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PARTICIPATORY ENVIRONMENTAL ASSESSMENT IN NYANGATOM DISTRICT OF SOUTH OMO ZONE, SOUTH ETHIOPIA

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ABSTRACT

The aim of the study was to identify potential constraints to mutual resource utilization in the bordering areas of Nyangatom and to identify and develop participatory mitigation measures to resource utilization problems based on community and government proposals. The study employed Focus Group Discussion (FGD) and Key Informant Interview (KII) to collect the primary data. 1 FGD and 2-3 FGDs were held in each kebele. Livestock production is the major source of livelihood followed by crop production in the district. Bee keeping, fishery and gathering of forest products are the supplementary activities performed by the community. Sell of livestock and livestock products, honey and crop in times of surplus production are the major sources of income and they spend it to fulfill their food demand, medication and purchase of clothing's. Most of the communities in Nyangatom are food insecure. Drought, conflict, diseases and invasive species are the main hazards to the environment in the area whereas resource scarcity and sense of ownership are among the reasons that prohibit mutual resource utilization. Area enclosures allied with plantation of grasses, Rehabilitation of the depleted grazing lands and introduction of improved pasture management, Maintenance, rehabilitation and construction of water infrastructure, Expanding small scale irrigation, Ensuring security and Countering prosopis juliflora were the mitigation measures suggested by the community.

Keywords:
Environment, KII, FGD, hazard, livelihood, Nyangatom.

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1. INTRODUCTION

1.1. BACKGROUND

The pastoral regions of Ethiopia, as elsewhere in Africa, have a fragile environment and unpredictable weather. Pastoralist areas cover about 61 percent of Ethiopia. Usually found below 1,500 meters, these areas are known as 'arid and semi-arid' land and are often described as

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marginal. Overall, pastoralist areas are noted for their highly variable and uncertain rainfall and are prone to drought and food shortages (PFE, IIRR and DF. 2010).

There are approximately 10 million pastoralists in Ethiopia who make up almost 14 percent of the total population. Coming from at least 29 different nations and nationalities, Ethiopian pastoralists live in more than 133 districts (woredas) in seven National Regional States. Somali, Afar and Oromo pastoralists are in the majority in their states and constitute 87 percent of the total pastoralist population. Pastoral communities in SNNPR (South Omo and Bench-Maji Zones), Benishangul-Gumuz, Dire Dewa and Gambella make up the remainder (Ibid).

The pastoral mode of life of Nyangatom communities is constrained by various factors including drought coupled with local natural resource degradation, ethnic conflict, skill gap in ecosystem restoration and management, narrow livelihood base and limited external development support to supplement communities' initiatives. These and other constraints coupled with effect of climate change made the pastoral life even worse.

It was in response to some of these situations Action For Development (AFD) and Horn of Africa Regional Environment Center and Network initiated a project called "Participatory Livelihood Diversification and WASH in Improving the Livelihood of Nyangatom Woreda Community as an Adaptation to Climate Change through CMDRR approach." AFD has been implementing this project in two kebeles of Nyangatom woreda, namely Lorenkachew and Ayipa since April 2013. The project is planned to improve the coping capacities to climate change in the target communities through livelihood diversification and enhancing access to WASH, climate change early warning information and scarce natural resources.

In order to achieve the above stated objective, the project envisaged to carry out participatory environmental assessment to identify potential constraints to mutual resource utilization in the bordering areas of Nyangatom and propose participatory implementation of the proposed assessment.

1.2. OBJECTIVES OF THE ASSESSMENT

The objectives of the assessment are:

- To identify potential constraints to mutual resource utilization in the bordering areas of Nyangatom,
- To identify and develop participatory mitigation measures to resource utilization problems based on community and government proposals.

