

Market Reforms, Research Policies And SADCC Food Security



Edited by

Mandivamba Rukuni & J.B. Wyckoff

University of Zimbabwe UZ/MSU Food Security Research in Southern Africa Project

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The Tanzania Crop Monitoring and Early Warning Systems Project

*D.A. Kajumulo*¹

INTRODUCTION

The problem of food security in SADCC has been discussed at length in many seminars and workshops. Tanzania benefitted from recommendations of the World Food Council (WFC) in the early 1970s and from those of the Food and Agriculture Organization of the United Nations (FAO) in the mid-1970s. The recommendations led to the formulation of the country's food strategy, *i.e.*, the establishment of a Crop Monitoring and Early Warning System (CMEWS) and the institution of the Government's Strategic Grain Reserve (SGR) for bad times. Both are of prime importance in planning for food security.

Equally important is the understanding of the parameters which determine the food security of a given population (Gomez *et al.*, 1984). The numerous interrelated factors are national, international, and environmental in origin. National factors that affect food security include:

- the wealth and income distribution within the population;
- the rate of growth of wealth;
- the presence of social and/or political strife;
- population density and growth rates;
- growth in the domestic food supply as influenced by price incentives;
- agriculture investment;
- technological change;

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- inputs availability;
- the effectiveness of early warnings on food shortages;
- the logistical and institutional infrastructure for food distribution;
- food storage policies;
- health and sanitation infrastructure;
- food import policies (particularly the magnitude and timing); and,
- public and private programmes to assist key target groups in augmenting their food consumption.

International factors include:

- world food availability and prices;
- other world prices;
- capital availability and interest rates;
- donor and relief responses of private voluntary organizations;
- international infrastructure for food distribution;
- war; and,
- international food surveillance and early monitoring.

Environmental factors include:

- short term variables (floods, drought, heat, cold);
- longer term climatic changes;
- resource constraints;
- various effects of environmental pollution; and,
- crop pests and diseases.

In 1975, the FAO Food Security Mission to Tanzania recommended a number of action programmes for strengthening the country's food security. One of these was the CMEWS project.

THE PROJECT

The CMEWS project is to provide the Government advance information on the food situation, making assessments of the crop performances (stages and conditions), stocks supplies and rural open market prices of major food staples (*i.e.*, maize, sorghum, millets, paddy/rice, roots and tubers, wheat, beans and bananas) for all the Regions of Mainland Tanzania. Arrangements are underway to extend the services of the project to the Tanzania Islands. The project also has been assisting in planning the operations of the National Milling Corporation (NMC) and is serving as secretariat to the Government's SGR.

The project is based in the Ministry of Agriculture and Livestock Development (KILIMO), and works in close collaboration with other institutions and organizations including the Directorate of Meteorology (DM) of the Ministry of Communication and Works (UJENZI), the Marketing Development Bureau (MDB), the Prime Minister and First Vice-President's Office (PM), the Regional Quelea project, and the Fertilizer and Seeds Programmes. CMEWS utilizes the services of the Plant Protection Commission, Armyworm Forecasting and National Soil Services.

FAO is the executing agency and the project has been financed by the Netherlands, Norway and the Tanzania Governments for Phase I, October 1978 to December 1981. During this phase the technical base and methodologies were developed. Phase II started in mid-May 1982 and developed the institutional arrangements leading to the establishment of an Early Warning Unit (EWU) in KILIMO. This was completed in mid-1986. The unit is now fully operational.

PROJECT ACTIVITIES

Tanzania, with a total area of about 94,027km², has a variety of agroclimates and agroeconomic zones ranging from semi-arid soda flats to heavy rainfall areas on deep, fertile, volcanic soils some with temperatures too cold to grow maize. Some areas have a bimodal, equatorial rainfall distribution.

Bimodality of rainfall is present throughout the country and constitutes the key to understanding Tanzania's food production variability (Gomez *et al.*, 1984). A short dry season typically falls in February. It may last only a week and be imperceptible. The season is virtually unimodal in this case and the crop failures, like rainfall, occur in patches and seldom cover more than two continuous regions of the country's 20. Serious food problems normally affect less than one district (about 10,000 km²) but may occur in several areas concurrently. Problemless years are exceptional. It is in this context that the CMEWS project began its activities in October 1978.

