



Indigenous Weather Forecasting Mechanisms among Ethiopia Somali

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Abstract

The study focused on identifying Indigenous knowledge of weather forecasting mechanisms in Korehay Zone, Somali Regional State, Ethiopia. The study was conducted in Ethiopia Somali region, Korahay Zone in 2017. The purpose of this study to identify indigenous knowledge have been experienced among pastoralist communities to predict weather patterns in their area. The study was employed ethnographic descriptive survey methods using open ended questionnaires and interviews. Data was collected purposively from knowledgeable elders to assesses communities understanding of identifying indigenous indicators to determine weather patterns in their environment. It was founded that indigenous indicators that of biological, atmospheric conditions and astronomic are used to predict weather patterns as of short, medium and long periods of time. Birds sound and movement, insect's movement and sounds, temperature density, wind direction, animal behavior, trees, and moon/star relationship were regarded as indicators of weather patterns. Both manmade and natural factors are deteriorating indigenous indicators of weather patterns in the study area. In the study area, indigenous indicators have potentials of predicting weather patterns with different duration though climate change vulnerability increasing has been questioned the relevance and reliability of indicators by communities. Thus, the stakeholders should have emphasized on documenting and preserving these indigenous weather forecasting mechanisms that enables to integrate into climate change adaption and modern weather forecasting mechanism.

Keywords: indigenous knowledge, indicators, weather forecasting, pastoral society.

1.1.Introduction

Traditional knowledge is explained as the knowledge of a group or a community from a particular area, based on their environmental understanding, interacting with nature and experiences within their area(Shumba, O.1999;De Boef, W.,etl., Eds.1993)IKS was pervasive in people's lives as tacit knowledge that was not easily modifiable but providedlocal basis for problem-solving strategies. But IKS was context specific which then allowed for the flourishing of the local situation and provision of enabling environment for activities designed to help the communities bring about development (World Bank Group, 2011).Traditional rainfall forecasting/prediction refers to indicators that are locally used to interpret weather/climate conditions to be expected. Traditional rainfall forecasts/ predictions differ across communities, cultural background, and environment around the (Hart,2007;Garay and Puri,2011).

Indigenous knowledge in weather and climate prediction is under threat of disappearance due to lack of systematic documentation of the knowledge; lack of coordinated research to investigate the accuracy and reliability of Indigenous knowledge forecasting and finally when old people who are the main custodians of the knowledge pass away, the knowledge which has been accumulated for many years is lost (Grace, 2008, Mhita, 2006 and Kijazi, et., 2012). Marginalization of pastorals indigenous knowledge, experiences and practices of weather forecasting weakened their adaptive capacity that resulted highly vulnerability risks than other community (WISP, 2007). Indigenous Knowledge of weather forecasting can be combined with the modernmethods to produce more reliable and accurate forecasts. In Western Kenya Rainmakers indigenous knowledge are integrated into that of from the Kenyan Meteorological Department to produce more accurate weather report (Thomson Reuters Foundation, 2012). In many rural communities of Africa use Indigenous knowledge to cope up with hazards related to climatic variability, especially in Tanzania, Zimbabwe and South Africa (Changa and Ngana, 2010; Blench, 1999). Also, in Europe, Australia the government make use of indigenous knowledge in order to cater for the varied microclimates in the region (Australian Government Bureau of Meteorology, 2010).In West Africa study demonstrated how seasonal rainfall forecast information was used to reduce loss of lives, property, and illness due to floods(Tall and Braman,2008). Efficient early warning systems have been shown to greatly re- duce mortality and morbidity due to extreme weather events

in the health sector (Robinson and Herbert, 2001; Acharya, 2011). Nyong, Adesina and Elash (2007) carried a study in the African Sahel on the value of indigenous knowledge in climate change mitigation and adaptation strategies show that indigenous knowledge has been applied in this region in climate change mitigation. In the area of adaptation, indigenous weather forecasts have been utilized in the assessment of vulnerability and implementation of adaptation strategies.

