

Indigenous Weather Forecasting: A Phenomenological Study Engaging the Shona of Zimbabwe

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Abstract

Across the globe, the environmental discourses on climate change and weather forecasting continue to preoccupy scholars and policy planners alike. Like other regions of the world, Africa is a victim of climate change that emanates from global warming. It has been noted that global warming has a strong bearing on natural ecosystems whose ripple effects ultimately affect humanity in several complicated socio-economic ways. Throughout generations, humanity has tried to control climate in order to serve and save its needs. Nevertheless, despite the technological advances in the use of modern scientific equipment to predict and manipulate weather, the study posits that the scientific methods of weather forecasting are flawed, to some extent. It should not be forgotten that from time immemorial, indigenous Africans relied very much on close observations on environmental phenomena in regards to weather forecasting. Drawing from the indigenous Shona approaches to weather forecasting in Zimbabwe, the study argues that Indigenous Knowledge Systems (IKSs) based on observing natural phenomena and celestial objects have helped to predict the imminence of the agricultural season and determine the patterns of the climate changes with a high degree of reliability. Therefore, the aim of the paper is to expose the Shona indigenous techniques of forecasting weather. In our conviction, it is necessary to employ the complementary role of the indigenous methods of weather forecasting and blend with those modern scientific techniques.

Introduction

Worldwide, the activity on weather forecasting is an exceedingly complicated process today. Its operations involve the use of thousands of thermometers, rain gauges and a plethora of other sophisticated telecommunication equipment only familiar to weather technocrats themselves. It must be mentioned that since time immemorial, people have reaped immense benefits out of the earth's resources in attempts to forecast weather. Those benefits have been made possible due to the use of technology. Yet, it is no secret that the technological advances have affected the natural ecosystems in a number of ways. To some extent, the ripple effects have been debilitating for humanity. For instance, Middleton (2003:177) has pointed out that the global climatic change that emanates from the increasing atmospheric concentrations of the greenhouse gases is one such negative effect that has been noticed since the mid 1980s. In fact, climatic change is a topical issue which pre-occupies the minds of scholars, environmentalists and policy planners in the environmental discourses across the globe today.

A number of environmentalists have noticed that there are some variations in the pattern of weather changes and or climate changes as they affect humanity. According to Riley and Spolton (1981:124) there are several theories that explain the business of weather forecasting as an attempt by 'man to protect man' from the worst that weather changes can bring. Perhaps the most important question has come in the form of a dilemma. What can people do to keep the weather changes and ultimately the impact of climatic changes on humanity to a low level? According to Hart (1985:178), there are two possible ways of facing the climatic challenges. Firstly, man has to try to change the weather to prevent its damaging effects. Secondly, if people cannot change the weather, then they to learn to forecast the weather in order to take action to protect humanity. As Buckle (1996:279) has claimed, the knowledge of the impending weather, if forecasted, may mean that the damages could be prevented and human life is saved and served.

In light of the foregoing insights, it must be noted that human action is responsible for increasing the atmospheric concentrations of a plethora of gasses that are closely related to warming in global temperatures. For instance, Clarke, Harrison and Davies (1975:115) have observed that 'man can modify the climate only in small ways, but he can modify the effectiveness for good or for ill much more easily'. The increased concentrations that seem to continue to build up in the foreseeable future, are already affecting global climate. In addition, as Jackson and Jackson (1996: 321) have pointed out, the presence of certain gasses in the atmosphere, notably, methane, sulphur, carbon dioxide and other hydrocarbons that usually transmit shortwave energy in the earth's surface and temporarily absorb and retain heat radiating from the loss of energy to space has resulted in global warming. It will be noted that past historical encounters have demonstrated that global warming has the potential for disrupting socio-economic systems. According to Middleton (2003:186), the global warming recorded in the past century has already resulted in numerous ecological changes in both the plant and animal communities.

