

Abstract Title: **Investigation on Utility of Weather and Climate Forecasts on Farming Activities in Kwale district, Kenya.**

Project Duration: **Six months**

Name of Principal Investigator: **Ms. Josephine M. Mwinamo**

1. Introduction

Kwale district, in Kenya, runs from 0 m to 420 m in the coastal uplands, and to 824m in the Kabash hills in Samburu. The district has 8,257km sq. of dry land and 65km sq. under water. The latest census puts the population of the district at 627,765 whose main economic activity is rain-fed agriculture. Most of the area lies in arid to semi-arid region and is vulnerable to frequent food insecurity. Accurate weather forecasts coupled with proper dissemination method will greatly assist the residents of this region.

This paper is designed to highlight the use of land in the area of study, meteorological information requirements and the problems the farmers encounter in accessing this information so as to come up with recommendations on how weather information dissemination can be improved to reach all target groups. Consequently the report will be formatted into three parts. Farming activities, Fishing activities and meteorological information requirements.

2. Project Goals

- To assess the relevance of weather forecasting to farmers in the district i.e. the availability and accessibility to them, and their attitude towards them.
- To establish the efficiency and reliability of weather forecasting information available in predicting accurately the climate conditions affecting farming in the district.
- To find out how best the farmers and other users can use such forecasts to help improve on their production activities.

3. Methodology

The survey made use of questionnaires to collect data. The research assistants who recorded the answers given to them by the farmers asked the questions. The questions were under three main sub-headings i.e., General information, Information on farming and Information on meteorology.

In each division a one-day pilot survey was carried out during which the research assistants and the members of the research team each visited a farmer. The research team together with the assistants met a day later to discuss the answers given and the problems encountered during the pilot survey. Finished questionnaires were forwarded to the secretariat on agreed dates.

The data was subjected to rigorous consistency checks. Analysis was done through the use of simple descriptive and statistical methods and discussions. The interpretations made were based on the research questions and objectives as in chapter one. Information gathered was presented in graphical form then analyzed and interpreted.

4. Results and accomplishments

The results show that most of the farmers interviewed are either illiterate or have only attained primary education. Very few farmers have gone to college level. The low level of illiteracy in the region would require that the climate forecasts information be interpreted in the local language for maximum utilization. This can be achieved by forming committees of the educated at the grass root level who will get the information, translate it and use community forums like the chief's "barazas" to disseminate it to the other farmers. These same committees can in partnership with the local Kenya news Agency staff and local radio stations (Baraka FM) prepare and send out these vernacular broadcasts through the radio, which is the main communication tool in the region.

The main communication tool is the radio and in most cases the decision-maker in matters pertaining to agriculture are men.

The survey noted that the elite also own a good percentage of land, thus if the information got to them and was used appropriately it could help alleviate the food shortage.

The women are the active in agricultural activities but are not involved in decision making in this area. Women should therefore be empowered to take active role in decision-making and should also be trained in accessing and interpretation and use of the climate information.

The results show that the main crops in the district are maize, cassava and cowpeas and pigeon peas. Other crops include beans, simsim, sorghum, and sweet and Irish potatoes etc., but in small quantities. Maize occupies a larger acreage than the rest followed by cassava. Agricultural authorities and the proposed committees should be able to interpret the forecast in line with the crops that would do well in the kind of forecast given. Given that maize and cassava are the predominant crops, more attention should be directed to these crops in terms of their management and agricultural authorities should give the appropriate advice to a larger section of the farmers.

Most farmers in the region prefer growing local maize variety for generally three reasons:

