

Impacts of abstraction of surface water for geothermal drilling on Alalobad geothermal project

Addisu bekele

Addisbekele066@gmail.com

Keywords: addiswgc

ABSTRACT

The Government of Ethiopia, under its latest Growth and Transformation Plan (GTP), envisions transitioning from a developing country to a middle-income country by 2025. Ethiopia's ability to achieve this ambitious goal in such key sectors as agriculture and industry is significantly constrained by current challenges in the power sector. Although Ethiopia is endowed with abundant renewable energy resources and has a potential to generate over 60,000 megawatts (MW) of electric power from hydroelectric, wind, solar and geothermal sources, which would help sustain Ethiopia's continued economic growth and enable it to become a regional renewable energy hub in East Africa.

The Ethiopia Geothermal Sector Development Project (GSDP), with a funding of US\$ 219 million, became effective on August 5, 2014 and is scheduled to close on June 30, 2020. The GSDP is being implemented by the Ethiopian Electric Power (EEP) in the role of Owner. The GSDP, in accordance with the original scope of work, was subdivided into four components. Component 2 - Alalobeda Geothermal Site Development - includes the development of the geothermal resources in the Alalobeda prospect through the implementation of a program of drilling and testing of 4 deep wells. In consideration of the clear indications derived from the surface exploration and of the opportunity to speed up the development of the Alalobeda resources, it was suggested to proceed with the underground exploration by drilling full-size wells, which may be fully tested and can be in principle exploited for feeding on a temporary basis a 2-3 MW portable back-pressure turbine. During each project phase, geothermal energy projects will have social impacts. Geothermal energy projects can have both positive and negative social impacts. Social impacts can be seen as changes to people's way of life, culture, community structure, stability, services and facilities and their level of participation in decision-making.

Some of the Negative social impacts include: Impacts on water for other uses such as drinking water or irrigation. Impacts on cultural heritage sites. Negative impacts on landscape and recreational areas. Noise or disturbance. Ground subsidence or earthquakes.

Since the Alalobad area is an important source of water during drought for nearby kebeles and nomads, the potential decrease can be considered critical due to the scarcity of water in the region and vulnerable conditions of nomads and semi nomads.

The aim of this study is identifying the potential negative impacts of the water sources in the project area on the pastoral communities. The water oasis is the sole drinking water sources for both the livestock's and the wild animals dwelling nearby the project areas. Therefore proper studies and management plan must be essential to mitigate the foreseen impacts.

This study brings the necessary mitigation measures to eradicate the potential negative impacts of water sources of Alalobad geothermal project.

Statement of the problem

Geothermal energy is one of the emerging renewable energy sources now a day in Ethiopia. Alalobad geothermal sector development project is one of the projects planned to develop in a far regional state of Ethiopia. Since geothermal sector development project is primarily linked with the use of surface water, it has adverse impact on both community and the wild animal around the project area. The abstraction of surface water for Alalobad geothermal project will reduce the amount of water and due to this; the community and animals around the area will be exposed to lack of water. This will cause adverse impact on the people, domestic animals and wild animals around Alalobad area.

Objectives of the study

General objectives

- Investigating the necessary mitigation measures for the impact of abstraction of surface water for Alalobad geothermal project.

Specific objective

- Identify and assess the socio-economic impacts of the abstraction of surface water for Alalobad geothermal project.
- Providing the possible mitigation measures for the negative impacts.

Methodology

Types and method of Data Collection

This study used both primary and secondary data to analyze the impact of Alalobad geothermal project. The primary data, were collected through interview with local peoples, clan leaders, using a semi-structured questionnaire. The secondary data were collected from governmental and non-governmental organizations and different researches.

Methods of Data Analysis

This study used both descriptive statistical methods and qualitative and quantitative methods to achieve its objectives. the study describe the impact of geothermal project in alalobad, social and economic situation up on the society come from different kebeles of the project area.

1. INTRODUCTION

1.1 Surface Water

The major river draining the Tendaho Graben is the Awash River. The river starts in the highlands of central Ethiopia, at an altitude of about 3,000 m.a.s.l. and after flowing to South-east for about 250 km, enters the Rift Valley and then follows the valley for the rest of its course up to Lake Abe on the border with the Djibouti Republic. The river passes about 10 km south of the drilled exploration geothermal wells and is characterized by extensive variations of flow throughout the year, the maximum being in September to October.

