



Understanding the Impact of Crop Forecasting on Public and Private Decisions and Improving Crop Forecasting in Zambia

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Understanding the Impact of Crop Forecasting on Public and Private Decisions and Improving Crop Forecasting in Zambia

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PREFACE

At the request of the Ministry of Agriculture, Food and Fisheries (MAFF), the United States Agency for International Development (USAID) provided four consultants to assist the National Early Warning Unit in the review of the crop forecasting system in Zambia. A joint MAFF/USAID Crop Forecasting Study Team was established on 28th April, 1999, and, after extensive consultations with stakeholders and assistance from two further short-term consultants, completed its report on 12th July, 1999.

The team would like to thank all those individuals and institutions who have contributed their time, ideas, comments, documents, and other resources to this effort. The team were assisted by all the main participants in the crop forecasting system, ranging from the Office of the Vice-President of the Government of Zambia to bilateral and multilateral donors, all concerned Government Departments, and the private sector. The team would particularly like to thank the members of the Early Warning Technical Committee for their timely and consistent support and advice throughout the study period. The team also appreciates the direction and support of Mr. A. K. Banda, Director, Economics and Market Development Department of the MAFF, Mr. J. J. Shawa, Deputy Director of the Policy and Planning Branch of the MAFF, and Mr. David Soroko, Agricultural Development Officer of USAID.

The team feels that a high level of consensus was reached between the main stakeholders on the main findings and recommendations. However, this report presents the independent findings and recommendations of the study team, and does not necessarily represent the views of USAID, MAFF, or of any other stakeholder.

This team feels that this report, and the stakeholder consultations on which it is based, provide a secure basis for understanding, and for taking action to strengthen, the crop forecasting system; it is now entirely within the realm of the main stakeholders to ensure that the necessary changes are implemented.

EXECUTIVE SUMMARY

The Ministry of Agriculture, Food and Fisheries (MAFF) and the United States Agency for International Development (USAID) established a joint Crop Forecasting Study Team which was designed to review the current operations of the crop forecasting system and to make recommendations for improvements. The team commenced its work with a stakeholders' meeting at USAID on 6th May, 1999, then subsequently met with stakeholders individually and in small groups, made an extensive review of available documents, undertook field visits to the Western and Southern Provinces, implemented a stakeholders' meeting at the MAFF on 24th June to review preliminary findings, and completed the study report on 12th July.

From the analysis of the 1997-99 experience, that inaccurate and conflicting forecasts of food security led to inappropriate food aid and market decisions at an estimated cost of more than \$40 million, and that this did not appear to be an effective use of scarce resources in terms of promoting agricultural productivity or food security, the team makes numerous proposals for change to improve the effectiveness of the crop forecasting system. Based on the analysis presented in the body of this report, the team's main findings and recommendations are:

- The National Early Warning Unit (NEWU) and the Early Warning Technical Committee (EWTC) should be supported in their roles of coordinating and disseminating technical crop production and food security information; however, technical information should be freely available on a timely basis, independently of the current need for political review.
- The CSO pre-harvest forecast should be terminated, as it is of doubtful accuracy, and the overall importance of the crop production forecast doesn't warrant additional resources being utilized for this purpose. Minor improvements in estimating crop production through the MAFF Field Services and others, and timely quality-of-season estimates provided through ZMD, are sufficient for purposes of market decision-making and establishing potential problem areas for food security estimations. However, the CSO post-harvest estimates should be retained and improved, to provide the necessary data for government policy and other sectoral decisions.
- The Zambian Provisional Food Balance Sheet (ZFBS), currently misinterpreted as a food security forecasting tool, should not be used as a basis for government food aid provisions, or other interventions. However, the Vulnerability Assessment Mapping (VAM) exercise should be strengthened, and the Food Needs Assessment reoriented to a social security needs assessment, in order to support the decentralization and market liberalization efforts.
- The extensive food aid exercises of recent years, based on disaster management, should be terminated. Although food aid may be needed for specific isolated cases needing disaster management, the limited volumes of aid and the necessity for accurate targeting are such that the food aid exercise can, and should, be implemented almost entirely at local level. This will present an opportunity for the government to further strengthen its decentralization program, leading to stronger local productive capacity and more sustainable local community institutions, rather than through the current system of large volumes of poorly-targeted and managed food aid, which have negatively impacted such institutions and productive capacities. There will always be a need for support to vulnerable sections of the population, and such support, whether it includes food aid or not, should be recognized as routine essential social security net activity, rather than as a discrete series of responses to disasters.

- The Food Reserve Agency (FRA) should terminate its interventions in maize and fertilizer markets. The FRA should be reoriented to provide the necessary market monitoring and development functions which were important elements of its founding legislation, and should be allowed more autonomy of operation from the political arena. This would allow the FRA to play a crucial supporting role in ensuring the success of the government's market liberalization policies, rather than the current system where the FRA impedes private sector trade and the development of infrastructure through direct and unpredictable market interventions.

These recommended changes in the crop forecasting system would likely improve the GRZ's role in food security, market development, decentralization, and the social security system. The GRZ would no longer suffer substantial financial losses in market transactions, support for vulnerable and food insecure populations would be enhanced, and the costs of the largely unproductive food aid exercise could be put to better use for sustainable community social services and improved productive capacity.

A more detailed summary of findings and recommendations is presented below, according to the three main elements of the crop forecasting system: estimating crop production, estimating food security, and responses to these estimates.

ESTIMATING CROP PRODUCTION

The team reviewed with stakeholders the current methods and processes of estimating crop production in Zambia. Focus was placed on those processes which support government decision-making on food security issues via the Early Warning Technical Committee (EWTC); these are the forecasts of the Zambia Meteorological Department (ZMD), the Central Statistics Office (CSO), and the Ministry of Agriculture, Food and Fisheries (MAFF) Field Service. It is concluded that:

- (1) The Global Climate Models (GCM) that are the basis for ZMD early weather forecasts are reasonably accurate for predicting broad changes in weather patterns. Crop production forecasts based on these models are useful for contingency planning at the regional or national level. Although these forecasts come very early, they are not accurate enough to be useful for changes in farming strategy at the sub-national or even the national level.
- (2) The current remote sensing models from the Southern Africa Development Community (SADC) and the ZMD provide good "quality-of-season" estimates both nationally and at the District level.
- (3) The CSO estimates, (the Final Forecast and the Post-Harvest Survey) are indicative of major changes in production levels from year to year, but are not reliable enough as estimates of the absolute level of production for purposes of, for example, making food security estimates at District level.
- (4) The MAFF Field Service forecasts are the most formal that are also the closest to the local authorities and local communities; the results and conclusions from this forecast are potentially timely and easily verified, are currently conducted as a normal Field Services support function, and are widely used locally.
- (5) For EWTC purposes, the overall assessment is to concentrate on improving existing remote sensing information and the post-harvest survey, with pre-harvest estimates being taken from the MAFF field services and the Zambia National Farmers' Union (ZNFU), rather than through a formal CSO survey.

The team's main recommendations in this area are:

- SADC should continue to develop and use models based on large data sets and powerful computer programs. These should continue to be used by ZMD and MAFF.
- Support ZMD remote sensing to obtain early estimates (February-March) of the quality-of-season, independently of but in close collaboration with CSO and MAFF. Support appropriate technology solutions to crop monitoring like those of the ZMD.
- Terminate the CSO Final Forecast because it does not have a very broad user base, and its accuracy is in question.
- Support and improve the MAFF Field Services forecast
- Support the Post Harvest Survey for food and cash crops which could be contracted to the CSO or the private sector, and should be completed in July to ensure its timely use for government and private sector planning.
- Support the National Early Warning Unit (NEWU) and EWTC so that they can better interpret the meanings of forecasts from others and incorporate that information into food security policy, through a collaborative consensus-building process with government, NGO, private sector and donor stakeholders.
- In terms of pre-harvest forecasts for cash crops, the NEWU should make greater use of existing private sector monitoring systems

ESTIMATING CASH CROP PRODUCTION

Smallholder production of non-food cash crops has become increasingly important since the introduction of economic reforms in the early 1990s. Forecasts of cash crop production are regularly made by private traders, input supply companies and other investors for the cash crop sectors where they have a particular interest, using a variety of informal networks and personal contacts. These systems have evolved over the years to suit the information needs of individual firms and are generally believed to provide a sufficiently accurate picture of each cash crop sector to plan effective buying and marketing strategies.

The CSO pre-harvest forecasting system began to collect data covering non-food cash crops in 1998. One reason for this is that the data from the CSO annual Post-Harvest Survey (PHS), which has always collected cash crop information, have not usually been available until several years after the season they cover. Given the problems of accuracy and of limited usefulness of the pre-harvest CSO data, and the very limited resources available to MAFF, it is recommended that the CSO pre-harvest survey be terminated, and effort is instead concentrated on improving the timeliness and accuracy of the PHS, which could be contracted out to the private sector by the MAFF if the CSO does not have the required personnel. District level data could still be collected through the MAFF Field Services as recommended for other crops.

Because pre-harvest cash crop production is linked with food security, an early indication of national production is still useful. Towards this end, it would make more sense to draw on existing private sector networks than use additional government resources. Although firms are understandably cautious about sharing detailed enterprise information, they have indicated they would be willing to provide sufficiently timely and accurate data required by the Marketing and Policy Division of the MAFF for its pre-harvest forecasts.

ESTIMATING FOOD SECURITY

The team reviewed with stakeholders the current methods and processes of estimating food security in Zambia. The GRZ, in carrying out its responsibilities of ensuring that the nation is food secure, uses the EWTC and the Early Warning Coordinating Committee (EWCC) of the MAFF to bring together the main stakeholders at national level for purposes of making food security estimates. The EWTC uses the following three centrally-administered approaches to food security estimation: (1) the Food Balance Sheet, for monitoring food availability at the national level, and used for making ex ante estimates in Zambia through the Zambian Provisional Food Balance Sheet (ZFBS); (2) Vulnerability Assessment Mapping (VAM), a joint exercise of MAFF/NEWU, the Household Food Security, Health and Nutrition Information System (FHANIS), the Famine Early Warning System of the United States Agency for International Development (USAID/FEWS) and the World Food Program (WFP), for monitoring food access at the District level; and (3) the Food Needs Assessment of MAFF/NEWU, FHANIS, the National Food and Nutrition Commission (NFNC), Care International, and the Program Against Malnutrition (PAM), for identifying specific socioeconomic groups within Districts, who qualify for food security disaster assistance (food aid).

The assessment of the ZFBS shows that it is not the tool to use for policy decisions such as deciding on the level of food aid, or as a presentation vehicle for food security. The main recommendations for the ZFBS are:

- As an ex ante exercise, restrict the ZFBS to a maize (or cereal/staple) only balance sheet.
- Zambia should continue to coordinate the development of the ZFBS for maize (and possibly other crops) with SADC.
- For ex post food balances, Zambia should continue to follow the format of the FAO Balance sheet for Zambia.
- A set of standard assumptions and procedures for calculating consumption requirements should be agreed.

The WFP, PAM, other Non-Governmental Organizations (NGOs), FHANIS, and GRZ agents such as NEWU participate in, and often use the results of, the VAM. The mere structuring of this kind of information into an easily-accessible data-base is very useful for many projects and development interventions. However, the VAM's current units of analysis in Zambia are too large, the orientation is towards showing economic stress rather than the availability of opportunities, and may be of limited use to decision-makers because of its complexity. The team's main recommendations for the VAM are:

- Improve presentation, which is currently not user-friendly even for technocrats.
- Improve distribution of the data, such as making data tables widely available on diskette.
- Include better indicators for natural resource availability and current shocks to agriculture
- Improve effectiveness of incorporating the SADC and ZMD remote sensing data into the VAM.
- Use the level of Camps or Constituencies as the smallest unit of analysis.

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- The VAM needs to be completed by June.
 - Reincorporate the development indicators into the VAM.

The general food security results can be summarized as follows:

- The focus on disaster mitigation, and issues of vulnerability to inadequate food access, should be at the Ward or District level. Communities may be in the best position to identify those households moving towards destitution. The need for economic support due to a disaster is best assessed by identifying the specific victims, with names and addresses.
- The market information system should be improved and better integrated into the VAM.
- Food monitoring systems of the FHANIS should be adapted to social services monitoring. Food security agencies should more carefully target the much smaller numbers of households who are truly food insecure.
- Support locally-administered Social Safety Nets not dependent on food aid, with financing at least partly coming from savings in food aid distributions.
- The increasing importance of non-food compared to food crops needs to be better understood and accounted for in food security assessments.
- Food security is often measured only in terms of the availability of maize. This distracts attention from the much broader set of linkages that constitute the food security chain.

CONSUMPTION ESTIMATES

A convention was proposed by FHANIS/NEWU in 1997 to estimate human consumption requirements. Briefly, this approach states that an average Zambian requires a total of 2,030 kCal per day in order to maintain a healthy, active life and that 70% of this energy (1,421 kCal) should come from basic staples including maize meal, sorghum and millet flour, cassava flour, other tubers such as sweet potato and Irish potatoes, pumpkin, rice and wheat flour. The remaining 30% of total energy is assumed to come from animal products, fruit, vegetables and legumes. To establish the proportionate amounts of each staple food required for human consumption, the FHANIS/NEWU procedure assumes that the total consumption of sorghum and millet flour, cassava flour and other tubers is equivalent to total production, so that any shortfall in terms of the energy supplied by these foods must be made up for by maize, rice, wheat and other internationally traded commodities.

Although this is a significant improvement over previous approaches which focused on the number of grams of food that should be consumed each day, this method has been poorly understood, being interpreted in many different ways when applied to estimating Zambia's national food balance. For example, the extreme variations between different estimates of Zambia's national food balance during the 1998-99 consumption season, ranging from a deficit of 930,000 metric tons to a surplus equivalent to 332,000 metric tons of maize, can be largely attributed to the various ways in which consumption was measured for the national food balance. It is recommended that much more effort be invested in explaining the assumptions and bases of the FHANIS/NEWU convention and in obtaining consensus on the operational procedures needed to effectively apply the convention to estimating the national food balance.

Within this context, however, it must be stressed that this method measures consumption in terms of a well-rounded, culturally appropriate diet. As long as this is the case, a deficit in the

food balance sheet must never be interpreted as an immediate call for emergency intervention since there are an infinite number of ways a human being can acquire the energy they need each day. What has actually been achieved by Zambians appears to be much less over the past decades, given the high levels of under-nutrition measured through nutritional surveillance of the population, and despite the apparent positive national-level food balance estimates for most years. It is recommended that more emphasis be placed on understanding and measuring consumption at the household level, rather than attempting to improve the consumption component of the national-level food balance, which is an inappropriate tool on which to base food security policy.

CASH CROPS IN FOOD SECURITY ESTIMATES

Although the increased production of non-food cash crops represents an important structural change in the Zambian economy, the importance of these enterprises has not been well understood. For example, food aid assessment reports have referred to cash crop production as a threat to food security, ignoring the central role of increased smallholder incomes as a means of improving access to food. Even where cash crop income is taken into account, this is most often counted as gross crop value rather than as net producer profit. Sometimes, cash crop income has even been confused with the national food balance. It is recommended that the MAFF/NEWU Economics and Marketing Development Department take a lead in ensuring that the role of cash crops is better understood and accounted for by food security practitioners and policy-makers.

RESPONSES: THE 1998-99 FOOD AID EXERCISE

Crop forecast information is used each year to make major policy decisions concerning food imports and emergency relief programs. Due to a variety of technical and political constraints, however, most production and food security forecast information is greeted each year with extreme skepticism and it is clear that existing data systems fail to send the clear signals policy makers need to plan appropriate interventions.

This was especially evident following the recent 1997/98 agricultural season when pre-season forecasts of El Niño weather conditions and available production information were used to plan a major food aid exercise covering 57 Districts in virtually every corner of Zambia. This episode clearly shows that Zambia's crop forecasting system failed to send coherent, time-bound information needed to plan appropriate policies. At least five versions of the national food balance sheet were prepared by different organizations for the purpose of estimating food aid requirements. This made it almost impossible for government and donors to know how to respond. Likewise, information on vulnerability to food insecurity at the District level was only published about four months after these data were required so that draft reports and unconfirmed accounts from political leaders and MAFF field staff became the primary basis for the decision to provide emergency assistance. Finally, because of the apparent fact that senior government officials concluded early in the process that food aid would be required as a blanket response, assessment missions fielded to estimate specific relief requirements virtually ignored the possibility that food aid may not be the most appropriate form of assistance. Due to these and other problems, the implementation of the food aid exercise was marked by a haphazard appeal for assistance, late deliveries of relief donations and an extension of the distribution season until well after the 1999 harvest had begun.

The question of whether food aid was truly required is the subject of much debated, but it is clear that this form of assistance has many costs. In purely financial terms, an estimated total of

about US\$14.2 million was spent on the distribution of emergency relief. Importantly, this money could have been used for other projects that address the underlying causes of poverty and food insecurity. When deciding to provide food aid, it must be recognized that this is a very indiscriminate form of assistance, both in terms of the potential negative consequences on farmer attitudes and private sector development. Because food aid only treats the effects of poverty and is not a cure, this form of assistance must be used much more judiciously in the future and should not be first response of government and the donor community to crop forecasting messages.

To improve the situation, it is recommended that considerably less effort should be given to the preparation of pre-harvest national food balance sheets and that this energy should be directed instead towards the production of improved vulnerability assessments. Zambia's current approach to crop forecasting reinforces the tendency of most government officials and political leaders to equate food security with maize availability, even though the two are only remotely connected. By definition, food balance sheets say nothing about the level of access to food for different segments of the population and it seems remarkable that major food aid decisions were made without more careful consideration of these issues.

Considerable effort is also needed to clarify essential procedures for the delivery of emergency assistance when required. The fact that most food aid arrived very late can be seen partly as a result of the "management by committee" approach that evolved out of ad hoc arrangements between WFP, DMMU and implementing NGOs. Importantly, the decision to continue with the distribution program after the start of the new harvest almost certainly had a negative impact on farmgate prices and provided very little nutritional benefit since other, locally produced, foods were readily available. The implementation of a relief program must never be left to chance and a much clearer chain of command, including a set of guiding principles, should be defined before any future program is initiated.

In the long-run, Zambia must also look for ways to increase the responsibility of local communities for their own food security. Rather than rely on outside donations, for example, consideration should be given to the establishment of small, locally-managed, grain banks. Food could then be sold from these banks as needed, perhaps in conjunction with a cash for work program designed to strengthen the purchasing power of vulnerable individuals. Emergency food aid may be needed from time to time under extreme circumstances, but this is a very risky form of assistance and should never be the first recourse in a country like Zambia.

RESPONSES: MARKETS

Although Zambia now has a partly-liberalized staple food market as a result of the GRZ's market liberalization policy in effect since 1991, the FRA remains an active participant in the maize and fertilizer markets. However, in spite of considerable difficulties in negotiating the newly emergent market system, the trade sector has shown itself to be capable of responding to virtually any market situation in food trade, particularly in maize markets. In addition, there is ample evidence to show that national fertilizer demand can be almost completely serviced through the private sector.

The 1997-99 period only served to confirm the FRA's reputation, acting under GRZ directive, for less than transparent decision making and disruptive behavior in the national fertilizer and maize markets. Instead of relying on the private sector to import maize, and facilitating imports by the private sector, in 1997-98 the FRA attempted to purchase 410,000t on its own account

(although only succeeding importing 202,000t). During the same period, due to late ordering and/or deliveries from international suppliers, much of the GRZ-sponsored fertilizer arrived late and so proved to be an inefficient means of expanding small-scale output. Instead of improving maize production, it sent unclear signals to the producers about what the input supply situation was and undermined the private sector's established markets through poor targeting procedures. As with the maize market, traders felt they were faced with a combination of poor financial factors and indeterminate market interference by the GRZ.

The GRZ interventions in the market have been based more on short-term social and political demands, than market development considerations. The private sector is discouraged from greater growth by what it sees as unclear signals from the government marketing agency. If the GRZ needs to subsidize fertilizer supplies to, or maize purchases from, certain areas due to poor infrastructure and market access, this can be done openly through tenders from existing private companies. It is therefore recommended that the FRA terminates its interventions in the maize and fertilizer markets either by deleting these activities from its portfolio, or by being closed down as an institution.

Much of the problem lies with the fact that GRZ is trying to rely too heavily on FRA's role as a strategic grain reserve, and less on its more important role as a market monitoring and development agency. With increased market liberalization, physical grain reserves need not be maintained for market stabilization purposes; a range of more cost-effective strategies are available for food security purposes. It is recommended that the FRA holds only cash reserves and forward stock options. If the political pressures to hold physical stocks prove impossible to resist, then the FRA should contract for no more than 40,000t to be held by private companies as its agents.

The FRA is in an excellent market development and facilitation position, and could provide much-needed technical assistance to political planners on appropriate market practices. The FRA should take advantage of its position between the public and private sectors to play a co-ordinating role on exchange of information, providing a forum for industry interaction, in order to jointly and openly manage agricultural markets. To make its policies and actions more public and transparent, and to help stabilize market fears of its activities, the FRA should expand its Board of Directors to include more of the private sector (millers and traders separately), and also to include donors.

The GRZ has severely underestimated the need for adequate market information in making its policy decisions regarding food security and market development. It has allowed its earlier developments in market information systems to deteriorate due to lack of prioritized budgeting. The Ministry of Agriculture's Agricultural Market Information Centre (AMIC) has been the main market information service carried out by the GRZ. Recently, however, donor funding for the activity ended and the AMIC has not been able to maintain its prior level of data collection, analysis and dissemination. In addition to several alternative market information services that are also available (ZNFU, ACE, CSO), the FRA is instructed by its legislation to collect market information on grain trading processing, stocks and prices, and to disseminate such information for the purposes of meeting the information requirements of the market participants. The main recommendations in the area of market information are:

- AMIC and NEWU should be operated together, sharing their budget and issuing a single series of publications.

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- FRA's authority should include joint operation of the information system process, thus increasing its ability to monitor market activities and plan market development programs. Funding for the MAFF activities (as decided upon at a newly-established Technical Co-ordinating Committee, which the FRA could chair) should come from the FRA.

Open-market staple food prices are usually rather late indicators of crop production levels, since they reflect current supply and demand. Thus they are more of a food security tool, rather than a crop-forecasting tool in the Zambian context. Additionally, open-market prices only reflect effective or commercial demand and tell us little about families who lack resources to purchase food. One approach to food security monitoring would be to observe prices of items other than the main food staple, e.g., in Western Province a likely response of farmers to an emerging food shortage is to sell livestock to raise cash to purchase staples. Thus, declining livestock prices could indicate a developing community problem. The same can hold true with sorghum, cassava and millet in specific areas.

The development of a reliable and efficient marketing system to serve the needs of rural Zambia requires concerted efforts by both the private and public sectors in infrastructure investment attuned to smallholder production, mechanisms for improving farmers' access to credit and inputs on a sustainable basis, instituting local responsibility for local market development efforts, processes for price determination, and strategies for optimizing the utilization of local processing capacity. Two priority issues need to be pursued: 1) local level analysis and use of data collected (i.e., decentralization), and 2) access to greater data flows and analyses regarding sub-regional market structures and changes.

The Government supported policy of decentralization of administrative authority seems to provide the best answer to improved development of the market sector. National policies and private sector initiatives are in place and working toward better national integration, but can only proceed as fast as local development requirements (in logistics, infrastructure, administration, etc) allow them. Local communities must start taking a strong hand in the decisions and initiatives for their own future development. The GRZ can assist by having strong planning and market support programs at this level. Market development and marketing services should be a priority budgetary item under the GRZ's liberalization effort.

Food aid has been found to be a major destabilizing factor in the development of markets and market structures. Most current food aid goes toward relieving chronic poverty, not physical lack of food due to drought or famine. The economic repercussions of this "misuse" of food aid hampers the evolution of effective local markets. Recommendations in the food aid area are:

- Recognize that national poverty issues are masquerading as food security issues, and convert food aid into more appropriate schemes such as Cash for Work.
- In the event of food aid being provided, then better self-targeting commodities, such as millet or sorghum, would put less stress on both national and local market functions.

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LIST OF ABBREVIATIONS

| | | |
|--------|---|---|
| ACE | - | Agricultural Commodity Exchange |
| ACMS | - | Agromet and Crop Monitoring System |
| AMC | - | Area Management Committee |
| AMIC | - | Agricultural Market Information Centre |
| AMIS | - | Agricultural Market Information Service |
| ARMB | - | Agricultural Rural Marketing Board |
| ASIP | - | Agricultural Sector Investment Programme (Zambia) |
| BCRS | - | Netherlands Remote Sensing Board |
| BoZ | - | Bank of Zambia |
| CCD | - | Cold Cloud Duration |
| CCU | - | Copperbelt Co-operative Union |
| CFSAM | - | Crop and Food Supply Assessment Mission |
| CFW | - | Cash for Work |
| CLUSA | - | Co-operative League of USA |
| COMESA | - | Common Market for Eastern and Southern Africa |
| CPCU | - | Central Province Co-operative Union |
| CPI | - | Consumer Price Index |
| CSO | - | Central Statistics Office |
| DACO | - | District Agricultural Co-ordinating Officer |
| DCU | - | District Co-operative Union |
| DMC | - | Drought Monitoring Centre |
| DMMU | - | Disaster Mitigation and Management Unit |
| DRC | - | Democratic Republic of Congo |
| EBZ | - | Export Board of Zambia |
| ENSO | - | El Niño Southern Oscillation |
| EROS | - | Earth Resources Observation Systems |
| EU | - | European Union |
| EWCC | - | Early Warning Coordinating Committee |
| EWTC | - | Early Warning Technical Committee |
| FAO | - | Food and Agriculture Organization of the United Nations |
| FBS | - | Food Balance Sheet |
| FEWS | - | Famine Early Warning System |
| FFF | - | Food for Free |
| FFW | - | Food for Work |
| FHANIS | - | Food Security, Health and Nutrition System |
| FNA | - | Food Needs Assessment |
| FRA | - | Food Reserve Agency |
| FSTAU | - | Food Security Technical and Administrative Unit (of SADC) |
| GCM | - | Global Climate Model |
| GIEWS | - | Global Information Early Warning System |

| | | |
|----------|---|--|
| GMB | - | Grain Marketing Board of Zimbabwe |
| GRZ | - | Government of the Republic of Zambia |
| ha | - | hectares |
| IDNDR | - | International Decade for Natural Disaster Reduction |
| IFAD | - | International Fund for Agricultural Development |
| IGAD | - | Inter-Governmental Authority on Development |
| kCal | - | kilocalories |
| kg | - | kilograms |
| KIMIA | - | Kaoma Inputs and Marketing Investment Association |
| KPE | - | Kapiri Commodity Exchange |
| LPCU | - | Lusaka Province Co-operative Union |
| MAFF | - | Ministry of Agriculture, Food and Fisheries |
| MEDO | - | Market and Entrepreneurship Development Officers |
| MIS | - | Market Information System |
| mt | - | metric tons |
| NAIS | - | National Agricultural Information System |
| NAMBoard | - | National Agricultural Marketing Board |
| NASA | - | National Atmospheric and Space Administration |
| NCF | - | Nitrogen Chemicals of Zambia |
| NDVI | - | Normalized Difference Vegetation Index |
| NEWU | - | National Early Warning Unit |
| NGO | - | Non-Governmental Organization |
| NORAD | - | Norwegian Agency for Development |
| OVP | - | Office of the Vice President |
| PACO | - | Provincial Agricultural Coordinating Officer |
| PAM | - | Programme Against Malnutrition |
| PCS | - | Primary Co-operative Society |
| PCU | - | Provincial Co-operative Union |
| PHS | - | Post Harvest Survey |
| PPM | - | Program to Prevent Malnutrition |
| PS | - | Permanent Secretary |
| REWU | - | Regional Early Warning Unit (SADC) |
| RRSP | - | Regional Remote Sensing Program |
| SACU | - | Southern Africa Customs Union |
| SADC | - | Southern Africa Development Community |
| SAFEX | - | South African Futures Exchange |
| SARCOF | - | Southern Africa Regional Climate Outlook Forum |
| SEA | - | Standard Enumeration Area |
| SEMDCO | - | Senior Economics and Marketing Development Co-ordinators |
| SGR | - | Strategic Grain Reserve |
| SIDA | - | Swedish International Development Agency |
| SNV | - | Netherlands Development Organization |

| | | |
|--------|---|---|
| SPCMU | - | Southern Province Co-operative and Marketing Union |
| SPP | - | Seasonal Price Pattern |
| SST | - | Sea Surface Temperature |
| TAMSAT | - | Terrestrial Assessment and Monitoring by Satellite |
| TAZ | - | Tobacco Association of Zambia |
| UN | - | United Nations |
| UNDP | - | United Nations Development Programme |
| UNZA | - | University of Zambia |
| USAID | - | United States Agency for International Development |
| VAM | - | Vulnerability Assessment Mapping |
| VMC | - | Village Management Committee |
| WFP | - | World Food Programme |
| ZACCI | - | Zambia Association of Chambers of Commerce and Industry |
| ZCF | - | Zambian Co-operative Federation Limited |
| ZFBS | - | Zambia Food Balance Sheet |
| ZMD | - | Zambia Meteorological Department |
| ZNBC | - | Zambia National Bank of Commerce |
| ZNFU | - | Zambia National Farmers' Union |

PART I. CROP FORECASTING AND EARLY WARNING SYSTEMS

1. INTRODUCTION

1.1 BACKGROUND

Agriculture has a central place in the process of economic development in Zambia; agriculture directly employs a substantial proportion of the population, contributes approximately 15% of Zambia's Gross Domestic Product, and is a primary vehicle for achieving development objectives through increasing employment opportunities and alleviating mass poverty. Only about 17% of Zambia's arable land is cultivated, and soil and climatic conditions are generally favorable. The potential, therefore, for increasing the contributions of the agricultural sector to economic growth is very high.

Agricultural development is however a complex issue, involving not only technical but also economic, social and political aspects. In particular, the success of agricultural development in Zambia depends on effective policy-making and efficient administration of policies by the government, at national and local levels.

The significant variability in crop production experienced by Zambia in recent years may have increased the risk of food insecurity by many rural and urban households, may have precipitated changes in Zambia's developing market infrastructure, and has increased the uncertainty faced by Zambia's 700,000 farm families, Government, agribusiness, investors, donor agencies and others. Given the importance of crop production to the overall economy, widespread crop failure could have a catastrophic effect on National Income and welfare.

There are numerous reasons proposed for variability in levels of crop production, and for the continued inability of Zambia to produce a consistent food surplus despite its abundant natural resources and hard-working population. Suggested causes of this malaise have included: poor harvests due to inadequate, excessive, or poorly distributed rainfall; the possibly increasing frequency of drought years; the removal of Government subsidies on fertilizer and maize marketing; economic liberalization, which began in late 1991, is leading farmers to switch from maize farming to cash crop production, possibly hurting national and household food security, notwithstanding the potential for increased cash crop production to improve food access through increased disposable incomes; and many farmers may be abandoning maize production and switching to more environmentally appropriate small cereals (millets, sorghums) and tubers (cassava, sweet potatoes).

Given the importance of crop production in the Zambian economy, and the significant variability in production levels from season to season, and from place to place within a season, it is important that Zambia retains an effective capacity for making timely and accurate estimates of crop production. Effective estimates of crop production will assist government, the private sector, the non-governmental organizations (NGO) community, donors, and all market participants in making timely responses to variations in crop production. Such timely responses may include government action to reduce food insecurity, food aid or cash-for-work provisions by government or private organizations, market interventions by government in increasing or subsidizing supplies of food or inputs such as fertilizer, and changes in market activities by traders and millers. Important longer-term uses of crop production estimates include agricultural planning and policy-making, and in project planning and implementation

However, the Government of Zambia (GRZ) has felt that its ability to collect, analyze and report on agricultural production information in a useful and effective way may be inadequate. Methodologies for estimating crop production may be inappropriate for a newly liberalized, free market, agricultural sector. Ministry of Agriculture, Food and Fisheries (MAFF) and Central Statistics Office (CSO) staff may be poorly compensated, poorly trained and under-equipped. Government budgeted resources may be insufficient and not be released in a timely manner to allow accurate and timely estimates to be made, or there simply may not be enough resources in Zambia's national budget to support the activities needed to develop accurate estimates.

In addition, the GRZ is concerned that its system of estimating levels of food security may need to be strengthened, in order to effectively mitigate anticipated food insecurity. Estimating food security is a complex process, made more difficult by the above difficulties in estimating crop production, and possibly by other factors outlined below.

Zambia's poor road and communications infrastructure, sparse rural populations, and varying agro-climatic conditions make accurate estimations difficult and potentially very expensive. In addition, increasing smallholder crop diversification seems to indicate that some families are producing high value crops and buying maize, others are expanding maize production, while others are producing tubers for their food and cash needs. This adds to the complexity of estimation, as does the possibility that influential public and private sector decision-makers may reinterpret the technical messages to support their own agendas.

Crop estimates and food needs assessments are undertaken on an administrative district basis instead of on an agro-ecological zone basis. These districts can contain different cropping systems and also the dietary habits of the people can vary from one area to another. These assessments may fail to place a food security value on such important sources of food and income as livestock, fishing, wild game and fruits, and off-farm labor.

It is believed that the dietary habits of many Zambians have changed since the last household surveys were taken in 1970 and their level of dependence on maize as their major food staple might be less than the average of 70% reported in these surveys. In particular, the dietary habits of the large number of people who have migrated to urban areas since 1970 may have significantly changed. Also, it is thought that the economic liberalization process launched in late 1991 is having an impact on dietary habits of the Zambian population at large.

With growing regional market integration, Zambia's agricultural and food sectors can be unpredictably influenced by food demand in the Democratic Republic of the Congo, Grain Marketing Board decisions in Zimbabwe, Rand depreciation in the Republic of South Africa, and maize harvests in Mozambique, all in the same year. Also, current estimates may not take sufficient account of the substantial growth in private outgrower schemes (cotton, tobacco, oilseeds, paprika, etc.) and the growth of agribusinesses which facilitate commodity flows to and from rural areas and across borders.

Further to the above difficulties with estimating crop production and food security, there has been much controversy over the responses to these estimates by donors, private organisations and government agencies. For example, during the 1998-99 marketing season, in response to some estimates of large food deficits from the 1997-98 production year, the Food Reserve Agency attempted to import 410,000 tons of maize (approximately one-third of estimated national annual requirements) and 80,000 tons of fertilizer (almost 100% of Zambia's estimated effective demand for fertilizer for maize). It is still unclear what the macroeconomic, food security, and agricultural

productivity effects of these Government interventions will be, but many observers postulate that government importation of fertilizer was inappropriate, and that maize and fertiliser interventions in the market may have resulted in substantial losses to the national treasury. They may also distort future agribusiness and farmer cash and food crop production, trading and processing investment decisions.

Faced with such an array of difficulties, a range of possible improvements have been suggested; some examples are as follows. It may be appropriate to simply modify current MAFF and CSO forecasting systems and methodologies so that they are more accurate and timely. Alternately, it may be better to replace or enhance public systems with commercial or NGO systems that report on a few key factors (e.g., rainfall, market prices, input sales, cross-border trade) in an accurate and timely manner. Perhaps greater use of satellite-based crop forecasting systems would be the most cost effective approach. Or, as recommended by some in the national farmers union, crop forecasting should focus only on areas that produce significant maize surpluses, and any such focus should be complemented by a more exact understanding of per capita and national maize requirements.

Given that Zambian agriculture is changing rapidly in response to the national economic liberalization effort initiated in 1991, the importance of food security issues in Zambia, and the Government's legitimate role in protecting the interests of vulnerable and food insecure rural and urban families, the Zambian Ministry of Agriculture, Food and Fisheries (MAFF) has asked for assistance in strengthening the crop forecasting system. In particular, there is need to reach a consensus among the major players such as the Government of Zambia, bilateral and multilateral aid donors, non-governmental organizations, and private sector organizations, on the reliability of recent seasonal and annual agricultural production and food security estimates, and on the effectiveness of the responses of the various stakeholders to such estimates. The MAFF made a request for assistance in February 1999, to the United States Agency for International Development (USAID), to assist it in developing a basis for consensus among the major stakeholders involved in the crop forecasting system. As a result of this request, USAID provided four consultants during the period 26th April to 12th July, 1999, to assist the MAFF with a crop forecasting study.

1.2 APPROACH

The MAFF and USAID established an integrated MAFF/USAID Crop Forecasting Study Team, within one week of the consultants' arrival. The team consisted of: Mr. Danny Kafuli, Head, National Early Warning Unit (NEWU), MAFF, and Mr. Tom Cusack, USAID agriculturalist, who jointly led the team; Mr. Masiye Nawiko, Senior Economist (NEWU); Mr. Abel Phiri, Head of the Agricultural Division of the CSO; Mr. Jeff Wright, USAID crop forecasting specialist; Mr. John Keyser, USAID agricultural economist; and Mr. George Olesh, USAID market information systems specialist. The team completed a draft workplan during its first week, and participated in a crop forecasting stakeholder briefing meeting at USAID on 6th May. As a result of comments received at the briefing meeting, and on the draft workplan, a final workplan (Annex 1) was developed and submitted to the MAFF and USAID on 14th May. Following a review of relevant documents, meetings with individual stakeholders, meetings with groups of stakeholders around specific study themes, and field visits to the Western and Southern Provinces, a draft report was developed and circulated to the MAFF and USAID on 16th June. The team prepared a summary of preliminary findings which formed the basis for discussion at a stakeholders' meeting hosted by the Acting Permanent Secretary (PS) of the MAFF at Mulungushi House on 24th June; comments from the meeting were incorporated into the preparation of this report. Two independent Zambian consultants were also engaged to assist the team with the Western Province case study (Ms. Nangana Simwinji) and the 1997-99 Food Aid exercise (Dr. Dennis Wanchinga). A full schedule of the

team's activities is presented in Annex 2, and a list of persons and organizations consulted is presented in Annex 3.

This approach was adopted to ensure that the principal concerns of stakeholders were addressed in the study, and that consensus would be built around many of the main recommendations. It was intended that a secure and practical basis would thereby be established for implementing programs to strengthen the crop forecasting system.

The study focused on all the major elements of Zambia's crop forecasting system, which is defined as comprising crop and food security forecasting, and including any responses to these forecasts.

The objectives of the study as presented in the workplan were:

- To identify and explain current constraints to accurate crop forecasting.
- To describe how crop forecasting impacts on public and private sector decisions.
- To make recommendations for improving accuracy of forecasts, and improving impact.

The analysis focused most particularly on the period 1997-99, comprising the 1997-98 agricultural production year and the 1998-99 marketing (consumption) year.

1.3 OVERVIEW OF THIS REPORT

Part I provides the background to the crop forecasting system, including the basic specifications, definitions and roles of crop forecasting and early warning systems (Chapter 2), and an outline of the flow of information within the Zambian crop forecasting and early warning systems (Chapter 3).

Part II assesses the current estimates of crop production, by reviewing the data collection process, the analysis of data, the messages and communications generated, the uses of the information, and potential impact. The assessment is then used to present conclusions and recommendations. Chapter 4 discusses estimates of food crop production, while Chapter 5 discusses estimates of cash crop production.

Part III assesses the current national system for forecasting of food security, focusing on Zambian balance sheets (Chapter 6), the use of consumption estimates in the food balance (Chapter 7), Vulnerability Assessment Mapping (Chapter 8), and needs assessments (Chapter 9). Part III concludes with a summary of conclusions concerning centrally-administered food security estimations (Chapter 10).

Parts II and III constitute a Stand-Alone section which assesses current crop forecasting and makes recommendations for improvements.

Part IV assesses the food aid responses to food security forecasts, focussing on the 1997-99 food aid exercise. Chapter 11 reviews the technical crop production forecasts, Chapter 12 discusses the crop forecasting messages, Chapter 13 discusses how these messages were interpreted, Chapter 14 describes the implementation of the food aid exercise, Chapter 15 assesses the impact of the food aid exercise, and Chapter 16 suggests some recommendations based on the 1997-99 experience. Part IV represents a Stand-Alone section which concentrates on the 1997-99 food aid exercise.

Part V assesses market responses to crop forecasting messages, again concentrating on the 1997-99 experience. Chapter 17 reviews national and regional issues in agricultural marketing, Chapter 18 reviews agricultural market information systems, Chapter 19 explores the relationship between market price information and food security, Chapter 20 discusses the role of the GRZ in agricultural markets through the Food Reserve Agency, and Chapter 21 reviews private sector marketing. Conclusions and recommendations for markets are presented in Chapter 22. Part V represents a Stand-Alone section which concentrates on the 1997-98 crop forecasting exercise, and its impact on government and private sector decisions.

Part VI presents a summary of the study's findings and recommendations, beginning with a summary of recommended changes in the crop forecasting system as a whole (Chapter 23), followed by short Chapters on each of the main elements of the study (Chapters 24-27), and a final summary of the potential costs and benefits of changes in the crop forecasting system (Chapter 28).

This report ends with a bibliography of those documents reviewed and/or referenced in the text, and with annexes containing supplementary information to the main text, including the text of the Western Province Case Study (Annex 4) which informed much of the discussion presented in the main text.

2. ZAMBIAN CROP FORECASTING AND EARLY WARNING SYSTEMS

2.1 DEFINITIONS

The term "crop forecasting" has been used in various ways by agricultural practitioners in Zambia. For some, the term refers to making specific pre-harvest forecasts of crop production, while for others it is a much broader term referring to a whole system of estimates of crop production, and the subsequent decisions which are taken in response to such estimates. For the purposes of this study, crop forecasting is defined as a system which comprises all elements of crop and food security forecasting, including any responses to these forecasts. The present study identifies three main elements of the crop forecasting system: estimating crop production, estimating food security, and responses to these estimates. However, it is also important to consider the linkages between estimates and responses, which are crucial to the effectiveness of the system.

The term "early warning" is most often used in the agricultural and public sector contexts as the process of making predictions about people's access to food, in the context of avoiding a "disaster". This context is strongly institutionalized in the public sector in Zambia, where the technical results of the MAFF National Early Warning Unit (NEWU) are reviewed by the Disaster Mitigation and Management Unit (DMMU) of the Office of the Vice-President, in order to mitigate any possible food security disasters. Thus, in the context of this study, "early warning" is the process of estimating food security, and the decisions and actions taken in response to these estimates. Therefore, early warning systems and processes are subsumed under our definition of "crop forecasting".

A disaster occurs when a disaster agent exposes the vulnerability of people in such a way that "their lives are directly threatened or sufficient harm has been done to economic and social structures, inevitably undermining their ability to survive" (Kent, 1987: page 4). Famine is considered as one type of disaster, and can be defined as "a socio-economic process which causes the accelerated destitution of the most vulnerable, marginal and least powerful groups in

a community, to a point where they can no longer, as a group, maintain a sustainable livelihood. Ultimately, the process leads to the inability of the individual to acquire sufficient food to sustain life” (Walker, 1989: page 6).

It is generally agreed that Zambia has not experienced “famine” conditions in modern times. However, it has been considered necessary in Zambia to continue to guard against the possibility of famine (through the “crop forecasting” system) by estimating crop production, estimating food security, and making responses to such estimates. These estimates and responses have occurred both nationally and for targeted “at risk” areas. The emphasis has been on the monitoring of food security levels, and making targeted responses, in order to prevent the development of famines, (or at least to prevent households from selling productive assets as the sole means of gaining access to food).

Thus, the crop forecasting system in Zambia is in essence a food security system. Food security can be simply defined as the degree of access to food by individuals or groups. Food insecure populations have inadequate access to food and/or are expected to have inadequate access to food in the future.

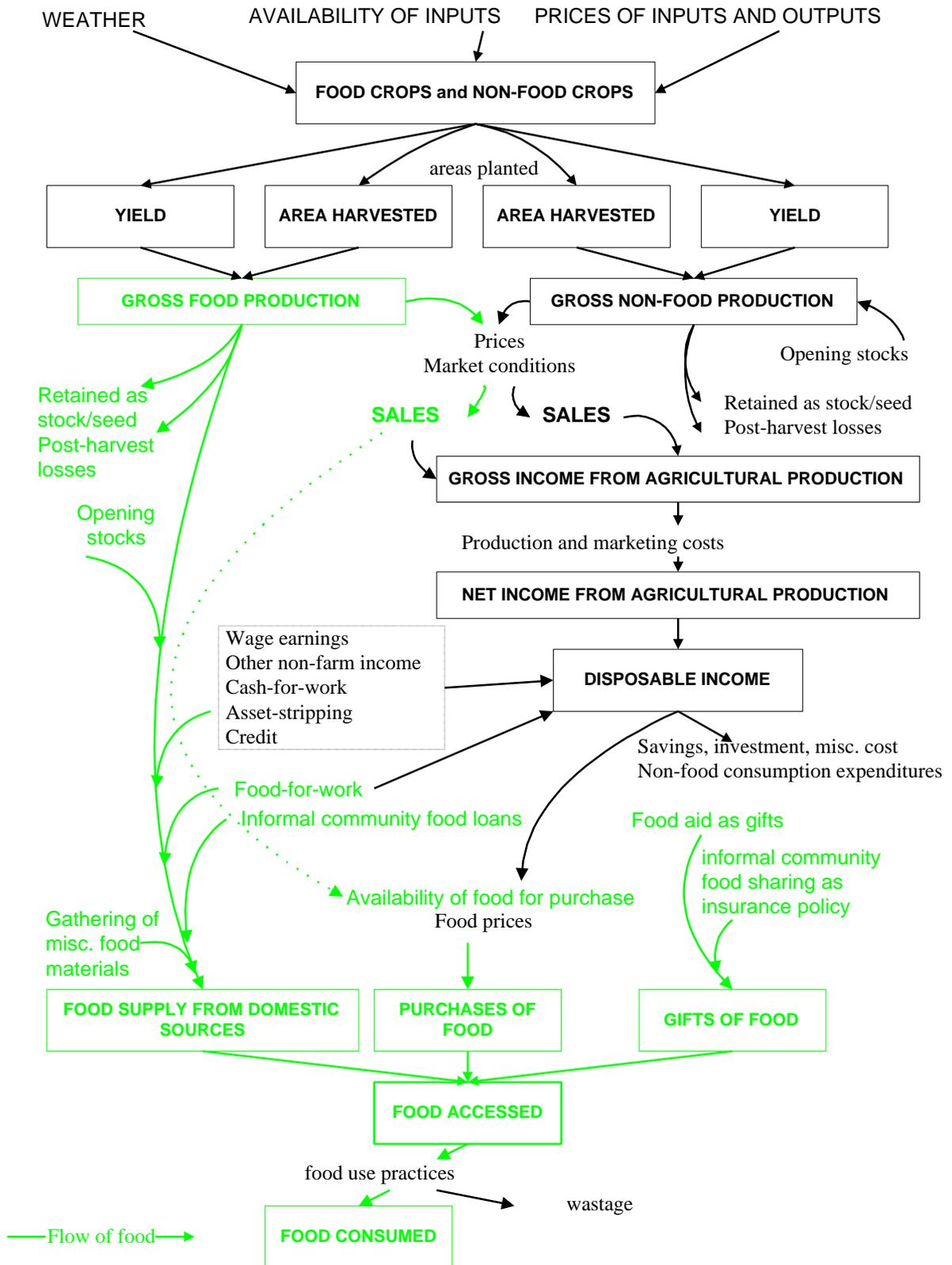
2.2 AN OUTLINE OF THE FOOD SECURITY SYSTEM

The overriding objective of the food security system is to ensure that Zambians achieve adequate and improving nutritional status. The levels and range of food consumption, together with general health characteristics such as the incidence of disease, determine the nutritional status of the population. Zambia can be said to be food secure if the quantity and quality of food consumed at national, district and household levels ensures that an adequate level of nutrition is being maintained by the population.

Food consumption at national, and at disaggregated levels such as the District and household, is directly related to the food accessed, through existing food use practices. Food accessed at national and disaggregated levels originates from the net domestic supply of food (“food supply from domestic sources”), food purchases through cash or barter, and any gifts of food from neighbors or through food aid.

An outline model of the Zambian food security system is presented schematically in Figure 1, and is described in the remainder of this section. The outline is designed to give an overall conceptual framework for reviewing Zambian food security information systems and for examining the responses of stakeholders to the information generated. The model concentrates on those elements of primary concern to stakeholders involved in generating information on the system and in responding to this information. The model is general in the sense that it applies to all types of farm production (crops, livestock, etc.), all incomes sources, for any given period of time, for any level of aggregation, and for both ex post and ex ante situations. The specific information needs and uses of information by stakeholders in the system are defined and discussed in more detail later in this report.

FIGURE 1. A graphic outline of the food security system



Food Supply from Domestic Sources

This component of total food access is particularly important for individual households, communities, and in the national context, where a high proportion of food consumption is sourced from domestic production.

The net domestic food supply for any given period of time depends upon storage levels from the previous period, and gross food production, adjusted for sales (“exports”), retentions for seed, retentions as assets to support future production (for example, unharvested crops and livestock production retained on the hoof), and post-harvest losses.

Gross food production is the sum of areas harvested and yields, or - in the case of livestock – the sum of livestock products harvested. For food and cash crops, yields per unit area depend on weather conditions, the incidence of pests and diseases, and use of farm inputs. In turn, the use of farm inputs depends upon their availability and farmers' perceptions of the productivity/profitability of their use (particularly related to the costs of inputs, marketability of outputs, and the current growing/husbandry conditions). Areas harvested are heavily dependant on areas planted, with changes from initial areas planted/abandonment related to factors affecting farmers' changed expectations of yields. Areas initially planted to various crops are determined by farmers' skills and experience of plantings in recent years, farmers' food production strategies, expectations of growing conditions (pest incidence, weather, input availability), access to resources such as labor and animal traction (Institute for African Studies, 1995), and expectations of market conditions (anticipated and actual input and output prices, transportation). The quantities of livestock products harvested are also dependent on the above factors, as applied to the production and marketing conditions for livestock and their products.

Additional domestic food supplies may become available in times of severe food deficit, through coping strategies such as unsustainable harvesting (selling productive assets, or asset-stripping) of livestock or crop enterprises, and eating of less desirable foods such as gathered wild food materials.

Food Purchases

This component of total food access is particularly important for non-farm households and communities which do not enjoy domestically-produced food supplies, for example much of the urbanized labor force, which represents approximately 45% of the Zambian population.

Food purchases depend upon food actually being available for purchase, food prices, and the disposition of income. The proportions and amounts of income which are devoted to buying food depends upon income level, food prices, food habits and strategies, competing uses of income such as for non-food consumption, and borrowing/savings/investment expenditures.

Income levels for farmers depend largely on net income from sales of food and cash crops, and of livestock products, although off-farm income from labouring or other pursuits is often substantial. Net income from cash and food crop production, and livestock production, depends on costs incurred and prices received by farmers, market access, and the sales volume. Sales volume depends upon gross production adjusted for post-harvest losses, seed retention, and the difference between opening and closing stocks for the period. Gross production levels are determined by weather and other factors already presented under gross food production.

Additional income may be generated in times of severe food deficit, through unsustainable selling of livestock or crop assets, or through other asset-stripping activities. Also, food-for-work and cash-for-work welfare programs can provide additional income. Informal and formal credit can also increase disposable incomes.

Gifts of Food

Officially-sponsored gifts of food, in the form of “Food Aid” can add significantly to the total quantity of food accessed. Also, informal networks in the local community can provide food “gifts” in time of need, through meal-sharing and donations (often within the extended family), although it is not often clear to what extent this is an informal community insurance function, rather than an informal loan arrangement.

System Participants and their Information Needs

The GRZ has overall responsibility for ensuring that the food security system performs effectively, and uses a number of policies and interventions to improve efficiency, both in the short and longer terms. In addition, all system participants have an interest in ensuring that the system works efficiently, and try to adjust their behaviors according to their changing perceptions of system operations. All participants, including the GRZ, need information on the operation of the system in order to take informed decisions in their own interests. In addition, the GRZ and other agencies potentially wishing to intervene in the workings of the system need information on the system as a whole; these agencies need monitoring information for the system as a whole.

Potential information needs are endless, and decisions to obtain more detailed or widely-ranging data, or to invest in expensive data-gathering and data-analysis exercises, must be made relative to resources available and to the additional benefits of obtaining more information. Data is needed for different time periods, for the many agricultural enterprises, at different levels of aggregation from the national level to the household, and for both ex ante (forecasts) or ex post (estimates of past events) circumstances. The principal data needs, suggested by the various elements of the system as illustrated in Figure 1, are listed in Table 1.

Information on an ex ante basis, in the form of forecasts of key variables in the system such as weather and prices, are needed to assist participants in making timely changes or interventions in the system. Ex post information, such as post-harvest estimates and measurements of nutritional status, is needed to study the longer-term operation of the system, in order to make appropriate longer-term crop production and food security policies.

Ex ante Estimates of crop production

Crop production forecasting activities center on the ex ante measurement of gross food and cash crop production at the national and disaggregated levels. Forecasts of crop production, in addition to ex post estimates, are used by millers and traders to plan shipments and processing, both domestic and external, in time to meet demand, and by GRZ, donors and other private sector participants, to help determine timely (if any) market interventions.

Gross food production is a major element in the Zambian population’s access to food, as gross food production is partly used as retentions for food (food supply from domestic sources) and is partly sold; such sales provide the basis for domestic purchases of food elsewhere in the economy, using available disposable incomes. The major causes of variations in levels of gross

**TABLE 1. Indicative list of data needs for management of the
Zambian food security system by its participants**

| |
|--|
| Farmers' skills and experience |
| Farmers' food access and food production strategies |
| Weather |
| Input availability for major farm enterprises |
| Pest/disease incidence for major farm enterprises |
| Input prices |
| Yields |
| Areas planted/harvested (gross agricultural production) |
| Output prices |
| Transportation and other market conditions |
| Post-harvest losses |
| Seed and asset retentions |
| Opening balances |
| Quantity of food supply from domestic sources |
| Quantity sold |
| Farm gate, wholesale and retail prices of agricultural and other commodities |
| Market conditions |
| Gross farm income |
| Costs of production and marketing |
| Net farm income |
| Wage income |
| Other non-farm income |
| Consumption credit obtained |
| Cash for work |
| Sales due to asset-stripping |
| Sales of food-for-work earnings |
| Sales of food aid received |
| Non-food consumption expenditures |
| Savings/investments/misc. costs |
| Availability of food for purchase |
| Retail food prices in rural and urban markets |
| Food habits and strategies |
| Quantity of food purchases |
| Sales of productive assets (asset-stripping) |
| Food-for-work retained as food |
| Informal community food loans |
| Gathering of misc. food items |
| Quantity of food aid |
| Quantity of food aid retained as food |
| Community food sharing as insurance policy |
| Total gifts of food |
| Total food supply from domestic sources |
| Total food access |
| Population |
| Food consumption required |
| Food use practices |
| Wastage at point of consumption |
| Food consumed |
| Nutritional status of the population |

food production from year to year are weather conditions, the availability of inputs and markets, pests and diseases, and the profitability of food crops relative to other farming enterprises such as cash crops. Emphasis in measurement (for food security and trade purposes) is placed on maize, as this is an important (for most of the population, the most important) staple, is readily traded, and experiences large fluctuations in production, related primarily to variations in weather conditions and input variability.

The ex ante measurement of cash crop production centers on the principal cash crops. The major year-to-year causes of fluctuations in cash crop production are the same as those prevalent for food crops, except that prices and markets are relatively much more important, and there is additional access to inputs through outgrower programs. Cash crops play a major role in food security, as they provide disposable income for farmers to purchase food, and for asset-building in order to increase the potential for income generation and food access in the future.

Ex ante estimates of food security

Ex ante estimates of food security (early warning) involve making predictions of future food access. Food and cash crop forecasts may be used as a basis, although it is usually necessary to make additional predictions for crops not covered by the crop forecasting system, as production levels of such crops, or livestock, may be difficult to measure, or may not be generally traded. Also, food security estimates may be sufficiently timely if made some time after harvest, so ex post estimates of crop production can be used.

Early warning estimates include both estimates of food supply from domestic and other sources and of the ability of the population to make food purchases, or to access food in other ways. These predictions of potential food access are then compared with estimated food needs in order to predict food security levels. Predicted food security levels are used by the GRZ, donors, traders, millers, NGOs, and other private sector participants, in making informed responses to achieve desired outcomes such as increasing food supplies in specific areas, or providing income supplements with which households can purchase food.

Crop production and food security monitoring systems

Ex post estimates of food security are useful for evaluating the performance of the system, including the responses of government and of other agencies such as NGOs and donors, who wish to improve the overall performance of their programs such as food aid, food-for-work, cash-for-work, and direct market interventions. Revised estimates of food access can be made, and the nutritional status of the population measured. Ex post estimates such as post-harvest surveys and nutritional surveillance are not a primary subject of this report.

Responses to crop production and food security estimates

The responses of stakeholders to crop production and food security estimates are diverse. Some responses are immediate and continuing such as adjustments to purchases and sales of maize by traders and millers, corresponding to new information received. Other responses include long-term changes in food aid programs as a result of system evaluations such as this study. Farmer responses can be both short-term (for example, a change in cropping plans for the current season as a result of weather conditions) and long-term (for example, investment in additional livestock). The response of markets in terms of prices and volumes traded to a large extent reflects the collective responses of all stakeholders.

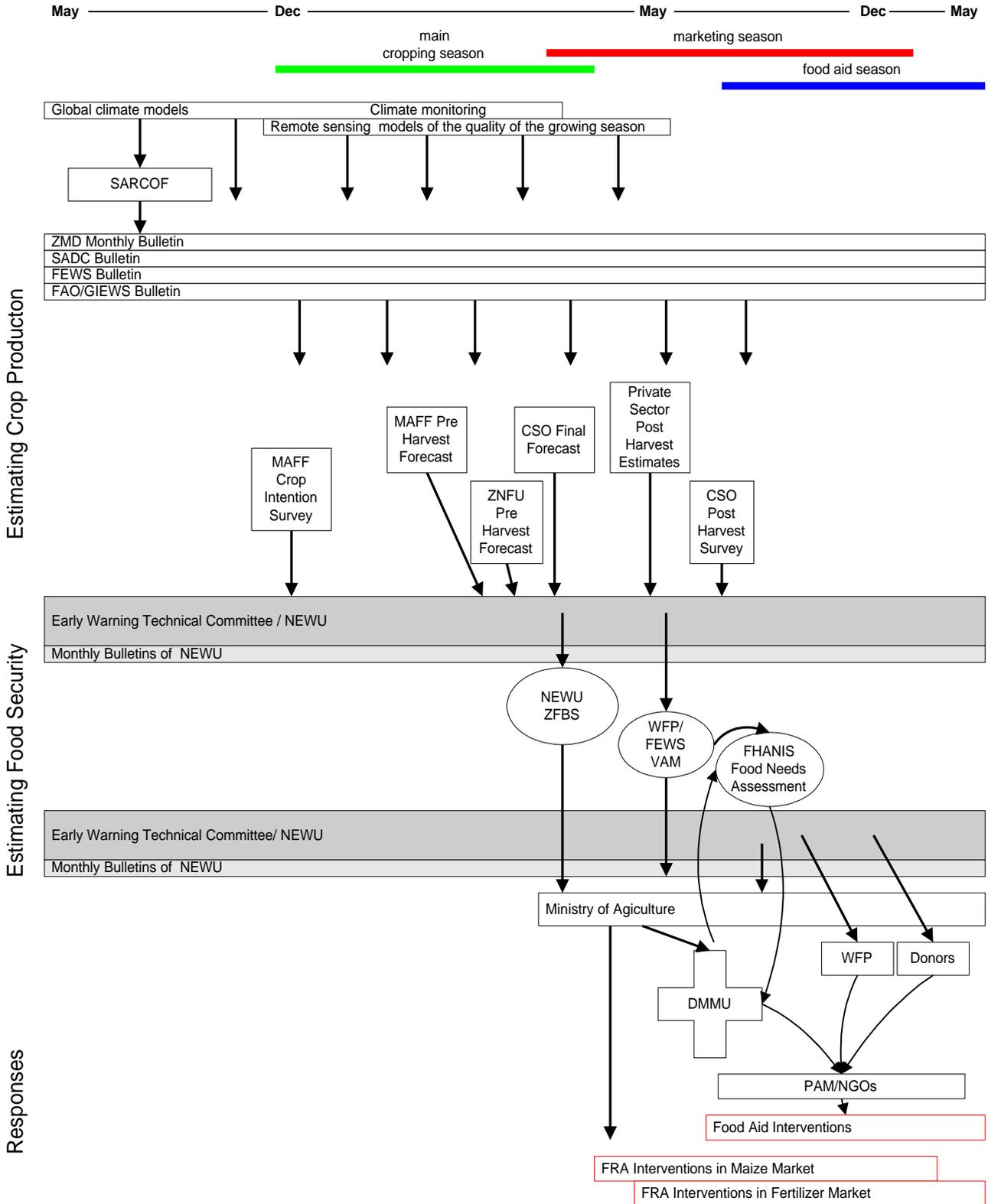
3. THE FLOW OF CROP FORECASTING INFORMATION

The participants of the three principal elements of the crop forecasting system, estimating crop production, estimating food security, and responses, are linked through information flows. The important and re-occurring GRZ food security interventions have been the provision of food aid, maize market transactions, and fertilizer market transactions; the extent and nature of these activities (responses) appear to be linked with (based on) a complex system of crop and food security estimates. The main features of the flows of information which apparently provide the basis for government interventions are outlined graphically in Figure 2. Figure 2 is constructed with time moving from left to right, and, from top to bottom, there is a logical sequence of the main functions of crop production estimates being followed by food security estimates and finally the responses.

The earliest crop production estimates are based on global climate models, (the top left corner of Figure 2) which are accessed by regional and global organizations, and provided on a regular basis to Zambia via the communications of the Southern Africa Regional Climate Outlook Forum (SARCOF) of the Southern African Development Community (SADC), by FAO/GIEWS, and by FEWS, to name a few. As the cropping season progresses, remote sensing models of the quality-of-season become more important. Remote sensing information of direct relevance to crop production is accessed in Zambia primarily through the Zambia Meteorological Department (ZMD) which has close links with the NEWU/MAFF.

Although there is a clear distinction between crop production and food security estimates, the Economics and Marketing Department of the MAFF is officially responsible for both types of estimates, and closely relates the two types of estimates through the workings of its Early Warning Technical Committee (EWTC). The EWTC, and its sister committee, the Early Warning Coordinating Committee (EWCC), are responsible to government for final crop and food security estimates, arrived at through consensus-building activities of their members. The goal of the EWTC is to identify, in advance (early), where there is a high risk for food security problems occurring, and inform (warning) response agencies so that they can take action against a projected lack of food access. The EWTC consists of representatives from the National Early Warning Unit (NEWU) of the MAFF (committee coordinator), the Food Reserve Agency (FRA), the Disaster Mitigation and Management Unit (DMMU), the Programme Against Malnutrition (PAM), the Zambian National Farmers' Union (ZNFU), the Food and Agriculture Organization of the United Nations (FAO), the World Food Programme (WFP), the Food Security, Health and Nutrition Information System (FHANIS), the University of Zambia (UNZA) School of Agriculture, the Famine Early Warning System (FEWS), and the Zambia Meteorological Department (ZMD).

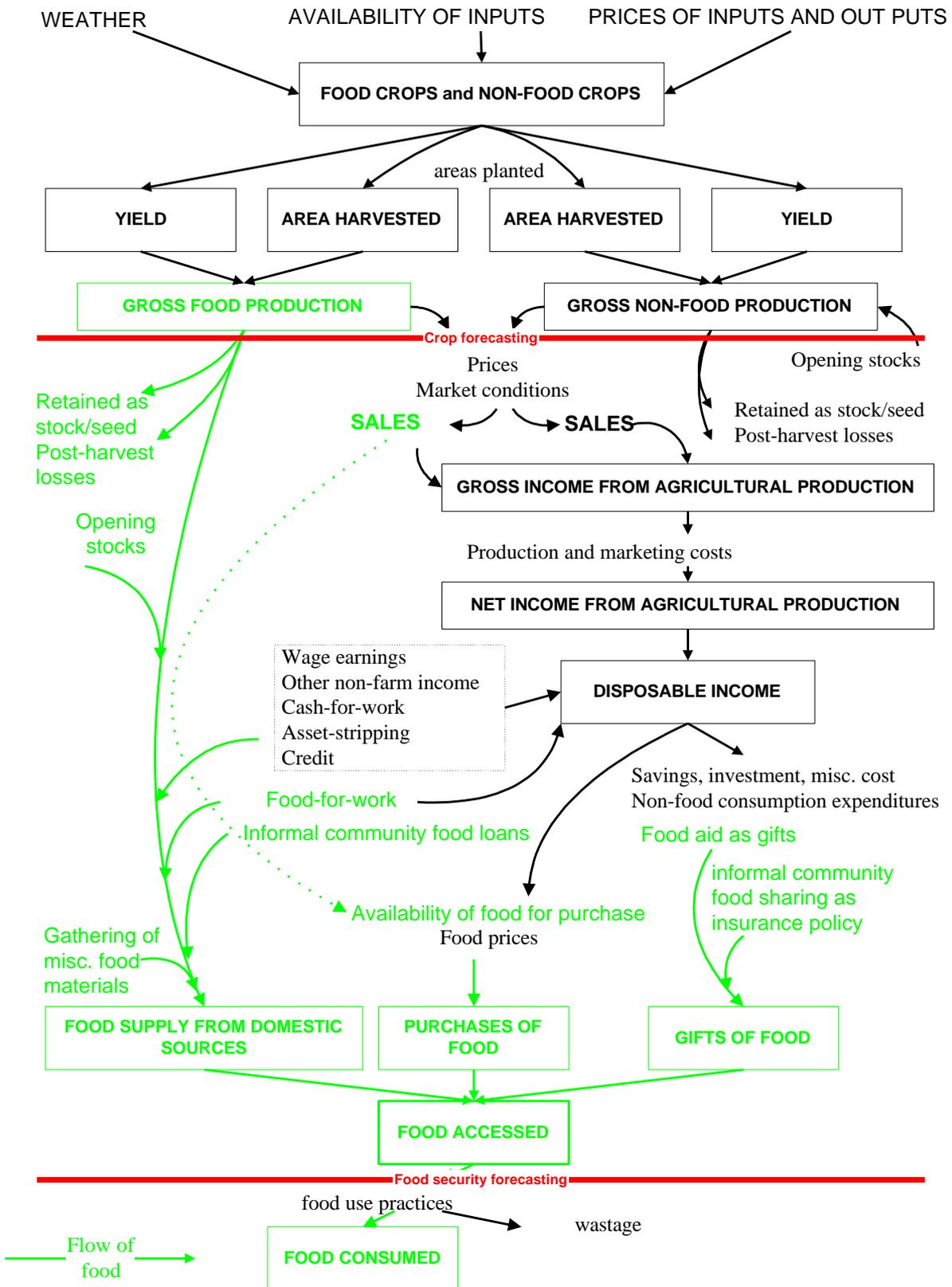
FIGURE 2. Diagram showing major flows of information in the Zambian crop forecasting system



The central roles of the EWTC/NEWU, and of its monthly bulletins, are illustrated in Figure 2 by the two gray horizontal bars. The first (upper) bar represents the current estimates of crop production based on remote sensing data and on-site data from the MAFF, the CSO, the private sector, and the Zambia National Farmers Union (ZNFU) at various stages during the season. Activities in the area above the upper gray bar are discussed in detail in Part II of this report. The main participants and flows of information for food security are portrayed in the area between the two gray bars; the food balance sheet, vulnerability assessment mapping (VAM), and food needs assessment exercises are detailed in Part III. The bottom right-hand corner of Figure 2 illustrates the flow of information which leads directly to interventions by the GRZ and others. The FRA interventions are more closely linked with information being channeled from the NEWU through the Ministry of Agriculture (Part V of this report), whereas food aid interventions arise through information and decisions based on the VAM and food needs assessment, which are then channeled to implementing NGOs through the DMMU, Donors and the WFP (Part IV of this report).

To emphasise the differences and similarities between crop production and food security estimates, Figure 3 divides up the diagram of Figure 1 using horizontal (red) lines to indicate the areas covered by “food security estimates” and “crop production estimates”; reading from the top of the diagram, crop production forecasting is concerned only with "Gross Food Production" and "Gross Non-food Production", above the first horizontal (red) line, while food security estimates are concerned with food access, which mainly includes the elements between the two horizontal (red) lines.

FIGURE 3. A graphic outline of the relationship between crop production estimates and food security estimates in the food security system.



PART II. ESTIMATING CROP PRODUCTION

4. ESTIMATES OF FOOD CROP PRODUCTION

This Chapter reviews the forecasts of crop production in roughly chronological order from earliest to latest. This will help in understanding how the various forecasts are related to each other. In general, the earlier the forecast (furthest from harvest time) the less accurate it is likely to be for a specific area. Forecasting methods can also be classified in other useful ways: for example, ground-based forecasts that use enumeration and survey methods, and model-based forecasts that integrate geographic, rainfall and crop growth data. Forecasting is an early educated guess at the outcome of some important event. For crop forecasting, this event is the actual production of crops. Once actual production is known or determined, the forecast is no longer of any use and the actual production becomes the policy tool.

4.1 METHODOLOGIES AND TECHNICAL TERMS

There are many institutions and individuals dedicating substantial resources to the monitoring and forecasting of crop production; these processes of estimation have different goals, methods, reporting schedules, reporting areas, and clients. A brief outline of the main participants has been presented in Figure 2, and brief profiles of each forecasting mechanism are presented in Table 2, below; these mechanisms are discussed in more detail later in this Chapter. Although most forecasts are made informally by concerned individuals such as farmers and traders, the most important forecasting processes from the standpoint of this study paper are those undertaken through government support in order to inform government decision-making on food security issues via the Early Warning Technical Committee (EWTC); these are the forecasts of the Zambia Meteorological Department, the CSO, and the MAFF Field Services.

Before proceeding to assess each method of estimating crop production, it will be useful, for clarity, to review some technical terms commonly used internationally in describing production estimates.

A **Post Harvest Survey** is conducted at the end of the crop production season. When properly carried out, these surveys usually provide the most accurate information. After harvest, growers best know how much area they actually harvested and how many units they produced from the area. In addition, outgrower schemes know how much was produced. The GRZ can use these data for major agricultural policy planning. This survey validates the forecasts that were produced earlier in the season. It also provides all of the available data on agricultural production needed by policy makers to assess the effects of drought, government interventions in the agricultural sector, crop diversification and other trends, for policy planning for long-term economic growth.

A **Provisional Estimate** is an estimate of the current year's production which includes extrapolated and sample data (FAO, 1996). These are pre-harvest surveys that take place during the growing season and rely on past years' data in combination with farmer evaluations of this year's production prospects. In Zambia, these are scheduled to take place in February and April. A provisional estimate is subject to change, as more data, including the post-harvest survey, become available. These forecasts may estimate crop yields based on the assumption that the season will continue in a normal fashion and pests, diseases and the weather will not change from the normal.

TABLE 2. Brief profiles of Zambian crop production forecasting mechanisms

| Forecaster | Clients | Timing | Uses | Potential Impact |
|---------------------------------------|--|---|--|--|
| Global Climate Models | Scientific Community, National Governments, Regional Organizations | Very early, six months before planting | Disaster preparedness | Reduced impact of unusual weather patterns |
| Producer forecasts | Small holders, and their communities | Very early, 1-6 months before planting | Crop and variety choice | Higher production |
| MAFF Field Service preliminary survey | Field Services, input suppliers, local decision makers, local traders | Early, at planting | Local agricultural policy, logistic support, input availability | Improved input market, better extension delivery |
| MAFF extension service final forecast | Field Services, local decision makers, local traders | Flowering stage, 1 month before harvest | Local agricultural policy, logistic support, Disaster response community | Better extension delivery, local market information |
| CSO preliminary and final forecasts | Early Warning Community, Disaster response community, FRA, GRZ | Flowering stage, 1 month before harvest | Disaster response, marketing, storage | National market information, Food Aid, Export policies |
| ZNFU pre-harvest forecast | Members of ZNFU, FRA | Flowering stage, 1 month before harvest | Marketing and storage of maize | Profit, policy prescription to GRZ |
| Agri-business | Traders, Millers, FRA, Out-growers | Ongoing, but focus on final yield | Marketing of inputs, purchases of grain, international sales | Profit |
| NGOs | NGOs, local producers | Usually at Flowering stage | Development interventions, food aid interventions | Community development, nutritional supplements |
| SADC | National governments and National Met Services, Early warning community | Very early interpretation of GCMs, ongoing monitoring | International marketing, disaster response | SADC Food balance sheets, better manag. of weather impacts |
| ZMD | National Government, MAFF Field Services, Early warning community, Producers | Ongoing | Disaster response, food aid interventions | Increased production, information on appropriate crops for climatic zones |
| Public Officials | Public Officials, Early Warning Community Disaster Response community | Harvest | Disaster response | Food Aid, market interventions |
| CSO Post Harvest Survey | Agricultural policy makers | Late, 1-4 months after harvest | Agricultural policy, disaster mitigation activities, agricultural project planning | Long-term growth in the agricultural sector, higher income for producers, better developed rural infrastructure, better rural communities, World Bank/ASIP sector performance assessment |

A **Crop Forecast** is an estimate which relies entirely on statistical extrapolation and no area or yield sampling has taken place (FAO, 1996). Forecasting crop production (before harvest) is usually not a critical activity. The two major reasons for doing a crop forecast are to make money and predict a disaster. Thus the private sector is interested in future crop production because of its potential effects on prices. They will therefore spend resources to forecast wheat production in the Russian Republics and the U.S., forecast cocoa production in West Africa or forecast maize production in Europe. "Early warning" organizations are also interested in future crop production for a similar reason. High prices of important commodities, especially food, will decrease disposable income in the household. Less disposable income means fewer resources for health, education and community development. Examples of crop forecasts would include simple models driven by satellite data or complicated crop models driven by ocean temperatures for estimating the impact of major changes in climate.

The primary distinctions between these three terms are timing in relation to the harvest. In general, the closer to harvest the crop assessment is done, the more accurate it will be. To reflect these relative levels of accuracy, early estimates are often, and most usefully, expressed in qualitative terms (good, average, poor) and later estimates may be expressed in more quantitative terms (yield per ha, production in tons or kg/capita).

4.2 GLOBAL EARLY WARNING AND GLOBAL CLIMATE MODELS (GCMS)

Description

The earliest weather forecasts come from technical service organizations in Europe and the United States of America (USA), including the National Atmospheric and Space Administration (NASA), the Climate Analysis Center, and the FAO Global Information and Early Warning System (GIEWS). These provide weather forecasts for up to one year in advance, and are based on models of atmospheric pressure and temperature differences, wind patterns, ocean temperatures, and analyses of historical and pre-historic weather patterns on a global scale.

These long-lead weather forecasts are themselves usually neutral as to the potential economic affects of weather patterns. However, the results of these global climate models are incorporated into the reporting schedules of Southern African agencies such as the USAID Famine Early Warning System (FEWS), the Southern African Development Community (SADC), the Zambia Meteorological Department (ZMD), and the Early Warning Technical Committee (EWTC). These organizations follow the GCMs because of the potential impact they may have on economic outcomes such as national and regional crop production.

Assessment

These models are generally reasonably accurate forecasters of broad changes in weather patterns. Even the much-discussed 1997 El Niño prediction was considered to have been reasonably accurate for Zambia. The problem is usually in the interpretation of the technical forecasting messages; any consequent crop production forecasts are relatively inaccurate, as the climate forecasts are not very location-specific, are inaccurate to within a few months regarding timing, and only describe very broadly the intra-seasonal rainfall pattern.

Crop production forecasts based on these models are useful for contingency planning at the regional or national level. They alert the Central Bank of possible changes in their long-term

estimates of economic growth or other gross indicators of economic development. As an example of these very early forecasts we can look at the El Niño Southern Oscillation (ENSO) event of 1997, which led to forecasts by the Southern Africa Regional Climate Outlook Forum (SARCOF) that there would likely be an extensive drought in North-Eastern Zambia in January/February, 1998. The possible responses to this forecast by the GRZ could have been arranging for some foreign exchange in case maize imports would be necessary, or ensuring that sufficient stocks of short-duration drought-tolerant seed material were available. A possible response by the international community could have been an increase in monitoring of African countries that were affected by previous ENSO events.

Although these forecasts come very early, they are not accurate enough to be useful at the sub-national or perhaps even the national level. They are not useful for making recommendations to producers because these forecasts are not very area specific and cannot be considered reliable enough for significantly changing farm production strategies. In 1997, for example, there was some confusion about the meanings of these kinds of forecasts related to the ENSO. Large producers ignored them because they had a broader understanding of the role and the usefulness of this type of forecast. However, many smaller producers may have made early decisions to sell livestock, not use fertilizer and stagger planting over time based on extension recommendations and publications such as the ZMD Bulletins (Colenbrander, 1998).

The costs of doing these types of forecasts are usually picked up by the scientific community. Poorer countries benefit from the expertise and funding that is being provided to regional organizations like SADC. Other possible benefits from these forecasts are alerting governments to dust off contingency plans and focusing monitoring efforts on areas that have suffered when similar conditions were noted in the past.

