

Candlelight for Health, Education & Environment

“CLIMATE CHANGE STOLE OUR MIST”

A Case study on the Impact of Climate Change
on Gacan Libaax Mist Forest and Livelihoods,
Somaliland July, 2007



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1. INTRODUCTION TO PROJECT AREA

1.1. Description of physical and ecological context

“Because of the mist, the grass used to hold the mist settling on it, nourishing the shoots and then seeped into the ground. The mist used to cover the area roughly beginning after *Asr* prayer time (in the afternoon) and continued to overshadow us till 9:00 a.m. in the following morning. We used to call it *Hayeys*, because of its incessant downpour. It dampened the soil and rejuvenated the vegetation at a time our livestock were in a dire need for it”.

Xalwo Cige (72), the mother of the author who has spent most of her early years in Gacan Libaax

The area of interest is Gacan Libaax Mountain (10°N, 45°E) in Somaliland. The mountain (c. 1718.90m above sea level) is a part of an extensive highland ecosystem in central Somaliland running parallel to the Gulf of Aden.

The area is well known for its gazetted juniper forest and other plant species, some of them endemic to the area. Hemming (1966) considered the *Juniperus* forest of Gacan Libaax to be a climatic relict in a sense it may have survived from a period of greater rainfall. In the work of Miskell (2000) which is the most recent ecological assessment in Gacan Libaax, he writes:

“It (the mountain) receives moisture in the form of mist, as maritime air is forced up over the area. This moisture helps to support patches of forest, which themselves facilitate the formation and entrapment of mist in self-contained system. If the forest is degraded the cycle may be broken...”

The other main evergreen trees and shrubs that can be found with the *Juniperus procera* are *Buxus hilderbrandtii*, *Euphorbia grandis*, *Olea africana*, *Ficus sp.*, *Sideroxylon buxifolium*, *Euclea schimperi*, *Cadida purpurea*, *Acokanthera schimperi*, *Dodonea*

viscosa, and *Draceana ombet* – the last is mostly found hanging from the escarpment just below the rim. Some of the exotic tree species experimented and introduced by the British colonial forestry officers in the 1950s are *Eucalyptus camaldulensis* which is doing poorly, *Cupressus sp.* and *Casuarina equisetifolia*.

1.2. Socio-economic context

In the past, pure pastoralism was the principal mode of production system in the area whereby inhabitants with their livestock (cattle, camels, sheep/goats) followed seasonal migration patterns, mainly north/south movement depending upon rainfall and pasture availability. Since the last 30 years, the pattern of land use has drastically changed into sedentary agro-pastoral rain-dependant farming. The principal crops are sorghum and maize. *Qat (catha edulis)*¹, is becoming popular throughout the area as a cash crop due to its high demand in both urban and rural areas.

The population in the catchment area of Gacan Libaax, who can be called as the mountain resource users, including the surrounding villages can be estimated at 1800 families (with an average family size of 7-8 persons), 53% women. The main villages in the area are Go'da Wein, Go'da Yar, Deri Mara, Iskudar and Biyo-fadhiisinka which serve as petty trading posts for the community.

The valley between Go'da Yar and Go'da Weyn, the two main villages in the area is fertile and the community produces sorghum, maize, cowpeas and fodder. The later is transported and sold to livestock exporters in the port town of Berbera for feeding animals during shipment to the Arabian markets. A variety of sisal (*Agave sisalana*) was introduced into the area in the early sixties and is used as live fence. It is also a source of income for women who weave ropes from its fiber.

¹ An evergreen shrub and a mild stimulant whose leaves are chewed mostly by men which cause euphoric effects

The decline in livestock herd sizes and their productivity, resulting from anthropogenic factors such as poor natural resource management, overgrazing and parcelling of open rangelands for private use and reduction in the mist levels is a major factor contributing to the economic marginalization of the pastoral communities. This led to the influx of pastoralists to the urban centres, thus joining the urban destitute, while many others turned to charcoal production and other forest exploits for subsistence.