1.2 Groundwater

The groundwater potential of the area is generally high, however in large part, the water is of poor quality (high salinity, high iron and high temperature) (MoWR and UNICEF, 2003). The TDS values tend to rise in the groundwater rather than in Awash River. The natural thermal systems are also affecting the quality of the groundwater. The project area is located in a broad, very flat basin that has a thick stratigraphic section of unconsolidated to poorly consolidated, often fine sediments. The water table is relatively near the surface, so water fills the interstices of the sediments. Groundwater aquifers of the region include coarse sedimentary and fractured volcanic units. The waters at depth in the Alalobeda geothermal system are of sodium chloride type. The deep recharge to the system originates in the western escarpment and plateau at elevations above 2,000 m.a.s.l.

Water and pasture are the most important resources for pastoralists. Accordingly, Awash River was mentioned to be the major source for water for both animals and human beings. The community also rely on the grazing wetland along across the Awash River. Alalobeda was also mentioned as a second most important source for water and pasture for the community. As to the frequency of visit made to Alalobeda, the majority of interviewees mentioned that they visit the area round the year. However, they do not visit it daily. People visit the area 3 to 5 consecutive days, to some extent a week in a month. This is largely because of the water composition at Alalobeda. According to the community, as the water is highly saline, livestock should not always drink it.

2. THE SIGNIFICANCE OF ALALOBEDA

2.1. Water and Pasture

Alalobeda provides multiple benefits to pastoralists. Water and pasture is the major resources benefiting the community. This is very important especially during drought period when other alternatives are dried out. In addition, the community strongly believes that the water has medicinal value for the livestock. As a result, the community mentioned that livestock which drink water from the water pond are strong and have greater resistance to diseases. Moreover, when animals are sick, the water is antidote to different types of animal diseases such as skin disease and internal parasitic initiated diseases. The community repeatedly mentioned that the water is a cure to animal disease caused by a plant locally known as Weyana (prosopise Jully). The plant is abundant and found everywhere in Afar. The disease is indicated to be associated with hepatitis. According to the community the disease is the most frequent In a normal situation, pastoralists who live nearby use the water resources 4-6 days in a month. As mentioned by the community, this is because livestock cannot and should also not drink the water on regular basis as it is highly saline. In addition, pastoralist also visit the area any time when their animals are sick as the water is believed to have medicinal value. Pastoralist from far also reported to visit the area two to three times a year specially to make use of the water resources for its medicinal value.

2.2 Benefits to human being

The water and steam are also believed to have medicinal value to human being. Pastoralists in both the nearby and far have bath in the water ponds and benefit from the steam. Moreover, some community members use the steam to bake bread. The benefit goes beyond the pastoralist communities. It is reported that domestic people and foreigners visit the areas in large number. This is largely related to the medicinal value the water and the steam have for human beings. The local community mentioned that many people with some sort of health problem specially people with paralysis come and use the water and the steam.

2.3 Reservoir for wild life

Alalobeda is also mentioned to be the home of wild live which depend on the water from the pond and the pasture around. Community members have mentioned that different wild animals are comfortable spending overnight around. During the field visits, the team were able to see gazelle in large number and some ostriches dispersed all over the area

3. Literature Review

Relevant literatures were reviewed like environmental and social impact assessment reports of alalobad geothermal project. In addition to this I made a practical observation of the site and make informal discussion with some of the local peoples in the project area.

3.1 back ground of the study area

. Afar is one of the most ancient and indigenous peoples in North East Africa belonging to the Cushitic language family. The Afar are called Adal by the Amhara, Taltal by the Tigreans, Danakil by the Yamani Arabs and Udali by the Somali. But the Afar calls themselves Afar, which does not exist in the literature. The term Afar, according to some of the

sources is inherited from a clan name called Almafra, found in Yemen. Other sources indicate that the Afar identify themselves as Cafar-umata, the Afar people. They call their language the Cqfar-qf, the Afar language, which is classified in the Lowland East Cushitic Language Family along with the Somali and Oromiffa languages. The Afar live in the three neighboring Horn-of-Africa countries - Ethiopia, Eritrea, and Djibouti and are variously described as "fearless", "tough", "aggressive", "territorial" etc, all in the spirit of highlighting the tireless adherence of the Afar to a pastoral tradition handed down from successive generations, and a devotion to the defense of a way of life in a forbiddingly hostile homeland. Afar people believe that the whole society living in all lower, upper and middle Awash and even beyond in Eritrea and Djibouti as one distinct ethnic group, different from others on the basis of language and way of life.

