AGROMETEOROLOGICAL ASPECTS IN SUSTAINABLE AGRICULTURAL DEVELOPMENT

Review and evaluation of the status of agrometeorological applications to conserve and manage natural resources for the benefit of agriculture, rangelands, forestry, fisheries and other relevant rural activities in Kenya

By
Sammy Kinuthia
Agrometeorological Division
Kenya Meteorological Department
Abstract

• Agriculture is an important sector for the economies of the African countries. Most of the countries grow cash crops such as coffee, tea, bananas, cotton, sugarcane etc., for export, while subsistence farmers grow maize, beans, cassava, millet, sorghum, rice, potatoes etc.

• One of the major challenges in the African continent is the provision of an equitable standard of living for the population, adequate food, water and a healthy environment.

• Another major challenge is communication between the National Meteorological Services (NMSs) and the end users of agrometeorological information and services.

• Human activities induce climate change, resulting in climate variability, and environmental issues such as land degradation, loss of biological diversity which threatens our ability to meet the above basic human needs.

• A more informed choice of Agrometeorological policies, practices and technologies will, in many cases, reduce the long-term vulnerability of agriculture, rangelands, forestry, fisheries and other relevant rural activities to natural climate variability.
Introduction

• Agrometeorological services were started in Kenya in 1974 with the objectives of assisting researchers in selecting appropriate plants and animal breeds so as to attain a sustainable food production system in the country.

• Apart from creating a sound data base, the agrometeorological information and services would provide decision and policy makers with agrometeorological information that would be of use in conserving and managing the natural and environmental resources for the economic benefits which would be translated into profitable action.

• In Kenya, Agrometeorological information and services are rarely used operationally and if so only by commercial farmers or directly by government and research institutions e.g. Kenya Agricultural Research Institute (KARI).

• In developing countries Governments, NGOs, Civil Society and various groups of farmers are much more aware that a gap exists in the flow of agrometeorological information between the NMSs and the end users of this information.

• To bridge this gap requires cooperation between the NMSs and the Agricultural, forestry and fisheries extension officers who are in direct contact with the end users of this information. Little has been done in the African countries on these aspects where this information is highly required due communication barriers.
Agrometeorological stations network in Kenya cont.......... 

• Up to the end of 1980s the Kenya Meteorological department maintained a dense network of observing stations numbering over 2,500 most of which were rainfall stations. However since 1990 this network has gradually declined considerably and currently the observing stations stands at below 1000.

• Due to economic constrains being experienced by developing countries it has become increasingly difficult to maintain and regularly inspect these stations.

• This has resulted in dwindling amounts and gaps in data sets and decline in the aerial coverage.

• The department maintains a network of 36 Synoptic stations and out these 13 stations report agrometeorological information, crop phenology and soil moisture in addition to other meteorological information. The rest of the stations supply agroclimatological information.
Instruments and equipments

- Advancement in technology and the use of Information Communication Technology (ICT) has resulted in modernization of weather observing instruments and equipments such as automatic weather stations (AWS).
- The pace of modernization has been slow due to economic constrains being experienced by the developing countries such as Kenya. The Kenya meteorological Department has been in the process of installing AWS to replace the manual instruments and more than 24 AWS have been installed.
- In addition the department also monitors ozone and has installed two ozone sonde stations located at the Meteorological headquarters and at Mt Kenya forest respectively through a project initiated by the French Meteorological Services.
- Maintenance of the existing meteorological instruments has also been affected by lack of adequate funding and lack of spare parts from manufacturers who no longer produce the same instruments.
- Due to lack of regular maintenance of these instruments and equipment, there is lack of continuity in data sets resulting in difficulties in analysis and accuracy of the end agrometeorological products intended for the conservation and management of natural and environmental resources.
Communication

• The Kenya Meteorological Department is committed to ensuring creation, capture, access and dissemination of agrometeorological information to achieve a more productive and sustainable use of land, water, and renewable natural and environmental resources.
• The Agrometeorological information and services contribute to the national economy by developing sustainable and economically viable agricultural systems aimed at improving agricultural production, reduce losses and costs as well as increasing efficiency of water use to combat drought and desertification.
• These products and services are of great assistance in conservation and management of natural and environmental resources for the benefit of agriculture, rangelands, forestry, fisheries and other relevant rural activities.
• In Kenya, as in most other African countries these information and services are available but quite a small fraction of the intended users have access to this information and services. This is mainly due to poor communication systems used between the NMSs and the end users.
• Poor knowledge in the use of ICT in the rural areas is also a limiting factor in effective communication between the NMS and the end users of agrometeorological information and services.
The digital gap limits access to information due to poor ICT infrastructure and high cost of telecommunication. Bandwidth cost in Africa, for example, is ten times more than in Europe and the US. There is need to develop regional networks and work together to lobby for lower costs and expansion of bandwidths.