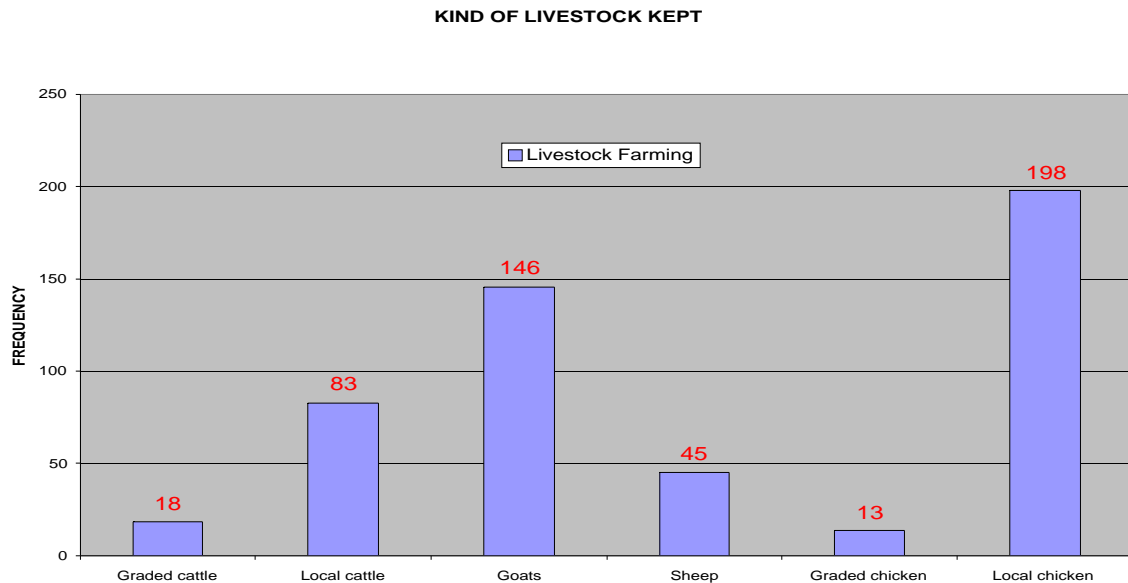
- That the variety can safely be stored using the traditional methods of seed preservation of putting in barns above the fire places and
- That the maize variety is sweeter than the hybrid type.
- During the short rain season when the rainfall duration is short this variety is even more preferred because of the belief that it is draught resistant

If the farmers got the forecast in good time and went for the recommended hybrid seeds they would still get a bigger yield than what they get with the local breed and this would expel their belief that the local variety is a better option. Lack of knowledge of the pattern of the seasonal rains could also be a contributory factor in these low yields.

Maize is the staple food crop and is grown throughout the district at a subsistence level. The demand for maize is yet to be met from the local production. Most families in Msambweni and Kubo divisions have sufficient maize for the better part of the year; few have maize all the year round while most families in Matuga division depend on maize flour purchased from shops. About sixty three percent of the maize harvest among the sampled farmers is for domestic consumption. Sixty seven percent of the surplus is kept as seed for the next season or given out to those who help with the preparation of the land. A paltry 33% of the surplus is sold. The farmers' poor harvest could be because of either using poor quality of seed or not preparing their land before the season begins. Those who grow the local variety keep seed from previous crops that could be infected with disease contributing to the low yields. Lack of knowledge of the pattern of the seasonal rains could also be a contributory factor in these low yields.

Livestock activities in the district are varied with the amount of rainfall and vegetation being the main determining factors. The results show that most of the farmers keep local chickens, goats and local cattle. However a few keep graded cattle and poultry. Experiences from dairy farmers show that tsetse fly out breaks are common during rainy seasons. The explanation advanced for this observation is that increased evaporation in the breeding areas is pushed by the wind regime to game parks where the tsetse flies pick up the scent and follow it to the breeding ground. The same farmers require forecast information for the management of the cattle feed stocks.

Figure 3.1.8 Kinds of Livestock



The same farmers require forecast information for the management of the cattle feed stocks.

The farmers engaged in this economic activity assert that they rely heavily on meteorological parameters to assist them in their fishing activities. Information required includes:

- Wind (speed and direction)

This information is associated with waves and current movement and the resultant rough seas, which are a hindrance to fishing.

- Temperatures – both sea surface and air.

Sea surface and air temperatures control fish movement and eating habits and help fishermen to determine fishing ground.

- Sunny periods

Sunny periods and clear skies attracts fish to the upper surface of the sea waters