Recommendations

Like any forecast, these global climate models present their results in terms of the probability of an outcome being similar to the forecast. The interpretation and dissemination of the results of need more careful treatment by stakeholders. It would be helpful if FEWS could interpret these forecasts clearly, and provide suggestions for action that would assist the contingency planning of the National Government, but not result in significant changes to on-farm production strategies. SADC should be clearer about who its clients are for these kinds of long-term forecasts, should place less emphasis on them in their regular reporting, and should make it clear that long-term climate projections are an assistance to national government-level contingency planning, rather than a guide to significant changes in farm-level strategies for the following season. At the National level the ZMD needs to better understand the capacity of its clients for using, and acting on, long-term forecasts. This is especially true for smallholders with a limited access to information sources.

4.3 PRODUCER FORECASTS

Agricultural producers are constantly assessing the availability and cost of inputs and potential weather patterns to forecast their production before and during the agricultural season. They are assisted in this process by their knowledge of the area in which they live. Each region has some very early signs of what the growing season will be like. Some of these include the nesting habits of birds, flowering times of specific trees or shrubs, wind patterns on specific days and cloud patterns at the start of the rainy season. These forecasts are very early (timely) but difficult to verify because, at the local level a "good" season may not be easily quantifiable.

There is not much that can be done to improve these types of weather forecasts because they are highly location specific and based on a knowledge base that is not easily accessible.

On the other hand, growers can make more accurate and informed forecasts, on which to base their planting and inputs decisions, if more information, for example on potential output prices, is made available to them through market information services and documents specifically written for them.

4.4 MAFF PRELIMINARY PRODUCER-INTENTION SURVEY

Camp Officers of the Field Service conduct this survey very early in the growing season (December). Camps are the smallest intervention unit of the extension system. Each Camp has a fairly homogenous agricultural system. There are approximately 1,300 Camp Officers to cover the 1,540 Camps. These Officers provide technical assistance, advice and sometimes are the conduit for inputs like fertilizer and seed. They receive in-service training 3 times per year. The Camp Officers report to the Block Supervisor. Each Block Supervisor covers about 10 Camp Officers. There are roughly six Blocks in a District. The Block Supervisors report to the District Agricultural Coordinating Officer (DACO).

For the preliminary producer-intention survey, Camp Officers interview all farmers, individually or in groups, to obtain their intentions for what crops they will plant, what areas they will allocate to these crops and what inputs they will use. The client for this formal forecast is the MAFF Field Services and to some extent input suppliers. This survey is part of the ongoing work of the Field Service and is integrated into their ongoing activities. Thus the DACO will use the results to lobby government agencies and the private sector. The results of this survey have been used to make requests for seeds, fertilizer, and empty bags to GRZ authorities providing agricultural inputs at the national and provincial level. This survey is useful for identifying market opportunities for agricultural inputs and possible farm management constraints (not using appropriate inputs).

4.5 MAFF FIELD SERVICE FINAL FORECAST

Description

This forecast is made in March when very few changes are expected in the outcome of the season. The primary purpose of this forecast is to estimate production outcomes and marketing intentions within the Camp. These forecasts are part of a complete enumeration of people, crops, and livestock at the Camp level. The Camp Officers are responsible for collecting and processing this data as part of their normal duties. Sometimes they measure fields and weigh samples, but most often they use interview techniques with farmer groups to obtain estimates of the crops being grown, the area planted to these crops, and the inputs that farmers applied or are intending to use. For households that are far from where the Camp Officers live and are difficult to visit, they will extrapolate from what they have learned from other households to these more inaccessible households.

The clients for the Field Service forecasts are the District Agricultural Coordinating Office (DACO), and the Provincial Agricultural Coordinating Office (PACO). These offices use the information to evaluate progress on their programs, suggest changes in extension messages and technical recommendations, and assess their own administrative needs. The PACO also provides the information to the PS of the Province, to assist in making agricultural policy decisions. The

PACO and the DACO are the primary technical resources for assisting the local Disaster Management Unit in the preliminary assessments of drought and flood areas.

Assessment

This forecast is the most formal forecast that is also the closest to the local authorities and local communities. The results and conclusions from this forecast are therefore timely and easily verified. In discussions with Provincial Authorities such as the PS in Western Province, the results of this survey and the expertise of the PACO and DACO are always used for local agricultural policy decision-making. This appears to be typical of uses of the data in most provinces in Zambia.

The MAFF Field Service forecasts have had difficulties in the past. Complete enumeration of all households and of all crops in a camp is very difficult and short cuts in this process have led to some major inaccuracies. These problems led to major changes beginning in 1990 that tried to combine the complete enumeration method of MAFF with more modern and streamlined sampling techniques. The evaluations of the methods of the MAFF forecasts stress that the tasks assigned the Camp Officers was impossible because the lack of transport.

Recommendations

This approach to forecasting offers the most potential for cost effective crop forecasting because it is based on a strong, institutionalised local initiative with local clients. Because the extension system is relatively well organized and supervised, small interventions can produce good results. For example, small investments in helping the Field Services aggregate their data up to the national level would provide a good indication of the quality of the season.

4.6 CSO PRELIMINARY AND FINAL FORECASTS

Description

The Central Statistics Office (CSO) conducts all of the official routine surveys and censuses for the GRZ. Their system is well developed and is reasonably well organized to produce reliable results for surveys. Since 1993, MAFF has contracted CSO to do three agricultural surveys each year. These surveys are the Preliminary Forecasts in December, the Final Forecast in March and the Post Harvest Survey by September after the main crops are harvested. The CSO conducts these surveys under contract from MAFF. The goal is to provide an unbiased estimate of agricultural production and use of inputs, for marketing and general agricultural policy decisions. All three surveys have a similar sample frame, methodology, and client. The differences between the surveys are their timing and hence accuracy.

All of these surveys use stratified sampling techniques. Zambia is divided into Standard Enumeration Areas (SEAs) by the preliminary work done for the 1990 census. These SEAs were designed to facilitate the work of census enumerators so that they could interview 20-100 households in a reasonable amount of time. The SEA is the standard unit for all CSO surveys. There are 12,979 SEAs (9,682 of them rural) made up of between 30 and 100 households each.

The sample stratifies farmers into three classes. The smallholders are families that cultivate less than 2 ha. Emerging Farmers are those families that cultivate 2-20 ha, usually with oxen. Commercial growers cultivate more than 20 ha, usually using tractors. The general break down

is 560,000 small and Emerging Farmers and 1,500 commercial growers. The CSO randomly selects 402 of the SEAs, stratified according to agro-ecological zones, and then randomly selects 20 smallholder and emerging farmers within each selected SEA. The same sample is used for all of the three surveys in the same year, but a new SEA and household sample is drawn each year. All of the commercial growers are interviewed.

The questionnaire for the 1999 final forecast covers maize, sorghum, millet, groundnut, sunflower, tobacco, paddy rice, wheat, sweet potatoes, and cassava. There are two types of questionnaires: one for small and emergent growers and one for large growers. The CSO developed these questionnaires with the assistance of the FAO and the MAFF. Because of the assistance of the FAO, they are similar to others in Africa. In addition to area planted and estimated production, there are some questions on the use of inputs like fertilizers and on management decisions related to weeding. Questionnaires from earlier years focused only on estimates of area planted and yield. The cash crop estimates are considered in detail in Chapter 5.

The Final Forecast takes about 4 weeks. Data collection requires 240 enumerators, 40 supervisors, 18 drivers, 12 Deputy Provincial Heads, 9 Provincial Heads, and substantial vehicle km. Data entry and analysis requires another 10 days. The exercise is budgeted at \$90,000.

Assessment

This survey evolved from major problems that the GRZ had in the late 1980s. In those years the both MAFF and CSO did official forecasts and the results from the two forecasts were not similar (Kiregyera 1990). The result of a number of workshops on these two forecasts was the integrated forecasts that merged the agricultural expertise of MAFF with the scientific survey expertise of CSO. The sample size was to be about 15,000 households in 11 crop zones to cover minor or localized crops. The size of this sample would generate acceptable estimates at the District Level (MAFF, 1990).

This is a well-designed sample survey for the specific purpose of providing some early crop production information at the national level using interviews with farmers. As a sample survey it was not meant to provide a complete inventory of all agricultural production in the country (until 1998, it covered only eight crops). The general criticisms of this method and its implementation includes a poor sampling frame (FAO, 1997), poor supervision at the field level, neglect of some agricultural commodities, and no assessment of the accuracy of the survey.

Many of these concerns stem from some confusion about the role and aim of the Final Forecast. The methodology and choice of crops that make up the Final Forecast were developed for assessing the need for maize imports at an official level as soon as possible. This need stems from the GRZ's responsibility to monitor the food security of its people and to be able to respond to any adverse condition that would affect food crop production in a timely manner. In Zambia food security usually means availability of maize. Thus maize is considered a good indicator crop for food security in Zambia. The tacit acceptance of this definition by most people has led to increasing pressure on the CSO Final Forecast to provide not only an estimate of maize production, but also information on input (fertilizer) use. Donors have also supported the Final Forecast because of their need for lead-time in implementing emergency food aid programs.

The sample size for all three estimates of crop production is 8,040 households (20 households in 402 SEAs), which is significantly less than the intended 15,000 households (30 households in 500 SEAs).

A number of studies have pointed out the sample frame is not representative of agricultural practices in Zambia. The Wood study (1998) suggests that the sample households could be better chosen to reflect these farming practices, with differences in agro-ecological zones and farming systems considered in more detail for the selection of the households. This suggestion has been acted on by the EWTC and there is now a major thrust to incorporate the Camps as the primary sampling unit rather than the SEAs. Camps are based on environment management territories that the people living in villages have some control over. The MAFF Mapping Section is digitizing these Camps and the boundaries should be ready in time for the 1999/00 growing season. Although the camps will be a significant improvement in determining agricultural production they may not be useful for communicating the significance of that production to political and implementing areas like Wards or Constituencies because the boundaries of these divisions do not coincide.

Poor supervision at the field level: there have been some suggestions that the survey may be "supervisor light" and it is difficult for the 40 supervisors to follow up on the 240 enumerators. In theory, a supervisor has to supervise only 6 enumerators. In practice, not all supervisors are equally conscientious or have the resources to properly follow up on the enumerators. In field trips and discussions with supervisors of the CSO survey, they said that they check back on about 20 percent of forms to see that they were filled out correctly and responsibly.

Missing commodities: the 1998/99 forecast questionnaire contains questions on all crops with major socioeconomic importance grown in the country. This is an extension of coverage over past years when the focus was only on grain crops. The issues of what crops to include into the forecasting exercise is decided on by the National Early Warning Technical Committee. Their decisions are driven by user needs. Most of the suggestions of the Wood Study (Wood, Denis, and Associates, 1998) have been incorporated into the 1998/99 forecast that took place in May 1999. The questionnaire now covers all economically significant crops. Reporting for some of these added crops may be difficult as enumerators may need more training about them. The guidelines for the 98/99 forecast are clear enough to capture most of the contribution of these other crops. As the number of crops increases so does the difficulty of administering the questionnaire.

No indication of accuracy: when the results of the CSO Final Forecast are published, there is no indication of confidence intervals for the production figures. A confidence interval for an estimated quantity is some indication of how good the estimate is. It is based on the relationship between the number of samples and the variability of the data.

Another indicator of accuracy is how well the forecast predicted the actual outcome of the growing season. In Zambia this is a fairly easy comparison to make because the CSO conducts a post-harvest survey that is conducted the same way with the same sample frame several months after harvest. The post-harvest survey provides the GRZ with the accurate information that it needs for long term policy decisions related to agriculture. There are no time constraints for gathering this information because agricultural systems change slowly in relation to market pressures and perhaps changes in the natural resource base (soil fertility, rainfall). The Post Harvest Survey is again a sample based on the same frame as the forecasts, and uses farmer

recall. The difference is the scope of the questionnaire. The Post Harvest Survey is designed to capture all inputs to production and marketing of farm production, and is 140 pages long. It is conducted in July when the production of most commodities is obvious to farmers in terms of bags or kilograms. At this time, farmers are best able recall how many bags of maize they produced and how many they sold or bought.

Institutionally, the demand for agricultural statistics shifted from accuracy to timeliness as the reasons for collecting data shifted from informed domestic policy decisions to economic aid issues. Currently, the primary clients for timeliness are those donors that need long lead times. This has shifted the emphasis in the CSO from late season accurate crop production statistics to early season (before harvest) forecasts. The earlier the forecast the less likely it is that it will capture the event that it is forecasting. The issue of how close a forecast comes to approaching reality is a critical question in this study. Of most interest perhaps in terms of usefulness of results for decision-making is the relationship between the pre-harvest forecast and the post harvest survey at the district level. There is also some production data available from the District Agricultural Coordinating Officers (obtained through the MAFF extension service as discussed in the previous section) that is used for policy and decisions at the Provincial and District level. If we look at maize as a good indicator crop for estimating the quality of the season, we can get a good idea of the situation.

If the CSO pre and post harvest surveys are compared, taking maize production estimates as an example (Table 3), it is found that they differ very significantly in every year of the comparison; the post-harvest estimates were always much lower than the pre-harvest estimates (between 41 and 20% lower), and – incredibly – were exactly 22% lower in the last three years. These results are particularly disappointing considering that the methodologies are so similar for both of the CSO products. It is clear that there are major methodological problems with these surveys, which evidently cannot be relied upon to give a reliable absolute estimate of production. However, these results show that the estimates are generally indicative of major changes in production levels from year to year. It is also evident that these results cannot be used at District level, a level for which it was designed. These results indicate that CSO estimates cannot be used reliably for making crop production estimations at District levels.

TABLE 3. A comparison of national maize production estimates from two CSO surveys.

| Year | Production in millions of bags | | % that PHS is of FF |
|------|--------------------------------|---------------------|---------------------|
| | Final Forecast | Post-Harvest Survey | |
| 1992 | 5.4 | 4.3 | 80 |
| 1993 | 17.8 | 10.5 | 59 |
| 1994 | 11.3 | 8.0 | 71 |
| 1995 | 8.2 | 6.4 | 78 |
| 1996 | 15.7 | 12.2 | 78 |
| 1997 | 10.7 | 8.3 | 78 |
| 1998 | 7.1 | na | |

The Final Forecast is the de facto official GRZ estimate of crop production for the year even though it is technically a provisional estimate (there is usually at least a year lag until the Post

Harvest Survey results are ready). It does not appear to be indicative enough to be useful at all. Considering that in some years when funding is not available early (1999) this Forecast can come out as late as mid-June, after all crops are harvested. This forecast is not used at the local level but it is used for the Preliminary National Food Balance Sheet and World Food Program's Vulnerability Assessment Mapping exercise. It is very unfortunate that the Post Harvest Survey is not available to validate these uses of preliminary forecasts. Part of the problem is the CSO's ability to analyze data and publish results. These constraints have not been dealt with very effectively. Even as far back as 1990 "the greatest weakness of the CSO's Agricultural Statistical System in the past has been the great imbalance between the development [of] its capacity to collect data and the capacity to process and analyze the data and publish the results" (MAFF, 1990).

Recommendations

There are a number of ways to improve the CSO Final Forecast. These include increasing the sample size up to the recommended 15,000 households, using the MAFF Field Services to better identify the crop zones for the sample frame and simplifying (fewer crops) the questionnaire so that it is easier to administer. Most of these improvements will increase the cost and the benefits for increasing the cost are not clear. As noted, forecasts of crop production are not useful for major policy decisions.

We recommend that the Final Forecast be eliminated. It does not have enough users to make it a useful exercise and the misuse and misunderstanding of the information has created more confusion than clarity. The primary users are the early warning community and the Office of the Vice President who use it for decisions about food aid to disaster victims. There are much better ways of getting the information about the number and locations of disaster victims.

4.7 ZNFU PRE-HARVEST FORECAST

The ZNFU surveys its members about their expectations for the production of maize in the February-April period. They use a telephone survey of large growers and of ZNFU agents at local levels. These agents are members of commodity associations that are made of producers, traders and processors of specific agricultural commodities. This mix of actors help balance the biases of the interested parties.

The clients for these forecasts are ZNFU members and the international agribusiness community. Large farmers use the information from this forecast to make storage decisions to capitalize on the seasonality of maize prices. This forecast is demand driven, and works well for its clients. It is not used officially by the GRZ because there is some concern that the ZNFU forecast would underestimate production in order to increase the price of maize for its members or that it might overestimate production to try and keep the FRA from interfering in the maize market.

4.8 AGRIBUSINESS (TRADERS, MILLERS, FOOD RESERVE AGENCY, OUTGROWERS)

International agribusinesses such as the principal agricultural processing and trading companies assess production levels at both regional and national/local levels. Their assessments are ongoing, and are based on long-range weather forecasts, availability of inputs and prices of inputs and outputs, production strategies by producers at all levels, and storage and market opportunities. Their information travels through word of mouth, formal (like the ZNFU) and

informal data exchanges, press reports, radio, television, newsletters, telephone conversations and the internet.

The motivating factors for these informal data exchanges is money, making it or not losing it. In places where futures contracts are used more, there seems to be a higher level of interest in forecasting. Most traders and millers in Zambia make decisions based on spot market purchases, thus limiting their planning horizons to 3 months. They generally do not invest many resources in forecasting, but trans-national companies can benefit from regional assessments made by their international offices. They also use futures market prices in the Agricultural Commodity Exchange as a reference for estimating import parity prices. These future prices are being driven by South African crop production forecasts. The focus of most traders is on forecasting marketable surpluses.

In the case of cotton and tobacco, data are supplied by the Cotton Association and Tobacco Association of Zambia respectively. Likewise, for wheat, which is grown almost exclusively by commercial farmers, data are provided by the ZNFU, for use in estimating the National Food Balance Sheet. This is certainly the most direct means of gathering information for these crops since each organization makes its own projection of total output from data supplied by their members.

The situation for paprika, on the other hand, is quite different since very good information is available from the outgrower companies that support this crop. Each of the firms keeps detailed records on the number of farmers they support, total area planted, quantities of seed and other inputs given out on loan and expected yield. These firms are understandably cautious about sharing the sensitive information needed to protect their competitive advantage, but still indicated they would be willing to provide the very general types of data required by the CSO. This is likely to be a far more cost-effective approach than including paprika in the formal crop survey, as the CSO has done for the past two years.

Private traders, input supply companies and other investors have always monitored performance in the cash crop sectors where they have a particular interest using a variety of informal networks and personal contacts. These systems have evolved over the years to suit the information needs of individual firms and are generally believed to provide a sufficiently accurate picture of each cash crop sector to plan an effective buying and marketing strategy. Estimates of cash crop production are discussed in detail in the next Chapter.

4.9 NONGOVERNMENTAL ORGANIZATIONS

Large NGOs such as CARE and PAM have a broad base of staff in their projects around the country. However, there are numerous smaller NGOs which have more intensive networks and experience at village level in particular localities. These networks have an ongoing, formal or informal, process of data acquisition. Their reporting system is often informal but can be effective. They are interested in forecasting because production differences from average can affect the progress of their community development activities. These forecasts are highly localized in areas where the NGO is operating. Information from specific locations is very difficult to deal with at the national level because the economic significance of a crop failure is difficult to interpret outside the area. Thus, these forecasts are most useful for better local forecasting (and responses) by the local Disaster Management and Mitigation Unit, MAFF, and local authorities.

4.10 SOUTHERN AFRICAN DEVELOPMENT COMMUNITY (SADC)

Description

SADC provides technical assistance, data, and food security analysis to its member countries. It keeps abreast with technical advances in food security monitoring. It uses low-resolution satellite imagery for drought monitoring and produces monthly bulletins summarizing the data from the satellites. SADC is continually looking for better ways to serve the needs of the member states, and is currently producing quality-of-season maps of the region on a 10-day basis using the Agromet and Crop Monitoring System (ACMS).

The ACMS was developed by the EARS Remote Sensing Consultants in Delft, the Netherlands, with support from the Netherlands Remote Sensing Board (BCRS), the European Space Agency (ESA) and DG XII of the European Union (EU). The ACMS is fully operational and is used for crop forecasting in the EU; China has also signed a contract to use the system.

The ACMS uses data from satellites to measure earth surface temperature and light reflection. Their model estimates radiation and evapotranspiration. Evapotranspiration is a direct measure of soil water available to crops. The evapotranspiration and radiation data go into a dedicated crop model that simulates the development of the crop through the growing season. The model deals with both water limitation (drought) and light limitation (high cloudiness) and assumes that, if there is no moisture stress or light stress, the crop will produce its maximum yield. This maximum yield is derived from agricultural statistics from the area. With the onset of stress, the yield will be reduced by various percentages depending upon the growth stage of the crop with the stress occurred. The result is an estimate of crop yield in percent from the long-term maximum yield, updated every 10 days.

Assessment

In an evaluation of the model used for the Communal Lands of Zimbabwe, SADC found that the model could provide a reliable end of season estimates for maize yield, 60 days after planting. The model easily detected differences in maize yields between communal lands. The results of this kind of an early forecast are useful and this could be a cheaper early warning mechanism compared to the GRZ ground based surveys. It is unlikely to miss bad weather conditions that could significantly affect national cereal production at the district or camp level. It would therefore be more indicative than ground based surveys especially at smaller administrative units. These kinds of models easily pick out low and high levels of rainfall on a daily basis, but they cannot determine area planted and inputs used. These limitations are not serious when considering the detailed coverage of a country and the synoptic approach of these kinds of models. These complex modeling efforts should be supported at the regional level through SADC. At the national level, there may not be enough of a human resource base to manage the large quantities of data and the associated capacity for empirical analysis.

4.11 ZAMBIA METEOROLOGICAL DEPARTMENT (ZMD)

Description

The ZMD is a major contributor to the EWTC as the Agrometeorology Component of NEWU. The Department obtains information from all of the GCM organizations. These include: the

Climate Analysis Center in Washington DC for ENSO information, continental scale seasonal forecasts from the African Center for Meteorological Applications and Development in Niamey, regional forecasts from the Drought Monitoring Center in Nairobi, and the European Center for Medium Range Weather Forecasts that arrive over the Meteorological Data Distribution network (MDD). The Department is linked with SARCOF for seasonal information bulletins. The SARCOF meetings take place three times each year: at pre-season, mid-season and end-of-season.

The ZMD publishes the Crop Weather Bulletin and provides imagery data to other users. The Crop Weather Bulletin is published every ten days during the growing season and summarizes the data from the network of official rainfall stations as well as information on the location of the Inter-tropical Convergence Zone received from SADC and other sources. The ZMD have 16 professionals and 3 vehicles. One of the staff has been trained in Reading University. They operate an official network of about 35 rain-gauges and also report on some unofficial gauges.

With funding from FAO and the Netherlands, ZMD developed the agrometeorology component of the Zambia National Early Warning System. This component is a mail-in card asking for rainfall amounts, dates of rainfall, crop stages and crop conditions. The system is well thought out, labor efficient, and communicates the information necessary for validating quality-of-season models. The results from the cards are not analyzed until the end of the agricultural season.

In addition to maximizing the use of rain gauge data, the ZMD has developed an archiving system for satellite imagery data. Beginning in 1998 they produce information products derived from this data, including:

- Dekad rainfall amounts and derived quantities (like cumulatives)
- Fractional wet area of large river catchments
- Number of rain days over a specified period
- Determination of the length of consecutive dry periods
- Determination of the onset of sowing rains
- Monitoring of vegetation
- Monitoring of large-scale flooding

Currently there are 15 paying users for these products that include CARE, PAM, and FEWS. The users receive 10-day estimates of rainfall by district, to assess drought or flooding conditions at the district level. The ZMD provides rainfall analysis for the NEWU but this analysis is included in the Vulnerability Assessment Mapping exercise (see Part III) only as commentary.

The TAMSAT group at Reading University is working on a project that provides technical assistance for satellite imagery analysis. The Project is under the IDNDR Flagship Programme of Forecasts and Warnings sponsored by the UK National Coordination Committee for the International Decade for Natural Disaster Reduction. The project goal was to develop an agrometeorological information system, focused on food security and famine early warning. The system uses archived data from the satellite receiver at ZMD, uses software that can treat the raw data and make it useable for further analysis, and uses software for analyses of series of images. The project also has a component to study the best ways of presenting drought and

flood forecasts to assist in remedial action and preparation of warnings. This is critical to understanding the messages about the quantity of crop production and understanding the context of food security forecasts.

The technology that the TAMSAT/ZMD group uses is very simple. Their satellite receivers have been working flawlessly since they were installed in 1992. The Department of Meteorology of the University of Reading in the UK provided the technical assistance for setting up the receivers. Their approach is to use these low cost satellite receivers, inexpensive computers, and efficient communication systems to decentralize the use of satellite imagery to national meteorological services. The information products are in this way closer to users and to user needs, while at the same time they support the development of human and technical capacity at the local level. The result of this approach is better information products for local conditions and interests. They produce two products that review the agrometeorological conditions for the country on a monthly and weekly basis. One product is point data based which is published as the monthly Crop Weather Bulletin. The other product is the satellite based data which becomes available every ten days.

The primary product is a rainfall surface that covers Zambia every ten days. Integrating the data from point rainfall stations with the CCD data overcomes one of the major limitations of the CCD data alone. That is the tendency to overestimate low rainfall amounts and underestimate high rainfall amounts. The merged data is more sensitive to water logging conditions that are common in Zambia where high rainfall can be just as detrimental to crops as drought conditions. The data from this surface can be easily extracted for single pixels for validating the results at rain stations not used in the merging process. The data from a number of pixels can be averaged for a Camp or District to obtain a ten-day estimate of the rainfall. This information would be useful for identifying drought periods (say, for less than some critical value during the crop growth cycle).

Another related product that is available as a spin off is the number of days in which precipitation fell during each ten-day period. Unlike rainfall estimates in millimeters, this product counts the days of rain. The days of rain in any one dekad is a very useful indicator for determining how much moisture is available for crop production. Rains every day suggest that much of the moisture ran off the soil surface or leached through the root zone. Estimates of days of rain or consecutive days without rain are very useful for drought monitoring. Drought monitoring is essential because Zambia's major crop, maize, is not very drought tolerant. Droughts, in turn, have become a primary indicator for market interventions in the form of food aid.

Assessment

The ZMD has many products that could be used to help clarify the quality of the season as it progresses. These include Cold Cloud Duration Imagery, point rainfall data, point rainfall and CCD merged data. The ZMD have not put many resources into looking at relationships between the historical rainfall pattern and historical data on crop production in Zambia. One of the reasons they have not done this is because the official crop production estimates at the district level may not be indicative enough for them to find relationships.

The software they use for doing image analysis is a free product and users reports that it is easy to learn because it is batch file based. It provides all the flexibility necessary for comparing images, extracting data from polygons and points, and presenting data. For the equipment, the weakest link may be the receivers because they are more than eight years old. Current

equipment needs include a computer with 60 gigabyte hard disk, a Global Positioning System, a spare CD writer for archiving data, and some supplies like printer ink and blank CDs. The major focus of Reading University is, of course, training of local staff to generate products from the data that satisfy user needs. The training resources would include sending a technician from Reading to Zambia twice a year for 3 weeks each over 5 years. This effort should continue to be supported.

4.12 PUBLIC OFFICIALS

The methods used by public officials are roughly similar to those used by agribusiness. They are not formal assessments and the method used may change according to circumstances. Officials are primarily attuned to anecdotal information that will help them in transferring available resources into their constituencies. These forecasters are motivated by concern for the people that live in their district and represent their needs to the central government. These forecasts, especially forecasts of crop failures, are very effective because they are locally based, easily verified and are often very early. They are effective because other government officials, who are the clients, will act on these forecasts very quickly. Verifying the legitimacy of these types of forecasts falls to the DMMU and MAFF technical services. However, many of the calls for assistance are self-serving and are used to demonstrate to their constituencies that they are working for the interests of the poor and destitute. This makes good copy in the press but may waste the time and energy of the technical services of the GRZ.

Local government and elected representatives, in conjunction with the relatively free press in Zambia, are probably the most effective communicators of forecasts. They are effective because they are listened to and can capture the attention of high-level decision-makers easily. Improvements to this system will come as decentralization progresses and local communities have more resources for responding to local problems.

In the short term, the DMMU can provide some guidelines for documenting crop failures. These guidelines would include rainfall records, dates and intensities of pest damage, actions taken by the local authorities, and steps that should be taken to see that the same call does not happen again (in general, the same disaster in the same place is very rare and an indication that the causes have not been addressed). DMMU needs to formalize the process of declaring a disaster so that local resources can be mobilized immediately. DMMU could assist the local authorities in determining the causes and magnitude of the disaster, and also assist them with developing the legal framework for mobilizing local resources to respond to the disaster.

4.13 CONCLUSIONS REGARDING CROP PRODUCTION ESTIMATES

Summary Assessment of methods for estimating crop production

Crop production forecasting is done for different reasons by different organizations for different areas. The GCM is interested in the whole world. SADC is interested in Southern Africa. ZMD and CSO are interested in Zambia. Agribusiness is interested in regional differences, both within Zambia and within Southern Africa. The MAFF Field Service is interested in the District. The Camp Officer is interested in his Camp. Public officials are interested in their Wards and Constituencies and producers are interested in their household. The result of all of this interest in crop production is that the GRZ and donors have enough information available at all levels and at all times to assure that a famine will not happen (for example, with less information available in 1992 than today, there was no famine). In addition there is enough

information at the local level through the MAFF, NGOs and local authorities to ensure that any decline towards destitution of large numbers of people would not go unnoticed.

What is not available from all of this forecasting activity is a definitive statement of production, at the national level, that is useful for assessing import and food aid requirements with any accuracy. Although this was cited as a goal for forecasting by several stakeholders, it is not a realistic goal given the level of resources that are available for the activity or that are likely to be allocated. The forecasting methods, using high resolution satellite imagery, that are used in Europe could meet this goal. The costs of these kinds of forecasts for Zambia have been estimated by a Hungarian firm to be about \$ 4 million to establish the system and about \$ 600,000 annually (FOMI, 1998, personal communication).

The use of coarse resolution remote sensing for modeling crop production is limited by the lack of accuracy in agricultural statistics in the past and by the significant role that access to fertilizer plays in the annual variation of maize production. However, the current remote sensing models from SADC and ZMD can provide excellent "quality-of-season" estimates both nationally and at the District level.

Summary of recommendations for methods of estimating crop production

In Zambia, a food security disaster is a declaration by or for a local community that says "we had a **crop failure** this year and we will **need** to have food brought to us or we will have to sell assets to purchase it". Given the high levels of poverty in Zambia, the implication is that if the people must liquidate any of their assets to purchase food they will never be able to accumulate them again and will irretrievably spiral into destitution in large numbers. To see that this does not happen, the GRZ and donors have provided the EWTC with technical and human resources to monitor food security and identify victims. If maize crop failures continue to be the primary "disaster", and poor, marginalized, rural people continue to attempt to grow maize, then local authorities will always be the most knowledgeable in identifying the scale of the crop failure and identifying victims. Thus, this list of recommendations for crop and food security forecasting is driven by the need to obtain a better understanding of where crop failures happen and who lives in these areas.

Support to SADC

SADC currently contracts for, develops and uses, weather and crop forecasting models. These models require large data sets and high levels of scientific and technical expertise. Regional centers should continue to be supported for these purposes.

Provide support to develop the ZMD

The ZMD can provide remote sensing products for early estimates (February-March) of the quality-of-season that are independent of CSO and MAFF. We suggest that they identify droughts with economic significance at the district level to support local authorities in identifying areas of potential maize crop failures. This support would be in the form of technical assistance to evaluate the agricultural significance of their existing archive of data for the purpose of better identifying droughts and the areas affected by droughts.

Terminate the CSO Final Crop Forecast

The early warning community uses the CSO Final Forecast for input into the District level VAM only because it does not have easy access to other early information on agricultural production. As already noted in the report, the CSO survey is not very indicative of production at the District level. Without a good indication of production, the VAM could miss those marginalized socio-economic groups that suffered a maize crop failure. We are suggesting the VAM use other indicators for estimating the quality of the growing season as early as possible. The results of CSO Final Crop Forecast are also used as the Gross Production section of the preliminary national food balance sheet (ZFBS) for the GRZ. As noted, there are no benefits to using the national food balance sheet for early warning activities. Lastly, the CSO Final Crop Forecast is used for some marketing decisions. The information gathered for these kinds of marketing decisions should be paid for by the private sector. They are in a better position to determine the overall worth of a forecast. Thus, the CSO final forecast does not have a very broad user base, is expensive, and its accuracy at the district level is not useful for the purpose of early warning or for supporting marketing decisions.

Support and improve the MAFF Field Service Forecast

This forecast is already being conducted as a normal field services support function, is widely used locally, and is easy to verify. This forecast is an effective early warning tool because it is local and therefore close to those marginalized socio-economic groups who suffer the most from crop failures. There are 1,500 camps which are small and homogenous enough to be useful for identifying areas of crop failures for early warning purposes.

We suggest assisting MAFF Field Services with this task by providing their Camp Officers with rain gauges so they are better able to document the primary causes of crop failures (drought and flooding). We also see the Camp Officer's position as central to the forecasting exercise for early warning, and suggest that they can provide the qualitative information for the outlook for the season (poor, average, good) in February that is necessary for planning mitigation efforts in the event of a crop failure. The Field Services can aggregate their estimates up to the national level to satisfy requests of a preliminary estimate of crop production for the nation.

The needed level of support is small because: 1) the MAFF Field Service forecast can concentrate only on maize, and 2) the already existing data can be aggregated to the national level. This forecast of production from MAFF Field Services would be the provisional estimate of production. Like any provisional estimate, it would **not** be useful for major policy decisions, especially decisions related to food aid.

Support the CSO Post-Harvest Survey

There is a tremendous opportunity for developing a good agricultural statistics database. The current document for agricultural statistics (MAFF, 1998) is primarily based on estimates of production from the CSO Forecast. Improving the quality and timeliness of the actual (after the harvest) production estimates by using the Post Harvest Survey will greatly enhance policy decision making and the monitoring of the effectiveness of agricultural policy decisions. The Post Harvest Survey will also be a validation tool for the forecasts of others, including the MAFF Field Service forecast. If the Post Harvest Survey is conducted in June, and the preliminary results are available in July, it could also inform immediate policy decisions related

to districts that have suffered crop failures. The CSO reports that it sees no technical constraint to implementing this time frame (Personal communication, CSO). These policy decisions would include the level of support to provide to the local authorities to deal with the crop failure and what forms of support would be most useful (direct grants of money to victims or money for work projects for those victims).

Improving the Post Harvest Survey would be costly because the sample size should be almost doubled to get indicative results at the district level. However, increased sample size, in conjunction with the 2001 Agricultural Census, will provide the necessary tools for good policy, supporting shifts to better adapted and more profitable crops for small producers.

Support the EWTC (NEWU)

The EWTC is the primary interpreter of general climatic and socio-economic information into food security messages for action. These food security messages need to be more formalized and more transparent to reduce the kinds of ambiguity that wastes time and resources when identifying and responding to any disaster, including the crop failures so prevalent in Zambia. The best way to reduce ambiguity is for the EWTC to interpret the meanings of all forecasts for their specific clients (large growers, small growers, agribusiness, donors, GRZ, and DMMU). One of the primary clients for food security messages is the donor community, which provides food aid. Since food aid is currently a major response mechanism for responding to the effects of crop failures, the donor community needs to be kept up to speed on every aspect of food security and know what decisions are made by which actor. NEWU should continue to incorporate forecast information into food security estimations, through a collaborative consensus-building process with government, NGOs, the private sector and donor stakeholders.

5. ESTIMATES OF CASH CROP PRODUCTION

Since the introduction of economic reforms in the early 1990s, smallholder production of non-food cash crops has become increasingly important. A recent survey found that farmers in many districts have reduced the area planted to food crops by an average of 25% and increased the area given to non-food crops by 30% to 50% (NEWU et al, 1998). At least two important factors explain this trend including the elimination of guaranteed producer prices and input subsidies for maize and the development of private outgrower schemes that now support a variety of cash crops including cotton, tobacco and paprika. Together, these developments mean that the prices for most crops have improved relative to maize and that marketing risks normally associated with non-food items have been substantially reduced.

These developments represent a major structural change and it is important to consider the implications for Zambia's crop forecasting system and food security policy. Is it necessary, for example, to provide an early cash crop forecast or is a post-harvest survey of actual production sufficient for monitoring sector performance? Even more critically, how can production information covering cash crops be used to make better policy decisions concerning food aid, agriculture sector performance, investment and agricultural trade policies?

To address these issues, this chapter is presented in three sections. Section 5.1 describes and evaluates the existing systems used in Zambia to gather cash crop information, and Section 5.2 then looks at how this information is used and how it provides a basic framework for the improved interpretation of cash crop data. The discussion concludes in Section 5.3 with a summary of key lessons and recommendations for the future.

5.1 EXISTING CASH CROP MONITORING SYSTEMS

Broadly speaking, a cash crop may be defined as any agricultural commodity sold for income, including food and non-food crops. Maize, for example, is Zambia's most important staple food, but most farmers still sell some of their harvest each year for cash. Other food crops including sorghum, millet and cassava are also sold to raise income. These activities have been monitored by the crop forecasting system for many years.

Data covering non-food cash crops, on the other hand, have only been collected by the CSO pre-harvest forecasting system since 1998. The annual Post-Harvest Survey (PHS) carried out by CSO has always collected cash crop information, but these data are not normally available until several years after the season they cover. Given this obvious limitation, the decision to expand the coverage of the forecasting exercise was made following calls from certain elements of the private sector, economic researchers, donors, and other policy makers and others with a perceived need for early information on cash crop production. Although the decision to increase the coverage of the pre-harvest forecast can be commended, it must also be recognized that this imposes an additional burden on CSO and NEWU in terms of financial resources and length of time needed to process the data. Table 4 provides a summary of crops covered by the forecasting exercise before and after the changes made in 1998.

TABLE 4: Crops Covered by the CSO Forecasting Exercise.

| Crops Covered Before 1998 | New Crops Added in 1998 |
|---------------------------|-------------------------|
| Maize | Cotton |
| Sorghum | Burley Tobacco |
| Paddy Rice | Virginia Tobacco |
| Millet | Paprika |
| Sunflower | Castor Beans |
| Groundnuts | Cowpeas |
| Soybeans | Wheat |
| Mixed Beans | Barley |

Note: from 1999, sweet potato and Irish potatoes were also added to the commodities covered by the forecasting exercise.

There are essentially two channels CSO uses to collect information on the cash crops added to the forecasting exercise in 1998. The first of these relies on secondary data provided by producer associations. Specifically, in the case of cotton and tobacco, data are supplied by the Cotton Association and Tobacco Association of Zambia (TAZ) respectively. Likewise, for wheat, which is grown almost exclusively by commercial farmers, data are provided by the ZNFU for use in estimating the National Food Balance Sheet. These data are later updated in a special post-harvest survey of commercial farmers covering wheat and barley (if funds for this exercise are available). This is certainly the most direct means of gathering information for these crops since each organization makes its own projection of total output from data supplied by their members. Compared with adding sections on these crops to the already cumbersome pre-harvest questionnaire, this seems a much more cost-effective approach and is just as likely to

provide a reliable indication of expected production. Importantly, however, CSO must also cross-check these data with information from other sources and some additional efforts are needed to verify the production estimates supplied by the producer associations.

Secondly, with respect to paprika, castor beans and cowpeas, data are collected directly from farmers as part of the pre-harvest survey using standard enumeration methods discussed in the previous Chapter. To the extent that information covering castor beans and cowpeas is important, this approach is probably necessary since these crops are normally traded only through informal networks and reliable secondary information from producer associations is not available. The situation for paprika, on the other hand, is quite different since very good information is most certainly available from the outgrower companies that support this crop. Each of these firms keeps detailed records on the number of farmers they support, total area planted, quantities of seed and other inputs given out on loan and expected yield. These firms are understandably cautious about sharing sensitive information needed to protect their competitive advantage, but still indicated they would be willing to provide the very general types of data required by CSO. This is likely to be a far more cost-effective approach than including paprika in the formal crop survey.

Indeed, private traders, input supply companies and other investors have always monitored performance in the cash crop sectors where they have a particular interest using a variety of informal networks and personal contacts. These systems have evolved over the years to suit the information needs of individual firms and are generally believed to provide a sufficiently accurate picture of each cash crop sector to plan effective buying and marketing strategies (Food Reserve Agency, 1998). Given the limited resources available to CSO for monitoring cash crop performance, it would seem to make more sense to try and tap into these networks for information that can be included in the official GRZ crop forecast.

5.2 USES OF CASH CROP INFORMATION

In deciding the best way to collect cash crop information, it is necessary to consider how these data are to be used. Government and the private sector require cash crop information for different reasons and it is important that the methods used to monitor these crops should be consistent with the requirements of both groups.

First, with respect to government, there is a fundamental obligation to monitor agriculture sector performance, including developments in individual subsectors, as a basis for policy formulation and general public information. It is important, for example, that anyone looking to invest in Zambian agriculture should be able to turn to government for reliable information on cash crop performance. This information, however, could easily be supplied on a post-harvest basis since new investors have little or no interest in forecast data which, by definition, are an imprecise guess of the current season's total production. The previous monitoring system where cash crop information was collected only by the PHS obviously did not provide the information that investors and other sector stakeholders might require and improvements were needed. Certainly, cash crop information needs to be made available sooner than the current one to three years after each production season, but as a matter of public awareness, there is no special need for this information on a pre-harvest basis.

In terms of making policy decisions, however, government does have an interest in forecasting total cash crop production. This is especially true given the increasing importance of cash crops in most farm strategies where a variety of new agricultural enterprises now provide a substantial

share of total income for many smallholder farmers. Purely for the sake of monitoring sector performance, pre-harvest forecast data covering cash crops is not required. However, when major decisions concerning trade policy, fertilizer imports and food aid need to be made, cash crop forecast information can be important. This is especially true with respect to the calculation of food aid requirements since the income generated by selling a crop can be used to purchase food at a later date. In this respect, it is useful to have an early indication of total cash crop production in specific locations as a means of estimating the purchasing power and level of access to food for individuals in these areas.

Although this makes obvious sense, the importance of cash crops has not been well understood by those estimating food aid requirements and better use must be made of these data. In some cases, for example, food aid needs assessment reports have referred to cash crop production as a threat to food security in that the transition to these activities means that less area is being given to food production. Other reports note that the income from cash crops can be used to buy food, but fail to include the income generated by these enterprises in the estimated food aid requirements. Even where cash crop income is taken into account, this is most often calculated only as gross crop value rather than net farm profit which is the only true indicator of local purchasing power. Clearly, a more consistent methodological approach is needed in the future for interpreting the forecast information. Unless these data are used consistently and in an appropriate way, there is very little point behind the recent attempts to improve cash crop forecasting.

For the private sector, cash crop information is used each year mainly for planning buying and marketing strategies. Outgrower supply companies, for example, have an obvious interest in tracking production as a step to ensure loan recovery whereas agricultural processors are interested to identify the areas where the commodities needed to sustain their operations can be bought. As noted, a variety of forecasting systems have evolved out of the need for this information and individual companies all track performance in the sector where they have a particular interest. For the most part, private operators trust this information far more than government estimates and are quick to point deficiencies in the GRZ forecasting system.

Given the widespread mistrust among the private sector for government data, it is difficult to justify the GRZ's cash crop forecasting efforts on grounds that traders require this information. Again, it may be useful for the GRZ to collect cash crop forecast data from the private sector, and to make this information available on an aggregated basis to the general public, but the private sector clearly does not demand the results of an independent GRZ assessment. Instead, it would make much more sense for government to focus on the preparation of timely, reliable post-harvest data since this could be used by the private sector to track actual (rather than predicted) developments in their particular sector.

5.3 SUMMARY AND RECOMMENDATIONS

This Chapter has reviewed the current systems used in Zambia for forecasting cash crop production. The CSO has taken steps in recent years to expand the coverage of the pre-harvest survey to include a range of important cash crops, and it is important to consider both how this information is collected and used.

- First, with respect to the collection of cash crop information, it is recommended that the GRZ should make much greater use of existing private sector monitoring systems. Data for

about half of the cash crops added to the CSO forecasting exercise in 1998 are drawn from secondary sources including producers' associations and other representative bodies. This is a far more cost-effective approach than sending field enumerators to interview farmers on their production of cash crops. Private sector monitoring systems have evolved over the years and are well adapted to Zambian conditions and the GRZ should look to make more extensive use of this information. Understandably, private firms are likely to be cautious about sharing information that might jeopardize their competitive advantage, but basic information concerning area planted and estimated total production should be easy to collect. It may take time to build confidence that government will use the forecast information responsibly, and the data should only ever be presented on an aggregated basis so as not to reveal trade secrets or other sensitive information.

- In terms of how cash crop information is used, it is necessary to distinguish between forecast data which predict total output, on the one hand, and post-harvest data which measure actual output on the other. In terms of forecast information, it is beneficial for government and the private sector alike to have an idea of the total production that can be expected for individual cash crops. Government needs this information for making policy decisions concerning trade, import decisions and, on rare occasions, for estimating food aid requirements. The private sector needs this information for planning effective purchasing and marketing strategies. Importantly, private sector has always collected this information through a variety of channels that are well adapted to Zambian conditions. Since this information is available, government may as well collect these data in one central location, if only to improve public awareness of agriculture sector performance.
- When it comes to using cash crop information to formulate national policy, much greater care must be used in the future than has so far been the case. As discussed, the role of cash crops as a factor related to food security and food access is poorly understood and a variety of methodologies have been used in estimating food aid requirements. At least in theory, cash crop forecasting can help in the formulation of appropriate development strategies and emergency interventions when required. This process obviously does not end with the collection of raw data, however, and the importance of cash crops to the national economy and purchasing power of individual households must be better understood by policy makers at all levels.
- Finally, with respect to post-harvest cash crop data, this information is important for monitoring sector performance and tracking agricultural development over time. This information can be used by new investors to plan their business strategies, by government to develop effective long-term policies and by the donor community to identify areas of growth that may benefit from additional support. The current system, whereby PHS data are only released up to several years after each production season is obviously inadequate for these purposes and steps are needed to ensure this information is made available on a more timely basis. It seems that a comprehensive field survey is not needed to achieve this objective, however, since reliable information is available from the private sector.

PART III. ESTIMATING FOOD SECURITY

Estimates of food security are regularly made by households, by concerned community organizations, and by national and local government. Households make strategic resource decisions based on their current and expected future access to food. For example, an unexpectedly large maize harvest may result in a farmer selling higher than normal quantities of maize in order to purchase livestock which can generate a diversified future income, whereas an urban labourer who has recently lost his job may need to call upon the community's formal or informal social security payments system and/or sell assets such as a radio in order to purchase food. The GRZ, in carrying out its responsibilities of ensuring that the nation is food secure, uses the EWTC and the EWCC of the MAFF to bring together the main stakeholders at national level with the objective of making reliable food security estimates. The EWTC uses the following three centrally-administered approaches to food security estimation:

- The Food Balance Sheet, for monitoring food availability at the national level, and used for making ex ante estimates in Zambia through the Zambian Provisional Food Balance Sheet (ZFBS), which may provide a basis for government intervention in crop and input markets through the FRA, and for food aid decisions,
- Vulnerability Assessment Mapping (VAM), a joint exercise of MAFF/NEWU, FHANIS, USAID/FEWS and the World Food Program, for monitoring food access at the District level, and
- The Food Needs Assessment of MAFF/NEWU, FHANIS and the Program Against Malnutrition (PAM), for identifying specific socioeconomic groups within Districts, who qualify for food security disaster assistance (food aid).

6. FOOD BALANCE SHEETS

The FAO developed the Food Balance Sheet Approach (FBS) to help governments with the task of clearly presenting their food export potentials and import needs. The FBS is a method of combining stocks, production, consumption and trade statistics on food commodities, with the object of "presenting a comprehensive picture of the pattern of a country's food supply during a specified reference period" (FAO, 1996).

The classic FBS, and the standard by which all FBSs are measured, is the FAO version that their statistical service develops for all countries in the world. The FAO does a balance sheet as an ex post estimation of food consumption. This can be compared to the various nutrition surveillance exercises which may provide ex post assessments of food access.

This FBS sums up the food value of all foods produced within a country including imports and exports. The directions for doing this are in Annex 5 and an example of a recent FBS for Zambia is presented in Annex 6. Other users in Zambia use other food balance sheets for specific purposes. For example, the FRA develops balance sheets on a monthly basis to track and project maize consumption patterns to help them decide if there will be enough maize for millers. These sheets include assumptions about substitution of maize by other food commodities, based on price differences between maize and cassava. NGOs, like CARE, will construct food balance sheets for the regions where they have activities because major food surpluses or deficits could affect the incentive structures for community participation in their activities. SADC publishes their FBS for each country on their website. Some Extension Camp

Officers do a food balance sheet for their Camps and the EWTC does provisional FBS for Provinces.

6.1 THE PROVISIONAL NATIONAL FOOD BALANCE SHEET FOR ZAMBIA (ZFBS)

The role of the ZFBS

The most important FBS in Zambia in terms of food security policy decisions, is the Provisional National Food Balance Sheet (ZFBS). This FBS comes out in conjunction with production figures from the final forecast, in May/June of each year, through the EWTC. The ZFBS can be used as a basis for planning maize imports by agribusiness and triggering market interventions by the GRZ, and its partners such as USAID, Japan, The Netherlands, Italy, and the European Union in the form of food aid. Because of the significance of these market interventions, this FBS incorporates the expertise of the twelve organizations under the umbrella of the Early Warning Technical Committee:

National Early Warning Unit (NEWU)
 Food Security, Health and Nutrition Information System (FHANIS)
 USAID/Famine Early Warning System (FEWS)
 World Food Program (WFP)
 Food and Agriculture Organization of the United Nations (FAO/GIEWS)
 Food Reserve Agency (FRA)
 Zambia Farmers Union (ZNFU)
 Disaster Mitigation and Management Unit (DMMU)
 University of Zambia (UNZA)
 Program Against Malnutrition
 Zambia Meteorological Department (ZMD)
 National Food and Nutrition Commission

All of the information for the ZFBS comes from already existing data available from the participant organizations. The committee determines the use and format of the data for the ZFBS. It coordinates the activities of its members to avoid unnecessary redundancies, provides validation for and critiques of each others' methods of collection and of analyzing food security data, and assists participants in data analyses and in providing - and interpreting - information useful for food security decision makers.

The EWTC reviews problems associated with the ZFBS, incorporates new information or methodology, and continually assesses user needs. The EWTC keeps abreast of current academic thinking about food security, of local community perspectives (for example, the possible use of food economy units), and of the information needs of donors. In its meeting of January 1999, it made changes related to changing funding levels among its participants, and related to criticisms of the ZFBS that came through the FRA (1998) and the donor community (Wood et al., 1998).

The ZFBS is an early summary of the estimated national availability of some food items. Because national availability is not directly related to food access, the EWTC does not itself use the provisional national food balance sheet. The technical ZFBS report, on what food items are available for export and what food items may need to be imported, is sent by the Director of the Department of Economics and Marketing to the Permanent Secretary (PS) for Agriculture, who in turn forwards the report to the Cabinet if the situation appears to warrant market or disaster

response interventions. At this level, the DMMU of the Office of the Vice President becomes involved.

Components of the ZFBS

As we discuss the development of the ZFBS we will point out the options that technical people have for including their personal values and the global values of the country they live in. The discussion also shows the range of options that are available to a country through its technical services in deciding what to include and exclude. This example, which is presented in Table 5, uses the ZFBS that was presented to the international community in 1997.

Opening Stocks

Simply put, this is what food is available at the beginning of the marketing year. The marketing year begins at harvest time for maize (June). Harvest time for maize is chosen because it is the major food staple and is the most widely-traded food commodity in Zambia. Stocks are determined by surveying the private sector with storage facilities and storage records. As noted in the footnote to Table 5, on-farm stocks are not determined. The reason for this lack of information in the ZFBS is that it is too expensive to conduct a survey for this purpose, and the EWTC feels such stocks are insignificant.

Production

Production figures for the ZFBS come from the Final Forecast conducted by the CSO. The Final Forecast is a provisional estimate (that may or may not reflect actual production for the country) and therefore helps to emphasise the "provisional" character of the ZFBS. The ZFBS includes maize, paddy rice, wheat, sorghum, millet and tubers. The technical aspects of collecting the data on food production are discussed elsewhere, but the conclusion was that the methods and execution were generally adequate for the objective of forecasting production, as early as possible, of major crops at the national level.

The adjustments (losses, seed stock, etc) are made on the gross production to arrive at the aggregate food value for production.

Staple Food Requirement

To cope with the lack of reliable data on actual consumption patterns, a convention was proposed by FHANIS in 1997 to estimate human consumption requirements. This method has been approved by the Early Warning Technical Committee and adopted by NEWU to prepare its national food balance sheet. Specifically, this approach states that an average Zambian requires a total of 2,030 kCal per day in order to maintain a healthy, active life. This figure is a weighted average energy requirement for men, women and children and is based on demographic studies of the Zambian population (i.e. 50% of Zambians are below 15 years of age) and other nutritional considerations. Next, the FHANIS/NEWU convention states that, of the total energy requirement, 70% (1,421 kCal) should come from basic staples including maize meal, sorghum and millet flour, cassava flour and other tubers (sweet potato, Irish potatoes and pumpkin), rice and wheat flour. The remaining 30% of total energy is assumed to come from animal products, fruit, vegetables and legumes. Although precise consumption patterns vary between provinces and regions, the estimated average of 70% of total energy from staple food crops is roughly in line with existing (but aging) Zambian research data. Issues related to the measurement and use of consumption requirements in the FBS are discussed in the next Chapter.

**TABLE 5: The Projected Annual Food Balance Sheet (ZFBS)
for the 1996/1997 marketing season**

| | Maize | Sorghum/ Millet | Cassava | Other Tubers | Rice | Wheat | Total |
|-----------------------------------|--|--------------------|---------|-----------------|------|-------|-------|
| A. Opening Stocks | 130 | 1 | | | 2 | 20 | 153 |
| B. Production | 960 | 92 | 702 | 140 | 12 | 60 | |
| C. Total Availability (A+B) | 1090 | 93 | 702 | 140 | 14 | 80 | |
| D. Staple Food Requirement | | | | | | | |
| 1 Human consumption | 1086 | 81 | 667 | 133 | 19 | | |
| 2 Food Reserve Stocks (net) | 10 | 1 | 0 | 0 | 0 | | |
| 3 Stock Feed | 78 | 0 | 0 | 0 | 0 | | |
| 4 Breweries | 57 | 2 | 0 | 0 | 0 | | |
| 5 Seed | 10 | 1 | 0 | 0 | 0 | | |
| 6 Export/Cross border trade | 50 | 3 | 0 | 0 | 0 | | |
| 7 Loses | 72 | 5 | 35 | 7 | 1 | | |
| E. Total Requirement | 1363 | 93 | 702 | 140 | 20 | | |
| F. Surplus/Deficit | 273 | 0 | 0 | 0 | 6 | -49 | |
| G. Food Relief Requirements | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| H. Commercial Import Requirement | 273 | 0 | 0 | 0 | 6 | 49 | |
| Notes to the balance sheet | | | | | | | |
| A. | Stocks expected to be held by commodity traders, FRA, millers and commercial farmers as of May 1997, not including stocks held by small scale farmers in rural areas | | | | | | |
| B. | Production estimates from the Final Crop Forecast prepared by CSO and MAFF. Production of cassava has been estimated at 7 metric tonnes yield per hectare while production of other tubers has been put at 20% of cassava | | | | | | |
| D1 | Staple food representing 70% (1,421 kcal/person/day) of total diet (2,030 kcal/person/day) | | | | | | |
| | Converted to crop requirements over and estimated population of 9.7 million people. Given overall maize shortfall, it is assumed that the total production of sorghum and millet, cassava and other tubers are available for consumption and will to the extent possible provide a substitute for maize. | | | | | | |
| D2 | Stocks expected to be purchased by the Food Reserve Agency on the market and carried over to the next season. | | | | | | |
| D3 | Requirements by all major stock feed producers, including large farms | | | | | | |
| D4 | Requirements by all known breweries | | | | | | |
| D5 | Estimated seed crop grown for the seed companies | | | | | | |
| D6 | Total net exports expected on the basis of the demand for food crops in neighboring countries | | | | | | |
| D7 | Losses are estimated at 7.5 % for maize and rice and 5% for sorghum, millet, cassava, wheat and other tubers. | | | | | | |

Source: Report of the Early Warning Technical Committee

Surplus/Deficit

This is the final calculation that can be derived from the standard inputs to the FBS. If there is a surplus or deficit it is carried down to the line "import or export" needs. Food relief requirements are determined by other means and are based on sample surveys conducted throughout the country. If the results from these or other surveys are available, they are included in this provisional food balance sheet.

6.2 ASSESSMENT OF THE ZFBS

The FBS is the primary presentation tool for representing food availability at the national level. The FBS has been found useful because it is a relatively inexpensive tool. Governments collect

the data that go into the FBS as a regular part of their duties. Since its inception in 1948, the FBS has changed gradually to reflect new views of food availability. The FBS has undergone some name changes. Food Balance Sheets were first called Cereal Balance Sheets because their focus was on staple cereals. Later, they became Food Balance Sheets to be more inclusive of what people eat as food. The current incarnation is the Commodity Balance Sheet, that may better represent food access and the purchasing power of a country. This evolution in names reflects the increasing quantities of economic information that have become available. If we look at the early days, the cereal balance was all that was useful for determining food availability because the countries where famines occurred had little information on other commodities and other sources of income, and donors had excess cereals to give away so they were only interested in cereals as aid.

As more socioeconomic information and satellite imagery became available, and more technical assistance was provided to the agricultural sector, agricultural statistics became more comprehensive and accurate. The inclusion of these additional commodities would better reflect availability of food, even in the highly aggregated form of a national food balance sheet.

These changes have added complexity, and created problems of transparency and reproducibility that make the interpretation of FBSs much more complicated for users. The added complexity adds more sources of information that need to be verified. This is especially true for countries with complex economies. The early FBSs were most useful in highly agricultural countries, where 90% of the population can be directly dependant on rain fed crops, famines have occurred, agricultural land was fully exploited, and droughts disrupted the food economy only if they occurred in two consecutive years in the same place.

The ZFBS assumed importance in the more complex economies of Southern Africa with the 1992 drought. The 1992 drought coincided with the shift towards more complex definitions of food insecurity in the international community. In addition, Southern Africa has more agriculturally complex economies, with no history of widespread famine. These complexities have led to increasing problems for those who wish to use the ZFBS as a tool for determining food needs.

Assessment of the sociopolitical processes that influence the ZFBS

The ex ante food balance sheet exercise is partly technical and partly sociopolitical in that it incorporates some of the values of the people who are responsible for doing it and some of the external pressures that influence their decisions on what to include and what to exclude. Any FBS by itself is a fairly benign document. The FBS only gains stature when a country such as Zambia uses it as a justification for declaring a national disaster. The Office of the Vice President uses the Provisional National Food Balance Sheet for Zambia (ZFBS) as the primary message to mitigate a disaster which arose out of an unusual natural phenomenon. In this case, in addition to the technical aspects of creating and using the FBS, there are sociopolitical considerations that add another level of complexity to the exercise. These sociopolitical forces tend to influence what counts as food and what does not. The most extreme view of these sociopolitical considerations comes from SADC (1998):

"The mission is of the opinion that the food security figures computed by individual countries are a means to an end. That end is, in the final analysis, a desire to obtain sympathy for either high balance of payment support or food aid. This motivation for

food aid syndrome is a signal that SADC is increasingly failing to grapple with the real issues of household food security".

Although this view is accurate, it does not shed any light on the enabling environment for these sociopolitical forces to obtain sympathy. Some of these are:

- Food aid as an easy mechanism for donors to bolster political support for governments.
- Donors do not want to be associated with starvation. Donors may not want to spend a lot of time or money on analysis. This leads to a propensity to not question too critically any individual country food aid requests, especially if there is supporting evidence from one of the multi-laterals like WFP or FAO. In addition, food aid is administratively and politically very easy for donors. Food aid may come with or without any of the political baggage of interfering with sovereignty, neocolonialism or cultural colonialism; both positions have been taken by Zambia's political leadership at different times in the past.
- At the National Level food aid can save foreign exchange and improve the balance of payments.
- Food aid is political power for local leaders like chiefs and politicians. For them, crying famine is a way to announce to their constituents that they care and can help. There is consequently no apparent political baggage attached to these self-serving calls. In addition, they may not have any other recourse for mobilizing resources for their poor, or for their supporters.
- Food aid is often the only social safety net. In the absence of a proper social safety net, poor people may be characterized as food insecure because food aid is the only option available for responses and interventions. In Zambia the two most important official institutions to facilitate transfers to the poor are The Pension fund and the Public Welfare Assistance Scheme. The pension fund covers retirees, and the Public Welfare Assistance Scheme identifies the most destitute in communities and provides meager assistance. However, this organization is not involved with destitution due to poor agricultural production. Other possible social safety nets include GRZ subsidized inputs (fertilizer), NGOs that may provide direct grants, communities, extended families, churches, and donor projects such as micro-finance, food-for-work, cash-for-work, rural investment funds, natural resource management, etc.. Without recognition and adequate support for formal or informal locally-based social safety nets, any event that causes suffering or loss, no matter how small, will be a "disaster".

Technical Assessment of the ZFBS

Anyone given the task of producing a FBS has some flexibility in what to include and exclude. If we begin with stocks, governments always include their favorite grain. However, there is a wide range of commodities which can be included as stocks.

A cereal balance sheet may include all cereals grown, a more complete food balance sheet can add all edible crops and a commodity balance sheet will add all agricultural production including livestock. Within this range of options, technicians can pick and choose depending on data availability, personal values about the meaning of food security, and sociopolitical considerations. In Zambia, stocks include only maize in commercial storage facilities. All the other maize from the last production year is considered to have disappeared and is not included as either food or as an indication of purchasing power.

Thus a country that wishes to hide its failures in the agricultural sector will look for grain in every granary and in every kitchen. A country that needs, for whatever reason, to parade its failures will not find any stocks in the country except in the most overt places.

The decision on which commodities to include in gross production is also influenced by sociopolitical considerations. Thus a country may include everything including baobab leaves, or may wish to make a stronger case for food aid by excluding some staple foods from its production figures.

The food "requirement" for a country is highly dependant on the consumption figures it chooses to use and there is flexibility in these choices. However, once you know what Zambians, as a group, normally eat, there are still several options available about the level you wish them to be fed in normal, emergency or disaster situations. The World Food Program uses 300 grams/day of dry cereal or equivalent for short-term disaster, 400 grams/day for emergency, and 500 grams/day for long term disaster assistance for people away from their homes, lands and families; a level of 350 grams/day was used in Zambia in 1998-99, for purposes of calculating food aid needs.

In addition to the quantity of food required per day, technicians need to decide how many days of aid are needed. This figure can range from a short "hungry season" period lasting 1-3 months, or for a whole year. If we look only at the consumption component we can see that there are three possible diets for any number of alternative durations of need; even if there is no question about stocks and production, differing consumption assumptions can give many possible alternative provisional FBSs for Zambia.

What does the FBS tell us?

Because of the great flexibility in choosing what should be included and excluded in developing a food balance sheet, they need to be interpreted with great care and never used directly for major policy decisions. They are usually used primarily by international agencies to obtain a concise view of potential cereal deficit and cereal surplus countries in any one year. In this sense they are primarily a presentation tool. They are assumed to sum up interesting and perhaps useful information related to the trade potentials across the various countries. Provisional food balance sheets are the most useful when they are used to compare across countries with similar types of economies with similar orientations toward food aid.

For a single country and depending on what is included, an FBS is an indication of how much cereal, food, or commodities are produced in the country. When combined with information on how people use the cereal, the food or the commodities, it may provide an indication of potential exports and imports for the country. The FBSs are not useful for other processes such as food aid calculations, or for assessing numbers of people vulnerable to food insecurity.

What does the ZFBS not tell us?

When food balance sheets are done at the national level, the results are not at all related to supply and demand conditions within the country. In addition, if individual countries are doing their own FBS, cross border trade opportunities cannot be determined. The FBS does not tell us anything about household purchasing power, which is the main key to food access, nationwide. It does not tell us that Zambians have many ways of obtaining money to buy food, or have many

alternative foods to choose from at many different prices at various times of the year. It does not tell us anything about how to target food aid, or about numbers of vulnerable people.

Therefore, given the difficulties in interpreting any single country's FBS, it is clearly a difficult tool to use for any policy decision (including food aid) where resource decisions need to be taken. This is especially true in the more complex economies of Southern Africa where there are adequate agricultural statistics and food security information sources.

The main reason for the limited usefulness of food balance sheets for specific food security purposes is that food insecurity is not a characteristic of countries or cities or regions. As Amarta Sen (Sen, 1981) has consistently pointed out, and as the USAID/FEWS Project and WFP/VAM methodologies reflect, food insecurity is a characteristic of socioeconomic groups. Food insecure socioeconomic groups are typically those marginalized by illiteracy, and by physical and economic isolation. Sometimes marginalization is due to market failure in times of civil unrest. This type of marginalization is the most worrisome for food security analysts because it is so unpredictable. In Zambia the most marginalized groups seem to be those that are rural and not adequately served by the transportation infrastructure (WFP, 1995).

These inadequacies of the FBS were the reasons for the development of famine early warning systems and vulnerability mapping. These more modern tools are used to identify smaller groups of people in need of income support by looking at livelihoods and income sources. The goals of all of the FEWS-type projects were to break down the principles of the FBS to smaller geographical units and incorporate the contribution of cash crops, livestock and off farm income. This was achieved, not to aid in the calculation of food aid, but to identify potential interventions long before food security became the problem. The result of this process was the development of vulnerability assessments that include the overall socioeconomic context for food production information at disaggregated levels.

Conclusions

The FBS does not provide any significant additional value to existing food security information. There is already sufficient food security information in the form of newspapers, telephones, faxes, email, satellite coverage and roads to assure that a famine will not happen in Zambia. These information sources also assure that major changes in food access (consecutive drought years, currency fluctuations, major pest infections, market collapse) will not pass unnoticed.

As a food security message, the ZFBS is difficult to interpret. If taken too seriously, the FBS confuses the commodity market with welfare. It makes cereal deficits in a single year look bad rather than as an opportunity for the market to work. Although cereal surpluses may look good, they may actually lead to reduced income for producers. It is asking too much of a FBS, to use it for deciding on the level of food aid, or as a presentation vehicle for food security.

The appropriate responses to the ZFBS or any FBS are limited. The ZFBS has been the primary presentation tool of the GRZ through the Vice Presidents Office (Disaster Mitigation and Management Unit) to communicate to the international community that hundreds of thousands of people (in poor maize harvest years, and at least tens of thousands in any year) will rapidly fall into destitution and starvation unless emergency food aid is provided immediately by outside donors. Further, the ZFBS is unable to indicate the "how or who" of potential food imports.

6.3 RECOMMENDATIONS FOR THE ZFBS

As an ex ante exercise, restrict the provisional FBS to a maize (or cereal) only balance sheet. It is clear that the more complicated the balance sheet becomes the more difficult it is to do, the more politically charged it is, more difficult to explain and the less credibility it has. The simplest form of the ZFBS would be the maize balance sheet. A maize-only balance sheet would properly focus attention on potential imports and exports of maize, and therefore assist policy makers and agribusiness in making international marketing decisions.

The simplest way to determine how much maize Zambia needs in a year is to use the long term average annual consumption derived from the ex post food balance sheets published by MAFF (1997). This appears to have fallen from a level of 134 kg/capita to 100 kg/capita per year in 1998.

The provisional maize FBS will be useful for the international maize market because it would be a clear statement of import requirements or export potential. It would be very clear to all users that it was concerned only with maize imports and export potentials, not human consumption in the country and not the aggregated food or dietary habits of Zambia. This sheet would not be referred to in the context of food security messages or food security decisions.

Zambia should continue to coordinate the development of the its provisional FBS with SADC; this ensures that Zambia can take account of assumptions and values used by other countries in the region, and ensures that a more useful regional provisional food balance sheet is produced to assist with regional trade.

In poor maize production years the primary client for the ZFBS is the donor community. The EWTC needs to assure the client understands the ZFBS. The best way to do this is to have the process of creating the ZFBS stay entirely with in the EWTC so that the political processes do not cause confusion and lead to unnecessary delays in response.

For ex post food balances, Zambia should continue to follow the format of the FAO Balance sheet for Zambia, which ensures that Zambia has a reasonably consistent basis for making national inter-year comparisons, and inter-country comparisons, for research and policy purposes.

7. THE USE OF CONSUMPTION ESTIMATES IN THE NATIONAL FOOD BALANCE

Consumption estimates are used together with data supplied by the annual crop forecast to predict Zambia's overall food balance. In theory, this is a straightforward process where a food deficit or surplus is measured by the difference between the country's total estimated production and consumption of staple foods. In years where the country does not produce all of the food considered necessary for consumption, the balance sheet will show a deficit which is normally interpreted as Zambia's total import requirement, comprising private and public sector imports plus donor food aid. In years with a surplus, the balance sheet is said to reflect the total amount of food available for export.

Although outwardly simple, the use of consumption estimates to calculate the national food balance is made extremely difficult by the fact that *consumption* is a subjective concept. Does the term refer to what Zambians actually eat, for example, or to what they should eat for a well rounded, culturally appropriate diet, or even to what they must eat to avoid starvation? From

whose perspective are these terms being defined? Obviously, a nutritionist is likely to answer these questions very differently than a politician, especially when the receipt of donor food aid is at stake. Given that consumption can be interpreted in many ways, it is unsurprising that a variety of approaches have been used to calculate Zambia's national food balance in recent years. At best, the outcome is widespread confusion which undermines the credibility of the balance sheet approach. When these data are used to make major policy decisions, however, the cost can be far greater in terms of inappropriate signals to the private sector and a misallocation of domestic and donor development resources.

Against this background, the primary objective of this Chapter is to clarify the procedures that have been used to calculate Zambia's national food balance and to stimulate discussion of ways to make more appropriate use of this information. Towards this end, this Chapter is presented in three sections. Section 7.1 reviews the basic elements of Zambia's food balance sheet and considers a set of technical factors relevant to the estimation of total consumption. Section 7.2 then reviews how consumption figures have been used in recent food balance sheets and considers the impact of policy decisions based on these data. The discussion concludes in Section 7.3 with a summary of key lessons and recommendations for the future.

7.1 CONSUMPTION IN THE FOOD BALANCE SHEET

As noted, Zambia's national food balance is calculated by estimating the total availability of selected food crops less the total consumption of each commodity. The methods used to calculate food availability have already been discussed, but simply put, are based on opening stocks left from the previous year plus total estimated production in the season under analysis. Consumption, on the other hand, is broken down into four sub-categories including: (i) food used for direct human consumption; (ii) industrial use; (iii) export and cross border trade; and (iv) losses. The basic structure of the food balance sheet is summarized in Table 6 where separate calculations are normally carried out for a range of important food crops.

TABLE 6: Structure and contents of the National Food Balance

| |
|--|
| A. Opening stocks |
| B. Total production |
| C. TOTAL AVAILABILITY (A+B) |
| D. TOTAL REQUIREMENTS (consumption) |
| D.1 Direct human consumption |
| D.2 Industrial use (seed, stock feed, breweries) |
| D.3 Exports |
| D.4 Losses |
| E. SURPLUS/DEFICIT (C-D) |
| F. Food Relief Requirements |
| G. Food Aid Import Requirements |
| H. Commercial Import Requirements |

As discussed later in this report, the choice of which commodities to include in the food balance sheet has been a point of major controversy with important implications for the way total import and food aid requirements are estimated. Traditionally, only basic cereals including maize, rice, sorghum/millet and wheat have been included in overall food balance calculations. In recent

years, the EWTC, with the guidance of FHANIS and NEWU, have taken steps to improve the situation by proposing a methodology that incorporates pumpkin, cassava, sweet potato and other tubers in the estimation of total consumption requirements. This method has been approved by the Early Warning Technical Committee and gained acceptance domestically, but has not been adopted by other organizations, including FAO and WFP, which produced their own pre-harvest food balance sheets for the purpose of estimating food aid requirements, following the 1997-98 season.

Estimating a precise figure for each type of consumption in the table above is far from a simple exercise since each item poses its own specific challenge. Any interpretation of the national food balance must keep this in mind since the estimated surplus or deficit is only as reliable as the many other figures used in its derivation. In order to clarify the situation and facilitate the interpretation of future food balance sheets, it is necessary to understand the methods used for estimating each category of consumption.

Direct Human Consumption

By far, the vast majority of Zambia's total estimated food requirement is accounted for by direct human consumption. Compared with other uses, human consumption typically accounts for about 85% of the total maize requirement and around 95% of the total requirement for other crops in most balance sheets.

Despite the importance of human consumption in the national food balance, relatively little is known about what Zambians actually eat. Indeed, the most recently available data on actual food consumption date back to the Household Food Consumption Survey carried out jointly by FAO and UNDP in 1970. At the time, an average of 150kg of staple crops (128kg cereal flour and 22kg cassava flour) were consumed per capita, with a notable variance between regions (FRA Research Note No. 1, October, 1997). In response to the lack of reliable field data, FHANIS requested CSO to carry out a further analysis of data from a Household Budget Survey carried out between 1993 to 1995 with special emphasis on consumption patterns. Unfortunately, this has not yet been possible due to technical problems with the use of computer software. Once the technical difficulties are resolved, the data could be used in the preparation of future food balance sheets.

With respect to urban consumers, the situation is slightly improved in that FHANIS has carried out a series of consumption surveys covering ten urban centers over the past two years (FHANIS, 1997, 1998). Nevertheless, these reports only show the percentage of urban residents that consume different foods and do not provide information on the actual quantities being eaten. Although these reports provide information that can help monitor the nutritional status of vulnerable groups, they say little about consumption patterns that can be used in the national food balance sheet.

To cope with the lack of reliable data on actual consumption patterns, a convention was proposed by FHANIS in 1997 to estimate human consumption requirements. This method has been approved by the Early Warning Technical Committee and adopted by NEWU to prepare its national food balance sheet (FRA Research Note No. 1, October, 1997). Specifically, this approach states that an average Zambian requires a total of 2,030 kCal per day in order to maintain a healthy, active life. This figure is a weighted average energy requirement for men, women and children and is based demographic studies of the Zambian population (i.e. 50% of Zambians are below 15 years of age) and other nutritional considerations. Next, the

FHANIS/NEWU convention states that of the total energy requirement, 70% (1,421 kCal) should come from basic staples including maize meal, sorghum and millet flour, cassava flour and other tubers (sweet potato, Irish potatoes and pumpkin), rice and wheat flour. The remaining 30% of total energy is assumed to come from animal products, fruit, vegetables and legumes. Although precise consumption patterns vary between provinces and regions, the estimated average of 70% of total energy from staple food crops is roughly in line with existing (but aging) Zambian research data.

In order to establish the proportionate amounts of each staple food required for human consumption, a further set of assumptions based on the availability of each commodity have been adopted. Simply put, this procedure assumes that the total consumption of sorghum and millet flour, cassava flour and other tubers is equivalent to total production so that any shortfall in terms of the energy supplied by these foods must be made up for by maize, rice, wheat and other internationally traded commodities. In other words, a surplus of sorghum, millet, cassava and other tubers is never assumed to exist since these commodities are either consumed locally or are available for consumption. Although this means that Zambia's overall food balance, as calculated by NEWU, is normally expressed only in terms of a surplus or deficit of maize, rice and wheat, the consumption requirements for these commodities (and hence the overall food balance) are derived with reference to a much broader range of food items. An example of how these calculations are carried out is presented in Table 7 using production estimates from the 1997/98 Final Crop Forecast.

Although the FHANIS/NEWU method is clearly an improvement over previous systems based on the number of grams of food that must be eaten each day, it is important to stress that the approach is still based on ideal dietary requirements. In this respect, any deficit shown in the food balance sheet only indicates that domestic production of food was not sufficient to provide a well rounded, culturally appropriate, menu based on the consumption of maize and other staples as 70% of the diet. There are an infinite number of ways for human beings to obtain the food energy they require each day, and a food deficit in the balance sheet should not necessarily be interpreted as a call for emergency intervention, including the distribution of food aid and other types of relief.

Finally, it must be noted that one extremely important factor underlying these calculations is the estimate of total population. Specifically, the data presented in Table 7 are based on official CSO estimates which state that there were approximately 10 million Zambians living in 1998 (see the note for column 8 in Table 7). This figure is based on the 1990 population census and various population growth assumptions, but is acknowledged to be little more than a best guess. To improve the situation, an independent study was carried out in May, 1998 to review the national population estimates with special emphasis on the impact of HIV/AIDS (Nsemukila, Buleti and M. Tembo, 1998). Briefly, this report found that the official population figures may be overstated by as much as 400,000 individuals. If this new projection is accepted, the total consumption requirement calculated in Table 7 could be overstated by about 82,000t.