The need to develop information management skills of all stakeholders - from researchers to farmers and especially the need to empower women in the use and application of ICTs participation of the private sector is critical in narrowing the digital divide.

However, sustainability of ICT projects is still a big challenge in most African countries.

Dependence on donor funding is not sustainable and therefore there is need for home-grown initiatives for fund-raising through government and private sector participation.

In order to bridge the digital divide, stronger initiatives are required to create awareness on ICTs available for agricultural information communication and management.
Modernization and development of agrometeorological information and services

The Kenya Meteorological Department through the Agrometeorological Division provides various periodic information, products and services to its clients who include;

- Private individuals
- Small scale farmers and pastoralists
- Large scale commercial farmers and ranchers
- Government Ministries and departments
- Research Institutions
- Universities
- NGOs
Modernization and development of agrometeorological information and services cont..........

• It is easy to pass agrometeorological information to the government departments, Research Institutions, Universities and other stakeholders including large scale farmers especially those in horticulture/floriculture, ranching and agriculture.
• These stakeholders have knowledge in ICT and also have access to modern communication equipments.
• The products usually requested include fire outbreaks, extreme weather events such as drought and floods, hail and frost suppression, spraying, outbreak of pests and diseases and post harvest operations especially in horticulture, tailor-made agrometeorological forecasts etc.
• Providing agrometeorological information and services to the small scale farmers in the rural areas in a timely framework has been very difficult due to communication barriers.
• This is because of the assumption that agrometeorological information and services successfully reach farmers through agricultural extension services while this has not been the case.
Agrometeorological Information and Services

The Kenya Meteorological Department provides the following information and services;

- The start and end of the rainy seasons and the rainfall performance during the seasons.
- The probable planting dates.
- Monthly agrometeorological bulletin
- The 10 day (Dekadal) agrometeorological Bulletin which gives the following information
  - Crop and weather review
  - Forecast on weather and crop performance
  - Advisory services on adverse effects of weather on crops.
  - Advisory services on breeding conditions of pests and diseases.
  - Forecast on pastures and general water status for livestock and wildlife.
  - Advisory services on harvest and post harvest operations.
  - Prediction on yields and advisories on food security.
  - Tailor made products and services as specified by the user.
Use of agrometeorological information and services

• The frequency and severity of extreme weather events such as droughts and floods has called for an increased demand for Agrometeorological information and services from the National Meteorological and Hydrological Services (NMHSs).

• This has led the farming community to show an increase in interest for agrometeorological information and services to cope more efficiently with climate variability and minimize losses in agricultural production.

• Great strides have been made in the agrometeorological field in terms of data collection, archiving and analysis and their transformation into information that can be of benefit to the farming communities.

• Although this has been the case, use of this information especially in developing countries where such information needs are the greatest has lagged behind due to communication barriers.

• Another important factor is lack of adequate interaction with the user communities in assessing the appropriate dissemination and communication procedures that can enhance the value of the agrometeorological information and services.
Conclusion

- Agrometeorological information and services are significant for planning of agricultural activities to increase food production for the ever increasing population as well as minimizing risks in agricultural production.
- The conservation and management of forests, rangelands and other relevant rural activities will depend largely on agrometeorological information and services.
- Weather fire information contributes greatly to the management of forest and Wildland fires.
- The frequency and severity of extreme weather events such as droughts and floods has called for an increased demand for Agrometeorological information and services from the National Meteorological and Hydrological Services (NMHSs) for management decisions by users depending on the nature of those decisions.
- The agrometeorological information and services have changed because of changes in the environment and technology. The user needs and aspirations have changed and there is a great need to adjust the way products and services are provided so as to meet these needs.
Recommendations

• There is need to optimally conserve and manage the natural and environmental resources in the African countries for the benefit of sustainable agriculture and related rural activities with respect to today’s agrometeorological practices.

• There is need for a more informed choice of Agrometeorological policies, practices and technologies that will reduce the long-term vulnerability of agriculture, rangelands, forestry, fisheries and other relevant rural activities to natural climate variability.

• Dependence on donor funding in conservation and management of the natural and environmental resources is not sustainable and therefore there is need for home-grown initiatives for fund-raising through government and private sector participation.

• The network of observing stations need improvement so as to capture all the different agroclimatic zones.

• There should be improved interaction between the NMSs and the user communities in assessing the appropriate dissemination and communication procedures that can enhance the value of the agrometeorological information and services.
• Poor knowledge of use of ICT in the rural areas is also a limiting factor in effective communication between the NMS and the end users of agrometeorological information and in order to bridge this gap, stronger initiatives are required to create awareness on ICTs available for agricultural information communication and management.

• Rural Community based radio stations can be introduced for dissemination of agrometeorological information and services in addition to the existing National Radio and Television stations.
THANK YOU

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