DATA COLLECTION

Food crop growth and yield are largely dependent on available water supply, thus for the rain-fed crops, on rainfall. Most food crops in Tanzania are rain-fed. Daily

rainfall data from some 600 well dispersed stations form the basic reporting network. The present network was obtained by trial and error over several years. It:

- a) covers all the important agricultural areas; and,
- b) provides all the qualitative information needed for the Crop Soil Specific Water Balance (CSSWB) calculations.

The project follows the East African Meteorological Department's traditional Thursday to Wednesday meteorological week. In the early phases, rainfall data were collected by the DM at a regional level, transmitted to Dar es Salaam and later passed on to the project. Because of delays, pre-paid post cards were eventually adopted as a compromise between timeliness and completeness. The layout of the cards is illustrated in Figure 1. They reflect several years of successive adjustments. The requested information can be provided by uneducated observers, yet in sufficient detail to meet the needs of the project. The cards provide information at a village level on rainfall (seven daily amounts) and on six crops, *i.e.*, maize (mahindi), sorghum (mtama), paddy (mpunga), Bulrush millet (uwele), beans (maharage) and cassava (muhogo). A qualitative production estimate relative to the previous year (mavuno) and price (bei) are reported for each crop, crop stage (ngazi) and condition (hail), and adverse effects (madhara). Phenology is very simply coded from "A" (planting) to "E" (harvesting). Crop condition ranks from "1" (failure) to "5" (bumper harvest). The price (in Tsh) is that which the rainfall and crop reporter (RCR) has to pay in his/her locality for one debe -- a traditional measure equivalent to four imperial gallons. Data from these cards form our "Weekly Reports".

Weekly reports are received from RCRs who were trained in rainfall and crop observations by the project in collaboration with the DM, the hydrometeorological section of the Ministry of Water (MAJI) and KILIMO. Most rainfall stations are run by MAJI, national parks, prisons, schools, parishes, the DM and KILIMO. Thus the RCR is, in most cases, a volunteer and the project spends considerable time and energy keeping in touch with the RCRs. In addition to the training seminars, spare equipment for rain gauges and other meteorological instruments, letters of encouragement, incentives such as T-Shirts, *etc.*, are regularly mailed to the reporters.

In addition to rainfall and crop data, information on crop varieties, growth cycles, planting dates, phenological stages, adverse effects, dates of maturity and yield is provided on a monthly basis by District Agricultural Development Offices (DADOs). These monthly reports from DADOs cover a whole district and also provide an estimate of yield. The coding is basically the same as for RCR reports. It is important to realise that hectarages are usually rather rough estimates and some are faked intentionally. Thus, the data undergo a very close scrutiny by the project before being entered into any calculations. The availability, quantity and distribution of key inputs such as fertilizers, seeds, pesticides, fuel, *etc.*, known to be productivity enhancing factors, are also contained in the same report.

KITUO:	NA:	FORM 1
WILAYA:	TARIFA:	

SIKU	TAREHE	MVUA <i>mm</i>	NGAZI HALI	MADILARA	MAVUNO	BEI <i>Shs/ debe</i>
THURSDAY ALHAMISI			MAHINDI			
FRIDAY JUMAA			MTAMA			
SATURDAY JUMAMOSI			MPUNGA			
SUNDAY JUMAPILI			UWELE			
MONDAY JUMATATU			MAHA- RAGE			
TUESDAY JUMA- MANNE			MUHOGO			
WEDNESDAY JUMATANO			MAELEZO:			
TOTAL JUMLA			MWANGALIZI			

POSTAGE WILL BE PAID BY ADDRESSEE	<div style="border: 1px solid black; width: 80%; margin: 0 auto; padding: 5px;"> BUSINESS REPLY SERVICE LICENCE NO. 53 </div> <p style="margin-top: 20px;"> Team Leader Early Warning & Crop Monitoring Project FAO/Kilimo/IDM P.O. Box 5384 Dar es Salaam </p>	NO POSTAGE STAMP NECESSARY IF POSTED FOR DELIVERY WITHIN TANZANIA
	<div style="display: flex; justify-content: space-around; width: 100%;"> <div style="width: 15%; background-color: #cccccc; height: 40px;"></div> <div style="width: 15%; height: 40px;"></div> <div style="width: 15%; background-color: #cccccc; height: 40px;"></div> <div style="width: 15%; height: 40px;"></div> </div>	

Fig 1: Weekly forms used by rainfall and crop reporters.