Moreover, Indigenous knowledge, skills and practices of pastoralists' community would obtain more attention as a productive asset and pastoral heritage that will be carefully identified and documented. Hence, in the case of Ethiopia Somali pastoralist are not out of these general aspects. Somali pastoralists community have developed indigenous weather forecasting mechanisms as their environments and livelihoods attached to it. These indigenous weather forecasting mechanisms yet not studied scientifically. It needs high attentions to study Somali pastoralists indigenous weather forecasting due to any attention has not given to it nationally and regionally. This is because of misunderstanding and undermining pastoralists' indigenous knowledge, practices and skills in general and indigenous weather forecasting mechanism in particular. Indigenous weather forecasting mechanisms are largely practiced knowledge among pastoral and agro pastoral communities in world. They have used well known indicators that would enable them to identify either bad or good season/weather patterns. These knowledge, skills and experiences of reading, understanding and interpreting are not equally distributed among the communities. Thus implies that identifying, documenting and preserving indigenous weather forecasting mechanisms become significant among pastoral communities.

The **specific objectives** of this study is to Identify indigenous knowledge and experiences of weather forecasting among the pastoral communities of Korehaya Zone, Ethiopia Somali regional state.

Importance of the Study

The pastoral communities have been experienced climate changes and have developed indigenous knowledge of determining the patterns of weather to minimize climate change vulnerabilities. Normally, pastoral communities have been living in scarce rainfall and their livelihood also affected by rain fall. Rain and rain related aspects are their life which means without rain no life and livelihood of pastoral communities. The study has identified and

described the indigenous knowledge of weather forecasting of the study communities. It has documented to preserve indigenous weather forecasting mechanisms for future generation. This study will pave the researchers to study and uses the finding as an inputs for their compressive scientific studies. The policy makers and other stakeholders will adopt the finding for their activities of climate change adaptations and decision making on the life and livelihoods of study area.

The study area

The Somali Region is geographically located in south-eastern part of Ethiopia, between 4° and 11° N latitude and 40 ° and 48° E longitude. The altitude of the region ranges between 400-1600 meters above sea level (m.a.s.l), with most areas lying below 900 m.a.s.l. It is the second largest region in Ethiopia next Oromia Regional State. It is bounded by Kenya and Somalia to the south, the Republic of Djibouti and the Somali region to the north, Somalia to the east and southeast and Oromiya region to the west. The region covers a total area of 350,000km² (SoRPPACC, 2011:15). The climate of the Ethiopia Somali Region State can describe as arid and semi-arid climate, with an average rainfall ranging from 200-700 mm/year. The two rainy seasons are, Gu (April to June) and the Deyr (October to November) whereas the two dry seasons are Jilaal (December to March) and Haggaa (from July to September). Somali communities have their own ways of counting season that related with their environment and cultural values (ibid).

The minimum amount of annual rainfall in the area needed to support viable pasture in the Horn of Africa was about 300mm. According to Somali perception variability of climate in the year's seen within four seasons. Within these four seasons the pastorals societies identify and understand the vulnerability of the climate in the specified months and then stands for its vulnerability through indigenous socio cultural and economic adaptation, resilience and cope with climate vulnerability. The four seasons of months in a year are *Jilala, Gu, Haga and Deyra. Jilaal*. Is the hot dry season (January to March), livestock are cheap because pasture and water are scarce, animals are susceptible to diseases, and pastoralists are in great need for purchased food, so they sell their animals at almost any price (Deveroux,2006 :56).

During Gu seasons, which is the first rainy period (April to June), and in Haggaa seasons which the dry seasons (July to September) whereas at seasons of the Deyr which is the rainy season (October to December), prices start to rise again (Ibid). The Somali society is highly structured and anchored in the system of clans and sub-clans that bind and divide Somalis.

The systems form the basis of much of the core social institutions and norms of traditional Somali society, including personal identity, rights of access to local resources, customary law (Xeer), blood payment groups (Diya), and support systems (Somali Region, Program of Plan to Adapt to Climate Change (2011).

Methods of the Study

The study was carried out in Korehay Zone, Somali regional state, Ethiopia. A descriptive survey was used. Purposive sampling was used in administering open ended questionnaires and interviews. The informants were selected purposefully from people had better knowledgeable about the study themes and their social status among the communities. Thirty-five elders (35) were purposively sampled for open ended questionnaires and interviews data collection sessions. Then, the collected data were analyzed and interpreted using qualitative descriptive approaches accordingly.

Findings and Discussion of the Study

Indigenous Weather Forecasting Mechanisms among Ethiopia Somali.

