SADC REGIONAL EARLY WARNING SYSTEM FOR FOOD SECURITY

Price Analysis

For Early Warning Monitoring and Reporting

Prepared by
Dr. Chuck Chopak
Regional Representative
Famine Early Warning Project (FEWS)

December 1998

P.O. Box 4046, Harare, Zimbabwe
Tel: 263-4-796847/8 Fax: 263-4-795345
Email: rewu@fanr-sadc.co.zw

PREFACE

The SADC Regional Early Warning System (SADC/REWS) operates as an integrated activity, comprising a **Regional Early Warning Unit** (REWU), based in Harare, and autonomous **National Early Warning Units** (NEWUs) in each of the 14 SADC member States. Activities of the National Early Warning Units are coordinated by the REWU, which acts as the Secretariat of the REWS.

The main **objective** of the SADC Regional Early Warning System is to provide user groups of early warning/food security information, particularly SADC member States and the international community, with **advance information on food security prospects in the region** through assessments of expected food production, food supplies and requirements.

The REWU thus is aimed at providing SADC, the member States and other user groups with early warning and food security information on:

- ❖ food crop performance;
- ❖ crop failures and subsequent shortfalls expected in food availability; and
- ❖ food stocks and projections of food needs.

The REWU compiles food security data for the SADC region, based on submissions from the NEWUs via fax and e-mail, and aggregates these for subsequent publication in a **Quarterly Food Security Bulletin**, supplemented by **Monthly Food Security Updates**. Similarly, the NEWUs themselves prepare national food security bulletins. Ad-hoc reports are submitted directly to decision makers, as required.

The Famine Early Warning System Project (FEWS) is an USAID-funded project managed by the Associates in Rural Development (ARD, Inc.). FEWS is associated with SADC's Food Security Technical and Administrative Unit (FSTAU) primarily through its collaboration with the Regional Early Warning Unit (REWU) and the Regional Remote Sensing Project (RRSP), and to a lesser degree other FSATU projects. FEWS works with both the REWU and the national early warning units in most SADC-member countries.

This price manual was an agreed upon product that was requested by the Regional Early Warning Unit to assist them in their support of the National Early Warning Units in SADC member States. Other manuals that are near completion include: "Thematic Mapping: A Practical Guide for Early Warning" and "Vulnerability Analysis for SADC Countries: A Suggested Approach for Early Warning Units".

The author would like to thank all people who provided useful comments in the completion of this practical manual.

TABLE OF CONTENTS

Page

Appendices

ACCRONYMS

FANR	Food, Agriculture and Natural Resources
FAO	Food and Agriculture Organization (United Nations)
FEWS	Famine Early Warning System Project (USAID)
FSTAU	Food Security Technical and Administrative Unit
MIS	Market Information System
NEWU	National Early Warning Unit
NGO	Non-governmental organization
REWU	Regional Early Warning Unit (SADC)
RRSU	Regional Remote Sensing Unit (SADC)
SADC	Southern Africa Development Community
USAID	United Stated Agency for International Development

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

1.1 Purpose of the manual

The purpose of this manual is to provide guidance to early warning professionals on appropriate and sustainable methods for monitoring price data. This manual will assist the analyst to understand: 1) what influences price behavior, 2) how prices behave, 3) which markets and commodities to monitor, 4) suggested procedures, and 5) what to report about price and market developments in early warning publications.

The focus of this manual is primarily on using graphical analysis and visual interpretation. The reason for this approach is that it is simple. By plotting the data on a graph one can easily see price trends, identify if there is missing data or data outliers, and identify odd price behavior. There are a few instances where techniques for quantitative analysis or data transformations are presented. In these cases the justification for this analysis is provided, as well as the techniques.

This manual is not intended to provide guidance on how to create a market information system (MIS). A MIS collects, manages, and disseminates market information. Its primary role is to increase market transparency by making market information available to all market participants. It also serves as a source of market information. As such, it is the primary source of price data for early warning. This manual assumes that a MIS or other sources of price data are readily available. These alternative sources of price data are also discussed in this manual.

This manual is intended to complement and reinforce concepts presented in other available documents. For example, SADC Regional Early Warning System has developed a series of Technical Handbooks, including "Market Information for Early Warning" (written by Jan Helder and Jan-Joost Nijhoff) and "Food Security Bulletins Vol 1: Analytical Content of Monthly Bulletins" (written by Yeb Hiemstra). Within the FEWS Project two documents are worth noting. First, the initial exploration of using price data in early warning was presented in "Price data in a famine early warning" (written by Chuck May). Second, FEWS/Somalia (written by Philip Steffen and Sidow Addou) developed a set of training materials on markets and marketing systems.

1.2 Challenges of price analysis

The main challenge to early warning professionals is to develop a system to monitor prices that are consistent with both available resources (human and financial) and decision maker needs. Early warning professionals tend to be over-extended in the demands for their time and usually have limited resources. This manual provides practical suggestions that recognize these constraints.

A second challenge of effective price analysis to understand and include the context within which price developments can be interpreted. Understanding the patterns of agricultural production and consumption, past price and market behavior, and the policy environment are critical.

Finally, another challenge is to be able to perform all activities to report in a useful (actionable) and timely manner. These activities include the establishment of a data management system (from collection to processing to archiving), routine analysis procedures, and presentation format.

1.3 Organization of the manual

This manual is divided into 6 chapters, with each chapter describing and guiding the reader to complete the sequential steps necessary to efficiently report price developments.

Chapter 2: Price theory and analysis for early warning: Topics include simple price analysis theory such as the role of prices and markets, the influence of market structure on prices, the impact of market distortions, seasonal price patterns, the influence of macroeconomic factors on market behavior.

Chapter 3: Food system context: Topics include the identification of key contextual information such as agricultural production patterns, consumption patterns, national marketing patterns, external trade patterns, marketing policies, and macroeconomic patterns. Also, selection criteria for markets and commodities for monitoring are presented.

Chapter 4: Data collection and management*:* Topics include data/file management and verification, sources of price data and market information, and the selection of software to analyze and present price information, and the types and sources of other complimentary data required to do price analysis.

Chapter 5: Analysis of historical price data*:* Topics include techniques to review historical price behavior both graphically and quantitatively) and reviewing interesting case studies.

Chapter 6: Routine market analysis and reporting: Topics include routine market analysis activities, fundamentals of reporting, and some suggestions about presentation formats and styles.

***Appendices*:** There are 10 appendices that offer a variety of information that complements that contained in the chapters of this manual.

Appendix A: presents a bibliography of useful price analysis texts and papers.

Appendix B: presents a worksheet to identify agricultural production patterns

Appendix C: presents a worksheet to identify cereal consumption patterns

Appendix D: presents a worksheet to identify domestic marketing patterns

Appendix E: presents a worksheet to identify external trade patterns

Appendix F: presents a worksheet to identify policies that affect market behavior

Appendix G: presents a worksheet to identify macroeconomic influences on price behavior

Appendix H: presents a summary of Priceman features

Appendix I: presents some key price analysis terminology

1.4 Concept of the worksheets (Appendices B through G)

Each worksheet will guide the analyst through a sequence of steps to identify the contextual information required to understand and interpret price behavior. In Chapter 3 are examples of completed worksheets for each section to support the conceptual discussion.

CHAPTER 2

PRICE THEORY AND ANALYSIS FOR EARLY WARNING

2.1 Introduction

This chapter provides the conceptual tools that are required for effective monitoring and reporting of price and market developments. First, some simple price and market analysis theory is provided. For the interested reader there are additional references in Appendix A. Finally, criteria are presented to guide the analyst in selecting markets and commodities for monitoring. The concentration of this manual is on the monitoring of commodity prices, but the techniques could easily be used to monitor prices of livestock products. Some examples will use livestock products to illustrate this point.

2.2 Why monitor prices?

Early warning analysts are concerned with all aspects of food security, including food availability[1] and food access[2]. Prices serve as signals of both food availability and food access. In summarizing the interactions between supply and demand prices provide a snapshot of current and expected supply of a commodity. Prices also affect food access of both producers and consumers. The influence on the income of producers is that prices determine the value of the commodities that farm households sell. The impact of prices on consumers is that they determine the amount of a commodity a household can buy. This is especially true for poorer households that have a substantial portion of their expenditures used to purchase food.

2.3 Simple price theory

Although price theory can be complex, price analysis for early warning can be relatively simple. This simplicity in analysis can still provide effective early warning information for decision-makers. This section provides some simple price analysis theory that will serve as the foundation for using the rest of this manual.

---

[1] **Food availability** is the aggregation of national food production, food stocks, and net trade (imports minus exports). A country is said to be food security in terms of national food availability if through these means they can meet national consumption requirements.

[2] **Food access** is a aggregation of own production, income (cash or in kind) from other activities, or transfers (cash or in kind). A household is said to be food secure in terms of food access if through these means they can produce enough food or control resources or entitlements to assure sufficient consumption.

2.3.1 What do prices do?

Prices are signals are sent between two (or more) participants in the food system. The participants in the food system include input producers and suppliers, farmers, marketing agents (rural assemblers, transporters, millers, packagers, wholesalers, and retailers), and consumers. Prices, in the purest sense, indicate value that has been added to a particular commodity. This value added can be changes in the form (e.g., production or milling), place (e.g., transportation), or time (e.g., storage) of a commodity. Price signals can be complex to understand as they carry information about cost of production, transportation, storage, perceptions, desires, and distortions. For the purpose of early warning monitoring and analysis, prices primarily perform the following functions:

- ***Prices express value of commodities.*** The determination of the price is made through the interaction between producers (the supply side) and consumers (the demand side).

- ***Prices inform us of the level of the supply of commodities in a market.*** As the amount of a commodity decreases in a market, the price of that commodity tends to increase (if it is allowed to fluctuate without intervention). A large increase in a price can be a signal that indicates that there is a decline in the amount of food for sale in that market.

- ***Prices inform us about perceptions about how people involved in trading these commodities perceive future supply and demand.*** Although prices do contain information about the volume traded, cost of production, storage, and transport of commodities, expectations by market participants can also influence the level of prices (up if there is a perceived future shortfall and down if there is a perceived surplus).

- ***Prices act as either an incentive or disincentive for trade.*** Prices, and more specifically relative prices, provide encouragement (or not) for people to enter into the market for trade.

- ***Prices act as incentive or disincentives for production.*** It is important to monitor prices at planting time to assess whether prevailing prices will act as incentives or disincentives to producers.

Prices are influenced by many factors, including supply and demand for specific commodities, the structure of the food system, government policy, and the macroeconomic environment. The classic relationship between supply and demand for agricultural products is generally observed for most staple commodities. When there is an increase in supply of a commodity (and the amount of that good that is demanded remains the same or decreases), the price tends to decrease. When there is an increase in the amount of the demand for a commodity (and the amount supply remains the same or decreases), the price tends to increase.

Factors that affect the supply of a particular commodity in the food system are production variability due to weather, technology, availability and access to productive resources (land and inputs), stock levels, net imports, food assistance, and government regulations. Factors that affect the demand for a particular commodity are income, tastes and preferences, and population issues (level, growth rate, and rate of urbanization).

2.3.2 What is a market?

Markets are where buyers and sellers come together to trade. Although most markets have a physical location (e.g., Soweto Market in Lusaka), this is not always the case. In some countries, markets even include the *Internet*. In the absence of government set prices (administered prices), markets are where prices are determined. Markets also coordinate transactions between the original producer through to the final consumer. It is the structure and behavior of the different participants in the marketing system that will determine the efficiency of movement of commodities through the system, and the level of distortion that is incorporated in a price.

2.3.3 How are markets organized and what is the impact on prices?

Markets are organized in a variety of ways, all of which have an impact on the resulting price signal that generated. The structure of a market or subsector[3] (how it is organized) strongly influences the behavior of participants in the marketing aspects of that subsector, which in turn strongly influences the performance of that subsector. Knowing how the marketing of a particular commodity is structured will help in understanding and interpreting prices. The structure of a subsector includes the number and size of buyers and sellers, the ease (or difficulty) that buyers and sellers can enter the market, the size of the market, the degree of specialization required for the specific subsector, and the degree of coordination between the different levels of the marketing system. A market is competitive when there are numerous buyers and sellers, there are few impediments to market entry, there is a high degree of coordination between different levels of the marketing system, and the degree of product specialization is low. In this situation prices are relatively free of distortions.

When there is active competition in markets and few distortions, it is easier to understand the signal being sent through prices. In this situation the simple forces of supply and demand tend to apply.

2.3.4 Some key marketing concepts

This section introduces a series of key market concepts that will be useful in price analysis. Concepts presented here include the role of marketing agents, marketing margins, market distortions, thin markets, market failure, and market sheds.

[3] A subsector in this context is all aspects of the production through to consumer of a particular commodity.

The *role that marketing agents* play in the food system is misunderstood by many decision-makers. Marketing agents provide many services, including assembling, transporting, storing, and transforming commodities. To perform these vital services marketing agents incur costs and take risks, and therefore need to be compensated.

At all stages of the food system there are transactions. The difference between the price received by one marketing agent and that paid by another marketing agent is called the *marketing margin*. A broader concept is the *gross marketing margin*, which is the difference between the price received by producers and that paid by consumers. It is common to hear decision-makers state that these margins are too high. There are numerous studies that have evaluated marketing margins and have concluded that given the high cost of transactions and the risk to invested capital that these margins are often reasonable.

Market distortions are also a key concept to understand to interpret prices. The degree that the information that is encoded in the prices can be understood depends on the degree that there are few distortions in the market. Market distortions include any structure or policy that restricts competitiveness in the trade of commodities. When there are market distortions, the prices may not accurately reflect the supply and demand conditions in that market. An example of market distortions is when governments set prices.

Thin markets are markets that do not have large volumes of trade, and therefore do not necessarily reflect the aggregate supply and demand conditions. The implication is that there can be large swings in prices (up or down) as a result of changes in supply or demand even if the structure of the market is competitive. One concern is that since relatively few transactions establish prices, prices are susceptible to manipulation.