3.1.1 Afar Social Organization

The social organization has at the top what may be called the present sense of Afar "nationalism" which indicates the whole society as one distinct ethnic group, different from others on the basis of language and way of life. Having one unique ethnicity, the Afar was indicated to be divided into two major groups. The Aisomara (Red men) and the Adiomara (white men). There are different explanations on the division of the Afar. Some states that the division is made on the basis of difference in colors and others argue that it is a societal class difference in which Aisomara (Red men) are the nobles and Adiomara (white men) are the commoner. However, this kind of division was indicated to be no more in existence today as people from both sides highly mixed through marriage both at tribal and clan levels and there are not any social divisions based upon the traditions. Moreover, Mohammed argues that it is impossible to make a physical differentiation between the two groups. According to Mohammed, Afar has other peculiar social organization having some hierarchy; tribe being at the top and family being the smallest social organization unit at the bottom. According to the same Author, the social organization includes;

- ☐ Tribe (Khido)
- ☐ Clan (Mela)
- ☐ Lineage (Gulub)
- ☐ Extended family (Dahala or Budha).
- ☐ Family (Burra)

A tribe consists of people descending from a common patrilineal ancestor. For the Afar tribe is the highest and territorially localized social organization that comprises a number of clans. However, the real and actual social system of the society is expressed and carried out at clan level therefore, for the Afar, it is more preferable to identify themselves as members of specific clan than any other social organization. There are several practical reasons for the preference of attaching oneself to a certain clan. First it is through his/her clan membership that an individual gains acceptance in the society and an individual seeks and gets assistance first from his clan members regardless of their geographical distance. According to information collected from a chair person of project target kebele Gurmudale and Hayideru, there are 15 clans residing in the kebele. These clans include Alikorari, Ahilto, Asebekeray, Laebora, Asakita, Amado, Alihidalay, Asarbaynto, Mesara, Alidalita, Mehabdi, Aysa, Moletay, Miserara and Bossale. Further investigation also reveals that three clans named Alikorari, Ahilto, Asebekeray are the ones customarily own the Alalboeda localities and resources mainly- pasture and water. In the social hierarchy lineage is found below next to clan. Lineage is composed of local community. This local community is formed based on patrilineal decent membership and also through marriage ties especially of marriage made through cross cousin marriage. Marrying a daughter of father sister or marrying a son of mother brother is very common among the Afar. Another form of marriage that guaranteed membership of the lineage is through affinal ties that is marriage between two individuals of the same clan, but outside of the same extended family and outside of a cross cousin arrangement. According to Mohammed, below the lineage is found an extended family. In Afar language extended family is known as Dahala (Budha). It comprises the father, his wife or wives, their children and the wives and children of his sons. This social unit of the Afar appears to have descendants from a grandfather in the male line and he has a supreme authority over the members. At the bottom of the social organization of the Afar society, there is a household or family for which the Afar term is Burra. It constitutes a minimal or nuclear family where strong solidarity between all members is seen. It is the basic and smallest social unit of the society, characteristically grouped into hamlets and comprises a husband, his wife and his children. In relation to social organization of the society of Afar, three institutions have a pivotal role in respect to administration of the population and handling of the day to day and strategic issues of the community. These are Clan leaders, council of representatives of leaders and an institution named finna- a group of young people responsible to peace and order. A clan leader is responsible for the administration of the clan affairs, cooperate with other clans on common matters, form defense against any attack, make peace between fighting clans and arrange access to each others' land and resources. Moreover, a clan leader arranges marriage and participates in circumcision. Furthermore, according to Getachew a clan head is also the chief representative of his clan in all external relations with the state and agents at large at a local level with all non-Afar neighbors and highland communities. However a clan leader has no veto power. Decisions are made collectively through the institutions of the council of elders including all heads of lineages of a clan and heads of finna. Finna is a typical Afar institution. Literally, the term finna in Afar language denotes "of equals" and also "of the same stage of circumcision." Finna is a multipurpose institution. According to Getachew, Finna has the following responsibilities in the community.

