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Factors influencing participation in resource based conflict among pastoral and agro pastoral households: The case of Erer District in Somali Regional State, Ethiopia

Gutema Bati Fedi[1]* and Jema Haji Mohammed[2]

[1]Department of Agricultural Economics and Value Chain Management, Wollega University, Ethiopia.
[2]School of Agricultural Economics and Agribusiness Management, Haramaya University, Ethiopia.

This article attempts to identify factors influencing participation in resource based conflict using cross sectional data collected from hundred randomly selected households from Erer district of Shinile Zone in Somali Regional State. A logit model was used to identify socioeconomic factors influencing participation in resource based conflict. The logit model results showed that households' involvement in resource based conflict are significantly and negatively influenced by age and size of irrigable land while livestock ownership and average distance to basic social service centers have a statistically significant positive effect on the livelihood of pastoral and agro pastoral households. Based on the finding, the study provides evidence that one should focus on accessing modern irrigation system and investing in alternative watering points such as wells and ponds and easily grown and drought resistant plant that can be used to feed animal. And also one should focus on size of irrigable farming land, household age and basic social services to improve livelihoods of the households and to reduce resource-based conflict in pastoral and agro-pastoral areas.

Key words: Resource based conflict, logit, Erer, pastoral and agro pastoral.

INTRODUCTION

In developing countries like Ethiopia, the natural resource base is critical because farmers, cattle herders and fishermen all make their living from renewable natural resources such as land, water, air, forest, grazing areas, irrigation water, plants and animals. Among others, land and water are very important resources to pastoral, agro pastoral, and mixed crop livestock agricultural systems in Ethiopia. Individuals/groups response to scarcity of resources depends on the livelihood strategy pursued by them. Crop-livestock farmers respond to scarcity of land by expanding into grazing and virgin lands. Pastoralists respond to scarcity by mobilizing their livestock and family into less exploited grazing areas and water points. Agro pastoralists may use a mixture of the two means.

Even though conflicts have been a tradition in pastoral and agro pastoral communities over resources like grazing lands, water and livestock; climate change, population pressure, poor infrastructure, low education level and increased competition for scarce resources aggravated the situation (Yemane, 2003). Moreover, governments and NGOs' effort to construct large and small scale irrigation schemes for these communities has now became one of the main sources of conflicts. In addition, Ahmed (2005) added that inter-and intra-clan level herder-herder and herder-farmer competition and the resulting conflicts over access and control of natural resources have become increasingly serious problems in

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*Corresponding author. E-mail: gutemabati@gmail.com. Tel: +251 91 3089014.

the pastoral regions of Ethiopia and elsewhere in the Horn and the Sahel. Singh and Sinh (2002) also noted that in the developing countries, conflicts over natural resources has increased in number and severity because of growing conflicts between agriculture and other land uses as both human and animal population increases.

Conflicts may benefit some, but in general hinder the capability of a community to fulfill its basic human needs. This is because conflicts result in deterioration of various forms of assets (human, physical, financial, natural, and social) that constitute the capability of a community. The adverse effects of conflicts are manifested both by direct losses of assets (social, political, human, financial, and physical capital asset) and reduced access to resources or opportunities, human death and suffering, restricted access to markets, restricted mobility, deterioration of social capital, and asset diversion which are the major impacts of conflicts (Hundie, 2008; Omosa, 2005).

According to Haro and Doyo (2005), conflicts over natural resource uses and access are common and inevitable especially where resources are used and managed by different groups. Natural resources, particularly, rangeland resources are typically nowhere sufficient or it is scarce which increases pressure on these resources as well as other changes in social, economic, political and demographics and resources in this context are more susceptible to conflict. In Shinile zone, rangeland resources are scarce because of the erratic rainfall forcing the pastoralists to move frequently resulting sometimes in conflict even getting worst in severe drought time (Devereux, 2006). As a result, resource based conflict usually happens that generally deteriorate individual livelihoods and it affects development and provision of essential services in pastoral and agro pastoral areas through disruption of the communities' livelihood systems by restricting access to natural resources.

Most of the violent and latent conflicts within the Somali Regional State are not political in the larger sense, but occur between or within clans and concern access to productive resources; especially water and pasture resource and farm land. With legally formalized property rights over these resources either absent or weakly defined, the boundaries between clan territories are often contested and when two groups converge on the same water point or pasture, conflict often follows (Gebre-Mariam, 2005).