The DADOs use this data to make a qualitative estimate of expected yields and production. This information is vital in formulating inputs distribution policy.

Finally the project collects the agroeconomic data necessary for establishing trend information for economic factors relating to the production and supply of food commodities important in Tanzania (Gomez *et al.*, 1984). Food supply and consumption data important for making surplus/deficit computations (*i.e.*, procurement, sales and stocks) plus open market consumer price data are collected. These data provide a basis for rational policies regarding reliable food supplies at reasonable costs.

DATA ANALYSIS

Based on the hypothesis that the crop growth and yield under Tanzania conditions are largely dependent on available moisture, a CSSWB is calculated for that particular crop in a weekly time step. However, using conventional Potential Evapotranspiration (PET) and soil water holding capacities (WHC), yields are calculated from the CSSWB calculations for each crop and district. The calculated yields are calibrated with district averages from DADO reports.

Calibration with local data is essential since it compensates for factors not normally taken into account by the version of the CSSWB computed in the project. This refers particularly to the effect of fertilizers, rates of infiltration versus runoff (effective rainfall), pests (armyworm), and diseases (maize streak virus), *etc.* Finally, yields are multiplied by area to get production estimates.

Rural open market prices are collected to explain the supply and demand situation within regions and districts.

Analyses of procurement, sales/issues, stocks, imports (aid and commercial) and exports are processed on a monthly basis and compared with previous years to assess the national food demand and supply trends. Estimates of marketable surplus available to the NMC and the Cooperative Unions are collected weekly during the intake years. Stock positions are monitored to detect any abnormal expansion or shrinkage in marketed demand. Thus the consumption requirements, stocks in warehouse (first day of month), purchases/procurement (forecast and actual) imports (confirmed and commercial) from different sources, *e.g.*, WFP, EEC, Japan, Italy, Australia, France, Canada, *etc.*, operational shortfall including the SGR and actual issues are tabulated to form the "National Food Balance Sheet" or "National Food Supply Situation".

OUTPUTS

The project issues four types of reports. They are the monthly Farming Weather Bulletin (FWB), the monthly Consolidated Assessment of the National Staple Food Situation (which evolved into the current National Food Security Bulletin), interim Production Estimates and the National Food Supply Projections. The FWB contains

the synoptic summaries for the month under review compared to the previous year. It also contains rainfall summaries, including maps, over a 12-month period plus an agricultural overview for selected stations in Mainland Tanzania.

The National Food Security Bulletin contains the current food situation, including a weather and crop review, input supply situation, open market rural price developments and the NMC food supply projections. The status of the SGR is also reviewed. The interim Production Estimates report, issued in April, contains the preliminary production forecast. The National Food Supply Projections report, issued in June, contains the final production forecasts by major crop and district. This report compares the magnitude of the expected harvests with consumption requirements based on standards developed by the FAO and the World Health Organization (WHO), to identify problem areas.

LIMITATIONS OF THE PROJECT ACTIVITIES

Since its inception, the project has met with important technical limitations. Area production data from DADOs often are unreliable or exaggerated intentionally. This problem is likely to ease with the Current Agricultural Surveys (CASs).

The second technical problem is the lack of rain-gauge stations to cover important agricultural and borderline areas. This problem is aggravated by the "decaying" of established stations due to breakage of glass measuring cylinders (which requires foreign replacements), the smashing of rain-gauges by reversing trucks (particularly at district headquarters), dismantling of installed rain-gauges by irresponsible people and the transfer of some of RCRs without replacements. The third technical problem is that our forecasts are in absolute quantities. They could be more scientifically presented in Maize Equivalent quantities of the edible portions. This is done deliberately because of a lack of self-sufficiency in rice and wheat. The fourth technical problem is that the project's final production forecasts are not discussed in any interdisciplinary or interministerial committee, thus, the project has full responsibility for its results.

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