It would be noted that some shifts on the earth's climatic zones over a period of several years would affect terrestrial ecosystems as well. Again, as Clarke et al (1975) have asserted, climatic shifts generally affect the agricultural patterns of land use and make the production of certain crops and livestock more or less suitable in the changed climate. This would not only affect climatic growing conditions but also the hazards from pests and diseases. As a number of studies show, the global climatic changes are likely to cause formidable economic, social and political challenges to governments and policy makers. Clearly, the alteration to the composition of the planet's atmosphere is a potential threat to all living organisms, including human beings. In order to improve decision making on matters affecting ecosystems and humanity, it then becomes imperative for people to gather factual information concerning weather patterns and forecasting.

At the global level, theoretical models like the General Circulation Models (GCMs) are used to predict the conditions of a warmer climate. Nevertheless, like all models, GCMs are simplifications of the real world and have their shortcomings. For instance, Middleton (2003:185) argues that models are slow, costly to use and their results are only approximate in nature. Indeed, they can predict changes in climatic conditions on continental scales but not predictions at finer resolutions, that is, at country level. In recent years, and drawn on the Zimbabwean context, the shifts in the earth's climatic zones have made it impossible for the Meteorological Department to come up with accurate predictions on weather forecasting.

The study therefore posits that since the scientific methods of weather forecasting have flawed techniques, it is necessary to employ the complementary role of indigenous methods of weather forecasting inherited by the indigenous African people from preceding generations with specific reference to the Shona people. The study presents an exposition and an explication of the indigenous Shona methods of weather forecasting in the Zimbabwean context. From the pre-colonial times, it must be mentioned that the Shona people, like the rest of other indigenes in Africa, relied very much on certain observations and benchmarks with regards to weather forecasting. The observations on certain weather phenomena as deduced from the environment and other celestial bodies helped them to approximate the imminence of the rain season (Muyambo, 2011). The people's observations were of greater help in determining the amount of rains and thereby made them know if they were going to have high, average or low rainfall in a particular agricultural season. These observations constitute an essential body of what in contemporary African studies is called ethno science, that is, the Indigenous Knowledge System (IKS). The IKS was somehow diluted and dissipated during the colonial era as it was viewed as heathen and backward.

As much as it can be asserted, the colonial regimes throughout the African continent strived to trivialise everything traditional as fetishistic in order to 'kill the man in the Bantu' (Temples, 1959:26). This prejudicial attitude was perhaps influenced by what contemporary scholars have called the 'centre-periphery' hypothesis. In part, the centre-periphery hypothesis claims that what was good for the westerners was also regarded as good for the indigenous Africans.

The purpose was to deliberately dislocate traditional African culture (the periphery) and replace it with western culture and civilization (the centre). Nevertheless, in the wake of the current pan African studies, as will be highlighted in the context of a postcolonial theory, it must be asserted that the notions of the centre-periphery hypothesis no longer hold sense any more (Maposa, 2011:5). In addition, in the light of the fact that some vital traditions still withstand, like the traditional techniques of weather forecasting, the centre-periphery hypothesis ought to be revisited. In fact, the study contends that the particularistic IKSs on weather forecasting constitute one of the enduring beneficial phenomena in modern Zimbabwe. Little did the colonialists realise that African beliefs and practices were based on hard empirical evidence of past African experiences which influenced their cosmological perceptions. The vitality of IKS cannot be overemphasized and drawn on the Zimbabwean case study, the Shona people still rely on certain phenomena like trees, birds, frogs, animals, amphibians, insects, grass, wind, moon, lighting and the sun to make reasonable weather forecasting within their environment. The effectiveness or reliability of the Shona techniques makes this study timeous and relevant in contemporary studies.

Justification of the Study

In Africa today, climate change is increasingly becoming a critical challenge to ecological, health, human well-being and people's livelihoods and future sustainable development. Climate deviations that are too far from the norm can be extremely disruptive to communities. Knowledge on traditional weather forecasting, among others, will improve decision-making on matters affecting ecosystems and communities' vulnerability. According to Chenje, Solo and Paleczny (1998), credible environmental information has the potential to empower people at all levels to influence decision-making. The information can be helpful to ordinary people, NGOs and government departments to better understand the environments and possibly adjust plans so as to improve human livelihoods. Embracing traditional approaches on weather forecasting is a strategic mechanism in supporting sustainable development. The reason is that it will inform people about the past and current conditions of the country's weather conditions. Indeed, recent experiences of scientific weather forecasting by the Meteorological Department in Zimbabwe have demonstrated that relying on the scientific methods does not always yield accurate weather estimates. Therefore, IKS can be harnessed to complement the scientific methods of weather forecasting.