2. A BRIEF DESCRIPTION OF THE CASE HOLDER

CLHE was founded in 1995 as a non-profit making organization, dedicated to development issues in under-served and/or marginalized Somaliland communities. CLHE works in four sectors viz. health, education, environment and income generation.

The environment sector of CLHE has made a formidable expansion since the year 2000 whereby the organization has carried out a number of projects in the areas of soil conservation, reforestation, alternative energies, awareness creation, lobby and advocacy. The organization is one of the most active NGO in the country in the environmental management sector.

3. CURRENT AND EXPECTED IMPACTS OF CLIMATE CHANGE

3.1. Description of current and expected climatic changes

According to community informants, the effect of the climate change that has taken place over the past few decades is manifested in the mountain landscape and its surroundings. The most visible change is the decrease of mist which used to cascade over the area for almost four months (November to February) annually. The absence of lichens (*Usnea articulata*) hanging from trees, particularly the East Africa Pencil Cedar (*Juniperus procera*) indicates that there is insufficient moisture from mist and rain to support them. Previously, the presence of mist during the long and dry winter (*Jilaal*) season

over the mountain in reasonable quantities kept the moisture regime in tact creating a conducive environment for the mountain vegetation green and to thrive in that kind of weather.



Plate 1: Lichens hanging from Juniperus procera is an indicator of presence of mist in reasonable quantities

According to some elderly community members, the area is also experiencing higher temperature levels compared to what it used to be a decade ago or so.

There is also decrease of rainfall over the years. In a survey taken during the period from 1945-1950, John A. Hunt recorded 43.68 inches of rainfall at Go'da wein village just at the south-eastern slope of Gacan Libaax². However, recent records for the northern highlands which Gacan Libah is a part of, estimate the amount of rainfall at 500 mm (20 inches) annually. This translates a 50% decrease in precipitation levels over the 60 year period.

According to Hemming (1966), the mean annual rainfall in Gacan Libaax was only 650 mm. (32.5 inches); while Butzer (1961), quoted by Hemming, has suggested that the rainfall has been reduced by 20-25% below the 1881-1910 mean value³.

3.2. Current and expected impact of climate change on livelihoods and ecosystems

² John A. Hunt, The General Survey of Somaliland Protectorate, 1945-1950

³ C.F.Hemming, The vegetation Map of the Northern Region of Somali Republic (1966)

3.2.1. Water

The mountain is dotted with a number of water points, most notably *Cuna Madow*, *Guro*, *Calaaculle* and *Kab-cun*, which are supply sources for the inhabitants in the area, their animals as well as the wildlife. The water levels of these wells and their recharge capacity has been decreasing to a level that it causes friction among pastoralists during the dry season. Because of their scarcity and decrease in well water recharge, fetching this precious fluid for human consumption and watering animals became time consuming.

In the dry season, when water is scarce, the mist descending and accumulating in rock holes and crevasses provided some water for thirsty humans, livestock and wild life. It is important to note here during the 1950's when the colonial government initiated a natural resource management programme in Gacan Libaax, the few buildings established in there had roof gutters which were made into good use by harvesting the mist descending on rooftops for the consumption of forest guards.

There are no more "permanent running springs in every hollow". This is a result of combination of factors: decrease of precipitation (mist and rain), thinning of mountain vegetation, and reduction in water infiltration and increased temperatures.

Gacan Libaax Mountain is an important watershed area. It is equally important for the communities living in the lowlands to the north (coastal areas) and south where vast dry land farming is made possible by the perennial water courses originating from Gacan Libaax area. Some of the stream flow is used for food and fodder crop production in fertile low rainfall areas through water-spreading and water harvesting using dykes and conveyance structures. The adverse climatic conditions, particularly the decrease in the precipitation levels will cause the reduction of headwaters of those seasonal water courses originating from the mountain. This will result water scarcity in number of villages and settlements downstream.

3.2.2. Food security and livelihoods

The decrease in the precipitation levels has not only affected the mountain ecosystem but also the livelihoods of the communities in the area. For example, the occurrence of the mist during the dry season kept the vegetation of the mountain green, ultimately supporting, the stockowners and their animals to pass the dry season with less hardship.

