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Community Participation on Watershed Management Programme. The Case of Gemechis District, Oromia, Ethiopia

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Abstract
This study was conducted in Gemechis distract, Oromia regional state, to evaluate levels of community participation towards watershed management practices. The study area was selected purposively based on accessibility and potential of watershed management interventions. Four-wheel accessible kebeles were categorized into three agro-ecological groups (Dega, weynadega and Kola). After these considerations, three kebeles were randomly selected from each agro-ecological category and all micro-watersheds within the kebeles where watershed management has been implemented by campaign work were considered for this study. The total household heads in was identified and stratified into two strata: farmers engaged in farming activates and others. Then the representative sample was selected randomly from the former strata (farmers engaged in farming activates). Data were collected through field observation, household questionnaire survey, focused group discussion and key informant interview. Qualitative data obtained was analyzed qualitatively using appropriate words. Quantitative data was employed using descriptive statistics such as percentages and frequency. Finally, the extent of People's Participation Index was measured. The study revealed that only 10% of the respondents were participated in all phases (planning, implementation; and monitoring and evaluation) of watershed development actives while 40.8% of the respondents were participated in two phases only (planning and implementation). The remaining 49.2% of the respondents were participated in implementation phase alone. This low participation in all phases (i.e.10%) of watershed development activities may not fully negotiate stakeholder's interests to set their priorities, evaluate opportunities, implement and monitor the outcomes. The people participation index during implementation phase was computed as 71.14% (high level of participation) while the least/low level (11.28%) of participation was recorded during monitoring and evaluation. Besides, the people participation index throughout planning phase which was calculated as 35.4% (moderate level of participation). This indicates that there was more enforcement of the people by the government for labour contribution during implementation phase alone. Generally, the overall community participation index on watershed development and management in the study area was computed as 39.28 percent (table). This showed that the level of community participation in the study area fall within moderate level category.
Keywords: Community Participation Index, Planning, Implementation, Monitoring and Evaluation

INTRODUCTION

Ethiopia is one of the most populous countries (more than100 million inhabitants) in Africa with a growth rate of 2.6 percent annually and finite productive lands area. Agriculture is the mainstay of the economy, which contributes for 47.7% of the total GDP, 90% of export revenues, 80% of employment and 70% of raw material requirements of agro-based domestic industries, and also a major source of the national food supplies (FAO, 2003; MoA, 2010). Specially, populations who live in rural areas are highly dependent on natural resources bases (land, water, forests etc.) for economic development, food security and other basic necessities (FAO, 203; Danyo, et al., 2017). To ensure agricultural development at the desired rate and on a sustainable basis, sustainable management of natural resources particularly soil resources, water and forest is crucial. However, the pressure of intense human activity and improper farming and management practices pose serious threats to the sustainability of the natural resources and maintaining ecological balance. These impose great pressure on land resources, worsening environmental degradation and raising the risk of food shortages (IFAD, 2016). Most studies conducted on the cost of land degradation in Ethiopia indicate that land degradation is one of the most serious problems facing the country's agriculture and food security. Recent estimates using satellite imagery show that land degradation hotspots over the last three decades cover about 23 % of the land area in the country (Gebreselassie et al. 2015) loss of 30,000 ha annually due to water erosion, with over 2 million ha already severely damaged (Berry 2003), annual forest loss of approximately 70,000 ha/yr and annual forest gain of approximately 30,000 ha/yr (relatively high annual forest area gain in the Dry Afromontane biome) (MEFCC, 2016).

Soil erosion in association with inappropriate land management practices is also one of the main factors causing degradation. Poor SWC management practices and lack of effective planning and implementation approaches for soil conservation are responsible for accelerating degradation on agricultural lands and siltation of lakes and reservoirs downstream. Most soil and water conservation planning approaches rely on empirical assessment methods by experts and hardly consider farmers' knowledge of soil erosion. Conservation programs relied on coercive approaches and performed poorly. Thus some authors (von Braun et al. 2013) warn that

'eradicating extreme poverty without adequately addressing land degradation is highly unlikely. Ensuing requirements for increased food production while keeping pace with greater food demand will continue to be a challenge.