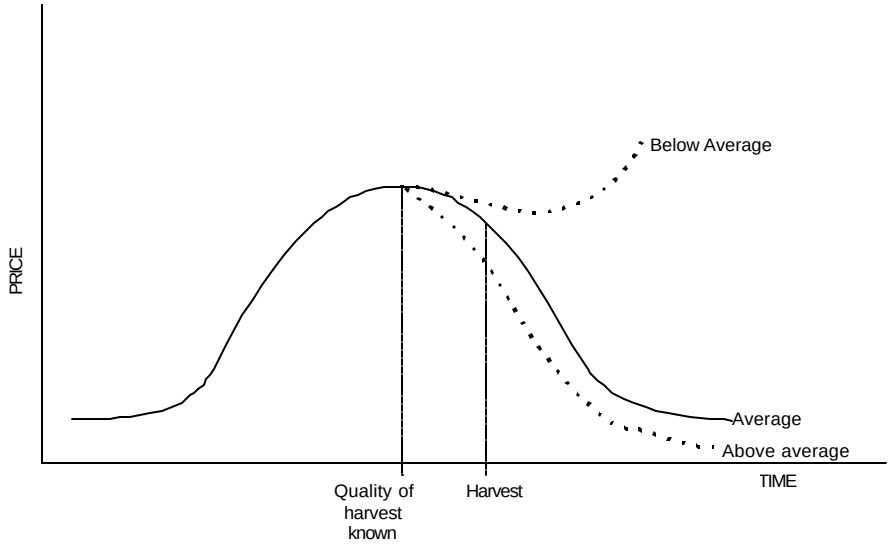
The term *market failure* is often misused. In common usage, albeit incorrect, it has been used to mean when the markets are not able provide certain goods either at all or at the required level. Examples are if a remote rural area does not receive enough food as a result of its remoteness and the cost of delivering that food is not profitable to a trader. This is technically not market failure. In general, market failure arises as a result of (1) non-excludability and/or (2) non-rival consumption of a good. Non-excludability means that individuals who have not paid for a good cannot be prevented from enjoying its benefits (or the cost of excluding would be too high). If a good is non-rival, its consumption by one person does not preclude its enjoyment by anyone else. Clean air is an example of a good that has both non-rival and non-excludable characteristics.

Finally, the concept of *market sheds*—or market catchment areas—is important to understand. Market sheds are geographic areas that have prices that move and behave together. Identifying market sheds will help understand how certain markets are connected.

2.3.5 What price trends are anticipated after an average, above average, and below average harvests?

The normal price behavior of a commodity[4] within a marketing season follows a fairly predictable pattern (Figure 2.1). At harvest time prices fall to a seasonal low. There are two reasons for this that mutually support each other. First, at harvest more of the commodity is sold on the market. Even households that are not surplus households tend to sell during this period to meet their cash needs (e.g., to repay a debt or pay a bill such as school fees). Also, it is at this time of the year that some rural assemblers of commodities are particularly active in more remote areas, providing an easy market outlet. The other factor that depresses prices at harvest time is that the amount demanded decreases. At this time almost all households (even households that do not produce enough to meet their food needs for the entire year) have enough food, and therefore do not demand the same amount in the market as other times of the year. As time passes after the harvest, the price of a commodity tends to rise. During this period the amount of a commodity offered on the market (supply) tends to decrease; and the amount of a commodity demanded (from deficit producing households) tends to increase. During this period commodity sellers sell prices that reflect the original cost of the commodity, the cost of storage, and some profit margin. This pattern continues until the harvest prospects of the current agricultural season becoming increasingly known. At one point (the peak in the graph) the harvest prospects are know with sufficient certainty (in this example that it will be a normal year) the price begins to fall in expectation of the coming harvest. Sellers with a surplus will begin selling their stocks, depressing the price. When the harvest begins and more of the commodity is sold in the market, the price begins a rapid decline.

Figure 2.1: Seasonal price patterns with different harvest outcomes



[4] For the purposes of this section, we will assume that little or no inflation and a competitive market structure.

The pattern described above is what happens when a normal (or average) harvest is recorded. If the expectation that the harvest will be above average, then traders may sell more of their stocks (so they do not get stuck holding large amounts of a commodity). The increase in volume will accelerate the decline in the commodity's price. If the expectation is that there will be a below average harvest, then traders will tend to hold higher levels of stocks in anticipation of higher prices (since there will be an increased demand) later in the marketing season.

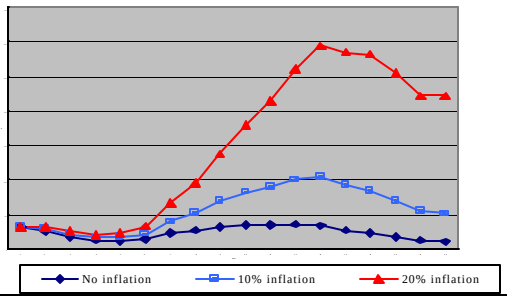
2.3.6 Influence of macroeconomic conditions on market behavior

Macroeconomic conditions can have dramatic influences on market behavior and household food security. The main macroeconomic issue that needs to be understood in price analysis is inflation. Inflation is defined as the general increase in the price level of all goods and services in an economy from one period to another. Inflation is measured using either a producer price index (PPI) or a consumer price index (CPI). CPI is most commonly used measure. Changes in inflation are closely related to fluctuations in real GDP/GNP.

There are three main types of inflation: demand pull, cost push and structural. *Demand pull inflation* is brought about when the economy spends above its capacity to produce. That is when the demand for commodities rise above the production capacity of producers based on the available resources in that economy. *Cost push inflation* occurs when the cost of production for producers go up due to increase in fuel prices, power and raw materials, production costs. *Structural inflation* occurs when prices and wages are flexible upwards and inflexible downwards. If there is a structural change in demand—for example some industries in the economy have increased demand for their products—the increased price results in a more permanent level of increased prices.

The importance of inflation to monitoring prices for early warning is not only because it erodes real incomes but that it also complicates price analysis. One way that inflation complicates price analysis is that it makes it difficult to interpret prices differences between years. Another way inflation complicates price analysis is that it can distort intra-annual seasonal price patterns (figure 2.2). In this case even if there is relatively low inflation the underlying price patterns can become distorted.

Figure 2.2 Price data with no inflation, 10% inflation and 20% inflation



CHAPTER 3

FOOD SYSTEM CONTEXT

3.1 Introduction

This chapter is intended to assist in identifying agricultural production, marketing, and consumption patterns, and the policies that influence these patterns. The identification of these patterns should rely on past studies and professionals (government, researchers, NGO's) with experience in each of the areas. For each part of section two in this chapter there are worksheets in separate appendices to guide the reader through the process of understanding the important context required for monitoring and reporting price behavior.

This manual focuses primarily on monitoring price and market development for staple and cash crops. The approach of understanding the production system, consumption patterns, and the policies that influence trade also applies to livestock markets.

3.2 Important contextual information

The context within which prices are determined is essential to be able to understand prices. The contextual information includes agricultural production patterns, consumption patterns, domestic marketing patterns, external trade patterns, historical and current marketing policies, and macroeconomic patterns. In each section there is an example worksheet to reinforce the concepts discussed in that section, with a blank worksheet in the appendices to be completed by the analyst.

To supplement and verify the information discussed in these sections and generated using the worksheets, it is important to acquire relevant studies done by government (ministries, research sections, or Central Statistics Office), universities, donors, UN agencies, and NGOs. Although an analyst can have a good understanding of some contextual information, these studies will both reinforce some information already known and add new information that will strengthen the monitoring and reporting.

3.2.1 Agricultural production patterns

Knowledge of agricultural production patterns is important to price analysis because:

- it provides the basis for selecting which commodities to monitor since people usually consume what they produce (with the exception of cash crops)
- it provides the basis for selecting which markets to monitor since surplus and deficit areas tend to have different price behavior
- it provides context for understanding historical price behavior (time series analysis)

As implied above, there are many aspects to understanding the pattern of agricultural production in a country. One aspect is that different crops have different production patterns depending on land availability, soil productivity, weather, seed availability and access to markets. Another aspect is whether households in an area are producing primarily for subsistence (consumed on-farm) or commercial (sold in the market) reasons. This will impact on the volume of trade.

Appendix B provides a blank detailed step-by-step worksheet to identify the major historical agricultural production patterns in a particular country. This worksheet could be used for livestock as well, but it would have to concentrate on the distribution of animals. The information generated using this worksheet should be printed and saved in a folder for use during the monitoring and analysis of prices and markets. An example of a completed worksheet for Zambia is presented in Figure 3.1.

Figure 3.1: Sample completed worksheet on agricultural production patterns

Appendix B

Worksheet to identify historical agricultural production patterns

Purpose: This worksheet will guide the analyst through a series of steps to identify the major historical agricultural production patterns in their country. The steps described below are intended to be sequential, and should be done in order. The objective for this worksheet is to have an spatial understanding of agricultural production patterns throughout the country. This input will be very important in selecting which markets (in which parts of the country) will be monitored intensively, and which markets will be monitored extensively.

Steps:

1. Photocopy this worksheet. Use only the photocopy for the steps described below. The original should remain unmarked in the manual for future use.
2. Fill out the table below answering the following questions:
   a. List the major staple food or cash crops produced in your country.
   b. Is the crop a staple food or cash crop, or both
   c. Rank each of each staple food crop in terms of its share of national production.
   d. Rank in terms of share of national production.
   e. For each staple food or cash crop, state whether poorer households, wealthier households, or all households produce that crop.
   f. Indicate the major supply areas for each crop?

Crop Name (a)	Staple, Cash, or Both? (b)	Rank as staple crop? (c)	Rank as cash crop? (d)	Poor/wealthy/ all HH's? (e)	Region (f)
Maize	Both	1	1	All	Central, East, South
Cassava	Staple	2	NA	Poor	Luapula
Sorghum/ Millet	Staple	3	NA	Poor	North,Western North,South
Cotton	Cash	NA	2	All	East, South, Central
G'nuts	Cash	NA	3	All	Whole country
Sunflower	Cash	NA	3	All	East

3. Print out a map of the country at the district level for each staple food and cash crops listed above that have a specific production pattern. If the district level is not available, then print out a map at the provincial level.
4. For each major staple food crop, draw on one of the maps the area of the country where that food is the primary agricultural crop for a majority of the people.
5. Use a thematic or GIS mapping software to prepare the maps sketched out in steps 4 and 5.
6. Write a brief summary of the insights you have learned from this process. Include in the summary comments about:
   - For stable food crops:
     1. What is the major staple food crop grown in the country?
     2. What other important staple food crops are grown in the country?
     3. Are there any staple food crops that are specific to (or produced more in) a particular part of the country? If yes, what part of the country?
   - For cash crops:
     1. What is the major cash crop grown in the country?
     2. What other important cash crops are grown in the country?
     3. Are there any cash crops that are specific to (or produced more in) a particular part of the country? If yes, what part of the country?

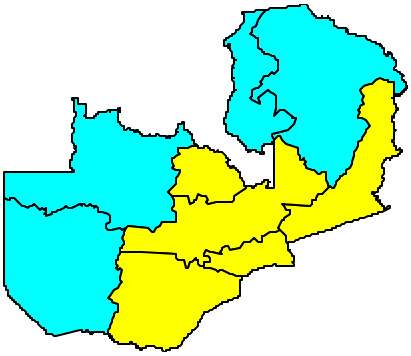
Tips if the answers to the above questions are not easily available:

- Try to identify any agricultural production studies that have been done for your country. A good source to acquire these studies are universities, donors (who sometimes fund these studies), other government ministry offices, and NGOs.
- Send out a very brief (2-3 questions) questionnaire to be completed by extension workers to ask what are the agricultural production patterns in their area.

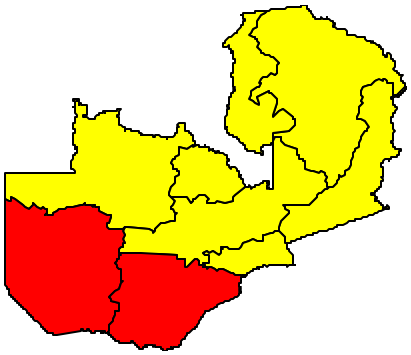
Instructions to fill out the worksheet:

- *Step 2* should be completed directly on a blank copy of the worksheet.
- Using *steps 3 through 5* of the above instructions, the following maps were constructed:

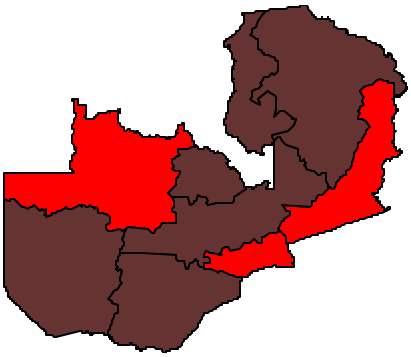
Most important staple crop



Second most important staple crop



Third most important staple crop



Key:

Maize

Cassava

Sorghum

Millet

- The final step in the process of identifying the production patterns is to summarize the information gathered during this process. The questions in *step 6* should be written out, and then discussed with the Ministry of Agriculture professionals that are aware of the agricultural production situation in your country to ensure that you have an accurate as possible understanding.

In the example from Zambia, there are some important aspects of the agricultural production pattern that are noteworthy for price analysis. The main staple crop for Zambia is maize. The other important staple food crops grown in Zambia are cassava, sorghum and millet. Cassava is the main staple crop in Luapula and Northern provinces, and to a lesser in extent Northwestern and Western provinces.

The major cash crop grown in Zambia is maize. Other crops widely grown cash crops among small holder farmers are groundnuts and sweet potatoes. Tobacco and cotton are mainly grown in the Eastern and Southern provinces of Zambia.

3.2.2 Consumption patterns

Knowledge of consumption patterns is also critical in price analysis because:

- it provides the basis for selecting which commodities to be monitored since rich and poor households tend to consume different products

- it provides the basis for selecting which commodities to monitor in specific markets

since people in different parts of a country may consume very different foods
- it provides the context to understanding historical price behavior (through time series analysis)

Consumption patterns vary depending on access to commodities (whether households live in rural or urban areas) and income (whether households are wealthier or poorer). The challenge for monitoring prices is to understand consumption patterns by socioeconomic group, geographic area, and level of urbanization to be able to infer the impact of changes in prices or significant market developments for food security. Not only are there differences in consumption patterns in terms of the type of goods that are consumed across groups, but also there are differences in terms of the level of processing of goods being sold. For example, in southern Africa it is more likely that maize will be sold as grain in the rural areas than in a city. Also, imported commodities tend to be consumed more by urban groups (e.g., rice and wheat in southern Africa). The knowledge of the above aspects of consumption patterns better prepares the analyst to interpret changes in price and market behavior.

Appendix C provides a blank detailed step-by-step worksheet to identify the major consumption patterns in a particular country. The information generated using this worksheet should be printed and saved in a folder for use during the monitoring and analysis of prices and markets. An example of a completed worksheet is presented in Figure 3.2.

Figure 3.2: Sample completed worksheet on consumption patterns

Appendix C

Worksheet to identify consumption patterns

Purpose: This worksheet will guide the analyst through a series of steps to identify the major consumption patterns in their country. The steps described below are intended to be sequential, and should be done in order. The objective for this worksheet is to have a spatial understanding of consumption patterns throughout the country. This input will be very important in selecting which commodities will be monitored intensively, and which commodities will be monitored extensively.

Steps:

1. Photocopy this worksheet. Use only the photocopy for the steps described below. The original should remain unmarked in the manual for future use.

2. Fill out the table below answering the following questions:

   a. List the major staple foods consumed in your country.
   b. Rank each staple food in terms of its importance in national consumption.
   c. For each staple food, state whether it is consumed by poorer households, wealthier households, or all households.
   d. For each staple food, state whether it is consumed by rural households, urban households, or all households.

Is this commodity consumed or in the entire country or only in specific parts?