2. METHODOLOGY

2.1. DESCRIPTION OF THE STUDY AREA

Nyangatom woreda is located in south omo zone of SNNPR, comprising of 20 (1 urban and 19 rural) kebele administrations (KAs). It is one of the eight woredas in south omo zone with an area of 2652 km^2 and is located at $4.85^0 – 5.67^0$ N and $35.75^0 – 36.23^0$ E. According to WFEDO report

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of 2005, the woreda has a human population of 22,349 of which 10,724 are male and 11,623 are female. The population density of the woreda is estimated to be 8 persons per km^2. It's bordering with bench maji zone and selamago woreda in north, dassenech woreda in south, hamar woreda in east and Kenya and south sudan in west. The traditional agro ecology of the woreda is kola with an altitude that ranges between 300 -450m a.s.l. The mean annual temperature of the woreda ranges between 33 and 42^0c. The woreda has a rainfall pattern of bimodal type (Belg from March to May and Meher from August to October). The rainfall in the woreda is erratic in nature. The mean annual rainfall ranges from 350 – 500mm. Livestock production is the dominant livelihood source in the woreda. It has an animal resource with an estimate of about 415292 cattle, 132,604 goats, 109217 sheep, 11218 donkeys and 5474 chicken. Bee keeping and fishery are also practiced in the woreda. The second most important source of livelihood is opportunistic crop production. Sorghum, maize and haricot bean are the major crops produced in the area. Regarding the land use the woreda has potential arable land (cultivated and cultivable), pasture land, natural forest, shrub land, non arable land and investment land of 60680, 72816, 6467, 36437, 4584 and 27938 ha, respectively. There are three ethnic groups in the woreda. Nyangatom is the dominant one followed by Murulle and Koygu (Muguji).

2.2. SAMPLING PROCEDURES

Before collecting the primary data a group of multi-disciplinary team visits the woreda to collect some basic information that can be used as a basis for selecting sample kebele's and getting insight about the overall conditions of the woreda. Accordingly, six kebele's namely Aypa, Shenkora, Lorenkachew, Kakuta, Nawyape and Kuchuru are selected based on the availability of different kinds of natural resources, ethnic representativeness, border sharing and availability of interventions like enclosures and irrigation.

2.3. TYPES OF DATA AND METHODS OF DATA COLLECTION

For this study both primary and secondary data from different sources were used. Primary data on the sources of livelihood of the community, environmental hazards faced, causes and seasons of conflict, food security status, factors affecting the mutual resource use with bordering areas, possible intervention areas, etc was collected using semi structured interview. FGD and KII were the participatory tools applied to collect the primary data. In the FGD different groups of the community like elders, youth and women are included. In each sample kebele 2-3 key informants were interviewed. The secondary data was collected from different bureaus of the woreda such as Woreda Agricultural and Rural Development Office (WARDO), Woreda Finance and Economic Development Office (WFEDO), Woreda Water, Mines and Energy Resource Office, Kebele managers and published and unpublished sources.

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Picture 1: Focus group discussion in Lorenkachew Kebele

2.4. DATA ANALYSIS

Since the data has a qualitative nature, it is analyzed by summarizing the responses of the community. The responses of the community in each question was grouped and summarized for further writing.

3. LIVELIHOOD SYSTEMS

The lowland areas are of diverse ethnic groups, environment and climatic condition which shape livelihoods and coping strategies. Shocks are fundamental and leading causes for the variation of livelihood systems in the lowlands. The arid climate, the changing weather conditions and lack of water and infrastructure are also contributing to livelihood variations and adaptive strategies. Considering these natural conditions, the population in the lowlands dwells on the production of livestock that thrives best to hostile environment for crop production and modern household economy. Thus unlike in the highlands, livelihoods and adaptive strategies are limited to very few economic activities.

Three major livelihood systems are dominant in lowland pastoral areas, excluding urban economic activities: Pastoralism is a way of life where livestock production is dominant and a major source of employment, income and food as well as wellbeing of the population. Pastoral adaptive strategies to the environmental shocks include production of large number of livestock that adapt to the environment, production system and production constraints. Transhumant migrations or seasonal migration in search of water and forage for animals are fundamental to the sustainability and survival of pastoral livelihood system. Mobility is the major distinguishing characteristics from other forms of livelihood systems in the lowlands. Pastoral production system is limited by extremely changing weather condition, shortage of forage and water, market and market infrastructure, inadequate access to veterinary and human health services, declining areas of the rangeland (population growth, crop production and bush encroachment).