Watershed development program has emerged as a new paradigm for sustainable rural livelihoods and it occupied the central-stage of rural development in the fragile and semi-arid environments of the developing nations. It is considered as an elective tool for addressing many of these problems and recognized as potential engine for agriculture growth and development in fragile and marginal rain-fed areas. Its approaches are now considered as innovative options for sustaining ecosystems while improving human welfare (Joshi et al. 2005 and Wani et al. 2006*)*. Management of natural resources at watershed scale produces multiple benefits in terms of increasing food production, improving livelihoods, protecting environment, addressing gender and equity issues along with biodiversity concerns. It encompasses the holistic approach to manage watershed resources that integrates forestry, agriculture, pasture and water management, which can be broadened to rural development with a strong link to the livelihoods of the local people (Rhoades and Elliot 2000; Wani et al, 2005).

Understanding these, Ethiopian government has been promoted a watershed based natural resource development and management in the country as a suitable strategy for improving productivity and sustainable intensification of agriculture since 1980s. However, due to lack of effective community participation, limited sense of responsibility over the asset created and unmanageable planning units large-scale efforts remained unsatisfactory. This implies that the sustainability of watershed development projects, therefore, depends on the level of participation, which requires effective planning, implementation and evaluation. Planning with the community also increase participation and produces better results. Participatory Watershed Management is a process in which stakeholders jointly negotiate how they will define their interests, set priorities, evaluate alternatives, and implement and monitor outcomes. Thus it provides opportunities to the stakeholders to jointly negotiate their interests, set priorities, evaluate opportunities, implement and monitor the outcomes. Community participation is an important aspect of micro-watershed development program. The process of community involvement starts from identification of the village to problem analysis, and monitoring and evaluation of the watershed program (Chadha, 2001).

Even though, the Government of Ethiopia initiated a 30 days public massive program of watershed development in highly degraded areas since 2011/12, the level of community participation was not studied yet. Therefore this study was initiated to assess levels of community participation towards watershed management practices in Gemechis District, Oromia National Regional State, Ethiopia.

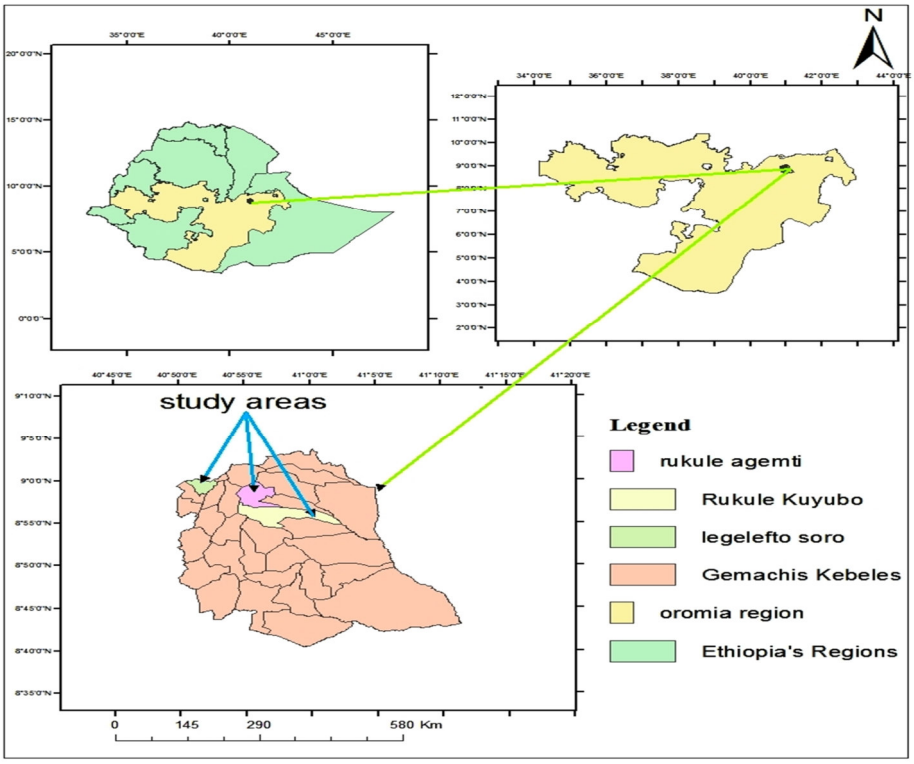
2. MATERIALS AND METHODS

2.1. Description of the Study Area

The study was conducted in Gemechis district of Western hararghe zone national regional state. Gemechis district is one of the 17 districts in West Hararghe Zone which is located at 343 km East of Addis Ababa and about 17 km towards the South of chiro, capital town of the Zone. It shares borders with Chiro district in the west and north, Oda bultun district in the south and Mesela district in the east (DOA, 2012).