Staple food?	Rank?	Poor/wealthy/all HH's?	Rural/urban/ all HH's?	Region Specific
(a)	(b)	(c)	(d)	(e)
Maize	1	All	All	All
Cassava	2	Poor	Rural	North, Luapula
Sorghum	3	Poor	Rural	South, North
Millet	4	Poor	Rural	South, North

3. Print out a map of the country at the district level for each of the commodities listed above that is consumed in a specific part of the country. If the district level is not available, then print out a map at the provincial level.

4. For each major staple foods draw on one of the maps the area in the country where that food is the primary staple food for a majority of the people.

5. Write a brief summary about the consumption pattern in your country. The summary should include comments about:
   - What is the major staple food in the country?
   - What other important staple foods are there in the country?
   - Are there any staple food that are specific (or consumed more) to a particular part of the country? If yes, what part of the country?
   - What commodities that should be monitored and why?

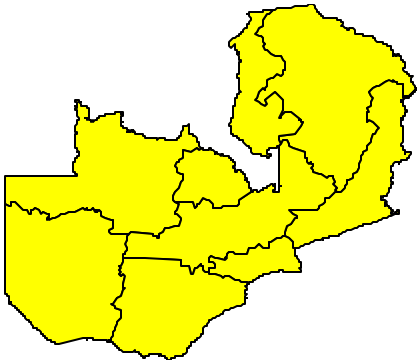
Tips if the answers to the above questions are not easily available:

- Try to identify any consumption studies that have been done for your country. A good source to acquire these studies are universities, donors (who sometimes fund these studies), other government ministry offices, and NGOs.
- Send out a very brief (2 - 3 questions) questionnaire to be completed by extension workers to ask what are the consumption patterns in their area.
- Ask provincial staff (agriculture, social welfare, health, …)

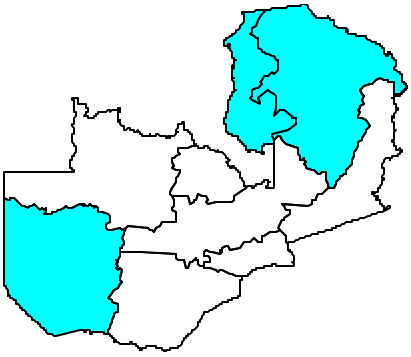
Instructions to fill out the worksheet:

- *Step 2* should be completed directly on a blank copy of the worksheet.
- Using *steps 3 and 4* of the above instructions, the following maps were constructed:

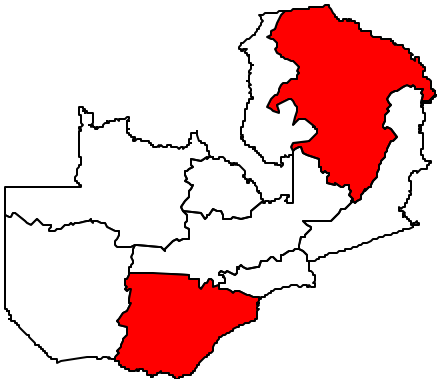
Most important consumed commodity



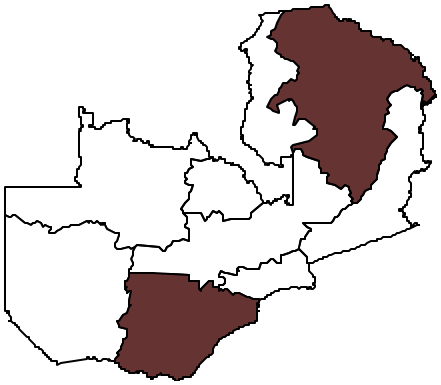
Second most important consumed commodity



Third most important consumed commodity



Fourth most important consumed commodity



Key:

- The final step in the process of identifying the consumption patterns is to summarize the information gathered during this process. The questions in *step 5* should be written out, and then discussed with the Ministries of Agriculture, Commerce, and Social Welfare or other professionals that are aware of the

consumption situation in your country to ensure that you have an accurate as possible understanding.

In the example from Zambia, there are some important aspects of the consumption pattern that are noteworthy for price analysis. First, it is clear that the dominant staple food in Zambia is maize. This is a result of years of production and consumption subsidies (at one point these subsidies were almost 19% of GDP). The other staple foods in Zambia are cassava (which is consumed primarily in Northern, Luapula, and Western provinces), and to a lesser extent sorghum (white) and millet in the Southern and Northern provinces. Sorghum and millet are also used in making beer.

3.2.3 Domestic marketing patterns

Understanding domestic agricultural marketing patterns is important to price analysis. The reasons for this are:

- it provides information on the major assembly, wholesale and consumer markets
- it provides an understanding of the flow of cereals through the domestic markets

Appendix D provides a blank detailed step-by-step worksheet to identify the organization and performance of the major cereal markets in a particular country. This worksheet focuses on the identification and understanding of national cereal marketing patterns, but the same worksheet could be used for other crops (e.g., cash crops) or livestock. An example of a completed worksheet is presented in Figure 3.3.

Figure 3.3: Sample completed worksheet on national marketing patterns

Appendix D

Worksheet to identify domestic marketing patterns

Purpose: This worksheet will guide the analyst through a sequential series of steps to identify both the movement and structure of major cereal markets in a particular country. The concept is offer a practical guide to identify the contextual information necessary to use market and price data and information for early warning.

Steps:

1. Collect and review past studies on the marketing of agricultural products in your country. Universities (both local and international), government, donors, or NGOs has often done these studies.

2. This step is to identify the movement of cereals within the country.
   a) Based on the previous two appendices, list the three most important staple foods. If there are more than three important staple foods then continue the list on another copy of Appendix D.
   b) For each staple list the name of the market, the location of the market (e.g., province), and the type of market (rural assembly, transit, or terminal market). If there are more markets for any staple food then continue the list on another copy of Appendix D.

Staple food	Major assembly markets	Major wholesale markets	Major consumption centers
1. Maize	Eastern	Eastern	Eastern
	Eastern	Eastern	Lusaka
	Eastern	Lusaka	Copperbelt
	Southern	Southern	Lusaka
	Central	Central	Copperbelt
2. Cassava	Northern	Northern	Northern
	Luapula	Luapula	Luapula
	Western	Western	Western
3. Sorghum/ Millet	Northern	Northern	Northern
	Western	Western	Western
	Southern	Southern	Southern

c) Print out a map of the country at the district level for each of the commodities listed above at the provincial level with both the market locations (Worksheet in Appendix C)and the production areas (worksheet in Appendix B).

d) For each staple food draw on a separate map the markets that you identified as important for the marketing of that commodity. Next show the direction of the movement of the commodity with arrows.

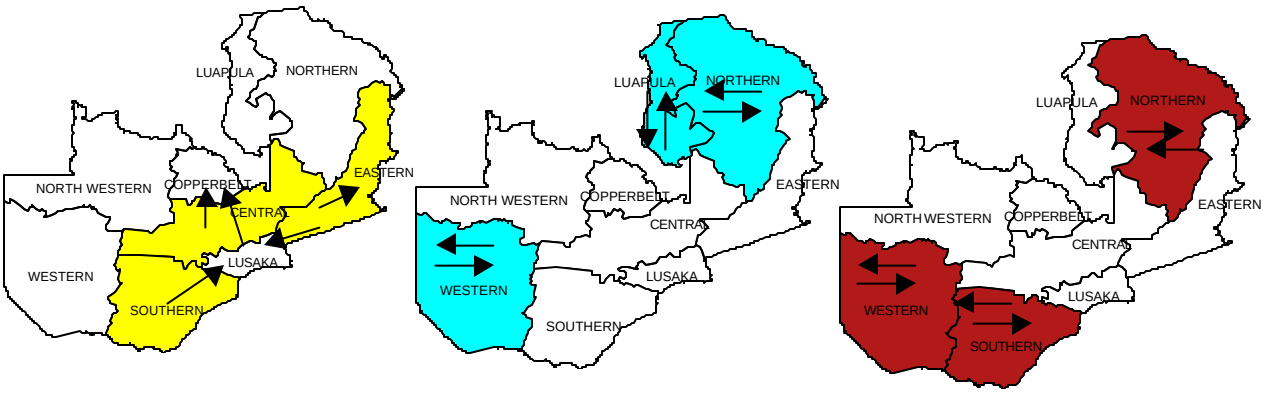
e) Write a brief summary of the insights that you learned in this process. The summary should include comments about:
   - What are the major markets for the main staple food in the country?
   - What major markets for the other important staple foods are there in the country?
   - What are the flows from farmer to consumer of the major staple foods in terms of spatial movement?

Tips if the answers to the above questions are not easily available:

- Try to identify any marketing studies that have been done for your country. A good source to acquire these studies are universities, donors (who sometimes fund these studies), other government ministry offices, and NGOs.
- Visit some of the major traders and millers in a country and discuss the structure and performance of the marketing of specific commodities.

Instructions to fill out the worksheet:

- *Step 2*a and 2b should be completed directly on a blank copy of the worksheet.
- Using *steps 2c and 2d* of the above instructions, the following maps were constructed:



Most important staple food flows: Maize	Second most important staple food flows: Cassava	Third most important staple food flows: Sorghum/Millet

- The final step in the process of identifying the national marketing patterns is to summarize the information gathered during this process. The questions in *step 2e* should be written out, and then discussed with major traders and millers in a country and discuss the structure and performance of the marketing of specific commodities.

In the example from Zambia, there are some important aspects of the national marketing pattern for the country's main staple food that are noteworthy for price analysis. First, the marketing of maize, the most important marketed agricultural commodity, has the most dynamic marketing pattern. The other staple crops are only marketed locally (within province). Lusaka and Copperbelt—both have large urban populations—are both major maize consuming areas.

An additional area that needs examination is the seasonality of the marketing of agricultural products. Showing similar maps, as presented above, for each quarter (3 months) of the year could do this. This would highlight marketing patterns at different times of the year.

3.2.4 External trade patterns

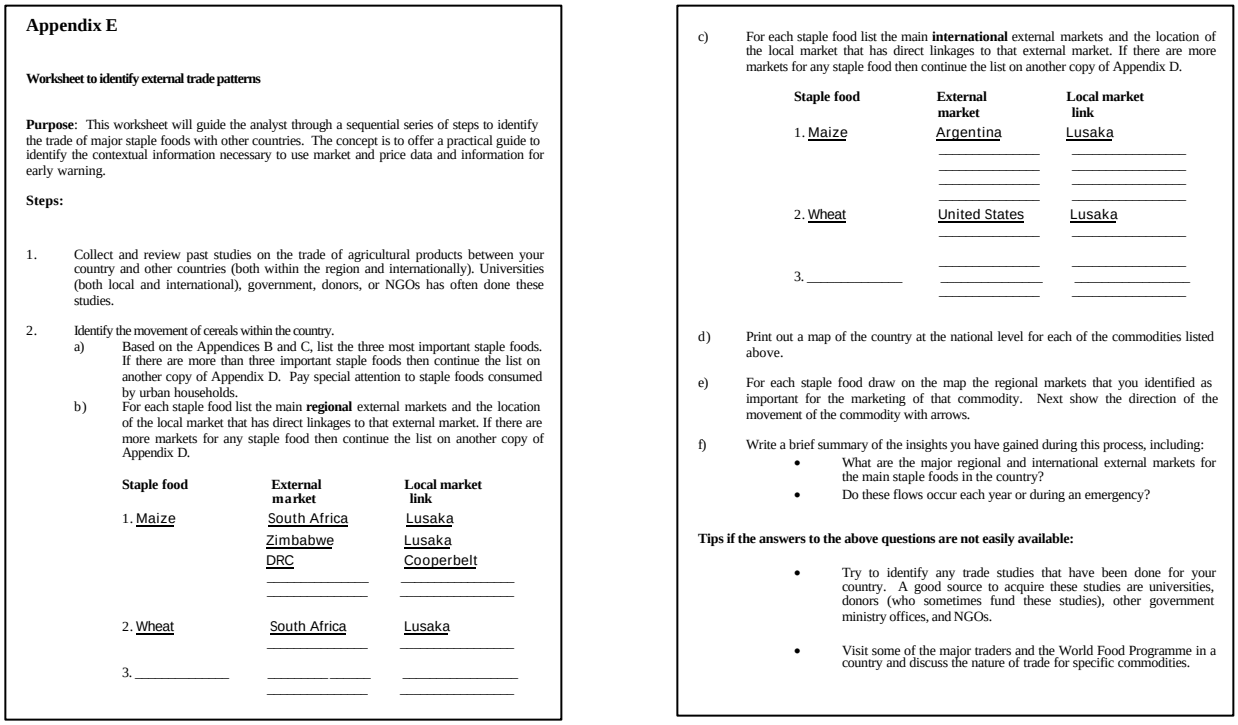
Understanding trade patterns with other countries is also important in price analysis. The main issue to understand is the flow of the major commodities into the country (imports) and out of the country (exports). This flow influences the level of supply (and therefore the

price) of a commodity. The issues to understand are the major trade partners (countries), the volume of flow of trade, and the timing of trade.

Trade with other countries can range from small-scale trade between border communities to large-scale trade (either regular or emergency). In both times of normalcy and crisis countries tend to procure commodities from the same places. Knowing these patterns of past behavior will assist the analyst to be prepared to identify and explain changes in prices.

Appendix E provides a blank detailed step-by-step worksheet to identify pattern of trade between your country and other countries. An example of a completed worksheet is presented in Figure 3.4.

Figure 3.4: Sample completed worksheet on external trade patterns



Appendix E

Worksheet to identify external trade patterns

Purpose: This worksheet will guide the analyst through a sequential series of steps to identify the trade of major staple foods with other countries. The concept is to offer a practical guide to identify the contextual information necessary to use market and price data and information for early warning.

Steps:

1. Collect and review past studies on the trade of agricultural products between your country and other countries (both within the region and internationally). Universities (both local and international), government, donors, or NGOs has often done these studies.

2. Identify the movement of cereals within the country.
   a) Based on the Appendices B and C, list the three most important staple foods. If there are more than three important staple foods then continue the list on another copy of Appendix D. Pay special attention to staple foods consumed by urban households.
   b) For each staple food list the main **regional** external markets and the location of the local market that has direct linkages to that external market. If there are more markets for any staple food then continue the list on another copy of Appendix D.

Staple food	External market	Local market link
1. Maize	South Africa	Lusaka
	Zimbabwe	Lusaka
	DRC	Cooperbelt
2. Wheat	South Africa	Lusaka
3. _____		

c) For each staple food list the main **international** external markets and the location of the local market that has direct linkages to that external market. If there are more markets for any staple food then continue the list on another copy of Appendix D.

Staple food	External market	Local market link
1. Maize	Argentina	Lusaka
2. Wheat	United States	Lusaka
3. _____		

d) Print out a map of the country at the national level for each of the commodities listed above.

e) For each staple food draw on the map the regional markets that you identified as important for the marketing of that commodity. Next show the direction of the movement of the commodity with arrows.

