

## **What Factors Influence Community Participation in Afforestation Activities? Case of Nathenje Area in Lilongwe District in Malawi**

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### **ABSTRACT**

The rationale of this study was to determine factors influencing community participation in afforestation activities in Nathenje area in Lilongwe district in central Malawi. The rationale of this study was to determine factors influencing community participation in afforestation activities. Simple random sampling was used to select 120 local community members as respondents for the study. Data collection was carried out using semi-structured interviews, focus group discussions and key informant interviews. Results showed a strong positive significant relationship between age and community participation in afforestation activities ( $P < 0.001$ ) and ( $r = 0.657$ ). A weak positive significant relationship was also observed between occupation of respondents and community participation ( $P < 0.032$ ) and ( $r = 0.460$ ). Participation was also found to be heavily influenced by the anticipated benefits ( $P < 0.001$ ) and ( $r = 0.846$ ). Firewood was noted to be the most common forest resource obtained by the respondents (42%: 50/120). Arson fire was noted to be the most prevalent challenge for afforestation in the study area. It is recommended that forest policy makers and programme planners need to train and involve more young people in afforestation since results showed that elderly people were the ones who were currently participating. There is also need to reduce fuel load in the forests and woodlots to reduce cases of arson fires.

**Keywords:** Afforestation, community participation, socio-economic factors, forest management

### **INTRODUCTION**

The rate of deforestation in Malawi has been on the increase (Kang'ombe, 2016). Currently, only 36% of the total land area is classified as forest, showing 11% decrease in the total forest cover as compared to the total area of forest cover in 1975 which was at 47%. The current rate of deforestation per year in Malawi which is at 3.4% is the highest in the SADC region (FAO, 2007; Kaira and Banda, 2015). The high rate of deforestation arises from different factors such as increased population growth, poverty, tobacco curing, infrastructural development and economic activities (Mkwara and Marsh, 2009).

In order to reduce deforestation, Government of Malawi directed by goal number 7 of the Millennium Development Goals promotes environmental sustainability by encouraging the planting of trees and also promoting sustainable use of trees and forests (GoM, 2010). To achieve this goal, government introduced various strategies. One of the strategies is the involvement of local communities in afforestation activities. In this study, afforestation is defined as a direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human induced promotion of natural seed sources Agee and Skinner (2005). In Malawi, afforestation activities were manifested by introduction of the annual national tree planting season where local communities are involved in tree nursery establishment, tree planting activities and woodlot establishment and management and conservation of village forest areas (Annis, 2014).

Community participation in wide-range approaches is thus a tool for rural community development and it has become an obligatory demand which is recognised by many development intervention agencies (Emeh *et al.*, 2012). In Malawi, community participation in tree and forest management is articulated within the National Forest Policy and Forest Act of 1996 and 1997, respectively (GoM, 2002). The policy provides local people full ownership rights to manage trees and forests. However, despite the promotion of local community participation in afforestation and general tree and forest management activities, there is inadequate empirical evidence on factors which influence community involvement in afforestation and tree and forest management. Promoting community participation in

afforestation in a situation of having inadequate knowledge on factors for effective participation is like shooting in the dark. It is for this reason that this study was carried out in order to determine factors that influence participation of local communities in afforestation activities.

## **METHODOLOGY**

The study was carried out in Nathenje area in Lilongwe district in central Malawi. The study site was purposively selected because there were a lot of afforestation programmes being undertaken in the area. Some of the examples of such programmes included: Malawi Social Action Fund (MASAF) afforestation programme, Airtel Go Green campaign, Total Land Care afforestation project, Inter-Aide Afforestation Programme and Care Malawi Mleranthaka Project. One hundred and twenty (120) respondents among the local communities were selected for the study. This sample size was considered valid since it is supported by the statistical central limit theory. The central limit theory states that any sample consisting of at least 30 observations has its mean approximately equal to the true mean of the population in question (4). Both qualitative and quantitative data were collected during the study using focus group discussions, semi structured interviews and key informant interviews.

Data analysis was done using descriptive statistics in SPSS version 16. Chi-square ( $X^2$ ) test was used to establish relationship between community participation (dependent variable) and probable variables (independent variables) influencing participation in afforestation activities. These included education, age, occupation, landholding size and anticipated benefits by the respondents. Further, Pearson's regression statistic ( $r$ ) was used to test the strength of the relationships between the independent and dependent variables. In addition, logistic regression model (logit model) was used to determine member specific factors influencing community participation in afforestation activities.