The district covers an area of 77,785 ha and it has 35 rural and one urban peasant association. The total population of the district is 184,032 of which 93659 are males and 90373 are females (CSA, 2007). The numbers of agricultural households in the district is estimated to 38,500 with 32,308 male headed and 6,192 female headed (DOA, 2012). The average family size is estimated to be 6 and 4 per house hold in rural and urban areas respectively. The district is the first most densely populated district in the zone.

Fig1. Map of study area



The district is found within 1300 to 2400m above mean sea level. It receive annual rain fall of 850mm. the district has bimodal distribution I nature with small rains starting from march/April to May and the main rainy season extending from June to September /October. The average temperature is 20^{o}c. The land use patter of the district, 32994.5ha is cultivated, 6185 ha is grazing, 1385 ha is covered by forest, bushes and shrubs,,6603.62 ha is arable and 17949. 34 are being used for other purposes such as encampment, infrastructure facilities. The black brown and red soils are the three dominant soil types constitute 55 25 and 205% respectively (DOA, 2012).

2.2. Methods

2.2.1. Site selection, Sampling Techniques and Sample Size

This study involves different and multistage sampling techniques. In order to select the study area (Zone and the Woreda) purposive sampling method was employed. Four-wheel accessible kebeles was categorized into agro-ecological groups. After these considerations, three kebeles (Rukule kuyyubbo, Rukule Agamtii and Lega lafto Soro) were randomly selected from each agro-ecological category and all micro-watersheds within the kebeles, where watershed management has been implemented by campaign work were considered for this study.

The total household heads in the study area was identified and stratified into two strata: farmers engaged in farming activates and others. Then the representative sample was selected randomly from the former strata (farmers engaged in farming activates). Factors like the homogeneity of population, cost of the survey, shortage of time, large number of factors to be analyzed and the precision level required was taken in to consideration while deciding sample size.

The sample size was determined by using the following formula at 95% confidence interval, 0.05 degree of variability and 95% level of precision

$$n = \frac{N}{1 + Ne^2}$$

(Cited in Girma Teshome *et al*. (2013))

Where n is the sample size, N is the total household heads size, and e is the level of precision

Fifteen Focused group discussions (each comprising 5–15 participants) was conducted based on checklists and semi-structured questionnaires, and in-depth interview was used for collection of the data. During this session, respondents were expressed their opinions, views, feelings and perspectives about the community based watershed management implementation process and outcomes. The main objective of this method is to triangulate the survey method and investigate additional facts that are not addressed by the survey method. Moreover, key informants interview was carried out with 4 elders, 4 local administrators and 4 experts.

The main data collection tools used in this research were observation checklist, key informant guide, focus

group discussion guide, Semi Structured Interview schedule (open ended, close ended and scale item questions are addressed) and a field practices performance evaluation check list. Household Questionnaire Survey was used to collect the primary data from sample households. This survey was focused on individual household's participation in watershed management and also to get information on farmer's field practices of land resource management.

2.2.2. Data Analysis

Both quantitative and qualitative methods were used in analyzing the information collected using different instruments. Qualitative data obtained using semi-structured questionnaire; interview, observations, focal group discussion and document analysis was analyzed qualitatively using appropriate words. For quantitative data, descriptive statistics such as percentages and frequency was employed to analyze the gathered data. Finally, the extent of people's participation in watershed development programme was measured with help of People's Participation Index (PPI) developed by Bagdi (2002) as given below:

2.2.2.1. *People's Participation Index*

$$PPI = \frac{Mean\ participation\ score(p)}{Maximum\ participation\ score} * 100 \quad (1)$$

where,

$$P = \frac{\sum_{i=1}^{N} Pi}{N} \quad (2)$$

where,

N = Total number of respondents

$$Pi = \sum_{j=1}^{k}(PPj + PIj + PMj) \quad (3)$$

where,

PPj = Total scores obtained by a respondent due to participation in programme planning;

PIj = Total scores obtained by a respondent due to participation in programme implementation;

PMj = Total scores obtained by a respondent due to participation in programme monitoring and evaluation;

K = Total number of statements on which responses of the respondents were recorded;

Pi = Total participation scores obtained by individual respondent in planning, implementation and maintenance.

