Indigenous Knowledge on **Climate change Adaptation** on **Droughts**

Traditional and modern Early warning and Early Action by Somali Communities

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Introduction

Climate change poses a multifaceted challenge to communities worldwide. In regions like Somalia, where the impacts of climate change are keenly felt, the communities' profound connection to their environment becomes a critical asset in navigating these challenges. Over centuries, the Somali communities have honed a deep understanding of the complex dynamics of their local ecosystems. The wealth of local knowledge, woven into the fabric of their daily lives, becomes a reservoir of wisdom that is instrumental in the face of the multifaceted challenges posed by climate change. Indigenous populations, through their experiences and practices, have crafted adaptive strategies that not only sustain livelihoods but also ensure the delicate balance between human activities and the environment.

We delve into the rich tapestry of indigenous strategies in Somalia, shedding light on various facets crucial for climate change adaptation. From the nomadic livestock management practices that allow communities to seamlessly traverse changing landscapes to the innovative water harvesting techniques designed to combat water scarcity, each aspect reflects the resilience and ingenuity ingrained in local knowledge. Furthermore, we examine the socio-cultural dimensions, emphasizing the community-based resource management systems and the cultural practices fostering social cohesion.

By harnessing the collaboration between scientific and indigenous knowledge systems, policymakers can create a more holistic understanding of climate dynamics and tailor interventions that address the unique challenges faced by Somalia. This inclusive approach recognizes the interconnectedness of environmental, cultural, and social factors, ultimately contributing to more sustainable and adaptive solutions in the face of a changing climate.

Drought is often one of the most devastating but least understood weather phenomena, largely because of its slow onset and accumulating impacts over time. Although definitions vary depending on the context, drought is generally an extended period of months or years in which precipitation is less than the annual average and results in severe water scarcity (Downing and Bakker 2000).

According to the World Meteorological Organization, droughts are classified as either meteorological (lack of precipitation over a region for a period of time), hydrological (a period with inadequate surface and subsurface water resources), agricultural (a period with declining soil moisture and consequent crop failure due to lack of surface water resources), or socioeconomic (failure of water resources systems to meet demands, which impacts human activities both directly and indirectly).

On the other hand, one could define optimal rainfall as sufficient rainfall in amount and distribution over time and space to meet the needs of specific livelihoods.

Key Somali Indigenous Knowledge For CC Adaptation

Indigenous Knowledge on Weather and Climate Forecasting Knowledge

Traditional weather and climate forecasting is used by many indigenous communities worldwide as a guide in making decisions that enable them to cope and adapt to climate changes including extreme weather variations. In many pastoral communities in Africa, traditional weather and climate forecasting remains the most accessible and affordable source of weather and climate information. In the four seasons of the year, usually Somalia expects to receive rainfall in spring and winter. But the indigenous conduct their weather and climate forecasting in every season to decide how the next season will be.

Indigenous people have traditional early warning systems to reduce the devastating effects that often result from unpredictable and variable weather patterns. Pastoralists have developed a culturally rich early warning system based on long-term observation and centuries old, accumulated experience. Somalis forecast the weather using the planets, stars, the moon, the sky, the wind, the clouds, animals and trees.

Traditional Weather forecast using Planets (stars)

Mariikh, Suheyb and Saxal

Traditional pastoralists say that there are two small planets called MARIKH and SAHAL which sit with the moon biannual, or one time in every 6 months each. If one of these planets has sat in the left side of the moon and the calendar is odd number like, 1, 3, 5, 7, 9---------- rain is expected. If the planet has sat on the right side of the moon the calendar is even like 2, 4, 6, 8, ------drought is expected.

Traditional Weather forecast using the Moon

If the moon gets in a yellow circle in the night; that is because there are soft clouds in the sky, the pastoralists say the moon is in a pool of fresh water, so, they predict rain

Traditional Weather Forecast Using Sky

If the sky is **clear and without clouds, very black in color in the day**, they say, it is renewed itself and prepared to receive many clouds that **will bring rain** and thus they expect rain. If the sky is **dusty and unclear**, the **expectation of rain is low**.