Indigenous Knowledge System and the Post-colonial Theory

The post-colonial theory provided the framework of this study. Briefly stated, the post-colonial theory posits that from its inception, colonialism on the African continent rubbished everything that was traditional or indigenous. This included abandonment of African traditional religion, interference with African social, economic and political systems in the mistaken belief that everything traditionally African was backwardness or primitive. Indeed, even the indigenous methods of weather forecasting were not spared either. This was a deliberate attempt by the colonialists to dismantle indigenous institutions and pave the way for the establishment and perpetuation of European hegemony in the African continent.

However, the fact that IKS did not die with colonialism reflects that it has enduring meaning and significance to the indigenous people's lives. The revival of IKS fits in well with the postcolonial theory in which the indigenes asserts their presence and identity through reclamation of their past which the colonialist had done everything to annihilate. The colonialists had thrived on the basis of the 'centre-periphery' approach in which the West was always portrayed as the standard form of reference and was associated with modernity and everything linked with the indigenes was viewed as backward.

According to Fanon (1968) as cited in Ashcroft, Griffiths and Tiffin (1995), the history, language, customs as well as beliefs systems of the white imperialists were viewed as universal, normative and superior to the IKS of the indigenous people who were perceived as the inferior-other. He further notes that the proliferation and perpetuation of this myth led to a very strong sense of inferiority complex among the colonized to the extent that they decided to unquestioningly embrace all that was associated with the coloniser's identity as their own. Fanon concluded that it was in the context of the above that the colonised ended up using the coloniser's language, culture and customs. The result was that most indigenous people got alienated from their cultural practices.

The present researchers feel that it is in the context of the above that now Africans are political liberated, there is need to re-claim, re-assert and re-construct their own traditions, history and heritage which, taken together would forge a vital African identity. This vision is succinctly captured by the insight, thus, 'Until lions have their own historians, tales of hunting will always glorify the hunter (author, anonymous). In light of the foregoing insight, the postcolonial theory perceives the need to establish the 'centre-to-centre' hypothesis which will ultimately re-corrects the absurdities of the 'centre-periphery' hypothesis. This study, therefore, is one such attempt to re-claim the enduring vitality of the indigenous methods of weather forecasting in Africa. Accordingly, the study is guided by the need to expose how the indigenous methods of weather forecasting can be used to predict the imminence of the rain season and also to approximate the amount of rains to be received in a particular rain season in order for rural communities to be able to plan agricultural tillage strategies. Such tillage strategies are vital because they are linked to some mechanisms of food security.

Method of the Study

The phenomenological approach was used in the study and was predominantly based on fieldwork. This method was chosen principally because it analyses natural behaviour, as the Shona people perceive it rather than imposing any sort of external value judgments. In fact, the phenomenology provides a crucial means for investigation in relation to how local people, as 'insiders' come to know reality (Cox, 1992). Through the principle of *epoche*, it was possible to gather data after 'bracketing' any of the value judgments that outsiders can hold. Accordingly, the Shona beliefs and practices on weather forecasting were explored as *sui generis* (pure categories). The suitability of this approach was its ability to differentiate *noumena* (things as they are) from *phenomena* (things as we perceive them). Therefore, first hand information was generated from the fieldwork by using this approach.

In the application of the phenomenological method, interviews were conducted in the field. Literally, the researchers hands 'got dirty' in a period of seven months, spanning from October 2010 to April 2011, conducting structured and semi-structured interviews in the southern and eastern provinces of Masvingo and Manicaland in Zimbabwe, respectively. The interviews enabled face-to-face interactions with the local Shona people in their situatedness and culturedness. As a result, the researchers gained an understanding of the vitality of the indigenous modes of weather forecasting. Many of the interviews targeted the elderly people, who are the custodians of oral history, culture and traditions of their respective communities.