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Agro-pastoral production system is the second economy subsisting the majority of the population in pastoral lowlands. This production system is a recent introduction to the lowlands due to migrations, drought, forced and induced transformation of the pastoral system through pauperization, development policies and strategies. Agro-pastoralism, unlike pastoral livelihoods depends on both production of crops and livestock both for the market and own production. Since most of agro pastoral livelihood is transformations of pastoralism due to poverty and inadequate restocking, it is subsistence. Crop production is opportunistic and located around river valleys, moist and wet weina dega and highland agro-climatic zones of pastoral areas.

Sedentary farming is the third livelihood system. This only hosts less than 10 percent of the population and dominant in the major river valleys of Genale, Wabe Shebelle and Awash (Hailu, 2008).

The main sources of livelihood in the woreda are livestock husbandry and crop production. Collection of different products from forest, bee keeping and fishery are among the supplementary activities that support the livelihood of the community. The different sources of livelihood and their current situation are discussed below.

3.1. LIVESTOCK PRODUCTION

Livestock are central to the pastoralist production system: females for all species types are preferred so that herds can keep growing as quickly as possible. Indigenous knowledge of livestock production, their diseases and needs, combined with an innate understanding of the land, allow pastoralists to make the best possible use of the available resources.

Livestock production is the dominant livelihood source in Nyangatom woreda. The livestock's kept in the woreda are cattle, goats, sheep, poultry and donkeys. They are used as a source of food like meat, milk and butter. The skin of cattle's is used as a mattress whereas goat's skin is a major input for women's dressing. They are also an asset, determinants of wealth status and a source of income for the community. Donkeys are kept primarily for the purpose of transportation.

In normal times all types of livestock's stay around the respective kebele's and fed on the available pasture in the surrounding and drink water from natural ponds and Omo River. During the dry season cows with milk, calves, goats and sheep and old cattle are kept close to home. Oxen, bulls and other dry cattle travel long distances in search of pasture and water. Almost all of the herds in the woreda go to a place called Tirga (a large pasture land near to kibish river and endowed with natural springs).

Table 1: Communal natural pasture areas with their nearest kebele

No.	Pasture land	Nearest kebele
1	Tirga	kakuta
2	lokulan	lorenkacho
3	charrii	Charrii
4	shenkora	shenkora
5	kuchuru	kuchuru

**source; the *Nyangatom* woreda pastoral development office

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According to the community the number and productivity of livestock are reducing due to shortage of pasture and water and occurrence of frequent diseases. The situation is even worse in kebele's around kibish river with the introduction of invasive alien species Prosopis Juliflora (lupoliso) that reduces the area of grazing land.

3.2. CROP PRODUCTION

Some pastoralists have diversified from relying entirely upon their livestock to putting areas under cultivation. This has been one of the most radical changes in land use and tenure. There are four main techniques for growing crops in pastoralist areas:

- Irrigation – including river-fed, hand-watered or machine-pumped.
- Flood recession – along river banks, using the flood-waters.
- Water harvesting – collecting, storing and diverting rain water.
- Dry land cropping – planting in the hope that expected rain will produce a harvest.

Among the four techniques discussed above flood recession (omo retreat) cultivation is the dominant one in Nyangatom woreda followed by small scale irrigation and rain fed (kure shesh) cultivation. The major crops cultivated in the woreda are sorghum, maize and haricot bean. The cultivation of sesame and some vegetables are also practiced in irrigated farms.

Picture 2: Water pump for irrigation around Omo River in Lorenkachew kebele

According to the community the production from omo retreat and rainfed cultivation is reduced because of the reduction in area covered by the overflow of Omo River and uneven distribution and low intensity of rainfall in the area.

3.3. OTHER LIVELIHOOD ACTIVITIES

As a result of internal dynamics and external pressures, pastoralists are becoming poorer and poorer and have to rely on non-pastoral activities to eke out a living. All these many effects have forced pastoralists to find other means of survival, such as; trading with the establishment of

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saving and credit cooperatives, agriculture, irrigated agriculture, wage labor, cutting firewood, sale of charcoal, tending animals for others, salt mining, craft sales, cross border milk marketing, incense and gum collection, wildlife tourism and fisheries.