2.2.2.2. *Categorization of PPI*

The PPI value calculated in a particular watershed development programme was categorized into three categories as suggested by the author based on the normal distribution curve values as given below (Table 1).

Table 1 Categorization of people's participation according to normal distribution curve values

Normal distribution curve range	PPI value range category	People's participation
< Mean – S.D.	0 to 34.13	Low level
Mean – S.D. to Mean + S.D.	34.14 to 68.26	moderate level
> Mean + S.D.	68.27 to100	High levels

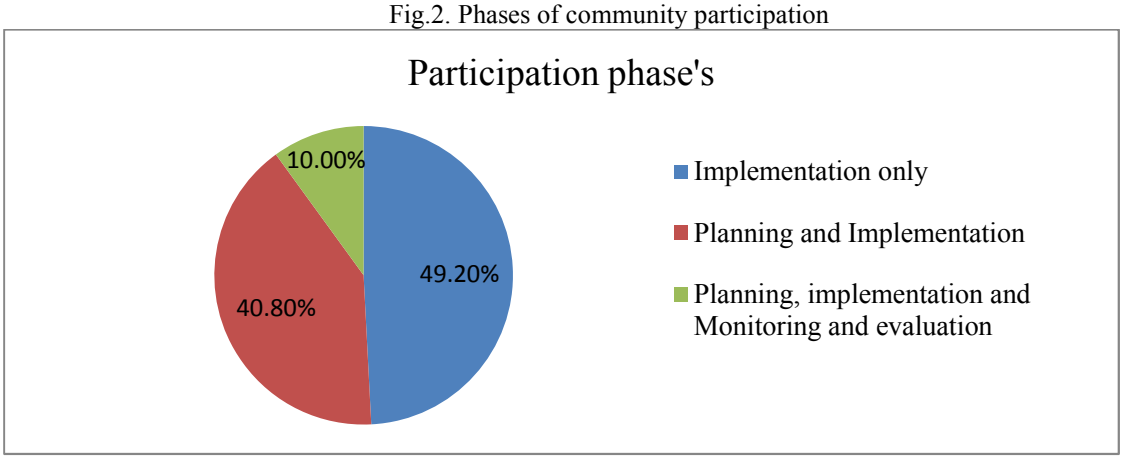
3.0. RESULTS AND DISCUSSION

3.1. Levels of community participation in watershed development

3.1.1. Participation in phases of watershed development

The processes of community participation in watershed development embraces three phases namely; planning, implementation, and monitoring & evaluation. For the sustainability of watershed development all stakeholders are expected to be participated in each phases of the programmes. However, this survey result showed that only 10% of the respondents were participated in each phases of watershed development actives (Fig.2.). Beside, 40.8% of the respondents were participated in planning and implementation while 49.2% of the respondents were participated in implementation phase only. Additionally, key informants and group discussion result link this low participation with political instability and lack of good local leadership for organizing people, mobilizing their resources, nurturing and sustaining the organization. Thus, such low participation in each phase of the programmme may not fully negotiate stakeholder's interests to set their priorities, evaluate opportunities, implement and monitor the outcomes.

Fig.2. Phases of community participation



3.1.2. Levels of community participation in planning phase

In the planning phase stakeholders are expected to provide valuable social-cultural, ecological, economic and technical indigenous knowledge ensuring consistency between objectives of development and community values and preferences. Additionally, they can mobilize local resources in the form of cash, labour, materials, managerial talent and political support which are critical to programme success. If the local people are fully participated in the program planning, its sustainability can be ensured after outsiders financial and technical supports are withdrawn. According to community based watershed development guide line developed by lakew, (2015), the major activities to be implemented during the planning phase are identifying & prioritizing their problems, formulating by-laws or norms, time scheduling and deciding for the distribution of benefits.

Table 3. Farmer's participation at the planning phase.