- Cloudiness

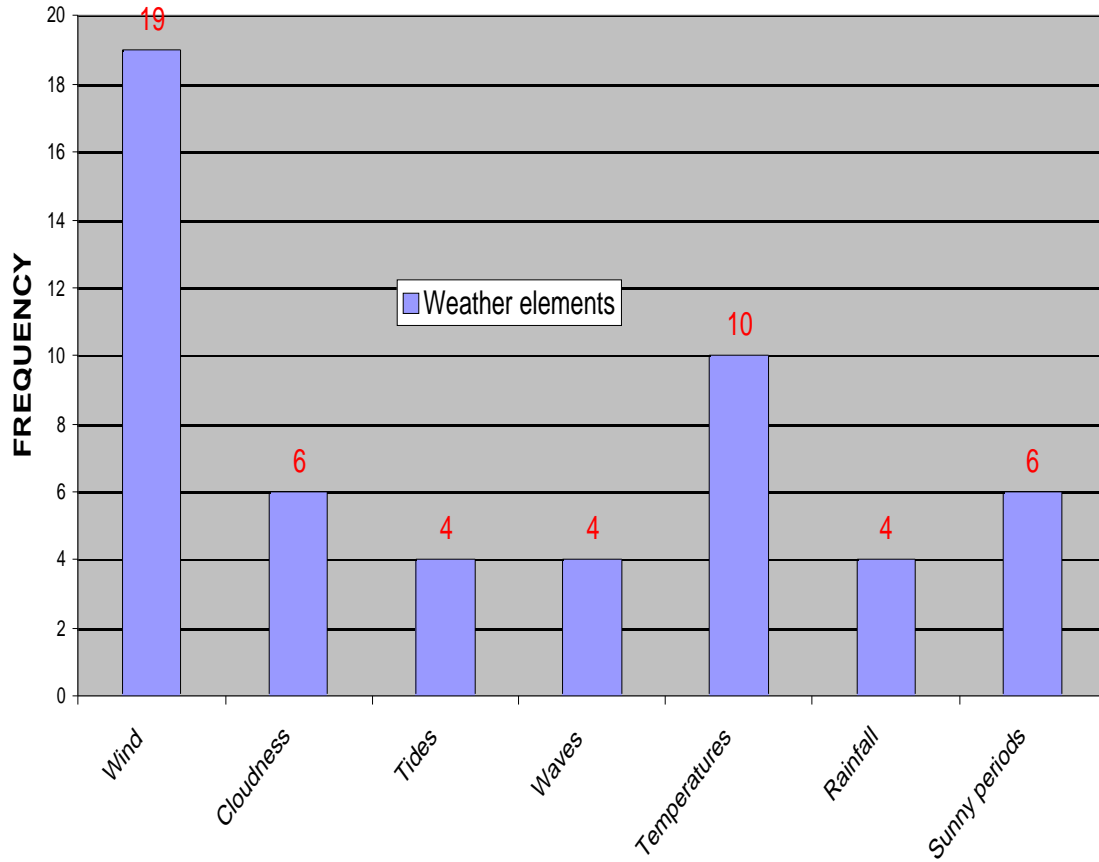
Cloudy skies make fish to move to higher depths in the ocean decreasing fish landings.

Small-scale fishing activities are greatly influenced by the prevailing weather patterns. Currently this sector is not covered well by the forecasts from the meteorological Department. The requirement of this information exists as revealed by the outcome of this survey. The farmers want the information on a daily basis and conveyed as broadcasts through the radio. The meteorological information providers should tailor their products to meet the increasing requirements of this expanding sector.

Research should also be undertaken to ascertain the behavior of fish in relation to the various meteorological parameters.

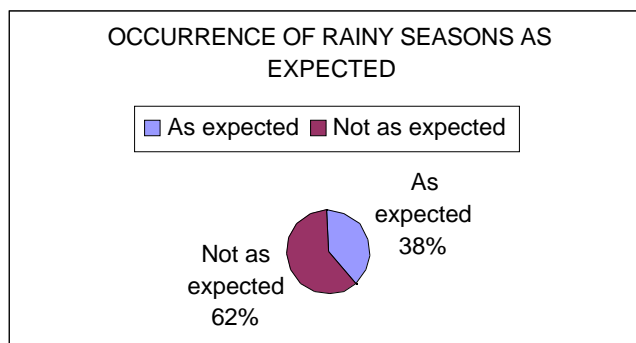
Figure 3.1.9 Meteorological Requirements for Fishing

METEOROLOGICAL REQUIREMENTS FOR FISHING



Most farmers state that there is a bimodal pattern of rainfall. Others say that there is a trimodal type where the long rains are broken into two seasons by a dry mid-spell around June.

