10077

30

The use of remote sensing in grain crop production forecasting in Kenya

R.K. SINANGE

Department of Resource Surveys and Remote Sensing, Ministry of Planning and National Development, Kenya

The most important grain crops in Kenya are maize, wheat and to a lesser extent rice. Others include sorghum and millet. However, the latter are nationally insignificant and are found in the marginal areas of production. Maize and wheat are produced in the agriculturally high potential areas under rainfed farming systems while rice is mostly produced under irrigation systems. The high potential area comprise about 20 % of the country's land area. Through distribution networks maize, wheat and rice reach all consumers in every part of the country from surplus production areas.

Maize and wheat are the staple food crops in Kenya and guarantee of their production and availability to the consumers is a major responsibility of the government. However, their final level or net production is subject to various production factors including :

– area put under production,

– weather and climate,

– farming system,

– input availability (labour, land preparation implements, fertilizers, certified seeds, pesticides, herbicides, etc.),

– amelioration of pre-harvest and post-harvest losses.

These factors introduce elements of uncertainly during the early stages of production process and have a bearing the final production levels of the crops. This is especially true for weather, area put under crop, and expected yields. None wants to be caught unaware if things go wrong. This is especially so because we live in a region with very unpredictable climates where droughts are not uncommon, and rainfall amounts and their spatial and temporal distributions are always uncertain. And yet for optimal yields crops and their varieties have very specific requirements. Governments therefore have to be vigile and keep monitoring the production systems at every stage to be sure of what is expected in the next harvest. A hungry nation can socially and economically be volatile.

Thus the Department of Resource Surveys and Remote Sensing (DRSRS) in the Ministry of Planning and National Development has established an annual maize and wheat production forecasting system for the country. The objectives of this early warning system is to indicate the levels of production of these two commodities long before harvest so that the Government can make appropriate contingency plans for storage if a bumper harvest is expected or for imports if a severe deficit is expected.

Widespread crop failure after droughts in 1984 prompted the necessity of establishing the crop production early warning system for the country a year later by DRSRS. This has served to give an indication of the crops' production and consumption trends in view of the government's long term policy of self-sufficiency in feeding its population and maintenance of stategic reserves. The 1991 forecast was the seventh year in a row that these forecasts were carried out by the Department. These series of data can now be considered to be consistent with the principles of a monitoring programme. The essence therefore, in the long run, is for the Government to develop a data bank to be used as a basis of modeling, projecting and formulating forward plans and policy adjustments, with an aim of creating conducive environments for efficient production and marketing of these commodities and equally relate this food production to other interacting aspects in the economy of the country [1, 2].

This paper outlines the procedures of acquiring statistics on area under the crops through photography, yield through aerial radiometer (light wave reflectance) measurement and the monitoring of crop healthness and weather through NOAA and METEOSAT data during the growth periods.

Methods

The department uses mostly remote sensing techniques to gather the necessary maize and wheat data. The most important steps are :
- the stratification of maize and wheat growing areas ;
- establishment of a croping calendar for the strata ;
- monitoring of the weather ;
- the measurement of total area under the crops for all strata ;
- the measurement of expected yield in all strata long before harvest.

The product of area and yield is the forecasted crop production estimates.