Obviously, the choice of which population figure to use has a major influence on the estimation of total consumption requirements and this must be kept in mind when interpreting any food balance sheet. As discussed in Section 7.2, a variety of population figures have been used to calculate total consumption requirements which has spread confusion and cast doubt on the food balance sheet as a reliable tool for policy making.

TABLE 7. Calculation of the Estimated Staple Food and Crop Requirements for Human Consumption (1996/97 data).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------|--|---|-------------------------------|--------------------------------------|-------------------------------|----------------------------------|---|--|
| Staple Food | Proportion of staple diet (% of weight) | Proportion of staple diet (% of kCal intake) | Energy Value (kCal/kg) | Staple food required (kg/day) | Energy Provided (kCal) | Crop-Product Conv. Factor | Crop Requirement 1997/98 (kg/person) | Total crop requirement in Zambia 1997/98 (MT) |
| Mealie Meal | 64% | 69.73% | 3,600 | 0.274 | 986 | 0.90 | 111.05 | 1,110,487 |
| Rice | 1% | 1.5% | 3,350 | 0.006 | 21 | 0.65 | 3.57 | 35,729 |
| Wheat Flour | 6% | 6% | 3,400 | 0.025 | 85 | 0.75 | 12.2 | 122,039 |
| Sorgh/Millet Fl. | 4% | 4.79% | 3,550 | 0.019 | 68 | 0.90 | 7.78 | 77,753 |
| Cassava Flour | 15% | 14.73% | 3,300 | 0.063 | 209 | 0.33 | 69.44 | 694,419 |
| Other Tubers | 10% | 3.61% | 1,200 | 0.043 | 51 | 0.90 | 17.36 | 173,605 |
| TOTAL | 100% | 100% | | 0.431 | 1,421 | | 221.40 | 2,214,032 |

Notes:

- Column 1: Indicates the composition of the staple portion of the diet by weight, whereby mealie meal should not exceed 70%. Consumption of sorghum/millet, cassava flour and other tubers (which include sweet potatoes, Irish potatoes and pumpkins) is assumed to equal total production minus industrial use and losses.
- Column 2: Indicates the energy contents of the staple diet as a percentage (derived from Column 5).
- Column 3: Indicates the energy values of the respective foods.
- Column 4: Computes the proportionate quantities of food required in order to achieve the representative energy intake.
- Column 5: Indicates the resulting energy intake, the total of 1,421 kCal being the staple energy requirement which is 70% of the total energy requirement of kCal 2,030 per person per day.
- Column 6: Indicates the average conversion factor for processing the crop into food product.
- Column 7: Computes the annual crop requirement per person from columns 4 and 6.
- Column 8: Computes the estimated annual national crop requirement, using the CSO population estimate of 10 million people. However, crop requirements for sorghum/millet, cassava and other tubers are assumed equal to the estimated production. Therefore, the figures in Column 8 are used to compute the respective proportions in the diet in Columns 1 and 2.

Industrial Use

As indicated in Table 6, industrial consumption of staple crops is normally divided into three categories including production used for seed, the manufacture of stock feed and use by the brewing industry. For the most part, the measurement of these uses is far less controversial than the estimation of human consumption since data can readily be obtained from the industrial users themselves. The Food Reserve Agency has carried out extensive surveys of all industrial users of food crops regarding their expected intake of commodities. These data are used in the NEWU food balance sheet.

Because seed is one of the most important industrial uses of staple crops, however, it is worth noting that consumption is normally only measured in terms of the crop grown specifically for commercial seed companies. In other words, the estimated consumption does not include household retentions of recycled seed. At an average planting density of 20kg seed per hectare for maize, the total amount of grain used for seed can be estimated at approximately 10,000mt, based on the 1997/98 Final Crop Forecast which projected that a little more than 500,000ha were planted to this crop. Of this total, only a relatively small portion is supplied by the commercial seed companies as specified in the national food balance.

Like all consumption information, data on the industrial use of staple foods must be updated each year to reflect current conditions. Although the Food Reserve Agency has provided this information in the past, a system for collecting regular information from industrial users has never been formalized. As discussed in Part V of this report, better communication with the private sector is needed, including a system for collecting market prices and other information.

Exports

Food commodities leave the country through two basic channels including formal exports and informal cross-border trade. Formal exports are relatively easy to monitor since all consignments must be registered with customs at the border post. This information is collected and monitored by the Export Board of Zambia (EBZ). Informal exports, on the other hand, are much more difficult to quantify due to the very nature of this trade. Despite recent attempts to study and monitor informal trade networks, reliable information has yet to be provided that can be included in the national food balance.

Given the difficulty of estimating a total export figure for each commodity, a variety of approaches have been used. The technical notes included as part of most food balance sheets state that “net exports are estimated based on the demand for food crops in neighboring countries.” No further explanation is provided and a variety of figures have been used in the different balance sheets calculated each year. In 1997, for example, one balance sheet estimated unofficial maize exports at 29,200mt (Ministry of Finance, 1997), while another pegged the figure at 50,000mt (FRA Research Note No. 1, 1998). The NEWU balance sheet for 1998/99 states that only 10,000mt of maize will be exported.

Compared to the total volume of food taken up by human consumption, these figures are of relatively minor importance to the overall food balance. Still, the fact that a variety of estimates have been used illustrates the need to use caution when interpreting any food balance sheet. Because exports are difficult to quantify, this category of consumption offers considerable scope for an analyst to tilt the message from a balance sheet one way or another. Where there is

pressure to demonstrate a large food deficit, for example, the tendency may be to overstate the export figure.

Losses

The final element of consumption included in most food balance sheets is crop losses that occur as a result of poor post-harvest storage and other factors. Like exports, a variety of approaches have been used to estimate this category of consumption based mainly on presuppositions and best guesses rather than actual field data. For the most part, the food balance sheets prepared by NEWU estimates total losses at about 8% for maize and rice and 5% for sorghum and millet and wheat and 15% for tubers. Obviously, these figures add up very quickly and become a major consumption element.

In this respect, a much more careful examination of actual crop losses based on field research of storage techniques and post-harvest handling is needed. A single attack of larger grain borer, for example, can easily wipe out all of the maize held in a traditional village silo. On the other hand, wheat is primarily grown by commercial farmers with very good post harvest handling. In this case, losses are probably much less than for sorghum and millet even though the figure of 5% is applied universally to each crop. Likewise, cassava and other tubers are mainly consumed on site by farmers soon after harvest so that losses for these crops should probably only be calculated on the small portion that is transported and sold in urban markets rather on total production.

7.2 THE APPLICATION OF CONSUMPTION ESTIMATES

Having described the basic categories of consumption included in most national food balance sheets, it is worth considering how these measurements have been applied by different analysts and how the various messages have been interpreted.

As discussed, consumption is a highly subjective concept where each element (human consumption, industrial use, exports and losses) can be measured in many ways to tilt the message from a food balance sheet in a particular direction. This was especially evident following the 1997/98 production season where NEWU first projected a 200,000mt and later a 450,000mt cereal deficit. Meanwhile a WFP/FAO mission initially estimated the cereal deficit at 930,000mt (on an unofficial basis) and later revised the figure to 660,000mt. In response to these contradictory signals, an independent study was commissioned by the British High Commission which projected a 332,000mt surplus. In many respects, the large variation between these figures can be attributed to the way in which consumption was measured. (Crop production was also measured very differently by each of these studies with major implications on the estimated food deficit; production estimates are discussed elsewhere in this report.)

In the first place, each of these studies focused on a different range of crops. Specifically, the WFP/FAO mission only included maize, sorghum/millet, rice and wheat in its food balance calculations whereas NEWU also included pumpkin, cassava, sweet potato and other tubers. In this case, the WFP/FAO mission argued that these items were non-tradable, seasonal crops and so should be excluded from the national food balance. This position is a significant departure from the NEWU approach which includes tubers and other traditional foods in the 2,030 kCal formula described above. Likewise, the independent, British High Commission study included the income generated by cash crops in its estimation of the food balance.

Furthermore, the WFP/FAO mission worked on an assumption that Zambians need to consume 2,000 kCal of staple foods each day. This figure is considerably more than the NEWU estimated requirement of 1,421 kCal of staples per day and obviously had a major effect on the calculations of the national food balance. In this respect, it is worth noting that the WFP/FAO figure was adopted specifically for the purpose of working within “safe limits” for the purpose of estimating food aid requirements. As described above, however, even the NEWU figure is based on a well rounded diet where 70% of energy is supplied by maize and other staples. Both methods, therefore, ignored the potential for substitution between foods including a shift away from staples to other energy sources. Again, consumption figures can be used in many different ways to tilt the message from a food balance sheet one way or another.

Finally, it should be noted that each of these studies adopted very different population figures to calculate total food requirements. As described, this can have a major impact on the final calculation of the national food balance. Specifically, the WFP/FAO mission used a figure of 10.24 million Zambians whereas NEWU worked on a figure of 10 million. Meanwhile, the British High Commission study assumed a population of 9.1 million. In the absence of reliable census data, it is difficult to know exactly which figure to use and it is clear that more work is needed to agree on a standard population estimate. Without consensus, food balance sheets will continue to send conflicting messages with potentially serious implications for national policy.

Given the range of data supplied by the food balance sheets each year, it is difficult to know exactly how to interpret their messages. A variety of consumption estimates have been used based mainly on presuppositions about dietary requirements and other types of food use. Because food balance sheets are used, at least in part, to estimate food aid requirements and to make other major policy decisions concerning import and export policy, this ad hoc approach should not be allowed to continue. Indeed, the cost of the current system is likely to be inefficient trade policy, a misallocation of government and private sector resources, and the delivery of food aid to areas where assistance is not required. Given the scarcity of development resources in Zambia, it is imperative that every program should be well conceived and the current food balance sheet approach, which allows for the use of a variety of consumption estimates, is unlikely to provide a basis for sound policy decisions.

7.3 SUMMARY AND RECOMMENDATIONS

This Chapter set out to assess and describe the various systems for estimating human and other types of consumption in national food balance sheet calculations. A variety of procedures and assumptions have been used by different analysts and it is hoped that this discussion at least provides an improved basis on which to interpret future balance sheets. The methods used to estimate total consumption offer considerable scope for variation with major implications for the messages sent by food balance sheets. At the very least, extreme caution must be used in interpreting the national food balance, especially when major policy decisions are at stake.

To improve the situation, it is recommended that at the very least a standard set of assumptions and procedures for the calculation of human consumption requirements should be agreed. The FHANIS/NEWU approach that focuses on energy requirements rather than grams of food is a step in the right direction, but still needs further refinement. In particular, it seems this method has not been well understood as evidenced by the confusion over whether cassava and other local foods should be included or not. Much more effort, therefore, is needed to explain the assumptions and operational procedures used in these calculations, including a declaration that

the total estimated requirement of 2,030 kCal (with 70% coming from staple foods) is based on a well rounded diet for an average Zambian. In these terms, a food deficit must not be interpreted as crisis calling for emergency imports and food aid.

Methods for estimating other types of food consumption should also be refined. As discussed, a system should be developed for collecting regular information from commercial users of food stocks. Better information is also needed on actual exports and crop losses. This is especially true given that that industrial use, trade figures and losses are normally stated in most balance sheets as a matter of fact, rather than as estimates. Until more reliable information is available, these figures should be treated with caution and it may make sense to calculate alternative balance sheets based on confidence intervals. One possibility, for example, would be for NEWU to prepare a best, average and worst case balance sheet, but this approach must be well explained so that the methodological procedures are fully transparent.

One often repeated suggestion is that Zambia should carry out a detailed consumption survey and that these results should be updated at least every five years. As noted, the most recent national consumption survey dates back to 1970 so that reliable information on current consumption patterns is not available. Although the results of such a survey could be used for monitoring the nutritional status of vulnerable groups, it is difficult to argue the case for this work on the grounds that it is needed to prepare improved food balance sheets. Indeed, macro-level balance sheets are, by definition, intended only to reflect total food availability at a very broad level and the FHANIS/NEWU approach is probably adequate for this purpose. Rather than complicate the model with excessive detail, therefore, it would make much more sense to improve systems for monitoring the level of access to food for different segments of the population, which is the essence of Zambia's food security problem.

Finally, it is worth asking whether the balance sheet approach is even the best way to estimate a food deficit or surplus. Given the fact that consumption (and production) data can be expressed in an almost infinite number of ways, with the detailed assumptions and methodological procedures disguised in vaguely worded footnotes, it seems that an alternative system for measuring food availability and stress on human consumption may be more appropriate, at least in terms of estimating food aid requirements. Although food balance sheets may be useful for planning macro-level trade policy, a focus on changes in market prices and degree of substitution between different commodities would provide a more reliable measurement of food availability and stress than a national balance sheet in specific locations. These and other alternative systems for monitoring food availability, and the level of access to food for different segments of the population, are discussed elsewhere in the main report. In the absence of a more reliable system for estimating consumption than traditional food balance sheets, a move away from this approach may make very good sense.

8. VULNERABILITY ASSESSMENT MAPPING (VAM)

8.1 DESCRIPTION

This chapter reviews some of the elements of disasters in general and describes the VAM's role as a risk assessment tool for food security disasters (early warning) and preparedness planning in Zambia.

Risk Assessment (RA)

Risk assessments are the first step in disaster preparedness planning. The common characteristic of risk assessment methods is that they rely on inventories (formal data sets and less formal sources of information) of what is at risk, and what is available to reduce the risk and mitigate consequences of disasters. These inventories, of what can be lost and what is available as capacity, are an essential part of all RAs. It is the case with all methods of assessing risks that the better the inventories, the better the assessment. For example the FBS is a very crude risk assessment. It is a small inventory of what is at risk for food problems (population of the country) and the resources available to reduce that risk (food produced and imported).

Risk assessments can be done at any level from individual and household to community, town, city or national. They are usually formal documents that point out the strengths and weakness in preparedness and assess the hazards that people could face. RAs formalize information that people may already have and know. It is the formal structure that provides decision makers with unambiguous information useful for making decisions and creates an institutional knowledge base that is transparent. The goal of a RA is to quantify, as best as possible, some of the elements of risk. These quantities can be monetary units, units of energy intake such as kCals, lives lost or injuries if a trigger event of some magnitude occurs (UNDP, 1992, page 67). The structure of risk assessments is often geographic; mapping important hazards, elements at risk, and vulnerability. To understand better the UN approach to disasters a few operational definitions of key terms are needed:

Disasters are events that cause suffering and losses that exceed the capability of a family, community or country to cope. They demand a crisis response beyond the scope of any single agency or service, such as the fire or police department. Thus, disasters require assistance from outside the affected family, community or country to reduce suffering and aid in recovery. Every disaster, whether individual or national, is a declaration that the consequences have exceeded the ability to cope. A car accident will be a family disaster, a bus accident may be a community disaster, a disease epidemic may be a district disaster and a widespread crop failure, in a poorly prepared country, may be a national disaster. Note that a car accident is a disaster for a family because injuries may keep the family from going to work and they may have to ask their friends for help. The car accident is not a community disaster because the local authorities and local medical staff can handle the situation without bringing in resources from outside the community. For large-scale disasters that affect a community, city or nation, a disaster is a declaration that the local and national government cannot carry out its duties and responsibilities to protect and provide for the safety of its people.

Hazard or disaster agent is a dangerous event or circumstance that has the potential to lead to a disaster. The list of hazards in Zambia includes floods, droughts, technological accidents and civil unrest. **Vulnerability** is the susceptibility of life, property, or the environment to suffering and damage if a hazard occurs. **Risk** (potential loss) is the probability of suffering those damages. Disasters are caused by the combination of vulnerability and hazards. Only when vulnerability is high, are hazards able to cause a disaster.

Underlying Causes of Disaster in Zambia

The underlying causes of disasters are any conditions that contribute significantly to increasing vulnerability. The UNDP points out six underlying causes that contribute significantly to increased vulnerability. These are 1) poverty, 2) limited access to political and economic

decision making structures, 3) lack of awareness, 4) economic systems, 5) general preconditioning factors and 6) ideologies.

- **Poverty** is the primary determinant of vulnerability. This is due to the definition of a disaster as an event that exceeds the resources of a community to cope with any consequences. Poor people (and poor countries) have fewer resources and, therefore, small hazards can cause disasters. In Zambia, incomes have been spiraling downward since 1990 and currently 65 percent of the population lives on less than \$US 1 per day.
- As pointed out in the introduction to this study, famines happen to the "**marginal and least powerful groups in a community**". These are the people and communities that are the most removed from political and economic decision making structures. In some countries these ethnic groups out of favor with the current national government or people living in isolated areas and not represented by the government authorities. In Zambia, these are smallholders and emergent farmers that live far from the line of rail or paved roads.
- **Lack of awareness** about the risks around them prevents people from taking the actions necessary to protect themselves, their families, their communities and country. In Zambia, the information services are weak and it is taking time for growers to move away from crops that are expensive to produce, difficult to market, and prone to failure in growing seasons that are less than optimal.
- Some **economic systems** can become more vulnerable when resources become scarce. In centrally-planned economies, resources for communities were well planned out and allocated according to the general needs of the community. Thus, the number of teachers and schools was based on a count of the number of students. The number of hospital beds was based on the estimated number of sick or injured at any one time. This centralized planning was efficient in some ways because it reduced waste and reduced the costs of dealing with surplus resources at the local level. Since there were no surpluses, it was very difficult for communities to cope with any events that caused losses of any kind. The national government provided the necessary extra resources to cope with any these events (no matter how small) in a community, much like an insurance company. In Zambia, this approach to disasters is still the case. The DMMU feels that it has the responsibility to compensate smallholders for their crop failures. The problem is that this is a very expensive task and the GRZ no longer has the resources for this kind of intervention. The current lack of GRZ resources to cope with disasters, requires DMMU to declare a national disaster in order to secure outside funds for compensating those smallholders who suffered a crop failure.
- Some **preconditioning factors** for disasters in Zambia could include the effects of the AIDS epidemic on the most productive age group of the economy and the rapidly deteriorating rural infrastructure that is producing shortages of potable water, long trips to adequate health facilities and contributing to the fragile economies of some communities. These communities are those that are isolated, lack diversity and where the major economic contribution takes place in high-risk zones: for example, rainfed agriculture taking place in areas of high variability of rainfall.
- **Ideologies** refer to pervasive beliefs within a culture that may influence attitudes about disasters and disaster preparedness. An example from centrally-planned economies, could be the belief that the government should take care of all disaster issues. This ideology could manifest itself in two ways: 1) lead individuals and communities to assume the government would take care of disaster mitigation for them, and therefore individuals and communities would not take much responsibility for disaster mitigation, and 2) lead the government

structures to assume that all disaster mitigation work was government responsibility. An example of this in Zambia could be the reference to "food aid syndrome" that suggests that growers are not moving to safer crops because there is often compensation from the DMMU when there is a maize crop failure. For the government side, the DMMU has been mostly focusing on disaster response to maize crop failures through food aid.

The VAM as a risk assessment tool

The Vulnerability Assessment Mapping exercise of WFP/FEWS is a risk assessment that attempts to capture some of the underlying causes and dangerous conditions necessary for a food security disaster to happen. It is an outgrowth of work which was done by the FEWS/USAID in the Sahel regions of Africa. FEWS adapted the concept of disaster vulnerability assessments to famines by pointing out necessary conditions for famines to happen. That work was based on a review of previous famines in Africa, identifying areas where famine had occurred in the past, and analyzing the preconditions of famine based on the wealth of information that had been accumulated over the years. The primary assumption in those vulnerability assessments was that drought-related famines could only occur in areas similar to where they had occurred in the past. The similarities were based on socioeconomic data, primary sources of income and agro-climatic zones. Some of the indicators that have appeared in various vulnerability assessments to represent these similarities are listed in Table 8. These have been used in various countries at various times.

Referring to Figure 4, which is based on the diagrams of Figures 1 and 3, we see that the indicators included in a VAM attempt to capture some of the elements that contribute directly to "disposable income". These elements are gross income from agricultural production, wage earning, and other non-farm income which are represented by the black arrows inside the large central (blue) VAM box of Figure 4.

The VAM in Zambia continues with this approach to determining vulnerability. It selects some indicators of vulnerability that have been related to food security disasters in Zambia. It quantifies the income sources and risks in each District and attempts to capture the contribution of all crops, forest products, livestock, and money transfers, to wealth in each district. Relative wealth is rightly assumed to be related to food access.

The objectives of the VAM in Zambia are to:

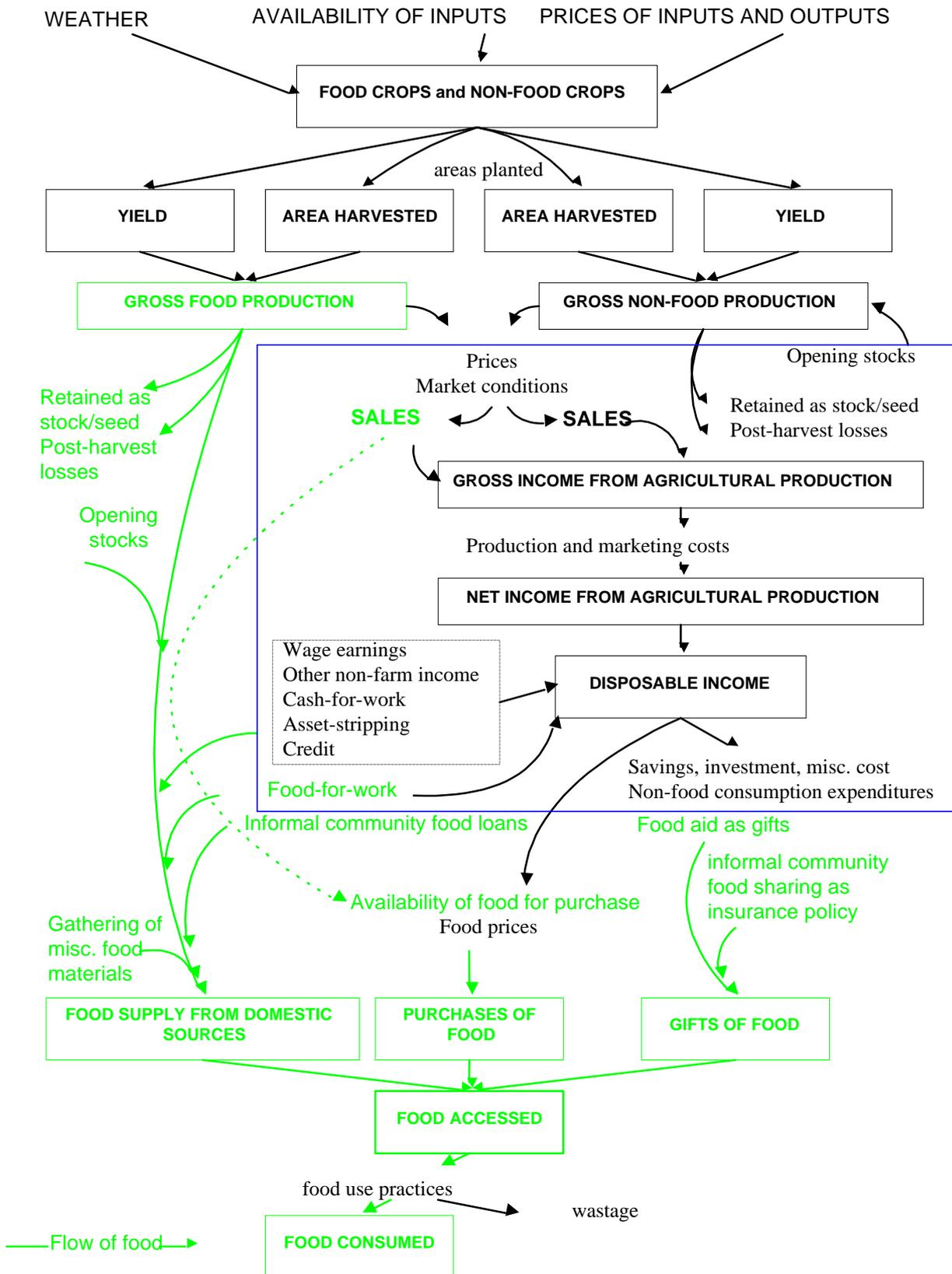
- Enhance geographic targeting of vulnerable areas for future intervention (vulnerabilities)
- Provide early warning indicators to facilitate identification of areas where conditions have changed from the previous year
- Recommend appropriate intervention strategies in the vulnerable areas
- Assess the physical conditions that affect crop production (risks of crop failures due to drought and flood).

The method of the VAM is to identify the sources of income for each district by using secondary data from the population census, the agricultural census, other official data, and surveys that provide wages and salaries. The sources of incomes are added together to form an indication of the total annual income of each District. Those districts with low annual income become areas where the more detailed Food Needs Assessment survey is conducted to identify numbers of victims.

TABLE 8. VAM indicators. (This is a collection of indicators that have been used in various VAM exercises in Africa. The indicators used in Zambia are in bold.)

| Dimension | Indicator | Weight | |
|---|---|--|------|
| Quality of life | Water points per capita | | |
| | % households with access to electricity for lighting | | |
| | % households with access to electricity or gas for cooking | | |
| | % households with flush toilets | | |
| | Percent households with access to piped water | | |
| | Average relative cost of travel to nearest district market | | |
| | Average relative cost of Travel to nearest major urban market | | |
| | Life expectancy | | |
| | Infant mortality rate | | |
| | Child mortality rate | | |
| | Under five mortality rate | | |
| | Rate of school attendance for population over 5 years old | | |
| | Literacy rate | | |
| | Population density | | |
| | Population growth rates | | |
| | Non-agricultural wage earners as a percent of all wage earners | | |
| | | TOTAL QUALITY OF LIFE | |
| Resource base | Average length of the rainy season | | |
| | Average maximum greenness of the vegetation | | |
| | Variability of Average maximum greenness | | |
| | Distance to river or lake | | |
| | GDP per capita | | |
| | Animal traction units per capita | | |
| | Km of paved road per sq km | | |
| | Tin roofs per capita | | |
| | | TOTAL RESOURCE BASE | |
| | Medium Term | Average per capita cereals production | |
| Average per capita roots/tubers production | | | |
| Average per capita cash crop production | | | |
| Average per capita fisheries production | | | |
| Average per capita livestock off take | | | |
| Other transfers | | | |
| Available wild food | | | |
| Available forest products (charcoal, wood) | | | |
| Wages and salaries | | | |
| Crop diversification index | | | |
| | | TOTAL MEDIUM TERM | |
| Current Year | | Per capita production all crops from Final Forecast | |
| | Per capita livestock off take | | |
| | Per capita fisheries | | |
| | Per capita production all crops from MAFF/Ext Camps | | |
| | Maximum Maize price minus maize price two months later | | |
| | Livestock/cereal terms of trade | | |
| | Biomass maximum difference from average | | |
| | Drought days in February | | |
| | Drought days in March | | |
| | Rainfall more than 300 mm in a dekad | | |
| | Livestock disease | | |
| | Crop pests | | |
| | Per capita production of all crops from previous year | | |
| | Civil insecurity | | |
| | | TOTAL CURRENT YEAR | |
| | | Total | 1.00 |

FIGURE 4. A graphic outline of the place of the VAM in the food security system. (The VAM is primarily concerned with the contents of the blue box.)



The VAM is a process activity. Over the years some indicators have been dropped from the final analysis of economic security and some have been added. In Zambia, there has been a general trend toward increasing the significance of the short-term (more rapidly changing) indicators. This has come about as the economic security situation for most Zambians steadily declines and they have become more and more vulnerable to crop failures. The current indicators for the VAM in Zambia are in bold type in Table 8 and are listed here:

Vegetation biomass for 1998 difference from the long term average

Total annual rainfall for 1998 difference from average

Livestock disease

Long-term coping ability (10-year average)

Relative cost to the nearest market

Income from crops

Income from livestock

Income from fisheries

Income from transfers

Wages and salaries

Current coping ability (in 1998)

Income from crops

Income from livestock

Income from fisheries

Income from transfers

Wages and salaries

The six indicators for long-term coping ability identify areas that are relatively poor in the sense that crops, livestock, fishing, transfers and wages, capture most of the income in these areas. In addition the relative cost to the nearest market, captures some information on the marginalization of rural groups that is a major factor in the development of food insecurity. The other eight indicators capture current or very recent shocks to the District agricultural economy that would affect large numbers of people.

The indicators are combined using an income accounting approach. The use of income accounting as a method for combining indicators provides a measure of the absolute vulnerability of different districts. Income accounting avoids the problems of trying to decide how important an indicator is and then giving it a "weight". Weighting indicators is a very difficult task especially if there is not general agreement on the specific goal of the VAM.

8.2 ASSESSMENT OF THE VAM

Clients, like the EWTC, participate in developing the VAM and use it often. The VAM is a structured data set of most of the useful socioeconomic indicators related to development issues and poverty identification. The mere structuring of this kind of information into an easily-accessed database has been very useful for many projects and development interventions. The WFP uses the VAM to make programming decisions about where to target supplementary feeding. The FHANIS uses it to identify where food surveys would be most helpful to the GRZ. The PAM and other NGOs use it to better target emergency food aid. Within the WFP, the

VAM is linked directly to organizational policy objectives - specifically, estimating food aid needs and targeting supplementary feeding programs.

The VAM in Zambia has several problems that reduce its credibility. As noted, the VAM is a process activity that changes according to user needs. The goal of this process activity needs to be carefully considered so that the results from the VAM are useful for reducing the long-term vulnerability of the most vulnerable socioeconomic groups. If the goal of the process is to find places to send food aid, this will inform the choice of indicators and the interpretation of those indicators. If the goal is to provide information for development interventions for reducing vulnerability in the long term, then the choice of indicators will be different. The indicator list has been changing. For example, in the 1995 VAM, there was a feeling that mono-cropping was a major contribution to food insecurity of smallholders. Thus, there were indicators that included the share of drought resistant crops and a crop diversity index. These have been dropped in the shift to an income accounting approach. In 1996, indicators of long term general development were dropped in favor of income and asset accounting. The loss of these kinds of indicators may, inappropriately, suggest to decision makers that annual agricultural production is the most important criteria for determining vulnerability. This approach seems consistent with the recent history of disasters in Zambia. They were all attributed to crop failures due to drought (or occasionally, flood).

The scale of the VAM analysis depends on the country but is usually done at an administrative level that is disaggregated enough to lead to relatively homogeneous units of study. The smaller the unit of analysis, the more effective the VAM would be in realizing its goal of identifying where the most vulnerable people live and why they are vulnerable. The current unit of analysis is far too large; Districts have an average population of 138,000 people and cover 13,000 square km. There is too much room for major heterogeneity in an administrative unit of this size, given Zambian conditions. The VAM would be far more useful if done on smaller geographic units. For example, the units for the VAM in Mali have an average population of 30,000, in Burkina 32,000, in Niger 66,000 and Chad 15,000. Moving to this scale would not require many resources because the two major indicators related to vulnerability (population and drought areas) are readily available. The population data is available from the CSO at the level of the Standard Enumeration Area (SEA), and the locations of droughts are available from ZMD and SADC at the pixel level.

It is quite likely that the VAM can be influenced by sociopolitical bias just as a FBS. It was originally designed to rule out where famines could happen rather than "find" destitute people (as in the Zambia VAM). In addition, the VAM, which was developed to find marginalized communities and suggest ways to reduce their marginalization (increase literacy rates, provide potable water, develop the communication infrastructure, etc), has begun shifting towards the goal of finding places to absorb food aid in Zambia. Much of this shift could be attributed to the institutional setting of the VAM in WFP. The WFP provides food aid, thus using the VAM for finding places to send food aid makes institutional sense.

It is oriented toward showing food stress rather than the availability of opportunities. The VAM shows quite convincingly that all of Zambia is very vulnerable using income thresholds based on costs of a nutritious food basket. It also includes some indicators that are helpful for assessing and increasing food access (access to markets) and others that do not seem very helpful (cumulative annual rainfall, and monthly vegetative biomass differences from average).

The VAM is the primary tool for food security analysts but may not be useful to decision-makers because of its complexity. Most decision makers have not understood the methods and objectives of the VAM, so that the VAM report has been poorly utilized. It provides the necessary economic context for the role of agricultural production and other sources of income at the District level. At the national level, the VAM can provide some of the information necessary to support calls for economic assistance in the event of a disaster.

The VAM has usually been produced late in the marketing year (August or September) to provide information on where groups or communities need to be monitored more closely for deteriorating economic conditions. In the current climate of a disaster being declared every year, this timing is not useful for informing response decisions in the event of a crop failure.

8.3 RECOMMENDATIONS FOR THE VAM

There are a number of ways to improve the VAM so that it better addresses its objectives. As the primary food security tool for Zambia, the VAM should be a clear statement of where the poorest and most marginalized people live, the reasons why they are marginalized, their level of risk of crop failure due to the weather, and the extent and severity of the conditions that produced the crop failure in the current year.

The most significant improvement, that would address the objectives of the VAM, would be to use smaller geographic units of analysis. Smaller units will greatly improve the critical information on **where** people live in relation to droughts, floods, market access and other events associated with food security disasters. As noted, Districts are too large to be very useful. Users and developers suggested that the level of Wards or Camps would be best. These smaller units would be the most appropriate because the demographic data are available through the MAFF and census. This transition to smaller units will be aided by the year 2000 census that should make available new village level demographic data. Incorporating professions of household heads into the census will provide a general indicator of the primary sources of income and aid in identifying what economic shocks are most likely in specific communities.

It is essential to reincorporate the development indicators into the VAM to better answer the questions of **why** these people are marginalized and vulnerable to crop failures. The reason why the general development indicators (refer Table 8) have been left out of recent VAMS are that they "don't seem to be related to coping strategies", and the methodologies for combining indicators does not allow an easy way to convert them into money or maize equivalents. This focus on coping strategies, like the availability of maize in the neighborhood after harvest, limits the usefulness of the VAM to solely food aid targeting. Food aid targeting should be only one, and not the most important, objective of the VAM.

We want to see more use made of satellite imagery for identifying the severity and extent of drought. Course resolution satellite imagery provides better indicators for natural resource availability (vegetation) and current shocks to agriculture. As noted in the crop forecasting section of this Chapter, the forecasts from CSO are probably not indicative of crop production at the district level (because the sample size is too small) and it is unlikely that better ground-based provisional estimates will be available in the near term. This situation provides an opportunity for using the satellite technologies available from SADC or the ZMD for estimates of the quality of the season for units smaller than the District. The use of smaller units will also help identify the spatial extent of droughts or floods. Incorporating this information into the formal structure

of the VAM will require attaching a cost to the quality of the season. There are several ways this can be done. The SADC model is most convenient because it provides a result for the quality of the season that is easily converted to maize yield per hectare. The ZMD and the VAM committee will have to work together to incorporate ZMD quality of the season estimates into the VAM. The simplest solution would be for the ZMD to use the results of their model to adjust the current indicator of long-term average per capita production from all crops. For example, if the quality of the current season were bad then the long-term average income from crops would be decreased by perhaps one or two standard deviations and used as the income from crops for the current year.

Improve the presentation, which is currently not user friendly even for technocrats. Some of the problems include the presentation of irrelevant data and information not related to food access (food balance sheet, maize availability). In addition, some of the transparency that was part of the earlier VAMs has been lost over the years. The most notable is insufficient distribution of the data. The VAM's data tables should be made available on diskette, as in earlier years. The VAM needs to be completed, or at least summarized, and presented to decision makers as early as possible to support local disaster mitigation activities and provide guidance for development programs geared toward reducing vulnerability. In addition, all of the food security decisions that need to get made for emergency food aid, require information by July. If the VAM is not ready, then arbitrary and ad hoc decisions will be made, resulting in poorly-targeted food aid and other interventions with negative consequences for the market and producers. The resources for improving the presentation are currently available from FEWS, WFP or the FAO.

9. THE FOOD NEEDS ASSESSMENT (FNA)

This centrally-funded initiative is the final stage in identifying socioeconomic groups in specific areas that are eligible for interventions and economic support. The FNA, again, is a sample survey drawn from those districts that have shown indications of economic stress serious enough to lead to liquidating productive assets.

This household survey asks about major and secondary livelihood strategies, any disabled and ill members, how many were engaged in agricultural production and what crops they grew including horticulture and fruits. It covers livestock, fishing and non-farm sources of income. The food security questions start with how long stocks will last, most important source of staple food, what the household will do when their stocks run out, and what wild foods they are gathering. The health section covers illness, sources of drinking water and type of sanitation. The consumption section covers what foods were eaten yesterday for each meal. Children's arm measurements and the levels of nutritional supplements are recorded.

The Survey also uses a District Needs Assessment Questionnaire that gathers socioeconomic data on the District and the impact of the disaster. This questionnaire ranks livelihoods in terms of their economic importance to the District, asks for production figures on other crops that may be important for the local economy (sweet potatoes, Irish potatoes, cotton, tobacco), deaths of livestock, importance of fishing, and prices of a number of common food items. Other economic information includes quality and capacity of storage facilities, number of private traders, transporters, and seed agents. Lastly, the survey asks for some general information on health in the community that includes the incidence of several common diseases, available health facilities and percent of the population with access to safe water and safe sanitation.

Results

The presentation of this information in the 1998 FNA suggests that the trend of moving away from unprofitable crops like maize is reducing food security at the local level. The reasons for this shift away from maize are not completely clear, but this will have a significant impact on food security formulas that relate food production to food security, and on policies geared toward that illusive goal of food self-sufficiency whether at the household or national level.

In 1998, the FNA concluded that there were 750,000 people that were severely affected and would need five months of food aid. In addition, there were a large number of others that were less affected but would still need three months worth of food. The total food aid requirement came to approximately 61,000t, and no food needs assessment team reported that food aid was not required.

The FNA is not a perfect tool but does help fill in some of the gaps that the VAM leaves. The FNA will improve when the VAM analysis uses smaller units, and when local authorities are able to provide more information on the economic situation within their communities.

10. CONCLUSIONS CONCERNING CENTRALLY-ADMINISTERED FOOD SECURITY ESTIMATIONS

The centrally-administered food security monitoring systems are useful because there is some attempt at standardization of methodologies for early warning, and at producing systematic technical reports on specified schedules. This structure is very useful for reducing ambiguity in disaster related information. However, in some years such as 1998, the decision making process was not sufficiently influenced by these centrally-administered food security monitoring systems; the result was confusion about scale of the crop failures, locations of the crop failures, locations of victims and the scale of their suffering. This problem is compounded by the fact that the technical results are routinely reinterpreted at political level.

The institutional links and transparency in the decision making process were absent, resulting in criticism of the EWTC/NEWU. Almost all of the technical work of the EWTC was discounted to the point where many stakeholders were asking about the value of the whole enterprise of early warning. The following recommendations attempt to support the presentation of technical findings for clear and transparent decision making.

Focus on Disaster Mitigation

Currently there is no legal framework for declaring or responding to a disaster. This causes confusion at all levels. Many ad hoc decisions are made due to the lack of a legal framework for declaring a disaster at the local level and the national level. The DMMU is currently working on this problem and it should be resolved early in the year 2000.

In the event of a crop failure for example, the village or Camp could appeal to the Ward for assistance. If the Ward did not have the resources, it could appeal to the District. If the District could not provide appropriate assistance it would have to appeal to the Province. If the Province could not provide the appropriate assistance it would appeal to the National DMMU. If the DMMU could not mobilize the necessary aid from the national resource base to cover the problem, it would have to declare a national disaster and petition the international community for help. This arrangement focuses on the local communities to define a disaster and what level

of distress (for example, extent of asset stripping) is acceptable before the local authorities respond with assistance.

The most common method for drought mitigation is to grow crops that are drought tolerant. Maize crop failures are the most common disaster agent in Zambia, purportedly affecting 750,000 vulnerable people in 1998. The best way to reduce the consequences of maize crop failures is to grow crops that are better adapted to the climatic and input constraints of Zambia. Local producers are learning this effective mitigation technique and the shift away from maize production, that began in 1992, is continuing at a rapid pace. This trend will continue but can be supported by outgrower schemes for more profitable crops and continued support of the introduction of more drought tolerant crops like millet and sorghum (e.g. PAM's Drought Rehabilitation Program).

Use only a grass roots head count for victims

Serious famines struck Africa in the 1980s. Since then, the causes of famines have changed from drought to market failure during times of civil unrest, economies have changed from command economies (the most susceptible to famine) to market oriented, the communication infrastructure has grown and governments have shifted towards more openness, citizen involvement, and the toleration of a free press. These changes suggest that centrally-administered food security monitoring systems may not be as important as they were 15 years ago. Local communities may be in the best position to identify those households moving towards destitution and have a good idea of why they are moving in that direction. The local elected representatives and local authorities have a stake in identifying droughts, in the extent of crop failures and in the economic consequences of these crop failures, so that appropriate responses are taken and suffering is reduced. Local communities can identify the specific victims, with names and addresses.

The Market Information System

The alternative, or supplement, to VAMs or food balance sheets for identifying economic stress within communities, is a market information system (MIS). The MIS helps consumers and producers allocate their productive resources, plan their purchases and sales, and prepare for their next cropping season and next crop failure. The MIS at the local level follows information on household income sources, especially those sources to which the poorest of the poor have access. These include charcoal and other forest products, brick making, fishing, cash crops and livestock. Most informative at local level is to follow the terms of trade between critical commodities. Depending on the area this could be cassava/livestock, maize/sorghum, maize/fish, maize/charcoal, maize/fertilizer, or any other combinations that communities feel would capture the major contributions of their economies to household financial security. Implementing a rudimentary local MIS at the District level would not require many resources since computers and market managers are already there.

Adapting food monitoring systems like FHANIS and the FNA to social services monitoring

The FNA already tracks important development indicators at the community level. This approach should be supported so that there is a growing understanding of the socioeconomic factors impacting food security. Confusing welfare and food security has led food security

agencies to become involved in general welfare programs rather than more carefully targeting the much smaller numbers of households who are truly food insecure.

Social Safety Nets not dependent on food aid.

The money to finance social safety nets could at least partly come from savings in food aid distributions. This is a difficult option for some donors like USAID that have restrictions on how emergency assistance is provided. However the EU is taking some steps to address this issue with their support to the Public Office Assistance Scheme.

PART IV. FOOD AID RESPONSES TO FORECASTS, WITH REFERENCE TO 1997-99

Crop forecast information is used each year in Zambia to make major policy decisions concerning food imports and emergency relief programs. In principle, the national forecasting systems are meant to provide reliable information on the production and consumption of essential food commodities so that policy makers can plan effective interventions needed to ensure market stability and cope with food shortages when they occur. Due to a variety of technical and political constraints, however, this has rarely been the case and most forecasting messages are greeted each year with confusion and controversy. This was especially evident following the recent 1997/98 production season when crop forecast information was used to plan a major food aid intervention covering 57 districts in virtually every corner of Zambia. This decision was based largely on early warning forecasts of El Niño weather conditions and initial crop estimates that showed below average agricultural production. Even today, however, more than twelve months after the initial crop estimates were first released, there is still little agreement over the extent of the problem and whether emergency food aid was truly needed.

What stands out most from this episode is that Zambia's crop forecasting system failed to send clear, time-bound information needed to plan an appropriate response. Official production estimates were regarded by government and the community alike with extreme skepticism and at least five versions of the national food balance sheet were prepared by different organizations for estimating food aid requirements. Information on vulnerability to food insecurity at the District level was only published about four months after these data were required and assessment missions fielded to estimate relief requirements virtually ignored the possibility that food aid may not be the most appropriate form of assistance. Major policy interventions should never be left to chance and it is imperative that steps be taken to avoid similar outcomes in the future.

Due to these and other problems, the implementation of the food aid response was marked by a haphazard appeal for assistance, late deliveries of food aid donations and an extension of the distribution season until well after the 1999 harvest had begun. As will be discussed, food aid is a very indiscriminate form of assistance in terms of the potential negative consequences on farmer attitudes and private sector development. Given that food aid only treats the effects of poverty, and is not a cure, these points provide good reason to question whether this form of assistance has a useful role to play in Zambia. Although emergency intervention may be required from time to time, food aid must be used much more judiciously in the future and should never be the first response of government and the donor community to crop forecasting messages.

Against this background, Part IV of this report reflects on how the system worked, or failed to work, in 1997/98, with the primary objective of stimulating discussion among key decision makers on how to improve the process of crop forecasting. Thus, it is hoped that improvements can be made to avoid the problems and eventual misallocation of resources that marked this season. Following a review of 1997-98 technical forecasts (Chapter 11), and of the details of the 1997/98 crop forecasting messages and the signals these sent to national decision makers (Chapter 12), Chapter 13 looks at how these messages were interpreted by government and donors in deciding on the various forms of response. Chapter 14 considers the implementation of the 1998-99 food aid exercise, Chapter 15 assesses the potential impact of this response, and the discussion concludes in Chapter 16 with outline findings and recommendations.

11. THE 1997-98 CROP PRODUCTION FORECASTS

There was confusion amongst government and donors about the level of food security in Zambia in 1998-99. This confusion led the GRZ to make expensive and counter-productive interventions in maize and fertilizer markets, and led to the GRZ and donors making contentious levels of provision of food aid. The numerous – and often conflicting – weather, crop production and food security forecasts were implicated in producing some of the confusion. There were also problems of inappropriate interpretation and distribution of technical messages. Finally, there was a marked lack of coordination and consensus between the major stakeholders, particularly regarding responses to the various messages. This Chapter concentrates on the technical crop production forecasts themselves, tracing the messages that flowed from the Global Climate Model (GCM) organizations, international organizations, and the Zambian Meteorological Department. Also included are details of the forecasts from the Zambia National Farmers' Union (ZNFU), the Central Statistics Office (CSO), MAFF extension service, public officials, NGOs and others.

In recent years the irregularly recurring inter-annual oscillation of Pacific sea surface temperature (SST), and atmospheric pressure, has produced what is known as the El Niño Southern Oscillation (ENSO). This is an anomaly in the global climate system that is associated with a shift in maximum precipitation from the western Pacific to the central and eastern Pacific regions. ENSO events are associated with SST events, and thus SSTs have been the primary indicator of the strength and magnitude of disruptions to normal climate patterns. Beginning in January of 1997, there were early indications that western Pacific SSTs were increasing at a higher rate than usual. This information started a train of intensified monitoring of the SST and discussions of its implications within the scientific community. At the same time press reports world-wide were covering the history and impacts of previous ENSO events.

This Chapter examines much of the official documentation and media reports which forecasted changes from normal weather patterns and which interpreted these changes for their effects on agricultural activities for the 1997-1998 production year. It provides the background necessary to understand the basis for some of the messages generated and stakeholder decisions, which are described in subsequent Chapters.

11.1 LONG-RANGE WEATHER FORECASTS

The Global Climate Models

The first indications of a strong ENSO event started in the scientific community with the SST data published by a monitoring group based in the UK. The Climate Analysis Center in Washington DC sent out this information (with various types of commentary) to regional climate organizations in Africa through the Meteorological Data Dissemination Service. These indications began appearing on their internet site.

The Southern Africa Development Community (SADC)

Southern Africa experienced drought conditions during the warm ENSO events of 1986-1987 and 1991-1992. With the oncoming ENSO, many people anticipated that drought conditions would "prevail" throughout the region of southern Africa during the 1997-1998 growing season. These reports were worrisome because of the very fragile economic situation in most of the countries concerned. SADC's perception was that the capability of most of the countries to cope

with a widespread crop failure in 1998 would be no better than in 1991; however, it is likely that Southern Africa is now much better prepared for a regional drought, considering improved regional security, greater cropping and dietary diversity, improved regional market integration, improved private sector participation in regional markets, and government and donor management experience in this area accumulated since 1992. There were no strategic reserves at the national level, cropping patterns had not significantly changed, surpluses from previous years had disappeared at the household level, maize production was still a primary source of income for small producers, and national governments had not invested in contingency planning for disaster mitigation and response.

The SADC has a responsibility to monitor food security issues for its members. Its food security monitoring resources are coordinated by the Food Security Technical and Administrative Unit (FSTAU). These resources include the Regional Remote Sensing Unit (RRSU), Regional Early Warning Units (REWU), and the FEWS Project. These organizations supported the Southern African Regional Climate Outlook Forum (SARCOF) as a way to use the peer review process to help sort out the confusions that were producing a multitude of forecasts for the 1997-1998 agricultural season. The goal of the SARCOF was to produce "forecast guidance" that would be disseminated to national Meteorological Departments. The Meteorological Departments could modify and interpret the regional guidance to obtain more local forecasts.

This guidance was developed at two SARCOF meetings. The SARCOF meeting of September 1997 in Kadoma produced specific forecasts for October, November and December 1997. The SARCOF of December, 1997, in Windhoek, Namibia, provided guidance for January, February and March 1998. They pointed out that forecast guidance was relevant only to seasonal time scales and relatively large areas, and local variations may occur. The specific results for Zambia during the first period were uncertain.

The December, 1997 SARCOF reviewed the full data set of Normalized Difference Vegetation Index (NDVI) imagery from the US National Oceanographic and Atmospheric Agency satellites. NDVI is an indicator of biomass production on the earth's surface. FEWS uses this imagery data as an operational indicator for food security monitoring. The review of this data was conducted by the US Geological Survey/Earth Resources Observation Systems (EROS) Data Center and Remote Sensing Research Unit at the University of California, Santa Barbara (Verdin, 1998).

This review of the data, showing where droughts had occurred in 1991-1992 in Southern Africa, also associated these drought areas with the SST data from 1991. Using this association it used the SST data from 1997 to predict the hydrological drought pattern over southern Africa in 1997-1998. Hydrological drought is less than normal rainfall. It is different from agricultural drought, which can reduce agricultural production. The result of this investigation was a series of maps showing that expected NDVI could be lower than average in north-eastern Zambia in January 1998, and a lower than average NDVI in the North, Eastern, and Copperbelt Provinces in February 1998. No mention was made of above average rainfall.

The SADC followed the details of these forecasts in their monthly bulletins to show how well the forecast was performing, and rationalizing exceptions. The Regional Remote Sensing Program (RRSP) monthly bulletin for October-November supported the forecast that the season would start well. The December bulletin notes that the season was well ahead of average in northern Zambia and average everywhere else. However, January was wet and this was not in

line with the forecast. By February, they suggested that crop production in northern SADC would be normal or above normal. In the March-April Bulletin, where regional problem areas were identified, Zambia was not mentioned.

Assessments of the SADC/SARCOF and the SADC/Food Security Technical and Administrative Unit (FSTAU) messages

The SADC assessed itself in several issues of their RRSP Monthly Bulletin. They became concerned about the minimal effect of the ENSO event on agricultural production and the evolving differences from their earlier predictions. The January 1998 the RRSP Bulletin declared that some of the early forecasts produced by the SARCOF were beginning to be seriously questioned and some commentary was necessary: "It is too early to validate the Windhoek guidance now, however it is clear that there are serious doubts amongst a variety of users." (SADC, 1998). In this assessment, SARCOF go through some of the issues that they have had to deal with from users. They note that they have been very careful about the wording of their predictions, using neutral language like "the probability of below normal rainfall". They point out this is by no means an agricultural drought that could reduce crop production.

One of the rhetorical questions SARCOF raised was "Is there more than rainfall when it comes to food security? Clearly, "yes" as food security is a complex set of relationships relating to production, availability and household access to food." Their discussion of how useful the forecast was points to a number of issues. They are clearly not interested in what mitigation actions were taken by whom. They note that their guidance captured the eventual pattern with wetter conditions in the north and a good start of the season in the south. So, although their predictions were generally correct, it is not clear if this had any impact on stakeholders, or what decisions were made based on the forecast, that improved conditions, benefited the people in Zambia, or decreased vulnerability to droughts.

In the conclusions of the analysis of NDVI imagery in relation to the SST, SADC noted the motivation for preparing these kinds of long-range forecasts is recognized as supporting food security assessments:

"an endeavor that relies on the convergence of evidence from many sources. The livelihoods of millions of people in the region stand to be impacted by the ENSO event of 1997-1998. It is hoped that the results presented here will contribute to the formation of an accurate impression of the food security situation, so that timely mitigating action, if necessary, can be taken by those responsible for disaster assistance" (Verdin, 1997).

The SARCOF meeting of 12 May 1999 made a post-season assessment. By then, they had some more time to reflect on the results of their estimates. Anayamb et al. (1998) point out that it is important to note from this warm ENSO event, that:

"the magnitude of the SST departures in eastern to central Pacific cannot be used as the sole indicator of the magnitude of the impacts over Southern Africa. Although this is the largest warm ENSO even this century, its impacts are mild, at least as seen from the evidence derived from the NDVI analysis. Many other factors need to be taken into consideration in future forecasts and predictions of warm ENSO effects over the region."

The Zambian Meteorological Department (ZMD)

The goal of the SARCOF was to produce "forecast guidance" that would be disseminated to national Meteorological Departments. These Departments could modify the guidance for more local detail. More local detail was added by the ZMD beginning with their bulletins and press releases. The 16 September 1997 press release from ZMD suggested that significant rainfall was expected in October and November in most parts of the country including Western, Southern, Central, Lusaka and southern parts of Eastern Provinces. Earlier than normal rains were predicted in Southern Zambia. In December through March, prolonged dry spells were expected.

More local detail was added by the ZMD beginning with their Press Release of 26 December 1997. This press release covered the forecasting period of January-March 1998 and indicated that the Northwestern, Copperbelt, Luapula, and Northern Provinces, and the northern districts of Eastern and Western Provinces, would have normal to above normal rainfall. Southern, Lusaka, and Central Provinces, and southern districts of Eastern and Western Provinces, would have below normal rainfall. Normal rainfall was defined as 75-100% of the 30-year average (1961-1990).

The Bulletin covering the period 11-20 January pointed out that Livingstone and Kaoma meteorological stations had received lower than normal cumulative (since July 1) rainfall. In the discussion of agro-meteorological conditions, the Bulletin notes that the rainfall deficit (below normal cumulative) had "adversely affected crop growth". But went on to say about the country:

" The combined effect of early planting and good rainfall activity during the flowering stage should lead to good crop prospects as long as soil moisture for the grain filling stage is also assured."

Thus, by mid January there were no major problems or indications of problems associated with the development of the growing season. Good rains finished out the month and no pests or diseases were reported. Although the good rains of January did cause some localized flooding, the reports continued to be up-beat and noted that farmers needed a break from the rain to do some weeding and other field work.

The First 10 days of February saw a very welcome dry spell and gave growers a chance to get into their fields. The second 10 days of February continued with "good rainfall distribution countrywide". "Crops throughout the country continue to respond quite favorably". The exception to this was some moisture stress in Mkushi and Kalomo districts.

By March "Reports received from every part of the country indicate that the majority of crops are at the maturity stage and generally free from serious incidents of pests and diseases." However, the continued wet weather could promote diseases. Most crops had matured and continued wet weather would be a problem. Lots of rainfall continued, and the meteorological service noted "that ants, rats and fungus could drastically reduce crop harvest if not properly controlled".

Summary of the Satellite Imagery

A review of the satellite images corroborates the general messages from the rain gauges. There were no gaps in the rainfall pattern long enough to cause significant moisture stress for most crops until February. A good summary of the quality of the season is presented in Figure 5. The image in the lower right hand corner is the NDVI difference from the long-term average for the last 10 days of February. This is a good indicator that the quality of the season was about average until the end of February. During February, the satellite imagery suggests that the cropping season came to end earlier than normal in the southern part of the country. A review of the duration of high, cold clouds (an indication of rainfall) over Zambia in February 1998 show that February was a very dry month with a possibility of moisture stress developing in late February in some of the southern districts (Figure 6).

FIGURE 5. NDVI during February 1998

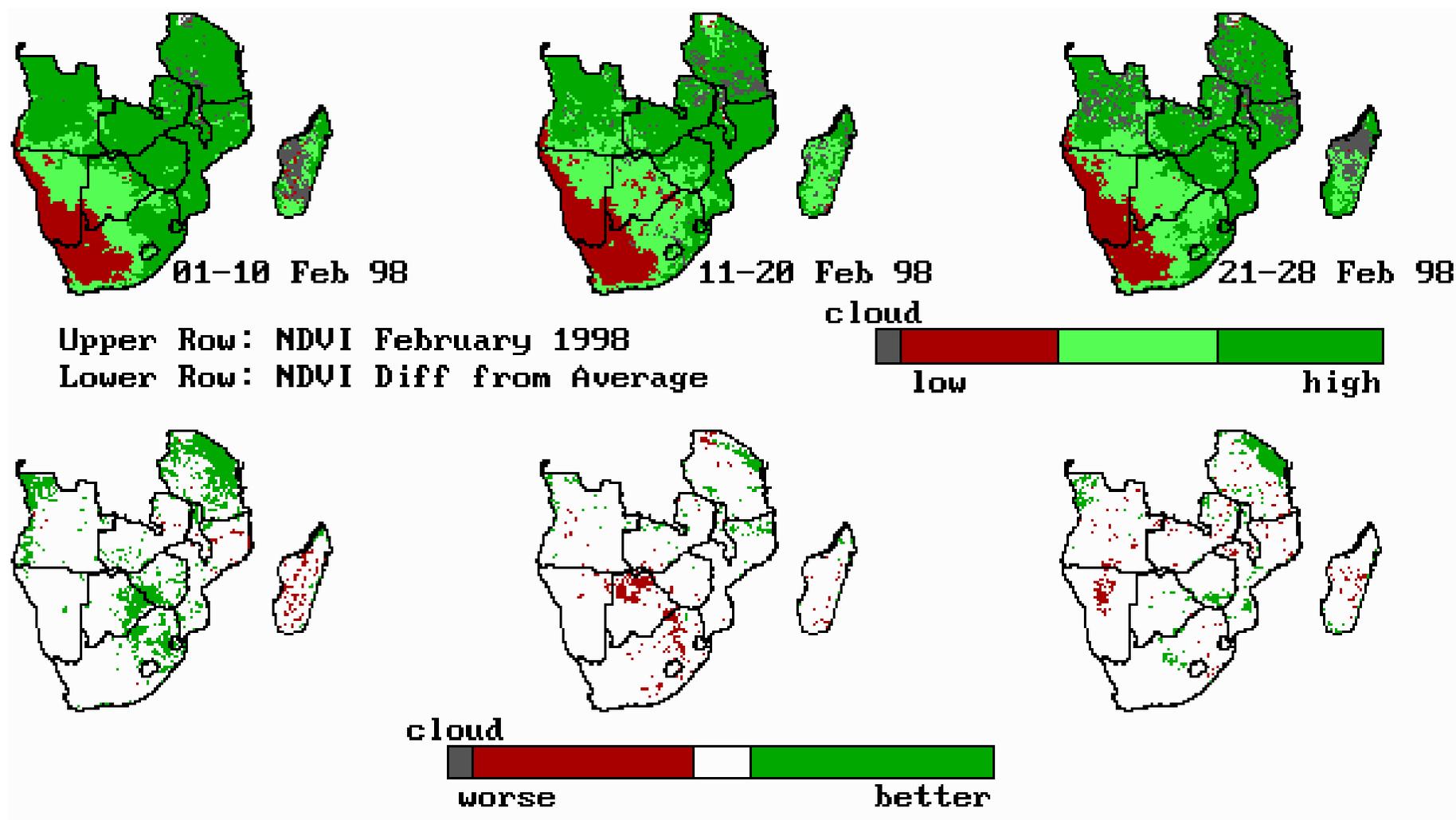


FIGURE 6. Cold Cloud Duration measurements over southern Africa in February, 1998

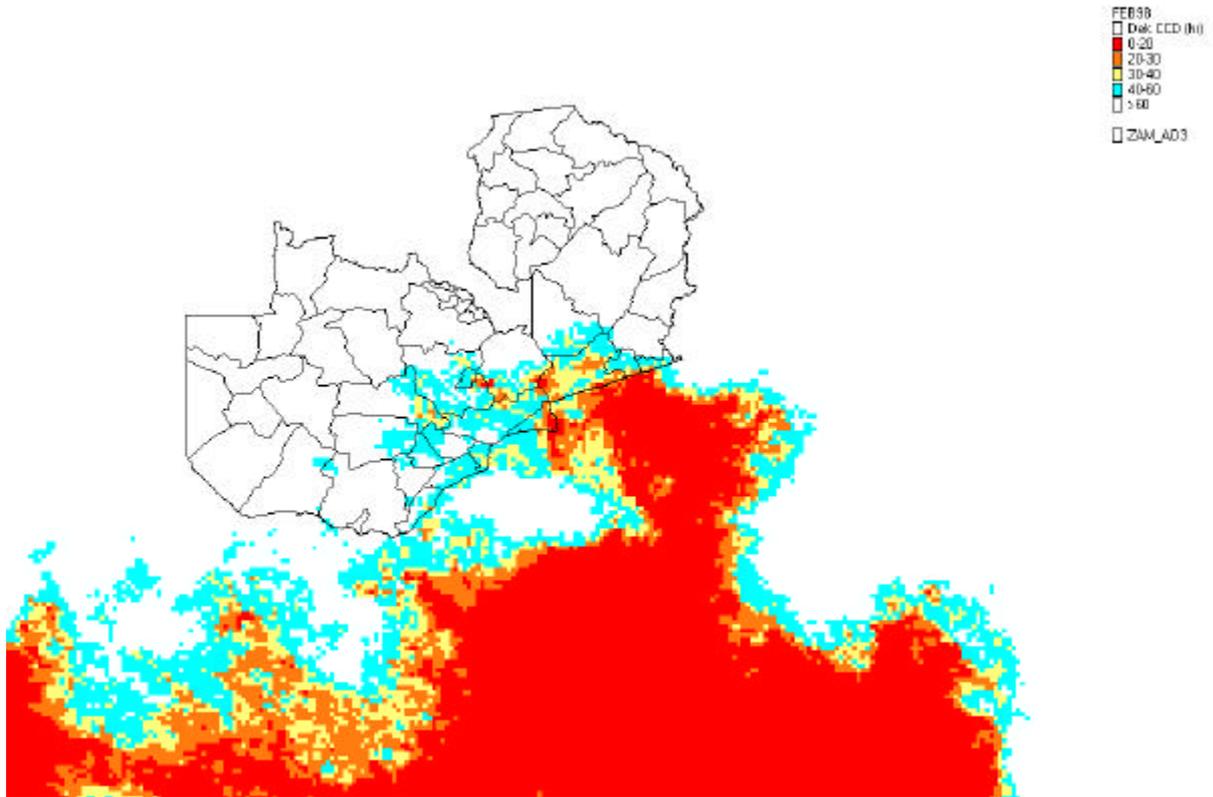
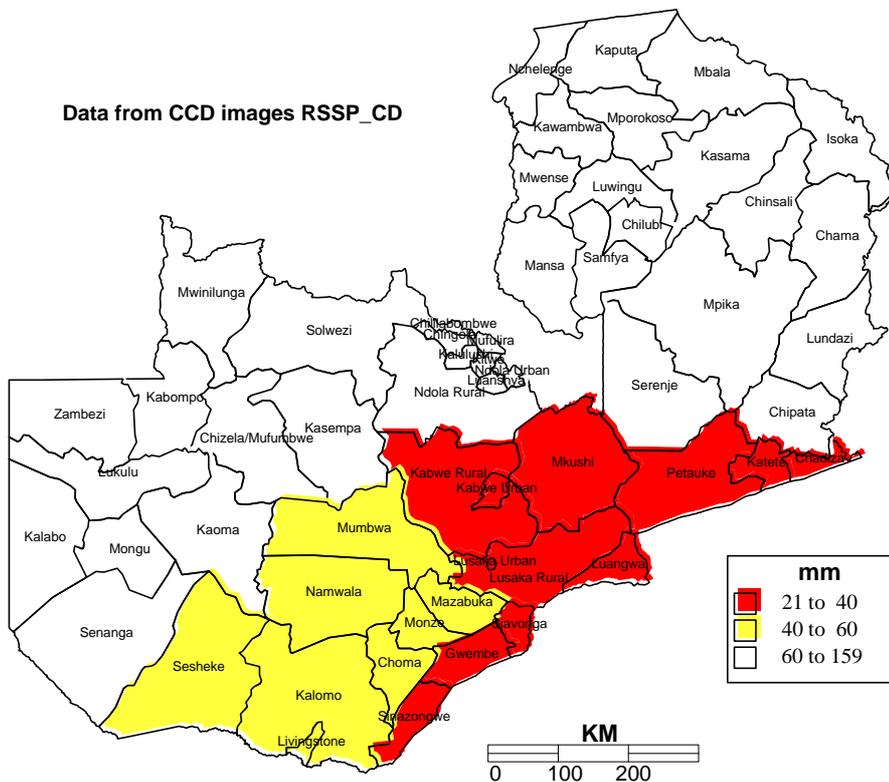


FIGURE 7. Total estimated rainfall for the last two dekads of February, 1998



The

economic consequences for growers were not critical because maize was probably in the grain-filling phase. This moisture stress at this period would explain some of the reports of shriveled kernels noted by millers. The low maize production that was forecast by the CSO in their Final Forecast was due to less maize planted for the 1997-1998 season. In 1997, producers planted only 410,372 ha, 59% of the long term average of 688,599 ha. It is unclear what prompted their decisions. It could have been risk avoidance in the face of ENSO, or the high price of producing maize, that kept them from choosing to plant more maize.

11.2 CROP PRODUCTION FORECASTS

The CSO

The results from the CSO forecast of production of maize was 7.1 million bags, much less than the 1992-1997 average of 11.5 million bags. Although the Final Forecast did not say why the production was so low, many people and analysts contributed the reduction to the heavy rains in January that caused flooding and leaching of nutrients from the soil. The Disaster Mitigation and Management Unit used the results from this forecast as the provisional production estimate in the provisional food balance sheet that they presented to the donor community in March.

The Zambia National Farmers Union (ZNFU)

The ZNFU polled their members by telephone, and consult with their agents stationed throughout Zambia, to get their impressions of what maize production will be each year. The goal of this forecast is to provide some information for their membership to make marketing and storage decisions. Their estimate for the production season 1997/1998 was 6.8 million bags.

FAO Crop and Food Supply Assessment Mission (CFSAM)

These are rapid appraisals that the FAO will conduct if necessary. The mission was in Zambia from 27 April to 14 May 1998. Their goal was to assess the impact of weather anomalies on food crop production and to estimate cereal import requirements for the marketing period May 1998-April 1999. They noted the sharp declines in maize production in previous years and they estimated a decline in the harvest for 1998. Most of the decline was due to less area planted to maize and poor yields related to the weather. They provide two examples of evidence for poor weather from one rain gauge. One of these is a dry spell from 1 February to 11 February 1998 and that total rainfall for the month was 95.8 mm. They point out that this is much less than normal for February (266 mm). They discuss the hydrological drought in Northern Zambia and point to rain gauge data in Mansa, Mbala, Isoka, and Kasama that show that annual rainfall for the 1997-1998 production season was below the long term averages. However they were all above 1,000 mm for the year.

The results of their visits and second guesses took a million bags off of the CSO Final Forecast estimate, reducing estimated production from 7.1 million bags to 6.1 million bags (548,000 tons) of maize. They justified this reduction with their observations on the seriousness of February droughts in the southern areas of the country. They estimated maize utilization at 1,224,000 million tons (13.6 million bags) which is roughly 120 kg/capita/year.

The reason this assessment was carried out was a request by the GRZ through the Donors and UNDP. This report of the CFSAM is a little embarrassing for the FAO. To distance itself from the report as much as possible, the FAO/GIEWS points out that, "It is rare that a CFSAM will be

undertaken in a country with an effective domestic information system” (FAO/GIEWS, 1996). It was the FAO that provided technical assistance to the MAFF and CSO to design appropriate sample frames and conduct agricultural surveys. In addition, other donors have spent large sums to support the MAFF in these critical areas. We have noted in this report that the CSO pre-harvest survey is not very accurate at the District level, but gives reasonably acceptable results for an early guess at production at the national level. However, these guesses do not provide a valid basis for major market intervention or food aid decisions.

11.3 ASSESSMENT

The difficulties that the SARCOF forecasting exercise pointed out in their self-assessments are the same as the difficulties of any forecasting exercise. The main problems associated with the forecasts were not their accuracy but rather what actions were taken and decisions made based on them. At the national level, the only action that was taken by the GRZ, in response to the early SADC messages, was to begin the process of requesting and importing food aid. The major decision that was made (and that was supported by the CSO Final Forecast) was for the GRZ to intervene in the cereals market at substantial cost (refer Part V of this report). Smallholders, with limited access to information, may have actually lost money by following recommendations from the MAFF to modify their farming strategies.

The long-lead forecasts produce “rolling” messages that require users to have access to updated information on a regular basis. Such forecasts may continue to improve as they get closer to the event they are trying to predict, and become irrelevant for action after the event. It seems as though the SADC spent a lot of resources trying to justify the accuracy of their original forecast.

The ex post analysis of all of the forecasts have all come close to what they predicted. The important issues for users of forecast are related to understanding who is the client for which kinds of forecast. Once one understands who the clients are then it is much easier to understand how to interpret the forecast. For example, the clients for the GCMs are the scientific community, large regional organizations like the SADC, and perhaps some specialists at the national level.

The analysis of course resolution satellite imagery for the 1997/1998 growing season shows that there were no serious widespread droughts that would have caused drastic decreases in agricultural productivity. The image products are not good at assessing floods and flood related reductions in crop production; such events are best evaluated by individual growers, Camp Officers and DACOs.

11.4 RECOMMENDATIONS FOR CROP FORECASTING BASED ON THE 1997-99 EXPERIENCE

The coarse resolution satellite imagery is robust enough to capture major droughts that would have economic significance at the national level. Make better use of the imagery products that are available from ZMD.

Some of the confusion about the relationship between the ENSO and crop production could have been more clearly presented very early in the process. The SADC seemed to focus more on justifying their forecast than on interpreting it for those clients that could take appropriate action.

Large growers did not take the ENSO forecasts very seriously because they had enough information to understand that long-range forecasting of the weather is not an exact science.

The SADC early forecasts were useful for the Disaster Mitigation and Management Unit. They used them in their early requests to the donor community for food aid. It would be useful if they had other options for protecting their people and contingency plans that were not so heavily dependent on assistance from outside the country.

The WFP/FAO CFSAM was not helpful for clarifying the production forecast or assisting with a food security forecast. It added more confusion to an already confusing year. Given the massive amount of data, information and expertise available under the umbrella of the National Early Warning Technical Committee, it is interesting that the FAO was called in at all. The CFSAM mission was ill-advised and is not recommended for future consultations.

12. REVIEW OF 1997/98 CROP FORECASTING MESSAGES

This chapter provides an overview of the crop forecasting messages sent to government, the donor community and others responsible for food aid decisions following the 1997/98 production year. The technical strengths and weaknesses of each forecasting system are covered elsewhere in this report and the primary aim of this discussion is to review the content and timing of key messages as a basis for interpreting the various responses that followed. What stands out most is that the 1997/98 crop forecasting system failed to send clear, time-bound messages needed to formulate an appropriate response. Instead, the 1997/98 forecasting exercise was marked by confusing and often contradictory reports, late delivery of essential information and little attention to important methodological issues. As discussed in later chapters, these shortcomings had a major influence on the eventual donor and government response.

In order to understand the 1997/98 forecasting messages, it is useful to distinguish between two types of estimates: crop production estimates and food security estimates. The first category includes pre-season predictions of regional weather patterns and the likely effect on agricultural output plus a wide variety of production surveys covering the area planted to different crops, likely yield and expected sales. These surveys are carried out by many different groups including government institutions, producer associations and the private sector. At least in principle, these are empirical exercises based on field observations, farmer interviews and other relevant data. Food security forecasting, on the other hand, involves interpretation of the production estimates and is therefore a more subjective, political exercise. Information systems that fall into this second category include macro-level national food balance sheets, the Vulnerability Assessment and Mapping (VAM) Report and a variety of district level needs assessments for the targeting of emergency assistance. These systems provide information on national, regional and household food security respectively.

12.1 PRODUCTION ESTIMATES

As noted, a wide variety of production estimates are made available each agricultural season. In general terms, these begin with forecasts of regional weather patterns and production trends and culminate with various producer surveys specifying area planted, expected yield and sales for key commodities.

Climatic Early Warning

Forecasts of weather patterns and climatic trends are generally made available before the start of each agricultural season so that farmers can be informed of any unusual conditions in order to make appropriate adjustments to their cropping strategy. This early warning information is also used by government officials, donors, NGOs and other aid organizations to set in place contingency plans that may be needed to cope with crop failure and food shortages should they occur. Several institutions are responsible for climatic forecasting including the SADC Regional Early Warning Unit (REWU), the Southern African Regional Climatic Outlook Forum (SARCOF) and the Drought Monitoring Centre (DMC) based in Zimbabwe.

Climatic early warning information was of particular importance in Zambia during the 1997/98 production season due to the global warnings of an El Niño phenomena circulated as early as December, 1996. Domestically, the Zambia Meteorological Department (ZMD) took a lead role by issuing bulletins from May, 1997 advising of the possibility of erratic and poor rainfall in many parts of the country. By mid-July, the Department issued a preliminary assessment of the 1997/98 rainy season which was communicated to Provincial Permanent Secretaries so they could alert farmers of the possible risks to crop production. Around this time, major newspapers, radio and television programs serving the farming community began to carry regular information on the El Niño advising farmers to plant early and to grow early maturing, drought-tolerant crops wherever possible. These messages were taken further into the rural communities by field block and camp extension staff of the MAFF, and by a number of NGOs and agro-institutions including the Programme Against Malnutrition (PAM), the Zambia National Farmers' Union (ZNFU) and the National Agricultural Information Service (NAIS). In some cases, the political leadership assisted in heightening awareness of the El Niño and appealed to their constituents to follow the advice of the agricultural experts on how to cope with the possibility of drought.

Despite these efforts, the response of farmers to the climatic messages was mixed. A report prepared for a FAO/Netherlands' Government sponsored mission to the SADC/IGAD region, for example, describes the farmer interpretation of the forecast messages in some detail and distinguishes between two types of response (Colenbrander, 1998). In the first instance, the report notes that most commercial and emergent farmers largely ignored the early warning information and continued to plant the usual range of crops suited to normal conditions, including cotton and tobacco. For these farmers, the report concludes, the strategy appeared to be "to go for a reliable cash crop rather than a risk-prone food crop." For most smallholders, on the other hand, the response was quite different where many growers adopted a variety of risk adverse strategies, including staggered planting and smaller hectarages. Whether or not the climatic messages influenced these decisions, however, is not entirely clear since most farmers continued to grow maize rather than more drought tolerant crops, including sorghum and millet.

The government reaction to the early warning El Niño messages, on the other hand, was anything but mixed. Specifically, based on little more than long-range climatic forecasts and memories of the 1991/92 drought, the Office of the Vice President called for a donor meeting in January, 1998 to request a total 150,000mt of food aid to be distributed to an estimated 2.5 million individuals who would be affected by the expected disaster. Importantly, these estimates of emergency requirements came out several months before any crop production and food security forecast data were available. Although it is always useful to plan ahead, the almost total lack of an analytical basis for such a dramatic request caused enormous skepticism within the

donor community which tainted later food aid negotiations. Before further requests could be entertained, for example, it was agreed that the GRZ should make the final crop forecast data available and conduct a food needs assessment in each affected district.

Production Surveys

After climatic early warning, the next set of forecasting messages to come out each year are actual estimates of crop production. Although there are many forecasting systems, the most important of these in terms of national decision making are the Preliminary and Final Crop Forecasts prepared by the Central Statistical Office (CSO). These annual surveys cover a wide range of important crops including maize, sorghum, paddy rice, millet, sunflower, groundnuts, soybeans and mixed beans. The CSO's final production estimates were made available in March, 1998 and are summarized below in Table 9.

Importantly, the data in Table 9 show a significant decline in the production and yield per hectare of most crops in 1997/98 compared with the previous 1996/97 agricultural season. Given the severity of the climatic early warning messages, government officials and other key policy makers were again quick to point to the crop forecast data as a signal of impending disaster and called for various interventions including food aid, emergency imports and price controls on FRA maize as discussed later in this report. Although the tendency to play it safe by calling for an early mobilization of resources is perhaps understandable, it must also be recognized that there is a risk more damage can be done by over-reacting than by allowing events to develop naturally. This is especially true in a country like Zambia where the private sector is still developing and vulnerable to price shocks caused by food aid and other market interventions.

At the time the CSO production estimates were being discussed, several methodological concerns were raised that questioned the validity of the findings. These limitations have been the subject of debate for many years and are discussed in greater detail elsewhere in this report. Simply put, however, a number of policy makers both within and outside government asked whether the crop forecast data could be trusted due to the limited sample size and coverage of the CSO survey, and problems with the supervision of field enumerators. Partly because of the fears caused by the El Niño warnings, there was concern that the CSO forecast may have overestimated production and that actual output would be worse than predicted.

Given these fears, the FAO agreed with MAFF to undertake an independent crop assessment to be carried out by a joint WFP/FAO mission. This mission visited Zambia from April 27 to May 14, 1998 and concluded that the CSO production estimates were grossly overstated and that the impending food deficit would be much larger than expected. Unfortunately, these conclusions were based mainly on a five-day field trip to Southern Province and it is not clear why the WFP/FAO findings should have been any more reliable than those provided by CSO. Despite the obvious limitations of this survey, the results were treated seriously by government as an official UN statement and the mission's findings were used to prepare alternative estimates of the national food balance as discussed in the next section.