Typologies of Shona Indigenous Weather Forecasting

As alluded to earlier on, the Shona people of Zimbabwe relied on the observation of certain physical phenomena in order to make reasonable and sometimes almost accurate weather forecasts. They relied on the study of certain phenomenon such as trees, birds, frogs, animals, insects, grass, wind, sun, moon and lightening, among others. Below is an exposition of some of these phenomena.

Trees

The behaviour of trees in general and fruit trees in particular plays a significant role in determining weather patterns in Shona cosmology. Fruit trees like *muchakata* (*parinari curatellifolia*), *gan'acha* (*lannea discolor*), *mushuku* (*uapaca kirkiana*) and mango are frequently used to predict the eminence of the rain season and the quantities of rainfall in any given agricultural season. It's interesting to note that the Shona people have even been able to harness the behavior of exotic trees like the mango trees in their extrapolation. According to one of our informants, Muguti (2010), if for instance, there is an abundance of fruits towards the encroachment of the rain season, people would know that the season was likely to experience low rainfall patterns.

On the contrary, if the fruit trees bear very little fruits, people likewise come to know that they would have plenty of rainfall. Many of our informants pointed out that when the fruits ripen earlier than the usual, the implications will mean that the season will experience a good rainfall pattern.

The Shona observations on certain non-fruit trees also have a bearing on weather predictions. A key example is supplied by the behaviour of *mupfuti* (*brachystegia boehmii*) tree. As observed by Mananike (2011), when its leaves begin to wither, but not peeling off, people normally predict plenty of rainfall to come in a matter of days. In contrast, when leaves wither and peel off, it means that a dry spell is imminent. People may panic and it supplies a moment when people resort to the performance of rituals meant to evoke rain to come. For instance, the Shona perform the *makoto* or *mukwerere* (rain-making) ritual in which the traditional elders play a significant in their capacity as religious functionaries. The assurance that the traditional ritual has been 'heard' is reflected in the sudden blossoming of tree leaves. The blossoming of leaves is perceived as life-generative, and must be actualized by the coming of rainfall.

As part of the study findings, the Shona people explain this apparent metaphysical behaviour of trees in terms of their religious consciousness. Trees as part of the natural organic ecosystem do respond to *meta-physical* powers that lie beyond the grasp of the mundane world.

Birds

Certain behaviour of birds can also be a helpful barometer in predicting the arrival and intensity of a particular rainy season. On one hand, once the migratory birds like *mashohori*, *fudzamombe*, *haya* and *shuramurove* (all referred to as stock) begin to surface in a particular environment, then the rain season is said to be imminent. Birds such as *hwidzi kwidzi* (black or blue birds) sing melodious songs. The continuous singing, by the day and by the night, heralds the commencement of the rainy season. Mapara (2009) avers that people could also foretell whether rains are going to fall in the next hour or two if they hear the sound of *dzvotsvotsvo* (rain bird). On the other hand, however, when the migratory birds vanish from a particular area or region, it signals the decrease of rain and eventually its departure. When birds like *muremwaremwa* (we regard a bat as a bird because it flies) are seen flying past a certain area it is a pointer that rainfall is erratic. If these bats fly around and occasionally land on the ground, especially as a swarm, it means that the rainfall pattern is good in that particular growing season (Chiondegwa, 2011). The study observed that even the ordinary chicken (*huku*) reared in homes, can be used to predict the nature of rainfall patterns. Normally, chickens do not wonder around when it is raining. Mapara (2009) argues that through observing their fowls and other birds, people can tell whether the rains are going to stop or not. If the birds and chickens venture out to feed when it's raining, people can foretell that for at least the next few days there would be a *mubvumbi* (drizzle). If the birds and poultry do not venture out to feed, the significance was that the rains would not last the whole day. Manamike (2011) further notes that in those rare occasions that birds and chicken move around when it is raining, people regard that rarity as an indicator of plentiful rains in that particular season.