- ☐ Finna serves as community police and is a clan defense force against any raids by other clan
- ☐ Finna Enforces sanctions passed by clan authorities
- ☐ Finna has a role of peacemaking between two or more clans

3.1.2 Collective Use of Natural Resources

Afar attachment to natural resources especially of land and water is so strong. The two are found to be the most important life sustaining natural resources, without which life is impossible in Afar. Land and water are the most precious resources Afar people die for. The two resources are also the primary causes of conflicts in the regions. Afar people strongly believe that land is an indispensable asset of the Afar and that no land is free to be used for any other purpose than livestock husbandry. Afar follow the philosophy of individual ownership of livestock in a communal land. There is no individual ownership of land and other natural resources in the pastoral section of the society of Afar. Individuals have a full use right of these natural resources through tracing his/her membership to respective clans as natural resources is customarily owned by clans not by individuals. Clan membership is the lowest social unit upon which the definition of communal property rights over land and other natural resources is based. Clan ownership of land, at least in a sense of control and use right is also acknowledged by the regional land administration and use policy. Therefore, clan has a central role in land ownership and management. Each clan has their own land and tells where the boundary of its 'home land' is. The land is commonly composed of grazing land, water points and other natural resources. Moreover, as part of communal land, each clan has communal graveyards, settlement areas (metaro), and ritual sites. The boundaries are often designated by physical landmarks including, hills, mountains, rivers and barren land. However, since pastoral/nomadic existence by definition requires the crossing of clan territories, the boundaries only represent control rights (exclusion, alienation and management rights) rather than exclusive ownership. Strict geographical demarcation does not exist among the Afar who claim that there is no difference in Afar land and they move freely as all land belongs to them. In the case of the project site, According to informants including both authorities and pastoralists, the customary ownership of the land and the natural resources mainly of pasture and water belongs to three clans namely Alikorari, Asebekari and Aahilto. These are three of the clans among more than 15 clans in the kebele administration. Though the customary ownership of the land belongs only to the three listed clans, pastoralist from other clan be it in the kebele, woreda and beyond have use rights of the resources as equally as pastoralists owning the resources customarily. These have been identified to be the case during field work. Land and other natural resources were clearly stipulated to be the state property. This has been indicated in both the federal and regional land administration and use policies. However, in practice except in the case of land taken by the government for development projects and specific plots apportioned for investors most of other land is continues to be communally administered and is predominantly used for communal livestock grazing. In some areas, especially along the Awash River, a good deal of land has also been assigned to investors on the basis of a contractual agreement with clan heads. As part of the agreement, investors share about 30-40 per cent of their produce to clans customarily owning the land. Actually this leasing of land by clans for investors is allowed by federal and regional government land administration and use policies mentioned above. In Ethiopia, until the recent establishment of the Afar National Regional State under the Federal Government of Ethiopia, they were divided among the administrative regions (Kifile hageres during the Darg regime) of Tigray, Wallo, Shoa and Western Hararge. The present Afar National Regional State, located in Northeastern part of the country, consists of a total area of 85,410 square kilometers (CSA 2008:5-6) and shares borders with the Regional States of Oromia in the south; Amhara in the west; Tigray in the northwest; as well as the sovereign states of Eritrea and Djibouti in the north and east respectively.

3.1.3 Language

The Afar speech is classified as a separate language in the Eastern Cushite group. It is most closely related to Saho (Ethiopia and Eritrea), and more distantly related to the Somali and Oromo groups of languages. Linguists generally identify four distinct dialects of Afar, Northern, Central, Aussa and Baadu, but intelligible each other.

3.1.4 Religion

The Afar are nominally Muslim, but a minimal level of orthodoxy in practice is attained only in the coastal regions and in the sultanates. The nomads of the interior are lax, and, though they hold Islam in great esteem, their own practices are imbued with the earlier Cushitic religion. According to the CSA (2007), 95% of the Afar population is Islam followers followed by Orthodox 3%.

3.1.5 Marriage

An individual can marry either from his father's side or his mother's side. Accordingly, a man can marry the daughters of his father's sisters for which the Afar term is Absuma while a girl can marry the sons of her mother's brothers for which the Afar term is Abino. This cross cousin marriage is the most preferred and the first choice of an Afar, that provides membership into a lineage. Since the Afar identify themselves with their paternal clan, this type of marriage precludes the couple from belonging to the same paternal clan. The fact that cross cousin marriage is the most preferred type of marriage could be explained with ecological factors. Living in an inhospitable environment, the homogenous group needs this type of marriage to access to production resources and mutual support among the parties and consolidate material benefits. But it is practiced to the extent of one wife, no matter how an Afar could marry. According to the laws of their religion, every man can have up to four wives, but only the wealthiest can profit from this privilege. Another form of marriage that guaranteed membership of the lineage is through affinal ties which is a marriage between two individuals of the same clan, but outside of the same extended family and outside of a cross cousin arrangement. Members of a lineage could also be recruits through patrilocal marriage. This implies that a woman married could be taken to the house of her husband's father and his locality hence establishing a form of patrilocal residence. Culturally, the newlyweds go on horseback to men's hut. It is very common among Afar people that a man builds his hut just before he gets married. Wife's first responsibility is to bring husband a goat or a sheep who he, according to the rules of Quran, kills. The woman dips her right hand in animal's blood and sprinkles doors of the hut. She smears rest of the blood onto her forehead. Next the woman enters the hut followed by the man who is holding a whip. He whips her three times. This ritual symbolizes his dominant role at home and in marriage. A woman who starts to cry during those whips is ridiculed by the whole village. After those rites, the man and the woman are accepted by the community as married couples.