TABLE 9: Final Crop Production Estimates, 1996/97 and 1997/98.

| Crop | Unit | Area Planted (Ha) | | Total Production | | Yield per Hectare | | Estimated Sales | |
|-------------|------|-------------------|---------|------------------|------------|-------------------|---------|-----------------|-----------|
| | | 1997/98 | 1996/97 | 1997/98 | 1996/97 | 1997/98 | 1996/97 | 1997/98 | 1996/97 |
| Maize | 90kg | 510,374 | 649,069 | 7,217,076 | 10,668,761 | 14 | 17 | 1,945,957 | 3,462,909 |
| Sorghum | 90kg | 35,864 | 40,237 | 282,214 | 334,986 | 8 | 8 | 46,631 | 56,723 |
| Paddy Rice | 80kg | 9,065 | 12,412 | 79,990 | 155,918 | 9 | 13 | 34,053 | 91,289 |
| Millet | 90kg | 90,047 | 78,639 | 691,509 | 661,833 | 8 | 8 | 137,376 | 134,581 |
| Sunflower | 50kg | 15,692 | 19,193 | 140,164 | 158,842 | 9 | 8 | 117,755 | 129,571 |
| Groundnuts | 80kg | 154,682 | 126,573 | 711,672 | 573,234 | 5 | 5 | 301,590 | 219,485 |
| Soybeans | 90kg | 11,681 | 17,273 | 136,909 | 325,462 | 12 | 19 | 145,530 | 256,372 |
| Mixed Beans | 90kg | 35,444 | 41,541 | 154,501 | 152,536 | 4 | 3 | 82,968 | 77,002 |

Source: Republic of Zambia (1998). *Final Crop Forecasts: 1997/98 Crop Season, Early Warning Policy and Planning Branch, Economics and Market Development Department, Ministry of Agriculture Food and Fisheries and Agriculture and Environment Division, Central Statistical Office, Lusaka.*

12.2 FOOD SECURITY ESTIMATES

There were three types of food security estimates produced following the 1997/98 production year including: (i) macro-level food balance sheets; (ii) regional vulnerability assessments; and (iii) district level needs assessments used for the targeting of food aid. Under normal circumstances, these reports should be produced in roughly the sequence outlined above to provide ever more specific information on the scale and nature of a food security problem. Macro-level national balance sheets, for example, only indicate whether food production for the country as a whole was sufficient to meet total consumption requirements. Vulnerability assessments are designed to provide more specific information on parts of the country where the food deficit may be especially severe and district level needs assessments are undertaken to identify specific aid requirements.

As with the crop production estimates, each of these systems sent confusing and contradictory signals following the 1997/98 production year so that the eventual response in terms of food aid and other policy decisions became little more than a compromise based on best guesses of the national food balance and other political and food security considerations. Many agencies seemed to take the position that it was better to be over-prepared and to intervene in the food markets than risk potential calamity and loss of life.

Food Balance Sheets

Food security forecasting began in 1997/98 with the preparation of national food balance sheets. The National Early Warning Unit (NEWU) prepared the first official food balance sheet using CSO production data and consumption estimates provided by the Food Security and Nutrition Information System (FHANIS) and other sources covering industrial use, exports and losses. The specific procedures used to measure production and consumption are discussed elsewhere in this report. Using standard procedures agreed by the Early Warning Technical Committee, NEWU's first draft of the national food balance estimated a 200,000mt cereal deficit. However, following discussions between MAFF and the Cabinet Office, it was agreed this figure was too low and should be revised, mainly for the purpose of working within safe limits for calculating food aid and domestic import requirements. On this basis, therefore, the NEWU food balance sheet was later revised to reflect a 450,000mt cereal deficit by adjusting estimated consumption requirements. Again, given the severity of the climatic forecasts, it appears that many high level decision makers felt it was better to be over-prepared for a food deficit rather than caught by surprise later on. Both of these estimates were treated as confidential GRZ figures and were only shared with certain agencies at the time food aid decisions were being made.

Due to the lack of consensus over just how to estimate the national food balance, it was agreed that an independent WFP/FAO crop and food supply assessment should be carried out as described above. Unfortunately, it seems this mission caused even more confusion by initially estimating the national cereal deficit at 930,000mt on an unofficial basis. According to internal sources, government officials were both concerned by the scale of this estimate and pleased to have such a large figure with which to argue the case for food aid before the donor community. Because the WFP/FAO estimate was based only on very short, cursory field visits, however, there was considerable debate and the figure was eventually revised downwards to a 660,000mt cereal deficit, including a 583,000mt maize shortfall (FAO/WFP, 1998). Although these figures were accepted by government and UN agencies as an official statement of Zambia's national

food balance in June of 1998, what started off as an exercise to clarify and improve NEWU's initial estimates actually created more controversy.

Obviously, with so many very different figures floating around, it was difficult to know exactly which data set to trust. In response to this confusion, and general skepticism over the need for food aid, a further independent study was funded by the British High Commission to review the food balance calculations and provide a more accurate estimate of the food security problem (Wood, Dennis; Otterdijk, R. and Muthana, T., 1998). This study adopted a very different methodology than the previous food balance sheets and attempted to include cash crops and other sources of income in the food security equation. On this basis, the report concluded that Zambia would actually have a 332,000mt food surplus in the 1998/99 marketing season and that there was no need for drastic market intervention. These figures were released in July.

Unsurprisingly, the British High Commission report created even more controversy where some donors were quick to endorse the findings and others within government and the NGO community criticized the results as methodologically unsound. Although the purpose of this discussion is not to review the technical merits of each food security estimate, it is worth noting that food balance sheet calculations do not normally make any statement on purchasing power or food accessibility. The British High Commission study can be commended for its attempt to include these factors, but the estimated 332,000mt surplus should not have been confused with the national food balance which is little more than a gross statement of food availability. (This report also miscalculated the importance of cash crop income by looking only at the gross value of selected commodities rather than the net income that accrues to farmers.) Due partly to the way this report was presented, therefore, this attempt to clarify the situation caused even more confusion and, by mid-year, there was still little agreement on the scale of the food deficit (or surplus) facing Zambia in the wake of the 1997/98 El Niño event.

Vulnerability Assessment

The next set of food security messages to come out in 1997/98 should have been provided by the Vulnerability Assessment and Mapping (VAM) Report produced each year by members of the Early Warning Technical Committee in cooperation with WFP and USAID's FEWS Project. As described elsewhere in this report, the VAM looks at a variety of district-level indicators, including rainfall patterns, production trends, sources of income, coping strategies, education and reserve food stocks in order to identify areas that may be especially vulnerable to food security problems. Importantly, the VAM only provides this information on a district by district basis and treats these areas as largely homogeneous despite many differences between population groups within district boundaries.

Although the VAM should have been used as a first step in the targeting of relief food, the 1998 Report (covering the 1997/98 production year) came out very late and was only available in September. By early May, however, there was an urgent need for information on areas that might be vulnerable to food insecurity in order to mobilize food aid and other responses in a timely fashion. In lieu of the final VAM Report, therefore, preliminary data were used together CSO crop forecast information to identify areas where emergency intervention may be required. Specifically, a total of 44 districts were originally identified as being especially vulnerable, and the next step was to carry out needs assessment in each of these locations to determine actual food aid requirements. The final VAM was only used to confirm that these 44 districts were vulnerable to food insecurity once the report became available.

As events developed, the Disaster Management and Mitigation Unit (DMMU), within the Office of the Vice President (OVP), received reports of critical food shortages in 13 additional districts not identified by the initial vulnerability assessment. Based on these reports from MAFF field staff and other local leaders, a decision was made for PAM to carry out a snap survey in September of food aid requirements in these areas. To a certain extent, pressure from MPs and other political leaders probably also contributed to the decision to include these districts in the relief program. It should be remembered that local council elections were scheduled for early 1999 and it seems likely this had a significant influence on the decision to provide assistance to marginal areas not identified by the initial vulnerability assessment.

However the decisions were made to identify certain districts as food insecure, it is clear that the 1998 vulnerability assessment was poorly organized and based mainly on preliminary information and unconfirmed field reports. Again, the final VAM Report was only made available some four months after the data were required so that policy makers within DMMU and other departments had very little hard information on which to base their decisions. Unfortunately, once the decision was made to label a district as vulnerable to food insecurity, very little effort was given to determining if this was the right assessment. The next set of food security messages focused mainly on determining actual food aid requirements rather than if food aid was the right form of assistance.

Needs Assessment

The final set of food security messages to come out in 1998 were the district level needs assessments of food aid requirements. At least in principle, the purpose of these reports should have been to confirm the initial vulnerability assessment to determine whether food aid is truly required in each of the 57 districts identified as vulnerable to food insecurity (44 original districts plus 13 added by the OVP). In reality, however, none of the needs assessment reports came back with the conclusion that food aid is not required or that another type of assistance may be more appropriate in a specific location. From this perspective, it seems that the needs assessment was little more than a rubber stamp to confirm the foreordained conclusion made by politicians and other national decision makers that food aid was required in most parts of Zambia. This outcome can also be seen as a result of the donor requirement for a food needs assessment in each affected district before emergency assistance could be provided.

As a result of these pressures, most needs assessment teams seem to have focused only on estimating the quantity of food aid required by each affected district. These calculations were made using a variety of methodologies including questionnaires and key informant interviews to collect data on the amount of grain held in storage, consumption requirements and alternative food and income sources. From these data, specific food aid requirements were estimated based on the length of the expected food shortfall multiplied by the total affected population and a consumption figure of 350g of maize per person per day. Groups involved with the needs assessment reporting in 1998 included the National Food and Nutrition Commission, PAM, FHANIS, FEWS, CARE and a variety of other independent research bodies. The DMMU was meant to assume overall responsibility for coordinating this work, at least on an official basis.

One area where most needs assessment reports were especially inadequate relates to the role of cash crops as an alternative source of farmer income. Although most studies do mention cash crops as an important factor related to food security, the treatment of these crops was very inconsistent to say the least. Some studies, for example, refer to the increased production of cash crops as a threat to food security in that the transition to these activities means that less area

is being given to food production. Other reports note that the income from cash crops can be used to buy food, but fail to include the income generated by these enterprises in the estimated food aid requirements. Even where cash crop income was taken into account, this was most often calculated only as gross crop value rather than net profit which is the only true indicator of farmer purchasing power. Clearly, a more consistent methodological approach is needed in the future and this must be well explained and understood by each assessment team.

In spite of these deficiencies, the needs assessment exercises eventually culminated with an estimate that a total of 54,000mt of food would be required for the 44 original Districts, plus another 7,000mt for the 13 Districts identified by the OVP. Specific estimates for selected Districts are summarized in Annex 7.

Based on these figures, Government again set about the process of requesting assistance from the donor community. This appeal process, however, was not well coordinated and began in October with an informal meeting where the Permanent Secretary from the OVP made a request to various donors for assistance. Eventually, when certain donors explained that a formal appeal would be required before food aid could be made available, the Vice President made a statement before Parliament concerning the need for assistance. This, however, still fell short of what was required and only after some additional weeks was a formal letter of appeal circulated to the donor community. Again, the earlier request made by government in January based on El Niño information alone tainted this process and meant that many donors were skeptical of the GRZ's estimated food aid requirements.

12.3 KEY LESSONS FROM THE 1997/98 FORECASTING EXERCISE

Key messages from the 1997/98 crop forecasting exercise are summarized in Table 10. Taken together, this matrix and the preceding discussion show that there were several problems associated with the production, packaging, receipt and use of the 1997/98 crop production and food security estimates. By far, the greatest problem was the lack of a clear, time-bound disaster management plan to provide a frame for the production of relevant information. Crop and food needs assessment figures were shrouded in doubts regarding their authenticity, leading only to a compromise figure to be used in negotiating food aid requirements. Furthermore, political leaders in some cases dramatized the severity of crop failure leading to a distortion of the problem and inappropriate types of response. As discussed, it was originally estimated that only 44 districts might be vulnerable to food insecurity, but 13 additional districts were eventually added to the list of areas to receive assistance. Not a single needs assessment team reported that food aid was not required in the district they surveyed and it appears the need for food aid was essentially a preordained conclusion from a very early stage in the forecasting process.

In this respect, there is good reason to question whether the food balance sheet approach to estimating food security requirements has a useful role to play in the formulation of food aid policy. As the 1997/98 episode clearly demonstrates, macro-level food balance sheets based on crop forecast information can be expressed in an almost infinite number of ways and so provide a very poor foundation for major policy decisions. Indeed, each version of the 1997/98 national food balance was formulated almost exclusively to support a particular position regarding the need for food aid and other types of intervention. This is true with respect to the original CSO/NEWU estimates, the WFP/FAO forecast and the independent British High Commission report alike. In the absence of timely and reliable crop forecast information on agricultural production and marketing trends, future balance sheets are unlikely to be any more conclusive.

SUMMARY OF 1997/98 CROP PRODUCTION AND FOOD SECURITY FORECASTING MESSAGES

| | Type of Message | Key Points | Produced By | Methodology | When Available | Dissemination | Remarks |
|-------------------------|--|--|---|--|--|---|--|
| PRODUCTION FORECASTS | Climate Early Warning | Warning of El Niño conditions: erratic rainfall expected, growing season likely to be very poor | Regional Early Warning Units; DMZ; FEWS | Remote sensing, satellite imagery, global warning messages. | First global warning in December 1996. Domestically, messages started around May, 1997 | Various: radio, TV, MAFF extension staff, politicians | Caused widespread concern for upcoming production season. GRZ issued early calls for 150,000mt food aid to reach 2.5million affected individuals based on early warning information alone. Farmer response to EW messages was mixed. |
| | Final Crop Forecast | Total crop production to be much less than in previous year (area planted, yield). Production of food crops especially poor. | CSO/MAFF | Questionnaire administered to farmers using CSO's standard enumeration areas and farmer recall (no crop cuts | First prepared in March, 1998. | First circulated as confidential document within GRZ departments. Released to selected organizations in May and to general public in August. | Combined with El Niño warnings, the CSO survey was a cause for much concern and led to calls for rapid and decisive interventions (food aid, FRA maize imports, fertilizer policy, other interventions). |
| FOOD SECURITY FORECASTS | Food Balance Sheets | 1) CSO/NEWU first estimate a 200,000mt cereal deficit; later revised to 450,000mt deficit. | CSO/NEWU | CSO crop forecast data and standard procedures to estimate consumption agreed by PHANIS and EW Tech. Cmte. Revised mainly by using different consumption data. | Late March - Early May, 1998 | Confidential GRZ estimates. | Agreed between MAFF and Cabinet Office to revise figures because of uncertainty regarding CSO crop forecast data. Decision to increase the estimated deficit mainly to work within "safe limits" for calculating food aid and import requirements. |
| | | 2) WFP/FAO first estimate a 930,000mt food deficit; later revised to 660,000mt deficit. | WFP/FAO Mission | 18 day mission, including a five day field trip for observations and discussions with farmers, MAFF staff in S Prov only. | First estimate reported to GRZ mid-May; Final estimated released on June 4. | Initial figure given to GRZ without approval from FAO/WFP HQ. Revised figure approved for public release. | Radically different estimate of the national food balance caused much confusion and controversy. GRZ alarmed by the large deficit and called for immediate action. |
| | | 3) BHC independent study estimated a 332,000mt food surplus. | Prepared by local consulting team funded by British High Commission | Included cash crops in food balance estimates. Used higher yield figures for cassava and other tubers than CSO/NEWU. Also, used different population estimates. | July, 1998 | Report made available to donor community and GRZ. | Study designed to provide an unbiased assessment, but created more confusion and controversy. Confused crop income with national food balance. Food balance estimates dismissed by GRZ. |
| | Vulnerability Assessment | Originally, 44 districts identified as vulnerable to food security; 13 districts later added to the list by OVP. | DMMU/NEWU | Initial assessment based on CSO crop forecast data and preliminary VAM information. Decision to add 13 districts based on reports from MAFF field staff and politicians. | 44 districts identified in May/June, 98. 13 extra districts added in Sept. | Internal GRZ discussions in coordination with WFP, FEWS, EW Tech Committee. 13 districts added by OVP. | Should have used VAM Report, but final data not available until Sept. 98. Therefore, assessment not well organized. Used various ad hoc methods. |
| Needs Assessment | Resulted in appeal for 54,000mt food aid for 44 districts plus 7,000mt for extra 13 districts. | NEWU, PAM, PHANIS, WFP, FEWS, CARE, etc | Field survey in each affected district using various methodologies. | June/July for orig. 44 districts, Sept. for extra 13 districts | Needs assessment reports; appeal to donor community (informal meeting, later an official request). | Mainly confirmed the need for food aid and quantities required. No assessment team reported that another type of assistance may be better. Donors skeptical of the messages; GRZ reluctant to launch a formal appeal. | |

Rather than focus on broad macro-level indicators of national food security, therefore, it seems a far more sensible approach would be to look at regional and district level food security systems. At least in theory, this is the job of the VAM Report which attempts to look at a broad set of indicators related to food access. Certainly, Zambia's food security equation is far more complicated than gross food availability and it is essential to consider other factors including market access and cash crop income as well as other coping strategies in order to have an overall picture of food stress. Unfortunately, the 1997/98 VAM was released only about four months after this information was required so that incomplete draft information had to be used for initial targeting of food aid and other emergency interventions. Considerable effort, therefore, is needed to improve the process of VAM reporting to ensure that accurate and timely food security information is made available each year. With development, this system should be able to replace the national food balance sheet as a more reliable tool for making food aid and other policy decisions.

13. INTERPRETATION OF FORECASTING MESSAGES AND FORMS OF RESPONSE

Having considered the timing and content of the 1997/98 forecasting messages, it is useful to consider how this information was interpreted by various decision makers. Given that many contradictory production forecasts and food security estimates were circulated following the 1997/98 agricultural season, it is unsurprising that these messages were interpreted very differently and evoked a variety of responses. The GRZ, for example, was primarily concerned to avoid a major food crisis and was quick to introduce a variety of policies designed to ensure an adequate supply of food in remote areas and prevent price increases in the urban markets. The donor community shared this concern for Zambia's welfare, but was generally more cautious and argued that whatever response was instituted should not be at the expense of Zambia's market-led development strategy.

Because of these different perspectives and lack of coherent crop forecasting information, the eventual response of government and the donor community became little more than a negotiated compromise. Many participants were concerned about the risks of under-reacting to the forecast messages since this could result in serious malnutrition problems and even starvation for certain segments of the population. At the same time, however, there was little hard information available with which to formulate an appropriate response since each forecasting system sent confusing and contradictory messages. As the 1998 marketing season progressed, the feeling that *something* had to be done eventually took hold. By mid-year, the time for planing was quickly running out and it was agreed that the potential cost of doing nothing would be too great to risk.

13.1 GRZ INTERPRETATION AND RESPONSE TO FORECASTING MESSAGES

For government, the primary concern was for the welfare of the Zambian population. Memories of food shortages following the 1991/92 and 1994/95 droughts undoubtedly influenced the response to the El Niño warnings and later production estimates. To the extent that high food prices and maize shortages would reflect poorly on the political leadership, the fact that local council elections were scheduled for early 1999 also played an important role in shaping government's decision to provide food aid to most parts of Zambia.

Indeed, a major factor underlying government's response to crop forecasting messages has always been the tendency of political leaders and senior civil servants to equate food security to

the availability of maize. Most government officials will argue vehemently that the availability of maize is food security and that food security is maize availability. Likewise, most politicians see the problem of widespread hunger as the lack of maize and equate hunger to inadequate supplies of maize even though there are other foods in the vicinity. As a result of these views, efforts to solve Zambia's food security problem following the 1997/98 production season (as in other years) were mostly restricted to narrow policies aimed at improving access to maize rather than on other interventions that address the much broader set of linkages that constitute the food security chain.

In addition to calls for emergency food aid, for example, the Food Reserve Agency (FRA) was instructed to import 410,000mt of maize for resale to urban millers and other traders. However, only about 200,000mt of this food actually arrived due to financial, logistical and demand constraints. As described elsewhere in this report, the price of this grain was fixed at ZK38,000/90kg bag for the entire marketing season to protect consumers from an increase in the price of mealie meal. Likewise, the emphasis on maize as the only route to food security can be seen in the decision to import some 57,000mt of fertilizer through the FRA which would be loaned out on concessional terms at fixed, pan-territorial prices. By supporting small scale farmers, it was argued, this program would minimize the risk of a food shortfall the following year. Of course, government also supports a wide variety of longer-term development programs, but the effective reintroduction of price controls and producer subsidies for maize illustrates the pre-occupation of national leaders with the availability of this commodity.

Another good example of this focus on maize is the relative coverage of the Drought Rehabilitation Program implemented by PAM compared to the distribution of emergency food aid. Under the PAM program, seeds for drought tolerant crops (and maize) are given out on loan to farm communities in an effort to promote agricultural diversification. This program was initiated following circulation of a Drought Appeal Document to donors in 1995 and is supported by NORAD, SIDA, World Bank and GRZ. Although this project has the potential to make a significant contribution to drought preparedness and improved food security, Table 11 below shows that far more households have received relief food from PAM than seed loans since the program was initiated. This is due partly to problems with loan repayment which threaten the long-term viability of this project, but can also be attributed to the level of interest among farm households in the various types of assistance on offer. For a comprehensive evaluation of PAM's seed loan and drought rehabilitation program, see Berg et. al. (1998).

TABLE 11. Percentage of Project Households Receiving PAM Relief Food and Seed Loans (provincial averages, 1995-98)

| Province | Relief Food (%) | Seed Loans (%) |
|--------------|-----------------|----------------|
| Western | 62 | 14 |
| Southern | 79 | 21 |
| Eastern | 68 | 22 |
| Central | 55 | 17 |
| Lusaka | 87 | 23 |
| Northern | 36 | 0 |
| Northwestern | 72 | 27 |

Source: PAM (1998). *Food Relief Assessment Report, Lusaka.*

13.2 DONOR INTERPRETATION AND RESPONSE TO FORECASTING MESSAGES

Generally, the donor community treated the 1997/98 crop forecast messages with much more skepticism than government. Questions were raised over the methodologies used by the forecasting teams and it was generally assumed that the estimated food shortfall predicted by the national food balance sheet was overstated. As described, government shared these concerns over methodology, but generally worked from the assumption that it was better to overestimate the national food deficit and be prepared for a worse case scenario. Most donors took a more cautious approach.

To a large degree, these different interpretations can be seen as part of the normal negotiating process that occurs whenever government turns to the donor community for assistance. Knowing that it is unlikely to get everything it requests, government has learned to overstate its position just as anyone would do at the start of a bargaining process. Donors, on the other hand, are aware of this tendency and so are generally skeptical of government estimates. This is best illustrated by the decision of some donors to group together to undertake a separate food security study, which would include the food security contribution of cash crops and different estimates of tuber production and human populations so as to provide an alternative estimate of food aid requirements. Likewise, government was quick to endorse the WFP/FAO study which projected a very large food shortfall since this would provide a strong negotiating position. Perhaps more than coincidentally, at least one multilateral agency that produced this very large estimate is also in the business of delivering emergency food aid.

Domestic politics in each donor's home country also had a bearing on the decision of how to respond to the 1997/98 forecasting messages. USAID, for example, normally provides 25% of whatever food is requested by WFP as a matter of standard operating procedure. Although this effectively passes responsibility for the decision to provide food aid onto WFP, this practice has much to do with domestic politics in the United States. Historically, PL480 food aid has been used as a form of price support for American farmers. Although the situation has changed in recent years due to budgetary constraints and an increased emphasis on global free trade, the only politically feasible option for food aid is still to send American grown grain. Part of USAID's job is to identify areas where this grain can be sent.

Other donors object to food aid on moral grounds as an inappropriate development strategy. Although the British Government did eventually provide cash used to buy about 2,700mt of maize through WFP, serious concerns were raised about the long-term impact of this form of assistance. Likewise, the Netherlands Government objected to food aid on moral grounds and opted to support a cash for work program in parts of Western Province rather than participate in the delivery of food aid. The support provided by SIDA and NORAD for the Drought Rehabilitation Program described above, can also be viewed in this context in that both governments argue it is much better to focus on long-term development issues rather than support "emergency" programs on an annual basis.

Although moral, political and economic considerations certainly shaped donor interpretations of the crop forecast information, by mid-1998 decisions had to be made over just how to respond. Given the severity of the food security forecasts, many donors eventually agreed to government's position that it was better to be prepared and provide food aid than risk widespread malnutrition and potential starvation. Without clear, timely and accurate forecast information, however, these decisions were based largely on presuppositions and donor biases

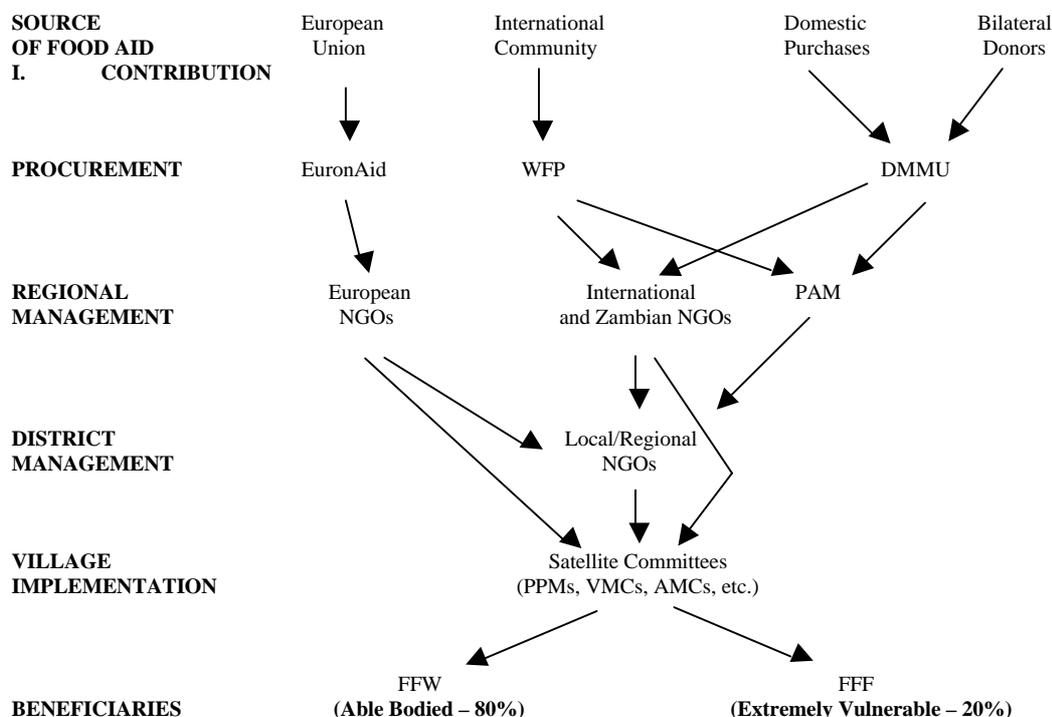
rather than hard fact. Clearly, considerable effort is needed to provide more detailed information on regional and district-level food security issues than has so far been the case.

14. IMPLEMENTATION OF THE 1998-99 FOOD AID RESPONSE

This chapter looks at the implementation of the 1998/99 food aid exercise. In order to determine whether this was an appropriate response to the 1997/98 forecasting messages, it is first necessary to consider how well the various distribution systems worked. How was the food aid exercise coordinated at the national and local levels and did the mechanisms for targeting recipients ensure that the assistance reached the truly needy? The longer-term impact of the 1998/99 food aid program is taken up later.

Figure 8 provides an overview of the many different distribution channels used in 1998/99 to illustrate how the food aid system actually worked. This shows that food supplies were procured from four principle sources by three coordinating bodies. The delivery of food to beneficiary communities was then managed by a variety of NGOs working in different parts of Zambia. Some large NGOs, including PAM, CARE International and World Vision, assumed the role of “lead NGO” and were responsible for managing the flow of funds and for monitoring the progress of smaller, locally based implementing organizations. At the village level, the actual distribution of food was managed through various satellite committees made up of local leaders and village headmen. These committees were directed to pass the food out through two channels – either as food for work (FFW) for the able bodied, or as food for free (FFF) to the extremely vulnerable, including widows, orphans and the disabled. As a guiding principle, 80% of the food was meant to be given out as FFW and only 20% as FFF.

FIGURE 8. Procurement and Distribution Channels, for the 1998-99 Food Aid Exercise



14.1 COORDINATION OF THE FOOD AID RESPONSE

As indicated by Figure 8, coordination of the 1998/99 food aid response was a collective exercise involving a variety of government departments, donor committees and NGOs at various levels. Although this is grandly referred as a “tripartite arrangement”, the lack of a single coordinating body created management problems since no single organization had the authority to see that the relief supplies were distributed effectively. This resulted in a highly inconsistent approach where most implementation procedures were formulated in reaction to events as they developed rather than according to a strategic plan.

At the national level, for example, official responsibility for the food aid exercise rested with the DMMU in the Office of the Vice President. The DMMU was only established in late-1997 and this was one of the first major exercises undertaken by the new office. As the lead government office, the DMMU was responsible for preparing the final estimate of food aid requirements for each affected district and for requesting assistance from the donor community. The DMMU was likewise meant to assume responsibility for coordinating the overall implementation of the food aid program including the selection of implementing agencies, monitoring of progress and provision of administrative support.

Due to a variety of technical and managerial constraints, however, the DMMU was mostly unable to provide the dynamic leadership that was required. Consequently, the food aid exercise became confused where various organizations took responsibility for different aspects of implementation. At the district level, for example, the DMMU was meant to be represented through District Councils by District Disaster Management Committees. These committees were supposed to monitor the progress and impact of food aid deliveries on behalf of the DMMU and submit regular progress reports. In reality, however, most of these committees were completely inoperational due to a lack of funding and poor motivation of district staff. Rather than report through the DMMU, therefore, most implementing NGOs dealt directly with their funding organization so that there was no single chain of accountability.

Likewise, WFP agreed to take lead responsibility for the procurement and transportation of food supplies to each affected district. Although WFP worked in close cooperation with the DMMU throughout this process, most food supplies arrived very late and there was considerable confusion among the donor community throughout the appeal process. Mostly, this relates to the excessive delay on the part of government in formulating a coherent appeal, but there was also confusion dealing with WFP in terms of identifying NGOs that would be operating in each specific area. Again, without a single, clearly defined, chain of command, many essential processes needed for the effective delivery of relief supplies simply did not work or came together only at a very late stage.

14.2 PROCUREMENT SOURCES

Figure 8 shows that 1998/99 food aid was procured from four principle sources. First, donations from the European Union were channeled through EuronAid which is the EU’s official relief and development agency. Likewise, most international donors (including USA, UK, Norway, Japan and Canada) channeled their contributions through WFP. Finally, the DMMU was responsible for procuring food from domestic sources and also received gifts from individual bilateral donors including Italy and China. As noted, this entire process was meant to be coordinated by WFP which worked in close cooperation with EuronAid and the DMMU.

TABLE 12. Sources of 1998/99 Food Aid.

I. Donations through EuronAid.

| Donor | Commodity | Origin | Quantity (mt) | Arrival in Zambia | Total Cost (US\$) |
|-------|-----------|--------|---------------|--------------------------------------|-------------------|
| EU | Maize | SA | 9,900 | December, 15, 1998 to March 15, 1999 | 2,699,730 |

II. Donations through WFP.

| Donor | Commodity | Origin | Quantity (mt) | Arrival in Zambia | Total Cost (US\$) |
|--------------|------------------------|----------------|---------------|------------------------|-------------------|
| USA | Sorghum | USA | 10,000 | Late December, 1998 | 4,235,000 |
| Norway & UK | Cash used to buy Maize | SA & Zambia | 5,000 | January to April, 1999 | 2,300,000 |
| Japan | Cash used to buy Maize | Zambia (Sable) | 2,797 | April, 1999 | 1,230,000 |
| Canada | Mealie Meal | Zambia | 2,497 | November, 1998 | 1,100,000 |
| | Maize | Zambia | 500 | November, 1998 | |
| | Rice | n/a | 330 | November, 1998 | |
| TOTAL | | | 21,124 | | 8,865,000 |

Note: Canadian donations already in Zambia for another project and diverted to WFP for use as 1998/99 food aid; eventually replenished by Canada.

III. Donations and Local Purchases through DMMU (OVP).

| Donor/ Source | Commodity | Origin | Quantity (mt) | When Available | Total Cost (US\$) |
|-------------------------------|--------------------|----------|----------------|----------------|-------------------|
| Italy | Rice | Italy | 1,200 | December, 1998 | 1,000,000 |
| | Maize | Zimbabwe | 2,500 | March, 1999 | 530,000 |
| China | Cash for transport | | | March, 1999 | 200,000 |
| Sable (purchase) | Maize | Zambia | 2,430.8 | February, 1999 | 559,084 |
| FRA (purchase) | Maize | Zambia | 1,589 | January, 1999 | 365,470 |
| 1997/98 left over relief food | Maize | Zambia | 194.8 | n/a | n/a |
| TOTAL | | | 7,914.6 | | 2,654,554 |

Note: FRA purchases estimated at US\$230/mt.

Details on the volume, value and sources of food that passed through each procurement channel are given in Table 12. Cost figures include distribution to the village level.

When all of the individual contributions identified in Table 12 are added together, the data show that a total of about 38,937mt of cereals were received by Zambia with a value of at least US\$14.2 million over the course of the 1998/99 food aid season. This figure falls far short of the estimated requirement of 61,000mt identified by the needs assessment missions discussed above (54,000mt for the original 44 districts plus 7,000 for the 13 districts added by the OVP).

Although Zambia received only a little more than half of the food aid it *requested*, it is not clear whether it received all that was *required*. This issue is taken up later in Chapter 15, but it is worth noting that the answer depends very much on how one defines the objectives of food aid. If the sole purpose is to prevent starvation, for example, then the quantities of food given out in 1998/99 were more than adequate since there have been no reports of mass death from hunger. If, on the other hand, the objective is to ensure access to a well rounded, culturally appropriate, diet for every Zambian citizen, then the answer is less clear. Certainly, there were problems with malnutrition in 1998/99, but whether this was sufficient to justify a major food aid intervention given the potential risks of this type of assistance is a point that will be debated for years to come.

Notably, Table 12 shows that much of the food promised by the donor community arrived in Zambia very late, which made distribution to the village level extremely difficult. The only exception to this was the food supplied by Canada which was made available from stocks already in the country in early November. USAID's contribution, was one of the first foreign consignments to arrive, but this only came in just before Christmas, 1998. Other donations, including WFP purchases using funds supplied by Japan, Norway and the UK, only began to arrive in January and some supplies were still coming in as late as April. Importantly, the timing of these deliveries caused major logistical problems due to the poor condition of rural roads after the start of the rains.

Because food was still coming in throughout the month of April, a decision was made to extend the distribution season by a month and a half from the planned termination date to May, 15. Importantly, this decision meant that food aid was still being given out in many areas well after the 1999 harvest had begun. In these cases, food aid almost certainly had a negative impact on farmgate prices and provided very little nutritional benefit since other, locally produced, foods were readily available. Exactly why the decision was made to continue with food distribution at this time is not entirely clear, but may have had something to do with local expectations of food aid created by politicians, coordinating NGOs and needs assessment teams at the village level. Just because the delivery of relief food was late, however, should not have been a sufficient reason to extend the distribution program. Given the potential negative consequences of these late deliveries, a far more sensible approach would have been to save the grain in storage or to sell it through the FRA or other marketing channels.

Finally, from Table 12 it is interesting to note the different sources of food provided by each donor. In particular, these data show that most donors provided cash which was used to buy grain from regional and domestic sources. In these cases, the 1998/99 food aid exercise at least provided some indirect support to producers in these African countries. Only in the case of donations from Italy and the USA was food from outside the Southern Africa region imported to Zambia. For these governments, international food aid is seen, at least to some extent, as a form of price support for domestic farmers. Although the long-term impact of this policy, and an

analysis of the trade-offs between using local supplies compared with food procured in the donor's home country, is well beyond the scope of the current discussion, it is worth noting that this form of assistance was likely of less benefit to Zambia (and the Southern Africa region) than if the food had been procured from local sources.

On the other hand, the decision of the US and Italian Governments to provide sorghum and rice respectively did help minimize the negative impact on domestic maize markets. Use of these commodities probably also contributed to improved targeting since most Zambians will only consume these alternative foods as a matter of last resort. Indeed, there is a significant risk that the distribution of white maize as emergency relief merely perpetuates dependency on outside assistance since most Zambians will be happy to label themselves food insecure if this means a chance of receiving their favorite food for free.

14.3 REGIONAL AND LOCAL MANAGEMENT

After procurement, the next step of the food aid exercise was to deliver the food stocks to each affected district for distribution. As indicated in Figure 1, these regional operations were managed by a variety of NGOs at two levels. Generally, food stocks were first passed to a lead-NGO which assumed responsibility for the distribution exercise on a regional basis. In some cases, these NGOs managed the actual distribution of food to satellite committees, whereas, in other cases, the lead-NGOs focused only on coordination and the provision of administrative services. In these instances, other NGOs with closer ties to the area targeted for food aid were contracted to manage local operations. By working with locally based, development oriented NGOs in this way, DMMU and WFP hoped to minimize the potential negative effects of their intervention.

The selection of individual NGOs to carry out these tasks depended on many factors. As a matter of standard procedure, for example, EuronAid worked exclusively with European-based NGOs to manage the distribution of its food aid contributions. As Figure 8 shows, these NGOs worked both directly with satellite committees at the village-level and through other, regional NGOs in cases where this arrangement was not practical. Although the choice to work exclusively with European organizations is understandable for the sake of administrative efficiency, it should be pointed out that this decision was at the expense of an opportunity to build the capacity of Zambian NGOs to carry out similar operations in the future.

Similarly, WFP and the DMMU directed their food aid procurements through a variety of large NGOs, including PAM and other domestic and international organizations. In this case, it is interesting to note that DMMU directed about 80% of its food aid procurements through PAM, whereas WFP only sent about 25% of its assistance through this channel. For the DMMU, this pattern relates mainly to the historic ties with PAM in that the DMMU was born, at least in part, out of this organization. For WFP, on the other hand, the preference for other NGOs mainly reflects problems it encountered working with PAM on previous occasions related to administrative efficiency and cost effectiveness. Many local NGOs working under PAM, for example, have expressed grave concern over delays in payment for their services and poor coordination of local transport arrangements. Again, there is a trade-off between the desire to work with local organizations to develop their administrative capacity and the need to ensure a smooth and timely delivery of relief assistance.

14.4 TARGETING AT THE VILLAGE LEVEL

However the distribution of food aid was managed, Figure 8 shows that all deliveries eventually passed into the hands of village-level satellite committees. These committees went by several different names. PAM, for example, worked with Programme to Prevent Malnutrition Committees (PPMs), whereas CARE International worked through Area Management Committees and Village Management Committees (AMCs and VMCs respectively) depending on their local structure in each area of operation. Regardless of nomenclature, these committees were made responsible for managing the actual distribution of relief supplies to individual recipients and for reporting on their progress to the coordinating NGO. To ensure that the relief supplies reached the truly needy, distribution was to be through two channels including food for work and food for free. FFF was intended only for the extremely vulnerable and was meant to account for only about 20% of total distributions.

By far, most food was given out through FFW, which was selected as the most straightforward and simple means of targeting relief distributions. More specifically, by making food available this way it was hoped that distribution would be self-targeting in that only the truly needy would want to participate in such a program. This was also seen as an opportunity to contribute to the longer-term development of the affected community in that food would only be given out in exchange for work on simple projects including feeder road rehabilitation, water point development and improvement of health and sanitation facilities.

Although impact assessment reports were still being prepared by WFP at the time of writing, it seems likely this system worked reasonably well. The use of sorghum, rice and other less preferential foods than maize may have contributed to improved targeting, but without a comprehensive analysis of the food security situation for individual households, it is difficult to know how the food could have been distributed more effectively. On the other hand, this does point to an inherent problem with the use of food aid in that targeting is at best imprecise, and there will always be questions over the actual needs of individual beneficiaries.

For their involvement in a FFW project, each participant was to receive a daily allowance of 350g of cereal flour plus an allowance for five additional family members (giving a total allowance of 2.1kg per day). This food was to be given out by the satellite committees only at the end of the month once the community project had been completed and inspected by the coordinating NGO.

Although conceptually simple, the actual implementation of these arrangements varied greatly from area to area depending on each satellite committee and their relations with the responsible NGO. Indeed, most NGOs interviewed for this study expressed serious concerns about the discipline of individual committees and suggested that the distribution system only worked well in about half of the cases. With regard to the other half, it is alleged that committee members first saw that they and their friends were very well fed and only worried about distributing food to other project participants as an afterthought or when prodded by the NGO. These allegations have been noted most often with respect to PPM committees working under PAM. In still other cases, it appears that food aid was simply given out by the satellite committees to all village residents as the most equitable way of sharing the “gift” they had received. Finally, it also appears that some satellite committees sold the food they were given and it is widely acknowledged that several hundred tons of relief supplies ended up in the Democratic Republic of Congo rather than Zambian villages. The impact of the 1998/99 food aid exercise is a theme taken up in much more detail in the next chapter.

15. IMPACT OF THE FOOD AID RESPONSE

At the time of writing, the formal impact assessment of the 1998/99 food aid exercise was still being carried out by WFP and other implementing agencies. Once these reports are available, it will be possible to make more definitive statements about the nutritional impact and benefits of the program in terms of household food security. In the absence of this detailed information, it is useful to identify three arenas of impact against which the success or failure of the 1998/99 food aid response can be measured. Specifically, in addition to short-term nutritional benefits, the impact of the food aid exercise must also be thought of in terms of the long-term effects on farmer attitudes concerning responsibility for their own food security and the impact on market development.

In interpreting these points, it must be remembered that food aid was only one type of international assistance provided to Zambia in 1998/99. No one would claim, for example, that food aid is a panacea that addresses all of Zambia's development needs. Many longer-term projects are supported each year by government and the donor community that focus on the underlying causes of poverty. Although the success of the 1998/99 food aid exercise cannot be measured in terms of major developmental achievements, it is still important that food aid should not undermine other efforts and that this form of assistance is consistent with national strategic objectives. As noted, a total of at least US\$14.2 million was spent on the 1998/99 food aid exercise and this money could have been used for other purposes. Given the scarcity of domestic and international development resources, it is essential that every Kwacha must be well spent for Zambia.

15.1 IMPACT ON NUTRITION

The nutritional benefits of the 1998/99 food aid exercise will not be known until the impact assessment report is made available by WFP. Based on circumstantial evidence and discussions with NGOs and beneficiary communities, however, it seems that some form of food intervention probably was necessary, at least in specific locations and for certain individuals. Reports of beneficiaries fainting away from exhaustion after a several day walk to the distribution point, for example, clearly suggest these individuals may have had a food security problem. Whether any of these individuals would have died without external assistance, however, is not clear since there have been no reports of mass starvation and Zambia was far from experiencing famine conditions.

Indeed, some recipients were quick to criticize the program. This was especially true in cases where sorghum and rice were being given out rather than maize. According to one NGO in Western Province, for example, food aid recipients even refused to participate in the food for work project until they were given maize. In other cases, beneficiary groups complained that the 350g daily allowance was too small and so refused to participate in the program unless the ration was increased. Obviously, these individuals were far from starving and did not require emergency food aid.

In this respect, it is worth noting again the tendency of most Zambians to measure food security against the availability of maize. Many other foods, including cassava, sweet potatoes, sorghum, mixed beans, fish and even caterpillars, were available in most parts of the country throughout the implementation of the 1998/99 food aid exercise. Obviously, most individuals would prefer to eat maize, but they will not starve by consuming these other foods. Indeed, in many locations, including virtually every district town and all provincial capitals,

maize was available for purchase over the entire course of the distribution program. From this perspective, the only real problem was that most individuals could not afford to buy this preferred food and so would have been forced to resort to a variety of less palatable alternatives if the distribution program had not gone ahead. Surely, this cannot be taken as sufficient justification for emergency relief.

Together, these points combine to suggest that Zambia's real problem following the 1997/98 production season was not so much a question of food availability, but had far more to do with poverty and securing reliable access to the desired commodities. Although there were almost certainly localized problems of food access, the very notion that most regions of the country required relief food, including districts such as Kapiri, Mposhi and Mkushi where growing conditions in 1997/98 were generally very good, is difficult to support. True, some vulnerable individuals may have needed nutritional interventions, and food aid may have prevented others from selling off productive resources to buy food, but it is very difficult to argue that emergency interventions were required in each of the 57 districts covered by the 1998/99 exercise. Food aid may treat the symptoms of poverty, but it is not a cure and should be used much more judiciously in the future.

15.2 IMPACT ON BENEFICIARY ATTITUDES

In terms of the impact on farmer attitudes, there can be no doubt that most beneficiaries greatly appreciated the food aid program. At the very least, the distribution of relief supplies meant that many Zambians were able to consume maize throughout the normal "hungry" season before harvest. As one group of beneficiaries explained, "we were suffering with no maize until the food aid came, without assistance we were going to be hungry." Of course, Zambian villagers will appreciate almost any food hand-out and this is not the same as saying they were in desperate need of assistance.

Indeed, one of the most often noted criticisms of food aid is that this form of assistance is alleged to foster a sense of dependency on external assistance among the intended beneficiaries. As one report commented following a visit to the Luano Valley, for example, villagers in this area often... "sit there looking to the skies waiting for the next helicopter to bring them food." (FAO/Netherlands' Government Mission, 1998). Although this is probably an exaggerated, extreme case, the delivery of emergency food aid to certain parts of Zambia on an almost annual basis, does nothing in the long-run to encourage farmers to take responsibility for their own food security.

From this perspective, it can be argued that food aid has essentially taken on the characteristics of a welfare program. Indeed, government has tended to argue the case for food aid before the donor community and national press almost as a form of compensation to Zambians for their poverty. Rather than use domestic and donor resources to treat the effects of poverty, however, the long-term objective must be for Zambian farmers to become more productive. Food aid may be required from time to time in certain isolated areas, but this is obviously not the long-term solution to Zambia's development problem. Again, food aid must be used much more judiciously in the future so that scarce domestic and donor resources can be directed to other programs that address long-term development issues.

15.3 IMPACT ON MARKET DEVELOPMENT

Finally, it is useful to consider the impact of the 1998/99 food aid exercise on farmgate prices and private sector development.

First, with respect to the impact on farmgate prices, it has already been noted that the distribution program continued in many areas well after the 1999 harvest had begun. Mostly, the decision to extend the distribution of emergency food aid was made simply because relief supplies arrived late so that additional time was needed to give out all of the food that had been pledged. Although it is difficult to quantify the price effects of this decision, it is obviously extremely difficult (if not impossible) for a farmer to sell their crop for a fair price when food is being given out for free in the same area.

This observation is little more than common sense and it seems remarkable that those planning and directing the 1998/99 food aid exercise did not consider the potential negative consequences for the intended beneficiaries of continuing with distribution after the start of the new harvest. That such a decision should have been made, can be seen, at least to some extent, as a result of the “management by committee” approach that evolved out of the ad hoc arrangements between WFP, DMMU and implementing NGOs. The management of a relief program must never be left to chance and a much clearer chain of command, including a set of guiding principles, should be defined before any future program is initiated.

Next, regarding the effect on private sector development, one of the most often cited justifications for food aid is that some parts of Zambia are considered so remote that private traders simply cannot operate in these areas. Although the poor condition of transport and communication infrastructure is indeed a major obstacle to private sector development, this characterization deserves closer scrutiny.

Specifically, during a visit to Kalabo District on the far bank of the Zambezi River, two small traders were quickly found that tried bringing maize meal to the area for commercial sale. Given that Kalabo can only be reached by boat for about eight months of the year, this area should easily pass anyone’s definition of the term “remote” and, contrary to conventional wisdom, these traders still managed to bring in about 150mt of roller meal to the area. Once all transportation costs were taken into account, the traders calculated that they would have to sell this food for about ZK25,000 per 25kg bag in order to make a profit. However, once the relief food supplied to Kalabo arrived, it was impossible to sell at this price and the traders were forced to sell for only ZK21,000 per bag which meant that they lost money on the deal. Although these traders did admit that some parts of Kalabo were too remote for them to serve, they were quick to point to the negative effects of food aid and were adamant that they could have supplied the BOMA town and surrounding area.

This is only one example from a particular location, but the long-term effects of food aid must be kept in mind when deciding to implement such a program. At least on paper, Zambia has opted for a market-led development strategy, and the risk that food aid may undermine this process should have been considered in greater detail. Although politicians and other national leaders were quick to call for emergency assistance, this should have only been implemented as a last resort and not as the first best alternative. More specifically, rather than provide relief food, a more sensible approach may have been to support cash for work programs to increase the purchasing power of local communities. Given the potential negative consequences of food aid, the tendency of some leaders to rush for this form of assistance is a very dangerous approach that can seriously affect the entire process of national development.

16. RECOMMENDATIONS BASED ON THE 1997-99 FOOD AID EXERCISE

This report set out to consider how the 1997/98 crop forecasting messages were interpreted and used to formulate the 1998/99 food aid response. Overall, the discussion has shown that there were many deficiencies in the forecasting system which led to a series of inappropriate policy decisions. As discussed, each forecasting system sent confusing and often contradictory signals so that it was difficult to know exactly how to respond to the 1997/98 forecast messages. Given the severity of initial El Niño warnings, for example, many key decision makers concluded early on that agricultural production would be very poor and that some form of emergency intervention was necessary to prevent mass hunger and widespread suffering. This perspective was undoubtedly influenced by the tendency of most politicians and senior civil servants to equate food security to the availability of maize. Importantly, this view distracts attention from the underlying causes of poverty in Zambia and leads to a potential misallocation of donor and domestic development resources.

To improve the situation, considerable effort is needed to strengthen the process of crop and food security forecasting and to clarify essential procedures for the delivery of emergency assistance when required.

First, with respect to the crop forecasting system, the most obvious deficiency with the 1997/98 messages was that most reports came out too late to be of any practical use. This was especially true with respect to the VAM Report which should have been used to identify parts of the country that may be vulnerable to food insecurity. As described, however, this report was released about four months too late so that draft information, best guesses and political biases became the basis for the vulnerability assessment rather than hard data. Likewise, a series of food balance sheets were produced from roughly the end of March until mid-July which sent confusing messages and made it almost impossible for government officials and donors to know how to respond. Because of the lack of clear information, therefore, the eventual response became little more than a compromise based on presuppositions and best guesses.

In order to improve the situation, it is recommended that considerably less attention should be given to the preparation of pre-harvest national food balance sheets and that this energy should be directed instead towards the production of improved vulnerability assessment reports. As the 1997/98 episode clearly demonstrates, the national food balance can be expressed in an almost infinite number of ways to support the biases of different organizations. At best, these balance sheets are based only on predictions of total crop production to provide a gross estimate of food availability for the country as a whole. By definition, these balance sheets say nothing about the level of access to food for different segments of the population, which is the essence of the food security problem. It seems remarkable that major food aid and other policy decisions were made without more careful consideration of these issues.

As noted, part of the reason these issues were ignored relates to the simple fact that the 1998 VAM Report only came out about four months after the information was required for making effective food aid decisions. This should not be allowed to happen in the future and considerable effort is needed to improve the situation. Towards this end, it seems a thorough review of the process of VAM reporting should be undertaken to identify meaningful indicators that can be easily interpreted by a range of policy makers. More specific recommendations concerning the VAM are presented in Part III of this report.

Only through an improved process of VAM reporting will it be possible to make sound, empirical, judgements on the need for food aid. Current information systems fail to send the clear signals needed to make these judgements and the 1998/99 food aid exercise was born mainly out of a fear of doing nothing and the tendency for some to equate food security with maize availability. The food balance sheet approach reinforces these views and distracts from critical development issues. At least in most areas, Zambia has a problem with poverty and not food availability. Whatever forecasting system is agreed should take this into account.

The cost of ignoring this advice is clearly illustrated by the 1998/99 food aid exercise. Although some form of nutritional intervention may have been required in certain locations, the crop forecasting system did not provide the information needed to make this judgement. Due to the lack of appropriate information, therefore, a decision was made by government at a very early stage to provide food aid to most parts of Zambia as a blanket response. Food aid may have its uses in extreme cases, but should never be the first recourse of government and the donor community, especially in a country like as Zambia where agricultural conditions are generally very good. As discussed, this is a very indiscriminate form of assistance in terms of the potential negative consequences on farmer attitudes and private sector development. Because food aid only treats the symptoms of poverty and is not a cure, this form of assistance must be used more judiciously in the future and should never be the first response of government and the donor community to crop forecasting messages.

The cost of the current haphazard forecasting system can also be seen in terms of the administration of the food aid response. Specifically, because of the controversy surrounding the forecast messages, and the failure of the OVP to issue a coherent and timely appeal for assistance, the mobilization of resources by the donor community was delayed by several weeks or months. Consequently, food aid contributions arrived in Zambia throughout the rainy season when transportation of the food was extremely difficult. Due to these logistical problems, a decision was made to extend the food distribution season, but this likely did more harm than good since food was still being given out after the new harvest had begun. To avoid these problems in the future, it is important to look for ways to increase the responsibility of local communities for their own food security. Rather than rely on outside donations, consideration should be given to the establishment of small, locally-managed grain banks. Food could then be sold from these banks as needed, perhaps in conjunction with a cash for work program designed to strengthen the purchasing power of vulnerable individuals.

Clearly, the development of improved crop and food security forecasting systems will require considerable effort on the part of all stakeholders. As the analysis has shown, existing forecasting systems failed to send the clear messages needed to formulate an appropriate response. This paper has attempted to illustrate some of the costs of the current system with respect to the 1998/99 food aid exercise. Beyond the estimated financial cost of US\$14.2 million, other indirect costs include significant personnel investments laid out by NGOs more routinely involved with development interventions, logistics and vehicle opportunity costs, the costs of discouraging traders and farmers from investing in the maize industry, the costs of creating a perception of disaster management agencies as inefficient and ineffectual, the costs of stressing the social fabric of rural areas when undesirable food aid commodities are refused or when local leaders divert food aid to their own use, the opportunity costs of delaying development of an effective strategy to deal with rural poverty and the costs of distrust between donor investors and government when dealing with weather induced food insecurity. Every Kwacha used for development in Zambia must be well spent, and it hoped that this discussion provides a basis for policy makers to agree on how the forecasting system can be improved.

PART V. MARKET RESPONSES TO FORECASTS, WITH REFERENCE TO 1997-99

17. AGRICULTURAL MARKETING IN ZAMBIA

17.1 NATIONAL ISSUES

In order to understand the current problems in agricultural marketing it will be helpful to look at a brief review of historical developments. Before independence in 1964, Zambian agricultural marketing was being carried out by two government established marketing boards (parastatals): the Grain Marketing Board and the Agricultural Rural Marketing Board (ARMB). The Grain Marketing Board bought agricultural crops from European farmers, who lived mainly along the major rail lines, while ARMB bought from African farmers in the more outlying rural areas.

NAMBoard Era

Following independence, the Government of the Republic of Zambia (GRZ) adopted socialist economic policies which strengthened state control of the agricultural marketing system through commodity price regulation. The political purpose of this policy was to please farmers with high producer prices, while also placating urban consumers with artificially low prices for agricultural end products. In order to work, these policies obviously required increasingly greater use of subsidies (called 'restitution'). Under the National Agricultural Marketing Act of 1969 the two colonial era marketing boards were abolished and a single parastatal, the National Agricultural Marketing Board (NAMBoard), created.

NAMBoard's all-encompassing functions included monopolies in marketing of all agricultural crops and inputs. Government's attempt to supply equal agricultural services to all producers regardless of location created an institution of enormously high handling, transportation, storage and other marketing costs. Furthermore, the policy of fixing pan-territorial producer prices regardless of seasonal demand cycles pushed NAMBoard's losses higher. The subsidies required to maintain the institution as an operational entity became a major drain on the GRZ budget.

Simultaneously, low export prices for copper (the primary national export commodity) and high oil prices on the world market wreaked havoc on the national economy. By 1986 Government was no longer able to sustain the drain on its budget that existing levels of subsidy to the agricultural sector had grown to. An attempt was made to partially reduce the overall subsidy by ending the subsidy on breakfast meal, seen as more of a luxury item than roller meal, which continued to be subsidized. However, the government attempt to gradually withdraw from the subsidy system was short-circuited by the millers who quickly realized that if they were allowed to freely mark-up breakfast meal but not roller meal, then breakfast meal was a more desirable sales commodity despite greater demand for the other. The result was a reduction in roller meal production and the consequent food riots of December 1986 in urban areas. Government reacted by nationalizing all maize mills and reinstating the breakfast meal subsidies (and price controls); an overreaction which was to lead to even greater deficits in the national budget.

Cooperative Era

In 1988 Government blamed NAMBoard for the high losses through inefficiency and attempted to deal with the problem by transferring responsibilities for primary agricultural marketing and intra-provincial trade in crops and inputs to Provincial Co-operative Unions (PCUs). However, no operational modalities were changed, so the PCUs experienced the same problems NAMBoard had and Government continued to be responsible for the debts incurred. The

negative situation was further emphasized as the 1988 growing season was remarkably good and the nation had a bumper harvest of maize (1.94 million metric tons), which Government had committed itself to purchasing. The cost of holding, and the losses entailed in, that size of carryover stocks put more financial strain on Government.

The GRZ carried out further institutional shuffling by enacting the Agricultural Marketing Act of 1989 which transferred maize marketing functions from the PCUs to the umbrella central organization, the Zambia Co-operative Federation Limited (ZCF), and fertilizer marketing to the existing parastatal, Nitrogen Chemicals of Zambia (NCZ). These, however, were purely administrative changes and could not make any significant difference to the marketing cost structure. By 1991, maize mills and PCUs were unable to raise funds for purchases as they were considered uncreditworthy by financial institutions and Government was unable to guarantee their credit applications.

For many years Zambia had an elaborate, government-instituted system of co-operatives. Farmers were organized in Primary Co-operative Societies (PCS), which formed the basis of District Co-operative Unions (DCU). The DCUs were aggregated into the PCU, and at the national level the co-operatives were organized in the umbrella organization of the ZCF. This system of government co-ops played a major role in the marketing of maize and in distribution of inputs until 1991.

The commitment of the co-op members was low. Top-down management and linkages with the GRZ were typical characteristics of these organizations, rather than true co-operative member participation. In the maize marketing, the role of the co-ops was defined as “government buying agencies”, not as “farmer sellers representatives”. Farmers considered them as buyers of maize and suppliers of inputs, which, in most cases, were given on credit. The organizations were not considered as belonging to the farmers and, hence, the farmers did not worry about the future of the co-op. Most of them were characterized by weak management and a costly structure due to a large excess of personnel.

Liberalization Era

A new Government was elected in 1991 on a platform of liberalization and market reform. Some of the steps taken were to liberalize imports by removal of non-tariff barriers and reduction of maximum tariffs for preferential trading partners, such as countries of COMESA. In agriculture, Government wanted to permit private maize and fertilizer trade. The first step was to remove price controls at all levels: producer, into-mill and consumer. Unfortunately, the 1991-92 agricultural season was characterized by severe drought, which frightened Government into the regressive step of drastically limiting the number of traders allowed to operate in each province and setting floor prices (becoming, effectively, government-set prices).

The GRZ designed its new role in agricultural marketing as being limited to a) formulating effective policies and legislation, b) creating cost-effective marketing support services, e.g. market information, marketing extension, marketing credit facilities, market place infrastructure development, etc., and c) safeguarding the nation’s food security position through establishing and operating a food reserve. This, however, was a statement of intent that eventually began wavering somewhat, as will be seen in the further description of GRZ’s activities.

Finally in 1993, Government began to implement its maize market liberalization policy in reality; subsidies for maize production and marketing were eliminated and restrictions on private sector participation in maize marketing were removed. As part of the effort to encourage the by

now discouraged private sector, Government initiated a program of leasing out its grain storage facilities to traders. However, the newly fledged trading companies were unable to finance crop purchases and Government decided to intervene through provision of credit to principal buyers. As the season progressed, these selected dealers were unable to sell their grain to the mills before the start of the next season and could not repay their government loans. Government was forced to repossess the stocks being held in April 1994; the grain so acquired (approximately 189,000mt) was used to establish a national Food Security Reserve.

During the 1994 grain marketing season, Government publicly announced that it would not become involved in market operations. The crop forecast indicated a need to import about 260,000mt to meet production shortfall, but millers and traders lacked confidence in Government's resolve not to interfere. This, combined with inexperience and financing difficulties, caused low imports of maize. By January 1995, the commercial mills were finding difficulty in sourcing supplies and prices had reached import parity. Finally Government's desire to recycle its reserve stock led it to release its stocks through public tender to bring down maize prices (see following section, Market Price Information and Food Security), thus confirming trader fears that it would be unable to keep itself from market interference.

To emphasize its market liberalization stance, the GRZ passed the Food Reserve Act and the Agricultural Credit Act in 1995. Both acts aimed at encouraging the private sector to develop efficient agricultural production and marketing systems by institutionalizing assistance to the private sector and creating market organizations which were managed jointly by the private sector and Government. The implementing arm of the Food Reserve Act was the Food Reserve Agency (the FRA), a semi-independent body designed to take over operation of the national Food Security Reserve.

During its first season of operations (1996/97), the FRA was ordered by the Minister of Agriculture to participate in regional purchases of maize, sorghum and millet in order to re-establish its reserves. It was publicly announced to be responsible for buying 50,000mt and this became part of the planning estimates of private traders. Eventually, however, the FRA was only able to purchase around 10,000mt, as it never received its stock establishment fund promised by Government. In the following season a large deficit was announced (680,000mt) and the GRZ, not trusting the private sector to respond adequately, ordered the FRA to import 410,000mt. Again the FRA's resources were inadequate and only some 200,000mt actually arrived.

The GRZ also clearly stated in 1996 that it would not get involved in the agricultural inputs markets, especially fertilizer. However, in an attempt to stimulate maize output through greater use of fertilizer the GRZ has reverted to distributing fertilizer to farmers on a large scale. It imported a total of 48,000mt of fertilizer for the 1998/99 production season through the FRA (as well as purchasing 18,100mt locally). As this represented enough fertilizer to cover the entire maize crop, the private sector felt intimidated by the overwhelming presence of the FRA in the market. Furthermore, later in the season, the private traders found FRA fertilizer in local markets at below their own marketing costs. However, much of the product was late in arriving and only about 15,000mt of top dressing was on hand by the onset of the early rains in November. The FRA purchased most of the fertilizer by international tender and contracted Omnia Fertilizer to undertake distribution on loan bases. Losses from non-payment of loans are estimated to be over US\$8 million, although the FRA's legal department is continuing to press defaulters for payment.

Thus it appears that the private sector and the FRA are creating a self-fulfilling prophecy of crisis in the agricultural marketing environment: the private sector doesn't trust the GRZ not to meddle in national markets, and Government doesn't trust the private sector to adequately meet national demand in the market. Each acts as if what they fear to be true is, and it becomes so.

Since the introduction of grain market reforms, agricultural commodity exchanges have been established in Lusaka and Kapiri Mposhi. The Agricultural Commodity Exchange (ACE) in Lusaka was set up in 1996 as an initiative of the Zambia National Farmers' Union (ZNFU) with the assistance of a consultancy firm from South Africa. Ownership is currently 60% by ZNFU and 40% by a private Zambian company. ACE provides centralized trading facilities for buyers and sellers of agricultural commodities and inputs. The Exchange administration also provides regular price information of traded commodities and an estimated futures price (SAFEX's Randfontein quoted futures price plus costs of landing the product in Zambia).

The Kapiri Commodity Exchange was established in 1997 as a privately owned limited company with offices in Central Province and Lusaka. The exchange mainly deals in maize and fertilizer. For the past two seasons it has been handling produce mainly for the small-scale farming sector. The KPE offers weekly price bulletins on its commodities traded.

For buyers and sellers alike, the appeal of the exchanges is that they provide an efficient, low cost and transparent marketplace. Initially the commodity exchanges have concentrated on straightforward spot market transactions, which involve purchases of commodities for immediate delivery and on a cash basis. The exchanges offer an alternative to traditional direct seller to buyer transactions. While the share of total trade channeled through these fledgling exchanges remains relatively small, they have managed to maintain their presence in the market and, as confidence in the process grows, will eventually take a more prominent place. The presence of a transparent marketplace, where prices are openly quoted, can provide assurance to all market participants.

However, from a food security and market stabilization viewpoint, the real value of commodity exchanges lies with the potential for forward contracting. In the Southern Africa region this currently exists only with SAFEX, the South African commodity exchange. Forward contracting would reduce the gap between import and export parity and, thus, promote market stability. ACE's estimated futures price information is used by local millers to help them make plans to meet their own supply needs throughout the year.

Lack of market information is another constraint to national market development. Market liberalization involves a long learning process, and the market information system is the means of seeing problems so that fine-tuning can be carried out. The GRZ tried to address the problem of lack of market information by establishing the Agricultural Market Information Centre in 1995 to provide this service. This was an important step for Government in its new role as provider of marketing infrastructure and enabler of conducive market environment. AMIC is co-ordinated in the Ministry of Agriculture, Food and Fisheries (MAFF) at Lusaka, and provincial marketing officers and their colleagues in the districts collect price and supply information in the field (see following section on Agricultural Marketing Information Services).

Although most of the co-operatives established pre-liberalization still exist, at least in name, their activities have largely declined. In the new market environment, they faced severe competition from the private sector. The co-ops were restructured under private management. However, they were not able to arrange enough working capital to engage in marketing activities

due to limited ability to subscribe new loans. This was because most of them inherited heavy debts from their prior existence.

Currently all the PCUs (there are nine, one in each Province) are multipurpose co-ops representing all the still financially viable DCUs and PCSs. They have, however, been hard pressed to sustain themselves and have resorted to asset stripping in the effort to try and sustain themselves. Only the Southern Province Co-operative & Marketing Union (SPCMU), the Central Province Co-operative Union (CPCU), the Copperbelt Co-operative Union (CCU) and Lusaka Province Co-operative Union (LPCU) are still viable entities. The new Co-operative Societies Act requires these remaining co-ops and ZCF to transform into single purpose operations before February 2000. GRZ also expects to re-establish co-operatives in the remaining provinces. It seems overly optimistic to expect these changes will become effective in the period specified.

In the current season, the marketing environment seems to be further evolving back to greater Government participation. The FRA has been ordered by the GRZ to purchase 20,000t of maize. It will also begin participating in the fertilizer market: it will purchase and distribute 80,000mt of fertilizer through new District Farmers' Co-operatives. An expanded RZ role may reduce even further the incentives of private traders to expand their operations in rural areas.

17.2 REGIONAL ISSUES

One of the most striking effects of the market liberalization has been the tremendous increase of private trade initiatives. Prior to the promulgation of liberalization policies there already existed an elaborate structure of informal barter trade in many local products, e.g. cassava, millet, fish, firewood, etc. However with the deregulation of marketing, informal trade became more visible: markets in urban centers experienced a rapid growth, small vendor stalls for consumer goods began to appear, even in remote rural areas, and along the main tarmac roads the number of cash-sales points for agricultural products increased.

However, the liberalization of the maize market took longer to materialize substantially. Although decontrolled in 1991, Government continued to be actively involved in maize trade through the raising of funds to buy maize, the selection of maize marketing financiers, the setting of grain bag prices, the appointment of buying agents on behalf of the financiers, and the policing of the use of funds. Finally during the 1994/95 season, the GRZ withdrew completely from the regional maize market system: no "floor price", "into-mill price", or other official price was announced, and Government did not try to intervene in the market related activities — either through severe self-control or lack of financial capability.

The first year's change from the, by-then, traditional Government supported system of maize purchasing resulted in a very fragmented, unpredictable market which left the large number of farmers that had been lured into growing maize as a cash crop by unrealistic Government policies a bit bewildered. However, within four years the numbers of small-scale maize traders has increased substantially: they have become the privileged suppliers of the public markets in District and Provincial centers. Although some farmers with enough extra cash to pay for transportation to central markets will sell a few bags of maize at higher wholesale prices, most farmers with a surplus rely on this new network of Provincially based small-scale traders and transporters.

IFAD is currently establishing a Provincially based project which will assist in the development of farmer/trader liaison and provide some basic market information. The project also will

attempt to establish a Code of Conduct among these small local traders, as a precondition to use of the project generated information.

Traders, however, have little incentive to provide agricultural input supplies to rural areas. It has been estimated by several of the major participants in the agricultural inputs business sector that only about 10 percent of smallholder producers are able to purchase inputs; another 10 percent may be captured into the market with “swap” deals (bags of fertilizer for bags of maize). The market will continue to develop slowly until the economies of rural marketing change (better infrastructure brings product prices down and farmers have more cash available for medium term investment decisions).

Poor road infrastructure hampers interest in both maize trading and the reverse-trade of agricultural inputs. Transport cost differences between Districts with a main road and Districts without can be five to ten times. These costs will always be reflected in the prices of products bought/sold. Thus there has been increased small farmer interest in cash crops (with higher value to weight ratio than maize) for marketing purposes, and more dependable food crops for their own on-farm “food reserves” (tubers, millet, sorghum, etc.).

Lack of local markets and market information is also a constraint to developing the economy of the approximately 560,000 small-scale farming families. The number of markets is very limited and concentrated in urban centers and along main roads. Easily accessible market facilities decrease the cost of doing business by making activities more transparent and less uncertain. Such facilities should be developed at the local level in response to local needs.

Market information is an essential ingredient in the process of developing the agricultural market, but it must be based on the needs of the recipients. These needs will vary in the different Provinces, and any market information system developed must be created with an eye to these needs first; national information will be merely a compilation of information available from the local centers of operation, not an end in itself.

The case study on Western Province clearly points out the difficulties inherent in trying to use food aid as a response to local production deficits. It is a “blunt instrument” relying on poor logistical and administrative delivery systems, and any food aid that is not perfectly targeted disrupts the local markets. The food aid deliveries directly inhibited trader initiatives to supply these markets and interfered with the development of local improved market procedures and structures. Experiments with Cash-for-Work (CfW) programs in the Province seem to indicate that it is a better means of increasing local food security while mitigating the negative effects of traditional food aid on market liberalization.

17.3 CROSS-BORDER TRADING

Informal cross-border trade (mostly illegal, or semi-legal) has received considerable attention in the countries of eastern and southern Africa where long, unguarded highly porous borders are the norm. Containing this trade would be almost impossible in such outlying border areas where personal relationships with people in villages across the border are more important than any in the national center. The volume of this trade is almost by definition difficult to quantify. Preliminary research suggests that it represents a relatively small amount of staple foods compared to national volumes produced and consumed, but this amount may be of some significance in the border areas themselves. Furthermore, as the flows move both ways across the borders, they can be of importance to national food security planners.

Inconsistent pricing and subsidy policies in neighboring countries seem to be the major causes of cross-border trade. The situation offers recurrent, rewarding trading opportunities for both large and small private traders. As is inherent to trade in general, informal cross-border trade contributes to improving food supplies through moving food from surplus to deficit areas; it generates employment opportunities in areas that are normally poor; and it provides production incentives as a result of opening new markets. Its informal nature, however, also produces some negative factors: lack of transparency in trade operations, increased transaction costs and consumer prices, customs tax evasion and violation of health and sanitary requirements.

Given the nature of the borders in Zambia and the history of trade relations among the border residents, attempts to control such trade are not practical. Instead, Government should work to establish shared tariff and policy frameworks with its neighbors, thereby diminishing volume of such trade to a minimum, and simply legalize it so it can pass through the appropriate official channels of supervision.

17.4 MARKET GLOBALIZATION

To a large extent today's markets are not just focused internally, but also are heavily affected by global product movements. For some of the major agricultural crops and inputs, prices are determined by factors affecting countries far from Africa (i.e. wheat, rice, fertilizer, seeds). Market participants in Zambia need to maintain a close watch on international market changes in order to bring these items into the country on terms at which they can benefit and which will assist the agricultural development and food security of the country.

Zambia is only a very small player in the international maize market. Average annual production over the past six years has been just over one million tons. The USA is the world's main producer with 238 million tons, followed by China (104 million tons) and Brazil (29 million tons). Most of this international maize trade is yellow maize. The major food staple in Zambia, and the rest of southern Africa, is white maize. In general, internationally traded white maize sells at a premium of 10% to 20% on the world market.

International trade in white maize is limited, as there is little demand for it outside of the eastern and southern Africa area. World trade is estimated to range between 1.5 and 2 million tons. This amount has not changed significantly over time, but may merely represent tradable surpluses present in the region as most white maize is consumed domestically in the producing countries. South Africa is the world's largest supplier of the produce for export, followed by Zimbabwe. However of late, production in the United States has risen dramatically and it is seeking to access the southern Africa market for white maize: this can only improve the competitive cost structure of the industry.

Regional Trade Agreements

South Africa dominates trade in the Southern Africa region. With its large agricultural production and manufacturing base, it is obviously the most reliable source for low transport cost exports into Zambia. Zimbabwe is a preferable trade partner, with lowest costs, but its lower production base makes it less dependable.

Zambia is currently a member of two regional trade agreements:

SADC (Malawi, Mozambique, Namibia, South Africa, Tanzania, Zambia, Zimbabwe),
COMESA (Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe),

and is negotiating to become part of:

SACU (Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland).

Under the COMESA agreement, Zambia receives a 60% duty reduction from intra-regional trade. The SADC Trade Protocol established a framework for the elimination of barriers to trade among members but duty reduction agreements have not yet been finalized. They are expected to be in place by the year 2000. Work has been done under both these agreements to improve the availability of import licenses and decrease quota controls. Zambia, in particular, has moved fastest among the eastern and southern African countries in establishing an “open-border” trade policy.

The most useful of the three mentioned regional agreements, the Southern Africa Customs Union, particularly opens the door to trade with South Africa. Negotiations on this, however, are currently stalled on discussions of appropriate trade levels with some of the other member states. The SADC agreement should ease the difficulties somewhat, as South Africa will be included in that grouping.

Since import license restrictions and quota controls (both considered as important trade barriers) have been greatly reduced, the current and future major constraints to regional trade is the inefficiency of law enforcement at the borders, transportation and communication problems, and the lack of market information. Food security can mean the resolution of these problems as much as, or more than, national grain reserves and food aid shipments.

The Nature of Maize Market Instability

A certain amount of “intra-seasonal” market instability has come to be recognized and accepted as the norm across much of Southern Africa. The term “hungry season”, describing the traditional months of food shortage prior to the onset of the main harvest, highlights this problem in the very extent of its usage. In Southern Africa, domestic food supply is dominated by a single harvest season, and supplies diminish as the marketing season progresses. Superimposed on this “background instability” is, however, the instability created by the lack of integration of markets.

The underlying cause of this market instability is the variability of domestic production and the presence of trade in only very weak form. Maize production is highly susceptible to fluctuations in rainfall; most of the crop is produced under rainfed conditions. The increase in rainfall variability in recent years has had a direct impact on maize production. This inherent instability is compounded by the following factors:

- The prevalence, after many years of interventionist policies, of a “mono-staple syndrome”, in which maize is regarded as the only suitable staple for human consumption. This has resulted in both reluctance among urban consumers to consider alternative domestically produced non-maize staples, as well as lack of supply response from producers.
- The widespread promotion of maize self-sufficiency in the past. This has not only pushed maize cultivation into the more marginal rainfall areas and as a result made domestic production even more susceptible to rainfall variability, but also focused resources towards domestic market integration rather than on more efficient regional market integration.
- The often slow trade response to domestic market instability. This exaggerates the initial instability created by domestic production variability. Delays in decisions to import, and the delivery of those imports, in the times of poor harvests increase the severity of shortfalls.

Mistargeting and delays of food aid further exacerbates the problems by driving post-harvest prices even lower than necessary.

In the theory of an efficient market, the range for price movement is capped by import parity prices, the margin between domestic and import parity being determined by marketing and transportation cost. While measures to reduce the import parity price gap, and hence the scope of market instability, have focused largely on the need for improved marketing and transportation infrastructure, other factors involved in determining the margin have received little attention. In particular, the timing of import decisions has been a major factor in determining the margin spread for import parity prices. World prices of white maize show a strong correlation with harvest conditions in southern Africa, and decisions regarding trade are mostly left until very late. So in deficit years most of the southern Africa countries are competing against one another for a limited world supply. This situation has been used to considerable advantage by large-scale grain traders who have both the resources and skill base with which to maximize the gains from such inefficiencies. Thus, apart from the need to reduce the costs of marketing and transportation, there is scope for reducing maize price instability if Zambia was less dependent on white maize, and if decisions regarding trade could be taken in a more timely and organized fashion.

Zambian Participants in External Food Trading

During the past few years, the emerging private trade sector has shown that it can play a significant role in the import and export of food and grains in Zambia. Already, all significant quantities of rice and wheat are fully handled by private trade. In response to appropriate price signals, considerable volumes of maize have been moved from surplus to deficit regions both within Zambia and within the southern Africa region. In spite of considerable difficulties in negotiating the newly emergent market system, the trade sector has shown to be capable of responding to market demands in food trade.