### **Specification of the Logit Model Applied in this Study**

To predict the influence of different factors on community participation in afforestation activities, a qualitative choice model, such as probit or logit can be used, where the dependent variable is binary Flores and Filho (2014). Hence, the logit model was chosen to perform the estimates on the probable independent variables affecting community participation in afforestation. The logit model for a participating community member  $i$  can be expressed as follows:

$$P_i = 1 / (1 + e^{-Z_i}) \quad (1)$$

$$\text{Log} (P_i / (1 - P_i)) = Z_i = \beta_0 + \beta_j X_{ij} + u_i \quad (2)$$

The expression on the left side of Equation 2 is the logarithm of the probability of representative individual participating to the odds those not participating while  $u_i$  is the error term. The parameter  $\beta_j$  is estimated by the logit model by maximum likelihood where,  $e$  is the base of natural logarithm,  $Z_i$  is an index determined by an independent variable.  $X_i$  and  $P_i$  is the probability that a community member will participate or not. The dependent variable was binary with an assigned value of 1 when a community member participates at some point, and 0 if the community member does not participate. In this way, the logit model used to investigate the influence of the independent variables on this dependent variable was specified as:

$$P(Z) = \beta_0 + \beta_1 \text{gender} + \beta_2 \text{age} + \beta_3 \text{edulevel} + \beta_4 \text{mstatus} + \beta_5 \text{occup} + \beta_6 \text{lsize} + \beta_7 \text{hszize} + \varepsilon \quad (3)$$

where, the dependent variable is a discrete variable as already defined above and  $\varepsilon$  is the error term of the model. The independent variables were defined as:

“gender” is a dummy variable that takes the value 1, when a man participates and 0 when a woman participates in afforestation activities

“age” refers to the age of a community member

“edulevel” represents the education level of a community member

“mstatus” refers to marital status of a participating member

“occup” corresponds to the occupation of a community member

“lsize” represents the size of land owned by a respondent

“hszize” corresponds to the number of members living in a household of the respondent.

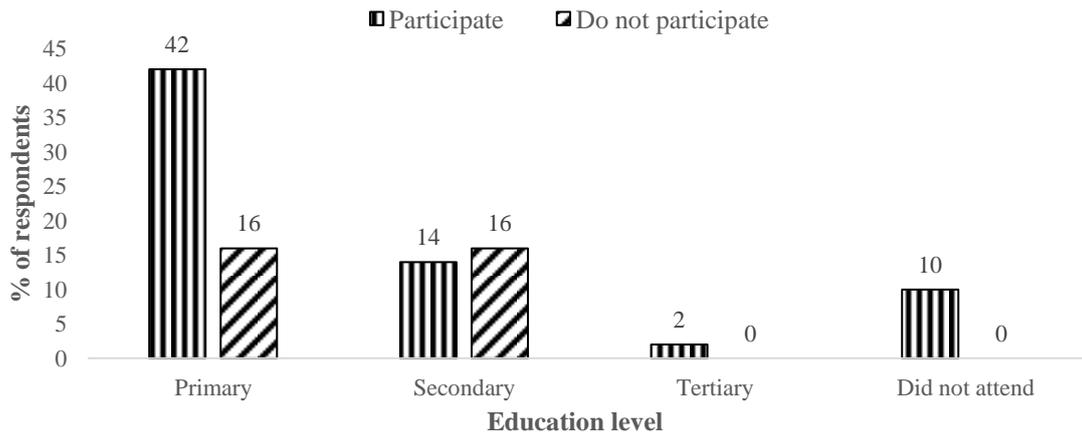
It was assumed that these variables would have an influence of whether a community member participates or not in afforestation activities.

## RESULTS AND DISCUSSION

A number of member specific factors influencing community participation in afforestation activities were assessed. These include education level of the respondents, age of the respondents, marital status of the respondent, occupation of respondents, landholding size and marital status of respondents.