If the season is **spring (Gu')** and the sky is **dusty and without clouds,** they say that **the season may not be good.** But if there are **scattered soft clouds in the sky,** they say m**ay be this Gu' season will be good.** The **vice versa**, if the season is **Dayr** and there are **scattered soft clouds in the sky**, they say, the **Dayr season may not be good.** But season is **Dayr** and the **sky is dusty and not clear enough**, they **expect rain**.

There is Somali Poet which says: ***"Dayrti caadliyo gugii ciira leh, Ceel wiyeeraa looga carараа",*** There is other saying: ***"Dayrtu ama ha da'yso ama ha diiraato".***

Traditional Weather Forecast Using Animals

Indigenous pastoralists predict specific weather based on observation of changes in animal behavior at certain specific periods of time. These observations include change in plumage of birds, reproductive and browsing behavior of camels and the behavior of movements of insects and wildlife. Some examples of animal-based weather forecast indicators include:

Indicator	Animal Behavior
Good Rains	• Towards the end of the dry season as the rains approach, animals will refuse to drink water and this signifies that the animals are anticipating rains i.e. fresh water. • If animals are happy during milking or at the fences, it signifies an anticipation of good harvests and rains by the animals. • "Cawl" gazelles mate
Drought / Rain Failure	• Livestock break the fence in the night and search for food, • Livestock kick their young ones and reject / abandon them, • Livestock refuse to be milked and show anger / restlessness. • "Cawl" gazelles do not mate

There is a well-known folklore which says that the male "Cawl" gazelle gazes at the stars before it mates and is able to read the stars better than humans ``For you will never see a 'Cawl' gazelle with newborn offspring in times of failed spring rains, like you do with the other gazelle species. For decades in the past, some nomads used to go far in the middle of the night to keep a track of a nearby herds of 'Cawl' gazelles, so that they know when to let their ram's mate with the ewes, and all this depended on whether the 'Cawl' gazelles had started to mate or not. Because, in the time period which 'Cawl' gazelles give birth to newborn offspring is about the same time as sheep give birth to their new born lambs (five months from the time of conception).

There are countless phrases, songs, proverbs and poems in Somali, which ascribe these skills to the male 'Cawl' gazelle and countless other wild animals. The poem of Cali Dhuux ascribes these skills to the male 'Cawl':

Somali Language (Af-soomaali)

“Markuu Cawlku Cawlaa orgayn, waa u cibaaroone,
Cisaday ku uuraysatiyo, caadaduu garane,
Cashaday calool gelahayaan, cannugga beertiisu,
Curcurradiyo lawyada intuu, ku cuskaduu saaro,
Cirridiyo cagaar miday ku dhalan, caadka kor u eegye,
Hadba cirirka loo nuuriyuu, ku cimro-qaataay”.

English Translation

“When the male ‘Cawl’ wishes to mate with his females,
He first makes astronomical calculations, He knows their menstrual periods and the techniques of mating,
The day he wishes to cause propagation and off springs,
He, placing first his front knees on to the female’s back,
Judges whether the young will be born in sun or green from the signs in the heavens, His decision whether to continue mating or to descend is in accordance with his celestial deductions”.

Traditional Weather forecast Using Clouds and Winds

One of the sources of weather forecast is the wind. If the clouds are soft and usually are moving fast, pastoralists do not like it. If the clouds are heavy and slowly moving, they predict good sign of rain.

Winds: variation of nature of the wind has been used by traditional societies as an indicator of weather change. The Indigenous observe the direction, strength, force and duration of winds that blow at different seasons and use these as sources of information for predicting weather.

if the **wind changes its usual direction** of the season and **blows from different sides** they call **(cel-celis and galangal),** they **predict rain**. If the wind is **strong and blowing from only one direction**, they **predict limited or no rain**.

Traditional Weather forecast using Trees

Traditional elders can forecast weather and climate from studying the trees. Certain plants in Somalia reveal some changes as a result of weather conditions with **some trees bloom in expectation of upcoming rains e.g. Qurac, galool, bilcil etc.**

The flowering of a tree could be due to the increase of humidity that is detectable or accessible only by the tree, but for the local communities, it is an indicator of future weather. In this case, the Indigenous Somali say, the tree feels that rain is coming. The tree absorbs water and nutrition from the soil through roots, if it feels that drought is coming, it would not do flowering and keeps water in its roots.