Some of the elderly community members felt quite nostalgic about the absence of the mist. Muse Aw Ahmed, a 65 year old community member said: "*Mist is an indication of plenitude. When it was with us, living conditions in the area were better than today. Access to water was also easier, the vegetation was greener and more enduring, there was more moisture on the ground and erosion was not speedily progressing compared to these days. Livestock herd-sizes per family were larger, more productive and with bigger body weight. The milking gourd used in the past for milking goats is now utilized for milking camels and cattle*".

Xalwo Cige (72), the mother of the present writer, who has spent most of her early years in Gacan Libaax said: "*Because of the mist, the grass used to hold the mist settling on it, nourishing the shoots and then seeped into the ground. The mist used to cover the area roughly beginning after Asr prayer time (in the afternoon) and continued to overshadow us till 9:00 a.m. in the following morning. We used to call it Hayeys, because of its incessant downpour. It dampened the soil and rejuvenated the vegetation at a time our livestock were in a dire need for it*".

Qat (Catha edulis) farming families are also experiencing decline in the quality and vigour of their plants due to the scarcity of mist which nourished the shrubs during the dry (*Jilaal*) season; thus affecting the marketability of their produce.

⁴ This is an indication that the milk production is now less

3.2.3. Impact on women

Because of the declining quantity and quality of animal products (ghee, milk, meat etc) – although it affects the nutritional requirement of the pastoral household as a whole – women are the ones to suffer most. These products which were consumed in the past by the family are now sold in the market in order to meet the shortfall in the family's income. Thus women are left to eat less as there is this preferential treatment, when it comes to food habits, based on tradition and gender lines. A health centre in Go'da wein, supported by CLHE, recorded an increase of anaemic cases among pregnant women. The depletion of forest resources will necessitate allocation of more time for firewood collection, acquisition of building materials for the Somali hut (*Aqal*) and more travelling distance to water points.

3.2.4. Biodiversity

As illustrated earlier, the decrease of mist will lead to the retreat and slow disappearance of some of the forest tree species such as *Juniperus procera*. A transect walk over the mountain revealed this species is receding to the westernmost areas and along the escarpment where the mist levels is higher but short-lived compared to earlier periods. Dead trees with shallow lateral root system, many of them poorly developed can be seen everywhere, particularly in the eastern part of the mountain. Some of the other plant species affected by the climate condition but also with poor regeneration are *Euphorbia grandis* and *Dracaena ombet* (Dragon's Blood Tree).



Plate 2: Endangered Dracena Ombet (Dragon's Blood tree) hanging at the edge of the escarpment. In the background, the gradient continues to fall to Guban lowland and coastal maritime plains

With the decrease in precipitation levels, the diversity of the mountain flora has been declining over the years. The regeneration of *Juniperus procera* and *Euphorbia grandis*, are now very low and most of the trees are showing decadence. According to the community, a species of wild thyme (*Thymus vulgaris*) which used to grow in Gacan Libaax is now believed to be rare (extinct?). They also believe that this plant thrived on the presence of mist.

The mist forest of Gacan Libaax used to hold forest animals. The decadence of the trees and opening up of the forest will affect the natural fauna and expose the few remaining species to extinction. Gacan Libaax is an important route for migratory birds as well as a home for wide variety of local species, thus the deterioration of the forest condition will have a stressful impact on these species.

3.2.6. Eco-tourism

Because of its exceptional natural attraction, the existence of pre-historic caves and its geographical proximity with the three major urban centres in Somaliland, there is a good potential for eco-tourism if properly protected and preserved. The mountain has been an important tourist point in the past. However, the effects of climate change will down grade considerably the eco-tourist potentiality of Gacan Libaax.

3.2.7. Indigenous knowledge: Traditional weather forecasting

Rain forecasting has been a developed art among Somalis. This art was born from a synthesis of Persian and African astronomy. For example, the *Nayruus*⁵ is celebrated with ignition of fire (literally *Dab-shid*) and hanging a life branch/leaf (preferably aloes) at the entrances of houses. The northern Somali forecaster is called *Xidaar* (literally: someone warning against something ominous, such as drought, tribal conflict or heralds something good such as rain) or *Xiddigiye* (astronomer). This class of people were very much respected as their predictions generally used to be precise.