Bee keeping, fishery and gathering forest products are among the other sources of livelihood in Nyangatom woreda. In kebeles like Kuchuru honey production plays a vital role in the livelihood of the society and also determines the wealth status of individual households. Gathering forest products (fruits, roots and leaves) and fishery are practiced in many parts of the woreda and serve as a means of coping strategy in times of food shortage.

3.4. HOUSEHOLD INCOME AND EXPENDITURE

The main characteristics of the pastoral economy is traditional and subsistence livestock rearing, opportunistic crop production and limited off farm or non-pastoral activities. Commercial livestock production and crop husbandry is either nonexistent or very limited to pocket areas. Market and market infrastructure are weak and terms of trade is mostly against the pastoral population. Extension services and modern production system are merely available. Drought and conflict and other natural and manmade calamities also limited the monetization of the pastoral economy. As a result, pastoral population tend to rear as many animals as possible to cope up with various socio-economic and environmental problems rather than dynamic transformation into commercial livestock production. Cumulative effect of the traditional and subsistence livestock production is limited access to cash income and declining animal productivity with increasing vulnerability of households to shocks. Cash expenditure is also limited by low level of cash income and subsistence economy (Hailu, 2008).

The main sources of income in the woreda are sell of livestock mostly goats, crops like sorghum and maize in times of good production and honey in some areas. There is no well-structured and well-functioning market in the woreda. They sell their products by moving to kangatin or exchange it with their neighboring kebeles. The income obtained is used for medication, clothing and purchase of food crops.

3.5. FOOD SECURITY AND FOOD SOURCES

The food security of households in pastoral areas depends on the number of the animals they owned, the asset position and above all the weather condition that determine the availability of water and forage for the animals. In good rainy seasons, in most of the lowlands food security situation is better with better productivity of the environment and the animals. With changing weather conditions to worse, particularly the shortage of main rainy season which mainly extends from April to the end of June, and the whole pastoral areas face critical shortage of forage, water and food. Better small rainy season between September and December however revive the vegetation cover, fodder availability and supply of milk and milk products. For agro-pastoral households who mainly depend on food crop production, slight change in volume and duration of rain is devastating. The failure of rains in the two periods however ends in havoc and significant human and animal sufferings over extended period of time as easy re-bounce to normal is very difficult. Furthermore, the limited opportunities to income and employment in the lowlands are

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the main reason for vulnerability of most of the pastoral and agro-pastoral households (Hailu, 2008).

As the production of food crops and productivity of livestock's highly depends on the availability of enough water either from rainfall or overflow of Omo River, most of the communities in Nyangatom woreda are food insecure. Shortage of rainfall and overflow from Omo River are the main reasons for food insecurity. The situation is worse in kebeles around kibish due to the fact that the community stops cultivation using the overflow of kibish river because of the conflict in the area and rain fed cultivation remains as the only option. The main sources of food in the woreda are subsistence crop production mainly sorghum and maize and livestock products like milk, meat and butter. In times of food shortage sell or exchange of livestock especially goats and honey with food crops, safety net (three month in cash three month in kind), fishery and collecting fruits, root and tubers and leaves of some trees from the forest are the sources of food.

4. HAZARDS

Pastoral communities in Ethiopia have been changing and adapting their livelihoods to changing environmental conditions for centuries. Recurrent droughts have been a major issue throughout history in the Ethiopian lowlands, and strategies to cope with, and adapt to these droughts are embedded in communities' traditional social structures and resource management systems. Local and scientific observations show that the region's climate is changing. Recent evidence includes increasing temperatures and drought frequency, as well as unpredictable rains that fall in shorter but more intense episodes. The magnitude and rate of current climate change, combined with additional environmental, social and political issues, are making many traditional coping strategies ineffective and/or unsustainable, amplifying environmental degradation and food insecurity, and forcing communities to rapidly find new livelihood strategies (Béatrice et al., 2009).

The hazards in Nyangatom woreda can be categorized into two: Natural hazards and man-made hazards. The natural hazards include drought, diseases in livestock and introduction of invasive alien species where as conflict is the man-made hazard in the woreda.

4.1. DROUGHT

Climate-related hazards in Ethiopia include drought, floods, heavy rains, strong winds, frost, heat waves (high temperatures) and lightning. Although the historical social and economic impacts of all of these hazards are not systematically well documented, the impacts of the most important ones, namely droughts and floods, are widely discussed (Kidane et al., 2010).