Figure 3.1.10 Occurrence of rainy seasons as expected



OCCURENCE OF RAINY SEASONS

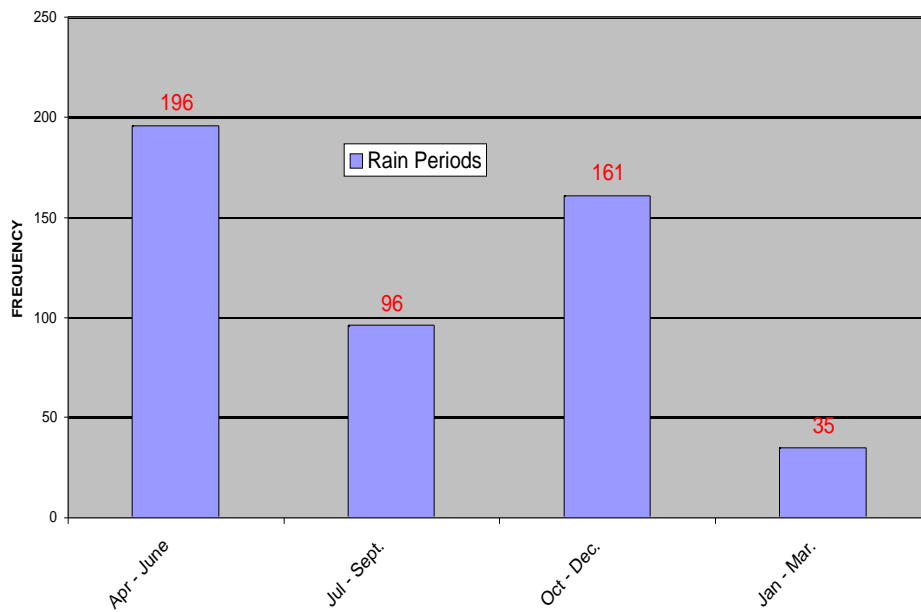
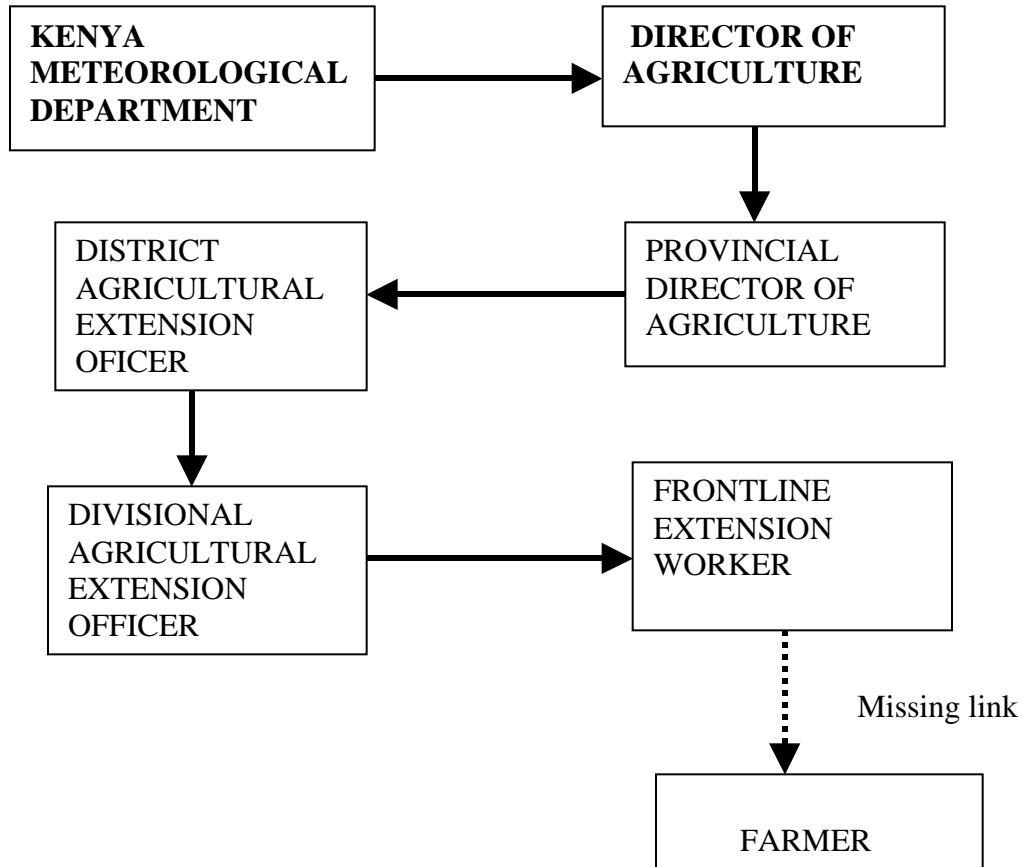


Figure 3.1.11 Occurrence of rainy seasons

Sixty two percent of the farmers state that for the last two seasons the rains did not come as per their expectations. The pre-season forecasts should be more detailed stating the on-set, duration, mid-dry spell and cessation of the season. This will help the farmers to prepare better. Though a small number attest to the existence of a trimodal type of seasonal pattern it is significant that this observation be studied carefully to come up with results, which will show the true picture. In this experienced global climate variations the need exists more than eve before to investigate this assertion.