⁵ Compare to Norouz, the Persian New Year

However, according to community informants, the predictions of these gurus are become more unreliable and their reputation is getting eroded. These gurus apply the same 'formulas' which their forefathers used but paradoxically the outcome is always not as revealing as it used to be in earlier times. According to the analysis of the present writer, the disturbance in this indigenous knowledge can be directly attributed to the effects of climate change. This is area which needs to be researched.

4. CURRENT AND FUTURE ADAPTATION STRATEGIES

The main adaptation strategies adopted by the community are:

4.1. Rural-urban migration

The decrease of precipitation entails reduction of the benefits to be derived by the community from the mountain resources. This lead to the reduction of families' livestock herd sizes and consequently a situation of food insecurity. As a result there is an out-migration to the urban centres.

Women and elderly family members are then left to care for the livestock. In a way, this is a sort of coping strategy whereby family members working in the urban areas support their families in the rural areas. On the negative aspect, the trend leads to turning these rural families dependant on the support of extended family members in the cities on one hand, and the pastoral mode of living to deteriorate on the other.

4.2. Diversification of income

In order to compensate for the loss in the livestock production system, bee keeping is becoming more common among agro-pastoralists. Poor pastoral families resorted to charcoal production, while others coupled rain-dependant farming with their pastoral production system in order to diversify their income base.

4.3. Development of new water sources/ points

The decrease of water in the study area urged the economically better off households to settle the lowlands towards the south of the mountain in order to get access to grazing areas beyond the mountain range. They construct cement-lined cisterns (*berkads*) and surface water catchments for harvesting rainwater, while poor pastoral households continue their trek to the traditional mountain sources. This trend relieves some grazing pressure from the mountain and leads to more even distribution of pastoralists and their animals in the area. It will also contribute to the lessening of the formation of livestock paths which often turn into water channels.

5. ACTIONS BEING IMPLEMENTED TO COPE WITH THE IMPACTS OF CLIMATE CHANGE

CLHE started working with the community in May 2000, in order to address the environmental problems facing the community and to revive those conservation and protection measures that had existed before the civil war. This interaction with the community gave CLHE a chance to learn about the environmental challenges facing them, what adaptation measures they have devised and adopted and also what actions will further assist them in adapting to the changes. CLHE is so far the only organization working with the community on these aspects.

During that period, the following activities were carried out:

5.1. Community training

The community were involved in the process from the beginning. The process has started with discussions about the present and past history of Gacan Libaax. An analytical process of thinking took place whereby some elderly community members narrated the history of Gacan Libaax, how it was in

the past and its present condition (that was in 2000). The community felt and expressed the need for the rehabilitation and re-establishment of the mountain range resource management system. They have now a locally elected committee which assists CLHE in the implementation of its interventions. This was followed by a number of trainings and sensitization workshops on community participation, basic principles of range management, climate change and its effects, cause of land degradation (including desertification and deforestation), water and water quality, unsustainable production and consumption etc.

5.2. Soil conservation

Soil conservation and reforestation activities were also initiated from the start of the project. This was meant to slow down water run off, increase percolation and improve moisture regime to allow regeneration of trees, shrubs and herbs. As a mitigation strategy, CLHE envisions that the improvement of ground cover will stimulate the micro-climate of the mountain area through reduction of temperature levels and water evaporation. This will contribute to the reduction of the evaporation of mist.



Plate 3: (Before CLHE intervention) A severely degraded area in Gacan Libaax. Bidhaan area – near northern escarpment (Photo by: John Miskell, May, 1999).



Plate 4: Same location showing dramatic recovery as a result of management (Photo by: Ahmed I. Awale, May 2007)



Plate 5: Dodonaea viscosa bushes established behind a stone checkdam



Plate 6: An excellent stand of perennial grasses surrounding a Cupressus spp. This area was bare of grass before seven years.