3.1.6 Customs

Afar people are nomadic or transhumance (moving from highland to lowlands with the seasonal rise and fall of the flood waters of the rivers). They carry their houses with them and reassemble them when they make temporary settlement. They use camels for pack animals, but do not ride them. They keep themselves very separate from the surrounding peoples, and are suspicious and antagonistic to their neighbors of the Somalis and the various Ethiopian tribes. Looking at the Afar social organization superficially it reflects the principal aspects of masculine identity which is also reflected in the political sphere. Women represent themselves through praising their men. Parker's collection and translation of Afar songs indicate the way women chant about the heroism and masculine qualities of their husbands. The Afar pastoralist and agro-pastoralist communities have a tradition of cooperation, social support and resource sharing, mostly through kinship networks of reciprocal solidarity. Participation in social exchange mechanisms is obligatory in Afar and is described as a defining feature of the Afar way of life: to be an Afar is to participate in the exchange economy. Assistance during or after a crisis can also take different forms and, in addition to gifts of animals, a vulnerable household will be supported with shared food (cereal and milk) from neighbours, which respondents considered to be of particular importance in rebuilding livelihoods. These institutions are generally based on family and clan lineage, but they can be far-reaching and go beyond clan level in times of need. One of the harmful traditional practices that is prevalent in Afar is Female Genital Mutilation. The overall prevalence of FGM/C in Afar is found to be 98.4%

4. Afar People as “Vulnerable and Underserved Community”

In Ethiopia there is a constitutional recognition on the existence of nation, nationalities and peoples underserved and lagging behind in terms of development. After acknowledging the existence of such groups, the constitution has also pointed out the need to do utmost efforts to bring about equity in development and the responsibility to bring about equity was clarified to rest upon the government. The same recognition and the need to provide special support to regions lagging behind in terms of economic and social development is also highlighted in different policies of the country. Here, education policy and health policy are a practical example. Moreover, several development indicators disaggregated by regions have clearly showed the existing imbalances between regions. Thus, Afar regional state is one of underserved regions in the country as different development indicators show. (Detail development indicators are presented under a section -existence of Underserved Communities/regions) The regional state of Afar together with the dry land of Somali, and large parts of Oromiya and the Southern Nations, Nationalities, and People's Region (SNNPR), are considered to be least developed part of Ethiopia. The nomadic Afar population has been widely mentioned to suffer a high level of poverty and as a result, exhibited an extreme deterioration of their living standards. Other also argues that the Afar Region is one of the poorest and least developed Regions of Ethiopia. Besides underdevelopment, the region under consideration is also known for its high vulnerability. The Afar people are considered as one of the most marginalized groups of people in the Horn of Africa. Even after good rains, Afar Pastoralists indicated to remain vulnerable. A further indication of the region vulnerability is also found in productive safety net program of the country. According to the report of the program about one third of the region's population are target beneficiaries of the safety net program which uses vulnerability index for inclusion/exclusion to/from the program. Factors contributing to the underdevelopment of the region are several, complex and interlinked. Generally speaking these factors are categorized as natural and manmade factors. As part of the natural factors, first of all the land inhabited by the Afar is extremely arid and barren, consisting of stone and sand desert interspersed with salt lakes and lava streams. The areas occupied by the Afar are the most inhospitable arid and semi-arid. Areas of good pasture that are able to support cattle have never been more than 15 percent of the total land area and are now becoming increasingly fragmented and lost. In addition, the occurrence of rainfall is highly erratic. The total amount of rain varies greatly from year to year resulting in severe droughts in some years. Moreover, temperatures are high throughout the region and throughout the year. As a result, most of the area are unfavorable unable to grow any vegetation limiting the possibilities of diversification of livelihoods which in turn limits the possibilities of growth. An increase in human and livestock population, the advent of commercial mechanized farming, the construction of Qoqa dam and the establishment of the Awash National Park with population displacing effects were indicated as part of an important factors exposing Afar for further vulnerability. Dwindling of resources was also found to be one of the underlying factors leading to inter-clan and inter-ethnic conflicts which in turn exacerbated poverty situation. Moreover, the underdevelopment of the regions is also associated with the development policies of the country. The region was designated as one of the regions neglected by national development efforts of the country. The development policies of the 1970s and 1980s have mentioned to fail to recognize customary rights of pastoralists to land. Afar pastoralists that have lost their land were not always adequately consulted nor compensated for the loss. In addition, since the 1970s international agencies have responded with humanitarian relief but with little or no assistance for economic development. In more recent phenomena, Ethiopian Eritrean war was quoted to affect the livelihood of Afar people. The presence of huge military force was made responsible to the destruction of the existing eco system. It has been reported that more than 350,000 trees were cut down as a result of the war and the war had also movement restriction on the pastoralists.