Animals

Another animal, *mbira* (rock rabbit), when it squeaks in ways that is unusually, it heralds the imminence of rainfall in a particular area in a particular season (Muzvidziwa, 2010). This is true also with the amphibian like frogs. Once frogs begin to ‘hiss’ incessantly, people come to realize that the rain season is ‘around the corner’. There are certain types of frogs that are used to predict the intensity of rains. For example, some big and brownish frogs known as *machesi* or *dzetse* (bull frogs), once they appear in large numbers in a particular *gandwa* (water pond), it is an indicator of high rainfall patterns in a given locality (Mareverwa, 2011).

Insects

The Shona people use a number of certain insects to predict weather patterns. When insects like *zviteza* begin to surface and continuously move around collecting grass for storage, it means the rain season is imminent. Usually, *zviteza* emerge for two or so days and continuously collect grass in large quantities for storage. After the collection of grass (food), these insects vanish and hibernate, but will not be threatened by starvation should the rains continue nonstop for some time. According to Chiondegwa, (2011), the behaviour of these insects is an indication that the growing season would be good so much that people are expected to work hard just like the *zviteza* insects. When *mandere* (day-flying chafers) make incessant singing, it signals the imminence of rainfall. As observed by Manamike (2011), another species of insects, known as *nyenze* (cicadas) usually begin to sing two or three weeks before the commencement of rains. These insects are very active when it is hot. Their continuous singing is taken as a sign that the rain season is around. In addition, some insects like *mikonikoni* (dragon flies) and *sharara/ishwa* (flying termites) are regarded as good indicators of the imminence of rainfall, especially when they fly past a certain area in swarms. *Mazongororo* (millipedes) are also associated with the imminence of rainfall, especially when seen in large numbers in a given locality. In our analysis, it is suffice to say that people base their inference concerning weather prediction on insect behavior and quantity. These twin aspects exert a strong bearing on the imminence and intensity of the rainfall to be experienced in a particular growing season.

Wind

The Shona people are good at using the nature of the wind directions to predict rainfall patterns. The direction of wind in the context of a locality is important in the determination of rainfall patterns. For instance, on one hand, the Manyika and Ndau people, who form the linguistic Shona groupings from the eastern Manicaland province in Zimbabwe, know that when wind blows from the eastern side bordering Mozambique, then the rain season is just ‘around the corner’. If the wind is continuous, it ‘tells’ that more rains would come (Majehwe, 2011). On the other hand, the Karanga people, another Shona linguistic grouping from the southern Masvingo province, can predict rainfall patterns out of the southern blowing winds.

The Karanga would expect more rains if the winds continuously blow from the southern zone. Moreover, the Zezuru and Korekore linguistic groupings domiciled in the central and northern belts of Zimbabwe expect good rains if they experience winds that blow from the northern direction. In general, Zimbabwe experiences a lot of whirlwind (*chamupupuri* or *kuvhuvhuta*) during the month of August. As part of their indigenous knowledge, the Shona normally assert that if there is a lot of whirlwind in August to mid September, it is a sign that there would be good rains. On the contrary, if there were little whirlwind, then rainfall would be erratic. People panic because it is an indicator of a looming drought and famine in the area (Kahlamba, 2011). As the study found out, this Shona knowledge on predicting rainfall patterns is grounded as part of their inherited indigenous knowledge system (IKS) and not based on mythical beliefs as some scholars would want to postulate.

Terrestrial Objects

One of the celestial bodies that the Shona have used to predict rainfall conditions is the sun. There is a lot that is associated with the sun with regards to rainfall patterns. Many of the informants agreed that when the rain season is about to commence, the sun does not heat directly on the people's heads. In such instances, people notice that the sun is coated by what the Shona call *gore* (fog or mist). The people believe that when the *gore* is smallish then rainfall would be little as well. On the other hand, when the *gore* is large then the rainfall would be plentiful as well (Majehwe, 2011). On a related point to note, during the rainy season, when the *day* is very hot (or the Shona people say, when the *sun* is very hot), people expect rains that very day or within two days. People usually comment that "*nhasi kwapisisa, kunonaya chete*" (Today it's too hot, rains will definitely fall. The inference is deduced in the light of the excesses of the day's heat. On the contrary, when it is cold, but it is during the rainy season, people regard that as a sign of lack of rains (Manamike, 2011).