5.3. Rain water harvesting

CLHE assisted the community in their rainwater harvesting initiatives outside the of the mountain area - an activity whereby some of the community members have already been involved in. The objective was to shorten the walking distance for women and animals to the shallow wells at the mountain bottom, reduce frictions related to water accessibility and availability among community members. This strategy contributed to the reduction of grazing pressure on the mountain and improved the regenerative capacity of the vegetation of the mountain for the purpose of reversing the shrinking forest cover.



Plate 7: Construction of underground cistern for harvesting rain water in Deri-mara village

5.4. Income generation activities

CLHE provided trainings on beekeeping as well as the necessary tools and equipment to the community. This was an attempt to link livelihoods support systems to conservation. The benefit of beekeeping is that it gives an added value to the trees threatened by the demand for charcoal and indiscriminate cutting of trees for thorn enclosure formation.

5.5. Reforestation

CLHE established a tree nursery in Gacan Libaax for the propagation of different mountain species. These trees are out-planted during the two rainy seasons. The villages and settlements around Gacan Libaax also get the seedlings for free. The community participate in the out-planting activities on voluntary basis.

6. CHALLENGES

Charcoal production

Charcoal produced from the acacia forests in the country is the single locally available energy for cooking and space heating. Gacan Libaax is located in the middle of three major urban centres in Somaliland viz. Hargeysa, Burao and Berbera with an approximate population of one million inhabitants. The area towards south of Gacan Libaax is a semi arid scrub which used to be well-endowed with *Acacia* species, particularly *Acacia Bussei* – the most preferred species for charcoal production. However, the thinning of these woodlands urged charcoal producers to move their commercial exploitation of biomass resources towards the direction of Gacan Libaax Mountain. This poses a major threat to the mountain ecosystem and is a contributory factor to impacting the micro-climate of the area through increased temperature and reduced precipitation and soil moisture regime.

In order to meet this challenge, CLHE has been proactive in highlighting the adverse consequences of charcoal production on the environment and

the socio-economy of the pastoral community. It has publicized the issue through case studies, radio programmes and through its newsletter “Our Environment” for public awareness at national level as well as for policy development. CLHE has also introduced the production and utilization of energy saving cook stoves (*Jiko*) in the urban centres. On policy level, CLHE, in collaboration with the like-minded civil society organizations (CSOs) has been lobbying for policy change for exempting taxes from any alternative energy option that can contribute to the reduction of charcoal consumption i.e. kerosene and kerosene stoves, liquefied petroleum gas (LPG), solar etc.

Lack of policy implementation

In Somaliland, there are two policies related to environment that has been in existence since 1998. These are the Somaliland Range Policy (2000) and the Natural Resource Protection and Conservation Act (1998). However, these policies are more on conservation and protection lines rather than discussing the effects of climate change and measures to mitigate them. Unfortunately they are all in a state of dormancy due to paucity of financial resources and absence of bi-lateral aid, poor political will and limited technical expertise. Therefore, since these policies are not tested their effectiveness and/or ineffectiveness can not be gauged now.

Community policies on these lines i.e. protection and conservation do exist and have been successful to a certain extent. For example, the opening and closure of the grazing land of Gacan Libaax is totally with in the hands of the local committee. They have also ensured that no logging and charcoal production could take place in the mountain area. However, the absence of government support makes these initiatives and efforts to be potentially vulnerable to breaching.

Illegal thorn enclosures

The decrease of the pasture and browse condition, resulting from unsustainable resource utilization practices compounded by effects of recurring

droughts, has triggered resource competition whereby some pastoralists enclose the communal rangelands for private use. Maintaining these enclosures require periodic cutting of trees, thus contributing to the denudation of the ground and increase in temperature levels. Moreover, shifting cultivation will create the same effects and give way to increased erosion. In facing this challenge, other than empowering the community to resist this trend, CLHE again sees the important role the government could play in curbing this practice through implementation of existing policies.



Plate 8: Land clearing for rain-fed farming at Biyo-fadhiisinka, south of Gacan Libaax

7. CONCLUSION

The intervention of CLHE, though on a small scale, has mitigated some of the galloping degenerating climatic effects in Gacan Libaax. CLHE has a permanent camp in the mountain housing the project staff and community volunteers and workers who carry out soil conservation, reforestation and grazing management activities. Oxfam Novib has so far been the main agency supporting CLHE in its environmental rehabilitation activities in the project area.