Similarly, in Erer district the failure of seasonal rains, which adversely affect pasture and water availability which in turn lead to poor crop and livestock production are the major vulnerability or risk factors which are sources of resource-based conflict (SC-UK, 2004). It is true that resource based conflict causes loss of human life, loss of livestock and crop, destruction of property, and further decline in rangeland resources, and generally deteriorates an individual's livelihood. The literature on conflicts in the horn of Africa has mainly focused on the analysis of the causes of inter and intra-state or secessionist ethnic conflicts using descriptive analysis and very little on pastoral resource conflicts and their impact on the livelihood of these communities. Inadequate or poor understanding of pastoral resource conflicts in the sub region has led to a situation where there are no mechanisms for dealing with this challenge. To the best of our knowledge there is no study conducted on the socioeconomic factors influencing participation in resource based conflict among pastoral and agro-pastoral households using rigorous econometric techniques. This article aims at filling this research gap.

METHODOLOGY

Description of the study area

Erer is among the six districts of Shinille zone of Somali National Regional State, which is located about 62 km to the South of Dire-Dawa city. The district has a total population of 77,544, of whom 42,405 were men and 35,139 were women and 64,935 (84%) of them reside in rural areas and urban dwellers are 12,609 (16%) (CSA, 2008). The district is primarily inhabited by the Issa and Gurgura clan of the Somali people. The agro-ecology of the district includes arid (60%), semi-arid (30%) and semi-desert and rocky (10%) areas. Its altitude ranges between 450 and 1200 m.a.s.l. and the main rainfall pattern in the district are bimodal type known as the *Gu* rains (its rain start in late March and ends mid-May) and *Karan* rains (its rain start in July and continue up to early September).

Livestock rearing and crop production characterizes the livelihood of the district. Goat, sheep, cattle, and camel are the most dominant species. Crop production is the second major sources of livelihood in Erer. The major crops grown in this area are cereals (sorghum and maize), fruits (orange, mango, lemon, banana, papaya, and guavas), vegetables (tomato, cabbage, and green peppers), and root crops (onion, sweet potato, and potato).

Rangelands in Erer district experience low rainfall with long spell of dry seasons and frequently recurring drought. The influence of drought on the quantity and quality of forage production has largely affected pastoralists and settled livelihood. The existing rangelands are mainly woodlands without any grass and they appear to be infested badly with some undesirable plant species and the main reasons for rangelands degradation are the problem of soil compaction, repeated and prolonged drought, over grazing, soil erosion and deforestation. The ownership pattern of the grazing land is mainly communal type and they are using the grazing and pasture lands available for large number of animals and all stock graze in the same place. The Erer, Gota, and Hurso seasonal rivers are the main sources of water for livestock and crop production. These rivers lead to the

emergence of agro pastoralism in those peripheral areas and serve as a source of drinking water for the pastoral households, their livestock and wild ungulates in the arid grasslands and savannas and also the major sources of conflict among the agro pastoral households.

Sampling design

Data sources and methods of data collection

In this study, both primary and secondary data were used. Primary data were collected from randomly selected pastoral and agro pastoral household heads who were involved in RBC through a semi-structured interview schedule. The interview schedule was pre-tested among non sampled respondents and then the questionnaire was revised in lights of suggestions received. For data collection, eight educated enumerators who speak the local language fluently and have good knowledge about the area and acquainted with the culture of the community were recruited from the study areas.

Training was given to the enumerators on the methods of data collection, on how to approach the households and the content of the questionnaire before commencing the survey. Finally, the survey was conducted from December, 2013 to January, 2014.

The questionnaires were administered by enumerators under a close supervision of the researchers. In order to generate a wide range of primary information and capture better socio economic context, key informants interview, focus group discussions with community leaders, government officials, and NGO representatives were also made.

Secondary data were also collected from published and unpublished documents, seasonal and annual reports of district, zonal and regional offices of livestock, crop and natural resources.

Sampling method

In this study, a three stage sampling procedure was adopted to collect primary data. In the first stage, among the six districts found in Shinile Zone, Erer district was selected purposively since it represents different tribes and types of conflicts.

In the second stage, among the 14 *kebeles* (*Kebele* is the smallest administrative unit in Ethiopia) in the district, five of the *kebeles* namely: Bila, Dimtu, Erer, Gota and Kantaras were randomly selected. Thirdly, stratified random sampling method was employed to identify sample households.

To this effect, involved households (at least once in a year) were listed by community leaders and management of each sampled *kebeles* and then 100 households in these *kebeles* were drawn randomly based on probability proportional to sample size.