The Pastoralists' Indigenous Knowledge and Food Security

In Puntland, there are some plants species that exist in wild form and used traditionally for their food, fodder, fiber, oil or medicinal properties, but not yet have been adopted in large-scale agriculture. They may have the potential to contribute to food security, nutrition, health, income generation and environmental services. Many of these plants are used during periods of food scarcity and famine. Some of these species have potential for more wide spread use, and hence promotion for food security and agricultural diversification.

Species such as **Yicib, Gob, Canjeel, Garas, Xamur, Carmo,** and others are used as human food some of which even when there is no food shortage.

Traditional Institutions

Pastoralism requires types of institutions which can flexibly react to adapt quickly to the dynamic changing conditions. Xeer Agreements Affairs are regulated by contracts between clan groups. These contracts define rules for the management of land and other issues and set up sanctions for the case that agreements are broken by one of the parties. Xeer agreements between groups need to be continuously renegotiated and redefined according to the needs to move towards new water and grazing resources. The responsibility over these institutions was held by the clan authorities: Clan elders regulate clan affairs on behalf of their people especially in regard to access to natural resources land conflicts.

Challenges of Indigenous Knowledge on Climate Change Adaptation in Somalia

Poaching, Deforestation and Loss of Biodiversity

Long term conflict, weak institutional capacity and low funding towards ecosystem management hasve been some of the leading causes of poaching, deforestation and biodiversity loss in Somalia. Poaching and deforestation has often resulted in the loss of key animal and plant species which were critical to indigenous communities either in predicting the future weather and climatic expectations and as an adaptation mechanism especially for wild crop varieties that were used for drought adaptation. This has served to dilute indigenous knowledge and capacity for climate change adaptation among Somali communities.

Increasing Climate Change Effects that Have Intensified Droughts and Other Extreme Weather Events:
Indigenous climate change adaptation strategies were highly reliant on regular observable climatic and weather patterns, with an increasing intensity in climate change impacts, there has been an increase in the frequency and irregularity of extreme climate events such as droughts and sudden onset floods. As such, this limits community capacity to accurately predict the weather conditions that they are faced with.

Institutional Challenges and Low Public Awareness
There exists discordance between modern early warning systems and the indigenous climate change adaptation approaches / practices instead of the two systems being complementary. At the same time, over time, public disaster management institutions and community early warning and early action platforms are not linked to the indigenous knowledge and practices with no effort to leverage the complementarity between the two in enhancing Somalia's climate adaptation capacity.

Further, there is a clear lack of weak political will and commitment to protect the environment is exemplified in the fact that the ministry which is mandated for environmental conservation and protection is one of the least funded government institutions. There is also absence of regional cooperation on issues related to environment. The integrity of the natural environment is a key part of the indigenous climate change adaptation knowledge and practices.

Denial / Loss of Indigenous Knowledge

The negative attitudes towards indigenous knowledge among national elites and foreigners who openly disparage the relevance, usefulness and credibility of IK for social and economic development. ¬ Globalization of capitalist production, consumption, and marketing systems have undermined completely the existence of indigenous knowledge production and consumption patterns and systems.

Furthermore, given the clear lack of formal cultural curation efforts in Somalia, there is a gradual but steady loss of indigenous knowledge, practices and capacities including those related to climate change adaptation.

Key policy Messages

- Undertake **research into Somali Indigenous Knowledge** on climate change adapatation and disseminate this knowledge to wider public especially among Somali Pastoralist and agro pastoralists. The Somali Indigenous Knowledge on Climate Change adaptation should be curated and recognized as Somali Community's intellectual property in order to preserve and protect the rights of these communities.

- Efforts and measures should be taken to l**ink Indigenous knowledge to modern sciences and climate data** so as to achieve an optimal use and adequately inform community early warning systems.

- Somali pastoralist and agro pastoral communities have experience with climate change adaptation especially in the areas of early warning and response, efforts should thereby be made to **enhance household and community access to early warning climate data** to enable thus enabling them to make evidence-based climate adaptation decisions.

- **Policy measures for protection and restoration of biodiversity, wildlife, forests and rangelands** i.e. healthy ecosystems as indigenous knowledge and practices are highly reliant on healthy and functional ecosystem. Ecosystem degradation destabilizes community indigenous early prediction models through loss of species that were used to make weather and climatic predictions.