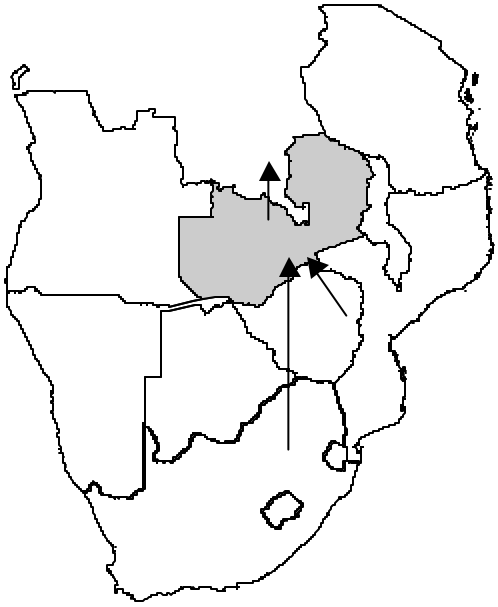
f) Write a brief summary of the insights you have gained during this process, including:
- What are the major regional and international external markets for the main staple foods in the country?
- Do these flows occur each year or during an emergency?

Tips if the answers to the above questions are not easily available:

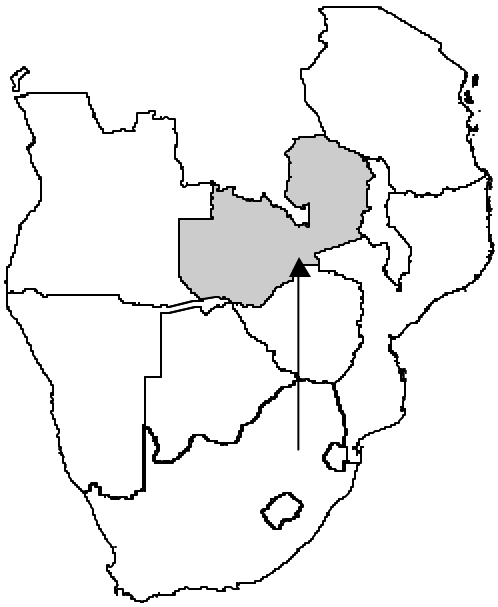
- Try to identify any trade studies that have been done for your country. A good source to acquire these studies are universities, donors (who sometimes fund these studies), other government ministry offices, and NGOs.
- Visit some of the major traders and the World Food Programme in a country and discuss the nature of trade for specific commodities.

Instructions to fill out the worksheet:

- *Step 2*a through 2c should be completed directly on a blank copy of the worksheet.
- For *steps 2dc and 2d* of the above instructions, the following maps were constructed:



Most important commodity trade flows: Maize



Second most important commodity trade flows: Wheat

- The final step in the process of identifying the external trade patterns is to summarize the information gathered during this process. The questions in *step 2f* should be written out, and then discussed with major traders and other key informants (e.g., the World Food Programme (WFP) in a country and discuss the nature of trade for specific commodities.

In the example from Zambia, there are some important aspects of the external trade pattern for the country's main staple food that are noteworthy for price analysis. First, in deficit years maize usually comes from regional markets, especially South Africa and Zimbabwe. In years that the region has had a maize shortfall, maize has come from as far away as Argentina. Wheat is imported every year (there is a structural deficit), and is mostly purchased from within the region (primarily South Africa). If there is a deficit in the region wheat is sometimes purchased in the United States.

3.2.5 Historical and current marketing policies

The identification of agricultural marketing and trade policies (and their enforcement) is also important for price analysis. Policies can either enable or constrain the functions of the marketing system. The result of these policies on observed prices is that they promote competitive trade or introduce market distortions. Policies that will be examined are controlled prices, the existence of cereal marketing boards, and those that affect the assembly, transportation, storage, and processing of cereals.

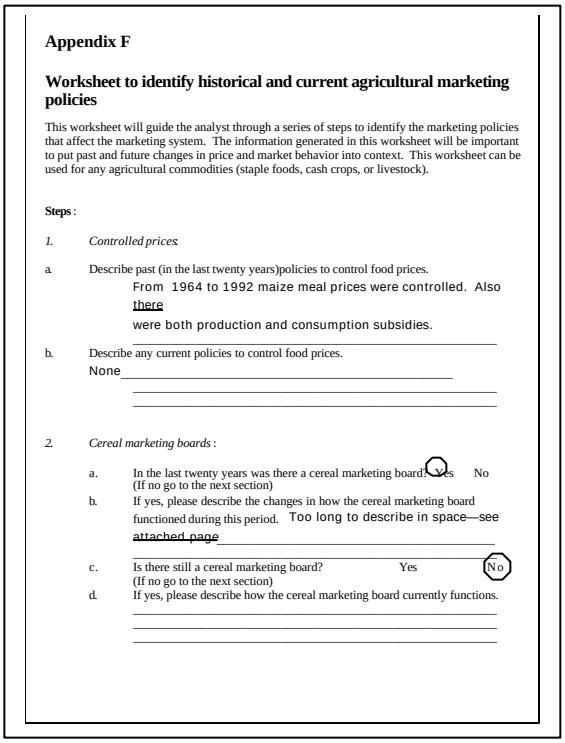
- these policies (and their enforcement) guide the structure, conduct and performance of markets since they can limit what different people in the marketing system (e.g., traders) can do

- these policies provide useful context to understand price behavior since sometimes odd marketing behavior can be explained by the types and enforcement of specific marketing policies

The existence and enforcement of policies have a very large influence on either encouraging or discouraging the marketing of agricultural products. Examples are policies like administered pricing (panseasonal or panterritorial pricing), establish and guide the functioning of a marketing board, and the restriction of individuals or the private sector to process or move agricultural commodities. All of these policies have occurred in the recent past in southern Africa. An understanding of these policies can enhance the quality of monitoring and interpreting price and market behavior.

Appendix F provides suggestions on the types of marketing policies that exist in a particular country. An example of a completed worksheet is presented in Figure 3.5.

Figure 3.5: Sample completed worksheet on historical and current marketing policies



Appendix F

Worksheet to identify historical and current agricultural marketing policies

This worksheet will guide the analyst through a series of steps to identify the marketing policies that affect the marketing system. The information generated in this worksheet will be important to put past and future changes in price and market behavior into context. This worksheet can be used for any agricultural commodities (staple foods, cash crops, or livestock).

Steps:

1. *Controlled prices*:

a. Describe past (in the last twenty years)policies to control food prices.
From 1964 to 1992 maize meal prices were controlled. Also there were both production and consumption subsidies.

b. Describe any current policies to control food prices.
None

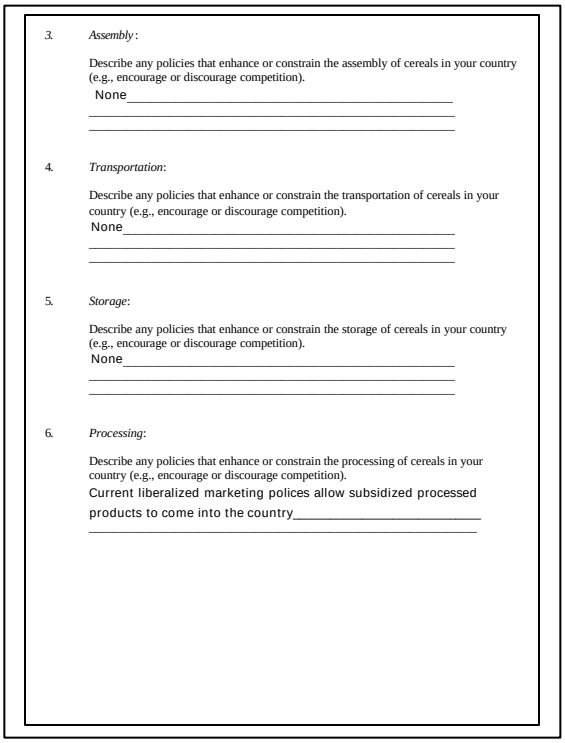
2. *Cereal marketing boards*:

a. In the last twenty years was there a cereal marketing board? Yes No
(If no go to the next section)

b. If yes, please describe the changes in how the cereal marketing board functioned during this period. Too long to describe in space—see attached page

c. Is there still a cereal marketing board? Yes No
(If no go to the next section)

d. If yes, please describe how the cereal marketing board currently functions.



3. *Assembly*:

Describe any policies that enhance or constrain the assembly of cereals in your country (e.g., encourage or discourage competition).
None

4. *Transportation*:

Describe any policies that enhance or constrain the transportation of cereals in your country (e.g., encourage or discourage competition).
None

5. *Storage*:

Describe any policies that enhance or constrain the storage of cereals in your country (e.g., encourage or discourage competition).
None

6. *Processing*:

Describe any policies that enhance or constrain the processing of cereals in your country (e.g., encourage or discourage competition).
Current liberalized marketing polices allow subsidized processed products to come into the country

All six steps should be completed on the worksheet. The answers from the worksheet provide some useful insights. First, in the past there were price controls and subsidized maize meal prices. These polices have resulted in the production of maize in areas of the country that do not have sufficient rainfall to grow maize. This has increased risk of food insecurity in these areas (e.g., Southern Province). The marketing of maize was liberalized in the early 1990s, and there appears to be no restrictions on the assembly, transportation, storage, processing, or sale (including export) of maize.

3.2.6 Macroeconomic influences on marketing and consumption

Macroeconomic factors can influence the conduct and performance of both government and private sector market activities, which can in turn influence prices.

The most important macroeconomic factors for price analysis are the inflation rate, the exchange rate, and the availability and access to foreign exchange. The *inflation rate* is important since it influences price levels, and ultimately the purchasing power of households. If inflation is high, households with the same amount of income will be able to purchase fewer commodities, including food. The *exchange rate* influences the ability of household income to purchase imported goods and the potential income to be earned from exported goods. If the local currency compared to an important regional (e.g., the South Africa rand) or international (e.g., US dollar) currency is gaining strength (e.g., a move from Z$18 to Z$17) then imported goods become relatively cheaper. If the local currency compared to an important regional or international currency is losing strength (e.g., a move from Z$17 to Z$18) then imported goods become relatively more expensive. Finally the availability of foreign exchange and traders ability to access it are also important factors in monitoring prices and markets. When foreign exchange (a traded currency like the US dollar) is either not available or not accessible the amount of imports that can be procured from outside of a country is limited. In a time of shortfall this could result in less cereals being imported than required to meet consumption requirements. In this situation the price of the cereal, or the products made using this cereal, would increase.

Appendix G provides suggestions on the types of macroeconomic policies that exist in a particular country. An example of a completed worksheet is presented in Figure 3.6.

Figure 3.6: Sample completed worksheet on macroeconomic polices

Appendix G

Worksheet to identify macroeconomic factors

This worksheet will guide the analyst through a series of steps to identify the major macroeconomic influences on the marketing system. The information generated in this worksheet will be important to deciding whether to adjust the price data during analysis and reporting.

Steps:

1. *Inflation*:
   a. Who in government collects data that shows the inflation rate? Central Statistics Office
   b. Collect the rate of inflation data and plot the last 10 years (or the amount of time that is available).
   c. Describe the long-term trend in the inflation rate (stable, increasing, high, variable)? Variable—see attached map
   d. Describe what factors have contributed to inflation in the recent past. Tight monetary and fiscal polices have reduced inflation

2. *Exchange rate*:
   a. Who in government collects data that shows the exchange rate? The Central Bank (Bank of Zambia)
   b. What is the current exchange rate against the currencies of the country's major trading partners?

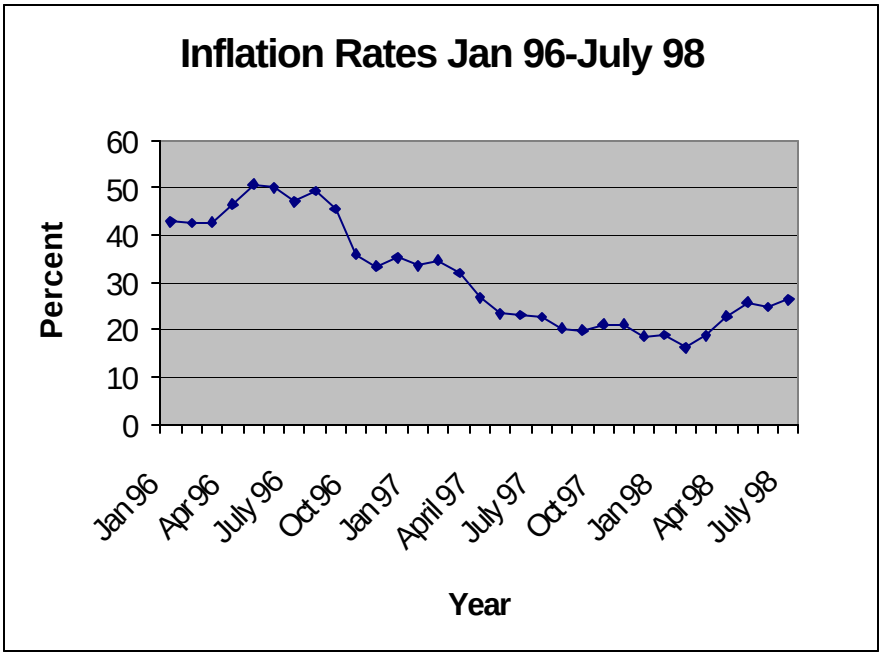
Currency	Rate (per local currency)	Date
US Dollars	2215	November 5, 1998
B. Pounds	3544	November 5, 1998

   c. Collect the exchange data and plot the last 10 years (or the amount of time that is available).
   d. Describe the long-term trend in the exchange rate (stable, increasing, high, variable)? Increasing (see attached graph)

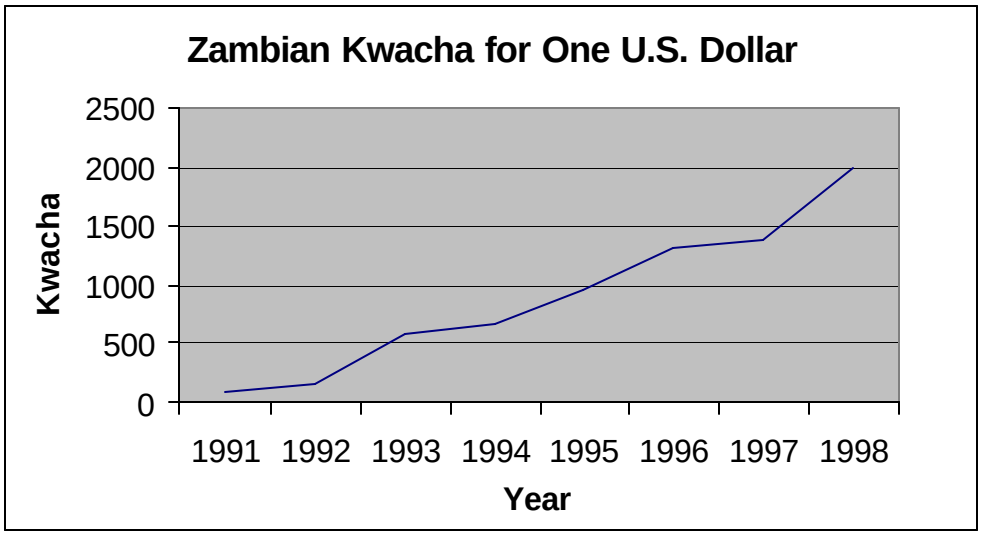
3. *Availability of foreign exchange*.
   a. Is the availability and access to foreign exchange a constraint to traders to import food? Yes No (If no, then this worksheet is completed)
   b. Describe how the availability of foreign exchange is a constraint to traders.
   c.
   d. Describe how the access to foreign exchange is a constraint to traders.