Methods of data analysis

Gujarati (2004) and Pindyek and Rubinfeld (1981) illustrated that the logistic and probit formulations are quite comparable, the main difference being that the former has slightly flatter tails, that is, the normal curve approaches the axis more quickly than the logistic curve. Therefore, the choice between the two is one of convenience and ready availability of computer programs.

Hosmer and Lemeshew (1989) pointed out that a logistic distribution has got advantage over the others in the analysis of dichotomous outcome variable in that it is extremely flexible and easily used model from mathematical point of view and results in meaningful interpretations. Thus, a logistic model was specified to identify factors influencing involvement in resource based conflict and to assess their relative importance in determining the probability of being in resource based conflict situation at household level.

This study is intended to analyze which and how much the hypothesized regressors were related to the involvement in RBC. In estimating the logit model, the dependent variable is involvement in RBC, which takes the value of 1 if a household is involved in RBC and 0 otherwise. However, the independent variables were of both types, that is, continuous and categorical. According to Gujarat (2004), the logit distribution model is defined as:

$$P_i = F(Z_i) = F(\alpha + \sum \beta_i X_i) = \frac{1}{1 + e^{-Z_i}} \qquad (1)$$

Where, p_i is the probability that an individual will make involvement (involving in resource-based conflict or not) given X_i; X_i represents the respondents i^{th} explanatory variables; and α and β are parameters to be estimated; and e represent the base of natural logarithms, which is approximately equal to 2.718.

Hosmer and Lemeshew (1989) pointed out that the logistic model could be written in terms of the odds and log of odds ratios, which enables one to understand the interpretation of the coefficients. The odds ratio implies the ratio of probability (P_i) that an individual would choose an alternative to the probability $(1 - P_i)$ that he/she would not choose it:

$$\frac{P_i}{1 - P_i} = e^{Z_i} = e^{(\alpha + \sum \beta X_i)} \qquad (2)$$

Applying logarithmic transformation to equation (2) yields

Table 1. Distribution of respondents based on causes of conflicts (N=100).

Major causes of conflicts	Percent
Pasture lands and water points	9
Irrigation water (*mengat*)	40
Both	40
Irrigable land	11

Table 2. Distribution of respondents based on the consequences of conflicts (N=100).

Major consequences of conflicts	Percent
Human death and suffering	6
Loss of livestock and crop	50
Loss of assets	21
Loss of grazing land and water points	43
Restricted access to markets	7

the final equation to be estimated:

$$Z_i = \ln(\frac{P_i}{1-P_i}) = \alpha + \sum \beta_i X_i \qquad (3)$$

If the disturbance term (U_i) is introduced, the logit model becomes:

$$Z_i = \alpha + \sum \beta_i X_i + U_i \qquad (4)$$

Where,

$i = 1, 2, 3 \ldots n$

n = the number of explanatory variables

α_i = are the intercept

β_i = are the logit parameters (slopes) of the equation in the model

U_i = a disturbance term, and

X_i = a vector of explanatory variables such as sex, age, educational status, size of family, livestock holding, access to irrigation, size of irrigable land, an average distances to basic social services, off/non-farm income.

EMPIRICAL RESULTS

Sources and consequences of conflicts

Results presented in Table 1 show that 40% of the participating households believe that irrigation water (*mengat*) is the main cause of conflicts in the district and also the same proportion of the respondents assured that irrigation water (*mengat*), pasture and water points are the main causes of conflicts. On the other hand, pasture and water points, and irrigable land were reported as the main causes of conflict by 9% and 11% of the respondents respectively. Moreover, the key informants interview and FGD revealed that mismanagement and scarcity of irrigation water and irrigable land are the major causes of conflict in the study area.

Results presented in Table 2 show that loss of livestock and crop, loss of grazing land and water points and loss of assets in this order were indicated as the main consequences of conflict in the study area. Moreover, key

informants interview and FGD revealed that as the causes of conflicts may differ so might be its consequences and it generally affects livelihood of the households. They argue that loss of livestock and crop through conflict have a significant economic impact on pastoral and agro-pastoral households. This idea is supported by Devereux (2006).

Table 3 shows the estimation results of the logit model. Looking into the estimated coefficients, the results show that involvement in RBC is significantly influenced by five explanatory variables.