The moon is another terrestrial object the Shona people utilizes to forecast weather patterns, especially when interpreted in conjunction with the dynamics of cloud cover. The moon is relied upon to predict the imminence and intensity of the rain season. According to Chiondegwa (2010), during the months that people expect rains, rains are usually plentiful when the moon doesn't appear for a long time during the night. Furthermore, when the moon appears with a ring around it, it is a sign that the rain season is imminent. The Shona people believe that the size of the ring coating the moon determines the amount of rains to be enjoyed that season. The larger the ring, the more rainfall is received that season. The reverse is also true.

Summary and Recommendations

The phenomenological paradigm is a critical indigenous method of weather forecasting as it can be used to complement other scientific methods to estimate the type of rain season that people would expect to encounter in a particular rain season. Indeed, today climate hazards are a significant danger to the survival of Zimbabwean rural communities which are predominantly agro-based.

In Zimbabwe today, like in other parts of Southern Africa, true to what Hammond-Tooke (1937:354) observed way back, rainfall is usually uncertain over large areas and the fear of drought is ever present. Climate hazards and climate change have resulted in water scarcity that retards progress in rural communities, land degradation, loss of livestock, loss of entire ecosystems and their species, food insecurity, famine, loss of livelihoods and an increase in infectious disease epidemics. The observation of the phenomenal developments discussed above can provide an important element in empowering rural communities, Non Governmental Organizations (NGOs) and policy makers in dealing with the ever variable and changeable climate today. This can make communities to be better prepared to tackle the vagaries of climate change as the study of trees, animals, birds and the sun, among others, can provide a reasonable projection to climatic exposures and stresses with other existing stresses and conditions that are responsible for people's hardships and low levels of economic welfare.

It can also be noted that a climate shock or stress has the potential to cause a lot of damage in a situation where social, economic or governance systems are in a state of failure and thus not capable of effective responses. The study of specific phenomena can complement scientific methods of weather forecasting in providing an early warning system in order to come up with effective social, economic, and governance systems which can result in effective responses to prevent, cope with, recover from and adopt to potentially adverse climatic impact. This can effectively help to mitigate the extent of harm from changes in the frequency or severity of extreme climatic changes. Thus, the improvement of the performance of human systems through reasonable weather forecasts can significantly reduce community vulnerability to climate change. The impact of climate change on agriculture, disease patterns and violent weather events sometimes results in poverty in communities which affect the poorest the worst (<http://www.endpoverty2015.org/take-action?Gclid=CKL2KVWFzaUEF>). The study has shown that there are a number of factors that can be advanced to account for the variability in the patterns of weather and climate changes across the globe.

Therefore, it was made clear that the phenomenological approaches can effectively be used by indigenous communities to acquire useful insights about disaster prevention, preparedness and early warning and response systems about weather and climate changes for sustainable development. The approaches can assist households with access to reasonable resources that can help them to cope with and overcome climate-related impacts. The local communities and their traditional leadership should tap from the indigenous knowledge systems to make reasonable weather forecasts. This is critical for the survival of their communities as they are to a very large extent vulnerable to climate and climate change as their economies are predominantly agro-based.

Shortage of rainfall in rural communities naturally leads to the drying out of water sources, shortage of food, scarcity of grazing land and loss of wild plants for gathering, among other factors. The planners at both local and national level should also embrace indigenous approaches to weather forecasting as this sometimes provides a useful insight as to the type of rain season to be enjoyed in a particular season.

The Non Governmental Organizations (NGOs) should also work closely with local communities in making decisions about weather forecast in order to come up with the best decisions that can result in sustainable development in the rural communities.

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