Instructions to fill out the worksheet:

- *Step 1* should be completed on the worksheet for parts *1a*, *1b*, and *1d*. For part 1c, plot the data on a graph (use a spreadsheet program).



- *Step 2* should be completed on the worksheet for parts *2a*, *2b*, and *2d*. For part *2c*, plot the data on a graph (use a spreadsheet program).



In the example presented above there are a few interesting insights that are apparent. First, the inflation rate since May 1996 had been steadily declining until mid 1998. Zambia had made significant progress on addressing key aspects of their economy that reflects this progress. This is especially significant given the lack of donor support for balance of payments, the large budget deficit, and the large interest payments on the external debt. As a result of a poor harvest, the inflation rate has begun rising from a low of about 17 percent in early 1998 to almost 26 percent in July 1998. The value of the Zambian Kwacha to the US dollar has steadily weakened since mid 1991. There have been periods of stability (e.g., mid 1993 to mid 1994). The steady weakening of the Kwacha and the continued high inflation has—in conjunction with a stagnation of wages—reduced the purchasing power of urban households.

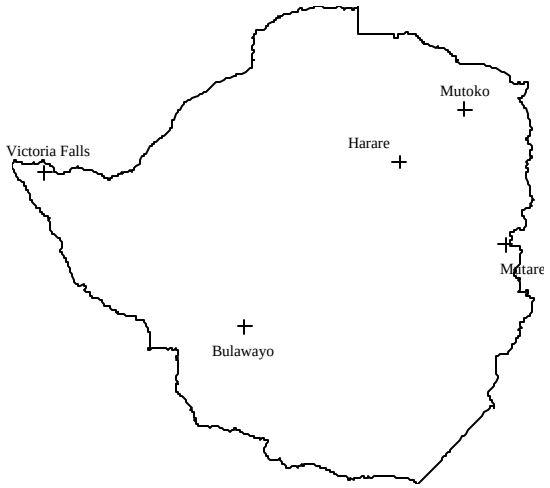
3.3 Deciding what to monitor

The decision of which markets and commodities to monitor if a function of two main factors. The first factor is the food system a country. The information generated in the previous section (and the worksheets) is important to include in these decisions. Another factor to include is the actual markets and commodities that are included in the price collection system that provides you with your data.

3.3.1 Identification of existing markets with available data

Before actually providing the criteria for selecting markets and commodities that should be monitored, it is important to identify (and map) markets for which there is regular reporting of price data and market information. This activity has two benefits. First, by mapping the existing markets it becomes easy to see where there are reporting gaps. The next step is to discuss with the market information system the need to increase their collection coverage. Also, the identification of this gap in the collection and reporting of prices should be a stimulus for the need to collect marketing information when on field trips to these areas. During these field trips a supplemental database could be developed that includes prices for those markets without regular data collection. The second benefit of developing a map of the collection and reporting of price data is that it can be overlaid (put on top of) a map of production and consumption patterns to provide a stronger basis to understand prices and markets. An example of a map of the reporting coverage of markets is presented in Figure 3.7.

Figure 3.7: Reporting markets in Zimbabwe



3.3.2 Selection of markets

Selecting which markets to monitor is a critical decision before monitoring prices and markets. This decision should be based on the information generated in the previous section using the worksheets, which uses historical patterns as a guide. These worksheets have guided you to identify different types of markets (section 3.2.3). The next step is to establish a balance between the number of markets that are monitored with the available resources and the heterogeneity of market conditions. More resources may mean that more markets could be covered. More heterogeneous of market conditions mean that more markets need to be monitored.

In a situation where there are only a few markets (less than twenty) reporting regularly, the analyst is advised to monitor all of the markets. The information generated using the worksheet in this case will guide the interpretation of the price data.

In a situation where there are a large number of markets, there is a need to limit the number of markets that need to be intensively monitored. The main reason for this is that it requires a significant investment in time to "understand" how a particular market works. The key markets that provide reliable information about changing food security conditions should be intensive monitored. Suggested criteria for determining the types of markets identified in the worksheet analysis that should be intensively monitored include markets that are:

1. major cereal collection markets (indication of both urban conditions—since usually located in larger towns—and the general movement of cereals in the country)

2. located in surplus-producing areas (to monitor food availability concerns)

3. located in food deficit areas (to monitor food access since poor households tend to be net purchasers of cereals)

4. located in major urban areas (to monitor urban food access)

A suggested distinction of the effort that should be included in the monitoring of intensive versus extensive monitoring of markets is:

1. **Intensive monitoring**: A select number of markets should be monitored on a regular basis regularly (as often as the price and marketing data become available—probably monthly). In these markets, any anomaly should be thoroughly examined, explained, and reported. Always crosscheck these data with other data types to see if they are providing the same understanding of a situation. Regular field trips or discussions with key informants should be done when anomalous behavior occurs.

2. **Extensive monitoring**: The rest of the markets that regularly report price and market data and information are in this category. These markets should be examined less frequently, for example each quarter. The same procedures proposed for the intensive monitored markets to resolve anomalous price patterns should be followed.

3.3.3 Selection of commodities

Selecting which commodities to monitor is also an important to make. This decision should be based on the information generated in the previous section using the worksheets. These worksheets have guided you to identify different types of commodities (section 3.2.2).

There is also a need to establish a balance between the number of commodities that are monitored with the available resources and the heterogeneity of consumption patterns. More resources may mean that more commodities could be covered. More heterogeneous consumption patterns may mean that more markets need to be monitored. This is a difficult balance to determine.

In a situation where there are only a few commodities (less than five) monitored regularly, the analyst is advised to monitor all of the commodities. The information generated using the worksheet in this case will guide the interpretation of the price data.

If there is a large number of commodities, there is a need to limit the number of commodities that need to be intensively monitored. The main reason for this is that it requires a significant investment in time to "understand" how certain commodities fit into the economics and consumption behavior of households. The key commodities that provide reliable information about changing food security conditions (whether food availability or food access conditions) should be intensive monitored, especially cereals and certain roots and tubers (if appropriate). Commodities should be intensively monitored if:

1. it is the national staple food (normal good--to capture national trends)

2. it is the staple food of a large portion of the country (to capture regional differences in consumption)

3. it is the staple food of a food insecure group (inferior good--to capture changes in food access)

A suggested distinction of the effort that should be included in the monitoring of intensive versus extensive monitoring of markets is:

1. **Intensive monitoring**: A select number of commodities that should be regularly be monitored on a regular basis (as often as price and marketing data become available—probably monthly). For these commodities, any anomaly should be thoroughly examined, explained, and reported. Always crosscheck these data with other data types to see if they are providing the same understanding of a situation. Regular field trips or discussions with key informants should be done when anomalous behavior occurs.

2. **Extensive monitoring**: The rest of the commodities for which there is regularly reported price and market data and information fall into this category. These commodities should be examined less frequently, for example each quarter. The same procedures proposed for the intensively monitored commodities to resolve anomalous price patterns should be followed.

Chapter 4

Data management and software selection

4.1 Introduction

Price analysis will be greatly facilitated by a well-thought through and documented data and file management system for price data. Also, selecting an appropriate software program for the storage, analysis, and presentation of price data is also important.

4.2 Data management and verification

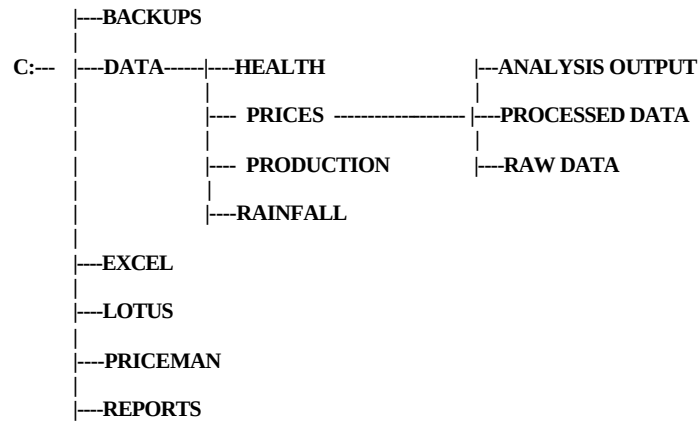
Data management

It is important to have solid data management concepts in mind when preparing to incorporate price monitoring into one's early warning activities. Although specific suggestions are provided below, the important concept is that the data management system be logical, consistent, and well documented. Spending some time thinking through a functional management system can save a lot of time later.

The first task is to establish ***a logical structure of subdirectories*** for data and outputs. The names of subdirectories should describe the contents of the subdirectory[5]. It is important that data, analysis outputs, reports, and computer programs not be mixed together within the same subdirectory. This will make it easier to retrieve data or document files.

Again, there are many structures that can be developed, but an easy and useful is presented below (Figure 4.1).

Figure 4.1: Proposed subdirectory structure



[5] In Windows 95 the length of the subdirectory and file names is not limited to eight characters as it was in DOS and Windows 3.1. A subdirectory called "Nominal prices" is now possible.

A useful piece of advice is to never store (save) your data or analysis in the same location as the computer software that you are using. It is easy to accidentally delete a key file that runs the software when deleting or moving data or analysis output files. Also, it is often very difficult to locate data and analysis files when they are mixed in with the system files.

The second task is to establish a simple, flexible, and useful set of ***file name conventions*** that make it clear what each file contains. Key information might include: 1) the data type (e.g., WP for wholesale prices or RP for retail prices), 2) the time period (e.g., 0697 for June 1997), 3) and the commodity (e.g., MZ for maize). The three letters or number permitted after the full stop usually relate to the computer program that the data are saved and stored in (e.g., XLS for an EXCEL file, DBF for a Dbase file, WK4 for a LOTUS 4 file, and so on). An example of an EXCEL file of retail maize prices for March 1997 would be written as RP9703MZ.XLS.

The next step of data management is to develop and maintain careful and comprehensive ***documentation of the data and files***. The purpose of documenting files is for easy reference and to understand how the data were collected to permit as accurate interpretation of the data as possible. This is a task that has to be done as soon as possible and updated as changes occur. The documentation needs to include who collected the data, at what level in the marketing chain the data were collected. All of these pieces of information are critical to understand during the analysis and interpretation activities of price and market monitoring.

The final data management activity that should be understood is need to establish a regular schedule to ***backup the data and information***. Although this activity may sound obvious, there are a lot of people who have lost irreplaceable files because they did not regularly back up their data. The optimal frequency to back up data is a function of how often you enter data (e.g., daily or weekly) and the amount of data that is entered each period. For example, for data that is entered once a monthly for 15 markets for six commodities, it is sufficient to backup the data after each month's data have been entered. These data should be stored on an external medium, whether it is a diskette, a zip disk, or a tape backup system.

Data verification

The purpose of data verification is to identify data entry errors. Data verification involves:

- random comparisons of hard copy and digital data for quality control if data are entered from hard copies
- visual inspection of data in tabular and graphical formats
- identification and verification of outliers using range checks
- spot checking price data during field trips

- need to compare price data with other data and information types (agricultural production, satellite imagery, field reports) to see if there is a convergence of evidence (triangulation)

4.3 Selection of software to analyze and present price data

There are many types of software that can be used in the processing, analysis, and presentation of these data and information is important to determine early. The decision as to whether a single, multi-purpose software program or a series of software programs is selected is dependent on many factors, including:

- Does the software provide the range of functions?
- Is there an easy linkage of the output from the software package to other packages?
- What software are other related institutions using to do this work?
- What is the cost of the software? Is it affordable by the NEWU?
- Does anyone in the NEWU have experience with the software?
- Can the available computer hardware support the efficient running of the software?

The above questions should be carefully thought through, and kept in mind, when reviewing the different software packages that are available.

There are many different software options that will all work well in providing an efficient system of data storage, processing, analysis, and presentation. The best software is the one or ones that allows these activities to proceed as quickly and effectively as possible. Experience with specific software often makes it the best software to use. Below is a brief review of some different options that should be considered:

- **Spreadsheets**: Software programs such as *LOTUS* and *EXCEL* the widest range of features and functions necessary for price monitoring. These types of programs are well-documented and reasonably easy to use. The presentational aspects of these programs can be cumbersome if many markets and products are being monitored. Macros can be developed and used to facilitate this activity, but can be complicated for the novice user and may need updating each time the software is upgraded (installation of a new version). For the experienced spreadsheet user, this is an attractive option since it can be used for data entry or importation, processing, analysis, and presentation.

- **Statistical packages**: Software programs such as SPSS or SAS offer most of the features and functions necessary for price monitoring. These programs have

adequate documentation, but tend to be to use than spreadsheets for novice users. Unless there is a particular person in the office with experience with a statistical program, and if it is within the budget of the early warning unit, this is not the best option. If there is an advanced user in the office, this is a useful way to do not only the monitoring activities but also some advanced statistical analytical procedures without having to move the data into another software program. However, given staff turnover in many early warning units, there may be a problem in continuity if the advanced user leaves the unit.

- **Customized software for price analysis**: Given the repetitive nature of price and market monitoring, some software has been developed by specific institutions to do these repetitive tasks. This software is customized to the exact needs of the early warning unit's requirements to store, analyze, and present the data. Although there are other programs, two of the ones that are available in Africa are:

    1. AGRIMARKET: This software package was developed by the Food and Agricultural Organization of the United Nations (FAO) to assist the functioning of MIS activities in developing countries. This package is primarily used for the data entry and presentation of market prices to rapidly disseminate information to interested people at specific levels of the marketing system. This program would not be appropriate for early warning monitoring of prices given its orientation.

    2. FEWS Price Data Manager: The USAID-funded Famine Early Warning System (FEWS) Project has developed an easy to use software program to facilitate all activities necessary to monitor, analyze, and present agricultural product prices for early warning purposes. The current version of the program, *PRICEMAN*, is a windows-based (32 bit) tool that allows easy data entry, a facility to review the data that are entered, specific data analysis selections, and a link to *Microsoft EXCEL* to permit the production of high quality presentational graphics. The latest version of the software has "wizards" to assist users make all of the decisions to use price analysis functions in the software package. This program is an updated version of a DOS-based version called PRIX that has been used for years by the FEWS Project in the Sahel. FEWS provides this software free of charge. This program is available through the FEWS office in Washington, field offices, or downloading using FTP. A summary of the main features of *PRICEMAN* is presented in Appendix H.