4.1 National Socioeconomic Indicators

The various development indicators of the country have also showed the existing imbalance between regions. According to the latest Ethiopia demographic and health survey, more than 74% of the population of Afar is concentrated in the lowest wealth quintile whereas the national average is only 20%. The same variation is also found in terms of education. The proportion of people with no education is 69 % for women and 45% for men in Afar, compared to 47 % and 30% for women and men respectively nationally. School attendance ratio is also the lowest in Afar standing at 61% in elementary school and 15% in secondary school. The same underdevelopment is also witnessed in health. According to the same study teenage childbearing and under five mortality rate are highest in Afar. On the other hand, institutional delivery is one of the lowest in Afar which stands at 18% compared to 29% of the national average. The same underdevelopment is also found in the case of vaccination and utilization of contraceptives. Afar is the lowest in basic vaccination and the second lowest in contraceptive coverage. (ibid) An attempt is also made to compare differences in terms of living standard within the region. Pastoralists are found in low economic situation compared to Agro- Pastoralist as the latter better engage in off farm activities and generate additional income from agricultural activities. There is difference in mean household income in Afar between pastoralists and agro-pastoralists which was found to be

statistically significant. As project affected afar community are exclusively pastoralist, they are found in lower economic situation. According to data from Dupiti Woreda Pastoral and Rural Development Office pastoralists in the project woreda earning their livelihood mainly from animals and off farm economic engagement is virtually nonexistent and no farming is practiced in the project Kebele. This is largely explained by water constraints and unsuitability and infertility of the land. Moreover, the large proportion of population of Gumurdale/Hayderu kebele (project target kebele) is found vulnerable as some data from productive safety net program indicate. According to the data, more than 56% of the population of the kebele is beneficiaries of the productive safety net program indicating high vulnerability of the community. The figure is high by any standard and much higher than the Woreda average which stands at 30%.

5. Land use, Land Tenure and Its Implication

a. Land Use

Ethiopia covers an area of 1,127,127 square kilometers, of which an estimated 34% is agricultural, 9.6% is arable, an estimated 3.6% is forested, and 48.9% is covered by woodlands and shrubs. Only 4.5% of arable land is considered irrigated. Protected areas encompass 14% of Ethiopia's total land area. On the other hand, Afar National Regional State possesses about 100,000 km² of which Cultivated and arable land constitutes a mere 5.24%, forest 1.54%, bush and shrub 18.62%, grassland 1.56%, marshy land 2.74%, water bodies 0.63%, and degraded and rocky land 63.7. Barren land mostly found in the north eastern part of the region and intermittently also found in the south eastern part. Grass land is mainly found in central part whereas bush and shrubs dominantly found along the western part of the region all the way from south to north. Cultivated land is found in some part of central and southern part of the region. According to the data from pastoral and rural development office of the project target Woreda, more than 75% of Dupiti woreda land is rocky and could not totally grow plants. Furthermore, the remaining could be used for farming but only mainly through irrigation. All the above combined with low level of rain and high degree of temperature makes farming difficult. As a result, only 5,300 hector of land is cultivated out of the total 539,044 hector of land of the woreda. (Less than 1%). The land use at project target area- Alalobeda is also as follow. The findings are based on field work and discussion with authorities and pastoralists in the area.