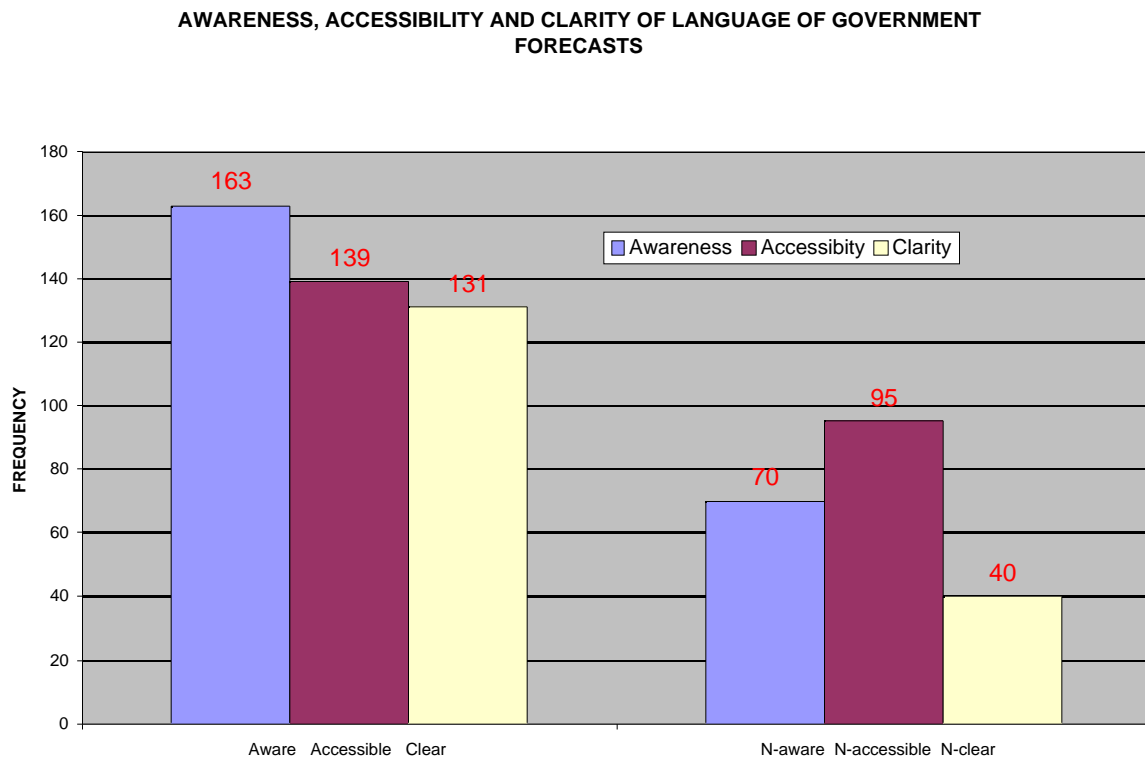
DISSEMINATION CHART – MINISTRY OF AGRICULTURE



The Drought Monitoring Center - Nairobi issues a pre-season forecast for the Greater Horn of Africa twice every year after the Greater Horn of Africa Climate Outlook Forum (GHACOF) workshops. No feedback mechanism exists to ascertain that this information is actually received by the target groups.

Problem areas in this dissemination Method include: (1) Lack of understanding of language of the forecasts by the disseminating agents leading to apathy and lack of faith of the forecasts by the same people; and (2) Poor logistics of dissemination on the grassroots level. Either the infrastructure is poor or the agricultural extension worker does not have the resources to mobilise and sensitise the farmers on the information.

Figure 3.1.13 Awareness, Accessibility and Clarity of Government Forecast.



The most effective way of disseminating this information would be through community mobilization where a group of farmers would be mobilized to source the information direct from the Kenya Meteorological Department. The better option therefore would be to establish networking of the farmers and service providers through Internet connectivity. Most farmers prefer this option.

Because of the missing link in the dissemination of these forecasts to the farmers and hence non-availability of the same coupled with the existence of traditional beliefs, the community have tended to believe in their traditional methods of forecasting for survival and these abound among the community in the district.

The people of Kwale have their own traditional methods of forecasting the seasons, which include the following:

- Migrations of butterflies and birds e.g. when the butterflies move from south to north, it means the long rains are about to come.
- High temperatures-they believes that when the rains are about to come, it is usually hotter than normal.
- Lightening without thunderstorms

- Flowering or shading of leaves from certain trees e.g. Acacia
- Winds change direction when the rains are about to come.
- Noise from the direction of the Ocean – rumbling of wind waves.
- Certain types of snakes become more common
- Position of certain star constellations e.g. the plough.
- Crawling insects become common e.g. safari ants and black ants.