A climate trend experienced in pastoralist areas over the last decade indicate that climate change may be bringing a "new normal" that adds unprecedented challenges for pastoralist communities. The two most important features of climate change impacts as they appear to be unfolding are: 1) increased frequency of severe droughts and 2) the chronic failure (late arrival, early cessation, or non-appearance) of the long rains in the period from March through May (Jeffrey et al., 2011).

Drought expressed in terms of failure and shortage of rainfall is the major hazard that affects the livelihood of the Nyangatom people. It has a negative impact on natural resources such as pasture,

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water sources, farmlands and trees which are directly related to the livings of the community and their livestock's. According to the responses of the community the availability of pasture in the area is reducing gradually due to drought and shorter rainy season. The rainy season is progressively becoming shorter starting late and finishing earlier with high rate of unpredictability. The dry season is also becoming longer and leading to shortage of pasture contributing to the gradual extinction of indigenous grasses. The drought also reduces crop yields and the availability of water in the area and leads to shortage of food and feed for humans and livestock respectively. They also believed that drought is the reason that reduces the overflow of Omo River.

4.2. INVASIVE SPECIES

Pastoralist livelihoods and the ecosystem are further threatened and worsened by the invasion of pastureland and potential rangelands by non-native plant species like Prosopis juliflora. This is a multipurpose dry land tree or shrub native to South and Central America and the Caribbean. The weed is resistant to drought: it can grow well in low rainfall areas and in poor soils. It is tolerant to salinity, alkalinity and repeated cutting (PFE, IIRR and DF, 2010).

The introduction of prosopis juliflora (lupoliso) is a threat to the Nyangatom communities living near to kibish river. It exists from 1990 onwards and believed that the species is brought from Kenya by means of their goats. According to the community in Nawyape it already covers large area of grazing and cultivable land and continues to invade more areas. They try to clear it but found it difficult to remove and only limited to clearing their living area.

4.3. LIVESTOCK DISEASES

Livestock diseases are among the hazards faced by the Nyangatom people. During extended dry periods, livestocks' access to pasture and water is limited. The lack of pasture and water weakens the livestock making them susceptible to variety of diseases. Livestock diseases contribute to rapid loss of livestock assets, reduction in production and productivity of livestock's which leads to shortage of livestock products like milk and butter. According to the responses of the communities the occurrence of diseases during the dry season are increased. Goats, which are said to be most resistant to droughts, have been affected by these emerging diseases. FGDs from Nawyape emphasized that there is a new goat disease in the area that becomes hard to cure.

4.4. CONFLICT

Inter-ethnic conflicts in the lower Omo valley have steadily increased in intensity and frequency. It appears that resource scarcity (which could be explained in terms of natural and social factors), the growing pressure over fast dwindling resources, and certain cultural factors are the driving force of conflict dynamics. Although adequate meteorological records are lacking to support arguments, climate change may have contributed to the frequent drought that (together with other factors) caused scarcity of water and pasture (Yntiso, 2012).

The Nyangatom community has a predominant livestock based ways of life, according to the words of the FGDs the foremost current causes of conflicts are related to access to grazing pasture and water points, unclear boundaries and revenge. The degradation and reduced carrying capacity of

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the rangelands combined with continued over-grazing by large cattle herds results in competition over resources, especially during droughts and dry season when there exists shortage of pasture and water for livestock. The limitation of the rangelands resources and the subsequent competition often leads to violent conflicts between different ethnic groups in the area. In the past conflicts occurred intermittently and reconciliation lasted for several years. Since recent years, according to informants, the frequency and intensity of conflicts increased and peace initiatives repeatedly failed. Accordingly, there appears a serious of inter and intra-ethnic conflict hazards over the communal resources on different edges of the woreda.