Chapter 5

Analysis of historical price data

5.1 Introduction

Reviewing historical price data is essential in understanding current price behavior. Combining price data with contextual information about agricultural production, consumption, and marketing will improve monitoring an analysis. Issues such as price data coverage, defining seasonal patterns, analysis of particular markets and commodities, and specific case studies will be discussed in this chapter.

5.2 Review historical price data

5.2.1 Data Coverage

The first step in reviewing price data is to review what data are actually available. The identification of the data coverage refers to a systematic examination of what data actually exist for different commodities and markets. Within *Priceman*, there is a simple process—guided by a step-by-step help wizard to assist the analyst. The output is a matrix of the number of valid months of data for each market-commodity combination by year (Figure 5.1). This is an efficient and rapid method to examine the data coverage. This examination will—in combination with the output from the worksheets, studies, and expert knowledge—set boundaries of what analysis is possible.

Figure 5.1: Priceman output of the data coverage operation

Data Coverage by Months.
The numbers represent the number of valid Months.

Country|Market|Source	Commodity	1993	1994	1995	1996	1997
ZA|LUSAKA URBAN|AMIC	MAIZE	0	1	12	12	4
ZA|LUSAKA URBAN|AMIC	MAIZE DRY 90 KG	6	11	12	12	4
ZA|MONGU|AMIC	MAIZE	0	8	12	12	4
ZA|MONGU|AMIC	MAIZE DRY 90 KG	8	11	12	12	4
ZA|NDOLA|AMIC	MAIZE	0	10	12	12	4
ZA|NDOLA|AMIC	MAIZE DRY 90 KG	6	11	12	11	4

5.2.2 Graphical analysis of price trends

Now that we know what data are available, and understand the general contextual information, it is time to finally review some price data. The general approach that is suggested in this manual is to review the historical price data using graphical analysis. There are many methods to observe historical price trends, ranging from simple to complex. For the purposes of price analysis in early warning simpler methods are appropriate. Graphical analysis involves plotting (graphing) the price data for a particular commodity-market combination over time and explaining the observed pattern. This approach is suggested since it is an easy way to catch major trends and anomalies in the data.

During this process the contextual information about agricultural production, consumption, and marketing generated earlier will be critical to explain the behavior of prices and markets. Through this process you will be able to understand how this market usually behaves after different production outcomes (average, above average, and below average), when structural changes occurred in the economy, or other shocks. Only when one understands the behavior of a market over time can one begin to explain anomalous or odd behavior. It is the identification of the anomalous behavior that is important in early warning, especially the identification of a potentially problematic behavior that will adversely affect household food security. As will be discussed later, the reporting of the anomalous behavior requires a reference period for comparison, which is what the review of the historical data will do.

At least two years of data is necessary to see historical trends. To have a clearer picture of historical price trends one would ideally need five or more years. If only one or two years of price data are available for a given market or commodity, more care should be made to interpret the behavior of current prices in those markets.

There are four steps that are important to do when reviewing historical price trends: 1) understanding seasonal patterns, 2) characterizing price relationships across commodities in the same market, 3) characterizing price relationships for a single commodity across markets, and 4) understanding relative prices. For each step of analysis, an explanation will be provided as to the purpose of the analysis and how the results should be interpreted.

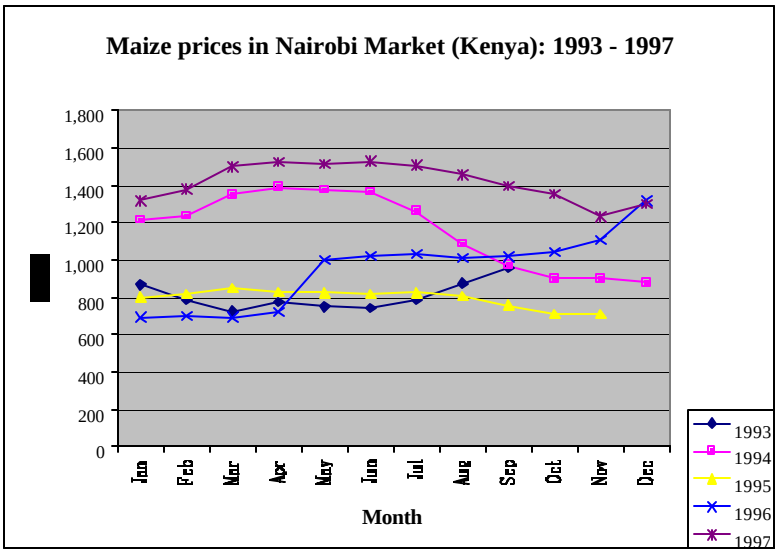
During the analysis of historical price data there are various aspects of price behavior that should be evaluated. The aspects to evaluate are the shape, rate of change, and peak of the historical price curves. This information should be correlated with the contextual information about production, consumption, and marketing patterns. Any anomalies in the historical times series data should be investigated. The first step to checking on these anomalies is to crosscheck with other data/information you have or know about that area. If necessary, more intensive investigation should be conducted with either key informant interviews or field trips.

5.2.2.1 Step 1: Understanding seasonal patterns

The purpose of this analysis is to understand for a given market and commodity combination the seasonal price trends. By understanding these trends (done by explaining unexpected behavior using the contextual information generated in Chapter 3) the analyst will gain valuable insights that will facilitate analysis of current prices. Also, this process can assist in identifying reference periods that will be useful comparisons for current price behavior.

An example of the output from this analytical procedure illustrates the behavior of maize prices in Nairobi, Kenya for each year over the period of 1993 to 1997 (Figure 5.2). The multiple year periods was selected to provide a historical perspective of the price behavior of maize for those years.

Figure 5.2. Example of intra-year seasonal price behavior



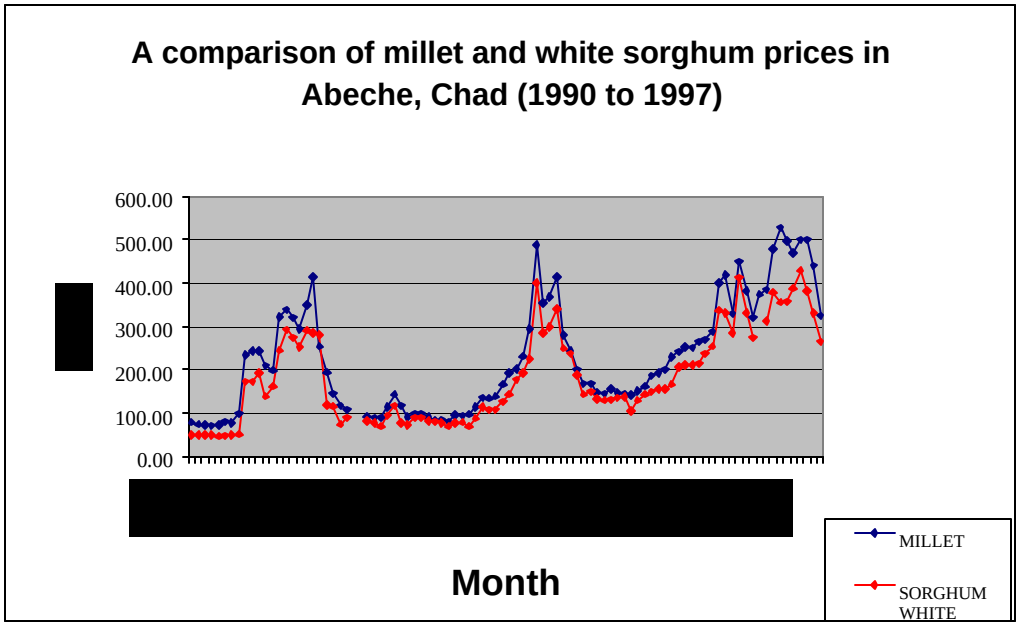
The following insights explain the observed price behavior in the Nairobi Market. During the first part of 1994, maize prices were well above normal. The reason for these high prices is that Kenya was just coming out of a severe drought. During the second half of 1994, prices exhibited normal seasonal levels, following an exceptionally good July-November long rains harvest and exceptional imports. The price pattern in 1995 was surprisingly flat. The reason for this was the exceptionally good July - November 1994 long rains harvest and the staggered releasing of grain on the market by traders. This tempered the usual increases in prices during the January - June period that resulted in the flat price curve. A near total maize crop failure occurred during the October-December short rains season in 1996. Thus maize prices appreciated dramatically during 1997 and remained comparatively higher than normal levels throughout 1997. Also, the unexpected price patterns in 1993 and 1996 are explained by uncharacteristic price appreciation after May that resulted from an expectation of below normal long rains production.

5.2.2.2 Step 2: Characterizing price relationships across commodities in the same market

The insights that come from the analysis of price behavior in this market for one or many commodities under different conditions. These conditions include different types of harvests (good, poor, and average), changes in consumption and marketing patterns, and policy and macroeconomic shocks. In addition, this analysis will assist in understanding the relationship between the commodities. For example, this analysis will provide an indication if commodities are substitutes or complements.

An example of the output from this analytical step illustrates the historical behavior of millet and white sorghum prices at the market in Abeche, Chad over the period of 1990 to 1997 (Figure 5.3). A period of many years was selected to provide a historical perspective of the price behavior of millet and white sorghum for that market.

Figure 5.3. Example of the examination price relationships across commodities in the same market



The behavior of millet and white sorghum prices in this market, with a few exceptions, illustrates an identifiable pattern. After the harvest, prices normally increase throughout the agricultural season until they peak in either May or June. This rise in prices reflects either an increase in demand or a decrease in supply. The peak in millet and white sorghum prices usually occurs in advance of the harvest, implying that traders are providing an early indication of the quality of the millet and white sorghum harvest prospects. Normally millet and white sorghum prices in this market decline after the peak until the harvest has been completed (December or January).

The behavior of millet and sorghum prices in this market generally follows this pattern. Still, there are some interesting departures from this pattern. For example, the price of both

millet and white sorghum in 1990 in Abeche did not peak, as usual, in May or June, but continued to rise until the harvest. The continual rise in prices might have signaled either trader uncertainty of the quality towards the upcoming harvest or that traders perceived that the harvest would be below average. There was a normal drop in prices after the harvest was completed, but the magnitude of the drop was small for both commodities. This reinforces the interpretation made during the season, when the normal peak in prices was not observed, that the agricultural season would probably be below average. This pattern was again observed in 1996/97.

Another interesting aspect of the prices in the Abeche market is the impact across years of both millet and white sorghum prices. In 1991, 1994 and 1997 prices of both products peaked at about the normal time (April), but the level of prices at the peak was much higher than anytime in other years. This appears to reflect the residual impact of the previous season's poor harvest.

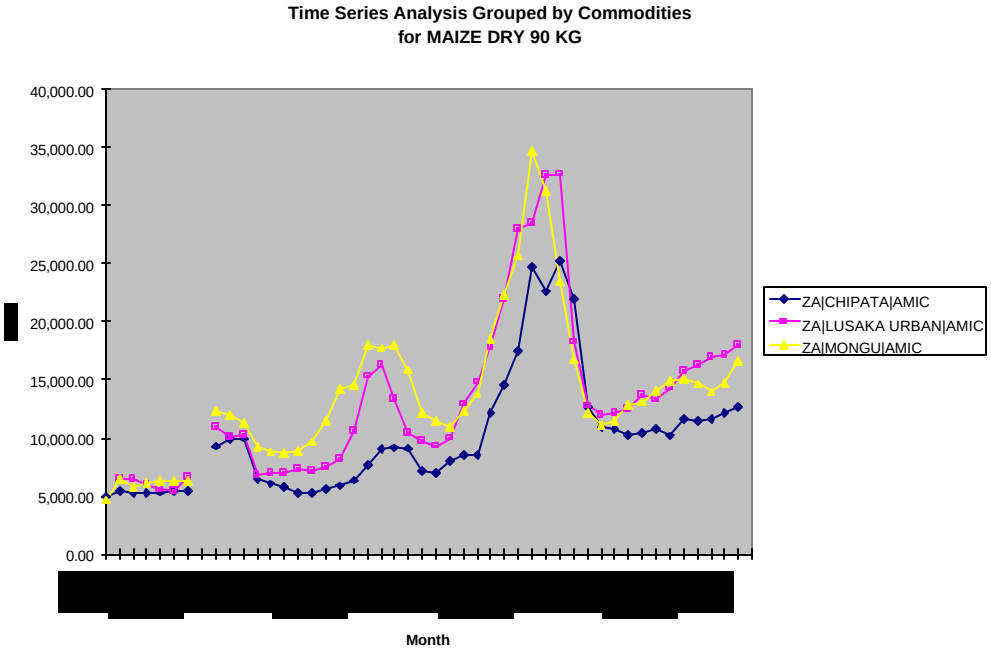
Finally, it is interesting to note the relationship of prices between millet and white sorghum. The behavior of prices moved in concert for most of the period under analysis, with the price of white sorghum being consistently 5 to 20 FCFA per kilogram below that of millet. This price gap between millet and white sorghum increased in the first half of 1997.

5.2.2.3 Step 3: Characterizing price relationships for a single commodity across markets

The knowledge that will come out of this analysis is an understanding of price behavior for a single commodity across many markets under different conditions. These conditions include different types of harvests (good, poor, and average), changes in consumption and marketing patterns, and policy and macroeconomic shocks. In addition, this analysis will assist in understanding the relationship across different markets for a single commodity. For example, this analysis will provide indications if prices in different markets are correlated.

An example of the output from this analytical step illustrates the historical behavior of maize prices in in the Lusaka, Chipata, and Mongu markets in Zambia over the period of 1990 to 1997 (Figure 5.4).

Figure 5.4. Example of the examination price relationships across commodities in the same market



The price behavior in these markets illustrates some interesting points. First, Chipata market is in a surplus producing area and Mongu market is in a deficit producing area. The relative maize prices for these two markets show this relationship. In the 1993/94 agricultural season, there was a normal harvest in most of the country. The difference in price patterns following the harvest (May 1994 to April 1995) shows the difference in these patterns for surplus and deficit producing areas and an urban market (Lusaka). In the 1994/95 production season there was a drought in most of the country that is reflected in the exaggerated price pattern following that harvest.