- ☐ Alalobeda is consisting of a set of water ponds, grazing land, hills and wide barren land. It is a joint land not owned by private or specific groups of the community.
- ☐ There is no any settlement, be it permanent and temporary in the area. The closest settlement is found more than 7 km away from the area.
- ☐ No investment or improvement is made on the land and the resources around by any one.
- ☐ No cultural heritage is found in the area, no ceremony takes place
- ☐ Alalobeda is considered to be one of future tourist attraction areas in the region. The

Regional government has a plan to develop the area for tourism. As per the discussion held with regional and woreda authorities, some request is being made to develop the area by private business. A company owning Kuriftu Resort in Debrezeith and recently in Semera was mentioned to be among the interested business entities. Moreover, hundreds of foreign tourists visit the area yearly. Moreover, there exists a burial place in between the different water ponds. The place is found in small hills in the southern part of Oasis. Information is collected and confirmation is made that it certainly a burial palace. The team was also able to see bones of dead bodies in some of the tombs. As per the information from the community members the area is no longer serving as burial places for new cases. The burial area is found in an area where water reservoir is planned to be built. The coordination for the burial place is E 0730422 and N1293299.

b. Land Tenure

There are typically two types of land tenure system that have crystallised over the course of time in Afar. The first is the formal system which is based on policies, laws and proclamations put in place by the federal and regional governments. The second relates to informal tenure, in which land boundaries and rules of resource use and administration are traditionally defined on the basis of clan-based social organization. The latter operates in accordance with existing customary norms and value systems. Except in the case of land taken by the government for development project, most part still remains in the custody of clan heads. The Ethiopian Constitution asserts state ownership of land; there are no private Property rights in land. At this juncture, Article 40 under its sub articles states the following. "The right to ownership of rural and urban land, as well as of all natural resources, is exclusively vested in the State and in the peoples of Ethiopia. Land is a common property of the Nations, Nationalities and Peoples of Ethiopia and shall not be subject to sale or to other means of exchange." The following is also stated in the same constitution in relation to pastoralists. "Ethiopian pastoralists have the right to free land for grazing and cultivation as well as the right not to be displaced from their own lands. The implementation shall be specified by law." On the other hand individuals have use rights on the land they possess and these individual rights on land include transferring the land rights in the form of sharecropping, subleasing, or rental arrangements. Use rights are also made inheritance within family possible. Aligning with the national constitution and federal rural land administration and use proclamation, the regional state of Afar enacted its own regional land use and administration policy in 2009. Similarly, the regional law of the region denounces private ownership of land and confirmed that the state is a sole owner of all lands. Practically, the regional law identified different land tenure system in the region. These include private holding, communal holding, joint holding and state holding. According to the law the different land holdings defined as follows.

-"private holding" means rural land in the holding of pastoralists, agro pastoralists, and other bodies who are entitled by law to use rural land

- "Communal holding" means rural land which is held by two or more persons who have indivisible right over the land and that is used equally by the communal holders.
- "Joint holding" means rural land holding which is not government or private land holding; and that is communally used by the local people for grazing, forestry, and other social services.
- "State holding" means land demarcated and land to be demarcated in the future as federal or regional states holding; and includes forestlands, wildlife protected areas, state farms, mining lands, lakes, rivers and other rural lands designated as state land.

However, the bottom line is that people possessing one or other land holding types have only use right along with the right to inherit to family members and lease out. According to the intent of the proclamation under consideration holding is inherently meant not ownership in its strict sense. Therefore, government is owner of all land and pastoralists and agro pastoralists are users of land in their perspective jurisdiction.

C Land Tenure- Implication to Land Acquisition

As clearly stipulated above, ownership of land rests on the state meaning that the state has a full legal rights to use and assign any land for public benefits. Any land includes land found under private, communal or joint holdings. In doing so, however, the regional land administration and use proclamation identified the importance of consultation and in agreement with pastoralists and agro- pastoralist.. The other important point is related to compensation. In this regard, Article 11, sub article 17 of the regional proclamation states the following. "Agro pastoralists have the right to payment of fair and equitable compensation to the investment and improvements they made on land where their communal or individual land holdings are expropriated for public purposes." From the above article, we can draw several ideas which have a direct bearing to land acquisition for the intervention. First of all the article says 'Agro- Pastoralists' not 'pastoralists' implying that it is Agro- pastoralists who could possibly own communal or individual land which is entitled compensation. In other words, pastoralist own joint land according to the classifications made by the same proclamation under scrutiny and as a result, no compensation implied to joint land, obviously, together with state holding land. Moreover, the rights having compensation was stated in section three "rural land use rights of Agro- pastoralists" but not in section two "Rural land use rights of pastoralists" of the Afar land administration and use proclamation. On the contrary, the rights of government to expropriate land were clearly mentioned in both sections. This directly implies that there is no need to do compensation on joint land holding by pastoralists. As also learnt from the same article stated above, the compensation implied not to the land expropriated but to the investment and improvement made on the land by land holders. Again this implies that pastoralists do not invest or improve the land they own as the land is a joint land mainly meant for grazing and forestry which naturally exist

Therefore, there is a need to judge the project target areas in line with the above points with regard to land acquisition. Thus,

1. The project target area as per regional legislation is a joint land used for grazing and pasture. So no compensation is required
2. There are no any residence and farming practices and therefore, no investment and improvement was made on the land. So no compensation is required.