However, despite of the above mentioned achievements, CLHE believes that without taking into account the developmental needs of the communities in the entire area, not just Gacan Libaax alone, more pressure on the fragile mountain ecosystem is expected to occur. Construction of bunds to reduce soil erosion should be extended to villages and settlements towards the south of Gacan Libaax, while the dependence of these communities on grazing and water resources of Gacan Libaax

is discouraged by investing more in water sources development and range management activities in the areas outside Gacan Libaax. The main purposes of these activities is to mitigate the environmental degradation processes in Gacan Libaax, though increasing the ground cover and stimulate a change in the micro-climate of the area that will have a positive impact on precipitation levels, including the mist. This will require greater financial resources which are not available at the moment.

There is also a need to capacitate the Ministry of Pastoral Development and Environment (MPD&E) to make the existing policies work, take the necessary steps to institutionalize mitigation and adaptive measures with these policies and make the Ministry accountable on this big issue – at least at local level. The support needed is both technical and financial. Implementation of these policies could speed up the recovery process.

In the case of 'climate proofing' national policies, it is primarily important to highlight that in the absence of adequate knowledge and information about climate change and its impacts, there is little chance of effecting a positive change. Influencing planners, decision makers and corporate agencies to take up in the mitigation of climate change as well as the adaptive measures in climate sensitive sectors and regions is very crucial and timely.

The scenario illustrated in this case study is of a crisis-in-the-making which is now being experienced in many parts of Africa. It is high time that the developed nations should realize that the suffering of the communities in Africa and the rest of the developing countries will not be confined to their boundaries - same as the impact of the emissions from the industries of the wealthier nations are crossing over to destroy the livelihoods of those communities. Future consequences of climate change will boomerang on its biggest contributors. Wealthier nations must strive for curbing their lion's share of green house gases (GHG) emissions, and at the same time must aid the peoples' in the developing nations to develop more sustainable livelihoods.

8. WAY FORWARD

The effect of climate change has manifested itself in the decrease mist and rainfall on one hand and the rise in temperature levels on the other. This has triggered socio-economic problems within the community and adverse ecological changes as well. These changes has urged the community to devise adaptation measures such as shifting from pure pastoralism to agro-pastoralism, migration to the urban centres, diversification of income through bee-keeping and charcoal production.

The local community very well understand the environment in which they live, and have a very positive attitude towards it. They associate plenitude with the presence of mist as far as its contribution, in terms of greening of vegetation and its resulting benefits to their livestock, is concerned. They understand that the mist and the rainfall on the mountain are the most important resource locally as well as the massif for its grazing resource, and a reason why Gacan Libaax must be protected (Miskell 1999). Therefore, the reduction of mist levels has had its far-reaching effects on the pastoral community in the area causing destitution and out-migration to urban centres. If this trend continues in the present condition, i.e. decrease of precipitation levels, it will mean for the community more hardship, food insecurity and resource-based conflicts. Other

than the continuing decadence of the mist forest, some of the other areas that are sensitive to climate change are the condition of the remaining wildlife, eco-tourist potentiality of the mountain and water.

CLHE, in collaboration with the community, has taken measures to slow down the deterioration of the forest and revive the rangeland health through rehabilitation works, reforestation, grazing management and community training, as well as encouraging the community to reduce the grazing pressure on the mountain. These mitigation activities were also coupled with adaptation measures such as income diversification, development of water sources beyond the mountain area as a means of easing pressure from the mountain.

However, in the absence of government support and the dormancy of the relevant policies, CLHE and the community, despite of these positive actions taken in reviving Gacan Libaax ecosystem, are yet to face the challenges posed by some of the unsound practices adopted by some community members such as charcoal production and enclosures. These practices do not only contribute to community conflicts and natural resource depletion, but also to affecting the micro climate of the area in general. There is an urgent need for action towards cooking energy diversification on one hand, and reviving pastoral livelihood conditions through income diversification.

ANNEX I: LITERATURE CITED

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