5.2.2.4 Step 4: Understanding relative prices

Prices are meaningful only when compared to other prices. Relative prices highlight the relative value between two commodities, and by extension the relative purchasing power between socio-economic groups whose well being depends on buying and/or selling a particular product. The selection of which products for this analysis should include the most important product for each of two different vulnerable socio-economic groups to compare the change in relative purchasing power due to changes in prices. Price combinations that are most commonly used in this analysis include the comparison between an agricultural product and 1) another agricultural product (to see the relative value of commodities), 2) livestock (to examine the terms of trade between farmers and pastoralists), and 3) wages (to look at the relative welfare between rural and urban populations). It is also important to check if there are any combinations of commodities for which the terms of trade is not stable. This will help identify compliments, substitutes, and avoid over generalizing. The

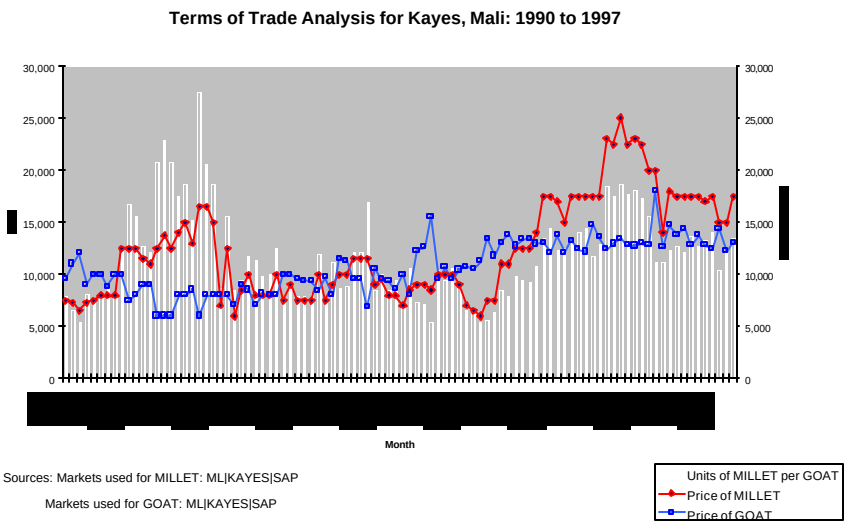
completion of the worksheets in the appendices is to guide the analyst through the steps to select the appropriate products for this analysis.

In an early warning context, this procedure is used to observe the historical and current relationship between two commodities within a given market four ways. First, it provides a historical understanding of the relationship between the prices of two commodities in a given market to understand the pattern of changes in relative prices. Second, it will capture any historical deviation or sudden departure of prices (either increases or decreases) from a normal pattern. Third, it will capture any rapid price changes in the terms of trade between different socio-economic groups to identify if a particular vulnerable group trading those commodities in that market has lost value in their commodity relative to the commodities traded by others. Finally, it can show changes in the terms of trade between different commodities in different markets.

It is important to understand what it means when there has been either an increase or decrease in the relative prices. For example, the terms of trade for goat/millet are a price ratio of goat prices (numerator) over millet prices (denominator) for each time period. An increase in the terms of trade for goat/millet means that the relative purchasing power for the sellers of goat has increased relative to sellers of millet. This can result from either from an increase in the price of goat, a decrease in the price of millet, or both. Conversely, a decrease in the relative terms of trade between goat and millet means that the relative purchasing power for the sellers of millet has increased relative to sellers of goat. This can result either from an increase in the price of millet, a decrease in the price of goat, or both.

An example of the output from this analytical step from Kayes, Mali during the period of 1990 to 1997 (Figure 5.5) illustrates the behavior of the terms of trade between goats and millet.

Figure 5.5: An example of the terms of trade analysis



The graph clearly illustrates that for millet the price pattern was strongly linked to different rainfall season. During this period the 1989/90 season was a poor production year, and the prices after the harvest increased. The 1993/94 agricultural season was good, which resulted in a decrease in prices following the harvest. The goat prices however remained fairly stable, but there was a structural shift between 1994 and 1996. During this period there was a transition from a fairly stable lower price to a fairly stable higher price. The result is that the terms of trade during this period favored the millet producers in good production years and favored pastoralists in bad millet production years.

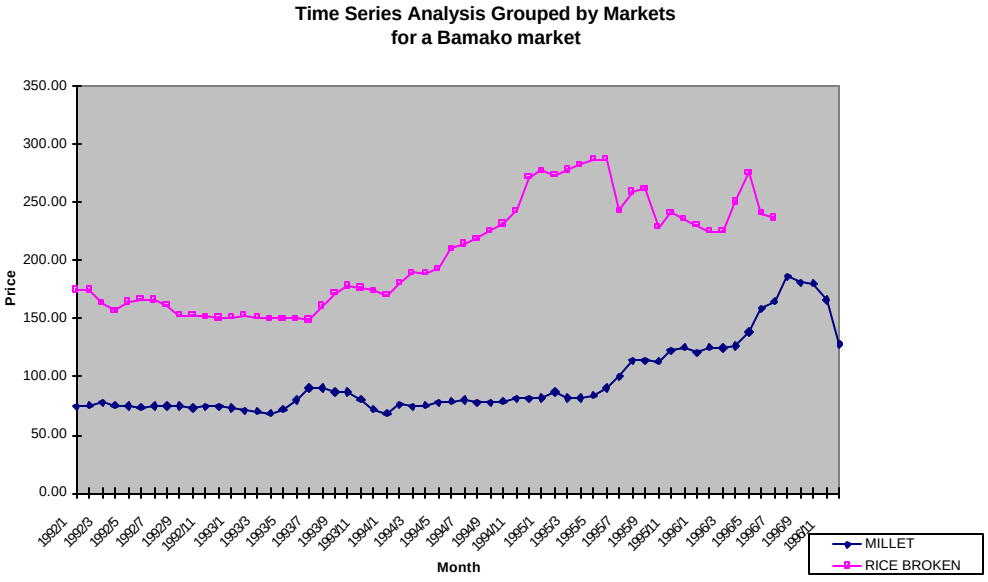
5.3 Historical case studies

This section provides a series of interesting case studies of situations that have arisen in the last few years in Africa. The examples are selected that illustrate key concepts or situations. Each of the case studies will be organized in three steps. First, the price graph that was initially observed will be presented. Next the steps that were used to interpret and investigate the issue raised in the price graph will be presented. Finally, the actions taken or follow activities are presented.

5.3.1 Devaluation in the Sahel (1994)

Observed price pattern:

The CFA, the currency in most West African countries, is tied to the French Franc. In January 1994 the CFA was devalued. The graph below shows the behavior of prices of domestically produced (millet) and imported (broken rice) commodities.

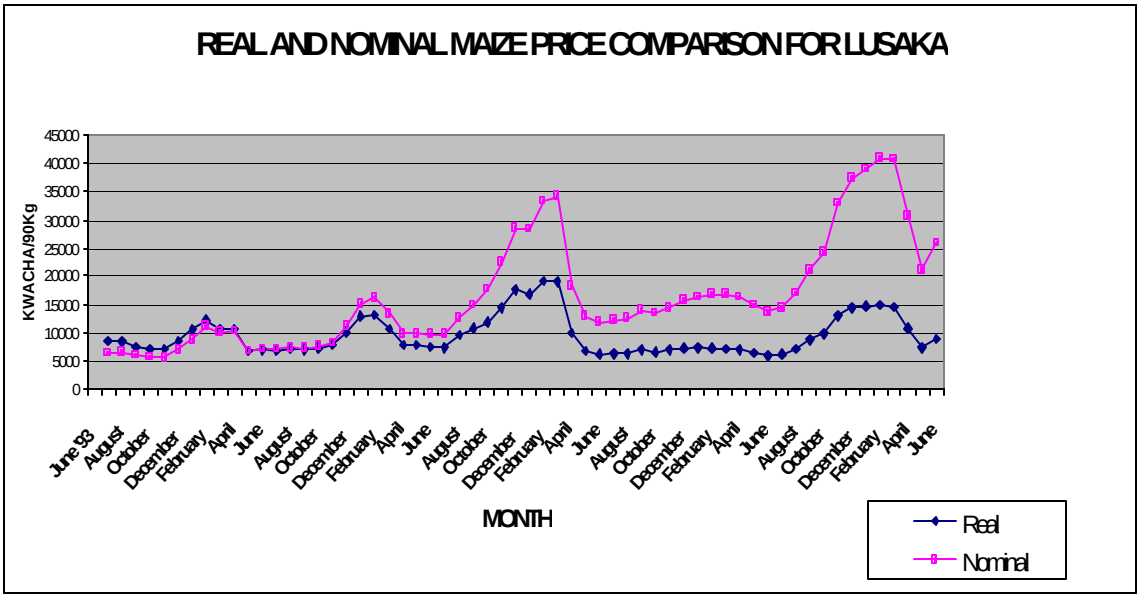


Steps taken to investigate the price behavior: The reason that this example is important in price analysis is that a structural shift of an economy requires a fresh understanding of how prices will behavior. This change in price behavior can be both in magnitude (the level that prices will rise and fall around) and variability (stability). In the above example there are clear differences in the behavior between the imported (rice) and domestically produced (millet) commodities. Although in both cases there was stability in the price of both commodities, the imported commodity reacted quicker to the devaluation of the CFA compared to the domestically produced commodity. The price of imported rice immediately was driven up as a result of the devaluation, and took a long time to stabilize. The price of millet in this market did not begin to rise until a year and a half later. Although there has been a steady increase in millet prices since May 1996, there has been a substantial amount of variability in imported broken rice prices since earlier 1996 after a steady price rise.

Action taken/follow up: The question to answer is "so what?". The information as to how prices adjust to new levels and variability is important knowledge to have when trying to understand what is "normal" in terms of price behavior. In this case, the new normal involves a higher level of prices and more variability for the price of imported rice and higher prices only for millet.

5.3.2 Looking at real and nominal prices in Zambia

Observed price pattern:



This is an important case study since inflation distorts the price pattern such that it becomes difficult to interpret. This is potentially a problem in many countries.

Steps taken to investigate the price behavior: The first issue to address is whether inflation is a problem or not in the economy and markets that are being monitored. If there is little or no inflation using nominal prices is the best option. The more difficult issue is to determine the threshold that above which observed prices should be adjusted for inflation. A visual examination of nominal price shows that starting in September 1995 that inflation was a beginning to be a problem. The reason that it did not seem to be a large problem during the 1993/94 and 1994/95 marketing seasons (May 1993 – April 1995) is that two successive above average agricultural seasons preceded these marketing seasons.

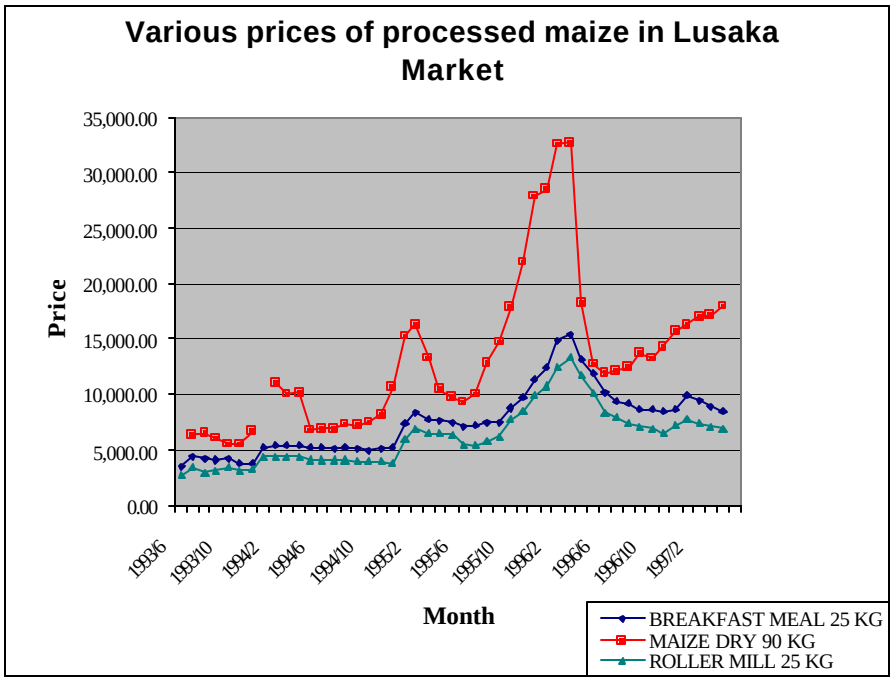
Still, one has to be careful when deciding to deflate nominal prices and whether to publish real price graphs. A problem is that these deflated prices have no meaning to farmers, marketing agents, and most decision-makers. The reason for this is that these prices do not correspond to the prices that they are observing (which are the nominal or inflated prices). The trick in those situations where inflation is a major problem in the economy is to report nominal prices, but to also analyze real prices. The real price shows whether or not the market is behaving properly. In the above example the prices are following a regular pattern. The second issue is to determine how to report the nominal prices such that decision-makers can understand the food security implication. In this case study it is clear that the increase is due to inflation, not market behavior. Therefore, the nominal price information must be combined with other data to assess if there is a problem. In the Zambia context the increase in problems does imply a decrease in the purchasing power of households because wages have remained constant during this period. As such, as prices increase the amount that they can purchase is decreasing over time.

Action taken/follow up:

The action that was taken was to do the analysis in both real and nominal terms, and then report the results in a publication. The graph that was selected for publication was the nominal graph, but the text discussed the food security implications of both real and nominal prices behavior.

5.3.3 Price changes of processed versus unprocessed maize in Lusaka, Zambia

Observed price pattern:



The price behavior observed in the Lusaka market for these products was interesting for the following reasons. First, there is a difference in the variability between processed (lower) and unprocessed (higher) maize. Second, the margin between the two forms of processed maize meal remained relatively constant. All of the commodities seem to incorporate inflation. The objective of understanding this situation is to make sense out of these relationships.

Steps taken to investigate the price behavior:

The first step in understanding this graph is to understand the production and consumption patterns. Obviously a city like Lusaka is not a surplus area. Still, the production areas around Lusaka are surplus producing areas in normal production years. The maize grain availability in the Lusaka market depends on the amount of maize produced in the country, and specifically in the areas surrounding Lusaka. The production, and therefore price, of maize is dependent on the weather, which results in high variability of production from year to year. This variability is reflected in maize prices. For example, the 1994/95 agricultural season was below average, which explains the relatively high price peak compared to the other two seasons. The less dramatic price changes for the processed maize can be explained by the smoothing effect of imports and the slow, steady release of maize meal on the market by millers. In the case of all three commodities there is a steady inflationary effect on prices.

