigh losses of curtailing previous behaviour", the likelihood of ensuring sustained participation will be unrealistic. Besides the authors' argument, the time dimension of benefit that potentially accrue from engaging in NRM was found to be an important factor in this research project, as smallholder farmers prefer to have immediate benefits to supplement their livelihood. This is partly reflected by non-participant farmers' general remark and FGD participants.

Likewise, outputs of the model also revealed that tailor-made training rather than farmers' education status was found to positively and significantly influence participation. The odds ratio for the variable suggests that, other things being constant, those farmers who received trainings related to NRM were 5.8 times more likely to participate than those who did not. The probable explanation is that participation in PECI requires better awareness and understanding of the issues in context. Providing farmers with tailor-made training is one of the key ways to facilitate farmers' learning and understanding of the situation in context, which, as briefly discussed in the prior-hypothesis, influence farmers participation positively. The result was found to be in line with findings of Badal *et al.* (2006).

The attitude of the farmers towards government-led PECI was the other major factor that was found to have a strong interaction with the level of farmers' participation as shown in the Table 12 above. The predictor was found to have a positive and significant influence on participation. The odds ratio suggests that, keeping other factors constant, farmers who have a positive attitude towards PECI are 6.8 times more likely to participate than those who do not believe that the government-led PECI improves the situation. The result was found consistent with several studies (Teshome *et al.,* 2016; Nuraeni *et al.,* 2013; Faham *et al.,* 2008). In addition to this, the result of the study was also in line with the Theory of Planned Behaviour, which states that people's intention to engage in specific behaviour is largely conditioned by their attitude toward the behaviour.

Likewise, contact with extension workers was found to be a positive and significant predictor of participation in the study area indicating that farmers who have established regular contact with the extension workers are more likely to participate than those who did not. The odds ratio also indicated that the likelihood of households that had more contact with extension workers are 6 times more likely to be involved than those who are rarely contacted by extension workers. This suggests that those respondents who had a regular contact with extension workers were able to get more information and institutional support to proactively engage in PECI.

[1] A positive sign of the coefficient signifies that higher values of the explanatory variable tend to increase the likelihood of participation whilst the negative sign implies an inverse relationship.

The result was found to be consistent with findings of Nkegbe *et al.* (2012) and Faham *et al.* (2008) in Ghana and Iran respectively.

As hypothesized, farmers' membership and involvement in peasant associations and community-based group networks were found to be a significant predictor of participation. The odds ratio for the predictor suggested that those farmers who are members of peasant associations operating in the vicinity are 9.95 times more likely to participate in the current PECI than those who were not involved in any peasant association. The probable explanation is that farmers who were active members of peasant association are more environmentally conscious as the platform potentially provides the opportunity to share information and easily access the extension service and other institutional support provided by the government. These all are expected to positively influence farmers' participation in PECI as hypothesized. Nkegbe *et al.* (2012) also found similar results in Ghana.

The coefficient for the remaining five explanatory variables were found to be non-significant, indicating that their influence on farmers' decision to participate is relatively weak compared to the six variables discussed in the preceding section. However, these variables showed a similar sign with the prior-hypothesis.

Conclusion

Findings of the study revealed that the majority of the respondents had a good level of awareness about environmental problems in their vicinity. However, a statistically significant difference was observed between participant and non-participant farmers concerning their perception and attitudes towards the government-led PECI. The findings also indicated that despite the process offered some degree of power to the local people following policy reform and institutional restructuring, the participation of farmers, particularly in the decision-making process, were found to be limited and . The study also revealed that farmers' participation in PECI was dominantly guided by extension workers and government officials indicating that the decision-making process is still manipulated by traditional power holders. Furthermore, the results of the Binary Logistic Regression Model indicated that out of the eleven demographic, socio-economic and institutional explanatory variables hypothesized to influence farmers' level of participation, the age of the household head, farmers' attitude towards PECI, tailor-made training, extension contact frequency and membership of farmers in peasant associations were found to be significant factors that positively influenced farmers' decision to participate in the present ECI. Whereas, farmers' active involvement in off-farm employment was found to be a negative and significant determinant of farmers' decision to participate in PECI. In general, the low level of farmers' participation in most stages of the intervention. This suggests that unless proactive measures are taken to increase the level of farmers' participation, empowering the local community to take control of the development process, as reflected in the country's environmental conservation and related policy documents, will be at risk. Therefore, the study suggests that any effort aimed at increasing farmer's level of participation in PECI in the study area needs to take into account the aforementioned factors.

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