There are a range of actors and operations present in Zambia's grain, and especially maize, markets. Small-scale farmers and emerging producers usually market their harvest through the ubiquitous small traders, who keep products in storage as bulk for short periods of time before delivering them to large traders or directly to milling companies. Small-scale farmers also tend to sell their products on local markets or to hammer mills. Small traders may be involved in significant levels of informal cross-border trade. Large commercial farmers tend to have better storage facilities, and supply directly to mills and large trading companies.

There are now several major commodity traders in Zambia, including Sable Transport, Amanita Group, B&P Shipping and Trading, and IMEX. Louis Dreyfus and Glencore, both based in South Africa, also have Zambia representatives who are regularly in the country. All of these firms are involved in the marketing of maize and other crops such as soybeans, groundnuts, sunflower, and wheat. They purchase both internally and externally for sale to the milling companies (Amanita has its own mill). Externally, the companies move stocks from and to Zimbabwe, Malawi, Mozambique and the Democratic Republic of Congo (DRC). In times of serious shortage, Zimbabwean and South African maize is also sourced. Working capital is usually financed from offshore sources, i.e. trading partners or associate companies in Europe.

The Food Reserve Agency (FRA), a semi-autonomous agency under the MAFF, also plays an important part in the grain marketing system of Zambia. It is heavily criticized by the private sector as being erratic, heavy-handed and opaque in its market interventions. This is regarded as

very destabilizing. The details of the FRA organization and trading activities will be discussed in the following Section.

The former dominance of the large government parastatal milling organization has been replaced by a handful of large to medium-sized milling companies, including: National Milling (comprising many of the facilities of the former government parastatal, but now owned by Seaboard from the USA), High Protein Foods Ltd, Mpongwe Milling, Ghirardi Milling, Simba Milling, Olympic Milling, Nyati Milling and Canary Mills.

Large scale maize mills buy from a range of traders, as well as directly from large scale farmers. These large mills sell the produced maize meal primarily to retailers in city and town markets who, in turn, sell it to consumers. Most of the large scale mills are in Lusaka and Copperbelt Provinces. In 1996, mills in Lusaka accounted for 50% of all mill production in Zambia.

Since liberalization in 1991 there has been a substantial decline in sales from large mills. This decline in demand has been caused by a fall in real incomes and by the emergence of alternative crops in rural areas. Furthermore, the less expensive product of hammermills has become preferred by consumers. Hammermills have increased in numbers by over 300% since 1991 and are estimated to process about 70% of maize in the country. Large mills view these hammermills as their largest competitor.

Most of the large trading companies and mills in Zambia say that it is imperative to keep current with price and market developments in other countries. The marketing officers and director can always, if asked, quote the day's import parity price for Zimbabwe and South Africa. Effective business strategy demands that the companies have good knowledge of supply/demand conditions throughout the southern Africa area. Public sources of this type of market information are not currently available in Zambia with the timeliness and frequency required for encouraging new entrants, who may not have the same resources as the few large established organizations. Analysis of such information is necessary for stockholding adjustments and active import/export activity. Other information, resulting from applied marketing and trade research being undertaken in various nearby countries, is also not publicly available; this slows the development of more integrated markets with better transparency.

18. AGRICULTURAL MARKET INFORMATION SYSTEMS

18.1 IMPORTANCE

Governments have become sensitized to the importance of agricultural liberalization and the development power of the liberalized market economy. In Southern Africa particularly, the governments have withdrawn from their previously pervasive role, disbanding marketing boards and withdrawing price subsidies and controls. They are attempting to retreat from direct involvement in the physical marketing of major food staples, looking instead for roles in 1) supply effective marketing support services, e.g. market and marketing information, marketing extension, marketing credit facilities, etc., 2) formulating effective policies and appropriate legislation, to facilitate a smooth operation of the marketing process, and 3) safeguarding the nation's food security position through monitoring the food security situation nation-wide and operating a strategic grain reserve.

The expected end result of the liberalization process is a more efficient use of the available resources at both national and regional levels. The reduction in production and marketing costs, consequent reallocation of resources, increased market transparency and integration, should over

time result in farmers being paid relatively better prices for their produce while at the same time consumers will have to pay relatively less for their food.

With the liberalization of the marketing system for maize (one of Zambia's primary staple foods) the manner in which food security can be guaranteed has also changed drastically. Where it used to be primarily an exercise in stock management and logistics (under NAMBoard), maize is now expected to be secured by the open market economy and through the strategic use of the grain reserve responsibilities invested in the Food Reserve Agency (FRA). The private sector has become largely responsible for providing food security within Zambia, and the underpinnings of national food security has become less clear as more people switch to alternate food staples in reaction to market vacillations. Agricultural market information contributes to national food security by improving the efficiency and effectiveness of the marketing system.

Obviously, the role of timely available and reliable market information has become increasingly important under the changed marketing conditions. With the rural community (farmers, NGOs, hammer-millers, etc) taking increasing control over local storage and an essentially anonymous trading community responsible for stock movement from the production areas to the consumption areas, it has become virtually impossible to monitor food security through stock balances and its distribution on a nationwide basis. Food price monitoring is a particularly sensitive and early indicator of adverse shifts in food security status: in a country like Zambia which exists near its "subsistence" level (average annual production of maize over the past five years has been about 12 million bags, similar to estimated consumption), small changes in production can induce relatively disproportionate swings in marketed food supply. Maize prices can be expected to rise rapidly when production falls and self-provisioning producers become market-dependent consumers.

National policy makers tend to establish price monitoring systems initially in order to monitor and use the market information to support their decisions, however the development impact of dissemination of such information to traders, farmers and consumers is equally important. The role of markets in promoting (or undermining) food security has greatly expanded and efficient markets require efficient flows of information. In order to stimulate private competition, market development and the movement of produce from surplus to deficit areas, traders need accurate and timely information on prices. Smallholder producers should have access to this information to assist them in selling their produce for fair prices.

18.2 ROLE OF INFORMATION IN MARKETING

Timely information on supply and demand conditions is crucial for farmers, traders, government officials and consumers operating in a market economy. Correct decision-making and planning depends on reliable information on variable market conditions, which are expressed by changing prices. Advocates of free market economies consider price flexibility a positive sign as it reflects the balance of supply and demand and seasonality in production. However, one of the preconditions for a market economy is that correct information on market conditions must be available and, within reason, accessible to all. Pricing decisions made at the last moment by government planners only serves as a disincentive to both producers and consumers, especially when the process is not transparent.

The role of produce (food and grain) markets is to provide the necessary facilities and services to producers and consumers to enable price formation to facilitate exchange. Markets should, in theory, supply produce corresponding to consumer preferences. The highest prices that consumers are willing to pay for their preferred produce should be offered to producers in order

to encourage production of the more highly demanded commodities. Price differences over time and between market locations should correspond to the transaction costs (mainly storage and transport).

Prices are the result of the market function, and are determined by supply and demand patterns. They are influenced by the costs of production, the costs of marketing and by consumer preferences. Prices act as market incentives and, in most situations, facilitate the allocation of productive resources within the agricultural sector. This is not, however, a straightforward process in countries where market conditions for agricultural commodities change as a result of highly seasonal production, where infrastructure (road networks, communication facilities, and physical markets) is underdeveloped, and where liberalized marketing systems are in the process of replacing centrally controlled systems. These circumstances result in high risks and high marketing costs.

In general, market prices of a particular commodity will be relatively high in places where it is in short supply compared to demand. Full market transparency means that the public at large (and especially, the trading and producing community) is fully informed and updated on a continuous basis of current price differences between various markets and the price developments over time. The full integration of markets means that price differences between markets only reflect the costs, plus a small margin, that are involved in moving commodities between markets. This, of course, is seldom the case in reality, but it is an ideal to strive for.

One of the constraints that impedes the functioning of markets is the lack of relevant information on market opportunities. Accessible information on prices, quantities and qualities plays a crucial role in reducing the risk of losses in market transactions. High risks lead to high marketing costs, as high margins are necessary to compensate for possible losses. Consequently market transparency, proper information, should reduce the costs of food and cereal marketing. However, information cannot be perfect. Prices move too rapidly for available information to serve as more than a guide to likely returns. Furthermore, the costs of improving information have to be offset by the additional benefits. Even when more precise information can be obtained, it might be too costly to do so. This implies that those involved in marketing will always have to take decisions based on varying degrees of imperfect information.

18.3 TRADERS AND MARKET INFORMATION

The information needs of traders concern market prices and conditions, volumes, and market price developments for various produce in major producing and consuming areas across the country. This enables improved decision-making on where, when and which produce to buy and sell. In Zambia, most large-scale traders and trading processors (such as millers) have extensive information services, but these are mainly personal contact systems and great care is taken not to share their knowledge. Freely available market information would be of greatest value to relatively small traders who lack the resources to monitor markets on a regular basis.

Spatial Arbitrage

Market performance is related to the functioning of arbitrage (the process of exchange of commodities with the objective of profiting from price differences that are greater than marketing costs). Spatial arbitrage, in theory, should clear supply and demand at different marketplaces until price differences are reduced to the level of transaction costs. This means that prices for homogeneous commodities (i.e. maize) in geographically dispersed markets would not

change independently, as long as the transaction costs are smaller than price differences between markets.

When traders recognize price differences and move product to take advantage of them, these differences decrease to approximate transaction costs again. In theory, prices in different markets would reflect local price determination, as long as transaction costs are greater than price differences. Therefore, the higher the level of transaction costs between markets, the smaller the probability that trade will occur. The marketing systems themselves thus increase in importance as the transaction costs decrease.

Marketing margins are quite high in developing countries, and Zambia is no exception. This implies those commercial activities and market imperfections are capturing a large part of the value-added. There can be many reasons for this: for example, marketing by a large number of “briefcase” traders in remote areas where they must spend time camping and searching for small quantities of surplus maize for sale is not as efficient as having established local marketplaces with local individuals assembling wholesale lots for trade with established agents. Lack of information is generally seen as being one of the main reasons for high transaction costs. When no formal market information service exists, information has to be collected by the traders themselves. This is especially costly for these very small traders, who cannot afford telephones or faxes. In many cases, information is gathered through personal networks based on mutual trust and by personal visits to markets. Large traders, on the other hand, do have access to communications and have a scale advantage in that they can spread the costs of information over much larger quantities of produce.

Temporal Arbitrage

Storage costs are a component of consumer prices. Prices increase in time due to such costs, which consist of maintenance, chemicals, depreciation of facilities and opportunity costs of invested capital. However, price changes over time not only depend on storage costs but also on how much of a product is being stored for subsequent release onto the market (as well as regional supply and demand conditions). The highest prices during a year do not necessarily correspond with that region’s end of the “hungry” season, because prices in other regions also influence market conditions, e.g. maize price patterns in Mongu are similar to the rest of the country representing a single crop pattern, although Western Province has a double cropping season. Variable climatic conditions between regions and between neighboring countries complicate the situation by opening up opportunities for spatial arbitrage, thus making storage a risky activity. It is here that market information, concerning regional price differences, stock supply conditions and forecasts of coming harvests, could play an important role. Even at the simplest level of market information, i.e. prices, knowledge of past price trends can enable traders to form an opinion about the likely viability of storage and its associated risks.

18.4 PRODUCERS’ USE OF MARKET INFORMATION

Small-scale producers often have limited outlets for their produce and are often bound by traditional trading relationships that may include an element of credit provision by the trader. Opportunities for farmers to take advantage of spatial arbitrage possibilities are therefore limited. Such opportunities are further hindered by the small quantities produced by most farmers, which means that they are unable to generate sufficient quantities to take economic advantage of spatial arbitrage possibilities. For non-perishable crops farmers do have the chance to store on-farm and carry out a limited form of temporal arbitrage. The economics of on-farm storage can, however, be poor with the risks associated with such storage (e.g., product losses

and deterioration, price fluctuations, government interventions) frequently acting as a powerful incentive for smaller producers not to store.

While the arbitrage possibilities for small farmers may be restricted, it cannot be concluded that market information is of no value to them. At the simplest level, the availability of market information can enable farmers to check on the prices they receive, compared to prevailing market prices. A regular flow of price information allows farmers to negotiate their sales from greater positions of strength.

Market information can facilitate optimal decision-making based on market incentives. A lack of information will hamper the producer in taking decisions concerning the crop and the quantity to plant each year. Information will also give insights into the risks associated with producing different crops. Consequently, better information should lead to higher profitability although, for most small farmers, information will have to be supplemented by extension services that are able to assist them to interpret price data. Lack of information is an entry barrier to both trade and production. Where farmers have access to information they are able to move beyond subsistence production (although it must be pointed out that access to market information by itself is not a sufficient condition to development, there are other requirements as well). Shifts in cropping patterns to higher value produce have also been noted in Zambia.

Information on market conditions can change farmers' marketing strategies. While individually, farmers may be unable to take advantage of spatial arbitrage possibilities, collectively they may be able to organize transport to more distant and profitable markets. Group marketing by farmers is not, of course, without its problems and farmers more often initiate group activities in more basic areas, i.e. storage, assembly market development. Improved availability of information can encourage selling further along the marketing chain, at the assembly market rather than to "briefcase" traders.

Market information can be particularly valuable where countries are changing over from a long-standing centrally controlled system to a liberalized market economy. Previously farmers needed to give no thought to marketing their produce; their only concern in this matter was how well the government institutions carried out their responsibilities. Under the liberalized marketing system, farmers not only have to seek market outlets but also have to carry out storage for longer than in the past. In most rain-fed production systems, the cropping calendar limits the cultivation and harvesting period to only a few months during the year. The question "when to produce" is automatically limited. This makes the question, "when to supply", more important. Availability of information about seasonal price movements should facilitate decisions about when to sell the crop.

For larger farmers and commercial farmers it is very worthwhile to invest in an information network to guarantee the availability of crucial signals regarding changes in market conditions. Such a network could consist of colleagues and terminal market traders, or be a more formal network through market organizations or farmers' associations. These large producers have more invested in transportation and storage capabilities, and so can take greater advantage of the opportunities for arbitrage. In Zambia the national farmers' union, ZNFU, has established a very comprehensive agricultural market information service.

18.5 POLICY-MAKERS AND MARKET INFORMATION

Traders in developing countries are often accused by policy-makers of exploitative behavior because of the fact that large price differences are observed in the marketing channels for agricultural products. It is alleged frequently by politicians and newspapers that traders are unscrupulous. Often it is difficult to substantiate these accusations because of the lack of market transparency. Reliable price information is absent and estimates about the costs and risks traders have to bear are difficult to obtain. Moreover, the risk premiums necessary to deal with price fluctuations are hardly taken into account by policy-makers making the accusations. Market information offers the opportunity to judge the functioning or the performance of markets for agricultural products and to determine microeconomic constraints.

Market information can also be used as a tool to monitor and analyze market development and marketing trends. The results can be used to better support the marketing process (e.g. to adjust or lobby for adjustments to existing marketing policies and legislation, to improve specific physical market structures, to formulate marketing extension messages) with the aim to 1) improve the level of market integration over time, and 2) achieve a more efficient use of available resources.

Governments can also play a role in facilitating food security. Policies to guarantee availability and accessibility have to take into account the functioning of the market. An efficient marketing system can be used as an instrument for food security policies: distribution of food can be organized by the market when local supply is insufficient. An inefficient marketing system has to be corrected in order to achieve the objectives of a food security policy: regulations and direct government intervention might, reluctantly, be necessary. Market information is necessary to derive the right policies and instruments for the delicate touch of appropriate intervention: heavy-handedness during an intervention can cause as many problems as it corrects.

Crop Forecasting and Market Information

Two areas where market information is particularly important are early warning food security assessments and management of food security reserves.

- In the former case, price trends can be used to confirm indications of possible food shortages that are available from other sources (e.g. satellite and crop forecasting data). Comparison of seasonal price movements in a particular year with long-term records of price movements over time can often provide indications of the seriousness of food deficits. Where extensive price data collection is undertaken this can be used to identify more localized shortages, which may be missed by other methods. However, it should be realized that open-market prices are usually rather late indicators since they reflect current supply and demand. As well, open market prices only reflect commercial demand and tell nothing about families who lack resources to purchase food. One approach for early warning indicators is to monitor prices of items other than the main food staple. For example, a likely response of farmers in Western Province to an emerging food shortage is to sell livestock to raise cash to purchase staples. Thus declining livestock prices can often indicate a developing food security problem.
- Managers of food security reserves require detailed price information, together with information on seasonal price patterns and price forecasts, in order to decide what to advise the GRZ regarding release of stocks onto the market, and when to carry out stock replenishment. While the need for such security reserves perhaps increases when grain

markets have been liberalized, it is essential that their operation does not disrupt commercial market operations. Thus reserves need to be operated on the basis of clear rules governing the purchase and release of stocks. Detailed information on market prices is essential if these rules are to be applied and if arbitrage activities by the private trade are not to be disrupted.

18.6 AGRICULTURAL MARKETING INFORMATION SERVICES

Users of market information are in both the public and private sectors. Those of the private sector are mainly traders, farmers, processors and import/exporters, both individually and in official associations. The major public sector users are the official ministries of agriculture, finance, planning, commerce, and parastatal agencies and research institutes. Services providing such information are developed at several points in the market structure – usually where there is sufficient money generated to support them: large traders or processors; farmers', traders' or processors' associations; commodity exchanges or in one of the concerned public sector agencies.

Generally speaking, an agricultural market information service (AMIS) is a system for facilitating the information flows necessary for markets to operate efficiently and for the individuals within the system to make efficient decisions. The work of the service involves the collection on a regular basis of information on prices and, in some cases, quantities supplied of widely traded agricultural products, from rural assembly markets, wholesale and retail markets, as appropriate, and dissemination of this information on a timely and regular basis through various media to farmers, traders, government officials, policy-makers and others, including consumers.

TABLE 13. Operational Information of Agricultural Market Information Systems

| User Groups | Information Need | Information Output | Dissemination Channel |
|------------------------------------|--|---|---|
| Traders and Farmers | Wholesale commodity and farm input prices at urban markets | <ul style="list-style-type: none"> Wholesale price reports Market commentary | <ul style="list-style-type: none"> Radio broadcast Newspapers Price boards |
| Small Farmers and Consumers | Retail prices at nearby local markets | <ul style="list-style-type: none"> Retail price reporting | <ul style="list-style-type: none"> Local radio Price boards |
| Government and Donors | <ul style="list-style-type: none"> Retail prices Supply and demand conditions Volumes traded Sources | <ul style="list-style-type: none"> Monthly/quarterly price series Periodic price analysis Quantities and sources | <ul style="list-style-type: none"> Monthly/ Quarterly Price Bulletin Early Warning Bulletin Formal and informal govt/donor briefings |
| All | Market prices and market developments | <ul style="list-style-type: none"> Annual crop analysis Market and marketing issues | <ul style="list-style-type: none"> Television broadcast Annual crop reviews |

Source: S. Devereux, "The Need for Adequate Information and Institutions", 23 October 1998.

The preceding table summarizes user groups, information needs and outputs, and dissemination channels for generic AMISs, but it must be recognized that the Zambian situation is much more limited in scope of activity. This is mainly due to lack of financial capability.

An AMIS is seen as providing greater market transparency, as previously discussed, depending on the extent of its dissemination “footprint”. The public sector services, in particular, are concerned about setting an appropriate environment for market development and are seen as part of the necessary infrastructure of the market economy. In Zambia there exist a range of AMISs: they mainly differ in the intensity of their development as a tool, by the originating body.

Traders and Millers

Private trade has no official market information system, although they are the most avid users of market information. Instead the traders rely on their wide range of personal contacts and industry meetings. The Zambia Association of Chambers of Commerce and Industry (ZACCI) is a strong organization that generally keeps membership in line with good principles of business. Regular monthly meetings of the agricultural traders’ subcommittee allow the business leaders time to discuss market changes and plans. The Zambian Competition Commission under the Ministry of Commerce and Industry also serves to prevent collusion among industries with few active participants.

There has recently been formed a Cross-Border Traders’ Organization, which falls under the general umbrella of ZACCI. This organization is one of the first attempts to bring the smaller rural traders together and let them exchange business information.

Thirteen major millers of Zambia are formed into an association as a subcommittee of the Zambia Association of Manufacturers. They also have regular monthly meetings and exchange market information. The Food Reserve Agency sits on this committee and uses it to discuss its market intentions in a public forum.

The major shortcoming of the industry is that there is no easily accessible market information source for new entrants to the market. This makes it difficult to start a new business as a trader, and does not encourage a wider range of market participants.

Agricultural Commodity Exchange (ACE)

ACE was set up as an initiative of ZNFU to provide a centralized trading facility for buyers and sellers of agricultural commodities and inputs. Since its inception in 1996 ACE has prepared its own weekly price information service; this is distributed directly to ZNBC, BoZ, Citibank, Financial Times, The Post, MAFF and ZNFU. ZNFU further distributes the information as part of its own agricultural price information service.

The information given is only on commodities likely to be traded openly on ACE: maize, wheat, oilseeds and some inputs (fertilizer, bags). The service estimates and publishes a Zambian futures price of maize by using a recognized South African trading point, plus estimated transport costs, plus clearing charges.

Special price information reports on other crops (tomatoes, groundnuts, onions, etc) are made: accessing the Lusaka general market with ACE’s own market reporter. This market information is collected weekly and is available upon request. The staff through lack of time and demand attempts no analyses of any of the price information.

Zambia National Farmers' Union (ZNFU)

The ZNFU is one of the oldest organizations in Zambia, having been established in 1904. Its major role is as a lobbyist of government for good agricultural policies, i.e. those that assist the development of farming as a business venture. It is a farmers' organization and claims to express their view. Its services are oriented mainly toward its membership.

ZNFU has established a market information service that provides monthly updates. The information is included in a special handout sent with its monthly magazine, "Zambian Farmer". This includes the information forwarded from ACE. It also provides the information to MAFF and publishes it on a website, www.znfu.org.zm.

There is only one headquarters staff member working on the information service at headquarters as ZNFU relies on its District Association members and Commodity Committee members to assist in assembling the local data. This reliance on "volunteer" work has severe repercussions on the ability of the service to expand the program beyond its current simple data assembly mode. Some analysis of market trends and pricing series is carried out, but only occasionally as articles are needed by the editor of the monthly magazine. If a member requests a special report on a commodity, this will be carried out by the service; in this regard, the service is demand driven, as it does not do reports unless so requested.

The mode of data collection, through members and volunteers, makes the market information service useful for crop estimations and crop forecasts, but less capable on pricing surveys. Moreover, pricing information on a monthly basis is not particularly useful to active market participants.

Ministry of Agriculture, Food and Fisheries (MAFF)

Among the first steps taken by the GRZ in its economic restructuring were to liberalize the marketing of agricultural produce and farming inputs, in particular that of maize, fertilizer and maize seed. To stimulate the development of the agricultural market process, Government stated its new role as:

- Formulating effective policies and legislation,
- Creating effective marketing support services, e.g. market information, marketing extension, marketing credit facilities, market place infrastructure development, etc.,
- Safeguarding the nation's food security position through establishing and operating a food reserve.

The liberalized agricultural marketing environment entails that the private sector assumes a major role in agricultural marketing. The role of government is to provide a conducive operating environment. One major component of the enabling environment is the availability of market support services. An official agricultural market information service was started by MAFF in 1993 as part of its market liberalization policies. At the national level, the coordinating unit of the service is the Agricultural Marketing Information Centre (AMIC) which falls under the Economic and Market Development Department of the Ministry.

Market data is collected by offices of the Market and Entrepreneurship Development Officers (MEDOs) which are the District level representatives of the Ministry's Market Development Branch. Specified types of data for specified agricultural commodities are collected at specified

times (details of this can be found in the reference document, **MAFF, Food Security Division, July 1995, "The Agricultural Market Information System in Zambia"**). The dissemination of market information is supposed to be done at District, Provincial and National levels. AMIC has set specified procedures for data collection, transmission and dissemination. MEDOs are responsible for market information dissemination at the District level, while consolidation of provincial marketing information is a responsibility of the Senior Economics and Marketing Development Co-ordinators (SEMDCOs). AMIC, in Lusaka, is responsible for the operation of the overall system and disseminating agricultural market information from the national perspective.

The information assembled and analyses carried out by AMIC is published in its Weekly Market Bulletin and the monthly Provincial Market Bulletin. However, with the current lack of funding both have become sporadic in production. The Weekly Bulletin is faxed to ZNFU and the National Agricultural Information Services who use it in various newspaper and radio programs on agricultural topics. It is passed, through the Minister of Agriculture, to the various GRZ agricultural policy-makers.

The major user of the AMIC information is MAFF in Lusaka. The potential for greater use of District level information is there, but because analysis is all done centrally logistical constraints seldom allow the data to get back to the District in time for realistic use. Most return information flows are abandoned in a "pending basket" at the Provincial office level. MEDOs are not trained to analyze or use the information they collect before passing it on to Lusaka.

AMIC is collecting wholesale and retail prices on a range of staple grain products, some tuber and vegetable prices, and agricultural inputs. Details of the crops, markets, unit sizes and problems encountered by the AMIC personnel can be seen in the 1995 document, "The Agricultural Market Information System in Zambia: an evaluation of its present operations and performance, and suggestions for its future development". No significant improvements in procedures have been enacted since the document's publication. There are longstanding plans to expand the service to horticultural products (for domestic sales), but with current funding difficulties this is unlikely to happen. A pilot expansion into livestock market information is currently underway in Western Province with the assistance of a Dutch funded livestock development project.

Food Reserve Agency (FRA)

As per the Food Reserve Act, the FRA is instructed to collect market information on grain trading processing, stocks and prices, and to disseminate such information for the purpose of meeting the information requirements of the GRZ, producers, traders, processors and other persons engaged in the production, marketing and processing of such commodities. However, at the inception of the FRA, the Ministry of Agriculture's AMIC was already engaged in carrying out this exercise on such crops and planning expansion into a wider variety of agricultural produce than came under the purview of the FRA. Recently, however, donor funding for the activity ended and the GRZ has not been able to maintain its prior level of data collection, analysis and dissemination.

Leaving collection of national and local market information to AMIC as best suited to that role, the FRA focused on collection of information on prices and stocks in the neighboring countries, the situation of current crops in those countries, and world market data. Such international information would identify potential import/export possibilities and the FRA could become an

advisory forum for market operators. The FRA liaised with the Export Board of Zambia (EBZ) in this exercise.

Because of the small number of market participants in Zambia, and the conservative nature of the traders, Government greatly fears under-importing of needed grains. Conversely, traders fear that the GRZ's heavy-handed interference in market activities will lead to over-supply, and hence force unremunerative price structures onto the market unnecessarily. It is therefore in the interest of both government and the traders to monitor the situation with respect to quantities of cereals being imported, and the GRZ considers this a public function given to the FRA under its mandate to maintain a grains market database. In order to collect this information, the Food Reserve Act requires that the traders and processors register with the FRA. An annual registration procedure for all grain traders and processors has been established. The objective of the registration is to facilitate the work of collecting information on stocks and prices of food commodities. The FRA would not give out data on individual firms publicly, but aggregated data could be published for use in planning decisions by the market participants. However, traders have, thus far, been reluctant to comply with the FRA regulations and no data has been officially received in the FRA marketing information section (although the Information Officer does collect this information informally over the telephone).

Except for special reports, the FRA international market information is published as part of the AMIC bulletin, and is circulated internally. A secondary database of AMIC price information is maintained at the FRA.

Export Board of Zambia (EBZ)

The Board publishes a monthly export bulletin of information supplied by the Customs Office. The bulletin contains value of exports, but not quantity as EBZ has difficulties obtaining that information. The agricultural commodities tracked by EBZ include maize, rice, wheat, sorghum, cassava, soybeans, sunflower, groundnuts, sweet potatoes, tea, coffee, cotton, tobacco, vegetables, beans and floriculture. These bulletins are provided to the GRZ officials dealing with agriculture and commerce policy, EBZ members and subscribers.

EBZ also publishes an Annual Export Audit, which analyzes the monthly data into trends and projections. It includes Sector Reports on each of the five industry sectors that it has identified:

- Horticulture/floriculture/agriculture
- Garments & textiles
- Wood products & construction
- Gemstones & processed foods
- Leather & animal products

As well, the Board expects to have a website established soon at www.zamnet.zm/zamnet/zambus/ebz/ebz.htm on which it will include some of its report information. The purpose of its information service is to encourage development of the non-traditional (i.e., non-mining) export sector.

19. MARKET PRICE INFORMATION AND FOOD SECURITY

Prices serve as signals of availability and access. In summarizing the interactions between supply and demand, prices provide a snapshot of current and expected supply of a commodity.

Open market prices can provide an indication of what is happening, or *what traders think is happening* or *is about to happen*. Where the level of integration of markets is still low, price information can map the spread of food insecure situations. More importantly, market prices are the most readily available and easiest to define of indicators for change within and between regions. The IRIS Market Liberalization Study (Dec. 1997) found large differences between the Zambian market centers in terms of transaction costs. Price differences were found to be both quite large and very volatile. Maize markets outside the major cities were found to be particularly imperfect in competition and not well integrated. The reasons were found to be based on the poor infrastructural development (transportation, information, communication, contract enforcement, on-farm storage, and access to credit and inputs), which remains in the same state currently. This is what price monitoring is about: to identify large price fluctuations and monitor further price developments.

It should be realized that open-market staple food prices are usually rather late indicators since they reflect current supply and demand. Thus they are more of a food security tool, rather than a crop-forecasting tool in the Zambian context. Additionally, open-market prices only reflect effective or commercial demand and tell nothing about families who lack resources to purchase food. One approach to food security monitoring would be to observe prices of items other than the main food staple, e.g. in Western Province a likely response of farmers to an emerging food shortage is to sell livestock to raise cash to purchase staples. Thus, declining livestock prices could indicate a developing community problem.

There are two main types of prices collected for market monitoring purposes: market center (urban) wholesale prices, and retail prices in both assembly (rural) markets and market centers. Wholesale price information availability is the most important factor in promotion of commodity flows between regions. Information on retail prices indicates the actual supply and demand positions confronting the consumer.

Price trends can be used to confirm indications, which are available from other sources, of possible food shortages. Comparison of seasonal price movements in a particular year with previous years can often provide indications of the seriousness of food deficits. Where extensive price data collection is undertaken, this can be used to identify localized shortages, which may be missed by other methods.

“Hungry” Period Prices Compared to Average

Both urban and rural households routinely purchase maize, and other staple foods, in the market. Significant numbers of smallholders sell most of their maize harvest to obtain cash; they plan to purchase other, cheaper, staples later in the season, or purchase maize at the higher, seasonal prices with their other income. If production was generally low, the need to purchase comes quickly. The most critical time is the “hungry” season – from December to March. This is the period when the demand for maize is high and the supply is low. Demand is high because many smallholders have exhausted their own stock and are turning to the market for staple foods. Supply is low because the quality of the upcoming season is not yet known, so the large central traders are holding back their stock should the upcoming harvest prove to be poor. Thus, theory indicates that the maize price at the beginning of the hungry season is a good indicator of both supply and demand. If prices in December are much above the averaged seasonal price, consumers spend more of their income to obtain food staples. If production is low and prices high, this will result in reduced consumption levels and increased food insecurity.

This indicator is normally expressed as a percentage, and represents the difference between the averaged December maize price and the current December price, divided by the average price. Real prices are used in order to allow for normal inflation trends. The indicator shows some significant results in Zambia.

Price Changes over the Period from “Hungry” Season to Post-Harvest

Market theory also says that changes in maize prices during the pre-harvest period reflect the perception of the upcoming harvest. If large farmers and traders anticipate a good harvest, they will put their remaining stocks on the market, and prices will fall. Alternatively, if the harvest prospects are poor, the farmers and traders will hold what stocks they have. Prices would then remain stable or increase.

Ordinarily a pre-harvest price figure would be compared to a post-harvest price. The difference between pre- and post-harvest prices would constitute the price change. This indicator is also expressed as a percent, but does not correspond to observed market actions for maize in Zambia and thus is not useful for national food security analysts. It is suspected that the need for expensive, imported maize on the market in the pre-harvest season leads to “de-stocking” prior to harvest, and re-stocking with cheaper local maize, regardless of the size of harvest.

With of both these indicators, it would be much more useful to look at price activity of all staple foods of a District, rather than looking at maize in isolation. Consumers, facing economic stress, have tended to switch from the relatively high priced maize to other lower cost staples (e.g. millet, sorghum, cassava, sweet potato, etc.). This factor cannot be measured by assuming maize is the overwhelming staple food eaten and monitoring only maize prices.

Graphic Representations of Analyses

The following two charts give an example of simple analysis that can be carried out for monitoring purposes. Figure 9 shows monthly wholesale prices of maize at Lusaka market. Prices have been deflated by the national Consumer Price Index (CPI) to allow comparison of approximately equal prices over several years (i.e. without the effects of inflation and exchange rate movements). In the price series for average prices, Lusaka market monthly price data has been averaged over a six-year period to represent a “normal” price trend throughout the year; it is shown as the thick yellow line.

Figure 10 shows national maize production for the same sequence of years. The double line in the center of the graph represents a roughly estimated “market stability zone”, i.e. an area of 8 to 11 million bags that is unofficially considered by traders and market analysts to be adequate to meet Zambia’s current consumption needs without causing large price deviations from the seasonal norm. This device of a “stability zone” is indicated solely as a means of representing market actions, and not proposed as an importation guideline. It can further be seen that the estimated slope on the line indicates a belief that Zambia is requiring decreasing amounts of maize to satisfy its national demand level. Within this general range of production, some imports may be needed but these would be expected to be readily acquired and distributed through normal trade practices. According to market theory, one would expect to find price levels in years after a good harvest below the average curve, and price levels in years after a poor harvest above the average curve. This is, in fact, the case as can be seen in Figures 9 and 10.

FIGURE 9. Wholesale Maize Prices in Real Terms at Lusaka Market, June 1993-May 1998Source: AMIC Weekly Market Bulletin.

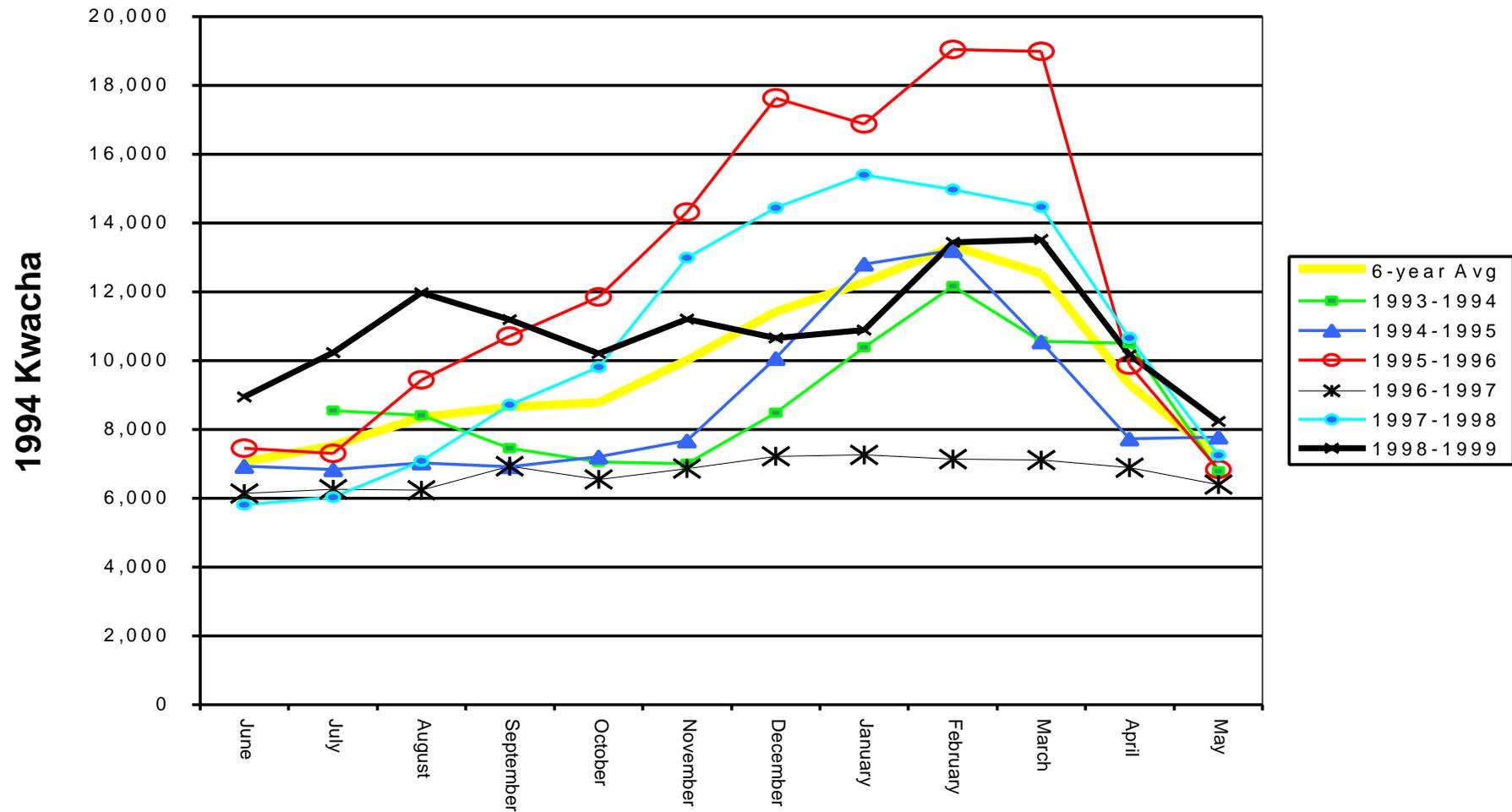
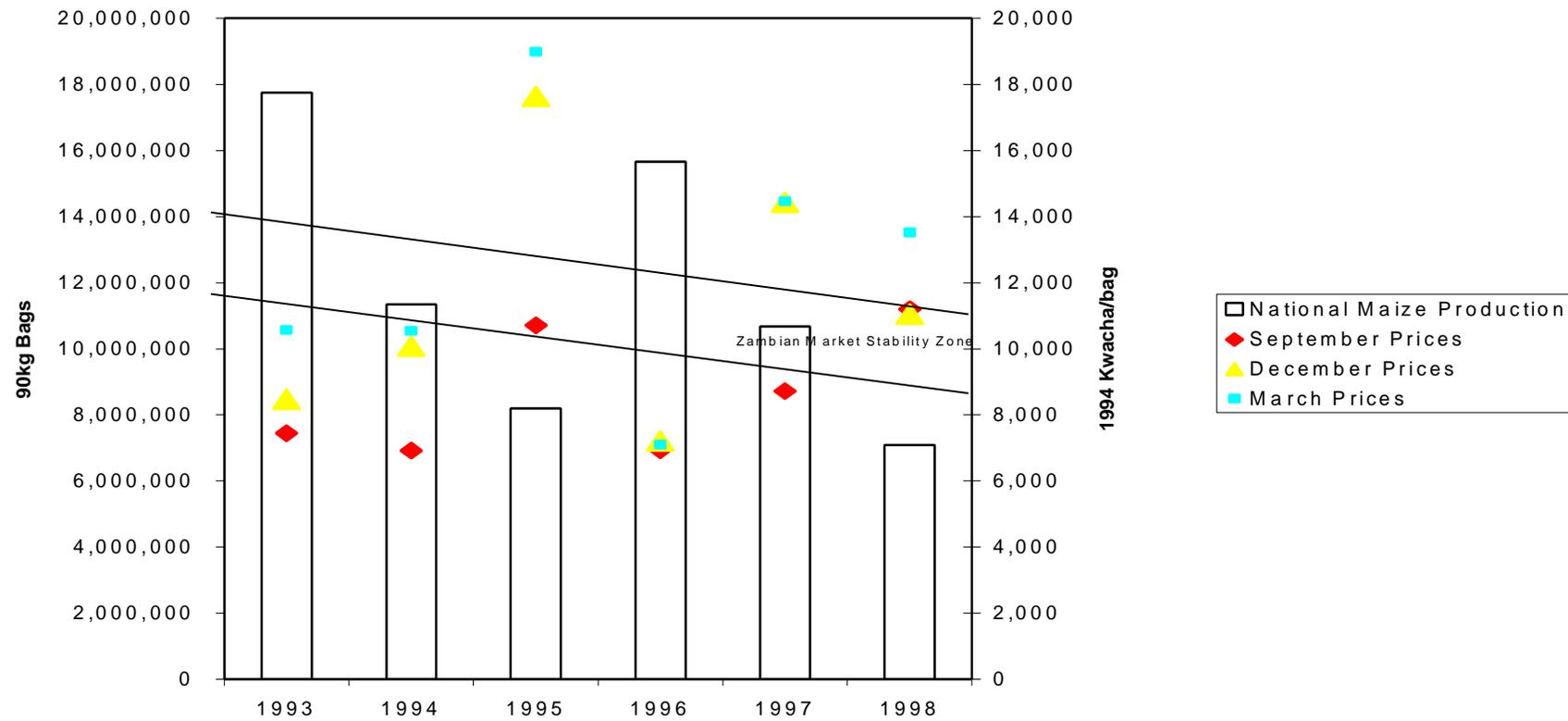


FIGURE 10. Zambian Maize Production 1993-1998



Source: 1995-1996 Agricultural Statistic Bulletin, CSO.

19.1 THE INTRA-SEASONAL SUPPLY, DEMAND AND PRICE OF MAIZE

Although it can thus be concluded that annual maize prices in Zambia change as one would expect according to changes in supply conditions, further information is needed to be able to understand the details of price movements within individual years. 1995 was a year of poor maize production – and the prices reflect this. However, the high prices in that year (1995-96) were pushed to their maximum, high import prices in the international market led traders in the Zambian market to maintain low levels of supplies, resulting in an exaggerated price curve until February 1996. At that time, the GRZ released its stocks of about 30,000mt, which at this time of moderate consumption needs, flooded the market and caused the exaggerated price drop that can be seen at that time. The strong government action caused many traders with long-term import commitments to lose considerable sums, and the inordinately low price levels in the subsequent year (1996-97) were partly caused by traders acting overly conservative due to fears of government manipulation of the market (combined with the particularly good harvest).

Using this data as a basis of extrapolation, and looking at the low 1998 production figures, should lead us to believe that prices will be higher than normal. This is the case at the beginning of the year -- the 1998/99 curve shows a high early season price level, consistent with a low harvest. But then it clearly shows an “abnormal” mid-season depression of the price curve. This coincides with the month that the FRA began importing its product (September), and continues until January – the months the FRA sold the bulk of its imports. The Agency received 141,000t of maize during the period September to December, and sold 140,000t during the period December to March. These links between the FRA purchases and sales, and prices, are illustrated in Figure 11.

Thereafter, the curve resumed a more “normal” shape. The implication is that the significant volume of sales of imported maize by the FRA was sufficient to reduce seasonal prices to approximately average levels.

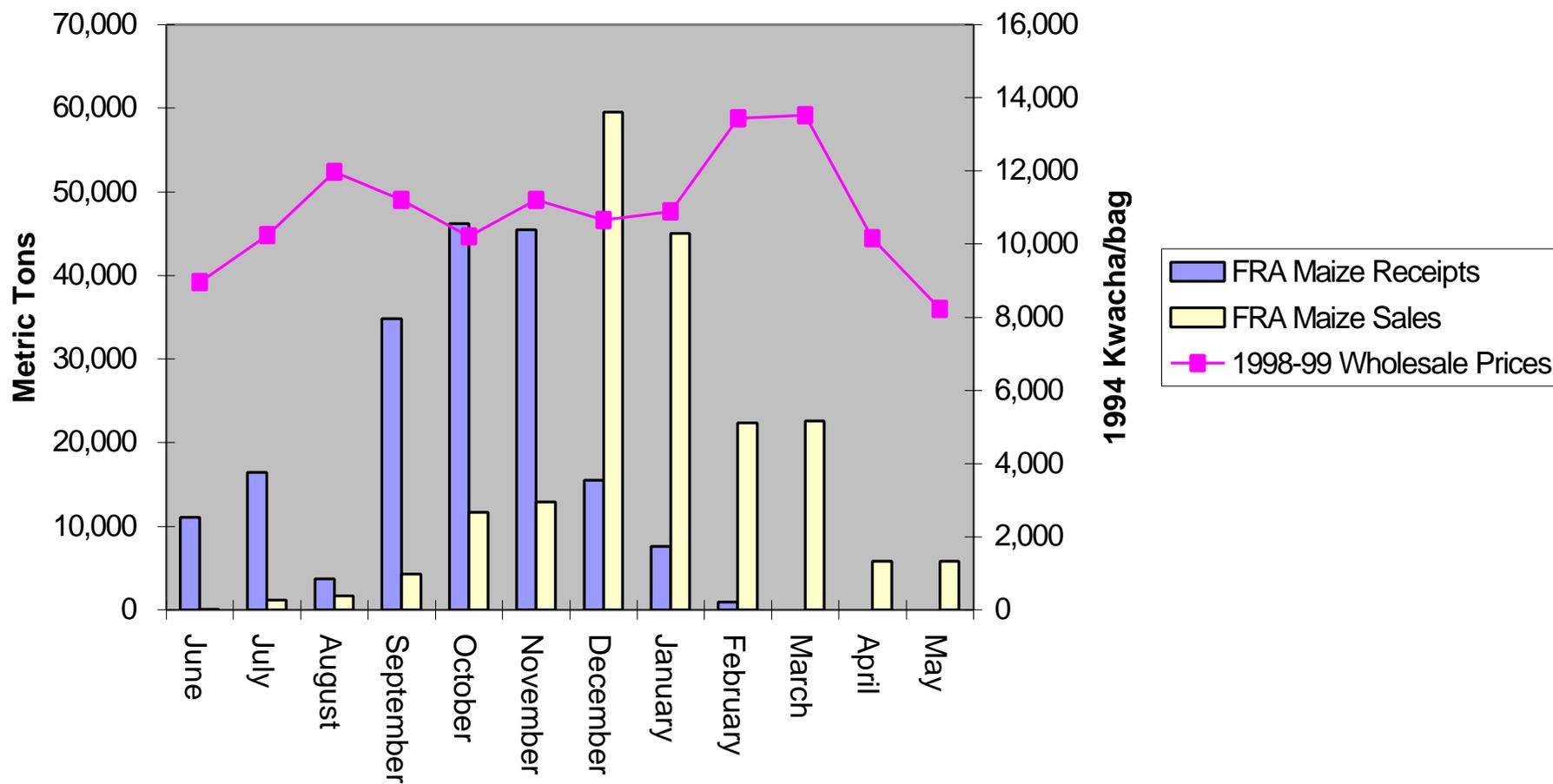
An incident of note is that although requested to bring in over 400,000mt, the FRA’s scheduled handling of imports allowed it to re-judge the situation and only import enough to satisfy local demand. It might have been better, however, if the FRA had put more faith in the private sector’s ability to contribute to the market needs, thus strengthening the local market sector.

19.2 SEASONAL PRICE PATTERN ANALYSIS

An alternative method of monitoring prices is to use seasonal price patterns (Table 14 and Figure 12). Prices vary throughout the year due to seasonal supply and relatively constant demand, resulting in prices moving according to the availability of the commodity. Seasonality in prices repeats itself every year. Although prices will behave differently from year to year, it is possible to identify a general pattern by looking at the seasonal price fluctuations over the past years.

It is important to note that seasonal price fluctuations do not necessarily show the same pattern throughout the country. Therefore, monitoring prices and price movements for early warning purposes requires separate analysis for each location of market prices selected.

FIGURE 11. FRA maize receipts and sales, & maize price levels in Lusaka, June 1998 – May 1999
expressed in metric tons and 1994 kwacha per 90kg bag



Source: AMIC Price data, MAFF.

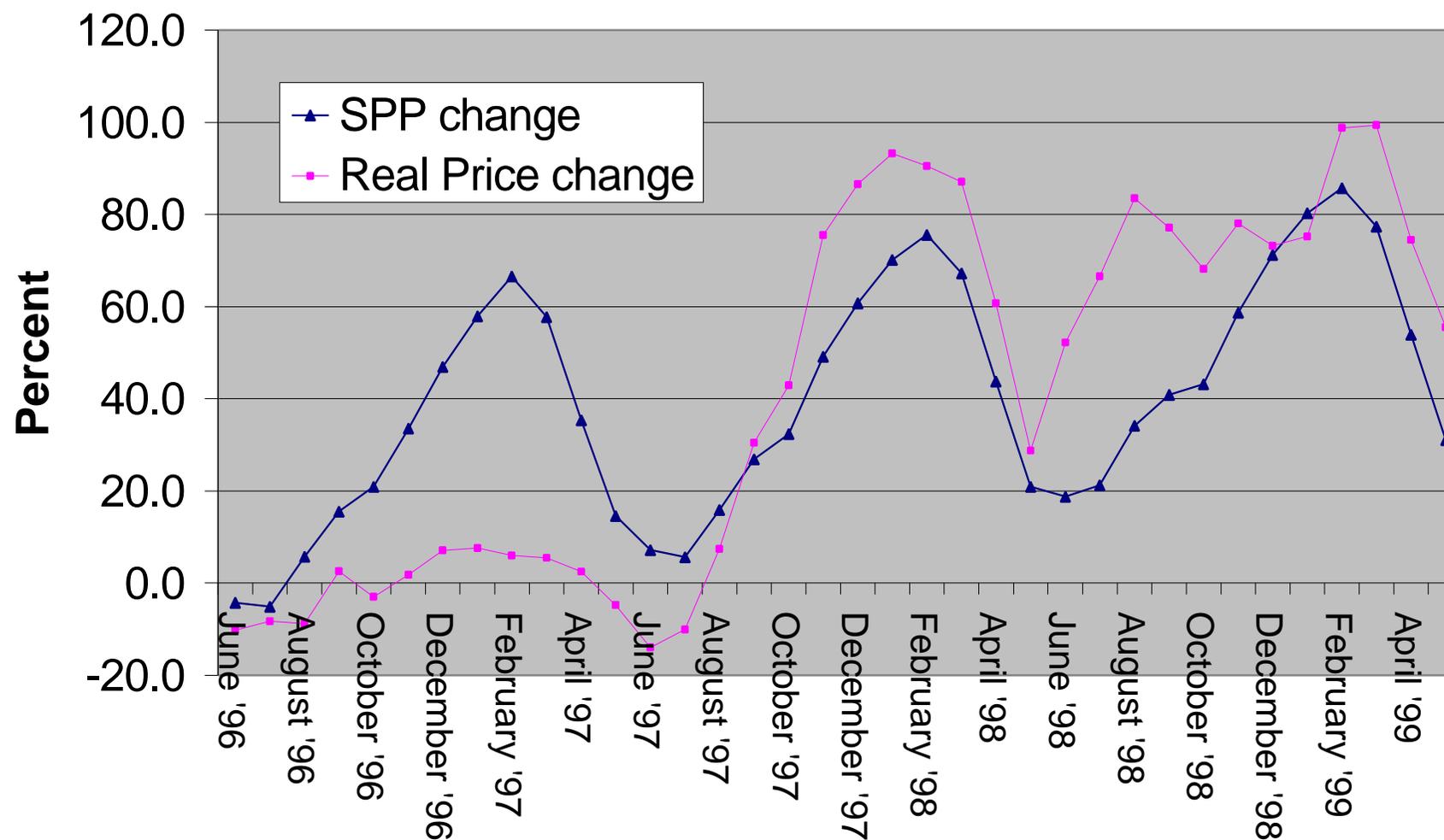
TABLE 14. Monthly Wholesale Prices for Maize, June 1996 to May 1999, and Seasonal Price Pattern Analysis

W H O L E S A L E P R I C E D E V E L O P M E N T O F M A I Z E A T L U S A K A
M o n t h l y A v e r a g e R e a l P r i c e s , Z K / 9 0 k g , C o m p o s i t e C o n s u m e r P r i c e I n d e x : 1 9 9 4 = 1 0 0

| M O N T H | Nominal Price | Deflator Index | Real Price | 12 M o Avg | Ratio to 12mo avg | SPP | Std Dev | --- % change --- | | cumulative % change | |
|---------------|---------------|----------------|------------|------------|-------------------|-----|---------|------------------|-------|---------------------|------|
| | | | | | | | | Real Price | SPP | Real Price | SPP |
| June '96 | 11,813 | 0.64 | 18,343 | 31,938 | 57 | 71 | | -10.2 | -4.2 | -10.2 | -4.2 |
| July '96 | 12,133 | 0.65 | 18,705 | 29,344 | 64 | 70 | | 2.0 | -0.8 | -8.2 | -5.0 |
| August '96 | 12,417 | 0.67 | 18,614 | 26,948 | 69 | 78 | | -0.5 | 10.8 | -8.7 | 5.8 |
| September '96 | 14,021 | 0.68 | 20,728 | 23,982 | 86 | 85 | | 11.4 | 9.7 | 2.6 | 15.5 |
| October '96 | 13,367 | 0.68 | 19,567 | 21,020 | 93 | 90 | | -5.6 | 5.4 | -3.0 | 20.9 |
| November '96 | 14,375 | 0.70 | 20,511 | 20,280 | 101 | 101 | 12.4 | 4.8 | 12.6 | 1.9 | 33.5 |
| December '96 | 15,780 | 0.73 | 21,588 | 20,170 | 107 | 115 | 19.1 | 5.3 | 13.4 | 7.1 | 47.0 |
| January '97 | 16,250 | 0.75 | 21,695 | 20,088 | 108 | 127 | 16.9 | 0.5 | 10.9 | 7.6 | 57.9 |
| February '97 | 16,813 | 0.79 | 21,340 | 20,032 | 107 | 138 | 21.8 | -1.6 | 8.6 | 6.0 | 66.5 |
| March '97 | 16,875 | 0.79 | 21,239 | 20,246 | 105 | 126 | 22.5 | -0.5 | -8.8 | 5.5 | 57.8 |
| April '97 | 16,200 | 0.79 | 20,598 | 20,691 | 100 | 98 | 19.8 | -3.0 | -22.4 | 2.5 | 35.4 |
| May '97 | 14,875 | 0.78 | 19,117 | 21,502 | 89 | 78 | 12.1 | -7.2 | -20.8 | -4.7 | 14.6 |
| June '97 | 13,750 | 0.79 | 17,357 | 23,029 | 75 | 72 | 10.4 | -9.2 | -7.4 | -13.9 | 7.2 |
| July '97 | 14,350 | 0.80 | 18,031 | 24,826 | 73 | 71 | 6.9 | 3.9 | -1.5 | -10.0 | 5.6 |
| August '97 | 17,000 | 0.80 | 21,183 | 26,854 | 79 | 78 | 6.3 | 17.5 | 10.3 | 7.4 | 15.9 |
| September '97 | 21,150 | 0.81 | 26,060 | 28,806 | 90 | 87 | 6.1 | 23.0 | 11.0 | 30.5 | 26.9 |
| October '97 | 24,250 | 0.83 | 29,300 | 30,639 | 96 | 91 | 6.9 | 12.4 | 5.5 | 42.9 | 32.4 |
| November '97 | 33,000 | 0.85 | 38,837 | 31,578 | 123 | 107 | 14.9 | 32.5 | 16.8 | 75.5 | 49.2 |
| December '97 | 37,400 | 0.87 | 43,149 | 31,791 | 136 | 119 | 19.0 | 11.1 | 11.6 | 86.6 | 60.7 |
| January '98 | 41,000 | 0.89 | 46,040 | 32,574 | 141 | 130 | 15.9 | 6.7 | 9.4 | 93.3 | 70.1 |
| February '98 | 41,000 | 0.92 | 44,762 | 33,621 | 133 | 137 | 19.0 | -2.8 | 5.5 | 90.5 | 75.6 |
| March '98 | 40,800 | 0.94 | 43,233 | 34,837 | 124 | 126 | 19.5 | -3.4 | -8.4 | 87.1 | 67.2 |
| April '98 | 30,750 | 0.97 | 31,861 | 35,455 | 90 | 96 | 17.5 | -26.3 | -23.4 | 60.8 | 43.8 |
| May '98 | 21,188 | 0.98 | 21,675 | 35,554 | 61 | 74 | 12.8 | -32.0 | -22.9 | 28.8 | 20.9 |
| June '98 | 26,450 | 0.99 | 26,757 | 35,111 | 76 | 73 | 9.2 | 23.4 | -2.1 | 52.2 | 18.8 |
| July '98 | 30,750 | 1.01 | 30,589 | 34,171 | 90 | 74 | 10.3 | 14.3 | 2.4 | 66.6 | 21.3 |
| August '98 | 36,500 | 1.02 | 35,785 | 33,045 | 108 | 84 | 14.6 | 17.0 | 12.8 | 83.5 | 34.1 |
| September '98 | 34,625 | 1.03 | 33,474 | 32,662 | 102 | 90 | 8.9 | -6.5 | 6.8 | 77.1 | 40.9 |
| October '98 | 32,200 | 1.06 | 30,489 | 32,427 | 94 | 92 | 6.1 | -8.9 | 2.3 | 68.2 | 43.2 |
| November '98 | 35,898 | 1.07 | 33,512 | 32,303 | 104 | 106 | 12.9 | 9.9 | 15.5 | 78.1 | 58.7 |
| December '98 | 36,067 | 1.13 | 31,869 | 32,547 | 98 | 119 | 18.4 | -4.9 | 12.6 | 73.2 | 71.3 |
| January '99 | 38,125 | 1.17 | 32,534 | | | 130 | | 2.1 | 9.0 | 75.3 | 80.3 |
| February '99 | 48,000 | 1.19 | 40,169 | | | 137 | | 23.5 | 5.5 | 98.7 | 85.7 |
| March '99 | 49,000 | 1.21 | 40,406 | | | 126 | | 0.6 | -8.4 | 99.3 | 77.4 |
| April '99 | 37,750 | 1.24 | 30,371 | | | 96 | | -24.8 | -23.4 | 74.5 | 53.9 |
| May '99 | 31,362 | 1.27 | 24,609 | | | 74 | | -19.0 | -22.9 | 55.5 | 31.0 |

Source: AMIC, MAFF and own data from Jan. 1999.

FIGURE 12. Cumulative Monthly Changes in Wholesale Maize Prices, June 1996 to May 1999



Source: Table 14.

The example of Table 14 shows several periods of concern, the last being June-August 1998. This problem was then reversed, as mentioned previously, by the FRA's cheap maize policy at that time. However, because of the market intervention by the FRA, indications regarding local supply levels can no longer be made.

A seasonal price pattern (SPP) is determined using a five year series of real (adjusted for inflation) prices. Using this data, a 12 month centered moving average is calculated for each month. Then, it is determined how much each month's real price diverges from the trend line; this is then expressed as a ratio. Calculating each month's mean ratio for the five year data set gives a SPP for this commodity. An example is shown in Table 14, and illustrated in Figure 12.

As mentioned above, the SPP value for each month is the arithmetic mean of ratio-to-moving-average values of that month over the last five years. The accuracy of the SPP depends on the spread of those values. The closer the individual values are to their mean, the smaller the spread, and the greater the accuracy, and therefore the reliability, of the SPP.

The most common way to express the SPP spread is using the variance and its derivative, the standard deviation (std dev). A large std dev of the SPP indicates market insecurity and is common in maize deficit areas. It reflects instability, with prices behaving differently each year. Consequently, the larger the std dev, the more that current price fluctuations are likely to differ from the SPP. The indicator provides another means of identifying large price fluctuations and monitoring further developments.

The example in Table 14 shows all quite high std devs, from six to twenty percent. This indicates a volatile market with large swings in prices, which ordinarily would be a signal of food insecurity. Because of the extended period of exaggerated price movement and the fact that all major Zambian market centers exhibit this characteristic, further analysis becomes difficult. As mentioned previously, the IRIS Report demonstrates a range of institutional development inadequacies that account for the emergence of these indicators.

Monitoring price movements is carried out by comparing actual and expected changes. Expressing the SPP and real prices as cumulative percent changes does this best. This clearly shows any sudden price rises above seasonal norms. Figure 12 is a graphic illustration of the data presented in the last two columns of Table 14.

Using these tools, possible problems regarding maize availability can be indicated. Appropriate analysis will take into account: 1) inflation, 2) seasonal price behavior, and 3) price behavior immediately before or after a suspect extreme. However, even with these indicators conclusions need to be treated with extreme care. It must be stressed that price monitoring has its limitations.

Prices indicate a level of demand, but only of the effective demand. After the price has risen beyond a certain level, many people depart from the market (are unable to afford to buy). Those who are still able to buy will determine the level of effective demand. Effective demand decreases as prices increase, and for an increasing proportion of consumers maize is out of reasonable reach – other food alternatives are sought.

SPP analysis is designed to show areas of rapid market change but in a situation like Zambia's, with extreme volatility, it can only capture what is already known – that prices change rapidly

and unpredictably. As the market matures it will become more fixed in its patterns: this tool will then show pricing anomalies likely to be associated with supply changes. Meanwhile, given the availability of prices on other important crops, it can be used to compare relative changes in prices; for example, if synchronous price rises occur, this could indicate possible regional food insecurity.

Substitutability of maize is an important factor. If alternative staple food crops are available to the consumer at a lower price, high maize prices do not necessarily mean a “food” shortage. In some areas cassava will be consumed the moment that maize availability decreases. In other areas millet and sorghum are substitute crops for maize, although this may not reach as far as larger urban centers. Thus, further analysis is necessary: price monitoring of alternative crops will allow terms of trade to be established. Purchasing power, eating habits, farming and trading practices are subjects that need to be well understood by the price analysts. Continual Government interventions in the market send the same false signals to producers and to price analysts regarding supply and demand balances.

20. THE FOOD RESERVE AGENCY

The Food Reserve Agency (FRA) was established by the GRZ in 1995 as an integral part of its agricultural market liberalization policy. The Food Reserve Act of 1995 creates the FRA as its implementing arm. It has the mandate to: 1) promote effective systems for the production, processing and marketing of designated food commodities within a privatized and liberalized marketing environment, and 2) encourage private sector operators and entrepreneurs to invest in agricultural marketing, processing and storage activities to meet the domestic demand for food commodities and expand export potential for agricultural commodities. The administration of the FRA did not become operational until 1996.

The FRA’s primary functions, as written in its enabling Act, are very specific and include:

- Establishing and managing the National Food Reserve,
- Establishing a market information system to inform Government, producers, co-operatives traders, processors and consumers on domestic and international price, market and commodity developments,
- Providing information to producers, co-operatives, traders, processors and consumers on prices, stocks and commodity developments, as well as potential regional or international marketing opportunities.

However, the final clause in the Act’s description of the Agency’s functions may be felt to be too open-ended as it allows the Minister to direct the FRA to carry out any “other function” considered necessary.

The Agency tries to operate on a commercial basis and maintain a financially self-sustaining situation, to the extent possible. The FRA’s primary responsibility is to domestically procure and/or import commodities to meet the established food reserve stock level as established annually by MAFF. Secondly, the FRA manages, maintains and leases government-owned storage facilities to co-operatives, traders and processors at competitive market prices. Presently the bulk of Agency financing comes from this activity. The FRA is further required to rehabilitate existing or construct new storage facilities if necessary. Finally, the Agency should provide information to producers, co-operatives, traders, processors and consumers on prices,

stocks and commodity developments, especially in regard to potential regional or international marketing opportunities.

The FRA exists as a corporate body that is independent and is able to recruit and remunerate its staff to carry out its mandate without Government interference. Such independence is ensured by making the Agency responsible to a Board of Directors, the composition of which includes seven representatives from the private sector among its ten members. Board members are nominated by the Minister of Agriculture, Food and Fisheries and approved by Cabinet. The current Board is structured as follows:

-- Government --

- A senior official from the Ministry of Agriculture, Food and Fisheries.
- A senior official from the Ministry of Commerce, Trade and Industry.
- A senior official from the Ministry of Finance.

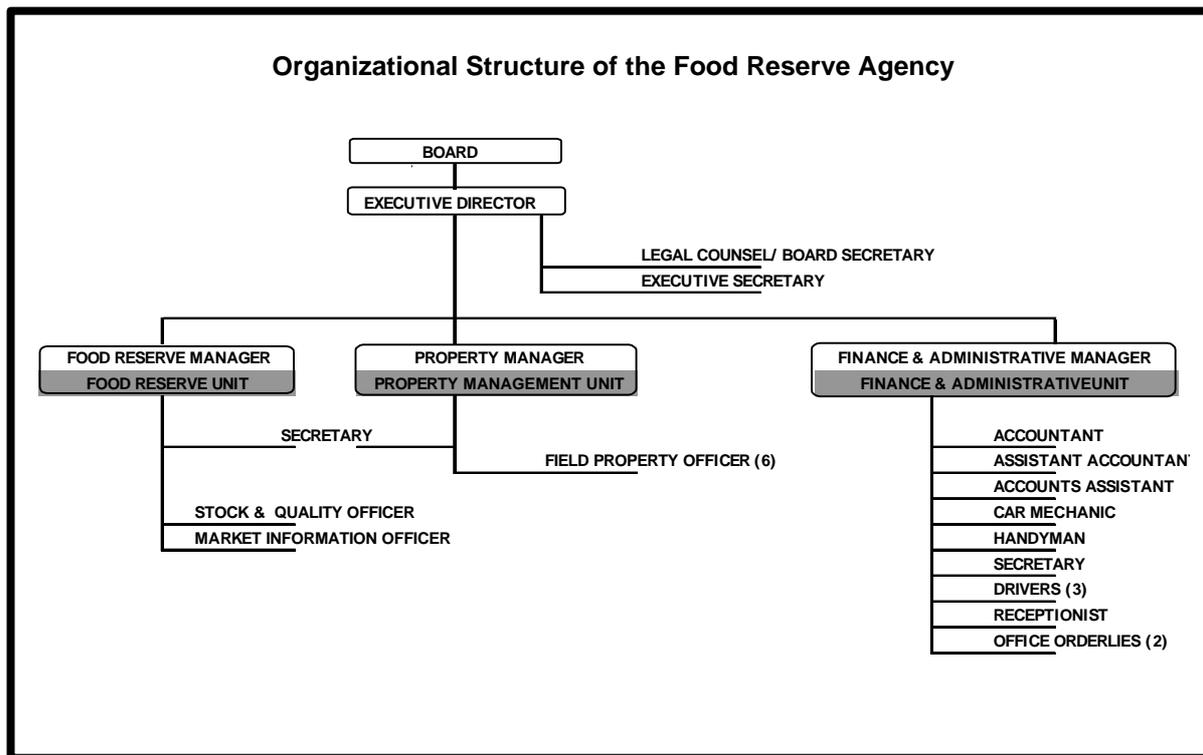
-- Private Sector --

- A representative of small-scale farmers.
- A representative of commercial farmers.
- A representative of persons engaged in the processing of agricultural food commodities.
- A representative of the Bankers' Association of Zambia.
- One person associated with the transportation and haulage of agricultural commodities.
- Two other persons from the private sector.

In general, the Board has the task to set the overall operational and financial policies pursued by the FRA in accordance with the stipulations made in the Act, monitor the effective implementation of these policies, and undertake any necessary action to enhance the managerial and operational efficiency of the FRA. To perform these functions, the Board may establish committees and delegate to each committee such functions as it deems necessary: it may co-opt onto the committee persons from outside the FRA organizational structure.

The organizational structure of the FRA is shown in Figure 13. The Executive Director is responsible for the day-to-day management and operation of the Agency and is accountable to the Board. There are three functional units of responsibility: 1) the Food Reserve Unit, 2) the Property Management Unit and 3) the Finance and Administrative Unit. A Manager who is responsible to the Executive Director heads each Unit. Only the Property Management Unit is represented at both the central office in Lusaka and the field offices in the regions.

The three functional units were established within the FRA on the basis of the concept of responsibility centers. Adherence to this concept ensures that the various component parts are made accountable for their actions. A responsibility center is defined as a designated headquarters or field area of operation for which the person in charge is accountable for all activities and actions taken. Each center is responsible for the operations undertaken in its area and account on a regular basis for the stock and financial transactions.

FIGURE 13. Organizational Structure of the Food Reserve Agency

The financial operations of the FRA are regulated by the Food Reserve Act. Proper accounts of all transactions must be maintained and submitted to Government. The manner in which income accruing to the Agency is utilized will be decided by Government and directives issued to the FRA. The National Food Reserve will be operated on behalf of the GRZ and all profits and losses on its reserve transactions will be to the account of the Government. All other expenditures will rely on the income the FRA generates itself.

20.1 CORE ACTIVITIES

National Food Reserve

Subject to being funded by the GRZ, the FRA purchases designated commodities in the domestic market for the National Food Reserve up to a total target quantity as determined each year by the Board. The total size of the physical reserve is flexible and varies according to the expected marketable surplus/deficit, and related market conditions. If no maize is available on the local market, the FRA may, subject to receiving instructions from its Board, import the maize it requires to meet the country's food security requirements, or receive and handle donations from prospective donors. The stocks held in the reserve are supposed to be released on the market only in situations where it is judged the private sector cannot adequately meet the local demand.

It was not intended for the establishment of the FRA to disturb the GRZ's commitment to the market liberalization process. Instead, it was to operate within the limits of established local market conditions: there was no base minimum price or any other fixed or set price at which the FRA bought and sold. Domestic purchases should be made through a process of unrestricted open tendering, calling for deliveries to be made to specific locations where the FRA intends to store the stocks. This would allow the FRA to make its purchases at the best competitive prices

available, while the level of the offers accepted by the agency would provide a signal to the market regarding the prevailing wholesale prices. Sales on the domestic or export markets, in case stocks from the reserve have to be released or rotated, should also be done through tendering.

Once a reserve has been established, rotation of maize stocks becomes a regular activity – latest after storing the commodity for one full season, if it is not to lose its value. At least half the total physical reserve should be recycled each year, always marketing the oldest half on a first-in-first-out basis. If no stock releases are desirable on the local market and, yet, recycling has to take place, reserve stocks can be exported. Likewise, stock replenishments can be imported if this is preferably to buying on the local market. However, a food reserve should ideally be composed of a combination of physical stocks and non-physical stocks in the form of financial reserves and futures commodity contracts, e.g. on SAFEX in South Africa. The exact mix of these reserves has not yet been established at the FRA, and is still under discussion by the Board and its MAFF supervisors.

Management of Storage Facilities

The FRA is responsible for managing and administering Government-owned storage facilities, the title deeds of which were transferred to the FRA on its inception. The facilities are leased to private sector operators or organizations. Lease rates are established through a tendering process, so as to ensure that they reflect market rates and do not act as a disincentive to the construction of new facilities by private traders. The income presently accruing from the leasing arrangements enables the FRA to meet its overall operational costs, including maintenance and rehabilitation of the storage facilities. There is a total of 694 storage facilities being managed by FRA currently; out of which, there are 242 usable facilities. Some of the facilities are used by the FRA to store the Food Security Reserve. FRA currently has 30 clients utilizing its facilities. The cost of rental ranges from two to three million kwacha per month in urban areas: in rural areas, the rental is decided by tender so can be very low if there is little demand. If it is required, the FRA may propose to sell some of the storage facilities.

Market Information

Managers of food security reserves require detailed current price information and price forecasts, together with historical information on seasonal price patterns, in order to decide when to release stocks onto the market and when it may be opportune to carry out stock replenishment. While the need for such security reserves perhaps increases when grain markets have been liberalized, it is essential that their operation does not disrupt commercial market operations. Thus, reserves need to be operated on the basis of clear rules governing the purchase and release of stocks. Detailed information on market prices is essential if these rules are to be applied and if arbitrage activities by the private trade are not to be disrupted. As indicated in the section on Market Information Services, the FRA has a mandate to provide a service that adequately monitors grain trade in the southern Africa area.

With increased market liberalization Strategic Grain Reserves need not be maintained for market stabilization purposes. Instead, the GRZ could provide incentives to private millers and traders to maintain commercial buffer stocks until the concept of stock management becomes better established within the private sector. These stocks would help to ensure that market prices do not exceed import parity in the event of unforeseen delays in shipments. Commercial buffer stocks would be owned and operated by the private sector, however. The GRZ (i.e. the FRA) would be consulted in the event that stock levels need to be drawn down. With good market

information and monitoring of national production, minimum commercial buffer stock levels would only need to be enforced at certain times of the year, or perhaps even only in certain years. This would reduce the cost of maintaining stocks considerably. Access to low cost borrowing may be a possible incentive to stock holders. Alternatively, such arrangements could be established through an open tendering system. In either case, the function of Government would be to facilitate the holding of commercial buffer stocks and not to either own or manage them.

Grades & Standards Promotion

The FRA should set and promote the internationally designated weight and grade standards for the main marketed grain commodities. The objective is to assist producers, traders and processors in adequately pricing their food commodities in compliance with uniform grade and weight standards. Price rewards can be offered for international level, first grade quality products, which will encourage farmers and traders to deal more with the quality of produce demanded by the more remunerative export markets. In co-ordination with the Zambia Bureau of Standards, the FRA promotes and enforces quality standards both in its own management of the food reserve and as necessary in the marketing operations of the private sector.

The purchasing activities of the FRA provide an opportunity to introduce such quality standards to the grain market. Invitations to tender and the subsequent contracts for the replenishment of the reserve include details of the specifications of grain which are acceptable. These specifications should be in accordance with international standards, thus encouraging the use of such standards in domestic transactions.

20.2 MARKET INTERVENTION OF THE FRA

Maize Trading

Except for the repossessed stocks being held by Government in 1994 and used to establish the food security reserve, which was eventually vested in the precursor to the Food Reserve Agency in 1995, the FRA has not had its physical food reserve actually established. The GRZ established the FRA in 1995 with a promised national food reserve budget of K10 billion. During the 1996/97 season the FRA was instructed by MAFF that it was necessary for national food security that they purchase maize, millet and sorghum in the four main production regions. Complex plans for purchasing and storing 50,000mt (the estimated amount able to be accessed on the market and handled for K10 billion) were made and purchasing modalities were officially announced. However, because Government never released the funds to the FRA, the purchases were never made. It is obvious the sort of market disruption that can ensue from this type of behavior from a major market participant.

In March, 1997, the Early Warning Technical Committee (EWTC) of the MAFF NEWU estimated a national food deficit equivalent to 350,000 tons of maize for the 1997-98 marketing (consumption) year, based on its estimates of crop production for the 1996-97 production year. The FRA had net carry-over stocks of 10,000mt of maize in July 1997 that it had purchased locally. Consequently, the FRA took the initiative to import about 70,000 tons of maize, to ensure sufficient domestic supplies. The FRA arranged two types of imports from the Grain Marketing Board of Zimbabwe. The first was a direct FRA import purchase of 20,000mt of maize at a cost of US\$150/mt (FOB Harare) through its financing arrangement with Nedbank (a debt which has been subsequently retired). This took place between December 1997 and March 1998. The second type of import was as an agent for nine local companies. The FRA brokered

a deal in May 1997 with the Grain Marketing Board of Zimbabwe to import 50,000mt at about the same price as its own imports. The local companies paid 15% advance payment and paid the balance on delivery of the grain which arrived between August 1997 and February 1998. The FRA charged a handling fee of \$2.50/mt. The FRA began selling its supply of maize in January: by March 1998, the FRA only had a maize supply left of 4,786mt in its reserve.

In March 1998, the EWTC made an early production and consumption estimate (not to be confused with its initial technical estimate of 200,000mt) which indicated a maize deficit of approximately 450,000mt. This estimate was later revised to 500,000mt by senior GRZ officials, who, feeling the estimate indicated a need for food security action, passed the information on to the FRA. Initial conversations with donors led FRA to estimate that food aid commitments would total about 90,000t, leaving a balance of 410,000mt. Senior officials at the FRA called a meeting with traders and millers in April 1998 to request their assistance in importing this amount during the year. The private sector, however, was not able to make any long term import commitments for several reasons relating to the existing business climate, and elected to indicate no import plans to the GRZ. The FRA feared the lack of response meant a lack of ability to import, and took it upon itself to import the entire 410,000mt of maize. An immediate contract continuing the prior GMB Zimbabwe agreement, for 50,000mt at a price of \$165/mt (FOB Harare) was established, and arrived during the period April 1998 to August 1998. Assuming transport and customs costs of \$30/mt, and finance charges (estimating 9 mos. of carrying the loan) of \$50/mt, the actual cost of this contract was about \$245/mt.

Subsequently, the FRA further requested, on behalf of the GRZ, that the millers inform them of at what price they needed to receive maize in order to keep the rollermeal prices below K18,000/bag (a price the GRZ was using as the unofficial “riot price”, or price above which it expected a repeat of the 1988 Copperbelt food riots). This price was indicated as K38,000/90kg bag of maize, which the FRA eventually used as its base sales price of maize until June 1999 (in Lusaka, with adjusted transport costs to other centers). Traders were sold maize at the higher price of 42,500/mt. Most of the sales were made to “millers” so the lower price was the prevailing one. Assuming a client mix of $\frac{3}{4}$ millers and $\frac{1}{4}$ traders, and an average exchange rate of K2000/\$ over this part of the year, it can be estimated that the FRA average sales price was \$217/mt. Total estimated loss on that contract was US\$1.38 million.