Conflict with Turkana

Around kibish areas there is a frequent incidence of conflicts between the turkana-kenyan and Nynagatom ethnic groups over the common resources of Temporary River kibish and the natural pasture. During the wet season the kibish River has an optimal volume of water to provide and fulfill for both the ethnic groups livestock and human and on the other hand the degree of dependence on the river is partially solved by the available natural well water sources found in nearby area. According to the respondents from kakuta and nawyape nowadays the conflict becomes escalating because of high competition to access the existing water source for the increased trend of flood re-treat cultivation on both sides due to lack of the other apparent alternatives. Besides, the river is used as a source of chirosh(water after digging) water for both humans and livestock in dry season. Regarding pasture during the dry season the Nyangatoms have a trends of moving their cattle's to access the pasture land beyond the kibish river at the turkana's territory; this has been a reason for losing many human lives and valuable sources of livelihoods. Sometimes these conflicts results in stealing of livestock's too. The community pointed out that the turkana's gets assistance from the national army of Kenya.

Conflict with Dassenech

The same is true with dassenech ethnic group around shenkora kebele, especially during the dry season from February until august the dassenech ethnic group has been moved to the natural pasture areas of the nyagatom territories. This has been the foremost reason of conflict combined with retaliation attempts to offset the drawback of their side from previous conflicts. Consequently the conflict hazards between these ethnic groups have been stimulated often by the acts of individuals and this has been makes the minorities residing in such geographic areas lives suspiciously and vulnerable.

Conflict with Hamer

The other conflict stimulated area is the *Hamer-Kara* bordering areas. According to the respondents there are two main reasons of conflicts; flood retreat cultivation and grazing lands for goats. Flood-retreat cultivation practices are the leading cause of conflict between the two ethnic groups. During earlier times the hamer-kara ethnic groups are the only group that has been potentially accessed both the omo-river basins for flood-retreat crop cultivation practices. Due to the up growing crop cultivation awareness and trends the rest of the pastoral communities are stimulated to engage on such activities on their nearby areas. Consequently the nyangatom ethnic

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group has been claimed often to take over one side of the omo river basin for flood retreat cultivation practices. However there is still the sense of ownership from the Hamar; as a result they have been taking an attempt to rustle cattle from the nyangatoms and this situation still hampers the existing situations between the ethnic groups. Conflict over grazing land exists usually exists in dry times in grazing lands across omo river mostly used by small ruminants.

Conflict with Mursi

The conflict with mursi exists in the side of kuchuru where the koygu ethnic groups live. The conflict exists in times of omo retreat cultivation. According to key informants and FGDs it's the mursi who come to their territory to use the flood recession land.

Conflict with Surma

The conflict between nyangatom and surma from bench maji took place in a communal grazing land called tirga; it is a place where livestock's from the surrounding surpass the dry season. The main reason of conflict in this area is livestock theft. The conflict in tirga also includes the turkana from Kenya.

Beyond these lists of conflict hazardous edges of the woreda, there are periodic intra-ethnic conflicts over natural pasture and water resources utilization. According to the respondents undeniably there are some misunderstandings with different adjacent kebele inhabitants on different occasions of time. However, such conflicts are easy to manage by the community elder's and from both sides they are not willing to utilize armaments unlike the other courses of conflict.

5. CONSTRAINTS TO MUTUAL RESOURCE UTILIZATION

The livelihood of the communities in Nyangatom woreda is highly intertwined with the availability of natural resources like pasture and water. The frequent drought and shortage of rainfall in the area contributes to the shortage of these essential natural resources and leads the community to competition over the available resources. According to key informants and FGDs there are two main constraints that prohibit them from mutually utilizing the available resources. These are scarcity of resources and the sense of ownership.

5.1. RESOURCE SCARCITY

The first and major constraint to mutual resource utilization is scarcity of resources like water and pasture. Due to the existence of recurrent drought, the natural resource base of the area is deteriorating from time to time and results in intense competition over the available resources. The community members emphasized that the availability of water and pasture in the area especially in dry seasons has become lesser and lesser and no one is willing to share the available resources.

5.2. SENSE OF OWNERSHIP

The second constraint to mutual resource utilization is the sense of ownership. Most of the resource bases that are the main areas of conflict currently were once used mutually by the surrounding

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community. This has led the community to a sense of ownership and right of use of that territory. When time goes on and the resources in the area get depleted due to drought the need to utilize the resource without competition and of securing ownership of the area becomes a constraint to mutual resource utilization.