Activities	**Degree of participation in planning phase**				***N= 120***
	Never	Rarely	Sometimes/ occasionally	Always/ whenever	Total participate
Identification & prioritization of problems	65 (54.2%)	31 (25.8%)	16 (13.3%)	8 (6.7%)	55 (45.8%)
Formulation of by-laws or norms	90 (75%)	10 (8.3%)	18 (15%)	2 (1.7%)	30 (25%)
Time scheduling	65 (54.2%)	18 (15%)	10 (8.3%)	27 (22.5%)	55 (45.8%)
Decisions on distribution of benefits	90 (75%)	10 (8.3%)	12 (10%)	8 (6.7%)	30 (25%)
PPI (%)	64.6	14.35	11.65	9.4	35.4

According to the survey result presented in table 3, less than half (45.8%) of the sample households were participate in the planning phase. Among these 25.8%, 13.3% and 6.7% participated rarely, sometimes and always respectively. The remaining 54.2% of the respondents were never participated in problem identification and prioritization. During formulation of by-laws/norms only 25% were participated. This indicates that community participation throughout by-laws formulation is very low. For time scheduling 45.8% of the respondents were participated. From these participants 22.5% were participated always while 8.3% & 15% were participated sometimes and rarely. For time of decisions making in distribution of benefits only 25% of sample household were participated. This low participation may not ensure equal sharing of programme benefits by wealthier members of the community. Beside, low level of community involvement in decision making may reduce their commitment for implementation of the programme and also diminish their ability to take responsibility to solve their own problems (Tyagi, 1998).

Generally, the overall People's Participation Index (PPI) of the local peoples during the planning phase of watershed development was calculated as 35.4 percent (Table 3). These value indicated that the PPI of the study area was categorizes within moderate level of participation. This indicate that only some decisions were taken in consultation with local people in village itself and the remaining were undertaken by the government offices on their own at organizational level. This re was in line with G. L. Bagdi and R. S. Kurothe, (2014).

3.1.3. Levels of community participation in implementation phase

The local communities' involvements in watershed management activities through mobilizing local resources in the form of cash, labour, materials, managerial and political support which are critical to programme success. In the forms of labour, activities such as pitting, planting of seedlings, trench, eyebrows, check dam, terrace construction were implemented in the study area. The result presented in table 4 reviled that all of the respondents were participated on pit preparation for seedling planting, flowered by 99.8% who were participated

in planting of seedlings. Majority of these respondents (91.5% & 81.7%) were participated occasionally in pitting and tree planting respectively (Table 4). Concerning Labour contribution for trench, eyebrows, check dam, terrace construction only 10% of the respondents were participated. Moreover, the result obtained from key informants and group discussion also showed that most of poor people cannot afford to spend time and energy on labour intensiveness activates if the benefits from such participation are low, delayed and uncertain.

Table 4. Farmer's participation at the implementation phase

Activities	**Degree of participation in implementation phase**				***N= 120***
	Never	Rarely	Sometimes/ occasionally	Always/ whenever	Total participate
Labour; Planting of seedlings	0	0	110	10	120
	0	0	(91.5%)	(8.3%)	(99.8%)
Labour; pitting	0	12	98	10	120
	0	(10%)	(81.7%)	(8.3%)	(100%)
Labour; trench, eyebrows, check dam, terrace	108	4	0	8	12
	(90%)	(3.3%)	0	(6.7%)	(10%)
Labour; Soil and Stone Bund construction	13	25	32	50	107
	(10.83%)	(20.83)	(26.67%)	(41.67)	(89.17)
Money contribution	52	30	30	8	68
	(43.3%)	(25%)	(25%)	(6.7%)	(56.7%)
PPI (%)	28.83	11.83	44.98	14.33	(71.14%)

This survey result also showed that, 89.17% of the respondents were participated during construction soil and stone bunds. These indicate that farmer's awareness and experience about these structures is under considerable level. The land scape itself and also government and non- government intervention through different programs (FFW) imposed the community to implement these structures for their survival. However, participation of farmers' in the form of money contribution is very low (11.28%) (See table 4).

The overall PPI of the respondent during implementation phase was summarized as 71.14%. According to normal distribution curve the values developed by Bagdi (2002), people's participation index in implementation phase was categorized under high levels.

3.1.4. Levels of community participation in Monitoring and Evaluation phase

Monitoring and Evaluation during and after implementation of watershed management practices are an indispensable component of watershed management. The implemented activities need to be periodically reviewed and compared with those outlined in the work plan. The implemented results collected through monitoring programs need to be evaluated against the objective and aim of the program. If the implemented practices are not adequately effective the milestones and targets set for natural resource degradation reductions, implementation adjustments and/or additional management measures become necessary. During Monitoring and Evaluation phase activities such as sharing information and consultation, assessment of results and assessment of deficiencies are expected to be considered. According to the survey result presented on table 5, only 20.1% of the respondents were participated on information sharing and consultation. This value indicates that, community participation on information sharing and consultation is very low. Failure to participate community on information sharing and consultation may reduce consistency of information for decision making (Lakew, 2005). Additionally, on an assessment of results and deficiencies only 10% & 15% of the respondents were participated.