The Ethiopia Somali community of Korehay Zone have been experiences using indigenous weather forecasting mechanisms. They have identified indicators supports for forecasting of weather patterns. Among well-known indigenous indicators of weather forecasting are star and moon patterns, behaviors of plant, insect, bird, animal and directions of wind/air and rain, and density of temperature. Somali community has indigenous naming for seasons and months. Having indigenous naming for materials enables the community to have indigenous knowledge and experiences towards objects. The Somali community count four seasons in a year and in each season there are three months that of 12 months in year. This knowledge enables the community to know patterns of seasons and months.

A. Star and Moon relationship

The appearances of astronomical features could be used to determine weather patterns based on the knowledge produced by communities for centuries. In the study area elders were enabled using stars and moon relationship or appearances to predict weather or season of their environment.

The following are the two well-known names of stars that uses for predicting weather patterns among the community of the study area.

1. **Dirrir.** This star called by indigenous name (Somali language) known as Dirrir. If this star appears with a moon in short distance on the 15th April of Gu' season, will indicate the

appearance of scarce rain season. But, if it appears on the 14th April, will signify the coming of good rainy season.

2. **Godan.** This star called by indigenous name (Somali language) known as **Godan.** If **Godan** appears side by side with moon in the west direction, indicate the coming of good rainy season.

Also, they have to use stars in association with moon and this knowledge system is termed as '**Fall**' in the community. In the reading of star-moon association, twenty-eight days are counted in the system from the moon's first appearance to its last day of onset. According to the informants' knowledge, on the first and last (30th) day, the moon appears alone without accompanied with a star. But, from day two to-day 29, one star accompanies the star every night. That one has its own name. Only one star accompanies the moon at one night and the other day some other star accompanies it. With these 28 days one star has only once chance to accompany the moon. Those stars do have their own name. What matters here is that which star on what day and in which direction accompanied the moon signals to the interpretation. From that 28 day, the forecasting man selects any one of the days which do not know why that particular day.

As one of my key informant, for instance, if that particular moon accompanied the moon on Sunday, it is not good whereas Monday is preferable/ indication of good things. Only few elderly people possess such knowledge and the knowledge is mostly reliable, but not always perfect.



Picture 1: Field data collection, experiences on practices, 2017.

Also, moon behavior indicator uses to determine weather patterns in the area. Accordingly, they see its shape pattern and direction. For instance, when the moon is surrounded by white cloud, it is an indication for the availability of heavy rainfall later.

B. Animals Behavior

Domestics and wild animals have used to determine weather patterns among different group of peoples in the world and in the study area specifically.

Camel behaviors have significant potential of determent either good or bad weather patterns.

Camel behaviors indicating of good rainy seasons are; when;

1. It doesn't drink much water than regular time.
2. It forcibly moves into some direction than before indicates where the rain fall/drop soon.
3. Unusually, stand calmly as usually in their limited compound rather walk all night and/or move into different direction inside compound and
4. If female camel give urine stand right straight and then crossing its two back legs will indicate the rainy season will continue or come soon.

Camel behaviors that indicating scarce rainy seasons are, when;

1. It doesn't give enough milk as usual,
2. It doesn't have pregnancy, though it is enough to do it and
3. It doesn't give birth sufficiently/ give birth at unusual period that will be physically weak/totally not.

In addition to the above camel behaviors, the study founded that camel sounds have a potential to determine weather patterns. Accordingly, among some well-known camel sound implications are the followings,

- a. If camel utters sounds likely "**Baaa'aaaaaa'aaaaaa**" will indicate the coming of good hope (may be rain),
- b. If camel utters sound most likely "**Immmmmmmmmmmmm**" will indicate fair hope and
- c. If camel utters sounds likely "**Baaaaaaaaaaba**" will indicate the coming of bad time.

Goat behavior. The goat behaviors that indicates the coming of rain when;

1. It refused to out from the home unusually,
2. It drinks less water and
3. If male goat utters ("**baa'aa**") sound reputedly for a week, will indicate the coming of rain soon.

The other indicators of weather patterns in the study area was wild animals' behaviors. The informants were described it for instance, the year to come next will be rainy and prosperous when wild animals become aggressive and attack our home animals.

C. Birds movement and sound

Birds movements and sounds of unique birds are used to determine weather patterns in the study area. One of my informant was said that;

“If the flocks of birds have moved to other area from normal habitat would indicate the bad season or scarce rainy season. But, If the flocks of the birds have moved into their area unusually; would indicate good rainy season”.