### Influence of Level of Education on Community Participation

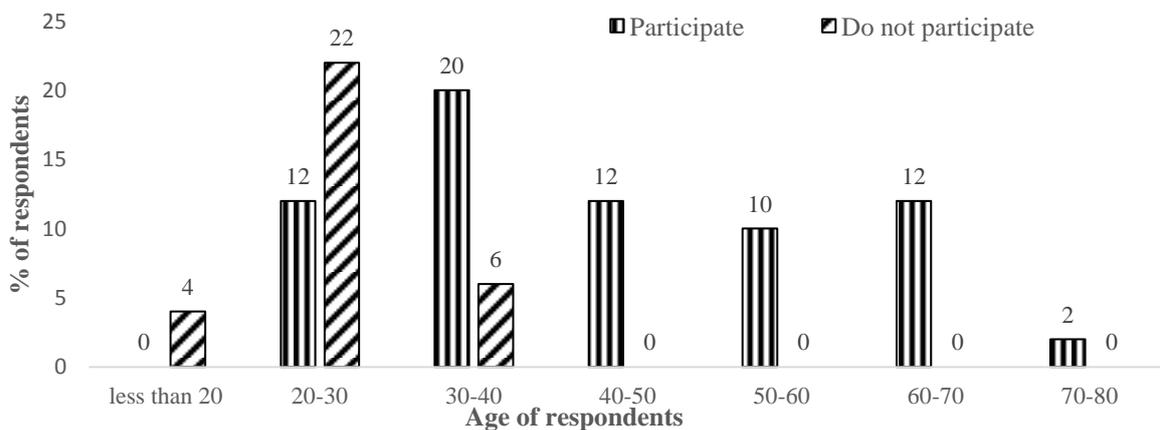
Results (Figure 1) show that there was no significant relationship between the level of education and participation in afforestation activities ( $X^2= 6.220$ ,  $df= 3$ ,  $P= 0.101$  and  $r =0.353$ ).



**Figure1.** Level of education of respondents

The results further show that most participants (42%: 50/120) who participated in afforestation activities during the study had primary level of education. It appears that despite having low levels of education, a high proportion of the respondents participated in afforestation activities. This entails that the level of education had no significant influence on participation of local community members in afforestation activities. This relates to the situation in Malawi where local communities usually participate in afforestation activities regardless the level of education that they have. A similar finding was found by Abdullah *et al.* (2015) who reported that in Bangladesh, the level of education did not influence local community participation in afforestation activities. However, this finding disagrees with Meshack *et al.* (2006) who found that in Tanzania community participation in afforestation activities was influenced by level of education of the local communities. The differences in these research findings could probably be due to the fact that the studies were carried out in different socio-cultural settings where the levels of education among the people are perceived differently.

### Influence of Age on Community Participation in Afforestation Activities



**Figure2.** Influence of age on community participation

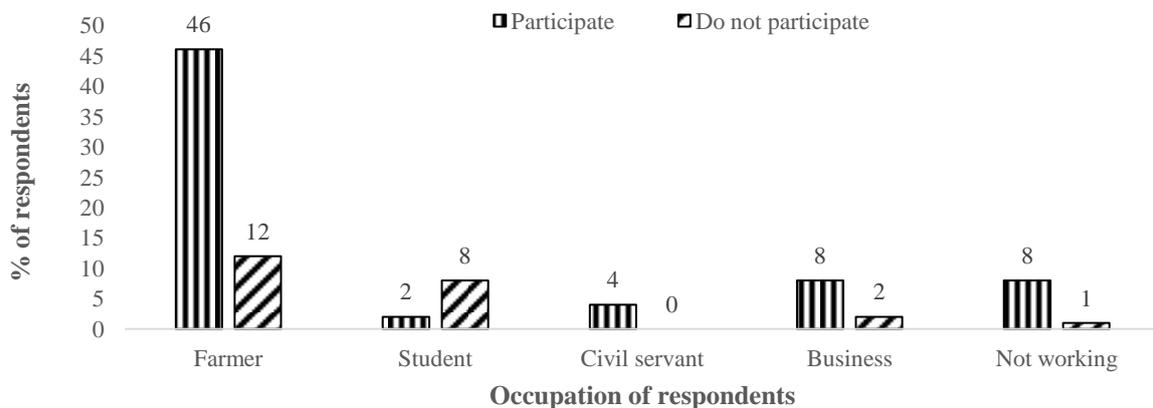
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The study further assessed on how age influence community participation in afforestation activities (Figure 2). Results showed a significant relationship between age and community participation in afforestation ( $X^2 = 21.553$ ,  $df = 6$ ,  $P = 0.001$ ). Not only did the relationship between the two variables exist, but it was also found to be strong and positive ( $r = 0.657$ ).