Access to irrigation is found to have strong and negative relationship with involvement in RBC. What this means is that households which have no access to irrigation sources (*mengat*) are more involved in RBC than those who have access to irrigation. This may be due to the fact that those who lack this resource complain for ownership. By contrast, an average distance to basic service centers is found to have strong and positive relationship with involvement in RBC. This show that households nearer to different basic services are less likely to be involved in RBC than others because households nearer to these service centers are more likely to get services first as needed compared to others. Similarly, livestock ownership has a strong and positive effect on involvement in RBC. This implies that households with larger herd ownership are more likely involved in RBC than those with lower herd ownership. This is due to more feed demand and sharing limited grazing and water sources for their livestock.

The effect of household age and size of irrigable land on the involvement is negative and statistically significant. This means that younger households are more likely to be involved in RBC than older households. Perhaps, this is due to the fact that elders had acquired very rich experience and insightful thought related to conflict which accumulated in their life time and the younger and energetic group had been directly involved in RBC as the main actors. This result is supported by the finding of Bough (2007).

Households with bigger size of irrigable land are less likely to be involved in RBC than those with less hectares of irrigable land. These are due to the fact that the households with large hectares of irrigable land satisfy his/her demand.

Table 3. Logit results of household involvement in RBC.

Covariates	Coef.	Std.Err.	Z-value	p>Z
Sex (1 if male; 0 otherwise)	-0.122	0.882	-0.14	0.890
Age (years)	-0.071***	0.022	-3.22	0.001
Education (1 if literate; 0 otherwise)	-1.852	1.134	-1.63	0.102
Household size (number)	0.125	0.129	0.96	0.336
Access to irrigation (1 if yes; 0 otherwise)	-2.889***	0.726	-3.98	0.000
Irrigable land (ha)	-0.842***	0.290	-2.90	0.004
Livestock ownership (TLU)	0.062***	0.012	5.22	0.000
Distance to service centers (km)	0.098***	0.028	3.40	0.001
Off/non-farm income (*birr*)	-0.0001	0.000	-0.70	0.482
Constant	8.691			
Number of observation (N)	200			
LR chi^2 (9)	84.82			
Prob > chi^2	0.000***			
Pseudo- R^2	0.306			
Log likelihood	-96.219			

Source: Own estimation result based on household responses, 2014. *** indicates 1% significance levels.

Conclusion

Resource-based conflict involvements of the household were significantly influenced by a combination of factors. Herd ownership has a strong and positive effect on household involvement in RBC. This implies households with large livestock ownership are more disposed to resource-based conflict than households with few livestock ownership due to more feed demand from disputed grazing area. Sharing of the common and limited grazing land and water points lead to competition and conflicts. By contrast, access to irrigation and size of irrigable cultivated land were found to have strong and negative relationship with household involvement in RBC. This implies that households with access to irrigation (*mengat*) and larger size of irrigable land are less likely to be involved in RBC than others with no access and small hectares of irrigable land, respectively. The effect of household age on the dependent variable is negative and statistically significant. This means that younger households are more likely to be involved in RBC than older ones. Similarly, an average distance to basic service centers was found to have strong and positive relationship with household involvement in RBC. This show that households nearer to different basic services are less likely to be involved in RBC than others because households nearer to these service centers are more aware of the consequences of conflict compared to others.

In line with conflict theory, where there is scarcity of natural resources there is always competition for economic power and access to natural resources which leads to conflicts (Homer-Dixon, 2004). The recent development that has been shown by the government or some NGOs in respecting and giving recognition to the resource-based conflict, role of indigenous conflict management and resolution mechanism is indeed a good start, but needs to be strengthened and sustained. Based on the empirical findings reported in this thesis, the following policy recommendations are forwarded.

On a positive note, this study has found evidence that the involvement in resource-based conflict in the study area has a statistically significant effect. This sends an encouraging signal for government or NGOs and funding agencies on preventing, managing and resolving the resource-based conflict. On the other hand, in the future, livelihood loss from involvement in resource-based conflict could be reduced by taking the following policy measures:

- Improving access to modern irrigation system (or improving water use efficiencies by investing in water-saving technologies in conditions of water stress) to the emerging agro-pastoral households would enhance households' livelihood and reduce resource-based conflict.
- Attention should be given to increase the size of irrigated land by taking the water to long distances to cover large area using improved irrigation schemes. This should be supported by agricultural extension services which increase productivity.
- Livestock have an immense role for household livelihoods. Attempts should be made in investing alternative watering points such as wells and ponds to reduce competition over water point, introducing technologies that are easily grown and drought resistant

plant that can be used to feed animals.

- Attention should be given to improve household livelihoods by further investment on different social basic services like access to education and health services at nearer distances to households.

- Moreover, attention should be given to the effect of household age by providing education and other basic training related to conflict.

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