6. PARTICIPATORY MITIGATION MEASURES TO RESOURCE UTILIZATION PROBLEMS

Conflict emerges as one way in which human society adjusts in the face of scarce resources. Conflicts are complicated issues that get interwoven with other social, economic, environmental and political activities within a society. If not managed well, conflict can have a negative impact on the environment and on the assets and capabilities people require for their survival. Being that delicate, conflict management takes time and resources (Eileen, 2005).

Pastoralist areas are frequently susceptible for climatic shocks, like drought and shortage of rainfall, which have aggravated the environmental degradation and led to lower productivity. Due to these environmental and economic shocks, the livelihood conditions and resilience capacity of pastoralist community have been deteriorating.

The interviewed community members pointed out that improving the current condition of the common natural resources especially water and grazing land is the solution for the existing problems. The solutions recommended by key informants and FGDs are listed below:

- **Area enclosures allied with plantation of grasses:** there are enclosures developed by AFD and HOAREC in some kebeles of the woreda which are used by some selected livestock's like kids and sick animals in dry times. The vegetation cover of these enclosures is dominated by shrubs. The community members suggested more enclosures accompanied by plantation of drought resistant grasses so that the enclosures could support grazers like lambs and calves.

- **Rehabilitation of the depleted grazing lands and introduction of improved pasture management:** grazing lands are among the resources depleted due to drought and are the causes of intra and inter-ethnic conflicts. Recovering the exhausted natural pasture lands and maintaining the existing pasture lands through the introduction of improved grazing practices are the solution to shortage of pasture.

- **Maintenance, rehabilitation and construction of water infrastructure:** water shortage is among the major problem of the communities in Nyangatom. Maintaining and rehabilitating the existing nonfunctional hand pumps and construction of new water points like cisterns and hand pumps for the use of both human and livestock is the main necessity emphasized by the communities.

- **Expanding small scale irrigation:** opportunistic crop production is one source of livelihood for the Nyangatom's. There has been a practice of small scale irrigation in kebeles around Omo River. According to the FGDs these irrigation is limited in amount and should be widened by using large pumps to cover the needs of most community members.

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- **Ensuring security:** improving security of the area by negotiating the different ethnic groups participated in conflicts, implementing interventions that reduce conflicts in both sides and demarcation of clear boundaries.

- **Countering prosopis juliflora (lupoliso):** the introduction of prosopis juliflora in kebeles around kibish results in the reduction of potential grazing lands. Eradicating these invasive species is among the needs of the Nyangatom communities around kibish.

7. CONCLUSION AND RECOMMENDATIONS

The livelihood of the communities in Nyangatom woreda is highly dependent on natural resources like pasture land, water sources, trees and shrubs and livestock's existed in the area. Livestock production is the dominant source of livelihood followed by opportunistic crop production. The communities in Nyangatom also support their livelihood through bee keeping, fishery and collection of different products from the forest. They are also vulnerable to various natural and man-made shocks due to frequent failure of rains, poor infrastructure and weak linkages to markets and poor extension and support services. There is no well-structured market in the woreda. The communities sold their products by going to kangatin (capital of the woreda) or exchange it with their neighbors. The main sources of income for the community are selling of livestock (especially goats), crop products like sorghum and maize in times of good production and honey for few kebeles. They are food insecure and part of productive safety net program.

The livestock resource of the community is decreasing because of shortage of forage and water, considerable level of animal diseases and drought. The availability of pasture lands and water is reduced because of drought, erratic and low amount of rainfall and introduction of invasive species like prosopis juliflora. There exists intra and enter ethnic conflicts between neighboring kebeles and bordering areas in the woreda. The main causes of conflict are scarcity of resources, unclear boundaries and revenge. The introduction of invasive species and temporary nature of kibish river makes the situation worse in kebeles around the kibish.

Generally the area needs focused, integrated and participatory interventions including:

- The development of adequate and sustainable water supply points
- Developing pasture lands through enclosures, maintaining indigenous drought tolerant grass species and introducing improved pasture management practices
- Improvement of the vegetation cover of the area through forestation of drought resistant multipurpose trees
- Improving livestock health services
- Livestock breed improvement
- Improving market infrastructure
- Development of small scale irrigation
- Introduction of early maturing/drought resistant crop varieties
- Management of prosopis juliflora
- Development of peace initiatives

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