It was observed that age of respondents had a significant influence on whether an individual could participate in afforestation activities or not. It was also noted that respondents between the ages of 30 and 40 were the ones who participated more in the afforestation activities than those aged below 30. This finding, is consistent with Victor and Bakare (2011) and Maraga *et al.* (2010) who observed that community members aged between 35 and 54 tended to participate more in community forestry programmes because they are able to plant trees and harvest them within their lifespan. In this regard, age has an important bearing on participation of people in afforestation since it relates to benefits from tree and forest resources in their lifetime. When people are sure that they would benefit from afforestation activities in their life time, it acts as an incentive for them to participate in tree and forest management. It is probably for this reason that within local communities, older people, mainly those aged above 30 years, tend to participate more in afforestation programmes. In addition, tree planting in this age range ensures tenure rights of the land where the trees are planted (Njera in Breen, 2013). In this case, besides age, people would plant trees not to specifically obtain tree and forest products but to maintain ownership and tenure rights of their land.

**Influence of Occupation on Community Participation in Afforestation Activities**

Results revealed a significant relationship between community participation in afforestation and occupation of the respondents ( $X^2 = 10.56$ ,  $df = 4$ ,  $P = 0.032$ ). The relationship between the two parameters was also found to be positive ( $r = 0.460$ ). It was observed that majority of respondents were farmers (46%) and only (4 %) were civil servants (Figure 3).



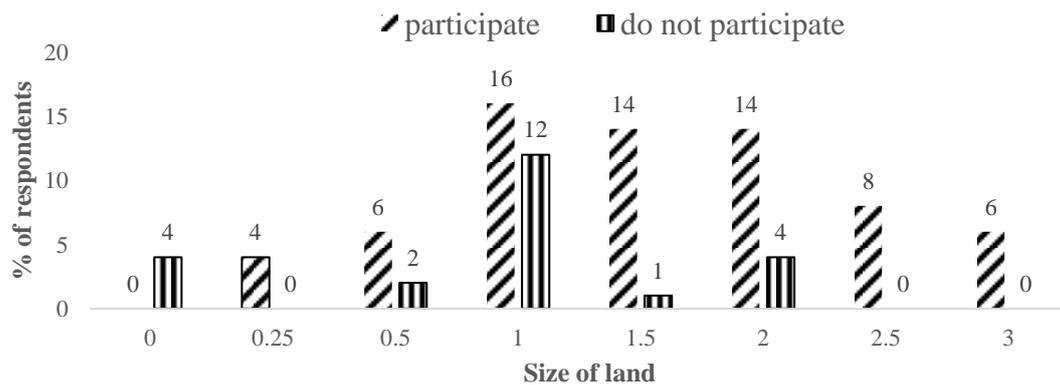
**Figure3.** Types of occupations of respondents

The results show that people’s occupations influence the extent of community participation in afforestation activities. Rural farmers tend to participate more in developmental activities e.g. in tree and forest management in order to achieve their intended benefits which they cannot afford through formal employment (Flores and Filho, 2014). It is evident from the research findings that civil servants participate less than farmers. An argument could arise from this that civil servants depend more on their salary to procure forest resources such as fuelwood, fruits and medicine. The same argument is true for those people doing business. In contrast, subsistence farmers may be enticed to participate for the need of the same materials which they cannot afford like their business and working counterparts who get monthly salaries from their work. It is for this reason that farmers appeared to participate more in afforestation activities compared to other respondents having different occupations.

**Influence of Landholding Size on Community Participation in Afforestation Activities**

Results between landholding size and community participation in the afforestation revealed no significant relationship between the two variables ( $x^2 = 10.245$ ,  $df = 7$ ,  $P = 0.175$ ) and ( $r = 0.453$ ).

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**Figure 4:** Landholding size of respondents

Most of the respondents (58%: 70/120) who participated in afforestation activities had at least 1 hectare of land (Figure 4). Therefore, although the results showed no relationship between landholding size and community participation in the afforestation programmes, it appears that those community members having a larger land holding size appeared to participate more than the other respondents having less landholding size. This means that regardless of the size of the land, people still participate in afforestation activities in the area. This agrees with what a study in Nepal found which revealed that there was a significant relationship between landholding size and community participation in afforestation activities (Maskey *et al.*, 2013).