Also, bird's sound uses to identify either the coming or the continuing of good or bad rains. The bird does appear physically and produces sounds. Some birds will appear at night and others appear above cloud. These indicated that birds differently characterize the weather patterns.

D. Plants behavior

Plants species are used to determine weather patterns in varieties ways.

One of my key informant described the plants behavior determining either bad or good weather patterns as follows

“If the trees like Garas, Meyag and Hegilo have grown fresh flowers/leafsin the area indicate the coming of long dry season. In contrary to this, other trees like kakor, yoob, kurar, dhiden, hoday, hagar, hode, hager, hankokib, lebih and yohob”. with green flower indicates the continuations of rainy seasons.

Besides, when plants regularly grow and green, unusually becoming to leave leaf indicate the coming of long dry season. Also, if the grasses become dried; though rain exist will indicate scarce rainy season/bad dry season. Informants claimed that trees/plants become more relevant indicators of predicting weather patterns in their area.

E. Insect behavior

The appearances and activities of insects in the study area was considered to determine weather patterns. Informants were dealt that insect's behaviors of the Abor and Bolol are uses as indigenouse indicators for weather forecasting. Accordingly, if these insects are collecting grasses for their consumption in to their holes will indicates the coming of bad rainy season or dry season. In contrary to this, if they put grasses outside of their holes and then they make line like dam/road will indicates the coming of good rainy season.

F. Temperature density

It is identified that changes of weather patterns were used to determine future characteristics of weather. My key informants were assured that although their area is hot; but, if it is hotter than before, will indicate the coming of rain within a day. And, also if the temperature is too hot, and no any scene of air movement, indicates the coming of rains very soon. They have parameter of the air movement using the indicator called thread. Then, they would have thread on their hands and looks either air is moving or not. If thread is move into some directions, will indicate the hope for the coming of rain, but if not it will predict bad rainy season.

G. Wind behavior

One of key informant narrated the significant of wind behavior indicating weather patterns in the area. Accordingly, if the strong wind called **Eermis** (local name) collect the dusty, then rotate and move directly up to sky will indicate the coming of rain within a days. The story behind this knowledge is the combined dusty like wind blow which is believed as it is *“pulling down”* sky, then sky will give birth in its *womb* which is the fall of rains. Besides to this, the direction of rain will indicate either the coming or constant or scarce rainy season. According to the Somali elders’ knowledge and experience about weather forecasting the rain came from east direction, will shows good rainy season and if it come from south will also has will similar implication. The rains come from the south direction has no any hope to rain or shows scarce rainy season. Hence, the wind directions dry season and rainy season are among some patterns of weather that community understand and identify to make decision in their livelihood development.

H. Stone pattern

In addition to the above indigenous practices of indicating weather patterns in the study area uses small stones pattern. According to the informants it has its own procedures of making it to happen. Then, forty-four small stones are collected. Next, the forecasting man randomly divides them into his two hands by judgmental size balance. He then starts by transferring the stones from one hand to the other. After transferring stones from his right hand to left hand, he puts certain amount of stones intentionally left on his right hand on the floor and the does the same thing when transferring them from left hand back to right hand. Finally, stones put on the floor separately from some pattern which translates to head and

tail. Then the direction to which many stones is skewed and the directions to which most of the stones in number are concentrated is translated to prosperous.



Figure: 2 stone pattern making (field,2017).

I: Cloud Behavior

Among that cloud behavior is one indicator they have to used. If the cloud in the spring is small, that is an indication of the drought coming in the year to come.

2.4. Discussion of the Study

Somali people of the study areas(Siti and Korehay Zone) have been developed knowledge and experiences of understanding indicators to determine weather patterns locally. These indigenous weather forecasting mechanisms indicators have been indicated either rainy season or dry season in general aspects. These indigenous indicators are sounds and behaviors of birds, insects, plants, moon, stars, temperatures, wind direction and animal's behaviors. Studies in Africa revealed that indigenous people have experienced using of indigenous indicators to determine weather patterns of their area accordingly (Muguti and Maposa, 2012; Netshiukhwi, Stigter and Walker,2013).These indigenous indicators are similar with this finding. Xidhiyeh,the knowledgeable Somali elders about star/moon readingunderstanding and describing thestars'/moons patterns to determine weather patterns. It is looking into patterns of moon and star position at different season, month and day. These would enable them to know the coming or continuing of either good or bad rainy season. The study in the South-Western Free State of South Africa revealed that farmers has knowledge and experiences of using moon as an indicators of determinant patterns of weather either rainy or dry seasons that enables to decides on their farming activities (Netshiukhwi, Stigter and Walker,2013:401).