In the absence of any further GRZ funds being provided to the FRA for grain purchases, it established revolving lines of credit for the financing of about 40,000mt at a time for further imports, partially through Nedbank. Due to the physical constraints of moving the product, selling it and paying off the outstanding amount before contracting and shipping the next block, only approximately 150,000mt was actually imported through this facility (although larger amounts were contracted for, subject to review). The bulk of these imports arrived during the period September to November 1998, at a price of \$218/mt (CIF Lusaka). Another \$50/mt can be added as finance charges. The prior price of K38,000/bag was held by order of the Minister of Agriculture. The FRA sold 152,000mt at this price between October 1998 and June 1999. With an estimated exchange rate of K2100/US\$ over this period, this would represent a sales price (on the averaged trader/miller spread) of \$207/t, or a loss of approximately US\$61/mt. The FRA’s estimated loss on this contract would be about US\$9.27 million. It is also alleged that FRA gave just over US\$6 million in credit to politically influential customers, who have yet to make any repayments on these loans.

Of the 224,000mt of maize that arrived in the 1998/99 period, some 85,000mt were re-exported to DRC (65,000mt of official FRA re-exports and 20,000mt of informal cross-border trade).

Eventually, the FRA put monitoring posts at the main DRC border points and, if caught, informal traders paid a re-export fee of US\$35/mt.

Fertilizer Trading

The GRZ clearly stated in 1996 that it would not get involved in the agricultural inputs markets, especially fertilizer. This was in reaction to the huge losses it had suffered under its earlier fertilizer subsidy programs. However, in May 1998 the FRA published on behalf of the GRZ a tender inviting bids for 57,000mt of imported fertilizer. This was in addition to 23,000mt of Japanese aid fertilizer, earlier donated to the GRZ for sale to maize producers through the Agricultural Commodity Exchange.

The reasons for GRZ's backtracking on its policy not to interfere in the inputs markets were the GRZ's views of the nation facing significant food insecurity problems while at the same time being unable to trust the private sector to reach the bulk of rural farmers with fertilizer on a loan basis. Market intervention was what the GRZ felt was necessary to ensure adequate and timely support of future production. Without some guarantee to offset the risk of non-repayment, the private sector was reluctant to service the more difficult regions.

The FRA contracted for two lots of imported fertilizer, one from South Africa and the other from Saudi Arabia, in 1998. From these contracts, it eventually received 48,000mt between November 1998 and February 1999. The fertilizer purchase was arranged late due to the administrative difficulties of tendering, negotiating financing and arranging government guarantees of payment to the international parties and financiers. The contract for the basal fertilizer was given to Omnia (South Africa source) and was distributed in December, but the top dressing (Urea) supplier was unable to deliver as promised. Eventually FRA received 1,000mt in January, but felt it necessary to purchase an additional 18,100mt of the Japanese fertilizer through ACE for distribution in January. FRA only received the final shipments of the prior contract in May-June 1999.

The planning of distribution for the fertilizer was carried out at the local level by District Agricultural Committees who recommended amounts and areas of concentration. At the national level, the FRA chaired a National Fertilizer Committee, which included members from MAFF and the Anti-Corruption Commission, who accumulated and decided on the local requests. However as can be seen in Figure 14, distribution of fertilizer supplies did not correspond with regional maize planting areas. Central and Lusaka Provinces alone received 43% of the total fertilizer distributed, with only 18% of the planted area. Whereas hard-to-reach areas that were supposed to be serviced by FRA, since private trade would not go there, did not receive significant amounts: Western and Northwest Provinces received only about 4% of the total distributed.

The FRA, itself, did not have the staff or logistics to distribute the fertilizers and so made a contract with Omnia Fertilizers to serve as the GRZ's agent. Thus, both the distributor and the financier (Nedbank) received guarantees from Government that it would cover any non-performance on the part of the beneficiaries. Omnia Fertilizer Ltd. was approached to carry out the activities indicated on a private basis. The basis for selection was that Omnia was the fertilizer company in Zambia with the best-placed and most extensive infrastructure to reach most of the small-scale farmers targeted by the GRZ for its program.

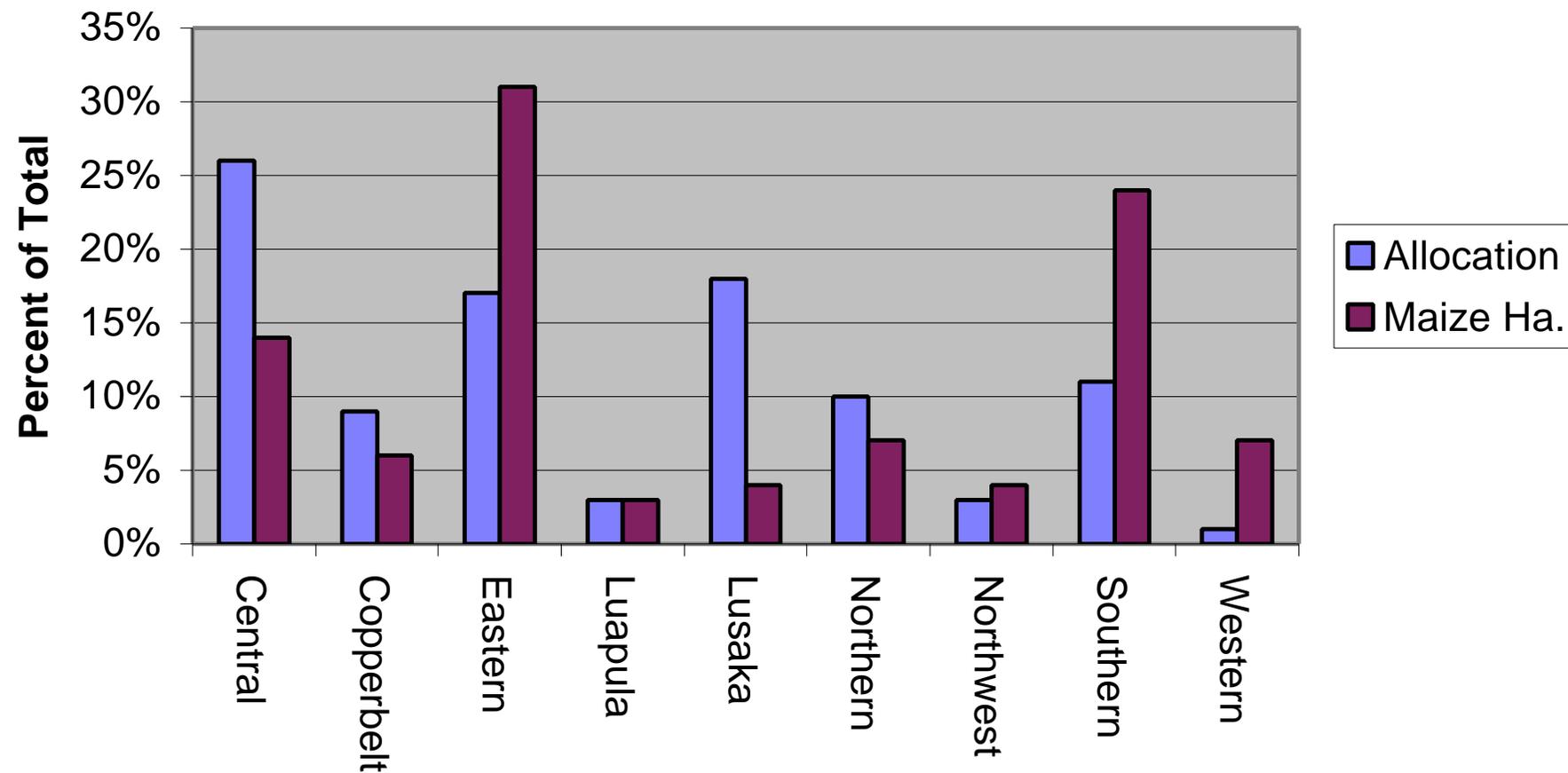
Initially, the purchasers were allowed to buy the product with a down-payment of 15%. This was later changed to 7.5% on smaller purchases. It is not yet clear what the final recovery rate

of these loans will be, as the process continues into the present with maize/fertilizer swaps to be carried out in this season. Some of the private sector industry participants estimate privately that the FRA has only received about a 11% recovery to date on the balance outstanding, and is unlikely to attain more than a 50% recovery rate by the end of the repayment season. The FRA's legal department has been authorized to proceed with legal procedures to recover all outstanding debts.

The estimated cost of the fertilizer was \$260/mt landed at Lusaka. Another approximately \$20/mt was incurred for transport to the regional sites. This suggests a fertilizer base cost of \$14/bag without seller's margin, and represents an investment of US\$13.4 million by the FRA.

Using the February 1999 exchange rate of K2400/US\$, the calculation of fertilizer base cost comes to K33,600/bag. The FRA was officially offering fertilizer for K28,800/bag. This represents a loss of US\$4.6 million. However, many of the local dealers were selling this for prices ranging from 20,000 to 25,000 per bag. The only conclusion that can be drawn – and is, with disgruntlement, by the private sector – is that a large number of purchasers of the FRA stocks made the decision not to repay the balance of their debt, and so could afford to sell at below-cost prices. If a projected default rate of 50% is inferred, then the losses to the FRA would total approximately US\$8 million.

FIGURE 14. 1998/99 Fertilizer Allocation vs Planted Maize Area by Region



Source: Omnia Fertilizer Distribution Study.

21. PRIVATE SECTOR MARKETING

21.1 MAIZE

The private sector can meet the demands of the Zambian maize market. Since 1995, when commercial agents were able to enter the liberalized market, private traders and millers have proven that they have the capacity to import, distribute and mill at reasonably affordable prices. While the sector still faces learning problems and is limited in size, there is sufficient expertise, capacity and accountability to warrant relying heavily on them to fulfil national demand. However, in April 1998, when the GRZ came to the traders and millers, informed them of the estimated shortfall of 500,000mt (the unofficial EWTC estimate) of maize, and requested them to indicate their ability to respond to this impending import demand, the private sector stated that they could not. Thus, the FRA felt it was forced to begin sourcing the product itself. We need to look into the details of what happened to see why, in this particular case, the private sector chose not to respond.

In March 1998, the EWTC made its initial production and consumption estimates. These estimates were passed to the Minister of Agriculture, who, feeling the estimates indicated a need for food security actions, passed the information on to the FRA. The FRA indicated that their analysis of the market situation suggested a significantly lower impending deficit, but this advice was ignored. The FRA was requested by the MAFF to expedite the import of the amount of maize indicated in the maize balance sheet. Senior officials at the FRA called a meeting with traders and millers in April 1998. Further meetings were held with millers in their monthly Association meetings (of which the FRA is a member). At these meetings, the FRA confirmed that it would be attempting to import by itself 410,000mt of maize, which represented the original estimate of 500,000mt less its own estimation of food aid donations. It further requested, on behalf of the GRZ, millers to inform them of what price they needed to receive maize in order to keep the rollermeal prices below K18,000/bag (a price the GRZ was using as the unofficial “riot price”, or price above which it expected a repeat of the 1988 Copperbelt food riots). This price was indicated as K38,000/90kg bag of maize, which the FRA eventually used as its base sales price of maize until June 1999.

The reasons given by the private sector for its reluctance to commit itself to import program plans at the behest of Government were based around several factors:

- Prior stocking positions taken,
- National foreign exchange shortages,
- Losses due to kwacha depreciation,
- Confusion within the national market due to uncertainty related to the GRZ actions
- Disbelief in the GRZ stated levels of imports required.

In the previous year millers delayed restocking until after August-September, as there were rumors of potentially large FRA maize imports from North America. By this time, local farm-held maize had already been completely sold to traders. The traders were only willing to resell the stocks at import parity or import themselves. They therefore committed themselves to high-cost stocks in November-February, which were in part still left on hand by April 1998. These stocks absorbed much of the millers’ liquidity. Commercial interest rates were (and still are) at high levels, over 30%. This discouraged the companies from further borrowing. The two

difficulties, individually and together, constrained the sector's ability to make long-term purchase plans for the following season.

Many traders and millers were finding it difficult to acquire the amount of foreign exchange required to purchase maize. The Bank of Zambia forex reserves were low during the early 1998 period, especially the uncommitted reserves used for financing private traders' needs. Little was freely available locally to allow traders to make investment plans over a period longer than a few months.

Another financial factor constraining private sector capacity to import and sell maize was the added risk caused by the rapid decline in the value of the kwacha. From late 1997 to early 1998 the kwacha had declined by 20%. Local traders and millers who bought or borrowed dollars in November-December 1997 to procure maize, and then used the kwacha proceeds from the sale of this maize to pay several months later for the dollars owed for this maize, incurred unanticipated heavy financial losses. Fear of a similar occurrence affects traders' corporate plans even until the present – and with good reason apparently, as the kwacha value continued to fall another 15% in the interim.

Private traders were hesitant to import maize because of the uncertainty surrounding the GRZ plans regarding entrance into the market. Traders feared that their profits could be undercut if the GRZ had the FRA sell substantial amounts at subsidized prices, as it was perceived to have done in February/March 1996. The unpredictability of the GRZ actions in the maize market, and the lack of transparency in executing these actions, prevented private importers from making forward plans to compete in the maize market.

The risks imposed by current market uncertainty and financial constraints are demonstrably high. The private sector, although capable of performing the necessary market functions, feel uncertain that they will receive an adequate return for the risks taken, and feel no social responsibility to try to meet the national food needs. They are certain that the GRZ will, in the end, ensure adequate consumer supplies to the country by other means, as it has always done. The GRZ needs to present further assurances that it will no longer cast itself in the role of "big brother", and will encourage and better support the private sector in reassessing its own position of social responsibility.

The private sector can meet the demands of the Zambian maize market, but it is clear that they will continue to be reluctant to perform fully in the Zambian maize market as long as the GRZ's actions through the FRA are not perceived as orderly and transparent. If the FRA had publicly established guidelines for its interventions and a clear statement of its procedures, some of the market confusion could be avoided. Greater rapport between the GRZ and the private sector would also lead the traders into a more independent view of their social role, leading to less dependency on Government resources. Greater representation of the private sector on the Board of Directors of the FRA, and involvement in the day-to-day running of the Agency would help sensitize the public and private sectors of the market. Maize market interventions need to be a truly open and collaborative effort between the FRA and the private sector.

21.2 Fertilizer

Liberalization of fertilizer markets has not been easy to achieve. Governments have been reluctant to step back from control of what they consider to be one of the key instruments for

modernizing agriculture and raising maize and other crop production. The GRZ's program of market liberalization cannot through its own efforts bring the private sector into the full scope of national fertilizer marketing. Private sector traders need time to develop confidence in its own abilities to service the demand in different regions at what they consider to be reasonable risks and with reasonable rewards. Vacillation of purpose on the part of Government generates conflicting signals to the other market actors, and slows down the process of market development. Uncertainty about the actions of Government becomes a major constraint to the involvement of the private sector in the fertilizer market.

The domestic market for fertilizer has shrunk following the withdrawal of government subsidies to small farmers. Total domestic fertilizer use is currently some 140,000mt per year. Of this, some 50 to 60% (80,000mt) is used on maize; and most of the remaining 60,000mt is used on wheat, sugar, tobacco, cotton, soybeans, vegetables and flowers. Of total commercial sales, about 65% goes to large farms and farming companies, and 35% to small farmers. It is estimated by the commercial sector that only about 50,000 out of Zambia's 560,000 small-scale farmers are able to buy or barter for fertilizer. The GRZ feels both the shrinking domestic use, and the small numbers of small-scale farmers able to finance inputs, are of concern to it in its management role of national food security.

Seven years ago there was only one fertilizer company in Zambia, there are now seven. Until 1996, however, there were only two – Omnia Fertilizer Ltd. and Kynoch (Zambia) Fertilizer – and there was (unproven) speculation that there was collusion on pricing. With the advent of more sources of supply, and closer official scrutiny, this conjecture is no longer made. It is estimated that Omnia currently services about 40% of national fertilizer demand, Kynoch about 25%, Norsk (Zimbabwe) Ltd. about 12%, and the remainder by Nutrichem, Avignon, ENK Trading and ICH. All the latter are international companies based out of Malawi, Zimbabwe or South Africa.

Private sector companies have responded to the government's policy of market liberalization in agricultural inputs by establishing good marketing channels. However, most of the companies' dealer networks are along the line of rail. Omnia Fertilizer's Small Scale department has a good infrastructure in the rural areas of Southern, Eastern, Lusaka and Central Provinces. The main food producing areas of Zambia are well serviced by the private sector. The private sector, however, is not prepared to serve as a financing agent for small-scale farmers and will only deal with financially viable customers.

The GRZ found this situation to be unacceptable to its own understanding of food security concepts, and requested the FRA to manage a new program of official fertilizer distribution in May 1997. The FRA published a tender inviting bids for the delivery of 57,000t of fertilizer. This was in addition to 23,000mt donated to the GRZ by the Japanese Government. As indicated, this amount of 80,000mt represents the total needed for the national maize crop.

Government contracted Omnia to undertake distribution as the company has established wide access to rural areas. Buyers originally needed to make a down-payment of 15% and pay the balance due after harvest, but even this was found to be too onerous for small-scale farmers, so later it was changed to allow a 7.5% down-payment for purchases below a certain amount.

Due to late ordering and late deliveries from international suppliers, fertilizer arrived late and so proved to be an inefficient means of expanding small-scale output. Instead of improving maize

production, it sent unclear signals to the producers about what the input supply situation was and undermined the private sector's established markets.

As with the maize market, traders felt they were faced with a combination of poor financial factors and indeterminate market interference by the GRZ. Thus, although they continued to service their long-time customers in the commercial farming sector and larger traders, they did not try to expand their new customer base any further. They chose to participate only marginally in what they judged to be a high-risk market.

The ASIP Consultative Forum looked in depth at the fertilizer market in Zambia and concluded that about 85% of the national demand can be serviced through the private sector. This, alone, is sufficient to meet the food security needs of the country. There is no need for the FRA to be involved in any politically motivated government inputs support scheme. Sustainable programs to further open availability of fertilizer to farmers needs to focus on reducing structural problems by feeder road construction, improving purchasing power through income enhancement strategies such as Cash-for-Work (CfW), and barter trade support in the private sector.

The GRZ, and its agencies, should not be involved in dealing with the physical tasks of obtaining and moving fertilizer to the rural farmers. If the decision is made to subsidize certain areas due to poor infrastructure and market access, this can be done openly through tenders for supply from existing private companies.

21.3 SEED

During the years of central market control by Government, the Zambia Seed Corporation (Zamseed) was the sole legitimate seed supplier. Although only 40% owned by the GRZ, it acted as a parastatal company, accepting controlled prices and carrying out Government directives regarding agricultural supplies. However, only in two years – 1983 and 1988 – was the company forced to set prices below costs and accept subsidies from Government. Now, with liberalization of the market and four new companies selling seed, Zamseed still sells 60 to 70 percent of the national market.

Previously Zamseed used the district co-operatives as its distributing agents and with their dissolution the rural distribution network has not worked well. Small local traders are reluctant to become involved in agricultural inputs, as the requirement to finance most of the local farmers is too onerous. This year, Zamseed is attempting to utilize the district level Farmers' Associations formed by ZNFU and the District Planning Officers in the regions.

Since 1994 maize seed sales have reduced by 47% to about 4,000mt (some private agribusiness representatives claim it is even lower, at closer to 3,000mt). This is a direct result of the collapse of Lima Bank and the necessary rural credit that was offered to farmers by that source. Without an institution to offer the credit through the production season, farmers are turning more to use of their own seeds regardless of lowered output. In some areas, this function is being taken up by the Drought Rehabilitation project of the Program against Malnutrition (PAM), who now purchase almost 40% of Zamseed's annual sales. In a smaller way, some of the other NGOs are doing similar programs.

The major problem, of course, remains the factor that defeated Lima Bank – the social culture that accepts non-repayment of loans as acceptable, and normal. Until this attitudinal change is made at the village level, little can be done to increase production through improved inputs.

21.4 OUTGROWERS SCHEMES

Increasingly, farmers are turning to the private sector to provide inputs, financing and extension. The number of small-scale farmers involved in outgrower schemes has increased to 180,000 in cotton, 6,000 in tobacco and 1,500 in paprika. Under these schemes, farmers are typically provided with seed, chemicals, extension support and marketing services. The larger companies support these schemes in order to ensure an adequate supply of the commodity for their own processing or export divisions.

Importantly the outgrower schemes are often risky to manage due to the potential for poaching of the crop by other buyers who did not extend pre-finance. This problem has become especially serious in the tobacco industry where each of the three main actors accuse their competitors of “poaching” and unethical business practices.

Smaller companies have attempted outgrower schemes, e.g. BIMZI, but have found them to be expensive to develop. The process is a long term investment in the physical, financial and even social infrastructure of a region, and often smaller businesses need to keep their capital flows less encumbered.

22. CONCLUSIONS AND RECOMMENDATIONS FOR THE MARKET SECTOR

22.1 THE MAIN FINDINGS

The GRZ’s macroeconomic program of market liberalization is working in the agricultural marketing sector, but cannot be expected to provide examples of robust activity even yet. The development of a reliable and efficient marketing system to serve the needs of rural Zambia requires concerted efforts by both the private and public sectors in infrastructure investment attuned to smallholder production, mechanisms for improving farmers’ access to credit and inputs on a sustainable basis, instituting local responsibility for local market development efforts, processes for price determination, and strategies for optimizing the utilization of local processing capacity.

The GRZ interventions in the market have been based more on short-term social and political demands, than market development considerations. The private sector is discouraged from greater growth by what it sees as unclear signals from the government marketing agency. Because of the small number of participants and market size, uninformed positions taken by a single player can seriously disrupt all other market decisions. Although such decisions may respond to the short-term demands on politicians, the uncertainty created in the market results in disrupting farming, trading, and processing activities. The private sector will decrease their future investments as they anticipate reduced net incomes due to non-market based interventions.

The GRZ used the official maize balance sheets prepared by the NEWU to order the FRA to assist in supplying the national maize market. This was an appropriate use of balance sheet information (although the data itself was not necessarily accurate due to the Government’s attempt to misuse consumption assumptions to make the balance sheet a full national food

balance sheet), which was to make maize import decisions, but the GRZ failed to make use of their established market experts to assess the appropriate nature of their intervention.

There is mistrust on both sides in the relationship of the public and private sectors of the grain industry and its marketing. The private sector believes the Government will interfere in the market for opaque, political, reasons causing disruption and financial losses, while the GRZ believes the private sector will try to increase its profits through stock and price manipulations that would cause unnecessary hardship to the public.

The impact of FRA sales on into mill prices indicate some degree of ambiguity. On the one hand, consumers benefited from a US\$10 million decrease in mealie-meal prices in 1998/99. Likewise, it appears that farmers lost very little in decreased wholesale maize prices since international prices also decreased over the same period. However, the impact of selling a substantial amount of commodity below import parity leads to uncertainty and distrust among the other market participants. Understandably, these traders feel in imminent danger of serious business losses should they decide to extend themselves by increasing their market activities.

The FRA, as the Strategic Grain Reserve advisor to the GRZ, is in a position to further educate the political planners on appropriate market practices. Advantage should be taken of their position between the public and private sectors to play a co-ordinating role on exchange of information, providing a forum for industry interaction.

The GRZ supported policy of decentralization of administrative authority seems to provide the best answer to better development of the market sector. National policies and private sector initiatives are in place and working toward better national integration, but can only proceed as fast as local development requirements (in logistics, infrastructure, administration, etc) allow them. Local communities must start taking a strong hand in the decisions and initiatives for their own future development. Government can assist by having strong planning and market support programs at this level. The GRZ must legislate the ability to generate revenues at District Administration level in order to strengthen the development capacity of local offices. Then programs can be initiated for the continued development of market infrastructure (market sites, sheds, etc). Such programs would be identified by local farmers' associations based on their own assessment of needs. Small amounts of initial funding could be made available through projects approved by the SEMDCOs, but the associations or other groups applying would have to demonstrate a large proportion of self-help or own-funds.

Continued development of the extension service at District and Camp levels is important for providing informational links to the rural communities. Linking the local extension agent to outgrower schemes where applicable (possibly through the Provincial Planning Office oversight) provides invaluable research information which can be spread wider through the community. Inclusion of market extension services through the regular extension agent improves his ability to offer income generating changes and widens his capacity to interest the community in development issues.

Local initiatives to respond to food insecurity messages (e.g. cereal banks, market department links with trader networks, expand District Agricultural Committee responsibility to food security matters) can be encouraged with financial support for specific programs. Funds for such programs should be established in special development accounts drawn from regular local

budgets (see #1 above), central office programs, and from “once-off” sources such as programs of international donors and/or NGOs.

The liberalization of the market sector has led to a situation in which many farmers have had to reconsider which cash crops to produce on the basis of 1) comparative advantage, and 2) relative access and/or proximity to markets. Insufficient attention appears to be given to the need to provide market extension support to the farming community. Such support would be required to assist smallholders to make optimal use of commodity production and market opportunities being created under the new liberalized conditions.

There are several private sector organizations and NGOs working with farmers to help organize self-owned groups and associations. These are also being advocated through the local SEMDCO/MEDOs and ZNFU. It is now estimated that there are more than 70,000 farmers who belong to such associations.

Market information services are an important factor in market development. They are unlikely to ever be completely self-supporting, and should be a priority budgetary item under the GRZ’s liberalization effort, but may be able to be linked to programs with some income generating capacity. Two issues need to be immediately pursued: 1) local level analysis and use of data collected (i.e. decentralization), and 2) accessing greater data flows and analyses regarding sub-regional market structures and changes.

The ASIP Consultative Forum looked in depth at the fertilizer market in Zambia and concluded that about 85% of the national demand can be serviced through the private sector. This, alone, is sufficient to meet the food security needs of the country. There is no need for the FRA to be involved in any politically motivated government inputs support scheme. Sustainable programs to further open availability of fertilizer to farmers needs to focus on reducing structural problems by feeder road construction, improving purchasing power through income enhancement strategies such as Cash-for-Work, and barter trade support in the private sector.

Food aid has been found to be a major destabilizing factor in the development of markets and market structures. Most current food aid is going to relieve the sociological stresses of chronic poverty, not physical lack of food due to drought or famine. The economic repercussions of this misuse of food aid hampers the evolution of effective local markets. Identification of national poverty issues masquerading as food security issues, and conversion of Food Aid into more appropriate schemes such as Cash-for-Work, would give a major boost towards real market development.

22.2 RECOMMENDATIONS

Market Infrastructure Development

1. Government’s major role in the development of the marketing sector is to provide the investment in public infrastructure, such as road and rail transport systems, communications systems, and appropriate market statistics information.

Market Information Service Development

2. AMIC should be given further administrative and logistical support to carry out its market information mandate in support of improved market infrastructures. In carrying out its mandate

it should strongly support strengthening of District level “self-help” initiatives. AMIC officers in the districts seek to learn of and make use of NGO initiatives in marketing and market information.

3. AMIC and NEWU should be operated in close collaboration, to the extent of sharing their budget and logistics in MAFF. Publications should be merged to include all current information in a single series of publications.

4. A Technical Coordinating Committee should be established for AMIC activities. Possible candidates for the committee are: FRA, ZNFU, ACE, EBZ, CSO, Ministry of Commerce, ZACCI -- as well as NEWU and Extension Department in MAFF.

5. AMIC should expand its range of commodities that it collects prices on to include regionally specific commodities (sorghum, millet, cassava) that could be used as terms of trade indicators when measured beside the standard maize related commodities. This information should be assessed at the district level and AMIC must design methods of making the basic price information available to local producers. AMIC should also develop a means of providing simple explanations of the use of price and market information to local groups.

Food Reserve Agency

6. The role of the FRA in the holding of physical stocks for strategic grain reserve activities should be re-evaluated. With the development of the private sector, this responsibility becomes increasingly a matter of monitoring stock flows, and less one of physical presence. It is recommended that only cash reserves and forward stock options be held by the FRA in future. If GRZ feels a nostalgic need to have physical stocks in the country, FRA should contract no more than 40,000t to be held by private companies as agents of the FRA. Purchases and sales of commodities, if required, should be carried out through a more neutral body, such as the Agricultural Commodity Exchange – thus, also encouraging greater development of the market infrastructure.

7. The FRA legislation gives it responsibility for Agricultural Market Information as well. This position should be expanded upon and brought to include joint operation of the AMIS process, thus increasing its ability to monitor market activities and plan market development programs. Funding for the MAFF activities (as decided upon at the TCC, which the FRA should chair) should come from the FRA. The FRA management of this funding should be open to the possibility of having some private financing sources, e.g. selling commercial advertisements.

8. The FRA should expand its Board of Directors to also include donors. It should also be expanded to include more of the private sector (millers and traders separately). This would make its policies and actions more public and transparent, helping to stabilize market fears of its activities. A clear, public statement of its aims and goals in the market – and its responsibilities as the National Food Reserve (e.g. 40,000t physical stock, X dollars cash reserve, and holding of forward options as required) would help calm public opinion. There should also be a clear re-establishment of the policy of management’s accountability to the Board of Directors. If satisfied with the FRA “independence” and commitment to market development, donors could initiate discussions regarding support for enhancement of specific activities (e.g. AMIS).

Food Aid Issues

9. It is strongly advised to use alternative methods of responding to request for aid for local production deficits, in particular it is recommended to develop income generating activities in the affected area. If it is felt there is an extreme need, then self-targeting commodities, such as millet or sorghum, will put less stress on both national and local market functions.

PART VI. SUMMARY AND CONCLUSIONS

23. RECOMMENDED CHANGES IN THE CROP FORECASTING SYSTEM

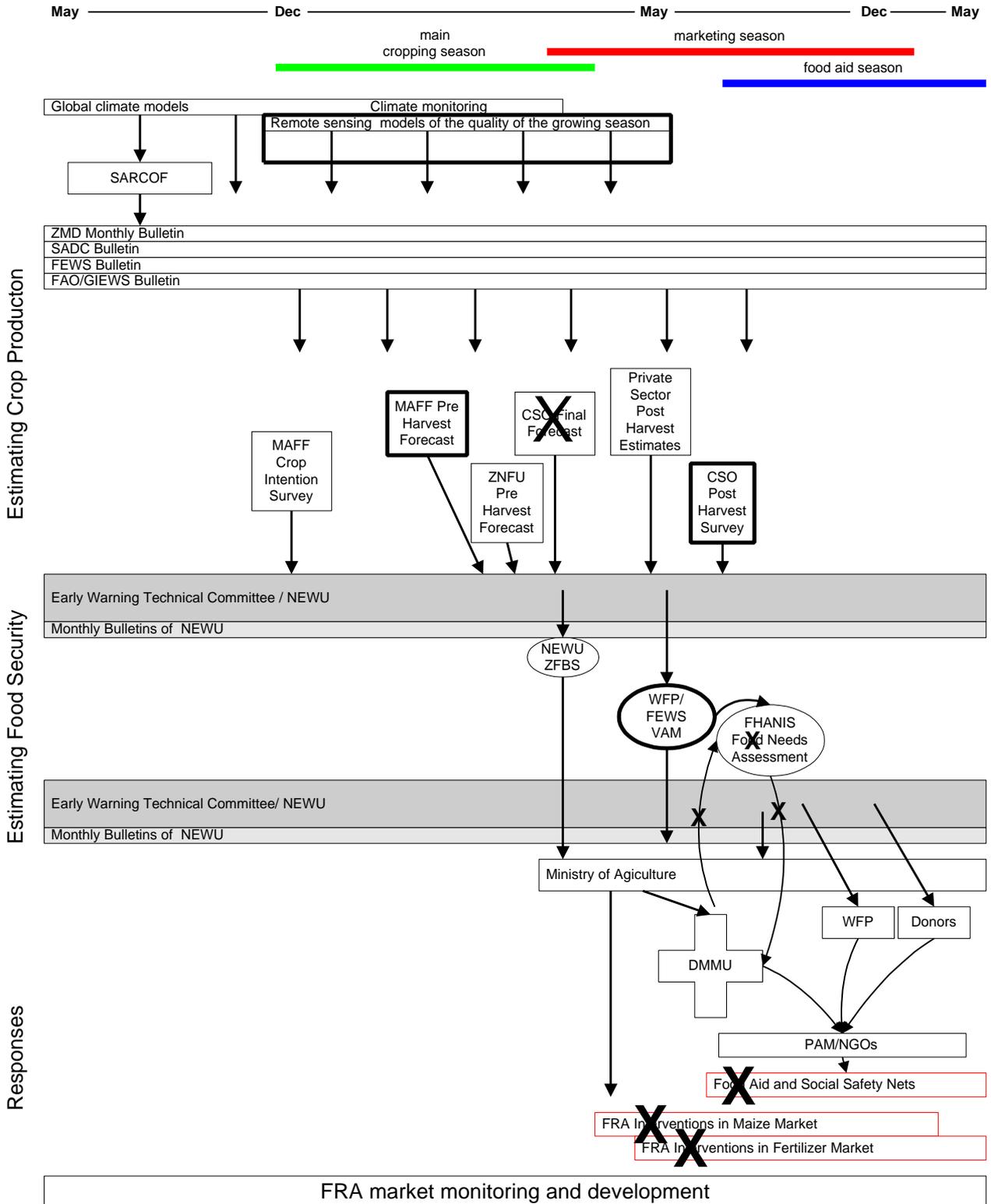
The MAFF/USAID study team has reviewed, together with stakeholders, the Zambian crop forecasting system. The focus has been on the flows of information which provide the basis for government interventions in the system; these flows are outlined graphically in Figure 2 (Chapter 3). This study recommends many changes to the present system, and some of the main ones are illustrated in Figure 15, which can be compared directly with Figure 3 to obtain a summary overview of the comparison between the current and proposed future crop forecasting systems.

Referring to the bottom items in Figure 15, the present system is driven by the demand from government for information it needs to intervene in maize and fertilizer markets through the FRA, and to provide extensive food aid. However, this study recommends that the extensive food aid exercises and FRA interventions in maize and fertilizer markets of recent years, based on disaster management, should be terminated.

Although food aid may be needed in some years for specific isolated cases needing disaster management, the limited volumes of aid and the necessity for accurate targeting are such that the food aid exercise can, and should, be implemented almost entirely at local level. This will present an opportunity for the government to further strengthen its decentralization program, leading to stronger local productive capacity and more sustainable local community institutions, rather than through the current system of large volumes of poorly-targeted and managed food aid, which have negatively impacted such institutions and productive capacities. Nevertheless, there may be some need for food aid or similar support for local communities from the point of view of the social security system. There are large sections of the Zambian population living in severe poverty, and trying to cope with crises such as the large increases in the orphaned population due to the HIV/AIDS epidemic. These vulnerable sections of the population need to be supported in some way, preferably by support to strengthen local community institutions to provide the necessary social services. Such support, whether it includes food aid or not, should be recognized as routine essential social security activity, rather than as a discrete series of responses to disasters.

It is recommended that the FRA be reoriented to provide the necessary market monitoring and development functions for which it was founded. This would allow the FRA to play a crucial supporting role in ensuring the success of the government's market liberalization policies, rather than the current system where the FRA impedes private sector trade and the development of infrastructure through unpredictable and direct market interventions.

FIGURE 15. Diagram showing major flows of information in the Zambian crop forecasting system, incorporating proposed system changes



Moving from bottom to top in Figure 15, the much-reduced food aid provisions through disaster management would become relatively unimportant compared to the routine support for local social security nets which would continue to be provided through PAM and other NGOs with funding from the GRZ, the WFP and other donors. This will require a shift in approach on the part of donors towards the relatively low-profile sustainable development of local social services and productive capacity, and away from the much more dramatic time-sensitive food aid exercise. This shift in emphasis will reduce the importance of the food balance sheet, and of the food needs assessments, but will create the need for improved vulnerability and social security needs assessments. The role of the DMMU in this process will be much diminished, as routine activity within the system is oriented away from “disasters” to routine provision of social services and community support. The role of the NEWU will remain central to coordination of stakeholders and information related to food security and crop production, particularly through its monthly bulletins. However, the technical information of the NEWU should be published without the delays and confusion caused by the need for political input.

It is recommended that the technical work of the FRA becomes more independent of the political system and works in closer technical liaison with NEWU and AMIC. The amalgamation of the AMIC and NEWU is recommended, and further, that these technical functions could be integrated into the FRA. It is recommended that the strategic reserve function of the FRA be reduced to joint private/GRZ management of small strategic stocks, and forward positions taken on commodity markets. The ZFBS would not be used in the FRA’s decision-making, although the FRA would monitor production and market developments and needs through its market information system and its own trade-oriented maize balance sheet.

Once the annual food aid exercises and direct FRA market interventions are no longer implemented, then the crop production and food security forecasting exercises become less politically important, and become more focussed on local conditions and needs. The VAM would become relatively more important, with the ZFBS being of only marginal, rather than its present central, importance. The technical crop production and food security estimates, made by technicians through the NEWU/EWTC, the FRA and others, are not always used directly by the GRZ to make their interventions; reinterpretation of estimates by the GRZ in providing the basis for decisions has devalued the technical estimation process. This problem would not remain under the study’s recommendations, as the GRZ would not be making intervention decisions.

It is recommended that the CSO pre-harvest forecast be terminated, as it is of doubtful accuracy, and the overall importance of the crop production forecast doesn’t warrant additional resources being utilized for this purpose. Existing crop production estimates through the MAFF Field Services and others, and timely quality-of-season estimates provided through ZMD, are sufficient for purposes of market decision-making and identifying potential problem areas for food security estimations.

The net impact of these recommended changes in the crop forecasting system would improve the GRZ’s role in food security, market development, decentralization, and the social security system. The GRZ would no longer suffer substantial financial losses in market transactions, support for vulnerable and food insecure populations would be enhanced, and the costs of the largely unproductive food aid exercise could be put to better use for sustainable community social services and improved productive capacity.

The remainder of Part VI summarizes these results in more detail.

24. CROP PRODUCTION ESTIMATES

Crop production forecasting is done for different reasons by different organizations for different areas. The GCM is interested in the whole world. SADC is interested in Southern Africa. ZMD and CSO are interested in Zambia. Agribusiness is interested in regional differences, both within Zambia and within Southern Africa. The MAFF Field Service is interested in the District. Public officials are interested in their Wards and Constituencies and producers are interested in their household. The result of all of this interest in crop production is that the GRZ and donors have enough information available at all levels and at all times to assure that a famine will not happen (for example, with less information available in 1992 than today, there was no famine). In addition there is enough information at the local level through the MAFF, NGOs and local authorities to ensure that any decline towards destitution of large numbers of people would not go unnoticed.

What is not available from all of this forecasting activity is a definitive statement of production, at the national level, that is useful for assessing import requirements with any accuracy. Although this was cited as a goal for forecasting by several stakeholders, it is not a realistic goal given the level of resources that are available for the activity or that are likely to be allocated in the near future. The forecasting methods, using **high** resolution satellite imagery, that are used in Europe could meet this goal. The costs of these kinds of forecasts for Zambia have been estimated by a Hungarian firm to be about US\$4 million to establish the system and about US\$600,000 annually (FOMI, 1998, personal communication).

The use of **course** resolution remote sensing for modeling crop production is limited by the lack of accuracy in agricultural statistics in the past and by the significant role that access to fertilizer plays in the annual variation of maize production. However, the current remote sensing models from SADC and ZMD can provide excellent "quality-of-season" estimates both nationally and at the District level.

Summary of recommendations for methods of estimating crop production

In Zambia, a food security disaster is a declaration by or for a vulnerable local community that says "we had a **crop failure** this year and we will **need** to have food brought to us or we will have to sell assets to purchase it". Given the high levels of poverty in Zambia, the implication is that if the people must liquidate any of their assets to purchase food they will never be able to accumulate them again and will irretrievably spiral into destitution in large numbers. To see that this does not happen, the GRZ and donors have provided the EWTC with technical and human resources to monitor food security and identify victims. If maize crop failures continue to be the primary disaster agent, and poor, marginalized, rural people continue to attempt to grow maize, then local authorities will always be the most knowledgeable in identifying the scale of the crop failure and identifying victims. Thus, this list of recommendations for crop forecasting is driven by the need to identify the locations of crop failures as early as possible and to determine how many marginalized, rural, smallholders live in those areas.

Support to SADC

SADC currently contracts for, develops and uses, weather and crop forecasting models. These models require large data sets and high levels of scientific and technical expertise. Regional

centers, like SADC, are better equipped than the GRZ and should continue to be supported for these purposes.

Provide support to develop the ZMD

The ZMD can provide remote sensing products for early estimates (February-March) of the quality-of-season that are independent of CSO and MAFF. We suggest that they identify droughts with economic significance at the district level to support local authorities in identifying areas of potential maize crop failures. This support to ZMD would be in the form of technical assistance to evaluate the agricultural significance of their existing archive of data for the purpose of better identifying droughts and the areas affected by droughts.

Terminate the CSO Final Crop Forecast

The early warning community uses the CSO Final Forecast for input into the District level VAM only because it does not have easy access to other early information on agricultural production. As already noted in the report, the CSO survey is not very indicative of production at the district level. Without a good indication of production, the VAM could miss those marginalized socio-economic groups that suffered a maize crop failure. We are suggesting the VAM use other indicators for estimating the quality of the growing season as early as possible. The results of CSO Final Crop Forecast are also used as the Gross Production section of the preliminary national food balance sheet (ZFBS) for the GRZ. As noted, there are no benefits to using the national food balance sheet for early warning activities. Lastly, the CSO Final Crop Forecast can be used for marketing planning and policy decisions. The information gathered for these kinds of marketing decisions should be paid for by the private sector. They are in a better position to determine the overall worth of a forecast. Thus, the CSO final forecast does not have a very broad user base, is expensive, and its accuracy at the district level is not useful for the purpose of early warning or for supporting marketing decisions.

Support and improve the MAFF Field Service Forecast

This forecast is already being conducted as a normal field services support function, is widely used locally, and is easy to verify. This forecast is an effective early warning tool because it is local and therefore close to those marginalized socio-economic groups who suffer the most from crop failures. There are 1,500 camps which are small and homogenous enough to be useful for identifying areas of crop failures for early warning purposes.

We suggest assisting MAFF Field Services with this task by providing their Camp Officers with rain gauges so they are better able to document the primary causes of crop failures (drought and flooding). We also see the Camp Officer's position as central to the forecasting exercise for early warning, and suggest that they can provide the qualitative information for the outlook for the season (poor, average, good) in February that is necessary for planning mitigation efforts in the event of a crop failure. The Field Services can aggregate their estimates up to the national level to satisfy requests for a preliminary estimate of crop production for the nation.

The needed level of support is small because: 1) the MAFF Field Service forecast can concentrate only on maize, and 2) the already existing data can be aggregated to the national level. This forecast of production from MAFF Field Services would be the provisional estimate of production. Like any provisional estimate, it would **not** be useful for major policy decisions, especially decisions related to food aid.

Support the CSO Post Harvest Survey

There is a tremendous opportunity for developing a good agricultural statistics database. The current document for agricultural statistics (MAFF, 1998) is primarily based on estimates of production from the CSO Forecast. Improving the quality and timeliness of the actual (after the harvest) production estimates by using the Post-Harvest Survey will greatly enhance policy decision making and the monitoring of the effectiveness of agricultural policy decisions. The Post-Harvest Survey will also be a validation tool for the forecasts of others, including the MAFF Field Service forecast. If the Post Harvest Survey is conducted in June, and the preliminary results are available in July, it could also inform immediate policy decisions related to districts that have suffered crop failures. These policy decisions would include the level of support to provide to the local authorities to deal with the crop failure and what forms of support would be most useful (direct grants of money to victims or money for work projects for those victims).

Improving the Post Harvest Survey would be costly because the sample size should be almost doubled to get indicative results at the district level. However, increased sample size, in conjunction with the 2001 Agricultural Census, will provide the necessary tools for good policy, supporting shifts to better adapted and more profitable crops for small producers.

Support the EWTC (NEWU)

The EWTC is the primary interpreter of general climatic and socio-economic information into food security messages for action. These food security messages need to be more formalized and more transparent to reduce the kinds of ambiguity that wastes time and resources when identifying and responding to any disaster, including the crop failures so prevalent in Zambia. The best way to reduce ambiguity is for the EWTC to interpret the meanings of all forecasts for their specific clients (large growers, small growers, agribusiness, donors, GRZ, and DMMU). One of the primary clients for food security messages is the donor community, which provides food aid. Since food aid is currently the only response mechanism for responding to the consequences of crop failures, the donor community needs to understand and be informed on every aspect of food security, and know what decisions are made by which actor. NEWU should continue to incorporate forecast information into food security estimations, through a collaborative consensus-building process with government, NGOs, the private sector and donor stakeholders.

Cash Crops

Since the introduction of economic reforms in the early 1990s, smallholder production of non-food cash crops has become increasingly important. These developments represent a major structural change and it is important to consider the implications for Zambia's crop forecasting system and food security policy.

Data covering non-food cash crops have only been collected by the CSO pre-harvest forecasting system since 1998. The annual Post-Harvest Survey (PHS) has always collected cash crop information, but these data are have not been available until several years after the season they cover. Given this obvious limitation, the decision to expand the coverage of the forecasting exercise was made following calls from certain elements of the private sector, economic researchers, policy makers and others with a perceived need for early information on cash crop patterns and production levels.

There are essentially two channels the MAFF uses to collect information on the cash crops added to the forecasting exercise in 1998. The first of these relies on secondary data provided by producer associations. This is certainly the most direct means of gathering information for these crops since each organization makes its own projection of total output from data supplied by their members. Compared with adding sections on these crops to the already cumbersome pre-harvest questionnaire, this seems a much more cost-effective approach and is just as likely to provide an equally, if not more reliable indication of expected production.

With respect to paprika, castor beans and cowpeas, data are collected directly from farmers as part of the pre-harvest survey using standard enumeration methods. To the extent that information covering castor beans and cowpeas is important, this approach is probably necessary since these crops are normally traded only through informal networks. For paprika, on the other hand, very good information is most certainly available from the outgrower companies that support this crop. Each of these firms keeps detailed records on the number of farmers they support, total area planted, quantities of seed and other inputs given out on loan and expected yield. These firms are understandably cautious about sharing sensitive information, but have indicated they would be willing to provide the very general types of data required to provide an early indication of total output.

Indeed, private traders, input supply companies and other investors have always monitored performance in the cash crop sectors where they have a particular interest using a variety of informal networks and personal contacts. These systems have evolved over the years to suit the information needs of individual firms and are generally believed to provide a sufficiently accurate picture of each cash crop sector to plan effective buying and marketing strategies. Given the limited resources available to CSO for monitoring cash crop performance, it would seem to make more sense to draw on these networks than spend additional government resources on a separate forecasting exercise. Where District-level data are not available from private firms, this information could be supplied through the MAFF Field Services.

Although the increased production of non-food cash crops represents an important structural change in the Zambian economy, the importance of these enterprises has not been well understood. In some cases, for example, food aid assessment reports have referred to cash crop production as a threat to food security, in that the transition to these activities means that less area is being given to food production. Other reports note that the income from cash crops can be used to buy food, but fail to include cash crop income when calculating food aid requirements. Even where cash crop income is taken into account, this is most often counted as gross crop value rather than net producer profit. Sometimes, cash crop income has even been confused with the national food balance even though questions of access and availability are completely distinct.

In terms of how cash crop information is used, it is necessary to distinguish between forecast data which predict total output, on the one hand, and post-harvest data which measure actual output on the other. Regarding pre-harvest information, it is beneficial for government and the private sector alike to have an idea of the total production that can be expected for individual cash crops. Government needs this information for making policy decisions concerning trade, import decisions and, in very rare circumstances, for estimating food aid requirements. Likewise, the private sector needs this information for planning effective purchasing and marketing strategies. Importantly, private sector has always collected this information through a

variety of channels that are well adapted to Zambian conditions. Since this information is available, government may as well collect these data in one central location, if only to improve public awareness of agriculture sector performance.

With respect to the use of cash crop information to formulate national policy, much greater care must be used in the future than has so far been the case. As noted, the role of cash crops as a factor related to food security and food access is poorly understood and a variety of methodological approaches have been used in estimating food aid requirements. At least in theory, cash crop forecasting can help in the formulation of appropriate development strategies and emergency interventions when required. This process obviously does not end with the collection of raw data, however, and the importance of cash crops to the national economy and purchasing power of individual households must be better understood by policy makers at all levels.

25. FOOD SECURITY ESTIMATES

The GRZ uses the Provisional Food Balance Sheet for making ex ante estimates of food availability at the national level. This FBS like any ex ante food balance sheet exercise is partly technical and partly sociopolitical in that it incorporates some of the values of the people who are responsible for doing it and some of the external pressures that influence their decisions on what to include and what to exclude. The result of this balance sheet has occasionally provided a basis for government intervention in agribusiness through the FRA and requests for food aid.

The FBS does not provide any significant additional value to existing food security information. There is already sufficient food security information in the form of newspapers, telephones, faxes, email, satellite coverage and roads to assure that a famine will not happen in Zambia. These information sources also assure that major changes in food access (consecutive drought years, currency fluctuations, major pest infections, market collapse) will not pass unnoticed.

Recommendations for the ZFBS

As an ex ante exercise, restrict the provisional FBS to a maize (or cereal) only balance sheet. It is clear that the more complicated the balance sheet becomes the more difficult it is to prepare, the more politically charged it is, more difficult to explain and the less credibility it has. The simplest form of the ZFBS would be the maize balance sheet. A maize-only balance sheet would properly focus attention on potential imports and exports of maize, and therefore assist policy makers and agribusiness in making international marketing decisions.

The simplest way to determine how much maize Zambia needs in a year is to use the long term average annual consumption derived from the ex post food balance sheets published by MAFF (1997). This is about 134 kg/capita per year. The provisional maize FBS will be useful for the international maize market because it would be a clear statement of import requirements or export potential. It would be very clear to all users that it was concerned only with maize imports and export potentials, not human consumption in the country and not the aggregated food or dietary habits of Zambia. This sheet would not be referred to in the context of food security messages or food security decisions.

Zambia should continue to coordinate the development of the provisional FBS with SADC; this ensures that Zambia can share assumptions and values used by other countries in the region, and ensures that a more useful regional provisional food balance sheet is produced to assist with regional trade.

In poor maize production years the primary client for the ZFBS is the donor community. The EWTC needs to assure that the client understands the ZFBS. The best way to do this is to have the process of creating the ZFBS stay entirely within the EWTC so that the political processes do not cause confusion and lead to unnecessary delays in response.

For ex post food balances, Zambia should continue to follow the format of the FAO Balance sheet for Zambia, which ensures that Zambia has a reasonably consistent basis for making national inter-year comparisons, and inter-country comparisons, for research and policy purposes.

Vulnerability Assessment Mapping (VAM)

Vulnerability Assessment Mapping (VAM) is a joint exercise of MAFF/NEWU, FHANIS, USAID/FEWS and the World Food Program. It monitors food access at the District level using a household income accounting model for the district. As noted, the VAM is a process activity that changes according to user needs. The goal of this process needs to be carefully considered so that the results from the VAM are useful for reducing the long-term vulnerability of the most vulnerable socioeconomic groups. If the goal of the process is to find places to absorb food aid this will inform the choice of indicators and the interpretation of those indicators. If the goal is to provide information for development interventions for reducing vulnerability in the long term then the choice of indicators will be different.

The VAM is a very useful tool for development decision makers that can be made even better. There are several ways to improve the usefulness of the VAM. The recommendations are listed here:

Improve the presentation, which is currently not user friendly even for technocrats. Some of the problems include the presentation of irrelevant data and information not related to food access (Food Balance Sheet, maize availability). The role of the technical committee is to make this exercise as clear as possible. The resources for this work are available from FEWS, WFP or the FAO.

Increase the transparency that was part of the earlier VAMs. It has been lost over the years. The most notable is insufficient distribution of the data. The VAM's data tables should be made available on diskette, as in earlier years.

Find better indicators for natural resource availability and current shocks to agriculture. As noted in the crop forecasting section of this chapter, the forecasts from CSO are probably not indicative of the crop production at the district level (because the sample size is too small) and it is unlikely that better ground based provisional estimates will be available in the near term. This situation provides an opportunity for using the satellite technologies available from SADC or the ZMD for estimates of the quality of the season.

Use smaller units of analysis. Districts are too large to be very useful. Users and developers suggested that the level of Wards or Camps would be best. These are the lowest levels of data for collection for the regular census and the agricultural census. These units would be the most appropriate because the demographic data are available through the MAFF and census. Smaller units will go a long way to providing the critical information on **where** people live in relation to droughts, floods, market access and other conditions associated with food security disasters.

This transition to smaller units will be aided by the year 2000 census that should make available new village level demographic data. Incorporating professions of household heads into the census will provide a general indicator of the primary sources of income and aid in identifying what economic shocks are most likely in specific communities.

The VAM needs to be completed as early as possible. All of the food security decisions that need to get made for emergency food aid require information from the District level. If the VAM is not ready, then arbitrary and ad hoc decisions will be made, resulting in poorly targeted food aid with negative consequences for the market and producers.

Reincorporate the development indicators. The VAM is a flexible tool. The reason why the general development indicators (refer Table 8) have been left out of recent VAMS are that they "don't seem to be related to coping strategies", and the methodologies for combining indicators does not allow an easy way to convert them into money or maize equivalents. Food aid targeting should be only one objective of the VAM.

Use the VAM to support local disaster mitigation activities. It can show communities what their vulnerabilities and resources are and provide guidance for reducing vulnerability.

The Food Needs Assessment

The Food Needs Assessment of MAFF/NEWU, FHANIS and the Program Against Malnutrition (PAM) identifies specific socioeconomic groups within Districts, who qualify for food aid.

The Survey includes a District Needs Assessment Questionnaire that gathers socioeconomic data on the District and the impact of the disaster. This questionnaire ranks livelihoods in terms of their economic importance to the District, asks for production figures on other crops that may be important for the local economy (sweet potatoes, Irish potatoes, cotton, tobacco), deaths of livestock, importance of fishing, and prices of a number of common food items. Other economic information includes quality and capacity of storage facilities, number of private traders, transporters, and seed agents. Lastly, the survey asks for some general information on health in the community that includes the incidence of several common diseases, available health facilities and percent of the population with access to safe water and safe sanitation.

The FNA is not a perfect tool but does help fill in some of the gaps that the VAM leaves. The FNA will improve when the VAM analysis uses smaller units, and when local authorities are able to provide more information on the economic situation within their communities.

We suggest to look at the results of the FNA over the past years as an aid for determining the characteristics of local communities that suffer from droughts. Once these characteristics are determined, they will be useful for identifying indicators for the VAM and provide a basis for specific interventions to reduce vulnerability to drought.

Conclusions Concerning Centrally-Administered Food Security Estimates

The centrally-administered food security monitoring systems are useful because there is some attempt at standardization of methodologies for early warning, and at producing systematic technical reports on specified schedules. This structure is very useful for reducing ambiguity in disaster related information. However, in some years such as 1998, the decision making process was not sufficiently influenced by these centrally-administered food security monitoring

systems; the result was confusion about scale of the crop failures, locations of the crop failures, locations of victims and the scale of their suffering.

The institutional links and transparency in the decision making process were absent, resulting in criticism of the EWTC and NEWU. Almost all of the technical work of the EWTC was discounted to the point where many stakeholders were asking about the value of the whole enterprise of early warning. The following recommendations attempt to support the presentation of technical findings for clear and transparent decision making.

Focus on Disaster Mitigation

Currently there is no legal framework for declaring or responding to a disaster. This causes confusion at all levels. Many ad hoc decisions are made due to the lack of a legal framework for declaring a disaster at the local level and the national level. The DMMU is currently working on this problem and it should be resolved by January 2000.

The most common method for drought mitigation is to grow crops that are drought tolerant. Local producers are learning this effective mitigation technique and the shift away from maize production, that began in 1992, is continuing at a rapid pace. This trend will continue but can be supported by outgrower schemes for more profitable crops and continued support of the introduction of more drought tolerant crops like millet and sorghum (e.g. PAM's Drought Rehabilitation Program).

Use only a grass roots head count for victims

Local communities can identify the specific victims, with names and addresses. Local communities may be in the best position to identify those households moving towards destitution and have a good idea of why they are moving in that direction. The local elected representatives and local authorities have a stake in identifying droughts, in the extent of crop failures and in the economic consequences of these crop failures, so that appropriate responses are taken and suffering is reduced.

Improve market information

The MIS at the local level should follow information on household income sources, especially those sources that the poorest of the poor have access to. These include charcoal and other forest products, brick making, fishing, cash crops and livestock. Most informative at local level is to follow the terms of trade between critical commodities. Depending on the area this could be cassava/livestock, maize/sorghum, maize/fish, maize/charcoal, maize/fertilizer, labor/maize or any other combinations that communities feel would capture the major contributions of their economies to household financial security. Implementing a rudimentary local MIS at the District level would not require many resources since computers and market managers are already there in District offices.

Adapting food monitoring systems like FHANIS and the FNA to social services monitoring.

The FNA already tracks important development indicators at the community level. This approach should be supported so that there is a growing understanding of the socioeconomic factors impacting food security. Confusing welfare and food security has led food security

agencies to become involved in general welfare programs rather than more carefully targeting the much smaller numbers of households who are truly food insecure.

Strengthen Social Safety Nets that are not dependent on food aid.

The money to finance social safety nets could at least partly come from savings in food aid distributions. This is a difficult option for some donors like USAID that have restrictions on how emergency assistance is provided. However the EU is taking some steps to address this issue with their support to the Public Office Assistance Scheme.

Consumption Estimates

Consumption estimates are used together with data supplied by the annual production forecast to predict Zambia's overall food balance. Although outwardly simple, the use of consumption estimates to calculate the national food balance is made extremely difficult by the fact that *consumption* is a subjective concept. Does the term refer to what Zambians actually eat, for example, or to what they should eat for a well rounded, culturally appropriate diet, or even to what they must eat to avoid starvation? From whose perspective are these terms being defined? Obviously, a nutritionist is likely to answer these questions very differently than a politician, especially when the receipt of donor food aid is at stake.

Given that consumption can be interpreted in many ways, it is unsurprising that a variety of approaches have been used to calculate Zambia's national food balance. At best, the outcome is widespread confusion which undermines the credibility of the balance sheet approach. When these data are used to make major policy decisions, the cost can be far greater in terms of inappropriate signals to the private sector and a misallocation of domestic and donor development resources.

By far, the vast majority of Zambia's total estimated food requirement is accounted for by human consumption. Compared with other uses, human consumption typically accounts for about 85% of total maize requirements and around 95% of the requirement for other crops. Despite the importance of human consumption, relatively little is known about what Zambians actually eat.

To cope with the lack of reliable data, a convention was proposed by FHANIS in 1997 to estimate human consumption requirements. Briefly, this approach states that an average Zambian requires a total of 2,030 kCal per day in order to maintain a healthy, active life and that 70% of this energy (1,421 kCal) should come from basic staples including maize meal, sorghum and millet flour, cassava flour and other tubers (sweet potato, Irish potatoes and pumpkin), rice and wheat flour. The remaining 30% of total energy is assumed to come from animal products, fruit, vegetables and legumes. To establish the proportionate amounts of each staple food required for human consumption, the FHANIS/NEWU procedure assumes that the total consumption of sorghum and millet flour, cassava flour and other tubers is equivalent to total production so that any shortfall in terms of the energy supplied by these foods must be made up for by maize, rice, wheat and other internationally traded commodities.

Although this is a significant improvement over previous approaches which focused on the number of grams of food that should be consumed each day, this method has been poorly understood and many different consumption estimates are still applied each year to estimate Zambia's national food balance. This was especially evident following the 1997/98 production

season where NEWU first projected a 200,000mt and later a 450,000mt cereal deficit. Meanwhile a WFP/FAO mission initially estimated the cereal deficit at 930,000mt (on an unofficial basis) and later revised the figure to 660,000mt. In response to these contradictory signals, an independent study was commissioned by the British High Commission which projected a 332,000mt surplus. In many respects, these large variations can be attributed to the way in which consumption was measured.

It must also be recognized that any deficit calculated using the FHANIS/NEWU method only indicates that domestic production of food was not sufficient to provide a culturally appropriate, menu based on the consumption of maize and other staples as 70% of the diet. There are an infinite number of ways for human beings to obtain the food energy they require each day, and a food deficit in the balance sheet must never be interpreted as an immediate call for emergency intervention, including the distribution of food aid and other types of relief.

Given the fact that consumption (and production) data can be expressed in an almost infinite number of ways, it seems that an alternative system for measuring food accessibility and stress on human consumption may be more appropriate. A focus on changes in market prices and degree of substitution between different types of food, for example, may provide a more accurate measurement of food security than a national balance sheet in specific locations. In the absence of a more reliable system for estimating consumption than traditional food balance sheets, a move away from this approach could make very good sense.

At the very least, a set of standard assumptions and procedures for calculating consumption requirements should be agreed. The FHANIS/NEWU approach that focuses on energy requirements rather than grams of food is a step in the right direction, but still needs further refinement and has not been well understood. Much more effort is needed to explain the assumptions and operational procedures used in these calculations including a declaration that the total estimated requirement of 2,030 kCal per person per day (with 70% coming from staple foods) is based on a well rounded, culturally appropriate menu for an average Zambian.

The 1997-1998 Crop Production Forecasts

The main problems associated with the long range forecasts were not their accuracy but rather what actions were taken and decisions made based on them. In the ex post analysis of all of the crop forecasts, they all come close to what they predicted. The important issues for users of forecast are related to understanding who is the client for which kinds of forecast. Once one understands who the clients are then it is much easier to understand how to interpret any forecast. For example the clients for the GCMs are the scientific community, large regional organizations like the SADC, and perhaps some specialists at the national level. Smallholders are **not** clients for GCMs.

Some of the confusion about the relationship between the ENSO and crop production could have been more clearly presented very early in the process. The SADC seemed to focus more on justifying their forecast than on interpreting it for those clients that could take appropriate action.

The analysis of course resolution satellite imagery for the 1997/1998 growing season shows that there were no serious widespread droughts that would have caused drastic decreases in agricultural productivity. The coarse resolution satellite imagery is robust enough to capture major droughts that would have economic significance at the National Level. Make better use of the imagery products that are available from ZMD.

The CFSAM mission was ill-advised and is not recommended for future consultations. The WFP/FAO CFSAM was not helpful for clarifying the production forecast or assisting with a food security forecast. It created more confusion to an already confusing year. Given the massive amount of data, information and expertise available under the umbrella of the National Early Warning Technical Committee, it is interesting that the CFSAM was called in at all.

26. FOOD AID

The national forecasting systems are meant to provide reliable information on the production and consumption of essential food commodities so that policy makers can plan effective interventions needed to ensure market stability and cope with food shortages when they occur. Due to a variety of technical constraints, this has rarely been the case and most forecasting messages are greeted each year with confusion and controversy. This was especially evident following the recent 1997/98 production season when crop forecast information was used to plan a major food aid intervention covering 57 districts in virtually every corner of Zambia. This decision was based largely on early warning forecasts of El Niño weather conditions and initial crop estimates that showed below average agricultural production. Even today, however, more than twelve months after the initial crop estimates were first released, there is little agreement over the extent of the problem and whether emergency food aid was truly needed.

Despite the lack of appropriate information, a decision was made by government at a very early stage to provide food aid to most parts of Zambia as a blanket response. This decision resulted partly from the tendency of most political leaders to equate food security to maize availability, even though the two are only indirectly connected. The current food security forecasting system reinforces this view and distracts attention from the much broader set of linkages that constitute the food security chain. Food aid may have its uses in extreme cases, but should never be the first recourse of government and the donor community. As discussed in the main text, this is a very indiscriminate form of assistance in terms of the potential negative consequences on farmer attitudes and private sector development. Because food aid only treats the symptoms of poverty and is not a cure, this form of assistance must be used more judiciously in the future.

In order to improve the situation, it is recommended that considerably less attention should be given to the preparation of pre-harvest national food balance sheets and that this energy should be directed instead towards the production of improved vulnerability assessment reports. As the 1997/98 episode clearly demonstrates, the national food balance can be expressed in an almost infinite number of ways to support the biases of different organizations. At best, these balance sheets are based only on predictions of total crop production to provide a gross estimate of food availability for the country as a whole. By definition, these balance sheets say nothing about the level of access to food for different segments of the population, which is the essence of Zambia's food security problem. It seems remarkable that major food aid and other policy decisions were made without more careful consideration of these issues.

Considerable effort is also needed to clarify essential procedures for the delivery of emergency assistance when required. Coordination of the 1998/99 food aid response was a collective exercise involving a variety of government departments, donor committees and NGOs at various levels. Although this is grandly referred as a "tripartite arrangement", the lack of a single coordinating body created management problems since no single organization had the authority to see that the relief supplies were distributed effectively. This resulted in a highly inconsistent

approach where most implementation procedures were formulated in reaction to events as they developed rather than according to a strategic plan.

Because there was no single chain of accountability, most food aid donations arrived in Zambia very late and a decision was made to extend the distribution season until well after the 1999 harvest had begun. In these cases, food aid almost certainly had a negative impact on farmgate prices and provided very little nutritional benefit since other, locally produced, foods were readily available. Exactly why the decision was made to continue with food distribution at this time is not entirely clear, but may have had something to do with local expectations of food aid created by politicians, coordinating NGOs and needs assessment teams at the village level. Just because the delivery of relief food was late, however, should not have been a sufficient reason to extend the distribution program.

To avoid these problems in the future, it is important to look for ways to increase the responsibility of local communities for their own food security. Rather than rely on outside donations, for example, consideration should be given to the establishment of small, locally-managed grain banks. Food could then be sold from these banks as needed, perhaps in conjunction with a cash for work program designed to strengthen the purchasing power of vulnerable individuals. Emergency food aid may be needed from time to time under extreme circumstances, but this is a very risky form of assistance and should never be the first recourse in a country like Zambia.

27. MARKETS

Grain market liberalization

As a result of the GRZ's implementation of a market liberalization policy since 1991, Zambia now has a partly-liberalized staple food market. However, the GRZ remains an active participant in some markets, such as for maize and fertilizer through the Food Reserve Agency, and imposes restrictions on exports in situations when national shortages are anticipated. Market interventions by the Food Reserve Agency have been heavily criticized by the private sector as being destabilizing which seems very much to be the case when it assists the GRZ in injecting implicit subsidies into urban maize meal prices and rural fertilizer marketing.

During the past several years, the emerging private trade sector has shown that it can play a significant role in the import and export of food and grains in Zambia. Already, all significant quantities of rice and wheat are fully handled by private trade. In response to appropriate price signals, considerable volumes of maize have been moved from surplus to deficit regions both within Zambia and within the southern Africa region. In spite of considerable difficulties in negotiating the newly emergent market system, the trade sector has shown to be capable of responding to market demands in food trade.

Maize Marketing

Since 1995, when commercial agents were able to enter the liberalized market, private traders and millers have proven that they have the capacity to import, distribute and mill at reasonably affordable prices. While the sector still faces learning problems and is limited in size, there is sufficient expertise, capacity and accountability to warrant relying heavily on them to fulfil national demand. However, in the past several years the GRZ has overestimated impending import demand and the private sector has been reluctant to respond to Government urging to

commit their resources so fully. Thus, the FRA has been increasingly requested by the GRZ to directly intervene in the maize market through purchases and imports.

With increased market liberalization, physical grain reserves need not be maintained for market stabilization purposes; a range of alternative strategies are available to FRA that maintain food security. Much of the problem lies with the fact that the GRZ is trying to rely too heavily on the FRA's role as a strategic grain reserve, and less on its more important role as a market monitoring and development agency.

Inputs Marketing

GRZ has been reluctant to step back from control of what they consider to be one of the key instruments for modernizing agriculture and raising maize and other crop production. The official program of market liberalization cannot immediately attract the private sector into the less attractive regions for fertilizer marketing, as private sector traders need time to develop confidence in their own abilities to service the demand in different regions at what they consider to be reasonable risks and with reasonable rewards. Uncertainty about the actions of Government becomes a major constraint to the involvement of the private sector in the rural fertilizer market.

As with the maize market, traders feel they are faced with a combination of poor national economic factors and indeterminate market interference by the GRZ. Thus, although they are willing to continue to service their long-time customers in the commercial farming sector and larger traders, they are reluctant to expand their new customer base any further. They choose to participate only marginally in what they judge to be a high-risk market.

Nonetheless, 85% of the national fertilizer demand can be serviced through the private sector. This, alone, is sufficient to meet the food security needs of the country. There is no need for the FRA to be involved in any politically motivated government inputs support scheme. By attempting to cater for the maize preference of urban Zambians the GRZ has introduced a number of counterproductive measures: it will be more practical to allow farmers to switch to other, less input dependent, crops until Government can provide improved infrastructure to reach their areas. The GRZ, and its agencies, should not be involved in dealing with the physical tasks of obtaining and moving fertilizer to the rural farmers. If the decision is made to subsidize certain areas due to poor infrastructure and market access, this can be done openly through tenders for supply from existing private companies.

Agricultural Market Information Services

The GRZ has severely underestimated the need for adequate market information in making its policy decisions regarding food security and market development. It is not too strong to say that information drives markets and markets drive the economy. Monitoring of market activities through price information is essential to making appropriate development plans. Unfortunately, the GRZ has allowed its earlier developments in market information systems to deteriorate due to lack of prioritized budgeting.

The Ministry of Agriculture's Agricultural Market Information Centre (AMIC) has been the main market information service carried out by the GRZ. Recently, however, donor funding for the activity ended and the AMIC has not been able to maintain its prior level of data collection, analysis and dissemination. There are several alternative market information services that are

also available (ZNFU, ACE, CSO). In addition, the FRA is instructed by its legislation to collect market information on grain trading processing, stocks and prices, and to disseminate such information for the purpose of meeting the information requirements of the market participants.

Market Price Information

Prices serve as signals of availability and access. In summarizing the interactions between supply and demand, prices provide a snapshot of current and expected supply of a commodity. Open market prices can provide an indication of what is happening, *or what traders think is happening or is about to happen*. Where the level of integration of markets is still low, price information can map the spread of food insecure situations. In Zambia, the major centers were found to be surprisingly integrated, generally -- with sudden, large and volatile price differences appearing on occasion. The rural maize markets, however, were particularly imperfect in competition and not well integrated. The main reasons are the poor infrastructural development of the marketing institutions and facilities.

It should be realized that open-market staple food prices are usually rather late indicators of crop production levels since they reflect current supply and demand. Thus they are more of a food security tool, rather than a crop-forecasting tool in the Zambian context. Additionally, open-market prices only reflect effective or commercial demand and tell nothing about families who lack resources to purchase food. One approach to food security monitoring would be to observe prices of items other than the main food staple, e.g. in Western Province a likely response of farmers to an emerging food shortage is to sell livestock to raise cash to purchase staples. Thus, declining livestock prices could indicate the onset of a community problem. The same can hold true with sorghum, cassava and millet in certain areas.

Conclusions

The GRZ interventions in the market have been based more on short-term social and political demands than market development considerations. The private sector is discouraged from greater growth by what it sees as unclear signals from the government marketing agency. Because of the small number of participants and market size, uneconomic positions taken by a single player can seriously disrupt all other market decisions. Although such decisions may respond to the short-term demands on politicians, the uncertainty created in the market results in disruption of farming, trading, and processing activities. The private sector will decrease their future investments as they anticipate reduced net incomes due to non-market based interventions.

The FRA, as the Strategic Grain Reserve advisor to the Government officials, is in a position to further educate the political planners on appropriate market practices. Advantage should be taken of the FRA's position between the public and private sectors to play a coordinating role on exchange of information, providing a forum for industry interaction.

- The FRA should expand its Board of Directors to also include donors. It should also be expanded to include more of the private sector (millers and traders separately). This would make its policies and actions more public and transparent, helping to stabilize market fears of its activities

Much of the problem lies with the fact that GRZ is trying to rely too heavily on FRA's role as a strategic grain reserve, and less on its more important role as a market monitoring and development agency. With increased market liberalization, physical grain reserves need not be maintained for market stabilization purposes.

- In future FRA should hold only cash reserves and forward stock options. If absolutely necessary to have GRZ physical stocks, these should be no more than 40,000t and be contracted to be held by private companies as agents for FRA.

Market information services are an important factor in market development. They are unlikely to ever be completely self-supporting, and should be a priority budgetary item under the GRZ's liberalization effort, but may be able to be linked to programs with some income generating capacity. Two issues need to be immediately pursued: 1) local level analysis and use of data collected (i.e. decentralization), and 2) accessing greater data flows and analyses regarding sub-regional market structures and changes.

- AMIC and NEWU should be operated together, sharing their budget and issuing a single series of publications.
- FRA's authority should include joint operation of the AMIS process, thus increasing its ability to monitor market activities and plan market development programs. Funding for the MAFF activities (as decided upon at a newly established Technical Coordinating Committee, which the FRA should chair) should come from the FRA.

The Government supported policy of decentralization of administrative authority seems to provide the best answer to better development of the market sector. National policies and private sector initiatives are in place and working toward better national integration, but can only proceed as fast as local development requirements (in logistics, infrastructure, administration, etc) allow them. Local communities must start taking a strong hand in the decisions and initiatives for their own future development. The GRZ must legislate the ability to generate revenues at District Administration level in order to strengthen the development capacity of the local level offices. Then programs can be initiated for the continued development of market infrastructure (market sites, sheds, etc). Such programs would be identified by local farmers' associations based on their own assessment of needs. Small amounts of initial funding could be made available through projects approved by the SEMDCOs, but the associations or other groups applying would have to demonstrate a large proportion of self-help or own-funds.

- The local extension agent should establish links to outgrowers schemes where applicable.
- Include market extension services as part of the informational infrastructure available at the District level.

Food aid has been found to be a major destabilizing factor in the development of markets and market structures. Most current food aid is going to relieve the sociological stresses of chronic poverty, not physical lack of food due to drought or famine. The economic repercussions of this misuse of food aid hampers the evolution of effective local markets.

- Identification of national poverty issues masquerading as food security issues, and conversion of Food Aid into more appropriate schemes such as Cash-for-Work, may give a major boost towards real market development.
- If there is an extreme need, then self-targeting commodities, such as millet or sorghum, will put less stress on both national and local market functions.

28. THE COSTS AND BENEFITS OF CHANGES IN THE CROP FORECASTING SYSTEM

28.1 INTRODUCTION

This section considers some of the financial and economic costs of Zambia's current crop forecasting system. In addition to the resources used to prepare the production and food security estimates themselves, it is also important to consider how this information has been interpreted to formulate major policy decisions.

As discussed throughout this report, most existing crop forecasting systems fail to send the clear signals needed for government and donors to formulate appropriate agricultural sector and food security policies. There is little agreement over the methods used to prepare the crop production and food security estimates and, each year, these forecasts are greeted with confusion and controversy. This was especially evident following the 1997/98 forecasting exercise when at least five versions of the national food balance sheet were prepared by different organizations to estimate import and food aid requirements. Each of these balance sheets were prepared almost exclusively to support a particular position regarding the need for market intervention and emergency assistance and there is still little agreement over what would have constituted an appropriate response.

Although it is possible to recommend a variety of methodologies that would improve the accuracy of crop forecast information, there is no guarantee that the additional use of domestic resources to improve the system would lead to better policy decisions. Indeed, as recent experience demonstrates, technical crop forecasting results are prone to different interpretation by politicians and other decision makers to justify their own prejudices regarding the need for certain types of intervention. Over the past year, for example, government planners called for a total of 61,000mt of emergency food aid, 410,000mt of subsidized maize imports and 57,000mt of fertilizer to be given out on loan at fixed, pan-territorial prices. The long-term cost of these interventions is almost impossible to quantify, but can be estimated at US\$46.55 million on a short-term financial basis including US\$14.2 million of food aid, and US\$ 32.35 spent on maize and fertilizer imports. Importantly, the decision to implement these policies were made even though the original NEWU food balance sheet showed only a 200,000mt cereal shortfall using standard methods agreed by the Early Warning Technical Committee. Certainly, national decision makers need a clear indication of the quality of the agricultural season, but there is no reason to try and estimate total crop production to the last 90kg bag since experience shows that technical considerations are more than likely to be superseded by political factors.

Against this background, the primary objective of this section is to review some of the costs of the current crop forecasting system and to consider how the recommendations presented throughout this document could lead to a more cost effective allocation of Zambia's scarce resources. Because many of the costs and benefits are intangible and difficult to quantify, it is not possible to carry out a traditional cost-benefit analysis. Rather, the main purpose of this discussion is to highlight some of the costs of the current systems in order to facilitate discussion and agreement on the best way forward.

28.2 CROP FORECASTING SYSTEMS

There are many organizations involved with crop forecasting and interpreting the results of the forecasts for early warning purposes. The list of contributors to the process includes the individual members of the EWTC and their associated institutions. Each of these organizations consume significant human and financial resources, but do not necessarily contribute to improved decision making at the national level. These institutions are:

National Early Warning Unit (NEWU)
 Food Health and Nutrition Information System (FHANIS)
 USAID/Famine Early Warning System (FEWS)
 World Food Program (WFP)
 Food and Agriculture Organization of the United Nations (FAO)
 Food Reserve Agency (FRA)
 Zambia Farmers Union (ZNFU)
 Disaster Mitigation and Management Unit (DMMU)
 University of Zambia (UNZA)
 Meteorological Service (MET)
 Central Statistics Office (CSO)
 Ministry of Health (MOH)

This very large and diverse resource base is working together and coordinating their activities to assure that there is adequate information available to decision makers to guarantee the short-term and long-term food security of marginalized, rural Zambians. This large resource base assures quality in the technical aspects of crop production forecasting and strives for clarity for food security forecasting. In addition to these organizations working in Zambia, the SADC contributes to the same goals.