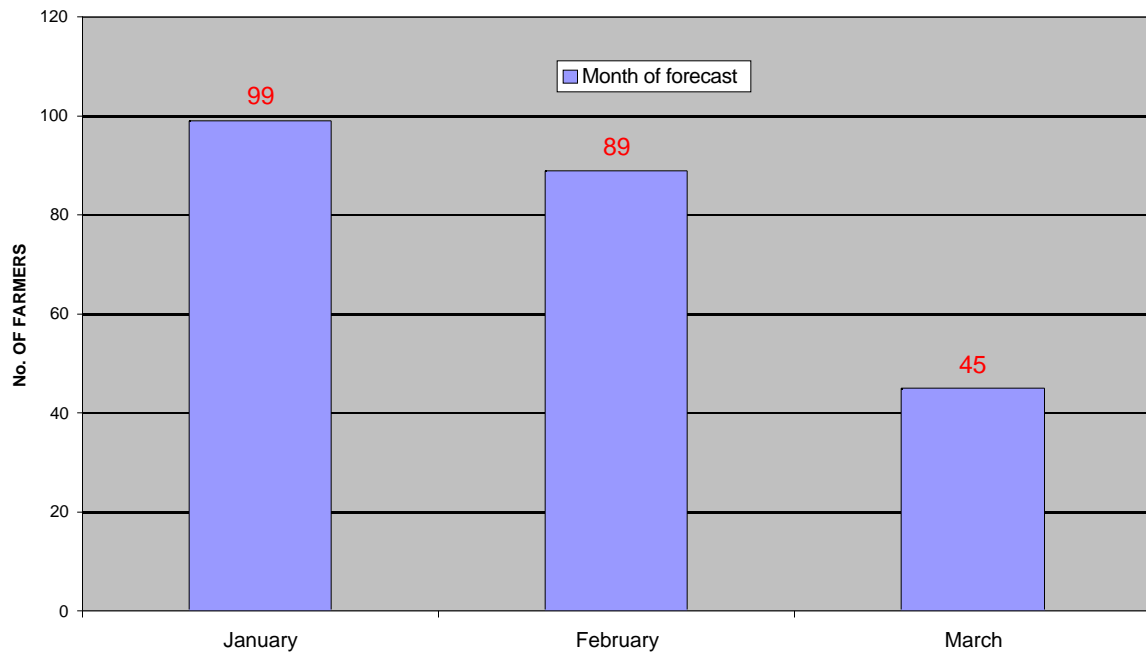
Ninety six percent of the farmers interviewed know about these traditional forecasts. Fifty seven percent of them believe in this forecast to be very accurate. Another Forty three percent believes that it is fairly accurate. Sixty seven percent of the farmer's state that the government forecast is more reliable than the traditional one.

Though most of the farmers believe in this forecast, they are not always reliable. Others rely on these methods because the more conventional forecast is not usually available. There is need for the farmers to have a way of receiving the government forecast on time so that they do not rely on the traditional one. A study should be carried out to get the scientific explanation of some of these traditional beliefs so that they can be incorporated in the forecasts.

Different users will require different climate information at the appropriate times. The farmers in Kwale district require to be given forecast for the long rains either in January or February. This is because the rains sometimes come by March.

Figure 3.1.16 Forecast issue for long rain season.