People in the study area were socio-culturally attached with camel production and productivity. These studyacknowledged that camel behaviors have indicated either bad or good rainy seasons. This studydescribed that the mass death of livestockat occurrences of flood accident heralded, the end of long dry season and it would indicate ahope for next rainy

season. Also, Birds' movement and bird's sounds have potential of indicating bad/good seasons among communities of the study area similar with that Shona of Zimbabwe and farmers in the South-Western Free State of South Africa respectively (Muguti, and Maposa, 2012; Netshiukhwi, Stigter and Walker, 2013). This study showed that plants behaviors indicate the happening of either a good or bad weather patterns like that revealed by scholars in different African countries (Muguti, and Maposa, 2012; Netshiukhwi, Stigter and Walker, 2013).

In the study area insect's behavior has indicated either bad or good rainy seasons. These are similar with the study of Muguti, and Maposa, (2012) in Zimbabwe, but different by its meaning of predicting weather patterns. For example, the study shows that among Shona people of Zimbabwe insect (like *zviteza*) begin to surface and continuously move around collecting grass for storage, it means the rain season is imminent (Muguti, and Maposa, 2012:109) in contrary, this study shows that insects by the name *Abor* and *Bolol* (indigenous name) an appearance and movement on the surface in mass of groups indicates the coming of the dry season. Also, this study showed that the higher temperature density at morning and mid-day indicates the coming of imminent of rain fall that similar with the experiences of the Shona people of Zimbabwe (Muguti and Maposa, 2012). Additionally, this study revealed that sky, with scattered clouds, indicates that there is rain coming in the afternoon that also described in the study of Netshiukhwi, Stigter and Walker (2013:400). In the study area wind/air direction also uses to identify bad or good weather patterns in the study area that has similar description of wind directions with some province of Zimbabwe (Majehwe, 2011:109). Stone patterns making is another indigenous indicators of weather forecasting in Korahey Zone that do not find in other literatures.

2.5.1. Conclusion

Ethiopia Somali community has experienced indigenous weather forecasting mechanisms for a century. They have developed knowledge, perception and perspectives towards the climate change vulnerability. These experiences have supported them to minimize the vulnerability related with climate change. There are different local indicators employed for weather forecasting patterns. Some of them are the wind and rain directions, reading of stars/ moons, animals, birds, insects and tress behaviors. According to Somali cosmology these indicators enables them to identify either bad or good rainy seasons. These indigenous weather

forecasting mechanisms would support building good community based climate change adaptation capacity.

The Somali pastoralists, people of the study have been experiencing indigenous knowledge forecasting weather patterns which is similar observation undertaken by scholars in different parts Africa and world in especial focuses of farmers' experiences on employing indigenous indicators of predicting weather patterns accordingly. Contrary to this, this study claimed that there is less differences impacts of people's livelihood and geography on indigenous indicators of predicting weather patterns accordingly. However, this knowledge is not passing to the next generation due religious practices that is against Allah's principle. The modern thinking has also influenced the youth and as a result the youth do not value such tradition rather they have seen it as backward things/beliefs. These also shown in the study by Risiro, et al., (2012) in Zimbabwe, Chimanimani districts of Manicaland on how to indigenous knowledge system to predict weather patterns. It indicates that stakeholders should have to emphasize on identifying, documenting and preserving this indigenous knowledge and experiences among Somali people in the study area.

The study has limited to the Korahye Zone that was not uses to generalize the finding for the other geographical zones of the region. Thus, it needs further study on others zones of Somali region to have comprehensive understanding about indigenous weather forecasting mechanisms.

2.5.2. Recommendation

Accordingly, the researcher will recommend the following significant concerns

- A.** Existence of indigenous weather forecasting mechanism are marvelous knowledge of people regarding impacts of climate change that experienced them to develop indigenous perceptions and responses and
- B.** Documentation and preservation since these study become pioneer in the area it needs more significant scientific study that should be documented and preserved in a scientific manner for further studies.
- C.** Integrating relevant indigenous knowledge, skills and experiences of the community towards agenda of climate change adaptation.

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