These organizations conduct national surveys to estimate crop production and find vulnerable people. They interpret satellite imagery, conduct field trips, follow markets, estimate incomes and produce over a hundred 10-day, weekly, monthly, and quarterly bulletins every year, informing the early warning community and decision makers about the progression of the growing season, locations of vulnerable people, types of interventions that are necessary and resources available for those interventions.

The result of this effort should be clear and transparent decisions related to policy interventions that increase long-term, short-term food security, and reduce the suffering of marginalized, rural households. However, there is still a gap between the technical aspects of early warning and the institutions that are charged with response. This gap leads to confusions and ad hoc decision making that were exemplified in the 1997/98 season. The confusion, ambiguity and ad hoc decisions provided the opportunity for socio-political forces to influence the whole food security exercise. These forces included a need for foreign exchange, electioneering, and sympathy for balance of payment support. The result was diminished credibility of the technical services involved in the EWTC to the extent that some stakeholders felt that the whole idea of early warning was an expensive and useless exercise.

This report has pointed out that the misuse of the early warning system does not negate the necessity for basic information. It does, however, call into question the amount of resources that

should be allocated to early warning and where those resources should be focused. Expensive crop production forecasts like those of the CSO are not useful for early warning.

We have suggested that existing information systems like the MAFF Field Services and closer monitoring of the season using coarse resolution satellite imagery will provide timely information on the locations of those rare droughts that could cause crop failures where marginalized, rural people live. The structuring and use of socio-economic information in the VAM will be improved to identify those rare victims of those rare droughts.

In addition, it has been recommended that some of the vast resources currently allocated to early warning would be better spent helping local communities reduce the impact of drought by being better prepared and reducing their levels of marginalization. Resources are better spent to reduce suffering by increasing their access to markets through the improvement of rural infrastructure, and improved access to market information.

28.3 RESPONSES TO FORECASTING MESSAGES

In order to decide on the best way to improve the crop forecasting system, it is necessary to look at how this information has been used in recent years. As noted throughout this document, many very costly decisions have been made due to inappropriate interpretation of the crop forecast messages. These decisions can be seen, at least to some extent, as a cost of the current forecasting system. It is useful to review some of the costs of these decisions since these point to the importance of working towards improved crop forecasting procedures.

Food Aid

One of the first responses of government to the 1997/98 crop forecast messages was to call for emergency food aid. Based on little more than early warning information of possible El Niño conditions, government called for a total of 125,000mt of food aid to be distributed to approximately 2.5million beneficiaries that would be affected by the expected disaster. These estimates were later revised to only 61,000mt of food aid, but it is still not clear that any assistance was required at all. Indeed, only about 39,000mt of food aid actually arrived and there have been no reports of mass starvation. In some cases, beneficiary communities even refused to participate in the food aid program because they did not like the commodities that were being given out (i.e. sorghum and rice rather than white maize) or thought that the ration was too small. Obviously, these individuals did not require emergency assistance.

One of the reasons for this outcome is that the current crop forecasting system tends to equate food security to the availability of maize. This is especially true with respect to the national food balance sheet which was one of the few food security forecasting tools available to judge the need for food aid following the 1997/98 production season. Rather than focus on gross food availability, however, it is far more important to consider how individual households gain access to food. Zambia's food security equation is far more complicated than food balance sheets can ever show and depends on a variety of factors including the income generated by cash crops plus non-farm sources of income, education and access to health and sanitation facilities. Greater emphasis should be given to understanding these elements of the food security equation in the future before rushing to any decision to provide food aid.

Although the question of whether food aid was truly required or not will be debated for years to come, it is clear that this form of assistance has many costs. In purely financial terms, an

estimated total of about US\$14.2 million was spent in 1998/99 on the delivery of emergency assistance to areas identified as vulnerable to food insecurity, including US\$2.2 million of GRZ money. Importantly, these funds could have been used in other ways for projects that address the underlying causes of poverty and food insecurity. Other, less tangible costs include significant personnel investments laid out by NGOs more routinely involved with development interventions, logistics and vehicle opportunity costs, the costs of discouraging traders and farmers from investing in the maize industry, the costs of creating a perception of disaster management agencies as inefficient and ineffectual, the costs of stressing the social fabric of rural areas when undesirable food aid commodities are refused or when local leaders divert food aid to their own use, the opportunity costs of delaying development of an effective strategy to deal with rural poverty and the costs of distrust between donor investors and government when dealing with weather induced food insecurity.

Given that food aid only treats the effects of poverty, and is not a cure, these points provide good reason to question whether this form of assistance has a useful role to play in Zambia. Although emergency intervention may be required from time to time, food aid must be used much more judiciously in the future and should never be the first response of government and the donor community to crop forecasting messages.

Input Markets

Another type of response to the 1997/98 crop forecasting messages was to call for the distribution of 57,000mt of fertilizer on loan at fixed pan-territorial prices. Although efforts to improve the productivity of small-scale farmers are important, the effective reintroduction of producer subsidies is a very alarming trend. Importantly, this intervention was born largely out of the tendency of most national leaders to equate food security to maize availability. The current crop forecasting system reinforces this view and distracts attention from longer-term development priorities. The precise cost of this intervention is not known but can be estimated as follows using data supplied by the Food Reserve Agency.

| | CIF Value | CIF + finance | Sales | Loss |
|------------|----------------|----------------|---------------|---------------|
| Compound D | \$9.1 million | \$11.4 million | \$4.4 million | \$7.0 million |
| Urea (RSA) | \$0.2 million | \$0.3 million | \$0.1 million | \$0.2 million |
| Urea (ACE) | \$2.2 million | \$3.4 million | \$2.4 million | \$1.0 million |
| | \$11.5 million | \$15.1 million | \$6.9 million | \$8.2 million |

Unrecovered credit (assuming 50% repayment) \$7.5 million

 Total FRA fertilizer intervention financial cost \$15.7 million

The details and assumptions of the table are as follows. 33,000mt of Compound D were purchased from RSA at \$275/mt (cif Lusaka). 1,000mt of Urea were purchased from RSA at \$236/mt (cif Lusaka). 18,000t of Urea were purchased through ACE in Lusaka (Japanese grant product) at K26,000/bag. Local transport costs are estimated at \$20/mt and financing costs at \$50mt. Sales are calculated at the FRA price of K28,800/bag. The exchange rate used for conversion is K2400/\$. It is estimated that 50% of the fertilizer loans will be unrecoverable.

Besides these direct financial costs to the national budget, there are many other less tangible costs. As discussed in the body of this report, government indicated its reason for participating in the fertilizer market was to assist in easing input distribution difficulties in hard-to-reach areas, but very little fertilizer actually reached these locations. This type of misallocation of resources hinders appropriate market development. Furthermore, the provision of credit to high risk customers and tolerance of unrecovered loans is contributing to the poor rural attitude towards credit repayment. The practice impedes the establishment of formal rural credit facilities.

Further intangible costs are industry efficiency losses, and hindering of the private sector development. Private sector traders need time to develop confidence in their own abilities to service the demand in different regions at what they consider to be reasonable risks and with reasonable rewards. Vacillation of purpose on the part of government generates conflicting signals to the other market actors, and slows down the process of market development. Uncertainty about the actions of government becomes a major constraint to the involvement of the private sector in the fertilizer market.

The GRZ, and its agencies, should not be involved in dealing with the physical tasks of obtaining and moving fertilizer to the rural farmers. It is important for Zambian farmers to become more productive – and for access of small-scale producers to crop inputs to be improved – but subsidized credit is an expensive, unsustainable, way to achieve this objective. If the decision is made to subsidize certain areas due to poor infrastructure and market access, this can be done openly through tenders for supply from existing private companies. It is better to invest resources in programs that support the development of the private sector, and plan for them to eventually take on the full burden of distributing fertilizer to remote areas.

Output Markets

Government also intervened in maize marketing by calling on the FRA to import a total of 410,000mt of maize to be sold at fixed prices to urban millers and other traders throughout the 1998/99 marketing season. This decision was undertaken mainly to protect urban consumers from a socially unacceptable increase in the price of mealie meal, even though the crop forecasting system did not provide the information needed to project future prices. In reality, only 202,000mt actually arrived and consumer prices remained fairly stable throughout the 1998/99 marketing season. The financial cost of these grain imports can be estimated as follows.

| | CIF Value | CIF + finance | Sales | Loss |
|------------------|-----------------|-----------------|-----------------|-----------------|
| <i>GMB maize</i> | \$9.75 million | \$12.25 million | \$10.87 million | \$1.38 million |
| <i>RSA maize</i> | \$33.14 million | \$40.74 million | \$31.47 million | \$9.27 million |
| | \$42.89 million | \$52.99 million | \$42.34 million | \$10.65 million |

Alleged unrecovered credit \$6.0 million

 Total FRA maize intervention financial cost \$16.65 million

The details and assumptions of the table are as follows. GMB maize arrived at a cost of \$165mt (fob Harare) with estimated customs & transport of a further \$30mt. RSA maize was purchased at \$218mt (cif Lusaka). Financing charges are estimated at \$50mt (based on a 30% interest rate for a Kwacha balance over a 9 month period). Sales were estimated to be made $\frac{3}{4}$ to millers at K38,000/bag and $\frac{1}{4}$ to traders at K42,500/bag. The exchange rate used for conversion is K2000/\$ for the GMB maize which came in earliest, and K2100/\$ for the RSA maize. The details of the unrecovered credit have not been confirmed.

The intervention costs portrayed above represent a direct subsidy to urban consumers at the cost of rural producers. Specifically, because the grain was sold mainly to large-scale millers, the price fixed by government mainly benefited the better-off segments of the urban population who consume industrial meal. At the same time, the fixed price meant that rural producers who may have hoped to take advantage of seasonal price increases were unable to gain any benefit from storage, despite recent years efforts of the extension services to advise on the importance of saving grain to sell late in the year.

It is clear that the private sector will continue to be reluctant to perform fully in the Zambian maize market as long as the GRZ's actions through the FRA are not perceived as orderly and transparent. If the FRA had publicly established guidelines for its interventions and a clear statement of its procedures, some of the market confusion could be avoided. Greater rapport between the GRZ and the private sector would also lead the traders into a more independent view of their social role, leading to less dependency on Government resources. Greater representation of the private sector on the Board of Directors of the FRA, and involvement in the day-to-day running of the Agency would help sensitize the public and private sectors of the market. Maize market interventions need to be a truly open and collaborative effort between the FRA and the private sector.

The GRZ interventions in the market have been based more on short-term social and political demands, than market development considerations. The private sector is discouraged from greater growth by what it sees as unclear signals from the government marketing agency. Because of the small number of participants and market size, uninformed positions taken by a single player can seriously disrupt all other market decisions. Although such decisions may respond to the short-term demands on politicians, the uncertainty created in the market disrupts farming, trading, and processing activities. The private sector will decrease their future investments as they anticipate reduced net incomes due to non-market based interventions.

There is mistrust on both sides in the relationship of the public and private sectors of the grain industry and its marketing. The private sector believes the Government will interfere in the market for opaque, political, reasons causing disruption and financial losses, while the Government believes the private sector will try to increase its profits through stock and price manipulations that would cause unnecessary hardship to the public.

28.4 CONCLUSIONS

Taken together, this discussion has shown that there are many direct and indirect costs associated with Zambia's current crop forecasting system. In addition to the vast resources spent on predicting crop production and food security, a number of costly and inappropriate policies have been implemented based on the forecast messages. This can be attributed partly to political factors, but also results from the failure of the crop forecasting system to send clear,

time-bound, methodologically coherent messages. Most policy makers, both within and outside government, have not trusted the technical estimates of crop production and consumption requirements and so have interpreted the data from their own perspective regarding the need for market interventions and emergency assistance.

In response to the 1997/98 forecast messages alone, a set of policies were introduced which have been estimated to cost Zambia at least US\$46.55 million in purely financial terms. Once the long-term development impact of emergency food aid and fertilizer and maize market interventions are taken into account, the true cost of these policies is much greater. Although these interventions may have achieved a variety of short-term political objectives, it is clear that these interventions did not contribute to private sector development and had negative consequences on farmer attitudes concerning responsibility for their own food security. Every Kwacha used for development in Zambia must be well spent, and it is hoped that this discussion at least points to the importance of avoiding similar outcomes in the future.

Towards this end, it is essential to simplify the process of crop forecasting to provide only very clear messages on the quality of season. Rather than use scarce resources to predict total production through complicated pre-harvest surveys, it would make far more sense to focus on the production of reliable post-harvest data in a timely fashion. There is still no guarantee that this information will be used to formulate more appropriate policies, but it is clear that the current system is expensive and does not provide the information that is required. At the very least, by simplifying the food security forecast messages and focusing only on essential information, it should be possible to stimulate more sensible debate over the types of policies that may be appropriate and effective.

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ANNEX 1. THE MAFF/USAID CROP FORECASTING STUDY WORK PLAN, 14 MAY 99

I. INTRODUCTION

Zambian agriculture is changing rapidly in response to the national economic liberalization effort initiated in 1991; however, a consensus has not yet been reached among the major players such as the Government of Zambia, bilateral and multilateral aid donors, nongovernmental organizations, and private sector organizations, on the past and future effects of these changes. In particular, there has been limited consensus on the reliability of recent seasonal and annual agricultural production estimates, and on the effectiveness of the responses of the various stakeholders to such estimates. The Ministry of Agriculture, Food and Fisheries (MAFF) has therefore requested the United States Agency for International Development (USAID) to assist it in developing a basis for consensus among the major stakeholders involved in the crop forecasting system.

The MAFF and USAID have established a MAFF/USAID Crop Forecasting Study Team, consisting of: Mr. Danny Kafuli, Head, National Early Warning Unit (NEWU), MAFF, and Mr. Tom Cusack, USAID agriculturalist, who jointly lead the team; Mr. Masiye Nawiko, Senior Economist (NEWU); Mr. Abel Phiri, Head of the Agricultural Section of the Central Statistical Office (CSO); Mr. Jeff Wright, USAID crop forecasting specialist; Mr. John Keyser, USAID agricultural economist; and Mr. George Olesh, USAID market information systems specialist. Additional Zambian consultants and members of stakeholder organizations will be invited to participate in the study as the need arises. The team reports progress on a weekly basis to Mr. A. K. Banda, Director, Economics and Marketing Development, MAFF, and to Mr. David Soroko, USAID Agricultural Development Officer. The team is scheduled to complete and present its final report by 2nd July, 1999.

The purpose of this workplan is to provide a basis for the team to efficiently undertake the study. The workplan is based on comments received from a first draft workplan which was circulated to MAFF and USAID on 3rd May, and from the team's briefing meeting with stakeholders at USAID on 6th May which reviewed the proposed tasks of the study. This process has ensured that the principal concerns of stakeholders will be addressed in the study. In addition, team members will meet separately with all major stakeholders during the course of the study to obtain documents, discuss issues and develop recommendations. The draft results and recommendations of the study will be presented to, and discussed by, the stakeholder community at a workshop to be held in Lusaka on 23rd June. The team will utilize the results of the workshop in completing its final report.

II. OBJECTIVES

- Identify and explain current constraints to accurate crop forecasting.
- Describe how crop forecasting impacts on public and private sector decisions.
- Make recommendations for improving accuracy of forecasts, and improving impact.

III. APPROACH

During May, the team will describe and evaluate the alternative crop forecasting/early warning systems. The team will then, jointly with stakeholders, develop conclusions and recommendations during the month of June.

All elements of the crop forecasting/early warning systems will be studied, as follows:

- A. Making a reliable assessment of food insecurity
- B. Constructing and communicating effective messages
- C. Effective responses

In making a reliable forecast, there will be two elements: the determination of accurate crop production estimates themselves, and the construction of accurate estimates of food availability. The tools to be considered include remote sensing, food balance models, nutritional surveillance, market behavior, and social behavior.

The analysis will focus on three time periods: the period up to 1996/97, the 1997/98 period, and the 1998/99 period. Recommendations will be formulated in terms of the short-term (the 1999-2000, and 2001/2002 seasons), and the longer-term. Also, the analysis will focus at both the national and Provincial levels.

IV. TASKS

Historical review of crop forecasting systems in Zambia and in the region.
Identification and description of actual and potential crop forecasting systems.

A. MAKING A RELIABLE ASSESSMENT

1. Evaluate Zambia's current crop forecasting.

Who are the different participants in the crop forecasting system and what are their roles?
Are their contributions cost effective?

As a whole, does the system generate accurate crop forecasts?

Is the crop forecasting system based on an appropriate sample size?

Does the system use satellite imagery? Why or why not?

Observe and evaluate MAFF's 1998/1999 annual March-May final crop forecasting exercise.

2. Assess and describe current systems for forecasting production on cash crops such as cotton, tobacco, oilseeds, paprika, and horticulture/floriculture.

Can accurate forecasting of these crops contribute to better decisions concerning food security, agricultural sector performance, investments and agricultural trade policies? How?

Would the contributions be worth the cost of generating the information?

3. Assess 1997/98 crop forecasting by the MAFF/Early Warning Unit, WFP/FAO, and the British High Commission Alternative Crop Forecasting Methodology team.

Describe the strengths and weaknesses of each approach.

Given what is known today, which of these forecasts was the most accurate, and why?

Is it possible to take appropriate parts of these three activities and combine them to create a more effective methodology? If so, how can that be done?

Compare these methods with other methods used in the SADACC region.

4. Describe current market price information systems.

How do these systems operate?

Is the commodity mix appropriate?

What price analysis is undertaken?

How is the market information provided to end users?

Can market prices be used to improve crop forecasting?

Can market prices be used to assess the "ex-post" accuracy of crop forecasting?

How can that be done in a way that reflects Zambian human and financial resource endowments?

How is Zambia's market price information system integrated into regional market price information systems?

5. Assess and describe systems for estimating household and national maize and other food staple consumption requirements.

Do these systems generate information that appropriately reflects what households eat? Why or why not?

6. Assess and describe how the national food balance sheet is developed.

Does the national food balance sheet accurately reflect Zambia's food demand and supply conditions? Why or why not?

B. CONSTRUCTING AND COMMUNICATING EFFECTIVE MESSAGES

7. Identify current and potential crop forecasting information end users and describe their information needs in terms of data, timeliness, presentation, analytical content, and dissemination.

How is the Zambian crop forecasting system integrated into regional crop forecasting systems?

How does the Zambian crop forecasting system compare with regional crop forecasting systems?

C. EFFECTIVE RESPONSES

8. Analyze and describe the impact of FRA maize and fertilizer market interventions.

What role did the 1997/98 crop forecasting exercise have in FRA's decisions to import maize?

To import fertilizer?

Did the FRA maize and fertilizer imports significantly improve household food security or agricultural productivity? Why or why not?

What impact will FRA maize and fertilizer imports have on macroeconomic or sector performance over the next five years, including local level impacts on populations and institutions?

Evaluate the role of the FRA in the crop forecasting system.

9. Analyze and describe donor and WFP food aid decisions made as a result of 1997/98 crop forecasting.

What role did crop forecasting information play in donor decisions to provide food aid?

Did donors supply all of the food aid required? Why or why not?

What was the impact of donor food aid contributions?

How effectively did the donors respond in 1997/98 and in other years?

RECOMMENDATIONS

10. Based on the findings under tasks 1-9, and on other findings the team considers important, the team shall work with stakeholders to develop draft recommendations on how to cost effectively improve Zambian crop forecasting and food balance sheet development.

The team will arrange a conference to enable key Zambian stakeholders to discuss and further develop the recommendations.

SCHEDULE

10may-05jun interviews with stakeholders in Lusaka, writing of initial section drafts
 18-23may field work in Western Province
 28may-02jun field work in Southern Province
 05-19jun small-group consensus-building meetings with stakeholders, recommendations.
 05-19jun writing of first complete draft of report
 16jun first draft of report sent to MAFF and USAID
 19jun summary report materials distributed to all stakeholders
 21-22jun prepare presentation materials for the stakeholders conference
 22jun pre-conference workshop
 23june stakeholders' conference
 24-26jun complete report of the conference, distribute to stakeholders
 24jun-02jul follow-up meetings with stakeholders, writing of final report
 02july copies of final report sent to MAFF, USAID and stakeholders

PERSONNEL EFFORT

Danny Kafuli, begin 28apr end 02jul, total effort 40 days
 Masiye Nawiko, begin 29apr end 02jul, total effort 20 days
 Abel Phiri, begin 29apr end 02jul, total effort 20 days
 Jeff Wright arrive 24apr, begin 26apr depart 13jul, total effort 67 days
 George Olesh arrive 25apr, begin 26apr depart 13jul, total effort 67 days
 Tom Cusack arrive 25apr, begin 26apr depart 13jul, total effort 67 days
 John Keyser arrive 01may, begin 03may depart 13jul, total effort 67 days
 1. Local Consultant (to be determined)
 2. Local Consultant (to be determined)
 3. Local Consultant (to be determined)
 4. Local Consultant (to be determined)

LOCAL CONSULTANT AREAS OF WORK

1. Preparation for, facilitation of, and reporting on the stakeholder conference.
2. The impact of liberalization on Zambian early warning systems, and future opportunities under alternative liberalization policies, with particular reference to the FRA.
3. Case study of crop forecasting and early warning systems in a traditionally food-insecure Province: the Western Province of Zambia.
4. An analysis of institutional changes in, and the impact of institutional support for, the early warning system in Zambia, with recommendations for future assistance, with particular reference to the annual food aid exercise.

LIST OF STAKEHOLDERS AND INSTITUTIONS

Early Warning Technical Committee, members:

National Early Warning Unit (NEWU), MAFF
Food Reserve Agency (FRA)
Disaster Mitigation and Management Unit, Office of the Vice-President
Programme Against Malnutrition (PAM)
Zambia National Farmers' Union (ZNFU)
Food and Agriculture Organization of the United Nations (FAO)
World Food Program (WFP)
Food Health and Nutrition Information System (FHANIS)
University of Zambia (UNZA) School of Agriculture
Famine Early Warning System (FEWS)/Zambia
Zambia Meteorological Department (ZMD)

Seed Companies: for example

Zambia Seed Company (ZAMSEED)
Seedcrop
Panner

Fertilizer Companies: for example

Omnia
Kynock
Nitrogen Chemicals of Zambia

Millers: for example

National Milling
Simba No.1
Milile
APG Milling
Antelope Milling
Goldster

Other Government of Zambia institutions: for example

Central Statistical Office
Department of Meteorology
Market Information Unit, MAFF

Other Zambian institutions: for example

Peasant Farmers' Association
Smallholders
Farmer Cooperative organizations
Commercial farmers
Maize Research Institute (MRI)

Other bilateral donor institutions: for example

USAID/Zambia
British High Commission/Zambia
GTZ
EU

Other multilateral donor institutions: for example

The World Bank/Zambia

Regional Institutions: for example

Southern African Regional Climatic Forum (SARCF)

SADC

FEWS/Southern Africa

Nongovernmental Organizations (NGOs): for example

CARE

AFRICARE

World Vision

INDICATIVE LIST OF FORECASTING SYSTEMS

National Early Warning System

World Food Program/Vulnerability Assessment Mapping

FAO/GIEWS

FEWS

British High Commission Method

National Farmers Union Crop Forecasting

SADACC Regional Early Warning System

Technical Coordination Committee of the NEWU

ANNEX 2. SCHEDULES OF ACTIVITIES FOR TEAM MEMBERS

Crop Forecasting Specialist: Jeff Wright

| Date | Activity |
|-------------|---|
| April 24 | Arrive in Lusaka |
| April 26 | Meeting with USAID to get general direction |
| April 27 | Meeting with Chuck Chopak, FEWS and Bentry Chaura, SADC. Meeting with Joyce Kanyangwa-Luma, FHANIS to discuss welfare |
| April 28 | Meeting with Chuck Chopak, FEWS and Bentry Chaura, SADC and Balard Zulu |
| May 2 | Meeting with John Heermans, CLUSA |
| May 3 | Meeting with David Soroko, USAID |
| May 6 | Stakeholder conference |
| May 11 | Meeting with FEWS. Meeting with Ms Chenga, Director of AfriCare |
| May 12 | Meeting with Ministry of Science and Technology to discuss forecasting. Meeting with Helen Samatebele, Assistant Director of PAM |
| May 13 | Meeting with Maurice Muchinda, Director of ZMD |
| May 14 | Meeting with Alan Lando, Maggie Chapa and Kawana Nawa of ZMD |
| May 18 | Meeting with Western Province Deputy Permanent Secretary. Meeting Willem Colenbrander, Consultant on Western Province |
| May 19 | Meeting with all DACOs of Western Province, Meeting with DACO of Mongu District. Visit Block coordinator and local farmer. CSO Provincial Senior Statistician, MAFF Survey Supervisor and four enumerators conducting the CSO final forecast |
| May 20 | Meeting with Deputy Permanent Secretary in Kalabo. Meeting with Nakambula Wise, Social Welfare, Kalabo. Meeting with Jeff and Boyd, Traders in Kalabo. Meeting with Robert Sanganbo of the Kalabo Rice Promotion Team. |
| May 21 | Meetings with the Development Council Center staff of Kalabo. Meeting with traders at the Kalabo Market. Meeting with Assistant Market Manager Sequenda Morbito |
| May 26 | Meeting with Rogerio Bonifacio of U Reading and ZMD Staff |
| May 27 | Meeting with, I.J.Gambhir General Manager of Agritech and Arun Mittal Managing Director of Agritech |
| May 31 | Meeting in Livingston with Senior Agricultural Officer, Crop Husbandry Officer and Farm Management Officer. Meeting with Mr. Mwendwe Block Supervisor and Mr. Simbeda Camp Officer for Mukin Camp. Meeting with Livestock Officer, Dr. Barnabas K. Chital. We also met with traders in chickens, beans, maize, and clothing and the Market Manager of Livingston Market |
| June 1 | Meeting with Provincial Disaster Response Coordinator of Disaster Mitigation and Management Unit in Choma |
| June 8 | Meeting to discuss crop forecasting Francis Banda, ZMD; Nowa, Kawana, ZMD; Chansa Mushingi, FEWS ; Danny Kafuli NEWU; Frank van Dixhoorn; Takku Muthana; Nawiko Masiya NEWU |
| June 9 | Meeting at Sable Road to discuss food security forecasting: Kawana Nowa, ZMD; Chansa Mushingi, FEWS; Danny Kafuli NEWU; Frank van Dixhoorn; Takku Muthana; Helen Samatebele, PAM; Billy Muinga WFP; Nangana Simwinji |
| June 13 | Meeting with Chansa Mushingi, FEWS Rep in Zambia |
| June 14 | Meeting at USAID |
| June 16 | Danny Kafuli, NEWU; Nsofwa Linga, Head of Mapping and GIS at MAFF; B.K.Chivunda, Chief Agricultural Officer; Richard Kamona, Chief Crop Production Agronomist |
| June 17 | Meeting with Abel Pheri to discuss the results of the meeting with MAFF/EXT. |
| June 18 | Meeting on Disaster plan with Chiselebwe Ng'andwe and Augustine Chapewa Director, Changa Management Services |
| June 21 | Meeting on VAM with Billy Mwiinga VAM Officer, WFP ; Chuck Chopak, FEWS,;UMCFS; Chansa Mushingi FEWS; Joyce Kanyangwe-Luma, FHANIS; Bentry Chaura, SADC; Ballard Zulu, FEWS |
| June 24 | Stakeholders meeting at MAFF |
| June 29 | Meeting with Alfred Mwila of ZNFU Economist |
| June 30 | Meeting with Maurice Michinda and Francis Banda of ZMD to go over the recommendations for the crop monitoring. Meeting with Alan Lando and Nawa Kawana on the same issues. |

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|--------|---|
| July 1 | Meeting to discuss food balance sheet with Billy Mwinga, VAM Officer, WFP ; Chansa Mushinge, FEWS; Joyce Kanyangwe-Luma, FHANIS; Patrick Mungaila, PAM; Danny Kafuli, NEWU; |
| July 8 | Meeting With Able and CSO about recommendations. Meeting with Alan Lando, ZMD to discuss the CSO data set of agricultural production. |
| July 9 | Full team meeting with the Minister of Agriculture |

Schedule for Agricultural Economist: John Keyser

| Date | Activity |
|--------------|---|
| May 1: | Arrive in Lusaka. |
| May 3-5: | First team meetings, formulation of workplan, meeting with USAID. |
| May 6: | Stakeholder conference. |
| May 7-8: | Meetings with EBZ, Cheetah Ltd, Amanita, BIMZI, FRA. |
| May 10-16: | Meetings with Amanita, Simba Milling, Kynoch Fertilizer, AfriCare, ACE, IMEX Trading, FHANIS, National Food and Nutrition Commission, PAM. |
| May 17: | Meetings with FRA, DMMU. |
| May 18: | Travel to Western Province, discussions with traders in Kaoma, meeting with Western Province Deputy Permanent Secretary, meeting with Willem Colenbrander. |
| May 19: | Meetings with all DACOs of Western Province, district councilor and commercial farmer, Kalabo Planning Officer, Programs Manager, Keepers' Foundation. Visit to Mongu central market. |
| May 20: | Travel to Kalabo District, meetings with Planning Officer, District Council Secretary, DACO, chairman of local farmer's association and two local grain traders. |
| May 21: | Visit to Yuka Mission to discuss food aid deliveries, return to Mongu. |
| May 22: | Meetings with SNV program officers, market inputs and supply advisor (TAG program on livestock market development). |
| May 23: | Return to Lusaka |
| May 24-29: | Meetings with WFP, ADRA, NEWU, FEWS, initial report writing, consultation with Dennis Wanchinga, food aid consultant. |
| May 30: | Report writing. |
| June 1-5: | Report writing, stakeholder meeting with nutrition specialists to discuss consumption estimates, stakeholder meeting with food aid organizations to discuss emergency assistance. Supervision of local food aid consultant. |
| June 7-12: | Report writing, receipt of local consultant's food aid report, various meetings. |
| June 14-19: | Meeting at USAID, FRA, revisions to report. |
| June 21- 26: | Report revision and further data collection from WFP, DMMU, various donors. Stakeholder meeting at MAFF on June 24. |
| June 28-30: | Report writing, executive summary, edits. |
| July 1-9: | Final revisions, fact checking, meeting with Minister for Agriculture. |

Schedule for Agricultural Market Information Specialist: George Olesh

| Date | Activity |
|---------------------|--|
| 26 April - 28 April | Participate in MAFF/FAO workshop to review the operations of the Agricultural Marketing Information System. |
| 29 April - 1 May | Meetings with FRA, ASIP Consultative Forum, MAFF/NEWU, MAFF/AMIC, FEWS, FHANIS. |
| 3 May - 5 May | Meetings with CSO, MAFF/NEWU, FRA, Women's Farmers Group. |
| 6 May | Briefing meeting with major Crop Forecasting System stakeholders at USAID office to highlight major areas of study and discuss methodology of study activities. |
| 7 May - 8 May | Meetings with EBZ, Cheetah Ltd, Aminita Group (grain trading), BIMZI Trading, FRA. |
| 10 May - 15 May | Meetings with Aminita Group (oilseeds), Simba Milling, Kynoch Fertilizer, ACE, IMEX Trading, ZNFU. |
| 17 May | Meetings with FEWS, FRA. |
| 18 May | Travel to Southern Province, interview farmers and grain trader in Kaoma, meet KIMIA representative, meetings in Mongu with Deputy PS, SEMDCO, provincial DACOs and Senior Veterinary Officer. |

| | |
|-------------------|---|
| 19 May | Meetings with Senior Field Services Officer, MAFF; Provincial Development Advisor, Office of the PS; District Councillor and commercial farmer; Kalabo Planning Officer; Programs Manager, Keepers Foundation. Visited Mongu Boma central market for commodity and pricing check. |
| 20 May | Travel to Kalabo District, meetings with Planning Officer, District Council Secretariate, DACO, Chairman of local farmers' association, two local grain traders. |
| 21 May | Meetings with Catholic Church Grain Storage Committee, hammermillers, traders. Visited District Boma market for commodity and pricing check. Interviewed Assistant Market Manager. Return to Mongu. Meeting with Keepers Foundation. |
| 22 May | Meetings with Advisor to Senior Veterinary Officer (TAG program) and Marketing Inputs and Supply Advisor (TAG program regarding Livestock Market Information Services, Programme Officer for SNV Regional office and Project Officer for SNV Cereal Bank Project. |
| 23 May | Return to Lusaka. Meetings with FEWS, FRA, MAFF/AMIC. |
| 24 May - 29 May | Meetings with National Milling, FRA, MAFF/AMIC, ACE. |
| 31 May - 5 June | Meetings with Zambian Association of Manufacturers, FRA. |
| 7 June | Meeting at USAID to present initial findings and proposed recommendations. |
| 8 June - 12 June | Stakeholders' workshops held at project offices on specific areas of interest: Production Estimates/Forecasts, Consumption Estimates, Food Security Assessment and Targeting, Market Responses, Food Aid Issues. |
| 14 June | Meeting with FRA. |
| 15 June | Meeting with Acting PS, MAFF and Deputy Director, Policy and Planning Branch, MAFF to present preliminary report findings. |
| 16 June - 19 June | Meetings with FRA, MAFF/AMIC, Changa Management Services (doing report for the OVP on Disaster Management). |
| 21 June - 23 June | Meetings with FRA, Omnia Fertilizer, Mpongwe Corporation. |
| 24 June | Stakeholders' Meeting for presentation of draft report results, review of major findings, consensus building on prescribed activities. Hosted by MAFF, chaired by Acting Permanent Secretary. |
| 25 June - 26 June | Report revision and further data collection at FRA. |
| 28 June - 3 July | Development of final report. Meetings with MAFF/NEWU, MAFF/AMIC, KPE, FRA, MSU representatives. |
| 5 July - 13 July | Final revisions of report. Presentation to USAID and MAFF. |

Team Leader/Agriculturalist: Tom Cusack

In addition to regular team and stakeholder meetings through the period:

| Date | Activity |
|-------------|---|
| April 25 | Arrive in Lusaka, initial meetings with Jeff Wright and George Olesh |
| April 26 | Initial meeting with David Soroko and other USAID Agricultural Office team members Opened local bank account |
| April 27 | Arranged long-term car hire and office space for the team at 30G Sable Road, Kabulonga |
| April 28 | Planning meeting with David Soroko, Meeting with A.K. Banda, Danny Kafuli and staff of MAFF |
| April 29 | MAFF/USAID team formed, first meeting to develop the workplan |
| April 30 | Administration tasks, and review of documents, meeting with individual key stakeholders, opened the MAFF/USAID crop forecasting team office at 30G Sable Road |
| May 01 | MAFF/USAID team meeting |
| May 02 | Initial meeting with John Keyser |
| May 03 | Meetings with consultant team, and consultant team with David Soroko, decision to hold stakeholder briefing meeting on 06 May |
| May 04 | Major MAFF/USAID team-building session |
| May 05 | Drafted outline workplan with team, for presentation on 06 May |
| May 06 | Stakeholder/team meeting at USAID |
| May 07 | Weekly meeting with A.K. Banda |
| May 08 | Interviewed five potential local consultants |
| May 10 | Completed draft implementation plan |

| | |
|-----------------|---|
| May 11 | Negotiated with more potential local consultants |
| May 12 | Sent implementation plan to USAID |
| May 13 | More local consultant work |
| May 14 | Completed and sent out the final workplan with Danny Kafuli |
| May 15 | Local consultants' draft request to ARD |
| May 17 | Planning the field trip to Western Province |
| May 18 | Drafting initial pages of the study report with Danny Kafuli |
| May 19 | More local personnel administration |
| May 20 | Document review |
| May 21 | Developed the food security chart with Danny Kafuli |
| May 22 | Document review, and more local personnel administration |
| May 24 | Project accounting |
| May 25 | Document review and writing of introduction to report |
| May 26 | Planning field trip to Southern Province |
| May 27 | DHL preparation, administration |
| May 28 | Planning field trip to Southern Province |
| May 29 | Travel to Livingstone with Danny Kafuli and Jeff Wright |
| May 30 | Review of Southern Province materials |
| May 31 | Meeting in Livingstone with Senior Agricultural Officer, Crop Husbandry Officer and Farm Management Officer. Meeting with Mr. Mwendwe Block Supervisor and Mr. Simbeda Camp Officer for Mukin Camp. |
| June 01 | Meeting with Provincial Disaster Response Coordinator of Disaster Mitigation and Management Unit in Choma |
| June 02 | Report writing, local consultant follow-up |
| June 03 | Administration, local consultant, and DHL work |
| June 04 | Local consultant administration |
| June 05 | Report writing |
| June 07-11 | Week of group meetings of stakeholders around the themes: crop forecasting estimates, food security forecasting, food aid, and markets. Nangana Simwinji begins work in the office on 07 June. |
| June 11 | Meeting with A.K. Banda. |
| June 12 | Report writing |
| June 14-16 | First draft report writing, sent first drafts to USAID and MAFF |
| June 17-18 | Preparation of first draft summaries |
| June 19-21 | Local consultant administration |
| June 22-23 | Preparation for the MAFF stakeholders' meeting |
| June 24 | Stakeholders' meeting at MAFF which reviewed the summary of preliminary findings |
| June 25-26 | Writing of draft final report |
| June 28-July 03 | Prepared and sent draft final report for comments key stakeholders |
| July 05- 10 | Preparation of final report, based on comments on drafts |
| July 09 | Review meeting between the team, A.K. Banda and the Minister of Agriculture |
| July 10-12 | Report production and distribution |
| (July 13 | Depart Lusaka) |

**ANNEX 3.
LIST OF PEOPLE CONTACTED**

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ANNEX 4.

**A CASE STUDY OF CROP FORECASTING AND EARLY WARNING SYSTEMS IN A
TRADITIONALLY FOOD-INSECURE PROVINCE:
THE WESTERN PROVINCE OF ZAMBIA.**

12 JULY, 1999

BY NANGANA SIMWINJI

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SUMMARY

This is a summary of the crop forecasting and early warning systems in the Western Province of Zambia. This serves as the case study of the MAFF/USAID crop forecasting study. The study looks at crop forecasting systems, food security estimation, and the responses made to crop forecasting messages.

The Western Province has been identified as one of the traditional food insecure provinces in the country. Factors responsible for this situation include:

- a) poor road infrastructure worsened by the terrain (sandy)
- b) production fluctuations resulting from changes in weather patterns
- c) distance from the major markets
- d) labor shortages during critical peak labor requirements - there is a tradition of able bodied men leaving the province [particularly from Kalabo] to go and work in the Sugar plantations in Mazabuka, Southern Province from April to November.
- e) relatively high poverty levels that make it difficult for the rural farmers to make meaningful investments in agriculture
- f) limited opportunities to diversify incomes or agricultural activities

Crop Forecasting Estimates

Crop forecasting is important primarily for the following reasons:

- a) it is the basis upon which the government bases its policy and planning decisions
- b) it provides useful early warning indicators concerning the food situation in the area/community
- c) it provides useful information for agricultural marketing purposes to both the traders and the consumer.

Both formal and informal systems are used to forecast crop production in the Province. The informal systems, which are used by the local people themselves and help give them an idea of the 'quality of the season', may not provide formal statistics but provide useful data from where households can base their market decisions, input and seed requirements and planting times. The formal crop forecasting estimates are made by the Central Statistical Office and the Ministry of Agriculture, Food and Fisheries.

At the regional level, two parallel crop forecasting systems exist: the MAFF Field Services and the CSO. The former is collected by the extension staff at Camp level and is part of the normal activities conducted by the extension staff. The staff take a preliminary stock of the types of crops the farmers intend to plant and the hectareage at Camp level [around October/November]. The final crop forecasting survey is conducted in March. It includes the estimated crop production as well as the marketing plans by the farmers at Camp level. The results are useful both at district and provincial level as it used by the DACOs and the PACO to evaluate their activities. This information is readily available to the staff of the MAFF at those levels.

The crop forecasting data of the CSO is collected using different units [SEAs] that do not bear any semblance to the units used by MAFF [Camps]. The data collected by the CSO using their enumerators is sent back to Lusaka where data analysis takes long because of lack of/limited funds. Consequently the information has been made available one or two years late, in the case of post-harvest estimates, and approximately two months late in the case of pre-harvest estimates.

The reliability and/or accuracy of this information, however, is debatable. Methodological concerns that have been raised concerning this include the poor quality of the sample, the sampling frame and the enumeration/supervision of the enumerators. There are a total of 1,119 SEAs in the Western Province, and out of this only 47 SEAs are included in the survey.

Another crop forecasting system used is that following the weather pattern by Zambia Meteorological Department (ZMD). The Department works closely with the MAFF and provides information that is useful to the farmers - the “quality of the season”.

Food Security Estimates

At the provincial and district levels the food security estimates are not done locally. The Food Balance Sheets, Vulnerability Assessment and Mapping (VAM) and the Food Needs Assessments are done centrally (at the national level).

Food Balance Sheets

The food balance sheets are prepared at the national level by the NEWU with expertise from members of the EWTC and basically incorporate the opening stocks from the previous season, current estimated crop production to arrive at a surplus/deficit based on assorted staple food requirements. FBS is the major tool for planning the major market interventions by the Government.

Vulnerability Assessments

The vulnerability assessment and mapping (VAM) is a approach that is used to gain an insight into factors which contribute to food security. Vulnerability analysis in Zambia is currently done at district level. The analysis provides indicative data of the food security situation but needs to be complimented by more detailed analysis at the lower level. This is because the districts are diverse and more localised data is much more useful for targeting purposes.

Food Needs Assessments

The food needs assessments are ideally conducted in areas identified by the VAM as being prone to vulnerability and also those areas that have suffered from floods/droughts. The needs assessments identify the type and estimate the population requiring assistance.

The Districts and Provincial authorities do not have sufficient of their own resources to mobilise and use to provide to victims of floods or droughts. When the local people’s livelihoods are threatened by the decline in agricultural production resulting from climatic changes they appeal to the central government. These cases of need are not catered for by the Public Social Welfare Assistance Scheme (PWAS) as it is limited by financial constraints.

Responses to Crop Forecasting Messages

Individuals, communities, districts, provinces, national and international authorities respond to crop forecasting messages differently.

Food Aid

Food aid has been a controversial response countrywide and this has not been different in Western Province. The concerns brought against food aid include:

- a) untimely delivery of food aid that has coincided with the harvest time. The situation has been serious in the year 1998/99. This has been relatively a good year for the province but the communities were receiving food aid even after the harvest season
- b) the provision of food aid has tended to lower the staple food prices in the communities where the private sector [traders] have been active.
- c) the provision of food aid does have negative implications on the local communities' initiatives to secure their food access. In the communities it is evident that various ways and/or resources are available which they could use to improve their food security situation. Many households, even in good agricultural years do not rely entirely on own production for the whole year. When their supplies deplete they rely on the market [using cash, labor or bartering].
- d) targeting of the real vulnerable households has proven to be difficult and the food aid tend to be misused
- e) there are variations in districts as far as resources and land use are concerned. As a result, assessment of food needs should capture this to be able to come up with specific areas that warrant food aid.
- f) The VAM/WFP identifies Western Province as one of the provinces with high levels of vulnerability in the country.

Market Responses

The private sector does supply staple food supplies to various parts of the province. Some traders are resident in the local communities while others come from elsewhere within the province. One trader mentioned that because he is known in one district, when the people there experience food shortages they contact him for supplies. The local economy operates at the rural communities' own capacity.

The private sector requires a conducive environment to be able operate more efficiently. Nevertheless, traders have been quite active in providing cereals [particularly maize] to many rural communities. The problem is however, low purchasing power of the rural communities. Consequently, injecting money in the local economy would promote food security and at the same time enable local traders to invest in their own areas. The Cash-for-Work program supported by the Royal Netherlands Embassy in Kalabo and Mongu districts has proven that the local market can be stimulated by injecting monies into the local economy. The income has been used to meet the immediate and long term needs of the local communities; for example, investments in agriculture such as purchase of oxen and fertiliser have been made possible, and this has implications on food security in the future.

The local people have appreciated this and they emphasised that food aid would not have afforded them such opportunities as they feel that food aid can meet only their immediate needs.

Cereal Banking

Given that many communities face periods of food insecurity in the months from August until the next harvest season, it is important to promote strategies that will encourage storage of food crops. In two Districts of Western Province (Sesheke and Senanga) a local NGO People's

Participation Service with the support of Netherlands Development Organisation (SNV) has started cereal banks projects.

Nalionwa Catholic Mission has also been supporting storing of cereals until they are needed. Cereals are bought from the farmers early in the season and sold off to the same communities later in the year when their supplies deplete. This is appreciated by the local communities as the prices are relatively low because no transport costs are incurred. .

Crop Diversification

Farmers are being encouraged to grow a variety of crops (both food and cash crops) so that they have other crops to fall back on rather than relying on one crop only. Local institutions promoting this in Western Province include PAM, Nalionwa Catholic Mission, Keepers (Zambia) Foundation, Mongu Nutrition Group and the Department of Agriculture. They provide inputs and early maturing and drought-tolerant seeds to the farmers. They also facilitate marketing of the farmers' produce.

Conclusions

- Given the important role crop forecasting plays in providing information that the consumers and traders need to make decisions concerning crop production estimates, it would be more useful if this information is made available at local levels within the province on a timely basis..
- Improving the food security situation is a challenge to the local communities and the nation as a whole that needs to be solved by diversifying crops and income generating activities. Food aid should be the last resort and only given in limited situations unlike what has been the case in the past.
- Interventions that need to be made are area-specific and treating Districts as homogeneous areas is not appropriate. Identifying the specific needs of specific areas will ensure that appropriate interventions are made.
- Although the private sector has limited capacity to reach out to many areas, this sector can ensure efficient transfer of food from food surplus to food deficit areas. When the food cannot be secured locally private traders look for it in other areas such as Lusaka.
- In order to improve targeting of the needy for food aid distribution, it would be useful to involve the local people, especially in food needs assessment. Currently, food needs assessment is done through the Early Warning Technical Committee in Lusaka and the local people/organisations only participate in monitoring and actual distribution of the food aid.

1. INTRODUCTION

This paper discusses crop forecasting and early warning systems in the Western Province of Zambia as a regional (provincial) case study of the national crop forecasting study in an attempt to understand the impact of crop forecasting on public and private sector decision making and improving the crop forecasting system. Western Province is one of the provinces in Zambia that has been identified as being traditionally food insecure. The Vulnerability Assessment and Mapping (VAM) analysis identifies the province as one of the provinces in the country that have

high levels of vulnerability and the Evolution of Poverty in Zambia Report by CSO observes that Western Province is one of the provinces with the highest depth of poverty and the largest proportion of poor people (86% of the rural dwellers) (CSO: 1996).

Western Province is located in the southern part of the country, between 22 degrees and 25 degrees 30 east and 13 degrees 45 and 17 degrees 45 south covering an area of 126,386 square kilometres, or approximately 17% of the total Zambian land area.

The Province consists of a vast, sandy upland plain with an altitude of 1,188 metres in the north-west slopping gently to 814 metres in the south-east. This upland plain is intersected by flood plains of the Zambezi and its tributaries, together covering an area of 12,950 square kilometres (Adaptive Research Planning Team - Western Province: 1993).

The Province is characterised by very difficult geographic and climatic conditions. Infrastructure is poor making transportation and cost of commodities expensive. In the rainy season the areas that are on the west bank of the Zambezi river are isolated from the rest of the province for four to six months a year (December to May). Districts that pose serious communication problems in the rainy season are Lukulu West, Kalabo and Shangombo.

Poor communication is one of the main hindrances to improved crop production. In rural Zambia, the prevalence of poverty and vulnerability is highly correlated with proximity to the traditional axis of development with lower poverty prevalence levels in areas along the rail line and higher levels further away from the rail line (Livingstone to the Copperbelt). VAM 1998 notes that distance to the market is a determinant of vulnerability. Districts that have depicted very low incomes in general are far from any markets (due to poor infrastructure and accessibility). Limitations of physical access has been a major determinant of food availability and access, as most of the economic activities in the province revolve around agriculture. The major crops grown include maize, sorghum, bulrush millet and rice. Others include sweet potatoes, pumpkins, and vegetables.

The population is largely concentrated around the relatively fertile flood plains, inland river valleys, dambos and district centres. The remainder of the population lives sparsely over the uplands. The population density is low and according to 1990 Population Census the population stands at approximately 607, 000. The population structure is characterised by a relatively high percentage of females. The sex ratio is 837 males to 1,000 females. Settlement in the province is dispersed. The population density is 5 persons per square kilometre (CSO 1990 Census). The major socio-economic activities include farming and crop production, pit sawing, cattle rearing and fishing. This indicates a diversity of resources that can be used to compliment one another and improve food security.

About the Study

The crop forecasting study has been necessitated by the need to have accurate and reliable data on crop forecasting. Accurate and reliable estimates of crop production would help the government, donor community, the Non-governmental sector, and the private sector make timely responses to the changes in crop production. The crop forecasting data provides useful information upon which the food security and food needs assessments are made. The specific responses that could be made which are discussed later in this paper include relief food distribution, provision of inputs and fertiliser to the farming community and promotion of drought-resistant crops

Among the stakeholders in the agricultural sector there has not been a consensus on the reliability of recent seasonal and annual agricultural production estimates, and on the effectiveness of the responses of the various stakeholders to such estimates.

In April 1998, WFP/FAO conducted a crop and food supply assessment countrywide that initially estimated a cereal import requirement of 930,000 metric tons. After discussions with the MAFF whose own crop forecast estimated a maize deficit of approximately 450,000 metric tons, WFP/FAO reduced their assessments to 660,000 metric tons. In view of the unfavourable weather conditions caused by El Nino phenomenon, a WFP/FAO Crop and Food Supply Assessment Mission toured the country from 27 April to 14 May 1998, at harvest time, to assess the impact of the weather anomalies of crop production and the general food supply situation, and to estimate cereal import requirements for the 1998/99 marketing year (May - April). This caused a series of donor and government discussions concerning crop forecasting methods and approaches (Food Needs Assessment Report: 1998). Improvement of the quality of information collected is important for planning purposes and the need and usefulness of the information generated is evident.

The MAFF and USAID, therefore, established a MAFF/USAID Crop forecasting study team to develop a basis for consensus among the stakeholders involved in the crop forecasting system. These being among others, Program Against Malnutrition, MAFF, World Food Program, Care International - Zambia, Disaster Management and Mitigation Unit, Central Statistical Office and the private sector .

Objectives of the Study

The following are the objectives of the study:

- Identify and explain current constraints to accurate crop forecasting.
- Describe how crop forecasting impacts on public and private sector decisions
- Make recommendations for improving accuracy of forecasts, and improving impact

2. ESTIMATES OF CROP PRODUCTION

There are several methods currently used to monitor and forecast both the weather and agricultural production in the province. The weather pattern is an important indicator of the cropping pattern and determine the decisions that individual farmers may make concerning the type of crops they may decide to plant or not to plant. Crop production estimates are important as they provide the basis upon which food requirements are calculated and the national and/or household food security situation assessed. Both formal and informal methods are used by different stakeholders. The forecasts that come out of these activities serve different goals and are used at different levels. The traders are interested in having the information for market decisions and the extension staff are interested in knowing the agricultural performance in their agricultural camps.

The following are the key players in crop forecasting at Provincial and District levels:

- the Central Statistical Office (CSO)
- the Department of Meteorology (MoD)

- the Economic and Marketing Department
- the Extension Service
- the farmer/producer

Users of the crop forecasting data

The potential users of crop forecasting data are many and include especially those institutions concerned with agricultural production and relief distribution. The list includes the government, donor community, consumers, local NGOs, traders, input and agricultural credit providers.

Why crop forecasting is important?

Crop Forecasting is primarily important for the following reasons:

- a) It is the basis upon which the government bases its policy and planning decisions
- b) It provides useful early warning indicators concerning the food situation in the area/community
- c) It provides useful information for agricultural marketing purposes to both the trader and the consumers.

For all of the above purposes, timely and accurate crop forecasting information is important to ensure that 'credible' and appropriate decisions are made. The quality of data generated by crop forecasting systems has implications on the type of responses that will be made and, thus, need to be reliable.

Methods Used For Crop Production Estimates

Crop production data is primarily collected by the MAFF and the CSO that is also provided to the national level and used for major policy decisions. The way data collection is done has gone through some changes over the years in an attempt to improve the crop forecasting system and the accuracy of the information collected. Two different systems of data collection are used and they produce two independent estimates of crop area and production that is made available at different times and at different levels.

1. Preliminary Crop Forecasting Survey by the Extension Staff

At the beginning of each cropping year/season (October/November) a preliminary stock of the types of crops the farmers intend to grow and the hectareage at Camp level is done. The Camp officers keep records of their farmers. This crop forecasting survey is part of their on-going activities and is part of their reporting system. This, however, has not been consistent because of logistical and financial constraints. There are six blocks per district and in each block the number of camps vary. The Camp officers are not able to reach most parts of their camps on foot while some camps are not manned. The information collected from this may be used by the Camp officer to make requests for his farming community for seeds or fertilisers.

The flow of this information is from the Camp level to the block, district and province and finally the national level. This information is readily available by the agricultural staff at these various levels making interventions possible depending on the factors responsible for the agricultural production variations.

It is, therefore, desirable to enhance the collection of crop forecasting data at the level of the Camp because of the usefulness of the information at that level. The farming community, with the help of the Camp officer would make improvements and adjustments to improve agricultural production and make responses to address the variations in crop production.

2. Final Crop Forecasting Survey by the MAFF

The final crop forecasting survey is conducted in March when it is evident how the agricultural season will be. It includes the estimated crop production as well as the marketing plans by the farmers at camp level. The results of this survey are made available to the Block Supervisors, District Agricultural Co-ordinators, the Provincial Agricultural Co-ordinator and the Provincial Administration office (Permanent Secretary's office) in the province. The information from this survey provide a basis for evaluation of the performance of agriculture at the local level. This information is also used to determine the food security situation in the area and the involvement of the District and Provincial Agricultural Co-ordinators in this is noted. The DACOs are members of the district committees that monitor the activities of relief food distribution (District PPM committees). They provide useful information to the Disaster Management and Mitigation Unit in the identification and initial assessments of the areas affected by drought or floods.

3. Crop Forecasting Surveys by the Central Statistical Office (CSO)

The CSO conducts Preliminary and final crop forecasting surveys for the MAFF under contract. This information is collected using the Standard Enumeration Areas (SEAs) which do not bear semblance to the Agricultural Camps. These SEAs were designed for the convenience of data collection during the 1990 Population and Agriculture Census by the institution to ensure that one enumerator could interview twenty to one hundred households in a reasonable time.

The information collected is sent to the CSO for analysis and this information is not immediately made available to the province and may be available a year or two later. The usefulness of this information is, thus, restricted and not immediately available for local use.

The reliability and/or accuracy of this information, however, is debatable. Methodological concerns that have been brought about concerning this include the sample, sampling frame and the enumeration/supervision of the enumerators.

4. Zambia Meteorology Department (ZMD)

The Zambia Meteorology Department (ZMD) monitors the weather pattern in different districts and records the trend. This information, however, is not made available to local communities. The Department works in close collaboration with the Department of Agriculture. For data collection, some of the extension staff are used.

5. Individual Farmers

The individual farmers at community level are basically interested in their own crop production and are keen to know what the crop production is at the household level. The local farmers may not have the actual quantities produced in different areas but they are aware of surplus and deficit areas. This information goes around informally but is quite efficiently disseminated.

6. Private Traders and Millers

The traders and millers at district and provincial levels assesses agricultural production at local levels mainly through informal systems. Word goes around concerning the performance of the agricultural season. This information is useful for their marketing decisions. They would, basically, know which are the surplus and deficit areas. The official production estimates may be known to them through the media at a later stage.

7. Local NGOs

Although there are local NGOs in the Province that are concerned with promoting crop production there are not actively involved in conducting (official) crop forecasting surveys. Local NGOs that could be interested in crop forecasting include Mongu Nutrition Group (MNG) and Keepers (Zambia) Foundation. These institutions are promoting agricultural production through helping the farmers with marketing of their produce, supply of inputs and promotion of use of draught power.

It is important for the local NGOs to take active role in crop forecasting as this will help them make useful decisions regarding the type of input supply and agricultural support the farmers may need. The limitation with the involvement of the local NGOs will be that the forecasts will be restricted to the areas they are active in. However, this kind of data is very useful for the local interventions.

3. ESTIMATES OF FOOD SECURITY

Crop production in Western Province varies from year to year as a result of weather and other factors (lack of input/seed supply and marketing constraints). Greatest decreases in maize yield (up to 50%) is attributed to water shortage in the flower initiation period resulting in decrease in grains per cob. The likelihood of drought is greater in the south and south-west of the Province, a factor influenced by the rainfall distribution pattern. These are areas where the growing period is also short (van Gils: 1988) refer to Table below. There is a gradient in rainfall running from north to south. Lukulu district in the north receives an average of 1,021 mm per year while Sesheke district in the south receives an average of 730 mm (see map of the rainfall zones in appendix 2). Crop production in the uplands of the Province is determined by the start of the rains (rainfed) and the rainfall varies from year to year.

TABLE 1: Growing Periods for Rainfed Crops in selected districts of Western Province

| Station | Mean annual rainfall (mm) | Growing Period (days) | Drought Periods |
|---------|---------------------------|-----------------------|-----------------|
| Mongu | 900 | 126 | 2 x 10 days |
| Kaoma | 1000 | 113 | 2 x 10 days |
| Kalabo | 800 | 111 | 2-3 x 10 days |
| Sesheke | 700 | 81 | 4 x 10 days |

Source: van Gils: 1988

During the agricultural season 1997/98 there was the problem of the El Nino weather phenomenon which caused heavy floods in the Barotse flood plains. Earlier in the season the farmers were warned by the Zambia Meteorology Department (ZMD) to grow drought resistant and early maturing crops that would stand the anticipated dry spells. Bulletins were issued beginning May 1997 advising communities about the possibility of poor and erratic rainy season. This message later started appearing in the newspapers, on radio and television sets. The

messages were transmitted further to the community levels through the agriculture system. The NGOs like PAM also transmitted the messages and provided the 'appropriate' seed to the farming community.

The flood plain, however, received relatively heavy rains. As a result some farmers lost the crop planted in the low lands due to high floods and the Zambia Meteorology Department was blamed for having misled the farming community. They were reluctant to cultivate large fields which would not grow well because of drought/dry spells. Some farmers said they could not grow the recommended crops because of lack of access to the proper seed. In Kaoma district the area under maize cultivation decreased from 26,949 hectares in 1996 to 19,980 hectares in 1997 whereas the area under millet cultivation increased from 3,674 hectares to 5,901 hectares (Department of Agriculture: 1998). The responses to the message were different from farmer to farmer.

Production Estimates

As already noted, there are many crop forecasting systems used to determine the production estimates. At the district level, the crop production estimates are made and from this the performance of the current season is compared to the previous one. The crop production message that comes from the crop forecast results into different reactions and actions.

Food Security Estimates

Estimates of food security have been controversial because of the variations in cereal requirements between various stakeholders. Various approaches are used to determine the food security situation. These are the food balance sheets, vulnerability assessment mapping and the food needs assessment.

1. Food Balance Sheets

The National Early Warning System Unit (NEWU) of MAFF with expertise from members of the Early Warning Technical Committee prepares the National Food Balance sheet and the Provincial balance sheets. The eleven organisations that constitute the Early Warning Technical Committee are the National Early Warning Unit, Food Health and Nutrition Information System, Famine Early Warning System, World Food Program, Program Against Malnutrition, Food and Agriculture Organisation, Food Reserve Agency, Zambia National Farmers' Union, Disaster Management and Mitigation Unit, UNZA and Zambia Meteorological Department. The food balance sheet basically incorporates the opening stocks from the previous season, current estimated crop production to produce or arrive at a surplus/deficit based on assorted staple food requirements. The National Food Balance sheet has traditionally been prepared to assist Government and the donor community to estimate food availability and to plan agricultural marketing activities. It forms part of the crop forecast reports which refer to expected production of major food and cash crops, expected consumption of food crops during the subsequent marketing season, and the resulting expected surplus or deficit of each food crop at a national level (FRA: 1997).

The Food Balance Sheet is the major tool for planning the major market interventions by the Government and justifying the need for food aid. The limitation with this approach is that it only focuses on availability but not access. It also does not provide detailed information in terms of the affected populations.

2. Vulnerability Assessments

The Vulnerability Assessment and Mapping (VAM) is an approach that is used to gain an insight into factors which contribute to food insecurity. It helps to:

- a) increase efficiency of resource allocation by identifying relative vulnerability of regions and groups to food security emergencies
- b) provide additional information for designing appropriate interventions which focus on factors directly impacting local areas and socio economic groups (Hermskerk: 1995).

Vulnerability analysis in Zambia is done at district level with the object of identifying food availability and accessibility for the current period as well as the average over a period of ten years. The information obtained from the vulnerability analysis provides indicative data of the food security situation but needs to be complimented by more detailed analysis at the lower level. This is because the districts are diverse and more localised data is much more useful for targeting purposes.

It may, therefore, be useful to involve the existing local structures to conduct the vulnerability assessments at the local level. The Area Development Co-ordinating Committees (ADCC) which fall within the framework of the District Development Co-ordinating Committees could be more appropriate because they are intersectoral and community-based.

Vulnerability analysis has in Zambia been used mostly to help in targeting relief food interventions to the presently food insecure areas. WFP's most visible and common role throughout the world is as an assessor of emergency food requirements and an implementor of emergency food distribution program. Consequently, the VAM exercise has had as one of its most important objectives the assessment of current food security conditions based upon both food availability and Zambians' access to food (VAM: 1996).

The objectives of the VAM analysis are:

- to assess the physical conditions that affect crop production
- to enhance geographic targeting of vulnerable areas for future intervention
- to provide early warning indicators to facilitate identification of areas where conditions have improved or deteriorated
- to recommend intervention strategies in the vulnerable areas

Methodology of vulnerability analysis looks at the analysis of risk and of coping ability. Analysis of risk conditions for food production include the following:

- vegetation levels
- drought/flood risk
- pest infestation and their occurrence
- limitations of physical access (distance to urban markets)
- market price changes

The indicators of coping ability used in the VAM are:

- income from crops,
- value of livestock,
- income from fisheries,
- income from transfers and
- wages and salaries.

The findings of the 1996 VAM analysis indicated that normal levels of vulnerability are generally highest - that is risk of drought is high at the same time that coping ability is low in most districts of Western Province (and Eastern and Southern Provinces) (1996 Zambia Vulnerability Assessment and Mapping Report). Four out of the then six districts of Western Province were identified as being vulnerable [at highest risk of drought] (Kalabo, Senanga, Lukulu and Sesheke).

3. Food Needs Assessment

The food needs assessment is conducted to identify people requiring food. The food needs assessment is carried out by different stakeholders to obtain the following information: crop performance, why the crop failed (floods/drought or lack of inputs) and household population requiring support.

Specific objectives of the food needs assessment are to:

- estimate the population affected by abnormal weather
- identify the type of households requiring assistance
- assess the quality of infrastructure in the affected districts
- determine the level of market access
- determine type of intervention required for various population groups

The stakeholders participating in needs assessment may vary from time to time but include key stakeholders involved in relief and food aspects from Office of the Vice President, Famine Early Warning System, National Food and Nutrition Commission, Meteorology Department, World Food Program, Program Against Malnutrition and National Early Warning Unit (MAFF). Some institutions carry their own independent needs assessments e.g. PAM.

Kalabo district was identified as a priority district and Senanga and Sesheke were identified as the less priority districts for emergency relief interventions in the 1998 Food Needs Assessment Survey conducted by the National Early Warning Systems. A total of 77,259 people were said to have been the affected population. WFP/FAO identified lower plains of Sesheke and Senanga districts and drought affected areas including Liangati in Senanga district as well as some surrounding areas in Sesheke district. The FAO/WFP Crop and Food Supply Assessment's estimated food requirement of affected population was 271,177 with a maize requirement of 18,801 Mt. The varying estimates confirm that different methodologies have been used to collect the information and in assessing the food security situation.

Food needs assessment should, ideally be conducted after the VAM analysis but the VAM report for 1998 (draft) came out in September after the food needs assessment which was carried out earlier in June/July. The VAM, thus, was not very useful.

The food requirements estimated for Western Province through the different methodologies have caused concerns because in assessing the food requirements for the province, the following aspects have been ignored:

a. The Agricultural Diversity of Western Province

Western Province may be divided into three major agricultural systems (see Map in appendix 4):

- A commercial crop-based agricultural system (Kaoma East, Lukulu East): mainly based on maize production on relatively good soils, producing a (maize) surplus in good years
- A wetland agricultural system (Mongu, Kalabo, Lukulu-West and Senanga-East): characterised by a diversity of garden types in wetlands (plains, dambos, river valleys) and uplands. Major crops include maize, cassava, sorghum and rice, . Livestock and fishing are also important in this system.
- A traditional subsistence agricultural system (Senanga-West and Sesheke). Major crops grown include maize, cassava, sorghum and millet

These systems may still be divided into various recommendation domains which may vary to some extent according to the type of recommendations on crops or livestock (Adaptive Research Planning Team - Western Province : 1993). Within districts there are variations. As a result, there is a need to consider these differences in the districts when undertaking the food needs and vulnerability assessments from where the food requirements are derived. Vulnerability Assessment and Mapping analysis particularly, has been criticised for making analysis at district level using district boundaries when there are different agro-ecological zones within these boundaries. The agro-ecological zones do not coincide with the district boundaries (Devereux: 1998, Wood et al: 1998).

VAM Report: 1998 admits that 'due to the heterogeneous groupings that are found in the districts, a concise analysis of vulnerability has rather been difficult. ...Even more complicating in the analysis is the issue of agro-ecological zones, which cut across district boundaries. This analysis does not specify the affected groups in the district. But detailed information is necessary for food distribution purposes and interventions, thereby providing more accurate data.

b. Different Garden Types

There are four wetland districts in the Province, namely - Kalabo, Lukulu, Mongu and Senanga. Different soil types prevail in these districts making cultivation of different crops grown at different times of the year possible. Two growing seasons for maize prevail, for example. Two maize harvests are possible, the early maize (green maize eaten from the cob) and the late maize planted in the higher land. The traditional farming combines these elements to satisfy the food needs of the farmers' households. A variety of crops like pumpkins, sweet potatoes and vegetables are grown. These contribute to food security situation particularly of the 'plains' people.

The early maize is planted around July/August in the plains and dambos and harvested around December/January. This is usually eaten as green maize, thereby reducing the hunger period. Although most of this maize is consumed, part of it is sold on the market for cash. According to Farming Systems Research Team - Western Province a relatively high proportion of the population has access to the wetlands (67%) (see table below).

TABLE 2: Farmer Categories for Different districts

| District | % Cattle owners | % Access to Wetlands |
|----------|-----------------|----------------------|
| Kalabo | 30 | 90 |
| Kaoma | 10 | 40 |
| Lukulu | 20 | 70 |
| Mongu | 30 | 90 |
| Senanga | 50 | 60 |
| Sesheke | 50 | 40 |
| TOTAL | 30 | 67 |

Source: Farming Systems Research Team - Western Province: 1993

c. The importance of other food crops

Maize has been seen as an important crop and many people prefer this to other food crops. There is a general belief that having maize is more important than other food crops. So the communities tend to emphasise that they have no food even when there are alternative food crops. Most parts of the Province cannot produce high yields of maize, while other crops grow better, for example, cassava, millet and sorghum (see Map showing the Technical Recommendation Domains in appendix 5). Rice production is on the increase and this provides an important source of income to the households contributing to household food security. Rice production in Western Province accounts for over 50% of total national rice production (MAFF Database). Furthermore, there is an increase in the hectarage under cultivation of crops like millet and sorghum in the Province. Crop diversification play an important role in improving the livelihood systems of the local people.

d. Timeliness of Response

Timeliness in responding is not only restricted to delivery of food but also to 'acquisition'. Sourcing for food may take time and this is done after it has been established that there is need to provide food aid. Thereafter, the logistical distribution to various areas becomes an issue. It generally is distributed later.

Distribution of relief food has tended to coincide with the harvest season and, therefore, not served the intended purpose. As a result it has been found to affect marketing of the local produce by depressing prices. In Senanga district relief maize was found in the market for K10,000 per bag in May, 1999 (pers. Comm. With a researcher who participated in the Impact Assessment). At the time of the study visit to Western Province [between 18 - 22 May] food was still being distributed. This coincided with the harvest season that falls between April and May for most food crops.

Food relief distribution was carried out from December 1998 to May 1999, and according to the cropping calendar in the Province, harvesting of different types of crops start in December (see diagram in appendix 6). The important question to ask here is to what extent in this case does food aid contribute to protecting asset disposal (productive assets) when the food aid is received after people's food availability increases? The positive impact of the food aid is supposedly the

improvement of food security situation by providing food thereby preventing the disposal of productive assets.

The logistics to deliver food are never put in place to ensure 'smooth' and efficient delivery. The Food Relief Monitoring visit to Sesheke and Shangombo by the Food Security Monitor (Famine Early Warning Systems) observed the difficulties that were experienced as a result of limited funds and inadequate transport for delivery (Zulu: April 1999). The food aid, thus, does not serve its purpose and it may be necessary to store the supplies when time runs out.

e. Different Ethnic Groupings

There are several ethnic groupings within the province with distinct cropping patterns and preferences. The Lozi are found around the Central plain; the Lozi-affiliated tribes like the Nyengo, Kwandi, are found in Mongu, Kalabo and Senanga districts. The Mbunda and Luvales are mainly found in the uplands and in Lukulu district

Dietary habits of these people vary from one ethnic group to another. The Lozi speaking people usually referred to as the 'plains people' prefer maize to cassava and they have their fields in the low lands. Accessibility to land types is also different for these different ethnic groupings, implying a diversity in crop production in the province. Intra-distribution of food between surplus and non-surplus areas is evident - redistribution of food.

f. Availability of other resources

Apart from agriculture production, cattle rearing, fishing and other non-agricultural activities (timber) are important socio-economic activities in most parts of the province. Fishing is the second important activity after agriculture (crop and livestock).

Food Security Forecasting at Districts and Provincial Levels

Food Security Forecasting at District and Provincial levels is primarily done by the Department of Agriculture. On the basis of the crop forecasting data they estimate the food requirements for their specific areas and they calculate the surplus/deficit as the case may be. The District Agricultural Co-ordinators (DACOs) do a preliminary crop forecast and make estimates of food requirement shortfalls as shown in the table below.

TABLE 3: Food Requirements for the Agricultural Season 1998/99

| Agricultural Block | Population | Expected Grain Production | Annual Grain Requirements (Tons) | Shortfall (Tons) |
|---------------------------|-------------------|----------------------------------|---|-------------------------|
| Mwandi | 15,000 | 2,628 | 3,420 | 792 |
| Kalobolelwa | 10,374 | 1,362 | 2,362 | 1,000 |
| Sichili | 9,175 | 2,457 | 6,922 | 4,465 |
| Loanja | 7,845 | 2,753 | 3,428 | 675 |
| Maondo | 7,843 | 1,375 | 2,108 | 733 |
| Total | 68,000 | 10,575 | 18,240 | 7,665 |

Source: Department of Agriculture, Sesheke

[Quoted by Zulu, Food Relief Monitoring Report in Sesheke and Shangombo]

Early Warning Indicators Used to Determine Food Security Situations

Early warning indicators help monitor people's access to food so as to provide timely notice when a food crisis threatens. The following are some of the indicators used within the Province.

Food Price Monitoring System

Food price monitoring done formally by Economic and Marketing Department (MAFF) and informally by the local people themselves is a particularly sensitive and early indicator of adverse shifts in the food security status. The price of staple food stuffs on the market increases as the supply also declines and this gives signals to the local people about the food availability situation in the area. At the national level, the Early Warning Unit makes use of the information collected by the Economic and Marketing Department.

The price information collected by Economic and Marketing Department is sent to AMIC where a Weekly Bulletin is sent back to the Province. This bulletin is, however, limited in circulation. The consumers and the traders do not have access to this information.

The food marketing trend/practice is that farmers sell relatively substantial amounts of their produce soon after harvest when the prices are low and run out of stocks in the lean months. Then they rely on what is available on the market. The problem is that during this period of scarce 'resources' the price of food produce rises about two to three times the price at the beginning of the harvest season, depending on the area. In March 1998 the average price of a 90 Kg bag of maize in Mongu was K43,500; this dropped to K28,600 in June when there was an increase in supply on the market (Economic and Marketing Department, Mongu).

Livestock Price Monitoring

The livestock price pattern is an important indicator of the food security situation in this area. In Western Province cattle play a very important role in the lives of the local people. An increase in the number of cattle sold is an indicator of the food security situation. Bartering of animals for food produce is also an important indicator which is evident during the lean period of the year ranging from August/September to December/January.

No official prices of cattle are available in the province. Currently cattle marketing in the province is largely unorganised and the cattle marketing information is not readily available. A Livestock Marketing Information System (LMIS) in Western Province is being promoted with the help of the Technical Advisory Group (TAG) to improve marketing information. Currently the cattle marketing is done by farmers (themselves), some middlemen and traders. Both the farmers and traders have expressed a need for more information on cattle marketing. However, their needs vary: farmers would like to have indications of current prices for different classes of cattle, for different places and times of the year. Traders' information needs focus on information about different slaughter arrangements and fees at urban abattoirs (Technical Advisory Group: 1997).

Weather Pattern

If floods come too early or when rains delay, the farmers themselves can know how the season is going to be. The local people may monitor the weather pattern themselves and determine, for example, how fast/high the floods are. If the floods are rising too fast and the maize in the field is not ripe then they know they will not have a good harvest/yield. The initial indicator of a good

harvest (season) is evident in the period when the maize is in the critical stage of growing (flower initiation period). This is particularly important for the province that has relatively lower rainfall.

Reliance on Other Resources

The increase in the number of people looking for work in the rural areas for food and use of fruits like eating green mangoes are important indicators. This information can easily be obtained from local sources though they do not keep statistics. The type of work most common is working in other people's fields during the lean months of the year. This could be monitored at community levels by the Area Development Co-ordinating Committees that follow in the district framework of the District Development Committees.

Other Early Warning Indicators

There are local indicators that the farmers use to tell what the season is going to be like and this may influence the type of crops they may decide to grow. If they expect good rains then a lot of rice would be planted (in anticipation of the good season) because rice (supa) does well in plenty of water. If the birds fly very high up in the sky then they anticipate a drought (implying that the ground surface is warm and the birds fly higher up where it is cooler and the opposite is anticipated when the birds fly low. These are important indicators because they help farmers make decisions as to the 'appropriate' crops to be grown in the coming season. However, they have mentioned that availability of input/right seed is a constraining factor.

Factors Responsible for Food Insecurity

There are several factors responsible for food insecurity, pointing to the fact that there are more important and necessary interventions that require to be made within the province to improve the situation and help the people 'jump out of the cycle'. Factors responsible for food insecurity in Western Province among others are:

- production fluctuations resulting from changes in weather patterns - drought and floods. Poor harvests are usually caused by inadequate rainfall. There might be too much or too little regionally localised rainfall, or extended dry spells during critical crop maturation phases
- distance from major markets, making transportation difficult and costly
- labor constraints - there is a tradition of able bodied men going to work in sugar plantations in Mazabuka (Southern Province) from April to November. This has negative implication on the communities they are coming from as most of the agricultural work is left entirely on the women. Another problem is that associated to labor productivity. During the peak period of labor input, most people have run out of food. Demand for labor coincides with limited availability of food (at household level).

4. RESPONSES TO CROP FORECASTING: FOOD AID

Different responses to crop forecasting are made by different stakeholders both at household, community, district, provincial and national levels. This section presents the types of specific responses. These responses show that the individuals, community and professionals are concerned about food security and realise that something needs to be done to ensure that affected people do not suffer.

There are adequate messages from various levels (both formal and informal) - the Ministry of Agriculture, Food and Fisheries at provincial and district levels, the local authorities (district councils) and the local communities concerning the food security situation in a locality. The local leadership, be it political or traditional, and the professional staff provide useful information. What is apparent is that there are limited resources mobilised at local level and resources are looked for at the national level.

1. Food aid

Food aid is one of the controversial responses to food production deficits by the donor community. More often than not food insecurity is interpreted as availability of maize grain. As a result, most interventions focus on improving access to maize as opposed to looking at other aspects that are paramount to the food security chain and more sustainable. Food aid is supposed to be a short term assistance, whose intended objective is misunderstood. It is felt that food aid is not warranted in most cases where it has been used country-wide and this is not an exception for Western Province.

More often than not Disaster Management and Mitigation Unit (DMMU) feels that when food crop production declines, the most appropriate response is food aid because the local people themselves cannot generate resources locally. From the way food aid has been handled, there is a great need to revisit it. It has become almost a permanent feature and an ultimate response. This may undermine local initiatives as it is evident that local people actually have demonstrated resourcefulness. Drought and flood occurrences are evident in the past years before the food aid interventions in 1991/92. People always found crops to grow that were adaptable to the prevailing conditions.