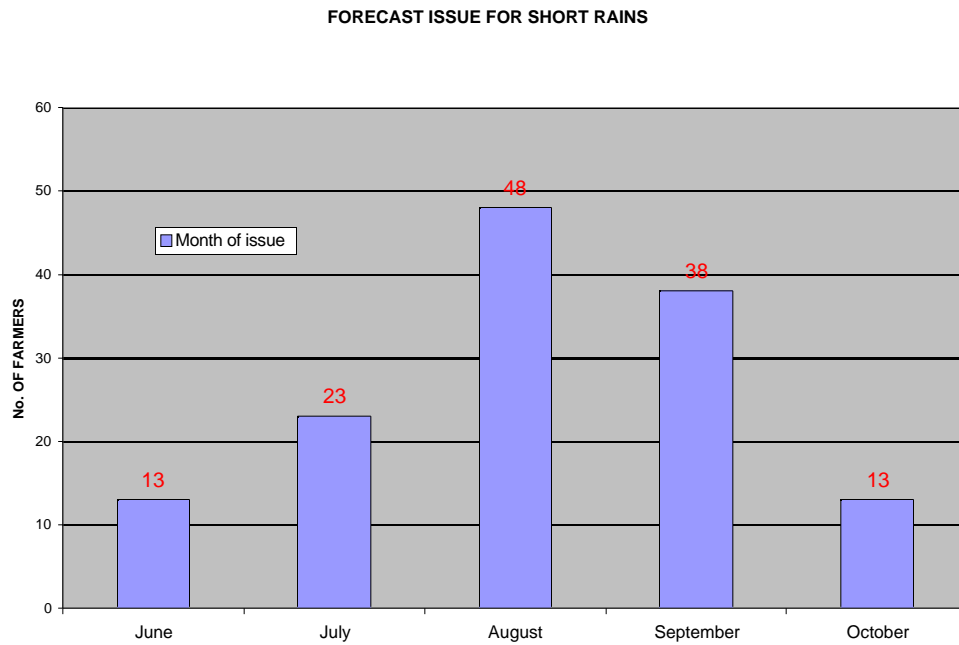
FORECAST ISSUE FOR LONG RAIN SEASON



The forecast for the short rains is needed by August or September. Most of them need information on: -

- Rainfall
- Temperatures
- Sunny periods
- Humidity
- Soil water content.

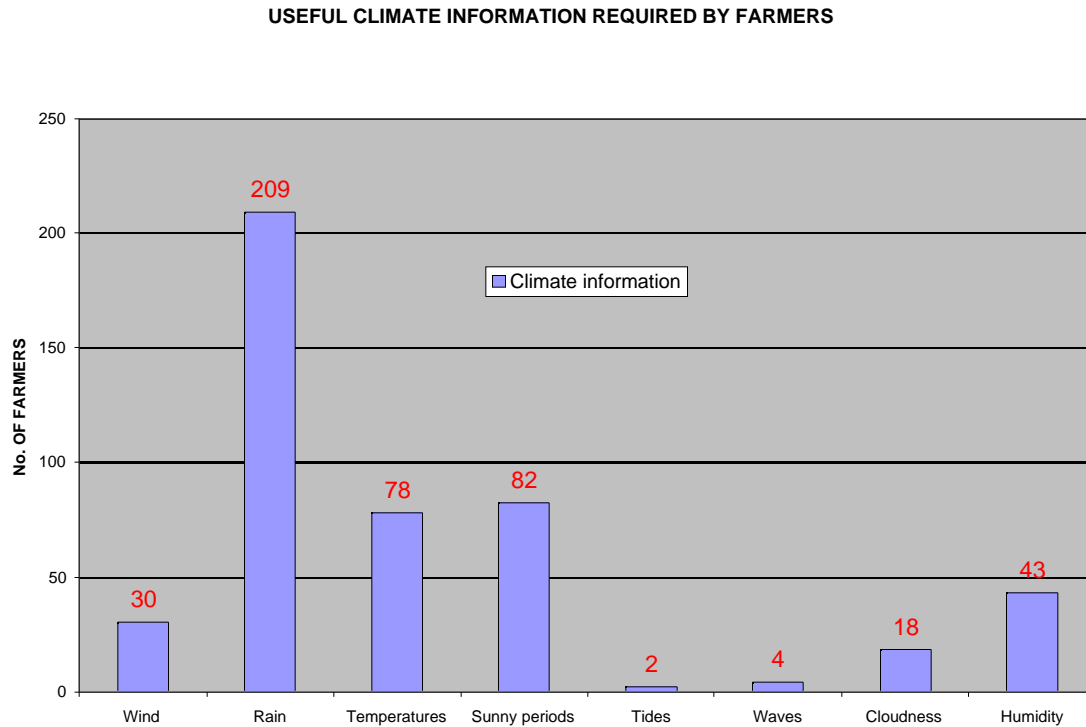
Figure 3.1.17 Forecast issue for short rains



Most of the farming activities depend on the rains. Due to this fact the information on the on-set of the rains must reach the farmers in good time so as to be useful. The farmers also require to be told exactly when the rains will come and how long it will last. They also need to know the hot season so as to avoid late planting that would be affected by the hot temperatures.

The KMD should tailor the forecast to suit the farmers' needs. This information should be sent mainly through radio, chief's "Barazas", TV and newspapers.