Table 5. Farmer's participation at the implementation phase

Activities	**Degree of participation Monitoring and Evaluation phase**				***N= 120***
	Never	**Rarely**	**Sometimes/ occasionally**	**Always/ whenever**	**Total participate**
Sharing information and consultation	96	8	14	2	24
	(80%)	(6.7%)	(11.7%)	(1.7%)	(20.1%)
Assessment of results	108	0	12	0	12
	(90%)	0	(10%)	0	(10%)
Assessment of deficiencies	102	18	0	0	18
	(85%)	(15%)	0	0	(15%)
PPI (%)	63.75	5.43	5.43	0.43	11.28

The overall people's participation index throughout monitoring and evaluation phase was calculated as 11.28%. According to People's Participation Index (PPI) categories developed by Bagdi (2002), the level of community participation during this phase was categorized as low level participation. Such low level involvement of landowners and other stakeholders may discourage learning, utilization of local knowledge and skills and also confidence of local people on watershed development and management program.

3.2. The overall community participation index watershed development phases

Table 5. Farmers participation at the implementation phase.

Participation phases	PPIs values at each participation phase *N= 120*
Planning	35.4%
Implementation	71.14%
Monitoring and evaluation	11.28%
Overall PPI (%)	39.28%

According to the result showed in table 5 above, the highest community participation (71.14%) were recorded during implementation phase followed by planning phase which was 35.4%. The least level (11.28%) of participation was recorded during monitoring and evaluation. This indicates that there was more enforcement by the government for labour contribution.

Generally, the overall community participation index on watershed development and management in the study area was computed as 39.28 percent (table). This showed that the level of community participation on watershed development activities in the study area fall within moderate level category.

4. Conclusion and Recommendation

4.1. Conclusion

While Ethiopian government has been promoted a watershed based natural resource development and management since 1980s, large-scale efforts remained unsatisfactory due to lack of effective community participation which limited sense of responsibility over the asset created. Alongside, various studies and experiences in the country also indicated that the effectiveness and sustainability of watershed development program depends on the level of community participation which requires effective planning, implementation; and Monitoring and evaluation. Participatory Watershed Management encourages all stakeholders to jointly negotiate their interests, set priorities, evaluate alternatives, and implement and monitor outcomes. Planning with the community can increase participation and produces better results by providing valuable social-cultural, ecological, economic and technical indigenous knowledge ensuring consistency between objectives of development and community values and preferences. Additionally, they can mobilize local resources in the form of cash, labour, materials, managerial talent and political support which are critical to programme success. ,

Even though, all stakeholders are expected to participate in all phases of watershed development of processes (planning, implementation and monitoring & evaluation phases), only 10% of the respondents in the study area were participated in all phases of watershed development actives. Beside, 40.8% of the respondents were participated in both planning and implementation while the remaining respondents participated only in implementation. These indicate that there was a gap to encourage all stake holders. Since 2011/12 GC when Government of Ethiopia declared a 30 days public massive program of watershed development, various intervention actives were implemented in different parts of the country including the study area. However, the level of community participation particularly in planning and monitoring and evaluation were still below the expectation. The people participation index during implementation phase was computed as 71.14% (high level of participation) while the least/low level (11.28%) of participation was recorded during monitoring and evaluation. Besides, the people participation index throughout planning phase which was calculated as 35.4% (moderate level of participation). This indicates that there was more enforcement of the people by the government for labour contribution during implementation phase. Generally, the overall community participation index on watershed development and management in the study area was computed as 39.28 percent. This showed that the level of community participation in the study area fall within moderate level category.

4.2. Recommendation

- All stake holders should be promoted to participate in all phases of watershed development for better mobilization of their valuable social-cultural, ecological, economic and technical indigenous knowledge; local resources in the form of cash, labour, materials to create sense of ownership and responsibility in the community better effective outcomes
- Clear policy research and analysis should be under taken in the country for sound understanding of effective resource management.

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