However, what is very important is the need of having serious consultation and agreement with pastoralists who are making use the resources on the project target area. This has been also emphasized to be important in the Afar rural land administration and use legislation. In this regard, three clans namely Alikorari, Ahilto, Asebekeray were identified to customarily own the land and therefore, consultation should give particular emphasis to these clans though there is no any restriction on the use of the natural resources in the project target area. The resources are openly used by any clans in the project target kebele and beyond.

6. Seasonal Patterns of Mobility

Seasonal migration is a principal coping mechanism of pastoralists in Afar and elsewhere. Afar is also known to move from place to place seasonally in response to availability/scarcity of resources- water and pasture. During normal years, Afar move their herds from a home base generally within a radius of 20 km, but seldom more than 50 km from reasonably permanent dry season watering places. In times of severe stress, Afar are forced to move their herds for greater distances up to 150 km. Pastoralists in Dupti are not exception to this. According to a study carried out in the middle Awash where Dupti is also a part indicates that 71% of the households had migrated to other areas in the last three year. The same study elaborated search for grazing land and water is the underlying factors for the seasonal migration. In addition, Search for Job, Natural Calamities, and Conflict were found to be statistically significant determinants of household migration.

7. Impacts of abstraction of surface water for geothermal drilling on Alalobad geothermal project

The Ethiopia Geothermal Sector Development Project (GSDP), with a funding of US\$ 219 million, became effective on August 5, 2014 and is scheduled to close on June 30, 2020. The GSDP is being implemented by the Ethiopian Electric Power (EEP) in the role of Owner. The GSDP, in accordance with the original scope of work, was subdivided into four components. Component 2 - Alalobeda Geothermal Site Development - includes the development of the geothermal resources in the Alalobeda prospect through the implementation of a program of drilling and testing of 4 deep wells.

Geothermal energy projects can have both positive and negative social impacts. Social impacts can be seen as changes to people's way of life, culture, community structure, stability, services and facilities and their level of participation in decision-making.

Some of the Negative social impacts include: Impacts on water for other uses such as drinking water or irrigation. Impacts on cultural heritage sites Negative impacts on landscape and recreational areas Noise or disturbance Ground subsidence or earthquakes

Since the alalobad area is an important source of water during drought for nearby kebeles and nomads, the potential decrease can be considered critical due to the scarcity of water in the region and vulnerable conditions of nomads and semi nomads

Alalobeda provides multiple benefits to pastoralists. Water and pasture is the major resources benefiting the community. This is very important especially during drought period when other alternatives are dried out. In addition, the community strongly believes that the water has medicinal value for the livestock. As a result, the community mentioned that livestock which drink water from the water pond are strong and have greater resistance to diseases. Moreover, when animals are sick, the water is antidote to different types of animal diseases such as skin disease and internal parasitic initiated diseases. The community repeatedly mentioned that the water is a cure to animal disease caused by a plant locally known as Weyana (prosopise Jully). The plant is abundant and found everywhere in Afar. The disease is indicated to be associated with hepatitis. According to the community the disease is the most frequent In a normal situation, pastoralists who live nearby use the water resources 4-6 days in a month. As mentioned by the community, this is because livestock cannot and should also not drink the water on regular basis as it is highly saline. In addition, pastoralist also visit the area any time when their animals are sick as the water is believed to have medicinal value. Pastoralist from far also reported to visit the area two to three times a year specially to make use of the water resources for its medicinal value.

Generally alalobad hot spring water is the essential resources for the surrounding community and wild animals. The water resource in that area is not only for ordinary drinking and hygiene, but also for medicinal value for the livestock. The life of pastoral community around the project area is depended on the hot spring water in alalobad.

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REFERENCES

The Federal Democratic Republic of Ethiopia Electric Power Alalobad Geothermal Prospect Exploratory Drilling Draft Environmental and Social Impact Assessment Report, ELC-ELECTROCOSULT, 20146 Milano - Italy (May 2019).