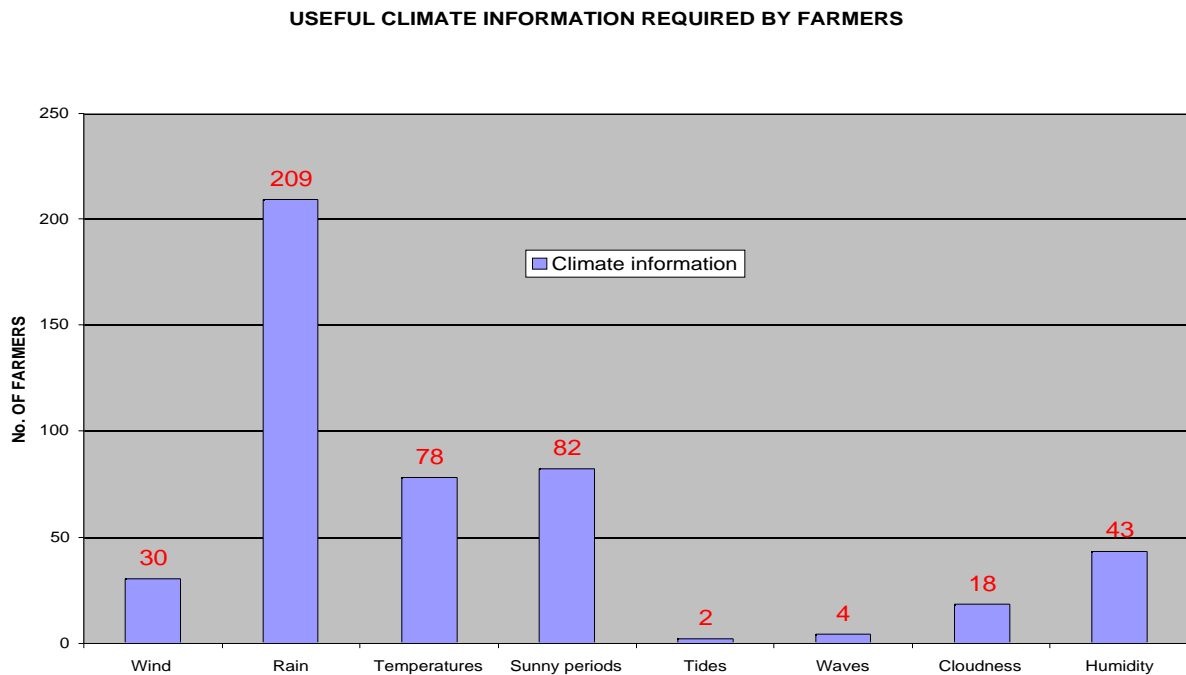
Figure 3.1.18 Useful Climate information required by Farmers.



The farmers also require to be told exactly when the rains will come and how long it will last. They also need to know the hot season so as to avoid late planting that would be affected by the hot temperatures.

The KMD should tailor the forecast to suit the farmers' needs. This information should be sent mainly through radio, chief's Barazas, TV and newspapers.

Figure 3.1.18 Useful Climate information required by Farmers.



The rainfall stations in the district are very important to the research and agricultural communities. These are tools which can be used to know the climatology of a place and long time series analysis of the figures can give a probabilistic forecast, though crude, in the absence of the real forecasts.

There is definitely a need to increase the rainfall network in the district for the Kenya meteorological department to effectively monitor the forecast they issue for the region. Areas have been identified in proximity to a telephone line where the farmers can send the information using reverse call.

Future work

The survey has certainly identified a gap in the dissemination of the forecast information in the district and by extension in the country. Farmers in Kwale do not receive this

information and in fact most of them are not even aware that it's available to them. Where this information reaches the farmer there is no feed back mechanisms for follow up to ascertain if the farmers benefited with the information.

Consequently the survey comes up with the following recommendations.

1. Dissemination of climate forecast

i. there is need to look for appropriate channels to disseminate the climate forecast information to the farmers through a multi-sect oral approach.

2. Timing of forecast issue

ii There is need to look into the timing of the forecast issue in order to release it early enough to be most useful to the farmers.

3. Research work

iii. Research institutions in the field of agriculture to improve on local varieties popular with the recipient communities and studies to be conducted to verify some of the observations made by farmers in this document especially on tsetse flies and the behavior of fish in relation to meteorological parameters.

4. Farming Management

iv. Enhance user capacity building in sourcing interpreting and utilization of the forecast.

- Livestock officers to come up with better management techniques in the field of local poultry for the farmers to exploit effectively this resource.

CONTACTS

Josephine M. Mwinamo
Project Co-ordinator
Waa High School
P. O. Box 96046
Mombasa – Kenya

Tel: 0127-51016

E-mail: jose@am.africaonline.com