Food security is often equated to maize availability even though other foods are available. As a result, the response tends to be provision of food aid. This just solves the symptoms and not the causes of food insecurity in the province. Every year the local people face periodic food insecurity for various reasons. Drought exacerbates the situation. It is important that longer-term solutions are provided to ensure that people get out of this cycle. The fact that the local people annually experience the 'hunger' period and still manage to 'bridge the gap' until the next harvest season reveals that they do not entirely rely on their own production. For this time of the year they meet their food needs through purchases (either through cash or in kind) by providing their labor. The Food Needs Assessment: 1998 by the National Early Warning Systems revealed, for example, that Kalabo is one of the districts with a high proportion of households relying on purchases (62.7%). Maimbo et al: 1996 observes that the contribution of non-crop activities to total household income is high. Marketable surpluses consist of cattle, rice and fish.

TABLE 4: Percentage of Households Engaged in Non-Farm Income, Livestock and Fishing Activities, Selected Districts of Western Province

| District | Non-Farm Income | Livestock | Fishing |
|----------|-----------------|-----------|---------|
| Kalabo | 54.8 | 62.5 | 40.6 |
| Senanga | 23.5 | 52.9 | 80 |
| Sesheke | 46.9 | 57.7 | 18.8 |

Source: FHANIS: 1998

The reliance on maize has largely been blamed for the food insecurity experienced in the province. The Zambian government policy has in the past supported maize production and

marketing through provision of subsidies. This led to a situation where maize was grown even in areas that could not support maize production (not appropriate for maize production) resulting in low yields. This has had implications on the food security situation of the rural peoples. Over the years an increase in areas planted to drought tolerant crops [millet/sorghum and cassava] are increasing. This is a positive change for the province as it facilitated promotion of crops that are better suited to crops other than maize. Besides, these crops do not require use of fertiliser which is unaffordable for most of the rural farmers.

TABLE 5: Amount of Food Aid Distributed and Total Food Requirements per District (mt)

| Districts | Total Food Requirements (mt)+ | Rice Distributed (Mt)* | Maize Distributed (Mt)* |
|-----------|-------------------------------|------------------------|-------------------------|
| Kaoma | 1,189 | 30 | 130 |
| Lukulu | 1,446 | 60 | 89.7 |
| Mongu | 1,026 | 60 | 119.4 |
| Senanga | 660 | 30 | 217 |
| Shangombo | 327 | 120 | 230 |
| Kalabo | 371 | nil | 544 |
| Sesheker | 1,480 | 30 | 449 |

Source: PAM

Amount distributed as at 26th April, 1999 - These figures exclude the maize that was received late.

a. Relief Distribution

Program Against Malnutrition (PAM) was appointed the distributing NGO in Western Province. At the national level the stakeholders' meeting(s) identified NGOs that were active in different parts of the country and these were given the role of distributing food aid in specific provinces. In an effort to improve efficiency in food relief distribution, PAM used local NGOs as implementing NGOs (see table below) to distribute food but still there was a problem due to the fact that the food supplies were received late and there were also logistical problems within the Province. The implementing NGO is an organisation charged with the management of food relief activities in an area or community. The rainy season poses difficult communication problems for most part of the province. (refer to appendix 6). The NGOs were selected on a basis of a set of criteria - the physical location, mandate of these institutions, their capacities and the development activities they are involved in. By working with locally based, development NGOs, it was hoped that the potential negative effects of the relief food intervention would be minimised or at best avoided. The local NGOs would integrate the distribution exercise with their development activities

The implementing NGOs expressed a number of constraints that had implications on the distribution exercise. The constraints mentioned by some of the implementing NGOs include:

- a) use of own resources which proved to be costly
- b) delay in allocation of funds by PAM
- c) inadequate funding advances by PAM

Relief Food Impact Assessment was carried out in May 1999 to determine the impact of the relief food distribution on the traders, the local community and the institutions involved were also assessed. Institutions that participated in the Impact Assessment were World Food Program, National Disaster Management Unit, Mitigation Unit of the Office of the Vice President, Program Against Malnutrition, Famine Early Warning System/USAID, Food, Health and

Nutrition Information System and the Food and Agriculture Organisation. The assessment was carried out in three districts of Western Province - Senanga, Kalabo and Mongu and sixty households from each district were included in the study. The results of the assessment are not yet available. It is hoped that the findings of the assessment will provide useful information that will be used to improve relief food interventions in the country.

The impact assessment is the first one to be carried out in the country. It is hoped that the assessment will bring out both positive and negative effects of the food relief exercise and provide useful learning experiences that will bring a 'new approach' to future food aid interventions. What will be interesting is to see whether there are specific differences in experiences between districts/province.

TABLE 6: NGOs that helped in relief food distribution in Western Province

| District | Local NGO Used |
|-----------|--------------------------------------|
| Mongu | Young Women's Christian Association |
| | Keepers (Zambia) Foundation |
| | Youth and Child Care Foundation |
| Senanga | Senanga PPM |
| Shangombo | Shangombo PPM |
| | Sioma Mission |
| Sesheke | Sichili Development Committee |
| | Mwandi United Church of Zambia |
| | St. Kizito |
| Lukulu | Lukulu Catholic Mission |
| Kaoma | Kaoma YWCA |
| | Kaoma Red Cross |
| Kalabo | Kalabo Seventh Day Adventist Mission |

Source: PAM Co-ordinator, Kaoma

b. Targeting

Relief food distribution is done using self targeting mechanism (this mechanism is self selective and ensures that those who are better off fall out as the transfer is not attractive) whereby those who feel they can work for food would do so. Of the total food distributed in an area 20% goes to the vulnerable groups that are not able to work for the food and 80% goes for Food-for-Work activities. The vulnerable categories of people are identified by satellite committees¹ that help monitor the food distribution. At the district level there are Program for Prevention of Malnutrition (PPM) committees which usually include the District Agricultural Co-ordinators and District Council Secretaries and other government staff (health, education, community development) who monitor food distribution. These structures have been established by PAM.

In order to avoid free distribution of food aid to able bodied people, the distribution of food aid is designed in such a way that it contributes to development/improvement of community infrastructure. As a result the recipients of the food aid (FfW) are expected to work. The communities contributed their labor to improve their roads, bridges and health centres among other projects.

Targeting is admittedly a crucial factor and yet difficult in relief food distribution. It is not easy to guarantee that the intended beneficiaries will actually receive the transfer partly because of

¹ Satellite committees are made of the government staff (health, community development) and also the traditional leadership. The purpose is to monitor relief food distribution at the local level.

political expediency and also because of the competing interests. Ideally, food aid should be targeted towards the hardest hit areas with the most severe vulnerable population in those districts.² The problem is that everybody wants to benefit and feel that they deserve the food. They see food aid as a gift and that they are entitled to it. Some feel that they are not supposed to do any work [for it] because some 'caring donor' has provided the food to the communities that have suffered a disaster. As one official involved in relief distribution said the Council Secretary in one district emphasised that he would like everybody 'to smell the food'.

For the involvement of individuals in the Food-for-Work Programs, they were entitled to 350 grams of cereal meal including an allowance of 350 grams for five of his/her household members. This requirement was calculated on the assumption that the average household has six members. In principle only one member from a household was supposed to work but in reality this did not work. It was difficult to stick to this guideline [it was not always implemented because of pressures from the local community and some local leadership].

Improving targeting has implications on resources and time that would be invested. But given that the food aid is an emergency intervention the urgency of the intervention makes it difficult to spend time on targeting issues. And this has been a great limitation of ensuring the efficacy of reaching the intended beneficiaries. Clearly there are no guidelines to ensure that the vulnerable people in the communities are identified. Female Headed Households (FHHs), for example, are amongst the vulnerable groups that would be affected by crop failure because they are comparatively disadvantaged than Male Headed Households. They have less resources to fall back on. Without clear guidelines to deliberately include the Female Headed Households, they may be left out and not benefit from the projects. Gender targeting in food aid may be useful in Western Province with the high number of FHHs.

Although there are guidelines provided as to who should participate, selection of who to participate is at the discretion of the implementing NGOs. Some of the PPM Committees, are not very active and only a handful of the members are and these make decisions on their own. The PPM Chairman in Sichili (Sesheke district) reported that even the government workers participated in Food-for-Work activities and other members of the committee were not consulted during the distribution exercise (Zulu: 1999).

c. Food Aid, Is It Necessary?

The Province has in the past years (1991/2 and 1994/5) and more recently 1998/99 seasons suffered from drought/floods making it one of the recipients of relief food. Within the Province there have been some concerns raised as to the relevance, timing and the quantities of food aid distributed especially that some of the food has been found being sold on the market (MAFF Food Security Assessment Report: 1995).

d. Conclusions

Given the scenario in Western Province concerning the food security situation, it is important to promote interventions that will have long term impacts on food availability in the traditionally food insecure region. Food aid is not a solution because it does not solve the problem but rather perpetuates the dependency situation. The 'regular' food insecurity situation experienced need to be avoided by putting in place interventions that will have long term impacts and improvements

² FEWS - Zambia January Monthly Report, 1998

of the food security situation. Consequently, non-food aid responses may be more appropriate for most of the populations.

However, the more vulnerable households could still be supported to ensure that they have adequate access to staple food supplies. The Department of Social Welfare has a social safety net known as the Public Welfare Assistance Scheme (PWAS) that currently is not capable of supporting the vulnerable people because of lack of funds. It is hoped that with the financial support from the European Union recently (June 1999), the vulnerable people will adequately be supported by the scheme. The scheme does not support persons that have been affected by drought/floods. The category of beneficiaries of the scheme include the sick, elderly, lame, blind, orphans and widows.

It is evident that trying to secure food aid for the areas hardest hit and distributing it requires time such that when the food gets to the intended populations it may be too late (after the period it is needed). It would, therefore, be useful to have contingency measures/resources within the province that could be used to address the problems related to relief interventions. A Disaster Fund managed at provincial level would be one such initiative to ensure timely and efficient response to a disaster. Resources should be available at the local level for such use.

2. Cash-for-Work Program

The Royal Netherlands government has been particularly concerned about the long term impact of food aid and has not been keen of providing food aid. As a result of the (partial) drought that occurred in the 1994/5 season which succeeded the poor season of 1993/94 the Royal Netherlands Government decided to meet the Zambian request for targeted food aid by financing a program called 'Cash-for-Work'. This, as the name suggests, is different from the traditional Food-for-Work since the beneficiaries receive cash transfers as opposed to food.

The decision to use cash and discontinue the usual maize handouts was based on the following considerations:

- Usual targeted food aid was oversized in both magnitude and time, therefore, disturbing the development of an effective liberalised maize market.
- The area was adjusting to liberalised agricultural marketing implying that developing local production and marketing of crops more suitable than maize was important
- Both magnitude of food shortages and number of people affected were uncertain.
- Distribution of large quantities of relief food has proved very difficult, especially under difficult conditions of Western Province.
- The local traders would make the food available on the market.
- Cash would not depress food prices locally and not be a disincentive to local food production.

The objectives of the program were:

- a) to mitigate the negative effects of traditional food aid on market liberalisation.
- b) to increase food security particularly among the poor population.

The program was initially started in Kalabo district in August 1995 and was later introduced to Mongu in December, 1995 and Lukulu in 1996. The impact assessment of the program revealed that there was an increase in the number of traders that operated in the areas as a result of the cash injected into the local economy. The program had multiple impacts that trickled down to the non-participating households and communities. Maize and mealie/meal were supplied on the market.

Cash-for-Work program is an alternative to food aid that has not been used [widely] in many areas but whose impact on the local community is wider and positive. The program has supported the investment in agriculture and promotion of local economy. Given the difficult conditions under which the relief food/food aid is distributed, it is more useful to introduce the use of cash transfers as opposed to food.

There is a tendency to underestimate the role of the private sector in provision of the staple food on the market. This notion is justified on the basis of the distance to the rural areas and the bad state of the rural infrastructure. The government, therefore, intervenes by providing the maize grain on the market to the disadvantage of the private sector and also supports provision of food aid. But it is quite evident that the private sector is quite active and does reach the remote areas where the government or relief interventions may not reach because of the type of transport modalities they use. They supply in ox-carts/canoes.

Although the economy is highly self contained... this does not imply that people do not participate in the market³. The local economy operates at the rural communities' own capacity.

5. MARKET RESPONSES

The liberalisation process entails that the private sector takes an active role in agricultural marketing and input supply. Generally, the involvement of the private sector has been relatively low in the province because of the unattractiveness of the area resulting from poor infrastructure. Traders prefer to go to areas where infrastructure is more developed, as this has financial implications.

At the community level, however, there are individual traders that take the initiative to supply food on the market which is sold both in large and small quantities. This was proven by the Cash-for-Work Program that was introduced to improve the purchasing power of the local people. The CfW program improved food security and promoted private trade in the year 1995. Maize grain and mealie meal was transported to the project area using ox-drawn carts and canoes. Traders took initiatives to supply food to these areas and trade was facilitated. In Kalabo district, maize has been supplied from Nyengo 70 Kms away from the township. Nyengo is one of the traditional (maize) surplus producing areas for Kalabo.

Within communities, surplus and non surplus households exist, with re-distribution of staple food through either cash and/or barter trade of processed products, non agricultural products or wage labor.

Crop and Livestock Marketing

The marketed crop production volumes are difficult to determine because no official records are kept as to the stock that are sold in the public markets. The prices are tracked on a weekly basis

³ Maimbo et: 1996 Opportunities for Western Province: An Agro-Economic Reconnaissance Study

by Economic and Marketing Department. However, this information is not collected for immediate consumption/use by the local communities. The information is sent to Agriculture Marketing Information Centre (AMIC) from where it is analysed and presented in a Weekly Bulletin that is sent back to the Province. The bulletin provides information on the prices of staple and cash crops for different provincial towns. The distribution of the bulletin is limited. There are also gaps or inconsistencies in the data collection resulting from break-downs in communication. Problems cited in dissemination of crop marketing information in the Province include:

- a) lack of transport
- b) long distances to cover
- c) poor and undeveloped road infrastructure
- d) insufficient resources to improve dissemination of market information through the bulletins to the rural farmers.

It is important to track prices for use at districts and provincial levels to ensure that local people are aware of prevailing prices as well as the availability of stocks. This would facilitate trade within and between the districts. It is evident that traders get to know about the market information through informal systems. Knowledge of the prevailing prices would help the traders decide where and what crops could be bought in one area and sold in another (following the laws of supply and demand). There are, however, few traders actively involved in the province and they are limited in terms of the areas they can reach.

The problem of limited intervention by the private sector may partly be attributed to the lack of information. It has been observed that the emerging 'commercial' farmers make their own arrangements to acquire such information because they have the resources and contacts. Every Tuesday, in the Post Newspaper the prices of the staple food stuffs are published for the general public but this still does not reach the rural farmers who remain disadvantaged. They sell their produce at low prices because they cannot bargain for a fair price.

Basically there are two reasons for this:

- a) lack of market information
- b) distance from the main urban markets.

Traders also rely on the contacts they have in the areas where they have been active. One trader confirmed that since he is known in the area where he buys cattle from, the Area Chief sent messages asking him to supply maize/mealie meal to the area as people there had run out of food.

The problem of lack of market information by the farmer and distance from the urban market is disadvantageous. Farmers will only be aware of what prices they received previously, not the current year's trend is. They are not aware of what their alternatives are at the urban market. Furthermore they are faced with the availability of only a limited number (possibly one at a time) of traders. Meanwhile, the trader would already have calculated his profit and would thus, press to get the produce at the lowest rate he can afford to negotiate [to the disadvantage of the poor farmer]. This is a common scenario the rice, maize and cattle farmers find themselves in. Mulozi and Hichaambwa: 1996 observes that rice farmers near the main road sold their rice at relatively higher prices compared to those further away.

In some parts of Western Province (especially those with a relatively high cattle population), cattle marketing is a good indicator of the food security problem. In December 1998, a 25 Kg bag of Roller Meal in Shangombo⁴ was costing K35,000 and one trader was exchanging 3 bags for an animal. He exchanged 300 x 25 Kg bags of Roller Meal for 90 cattle which he sold in Lusaka. During hunger period the price for cattle may be as low as K300 - K400 per Kg [pers. Comm with a local cattle trader]. As a result there are many part time cattle traders during this lean period. Some live locally while others come from along the rail line (especially the Copperbelt and Lusaka). Zambeef, the main cattle buyer in the Province offers K1,400 per Kg but not all the farmers are able to trek their animals there. This situation confirms the general observation that sale of cattle is necessitated by need, and during the lean months the farmers settle for what is available at whatever the cost. A cattle trader during the month of May failed to buy animals in one area because of the prices were pegged high. Then they dictate the price and they tend to refuse to negotiate. They give the trader a *'take it or leave it'*. Soon after the harvest, sales of animals is low and farmers ask for high prices because they are not under pressure to sell off their animals.

Although the extension officers have been sensitised to the value of market information, very few, if any, carry out this activity. They are important agents for dissemination of the market information. There are plans to have a Provincial Weekly Bulletin and also big bill boards in the market places indicating the prevailing market prices (pers. Comm with Mr. Liyembani Senior Economics and Marketing Information Officer, Western Province). At the community level it would also be important to keep track of the barter exchange for specific items and observe the seasonality changes and/or trends - how this varies over time.

Cereal Banks

It is important to prepare people for what may happen in a bad season. At the community level they could be encouraged to have 'food reserves' to store their produce. Netherlands Development Organisation, through a local NGO People's Participation Service (PPS), has introduced cereal banks projects in two districts of Western Province (Senanga and Sesheke). The purpose of this project is to enable communities store their own grain and be able to sell it or consume it later in the year when stocks decline. Although this is still at a pilot phase some benefits have been obtained - women's groups participating in the project have sold off their maize at higher prices during the lean period.

The main aim of storing grain is to have it when the grain is scarce for consumption or sell it when the prices are high (if there is surplus). This, therefore, promotes food security of the rural people. The storage bins are made using local resources.

Farmers tend to sell their produce soon after harvest at low prices. Due to distances from the urban centres and markets, farmers are not better able to negotiate for better prices. They sell part of their produce at low prices and two to three months later they run out of food because they generally do not produce enough to go up to the next harvest season. Cereal banks can easily be managed by the local communities and they need to be encouraged to store their grain.

This initiative has also worked very well in Kalabo where the Catholic Mission used to buy staple food [earlier maize only and later changed to millet as a way of encouraging production of millet] from the local community, store it and resell it during the 'hungry' season. Although the

⁴ Shangombo district lies extreme south west of Zambezi river and it has until 1997 been a sub-district of Senanga district.

produce was sold at a higher price than it was bought at, the selling price was comparatively lower than the prevailing price anywhere else. The produce was stored in the local area. Unfortunately, the Mission could not go ahead with this initiative because of the financial limitations.

To improve the market value of local produce thereby increasing the income levels of the rural farmers, People's Participation Service (PPS) has promoted parboiling of rice at village/community levels among the rice growing groups. This ensures that the rice grains do not break when polished and attracts relatively high prices. Income realised from sale of the rice could be used by farmers to meet their basic needs while the staple food crop is stored for consumption thereby improving food security at household level.

Seed Distribution

As part of the Drought Rehabilitation Program, PAM has also been, through selected organisations distributing early maturing and drought resistant varieties to farmers. The types of seeds distributed include maize, cowpeas, sunflower, cassava, ground nuts, millet and sorghum. Local NGOs are also used to distribute the seed to the local communities. Low recovery rates (30%) have been registered by PAM because of the poor agricultural seasons. PAM's condition for the loan is 2x 50 Kgs maize for a 10 Kg bag of seed. The farmers are expected to pay back when they harvest their crops.

Food Reserve Agency (FRA)

APG Milling (Mongu) is an appointed agent of Food Reserve Agency (FRA) and in the previous season (1997/98) was selling maize grain to consumers. This was an effort to ensure that the local consumers had access to the staple food. A 90 Kg bag of maize grain was pegged at K40,000 [in Mongu] as a way of controlling the price of the commodity and ensure that consumers obtain their staple food at a stable price.

In Sesheke district several local institutions have been identified as the selling points of maize from the FRA and Keepers (Zambia) Foundation will co-ordinate the selling activities. This is an effort designed to improve availability of maize supplies on the market.

TABLE 6: Seed Distributed in Western Province by PAM – Drought Rehabilitation Program

| District | Unit Package (Kgs) | Number of Bags |
|---------------|--------------------|----------------|
| Lukulu | | |
| Maize | 10 | 400 |
| Sorghum | 5 | 100 |
| Sunflower | 5 | 0 |
| Cowpeas | 2 | 100 |
| P-Millet | 2 | 100 |
| Groundnuts | 10 | 0 |
| Mongu | | |
| Maize | 10 | 600 |
| Sorghum | 5 | 100 |
| Sunflower | 5 | 0 |
| Cowpeas | 2 | 150 |
| P-Millet | 2 | 150 |
| Groundnuts | 10 | 50 |

| District | Unit Package (Kgs) | Number of Bags |
|------------------|--------------------|----------------|
| Kalabo | | |
| Maize | 10 | 1,600 |
| Sorghum | 5 | 100 |
| Sunflower | 5 | 0 |
| Cowpeas | 2 | 50 |
| P-Millet | 2 | 100 |
| Groundnuts | 10 | 0 |
| Senanga | | |
| Maize | 10 | 350 |
| Sorghum | 5 | 500 |
| Sunflower | 5 | 0 |
| Cowpeas | 2 | 150 |
| P-Millet | 2 | 300 |
| Groundnuts | 10 | 0 |
| Sesheke | | |
| Maize | 10 | 300 |
| Sorghum | 5 | 500 |
| Sunflower | 5 | 0 |
| Cowpeas | 2 | 300 |
| P-Millet | 2 | 500 |
| Kaoma | | |
| Maize | 10 | 950 |
| Sorghum | 5 | 450 |
| Sunflower | 5 | 200 |
| Cowpeas | 2 | 200 |
| P-Millet | 2 | 50 |
| Groundnuts | 10 | 500 |
| Shangombo | | |
| Maize | 10 | 50 |
| Sorghum | 5 | 200 |
| Sunflower | 5 | 0 |
| Cowpeas | 2 | 0 |
| P-Millet | 2 | 200 |

Source: PAM

GENERAL CONCLUSIONS

- Given the important role crop forecasting information plays, it is important that this information is available at local levels within the province.
- Improving food security situation is a challenge to the local communities and the nation as a whole that need to be solved by diversifying crops and income generating activities thereby promoting long term solutions.
- Interventions that need to be made are area-specific and treating districts as homogenous areas is not appropriate.
- Although the private traders have limited capacity, they are important actors in making food available to food deficit areas.
- In order to improve targeting of recipients of food aid, it would be desirable for food needs and vulnerability assessments to be carried out by the local people.

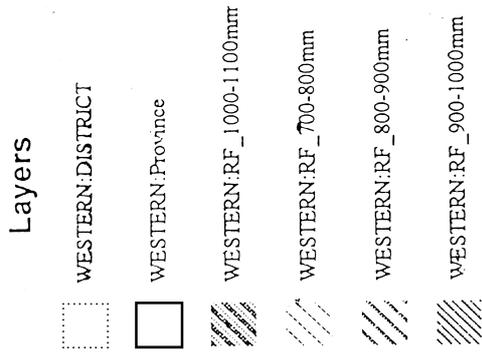
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APPENDIX 1: PERSONS INTERVIEWED

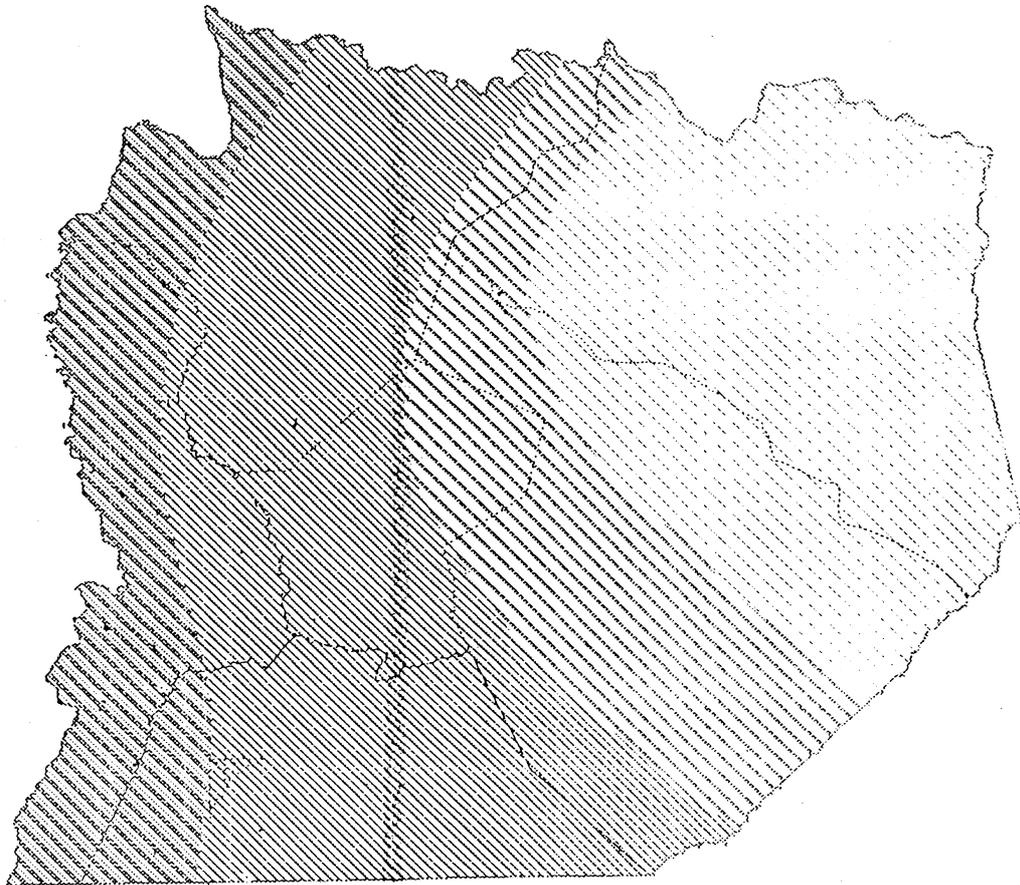
| | |
|--|------------------------|
| Deputy Permanent Secretary - Western Province | Mr. Colenbrander |
| Busiku Consultants for Development | Mr. Mukungu |
| District Agriculture Co-ordinator Mongu District | Mr. Sikota |
| District Agriculture Co-ordinator Lukulu District | Mr. Mwendamena |
| District Agriculture Co-ordinator Senanga District | Dr. Chiwawa |
| District Agriculture Co-ordinator Shangombo district | Ms. Ndulu |
| District Agriculture Co-ordinator Kaoma district | Dr. Mofya |
| District Agriculture Co-ordinator Kalabo district | Mr. Hamukali |
| Provincial Agriculture Co-ordinator | Dr. Minyoi |
| Principal Veterinary Officer | Mr. Siachoono |
| Food Aid Monitor | Mr. Tauzeni |
| The Manager Zambeef | Mr. Lewanika Munyinda |
| Cattle trader | Mr. Liyembani |
| Senior Economic and Marketing Officer | Area Chief Kaongolo |
| Malondo area | Yuka Adventist Mission |
| Dr. Ray Perana | Mr. Flanagan |
| Technical Advisory Group | Mr. Shimbilimbili |
| Technical Advisory Group | Mr. Kasongo |
| Keepers (Zambia) Foundation | Mr. Sitwala |
| District Planning Officer | |
| District Council Secretary - Kalabo | |
| Provincial Development Advisor - DDSP-WP | Mr. Young Cappon |

APPENDIX 2: RAINFALL ZONES



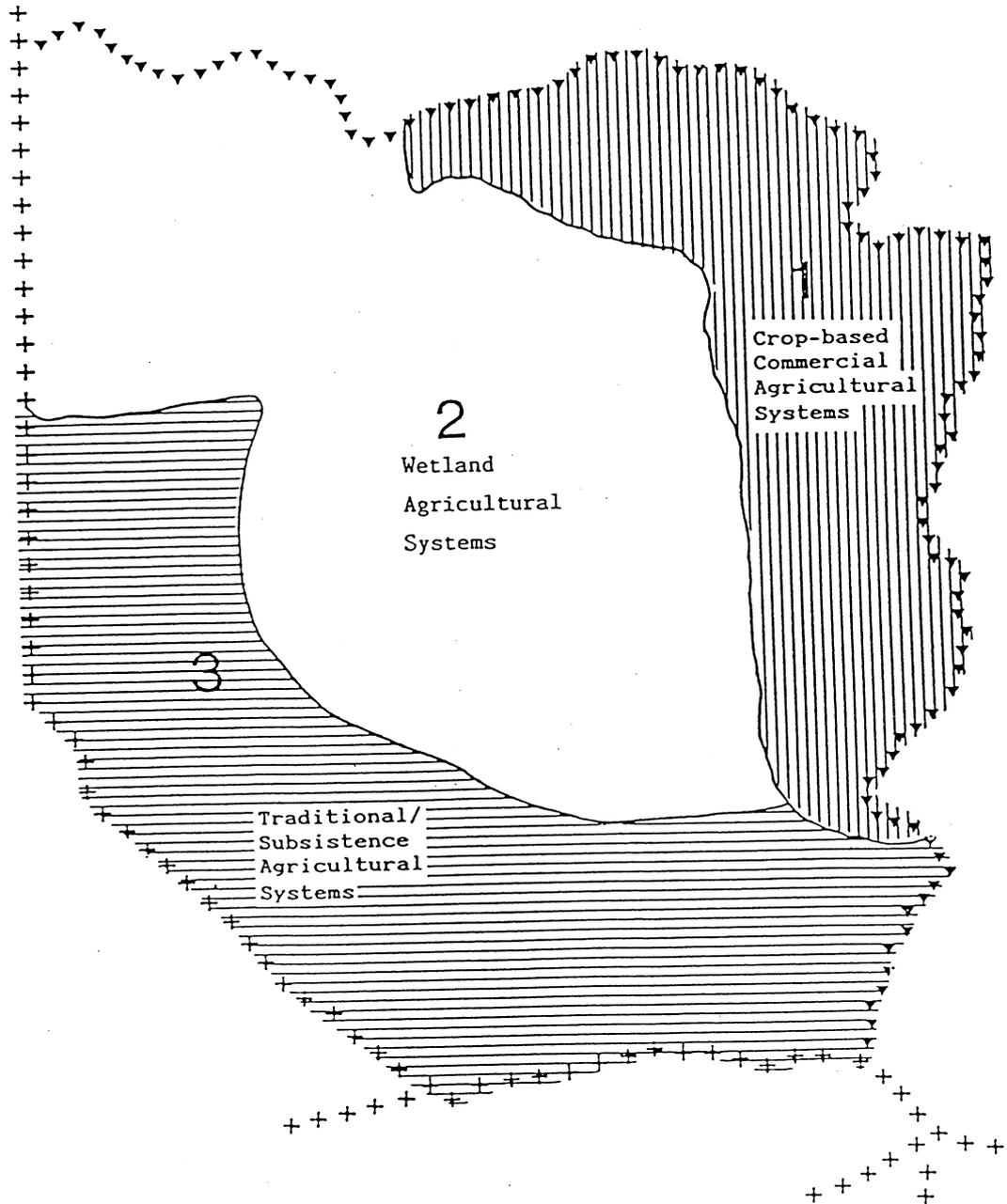
Rainfall Zones

Western Province



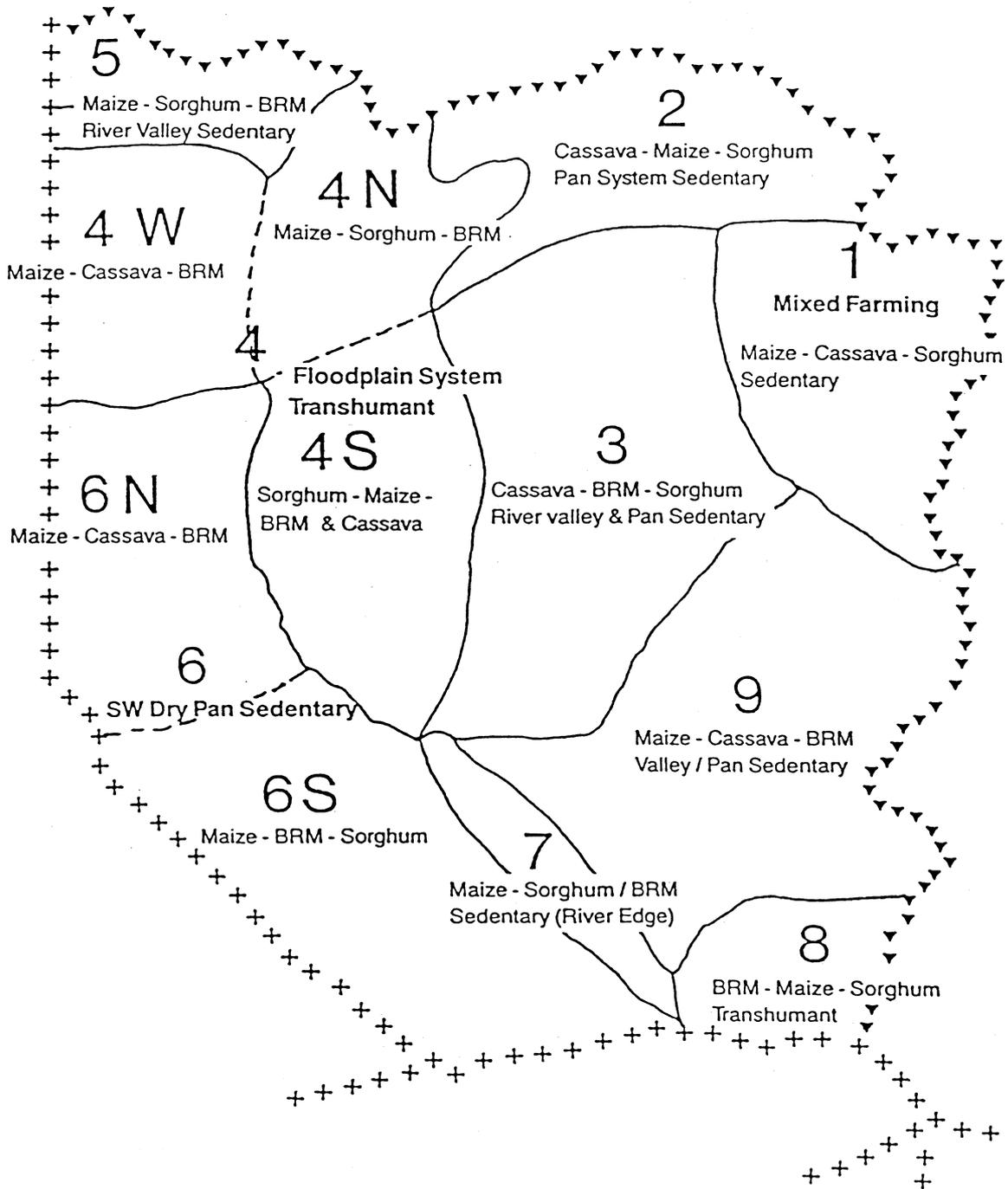
APPENDIX 3: CROP DATA FOR WESTERN PROVINCE

The three broad agricultural systems



Source: Farming in Western Province (Muwamba, 1988)

APPENDIX 4: TECHNICAL RECOMMENDATION DOMAINS

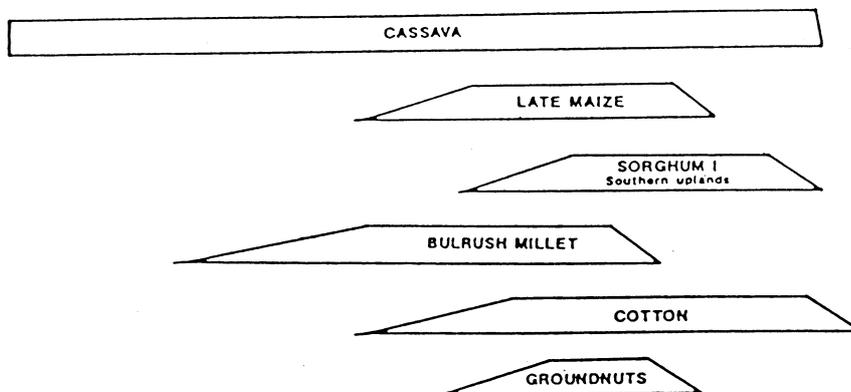


Source: Farming in Western Province (Muwamba, 1988)

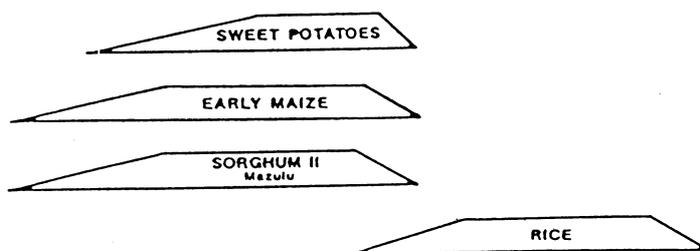
APPENDIX 5: CROPPING CALENDAR FOR WESTERN PROVINCE

CROP CALENDAR FOR WESTERN PROVINCE ZAMBIA

UPLAND PLAIN



LOWLAND AND UPLAND / LOWLAND EDGE



| July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Febr. | Mar. | April | May | June |
|------|------|-------|------|------|------|------|-------|------|-------|-----|------|
| 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 |

Figure 7 Crop calendar for Western Province Zambia.

Source: van Gils . 1988

APPENDIX 6: RELIEF FOOD DISTRIBUTION IN SESHEKE AND SHANGOMBO DISTRICTS IN WESTERN PROVINCE, 1998/99 SEASON

This brief report is based on field visits by Mr. David Soroko of USAID and a field trip undertaken by the Famine Early Warning System (FEWS) Food Security Monitor (Mr. Ballard Zulu) in Sesheke and Shangombo districts of Western Province. The visits were made between the months of April and May, 1999. The Crop Forecasting Report to NEWU by the Department of Economics and Marketing Department has also been included. The paper attempts to show how the distribution of food was done and how crop forecasting messages are interpreted. .

Food relief distribution in the two districts was done by local NGOs. In Sesheke district the local NGOs were Sichili Development Committee, Mwandu United Church, and St. Kizito while in Shangombo district it was Sioma Catholic Mission, Nangweshi PAM - PPM committee. These institutions were sub-contracted by the leading implementing NGO responsible for food relief distribution in the province - Programme Against Malnutrition (PAM)..

The food transfer that was distributed and the basis of this presentation is sorghum that was contributed by USAID (10,000 metric tons) towards the 1998/99 food relief effort in the country. A total of 650 metric tons were designated for distribution in the two districts. At the time of the visit only about 9% of the total consignment had been distributed.

Problems Encountered in Distribution

The following are the problems encountered by the local NGOs during distribution:

- a) inadequate funds received from PAM-Lusaka
- b) political interference from Ward Councillors
- c) delays in allocation of funds by PAM
- d) lack of adequate transport to deliver the supplies

NGOs' Effectiveness

- a) the relief distribution exercise was in some cases done by a few members of the PPM committees
- b) some supplies were reported to have been sold by the members of the PPM (to the District Hospital).
- c) misuse of truck dispatched by PAM-Lusaka for distribution of relief food

Targeting Issues

The following are the targeting issues that were noted:

- a) no guiding principles were applied in the targeting of food the populations that were affected as a result of crop failure
- b) only one committee reportedly distributed food to households that experienced food failure (in Sesheke Central Constituency).
- c) areas affected as a result of crop failure were targeted
- d) control over distribution and targeting aspects is not possible and the implementing organisations tend to do what is convenient for them.
- e) the agricultural staff provide useful information in identifying areas that have suffered crop failure.

It was observed that although the sorghum was intended to address the food insecurity situation of 1997/98 season, the food security problems brought about the crop failure of the 1998/99 agricultural season were also addressed. Field visits in the two agricultural blocks revealed poor performance of the maize crop and in another agricultural camp there were reports of extensive crop damage by elephants (Mulobezi Camp). The final crop forecast by the Department of Economics and Marketing indicates above 80% of crop failure and sees a need for extra food aid in the area.

However, in other areas that were designated to receive food aid the harvests were above average and the people interviewed indicated that there was no need for food aid at the time. They were of the opinion that the relief food would become useful in the month of October (when their own stocks deplete). The availability of food in this area has also been noted by the Department of Economics and Marketing Department, Sesheke. The prices of maize meal have dropped. In Shangombo district, the DACO estimates that 60% of population had at the time of the harvest enough food though it would not be enough to last them until the next harvest season.

Given the food security situation, it is important to look at ways of improving economic security in these areas to get the households to escape the cycle once and for all and relief aid is not the ultimate solution. People need to rebuild their food security for the longer term and this is the challenge of the local communities and the nation as a whole.

ANNEX 5. The FAO FBS Model

The following summary is based on materials extracted from the FAO website. It is based on two documents: One by Ladislav Kabat, Director of the FAO Statistics Division. "Supply Utilization Accounts And Food Balance Sheets In The Context Of A National Statistical System" and the introduction to the 1992-94 food balance sheets posted on the FAO website.

A food balance sheet presents a comprehensive picture of the pattern of a country's food supply during a specified reference period. The food balance sheet shows for each food item i.e. each primary commodity and a number of processed commodities potentially available for human consumption the sources of supply and its utilization. The total quantity of foodstuffs produced in a country added to the total quantity imported and adjusted to any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period. On the utilization side a distinction is made between the quantities exported, fed to livestock, used for seed, put to manufacture for food use and other uses, losses during storage and transportation, and food supplies available for human consumption. The per caput supply of each such food item available for human consumption is then obtained by dividing the respective quantity by the related data on the population actually partaking of it. Data on per caput food supplies are expressed in terms of quantity and by applying appropriate food composition factors for all primary and processed products also in terms of caloric value and protein and fat content.

Annual food balance sheets tabulated regularly over a period of years will show the trends in the overall national food supply, disclose changes that may have taken place in the types of food consumed, i.e. the pattern of the diet, and reveal the extent to which the food supply of the country, as a whole, is adequate in relation to nutritional requirements.

By bringing together the larger part of the food and agricultural data in each country, food balance sheets also serve in the detailed examination and appraisal of the food and agricultural situation in a country. A comparison of the quantities of food available for human consumption with those imported will indicate the extent to which a country depends upon imports (import dependency ratio). The amount of food crops used for feeding livestock in relation to total crop production indicates the degree to which primary food resources are used to produce animal feed which is useful to know when analysing livestock policies or patterns of agriculture. Data on per caput food supplies serve as a major element for the projection of food demand, together with other elements, such as income elasticity coefficients, projections of private consumption expenditure and of population. It is important to note that the quantities of food available for human consumption, as estimated in the food balance sheet, relate simply to the quantities of food reaching the consumer. However, the amount of food actually consumed may be lower than the quantity shown in the food balance sheet depending on the degree of losses of edible food and nutrients in the household, e.g. during storage, in preparation and cooking (which affect vitamins and minerals to a greater extent than they do calories, protein and fat), as platewaste or quantities fed to domestic animals and pets, or thrown away.

Food balance sheets do not give any indication of the differences that may exist in the diet consumed by different population groups, e.g. different socioeconomic groups, ecological zones and geographical areas within a country; neither do they provide information on seasonal variations in the total food supply. To obtain a complete picture, food consumption surveys

showing the distribution of the national food supply at various times of the year among different groups of the population should be conducted.

The first attempts at preparing FBS date back to World War I. FBS were the leading source of data when, in 1936, at the request of the League of Nations Mixed Committee on the Problem of Nutrition and its Sub-Committee on Nutritional Statistics, a systematic international comparison of food consumption data was prepared.

During World War II, the interest in FBS increased considerably. The Inter-Allied Committee on Post-war Requirements used them in 1942/43 in their studies of post-war requirements in European countries and an even more detailed technique was developed and employed by a joint committee of experts from Canada, the United States of America and the United Kingdom in the report "Food Consumption Levels in the United States, Canada and the United Kingdom". During these years, FBS were also constructed in Germany for the country itself as well as for the occupied countries. In the work of the International Emergency Food Council, which dealt with problems of food allocation and distribution in the period of worldwide food shortages after the war, FBS played an important role.

From the outset, the Food and Agriculture Organization of the United Nations (FAO) has given considerable importance to furthering the development of FBS, reflecting their usefulness in analyzing the food situation at the level of individual countries. The technique has been extensively employed in FAO's "World Food Surveys". The "Handbook for the Preparation of Food Balance Sheets" was published in 1949. Since then, FBS have been prepared and published by FAO on a regular basis.

Concepts and definitions used in food balance sheets

Commodity coverage

As already indicated, all potentially edible commodities should, in principle, be taken into account in preparing food balance sheets regardless of whether they are actually eaten or used for nonfood purposes. Whenever possible trade in processed commodities is expressed in the originating primary commodity equivalent. A list of commodities and their classification into major food groups, prepared by FAO for food balance sheet purposes, is shown in the Annex.

Production

In principle, production figures relate to the total domestic production whether inside or outside the agricultural sector, i.e. it includes noncommercial production and production from kitchen gardens. Unless otherwise indicated, production is reported at the farm level for crop and livestock products (i.e. in the case of crops, excluding harvesting losses) and in terms of live weight for fish items (i.e. the actual exwater weight at the time of the catch). As a general rule, all data on meat are expressed in terms of carcass weight.

Imports

In principle, this covers all movements into the country of the commodity in question. It includes commercial trade, food aid granted on specific terms, donated quantities and estimates of unrecorded trade. As a general rule, figures are reported in terms of net weight, i.e. excluding the weight of the container.

Stock changes

In principle, this heading comprises changes in stocks occurring during the reference period at all levels between the production and the retail levels, i.e. it comprises changes in government

stocks, in stocks with manufacturers, importers, exporters, other wholesale and retail merchants, transport and storage enterprises and in stocks on farms. In actual fact, however, the information available often relates only to stocks held by governments and even these are not available for a number of countries and important commodities. For this reason food balance sheets are usually prepared as an average of several years since this is believed to reduce the degree of inaccuracy contributed by the absence of information on stocks. In the absence of information on opening and closing stocks changes in stocks are also used for shifting production from the calendar year in which it is harvested to the year in which it is consumed.

Exports

In principle, this covers all movements out of the country of the commodity in question during the reference period. Remarks made above under Imports apply by analogy.

Domestic supply

There are various ways of defining supply and, in fact, various concepts are in use. The elements involved are production, imports, exports and changes in stocks (increases or decreases). There is no doubt that production, imports and decreases in stocks are genuine supply elements. Exports and increases in stocks might, however, be considered as utilization elements. Accordingly, the following are possible ways of defining supply: Production + imports + decrease in stocks = total supply Production + imports + changes in stocks (decrease or increase) = supply available for export and domestic utilization Production + imports exports + changes in stocks (decrease or increase) = supply for domestic utilization. This concept is used also in this document.

Feed

This comprises the amounts of the commodity in question and of edible commodities derived therefrom not shown separately in the food balance sheet fed to livestock during the reference period, whether domestically produced or imported. Seed. In principle, this comprises all amounts of the commodity in question used during the reference period for reproductive purposes, such as seed, sugar cane planted, eggs for hatching and fish for bait, whether domestically produced or imported. Whenever official data were not available, seed figures have been estimated either as a percentage of supply (e.g. eggs for hatching) or by multiplying a seed rate with the area under the crop of the subsequent year. In those cases where part of the crop is harvested green (e.g. cereals for direct feed or silage, green peas, green beans), account has been taken of the area under the crop harvested green.

Food manufacture

The amounts of the commodity in question used during the reference period for manufacture of processed commodities which could not be converted back to their originating primary commodities or which are part of a separate food group (e.g. sugar, fats and oils, alcoholic beverages) are shown here. The processed products do not always appear in the same food group. While oilseeds are shown under Oilcrops, the respective oil is shown under the group Vegetable oils; similarly, butter is under Animal fats and not under Milk.

Waste and other uses

Waste comprises the amounts of the commodity in question and of the commodities derived therefrom not further pursued in the food balance sheet, lost through waste at all stages between the level at which production is recorded and the household, i.e. waste in processing, storage and transportation. Losses occurring before and during harvest are excluded. Waste from both edible and inedible parts of the commodity occurring in the household is also excluded. Technical

losses occurring during the transformation of primary commodities into processed products are taken into account in the assessment of respective extraction/conversion rates. Other uses comprise quantities of commodities used for manufacture for nonfood purposes, e.g. oil for soap, and statistical discrepancies. In order not to distort the picture of the national food pattern, quantities of the commodities in question, consumed mainly by tourists, are included here (see also Per caput supply).

This comprises the amounts of the commodity in question and of any commodity derived therefrom not further pursued in the food balance sheet, available for human consumption during the reference period. Food from maize, for example, comprises the amount of maize, maize meal and any other products derived therefrom available for human consumption. Food from milk relates to the amounts of milk as such, as well as the fresh milk equivalent of dairy products, except butter.

Food

Calculating Per Caput Food Supply in FBS

The estimate of the total population is also a part of the set of ongoing official statistics. The per caput figure of each food commodity is obtained by dividing the food available for human consumption figure by the total population consuming it during the reference period. However, for many countries, this figure may also be subject to either incomplete or unreliable data. The total population estimates may refer to resident population only. Thus, non-resident population, such as illegal immigrants, tourists, refugees, foreign diplomatic personnel and their dependants, foreign armed forces, etc., are usually not included and these omitted individuals may constitute a considerable part of the population in some countries, if they were not counted in the population. This, therefore, would result in understating the total consuming population.

In food balance sheet, per caput food supplies in terms of quantity are given both in kilograms per year and grams per day. Calorie supplies are expressed in kilocalories (calories) per day, while supplies of protein and fat are provided in grams per day.

For the purpose of calculating the caloric value and the protein and fat content of the per caput food supplies, the choice of the appropriate food composition factors is very important. For example, the choice of the food composition factors for wheat flour depends, among other factors, on the water content, variety, and the degree of milling involved. The choice of the corresponding factors for cheese depends on whether the cheese is derived from whole milk, partly whole milk, or skim milk, as well as whether the cheese has been made from the milk of cows, sheep, goats, buffaloes, or camels, and lastly on whether the cheese is hard, semi-soft or soft. The nutritive factors can be obtained directly from the national food composition tables of the health authorities. These tables give the nutritional composition of food per 100 grams of edible portion.

As the quantity data of the FBS are on an "as purchased" basis, it is necessary that the nutritive composition in terms of edible portion be converted into this basis as well. The conversion is made by applying waste/refuse factors to the nutritive composition in term of edible portion. The resulting per caput total nutritive values are usually expressed on a daily basis. In the absence of food composition tables prepared by appropriate national institutions, one can use FAO's Food Composition Tables - Minerals and Vitamins - for International Use.

For calories, protein and fat, a grand total with a breakdown into components of vegetable and animal origin is shown at the beginning or the end of the food balance sheet.

Finally, one should pay special attention to the following when examining per caput food consumption and FBS in a country or a region:

- changes in the energy and protein availability,
- adequacy of average energy and protein availability,
- starchy staples,
- starchy staple ratio and animal products ratio,
- changes in the starchy staple ratio and animal products ratio,
- the trade situation: self sufficiency or import dependency
- consumption of "luxury" foods.

Accuracy of food balance sheets

The accuracy of food balance sheets, which are in essence derived statistics, is of course dependent on the reliability of the underlying basic statistics of population, supply and utilization of foods and of their nutritive value. These vary a great deal between countries, both in terms of coverage as well as in accuracy. In fact, there are many gaps particularly in the statistics of utilization for nonfood purposes, such as feed, seed and manufacture, as well as in those of farm, commercial and even government stocks. To overcome the former difficulty, estimates were prepared in FAO while the effect of the absence of statistics on stocks is considered to be reduced by preparing the food balance sheets as an average for a three-year period. But even the production and trade statistics on which the accuracy of food balance sheets depends most are, in many cases, subject to improvement through the organization of appropriate statistical field surveys. Furthermore, there are very few surveys so far known on which to base sound figures for waste, and in some cases also these are subject to significant margins of error. In most cases, the assumptions for waste used in food balance sheets are based on expert opinion obtained in the countries. The available statistics being what they are, considerable use had to be made in the preparation of the food balance sheets of evaluation techniques provided by consistency checks. Internal consistency checks are inherent in the accounting technique of the food balance sheet itself. Even more important are external consistency checks based on related supplementary information, such as the results of surveys conducted in various parts of the world as well as relevant technical, nutritional and economic expertise. It is believed that the food balance sheets so prepared, while often being far from satisfactory in the proper statistical sense, provide an approximate picture of the overall food situation in the countries which may be used for economic and nutritional studies, the preparation of development plans and the formulation of related projects, as in fact is being done in the FAO.

The advantages of FBS

Annual FBS tabulated regularly over a period of years will show overall trends in the national food supply, disclose changes that may have taken place in the types of food consumed, i.e., the pattern of the diet, and reveal the extent to which the food supply of the country as a whole is adequate in relation to nutritional requirements.

By bringing together the larger part of the food and agricultural data in each country, FBS are useful in making a detailed examination and appraisal of the food and agricultural situation in a country. A comparison of the quantities of food available for human consumption with those

imported will indicate the extent to which a country depends upon imports (import dependency ratio) to feed itself. The amount of food crops used for feeding livestock in relation to total crop production indicates the degree to which primary food resources are used to produce animal feed which is useful information for analysing livestock policies or patterns of agriculture. Data on per caput food supplies are an important element for projecting food demand. This data is the basis of projections into the future and are used with other information such as income elasticity and national income forecasts to analyze various possible scenarios for the year 2010, 2020 and recently forecast to the year 2030. FBS let you tell a story in a single presentation or report format. They are a powerful tool to the speechwriter, the analyst, the economist, the policy maker, the nutritionist and even the military. They allow those that have it to describe the status of the country - rich or poor - the health of the country - the trade situation in food - and together with past FBS the direction development is taking and can be useful for economic and nutritional studies, for preparing development plans and for formulating related projects.

They are often overlooked in the statistical system. Identification of important gaps in the available data might also stimulate the improvement of national statistics at the source.

The calorie values obtained as the mean in the FBS become proxies for the food consumption mean intake and when combined with the variance in food consumption data collected from household consumption - or expenditure surveys - are used to estimate the distribution (function) of food intakes in the country. Finally, if we apply a particular cut-off point or value, in terms of human nutrition requirements, we are able to estimate the numbers malnourished, which is a very important capacity.

Some notable limitations

FBS are often far from satisfactory in the proper statistical sense, as is explained below:

The accuracy of FBS depends on the reliability of the underlying basic statistics of population, supply and utilization of foods and on the accuracy of the nutritive value data of various foods which is usually the mandate of the national health and nutrition authorities. The data vary a lot both in terms of coverage and accuracy. In fact, there are many gaps particularly in the statistics of utilization for non-food purposes, such as feed, seed and manufacture, as well as in those of farm, commercial and even government stocks. To overcome the former difficulty, estimates can be prepared while the effect of the absence of statistics on stocks is considered to be reduced by preparing the FBS as an average for a three-year period. But even production statistics (on which the accuracy of FBS depends) are, in many cases, subject to improvement through carrying out statistical field surveys. Furthermore, there are few surveys on which to base sound figures for waste. In some cases, these estimates are subject to significant margins of error. Typically, assumptions about waste are based on expert opinion obtained in a country.

At the same time, FBS do not give any indication of the differences that may exist in the diet consumed by different population groups, e.g., people of different socio-economic groups, ecological zones or geographical areas within a country.

Nor do they provide information on seasonal variations in the total food supply. To obtain a complete picture, food consumption surveys (which show the distribution of the national food supply at various times of the year and among different groups of the population) should be conducted. In fact, the FBS and food consumption surveys are complementary and many countries do both of these. There are commodities for which a production estimate could best be based on estimated consumption as obtained from food consumption surveys.

It is very important to be aware of the fact that availability for human consumption is by no means identical with consumption. The quantities of food available for human consumption, as estimated in the food balance sheet, reflect only the quantities reaching the consumer. The amount of food actually consumed may be lower than the quantity shown in the food balance sheet depending on the degree of losses of edible food and nutrients in the household, e.g., during storage, in preparation and cooking (which affect vitamins and minerals to a greater extent than they do calories, protein and fat), as plate-waste, or quantities fed to domestic animals and pets, or thrown away.

Conclusion

FBSs are often extremely useful for economists, planners, and health experts, but in view of the difficulty in obtaining accurate data, FBS need to be interpreted with much caution. They are a powerful means of bringing together from different sources, information about a food economy and are excellent for showing very broad changes in a food economy over a given period of time. The adoption of a programme of work that includes the FBS is recommended to all involved in agricultural data and analysis.

ANNEX 6. The 1996 FAO Food Balance Sheet for Zambia

| COUNTRY Zambia | | YEAR 1996 | | | | | | | | | | POPULATION 8,275,000 | | | |
|--------------------------|----------------------|--------------|-----------------------|--------------|-------|----------------------|------|----------------------|-------|---------------|----------------------|-------------------------------|--------------|-------|------|
| PRODUCTS | DOMESTIC SUPPLY | | | | | DOMESTIC UTILIZATION | | | | | | PER CAPUT SUPPLY | | | |
| | PRO- DUC- TION | IM- PORTS | STOCK CHAN- GES | EX- PORTS | TOTAL | FEED | SEED | PRO- CESS- ING | WASTE | OTHER USES | FOOD | KILO- GRAMS PER YEAR | PER DAY | | |
| | | | | | | | | | | | | CALO- RIES | PRO- TEIN | FAT | |
| | | | | | | | | | | | | GRAMS | GRAMS | GRAMS | |
| | | | | | | | | | | | - 1000 METRIC TONS - | | | | |
| Grand Total | | | | | | | | | | | | 1939 | 51.1 | 28.8 | |
| Vegetable Products | | | | | | | | | | | | 1836 | 41.5 | 22.4 | |
| Animal Products | | | | | | | | | | | | 103 | 9.6 | 6.4 | |
| Cereals - excluding Beer | 1569 | 142 | -82 | 2 | 1626 | 74 | 22 | 64 | 128 | 1 | 1337 | 161.6 | 1306 | 34.9 | 13.3 |
| Wheat | 60 | 29 | 0 | 0 | 89 | | 1 | | 1 | | 86 | 10.4 | 83 | 2.5 | 0.3 |
| Rice (milled equivalent) | 9 | 4 | 0 | 0 | 13 | | 0 | | 0 | | 12 | 1.5 | 14 | 0.3 | 0.0 |
| Barley - excluding beer | 0 | 3 | 2 | 0 | 6 | | | 6 | 0 | | 0 | 0.1 | 0 | 0.1 | 0.0 |
| Maize | 1409 | 86 | -90 | 2 | 1403 | 70 | 18 | 19 | 115 | 1 | 1180 | 142.6 | 1145 | 30.2 | 12.3 |
| Rye | | 0 | | 0 | 0 | | | | | | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Oats | | 0 | | 0 | 0 | 0 | | | | | 0 | 0.0 | 0 | 0.1 | 0.0 |
| Millet | 55 | 0 | 5 | | 60 | 4 | 1 | 27 | 6 | | 22 | 2.6 | 24 | 0.7 | 0.3 |
| Sorghum | 36 | 20 | 0 | 0 | 56 | | 1 | 12 | 6 | | 37 | 4.5 | 40 | 1.2 | 0.4 |
| Cereals, other | | 0 | 0 | 0 | 0 | 0 | | | | | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Starchy Roots | 604 | 3 | | 0 | 606 | | 1 | | 33 | | 573 | 69.2 | 205 | 1.8 | 0.2 |
| Cassava | 540 | 0 | | | 540 | | | | 27 | | 513 | 62.0 | 187 | 1.5 | 0.2 |
| Potatoes | 10 | 3 | | 0 | 12 | | 1 | | 1 | | 11 | 1.3 | 3 | 0.1 | 0.0 |
| Sweet Potatoes | 54 | | | | 54 | | | | 5 | | 49 | 5.9 | 15 | 0.2 | 0.0 |
| Roots, other | | 0 | | | 0 | | | | | | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Sugarcrops | 1400 | | | | 1400 | | | 1400 | | | | | | | |
| Sugar Cane | 1400 | | | | 1400 | | | 1400 | | | | | | | |
| Sweeteners | 167 | 1 | 25 | 69 | 124 | | | | | | 0 | 124 | 15.0 | 146 | 0.0 |
| Sugar (Raw Equivalent) | 166 | 1 | 25 | 69 | 124 | | | | | | 0 | 124 | 14.9 | 146 | |
| Sweeteners, other | | 0 | | 0 | 0 | | | | | | 0 | 0.0 | 0 | | |
| Honey | 0 | 0 | | 0 | 0 | | | | | | 0 | 0.0 | 0 | 0.0 | |
| Pulses | 24 | 1 | -3 | 0 | 22 | | 2 | | 1 | | 18 | 2.2 | 21 | 1.3 | 0.1 |

| | | | | | | | | | | | | | | |
|------------------------|-----|---|----|---|-----|----|----|----|---|-----|------|----|-----|-----|
| Beans | | 0 | | | 0 | | | | | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Peas | | 0 | | 0 | 0 | | | | | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Pulses, other | 24 | 0 | -3 | 0 | 21 | 2 | 1 | | | 18 | 2.1 | 20 | 1.3 | 0.1 |
| Treenuts | | 0 | | 0 | 0 | | | | | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Oilcrops | 115 | 2 | -3 | 1 | 113 | 11 | 77 | 5 | 0 | 20 | 2.4 | 29 | 1.7 | 2.2 |
| Soyabeans | 40 | 1 | 0 | 1 | 40 | 2 | 32 | 1 | | 6 | 0.7 | 6 | 0.7 | 0.3 |
| Groundnuts (Shld Eq.) | 24 | 0 | 0 | 0 | 24 | 7 | 4 | 2 | | 11 | 1.3 | 19 | 0.8 | 1.6 |
| Sunflowerseed | 27 | 1 | -3 | 0 | 25 | 0 | 20 | 1 | | 3 | 0.4 | 3 | 0.1 | 0.3 |
| Rape and Mustardseed | | 0 | | | 0 | | | | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Cottonseed | 23 | 0 | 0 | 0 | 23 | 2 | 21 | | | | | | | |
| Olives | | | | 0 | 0 | | | | | | | | | |
| Oilcrops, other | | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0.0 | 0 | 0.1 | 0.1 |
| Vegetable Oils | 16 | 6 | 0 | 2 | 20 | | | | 3 | 19 | 2.2 | 54 | 0.0 | 6.1 |
| Soyabean Oil | 6 | 1 | 0 | 0 | 7 | | | | | 7 | 0.9 | 21 | | 2.4 |
| Groundnut Oil | 2 | 0 | | 0 | 2 | | | | | 2 | 0.2 | 5 | | 0.5 |
| Sunflowerseed Oil | 5 | 0 | 0 | 0 | 5 | | | | | 5 | 0.6 | 15 | | 1.7 |
| Rape and Mustard Oil | | 0 | | | 0 | | | | | 0 | 0.0 | 1 | | 0.1 |
| Cottonseed Oil | 3 | 0 | 0 | 0 | 3 | | | | | 3 | 0.4 | 10 | | 1.1 |
| Palmkernel Oil | | 0 | | | 0 | | | | | 0 | 0.0 | 0 | | 0.0 |
| Palm Oil | | 0 | | | 0 | | | | 0 | 0 | 0.0 | 1 | | 0.1 |
| Copra Oil | | 0 | | | 0 | | | | | 0 | 0.1 | 0 | | 0.0 |
| Sesameseed Oil | | 0 | | | 0 | | | | | 0 | 0.0 | 0 | | 0.0 |
| Olive Oil | | 0 | | 2 | -2 | | | | | 0 | 0.0 | 0 | | 0.0 |
| Oilcrops Oil, other | | 3 | 0 | 0 | 3 | | | | 3 | 0 | 0.0 | 1 | 0.0 | 0.1 |
| Vegetables | 273 | 0 | 0 | 1 | 273 | 0 | | 27 | | 246 | 29.7 | 20 | 1.1 | 0.2 |
| Tomatoes | 25 | 0 | | 0 | 25 | | | 2 | | 23 | 2.7 | 1 | 0.1 | 0.0 |
| Onions | 27 | 0 | | 0 | 27 | | | 3 | | 24 | 2.9 | 3 | 0.1 | 0.1 |
| Vegetables, other | 221 | 0 | 0 | 1 | 221 | 0 | | 22 | | 199 | 24.0 | 15 | 0.9 | 0.1 |
| Fruit - excluding Wine | 101 | 4 | 0 | 0 | 105 | | | 10 | 0 | 95 | 11.5 | 13 | 0.2 | 0.2 |
| Oranges, Mandarines | 4 | 1 | | | 5 | | | 0 | | 4 | 0.5 | 0 | 0.0 | 0.0 |
| Lemons, Limes | 0 | | | 0 | 0 | | | | | 0 | 0.0 | 0 | 0.0 | |
| Citrus, other | 0 | 0 | | 0 | 0 | | | | | 0 | 0.0 | 0 | 0.0 | |
| Bananas | 1 | 0 | | | 1 | | | 0 | | 1 | 0.1 | 0 | 0.0 | 0.0 |
| Apples - excl. Cider | | 2 | 0 | 0 | 2 | | | 0 | | 2 | 0.2 | 0 | 0.0 | 0.0 |
| Grapes - excl. Wine | | 0 | | | 0 | | | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Fruit, other | 97 | 0 | 0 | 0 | 98 | | | 10 | | 88 | 10.6 | 12 | 0.1 | 0.2 |
| Stimulants | 2 | 0 | 1 | 4 | -0 | | | | | 1 | 0.1 | 0 | 0.0 | 0.1 |

| | | | | | | | | | | | | |
|----------------------|-----|---|---|---|-----|---|---|-----|------|-----|-----|-----|
| Coffee | 2 | 0 | 1 | 4 | -1 | | | 0 | 0.0 | 0 | 0.0 | |
| Cocoa Beans | | 0 | | 0 | 0 | | | 0 | 0.0 | 0 | 0.1 | 0.1 |
| Tea | 0 | 0 | | 0 | 1 | | | 1 | 0.1 | 0 | 0.0 | |
| Spices | 0 | 0 | 0 | 0 | 0 | | | 0 | 0.1 | 0 | 0.0 | 0.0 |
| Pepper | 0 | 0 | | 0 | 0 | | | 0 | 0.0 | 0 | 0.1 | 0.0 |
| Pimento | 0 | 0 | | 0 | 0 | | | 0 | 0.1 | 0 | 0.0 | 0.0 |
| Spices, other | | 0 | 0 | 0 | 0 | | | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Alcoholic Beverages | 348 | 1 | | 0 | 349 | | 0 | 349 | 42.1 | 42 | 0.6 | 0.1 |
| Wine | | 0 | | | 0 | | | 0 | 0.0 | 0 | | |
| Barley, Beer | 53 | 0 | | 0 | 53 | | | 53 | 6.4 | 8 | 0.1 | |
| Beverages, Fermented | 295 | 0 | | | 295 | | | 295 | 35.7 | 35 | 0.5 | 0.1 |
| Beverages, Alcoholic | | 0 | | | 0 | | | 0 | 0.0 | 0 | | |
| Alcohol, Non-Food | | 0 | | | 0 | | 0 | | | | | |
| Meat | 103 | 0 | | 0 | 103 | | | 103 | 12.5 | 54 | 5.1 | 3.6 |
| Beef and Veal | 37 | 0 | | 0 | 37 | | | 37 | 4.4 | 23 | 1.8 | 1.7 |
| Mutton & Goat Meat | 2 | 0 | | 0 | 2 | | | 2 | 0.3 | 1 | 0.1 | 0.1 |
| Pigmeat | 10 | 0 | | | 10 | | | 10 | 1.2 | 10 | 0.4 | 0.9 |
| Poultry Meat | 24 | 0 | | 0 | 24 | | | 24 | 2.9 | 10 | 1.0 | 0.6 |
| other Meat | 31 | 0 | | 0 | 31 | | | 31 | 3.7 | 11 | 1.8 | 0.3 |
| Offals | 7 | 0 | | 0 | 7 | | | 7 | 0.8 | 2 | 0.4 | 0.1 |
| Animal Fats | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 0.3 | 6 | 0.0 | 0.7 |
| Butter, Ghee | 0 | 0 | | 0 | 0 | | | 0 | 0.0 | 1 | 0.1 | 0.1 |
| Cream | | 0 | | 0 | 0 | | | 0 | 0.1 | 0 | 0.1 | 0.0 |
| Fats, Animals, Raw | 2 | 0 | 0 | | 2 | | 0 | 2 | 0.2 | 5 | 0.0 | 0.6 |
| Fish, Body Oil | | 0 | | | 0 | 0 | | | | | | |
| Milk - excl. Butter | 70 | 7 | 0 | 0 | 77 | 1 | 0 | 4 | 73 | 8.8 | 14 | 0.7 |
| Eggs | 32 | 0 | | 0 | 32 | | 2 | 2 | 28 | 3.4 | 12 | 1.0 |
| Fish, Seafood | 66 | 8 | | 0 | | 5 | | 69 | 8.3 | 15 | 2.4 | 0.5 |
| Freshwater Fish | 66 | 0 | | 0 | 66 | | | 66 | 8.0 | 15 | 2.3 | 0.5 |
| Pelagic Fish | | 5 | | | 5 | 5 | | 0 | 0.0 | 0 | 0.0 | 0.1 |
| Marine Fish, other | | 2 | | 0 | 2 | | | 2 | 0.3 | 0 | 0.1 | 0.1 |
| Miscellaneous | | | | | | | | | | 0 | 0.0 | 0.0 |

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FBS

| PROGRAMME AGAINST MALNUTRITION STATUS REPORT ON THE 1998/99 RELIEF FOOD DISTRIBUTION PROGRAMME AS AT 12 MAY 1999. | | | | | | | | |
|--|-----------------|--------------------------|----------------------------------|----------------------------|----------------------------|----------|----------|------------|
| PROVINCE | DISTRICT | NGO | (Planned) District Reqt (Mtp) | (Itallan Don.) Quantity | (OVP&Itallan) Delivered | WFP | WFP | |
| | | | | | | | | |
| Southern | Monze | Monze PPM | 258 | 30 | 100 | | | 130 |
| | Mazabuka | Chikankata Mission | 1418 | 10 | 40 | | | 50 |
| | | Nakambala Parish | | | 10 | 30 | | 40 |
| | | WVI Chivuna | | | 10 | 30 | | 40 |
| | Siavonga | Siavonga Catholic Church | 827 | 4 | 70 | | | 74 |
| | | Lusitu Catholic Church | | | 4 | 70 | | 74 |
| | | Harvest Help | | | 4 | 70 | | 74 |
| | | Chirundu Catholic Church | | | 4 | 90 | | 94 |
| | Sinazongwe | Gossner Mission | 1584 | 0 | 60 | | | 60 |
| | | Sub-Total | 4087 | 76 | 560 | 0 | 0 | 636 |
| | | | | | | | | |
| Eastern | Petauke | Petauke Nutrition | 3,057 | 30 | 0 | 424 | | 454 |
| | Katele | St Francis | 583 | 30 | 30 | 162 | | 222 |
| | | Chadiza Disaster Group | 115 | 30 | 0 | 162 | | 192 |
| | Chadiza | Chadiza Disaster & Dev. | 1443 | 15 | 170 | 170 | | 355 |
| | Lundazi | Lundazi Disaster & Dev. | | | 15 | 170 | 50 | 235 |
| | | Lumezi Misslon | | | 15 | 90 | 0 | 105 |
| | Chipata | Chikungu Pastoral Centre | 144 | | 15 | 80 | 0 | 95 |
| | | Mwami Mission | | | 0 | 90 | 0 | 90 |
| | Nyimba | RCZ | | | 30 | 0 | 52 | 82 |
| | | Nyimba Methodist | 142 | | 60 | 150 | 0 | 210 |
| | Mambwe | Mambwe PPM | 105 | | 60 | 330 | 0 | 390 |
| Chama | Chama Red Cross | 303 | | 60 | 1110 | 1020 | 2430 | |
| | | | | | | | | 0 |
| Western | Senanga | Senanga PPM | 1189 | 30 | 30 | 262 | 0 | 322 |
| | | Sioma Mission | | | 30 | 0 | 50 | 70 |
| | | Hilltop Light Ministries | | | 30 | 0 | 50 | 70 |
| | | Shangombo PPM | 1446 | 60 | 30 | 100 | 0 | 190 |
| | Sesheke | Mwandi UCZ | 1026 | 10 | 0 | 500 | 160 | 670 |
| | | Sichili Dev. Committee | | | 10 | 0 | 0 | 180 |
| | | St. Kizito | | | 10 | 0 | 0 | 160 |
| | Lukulu | Lukulu PPM | 660 | 60 | 150 | 0 | 0 | 210 |
| | Mongu | Keepers Zambia | 327 | 60 | 120 | 75 | 0 | 255 |

| | | | | | | | | |
|-------------------|--------------|----------------------------|------|--------|-------|------|--------|--------|
| Northern | Kaoma | Kaoma YWCA | 371 | 15 | 65 | 0 | 0 | 80 |
| | | Kaoma Red Cross | | 15 | 65 | 0 | 0 | 80 |
| | Kalabo | Yuka Mission | 1480 | 0 | 0 | 544 | 0 | 544 |
| | | Sub-Total | 6499 | 330 | 460 | 1581 | 640 | 3011 |
| | | | | | | | | 0 |
| Northern | Kaputa | Kaputa Catholic Church | 1177 | 30 | 50 | 100 | | 180 |
| | Luwingu | Ipusukilli Catholic Church | 680 | 30 | 50 | 100 | | 180 |
| | Chinsali | Chinsali PPM | 1604 | 0 | 300 | 0 | | 300 |
| | | Sub-Total | 3461 | 60 | 400 | 200 | 0 | 660 |
| | | | | | | | | 0 |
| N/Western | Mwinilunga | Mwinilunga PPM | 231 | 60 | 150 | | | 210 |
| | Chavuma | Chavuma PPM | 420 | 60 | 140 | | | 200 |
| | | CMML | | 0 | 30 | | | 30 |
| | Solwezi | Solwezi Red Cross | 1621 | 0 | 100 | | | 100 |
| | | Sub-Total | 2272 | 120 | 420 | 0 | 0 | 540 |
| | | | | | | | | 0 |
| Central | Mumbwa | Mumbwa PPM | 390 | 15 | 225 | 0 | | 240 |
| | | Future Hope | | 5 | 110 | 0 | | 115 |
| | | Nangoma Mission | | 10 | 159 | 0 | | 169 |
| | | Nampundwe | | 0 | 25 | 0 | | 25 |
| | | Shibujunji PPM | | 0 | 35.8 | 0 | | 35.8 |
| | Serenje | Serenje | 524 | 20 | 0 | 200 | | 220 |
| | Kapirimposhi | Kapirimposhi Catholic | 2886 | 20 | 0 | 0 | | 20 |
| | | Mpunde Mission | | 35 | 40 | 0 | | 75 |
| | | St. Pauls Parish | | 20 | 0 | 0 | | 20 |
| | Chibombo | DAPP Chibombo | 2743 | 30 | 60 | 30 | | 120 |
| | | Pentecostal Church | | 10 | 50 | 20 | | 80 |
| | | Chibombo PPM | | 10 | 60 | 20 | | 90 |
| African Methodist | | | 10 | 45 | 15 | | 70 | |
| Katuba PPM | | | 10 | 45 | 15 | | 70 | |
| Mkushi | | Fiwila Mission | 577 | 0 | 10 | 0 | | 10 |
| | | Sub-Total | 7120 | 195 | 864.8 | 300 | 0 | 1359.8 |
| Lusaka | Kafue | Riverside Dev. Agency | 695 | 10 | 200 | | | 210 |
| | Chongwe | Rufunsa PPM | 1062 | 0 | 60 | | | 60 |
| | | Chongwe-ADRAgency | | 0 | 30 | | | 30 |
| | Luangwa | Luangwa PPM | 441 | 0 | 90 | | | 90 |
| | | Orphanages | | 28 | 0 | | | 28 |
| | Sub-Total | 2198 | 38 | 380 | 0 | 0 | 418 | |
| | TOTAL | 31,529 | 1119 | 4194.8 | 3101 | 640 | 9054.8 | |

Notes:

- i) Distribution period for the 1998/99 Relief Food Programme (November 1998 - May 1999)
- ii) (Planned) Total food requirements for distribution during the period - 31529 MT
- iii) Actual Qty. of relief food distributed to-date - 7 920 MT (ie. Italian Donation, WFP and OVP Sources)
- iv) Total Qty. of maize drawn from OVP Sources - 4194.8 MT (ie. 1998/99 OVPstocks(2490 MT), Italian Grant(1210 MT), FRA (300 MT) and Left-over stock 1997/98 (194.8 MT)
- v) Total Qty. of maize drawn from WFP - 3 101 MT
- vi) Total Distributed -Italian Donated Rice - 1119 MT
- vii) Percentage of actual Relief Food Distributed against the Planned - 29%

Prepared by PAM
May-99