**Influence of Expected Benefits on Community Participation in Afforestation Activities**

With regard to benefits from afforestation activities, results showed that there was a positive correlation between local community participation in afforestation activities and the respondents’ expected benefits from tree and forest management ( $X^2=33.640$ ,  $df= 2$ ,  $P=0.001$ ). The relationship was also found to be positive and very strong ( $r= 0.846$ ). Majority of the respondents (72%: 86/120)) reported that they participated in afforestation activities because they expected to get various forest products and services e.g. firewood, poles, timber, fruits and medicine. This shows that local community members will participate in afforestation if they are sure of the benefits they would obtain through their participation. This is consistent with what Bowen (2007) and Geidam (2012) who found that material incentives prompt communities to participate in community projects (5). It implies therefore that community participation and anticipated benefits were strongly related. This finding constructively compare with those of Maskey *et al.* (2013) and Okinda (2015) who conducted a research in Nepal and found that people participated in afforestation activities in anticipation of obtaining benefits benefits such as fuelwood and fodder. Boates *et al.* (2012) further observe that other expected benefits such as training and skills also influences peoples’ participation in afforestation activities. Another study in Ondo state, Nigeria, also showed that farmers participated in Taungya afforestation system because of the benefit factor such as enhanced crop production, increased fodder and increased incomes. Hence, through the Taungya system, farmers were able to get important livelihood sustaining products from the forests hence, enhancing their continued participation (Victor and Bakare, 2011). In order to substantiate the above mentioned results, a logit model was employed (Table 1).

**Table1.** Logit Model for member specific factors influencing participation in afforestation

Independent Variable	Correlation Coefficient	Standard error	P-value
Gender	-2.938	2.108	.163
Age	.594	.303	.050*
Education level	.131	.200	.513
Marital status	4.601	3.273	.160
Occupation	.429	.367	.242
Household size	-.242	.702	.730
Landholding size	-2.001	1.889	.289

*R square = 0.799*

\* represents significant differences at  $P < 0.05$ .

In the model, the R square suggests that 79.9% of variability is explained by the model implying that the model is reliable for predicting the factors influencing local community participation in afforestation. The results show that among the independent variables tested in the model, age was found to be significant in influencing community participation in afforestation activities while the other parameters seem not influence participation. However, despite not being significant, marital status was seen to have a positive correlation (4.601) with participation. This implies that age and marital status influence participation indicating that the older the members, the higher the likelihood of their participation in afforestation. In addition, the model also shows that there was a high likelihood for married members to participate more in afforestation activities compared to unmarried members.

### **Challenges the Communities Face When Carrying Out Afforestation Activities**

On challenges that communities face in afforestation activities, results showed significant differences ( $X^2 = 22.80$ ,  $df = 9$ ,  $P = 0.007$ ) in the number of respondents who mentioned various challenges faced when carrying out afforestation activities. Although majority of the respondents mentioned that they faced no challenges when carrying out afforestation activities, 16% (19/120) of respondents said they faced the problem of arson fires while 4% (5/120) said they had inadequate land and another 4% of the respondents mentioned theft as the problem they faced when carrying out afforestation activities. Inadequate land and theft of trees were the less dominant challenges that the participants faced in the area.

### **CONCLUSION AND RECOMMENDATIONS**

The study has revealed that three factors including age, occupation and anticipated benefits significantly influence community participation in afforestation activities in the study area. Of these three variables, the benefit factor showed to be the main factor influencing people's participation. Two variables, education and landholding size were found not to have an important bearing on community participation in the afforestation programmes. On challenges, arson fire was mentioned as the most prevalent challenge faced by communities when carrying out afforestation activities. However, the finding that anticipated benefits influence more people to participate is a sad scenario because if the benefits are withdrawn or the people cannot obtain what they expected, local communities may not be able to sustain afforestation activities. Due to low levels of education in the area, training activities before the commencement of an afforestation program should be exercised. Program planners need to involve more young people in afforestation activities since the results have shown that elderly people are the ones who are currently participating. People in the area must be taught to use other alternative sources of energy so as to reduce their reliance on firewood. There is also need to lessen amount of fuel load in the forests to reduce cases of arson fires.

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