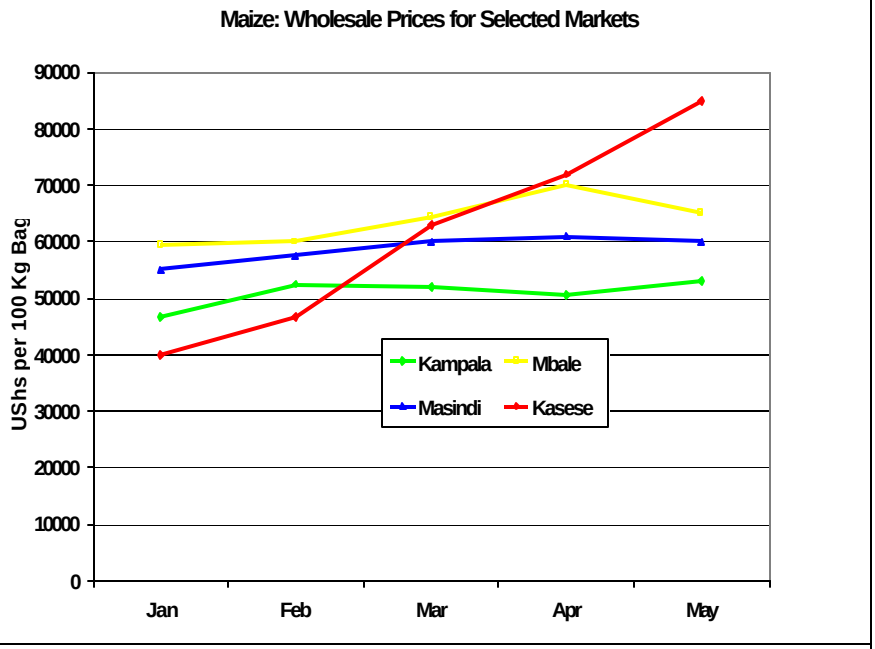
The consumption and marketing also provides some useful insights. Consumers tend to prefer breakfast meal to roller meal. Roller meal is not very processed (first run) maize meal, while breakfast meal is highly processed maize meal. The tastes and preferences for increased processing are clearly shown in the higher breakfast meal prices. Also, the size of the marketing margin and relative cost of the two processed maize meals is a result of the cost of milling. It is interesting to note that the margin between the two prices has remained fairly constant. Chansa: why is this?

Actions taken/follow up:

There is no specific follow up to the understanding that has been generated through the analysis of these prices. This information should be remembered when the analyst is doing future analysis.

5.3.4 Unexpected price behavior in a rural market in Uganda

Observed price pattern:



Source: Market Information Services, Ministry of Trade and Industry and FEWS, June 1998

Steps taken to investigate the price behavior:

Observing a price pattern like the one presented above is not unusual. The important issue to determine is whether the price behavior will have a negative impact on food security. Again, a review of the production, consumption, and marketing patterns (both domestic and external) provide some insights to whether the price behavior in the Kasese Market is problematic. This market is in a surplus-producing area of Uganda and is located near the Rwanda border. Upon investigation it was determined that the increase in prices does not show a food availability problem in this area. The reason for the increase in prices is a result of maize purchases that were to be exported to Rwanda. The exports had the result of bidding up the price of maize.

Action taken/follow up:

After explaining the price pattern and that the behavior was not problematic for local food security, there was no action taken.

Chapter 6

Routine market analysis and reporting

6.1 Introduction

Although reporting is the final step in the process, it is important that the reporting of price analysis be accurate, timely, and accessible to your users. Good analysis can only be useful if it is well written and well presented. Reporting is the final activity in a process that involves winnowing lots of data (sometimes sending conflicting signals) and turning it into information that is actionable by decision-makers. It is this distillation process that determines the effectiveness of the reporting. This chapter provides suggestions on routine analysis and reporting of market information.

6.2 Routine market analysis

6.2.1 Data processing activities

The regular and rapid processing of price data is very important in generating useful and timely early warning information. There are four steps that need to be done to efficiently process the price data.

First, a *data processing plan* needs to be developed. In this plan all aspects of the process—from collection to archiving of the data—need to be specified. Also, there should be a handbook (brief) that documents all of the procedures relating to the processing of the data. This helps lessen the impact of staff turnover that we have observed in many national early warning units. This plan should clearly state the responsibilities of staff members within the early warning unit to avoid confusion and delays.

Second, the *collection of data from the relevant institutions* (e.g., the Agricultural Marketing Information Centre) should be done immediately after the data are available. It is important to obtain their data processing schedule. Timely reporting begins with timely collection of price data.

Third, there should be a systematic procedure to *input and review the data* (error checking and quality control). Although these data are collected from reliable organizations, everyone makes mistakes. These data should be added to the current price database and some key market-commodity clusters reviewed.

Finally, the *data should be archived* for future use as a back up in the unlikely situation that they get damaged or lost. Although it is rare, there have been some circumstances that data at the organization that has collected the data have lost all of their data (e.g., due to computer failure).

6.2.2 Analysis activities

As an early warning analyst, there are many tasks competing for your time. A plan has to be developed to facilitate monitoring activities. This set of procedures is required to analyze price data efficiently. This section details the procedures needed to provide timely and useful reporting of price information. The relative responsibilities for the staff within the early warning unit need to be clear to avoid confusion and ensure rapid, high quality monitoring.

There are two levels of analysis in monitoring agricultural prices. The first is the regular plotting and review of the data as they are received from the market information system. The second activity is the further investigation of where problems seem to be developing.

There is a core set of activities to regularly plot and review the price data as they are made available by a market information system. These methods are the same as those presented in the previous chapter to review the historical price data. The orientation in this section is to provide guidance as to the actual steps that need to be done when monitoring prices.

In an earlier part of this manual there were suggestions on determining the commodities and markets that should be monitored. Whether the monitoring is done intensively or extensively, the same procedures should be routinely followed to analyze price data. The steps are:

1. *Plot the price data by market-commodity for the current year and a reference yea (stacked time series graph).* This will give an indication season price pattern and whether the price behavior is following or deviating from "normal" behavior.

2. *Plot the historical time series price data in two ways.* First, graph specific commodities for individual markets. Second, graph individual commodities across many markets. These provide the historical basis for comparison and putting the current data into context.

3. *Plot the price data by market for all of the commodities being monitored in that market.* This will give an indication of how prices within a market are moving together.

4. For both sets of plots done in steps 2 and 3, answer the following question: Are there any patterns that appear to be indicating a deviation from the expected pattern?

5. Finally, the rate of price change from one month to the next should be calculated and compared to reference periods (e.g., last year and an average year). The rate of change should be evaluated to see if it is about the same, faster, or slower than the reference periods.

6.3 Fundamentals of reporting

6.3.1 Knowing your target audience/user group

The most important preparation that is necessary as the early warning unit is getting started on price analysis is an understanding of the target audience (or user group). The target audience will help in determining the products that should be developed. It takes as much time to produce an unused product or output as it does to produce a good product or output, so understanding what your users want is a good investment of time.

To better understand the needs of your target audience, one needs to know the kinds of decisions that need to be made with this information, the frequency and timing of these decisions, the level of detail required in the products, and the preferred presentational format (if possible). This kind of information can be obtained from a user survey. This survey could take the form of a brief questionnaire or informal meetings. Even in informal meetings careful planning of questions should be done ahead of time.

Follow up meetings with decision-makers to pre-test products that they said they wanted, along with additional products. Decision-makers do not always know what they want, but usually can identify what they will use if they see it. Demonstrating new products before their introduction in reports is a good way to identify if they will be used. One suggestion is to have a meeting with two or three potential aggressive users of the information. This will initiate a more dynamic process that will better guide the development of appropriate products and provide feedback on reporting.

6.3.2 Report information not data

There is a difference between data and information. Data are numbers and facts, while information is data that are processed, analyzed, and interpreted. Too often data are confused as information and are included in reports.

Although there is a need to process data and information to be able to do effective analysis of prices, you must report information. Decision-makers that read your reports are not analysts. Do not expect them to become analysts (even if they had once been analysts in the past) since they have a limited amount of time. Given their busy schedules they require information (not data) upon which to base their decisions.

Remember that you are not trying to replace the market information system (MIS) that provided you with the data. A MIS reports the data and provides some analysis. You should have the opposite balance: little data and more analysis in your reporting. The purpose of price monitoring is to provide a broader picture of the early warning situation in your country. The objective is to use the price data supplied by the MIS and add value to it by combining it with other data types, assess the impact that changes in these data will have on

household food security. The "value-added" analysis and reporting that you are doing with the data makes your use of the data unique, and of great value to decision-makers.
6.3.3 Always compare changes in price and market behavior to reference values

One way that data becomes information is to put current data into the proper historical perspective. By comparing current data to specific reference periods (e.g., last year or a particularly or bad year) or averages provides the proper context to illustrate the current situation and its impact on household food security.

Reporting prices in Zambia increased ten percent in February tells the reader nothing. This sort of price increase is a normal seasonal development just before the harvest. The necessary context would be to compare the change in price (along with the level of price) with last year or an average of the last five years. This context would show that this rate of change is not at all unusual.

6.3.3 So what?: Assessing the impact of unusual price patterns

In addition to putting the current data into the proper perspective, the effective analyst always tries (to the degree possible) to what possible causes and potential impacts of the price changes. Decision-makers need to know "so what?". If you can not answer that question, you need to either do more analysis or collect more information (or clarification about the data/information already collected) from key informants. This is especially true if the expected impact will be negative and affect a large number of people.

A critical aspect in identifying and understanding data anomalies is the comparison of the price data implications with other data and information, especially field reports. This is an important FEWS concept called "convergence of evidence". The idea is to see if all available data sources are indicating the same thing. If they are, then one has more confidence that the price signal is correct. If not, the contradiction in data has to be investigated.

The verification of unusual price behavior can be done sequentially, meaning that there are progressively more costly (mostly time) ways to understand the situation. It is not necessary each time there is an apparent unusual price movement that you jump in the vehicle to see what is going on. This is unrealistic from a resources standpoint, and more importantly often not necessary.

The sequence of verifying unusual price behavior is:

- *Go back to the institution that provided the to verify that the unusual price behavior is not just the result of a data entry error or poor reporting from the field*. This is an important service to provide to the suppliers of the data. As an active analyst, you may problems in the MIS data collection or processing routines that need to be corrected. If the unusual price movements reflect real economic conditions, your feedback might draw the attention of the MIS to an interesting situation they might

want to report on. Telephoning the person responsible for collecting that price data and get an explanation very quickly.

- *Talk to other public and private sector key informants in the capital city.* In any capital city there is a wealth of information about the marketing of agricultural products. Key informants in government (e.g., Ministries of Agriculture and Commerce), universities, private sector, donor agencies, and NGOs should be visited to see if they can provide any insights into the unusual price behavior you have identified. Also, you should develop a network of contacts that will assist you to understand unusual price behavior.

- *Talk to other public and private sector key informants in the area where the market is located*. This can be done via telephone in many cases. Also, you should develop a network of contacts that will assist you to understand unusual price behavior. Face-to-face contacts when you are field trips will facilitate future telephone conversations.

- *Actually visit the market that has the unusual price behavior that you have identified.* Although this is a relatively expensive (both time and money) to resolve a problem, it can provide useful insights to what is happening in that market. This is for those more complicated issues that seem to baffle everybody.

The bottom line is that you have to be able to explain anomalies in the behavior of prices. Your job is to identify and explain the reason (and hopefully the potential impact) of an unusual behavior in prices or markets.

6.3.4 Analyze more than you report

Analysis is the process of understanding patterns in a particular data set or data sets. To feel confident that the reporting about prices is accurate, it is necessary to monitor and analyze more data than is included in the report. If all output from analysis were included in your report, it would be for a decision-maker to be able to put appropriate weight or value to the statements and conclusions included in your early warning publications.

The additional analysis that you do but that is not presented is not a waste of time. It is the result of a thorough analysis that you are confident that what you include in a report is an accurate picture of the situation. The additional analysis that you do is not presented can be drawn upon if a decision-maker would like greater depth than is possible in an early warning publication. Also, additional analyses leads to insights and understandings that can be used the next time a similar situation is faced.

6.3.5 Other fundamental reporting concepts

Some other important reporting concepts are:

- *Assumptions that went into the analysis should be clearly stated*. Only if your assumptions are clearly stated can your readers understand your interpretation of price behavior.

- *The degree of confidence in the analysis and results should also be clearly stated*. Given the quality of data that is usually available, you need to clearly state your impression of the accuracy of you results. This honesty and transparency will make you a more reliable analyst.

- *Collaborator and data providers should be clearly identified*. Often our work is a team effort, and our collaborators (both that provide data and assist with the analysis) need to be acknowledged.

- *The degree of specificity in reporting numbers is important to consider*. It is important that the level of specificity reflect both the quality and significance of the data. For example, including decimals for data that are not accurate or variables that are calculated using relatively poor data would be inappropriate. If you are trying to make a point about the percent change of prices from one month to the next, it would be better to report 20% as opposed to 20.23%. The decimals would imply better quality data and more specificity than is possible.

6.4 Reporting formats and suggestions

6.4.1 Suggested presentation formats

Tables, graphs, and maps that clearly illustrate the points the analyst is making should accompany price reporting. Tables can show the rate of change from the previous month of the current data compared to last year and an average year. Graphs can show temporal price trends. A map can show spatial patterns of price behavior. Finally, a combination of various formats can integrate several of these temporal and spatial concepts. The examples below are drawn from other parts of this manual. Although the presentations below are too small, they are meant to illustrate the different presentation formats.

Text:

The behavior of millet and white sorghum prices in this market, with a few exceptions, illustrates an identifiable pattern. After the harvest, prices normally increase throughout the agricultural season until they peak in either May or June. This rise in prices reflects either an increase in demand or a decrease in supply. The peak in millet and white sorghum prices usually occurs in advance of the harvest, implying that traders are providing an early indication of the quality of the millet and white sorghum harvest prospects. Normally millet and white sorghum prices in this market decline after the peak until the harvest has been completed (December or January).

The behavior of millet and sorghum prices in this market generally follows this pattern. Still, there are some interesting departures from this pattern. For example, the price of both millet and white sorghum in 1990 in Abeche did not peak, as usual, in May or June, but continued to rise until the harvest. The continual rise in prices might have signaled either trader uncertainty of the quality towards the upcoming harvest or that traders perceived that the harvest would be

Graph:

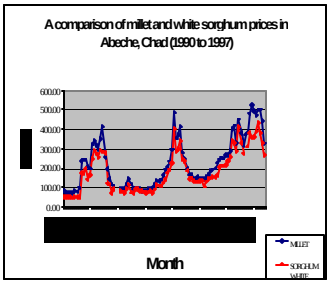
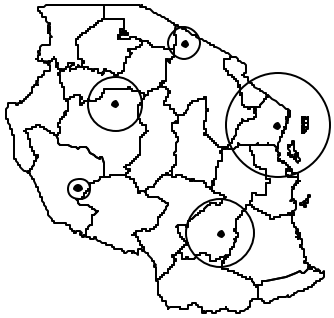


Table:

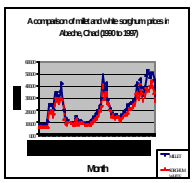
Percent change of maize prices between May and June 1998

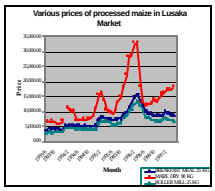
Market	May 98	June 98	Percent change May to June	Percent change from last year	Percent change from average
Lusaka	3395	3325	-4	17	29
Ndola	3775	3550	-6	11	16
Mpika	2954	3064	7	14	28
Mongu	3933	4075	8	37	24
Chipata	2990	3015	1	13	18
Feira	3510	3510	0	20	20
Kabwe	3937	3865	2	28	19

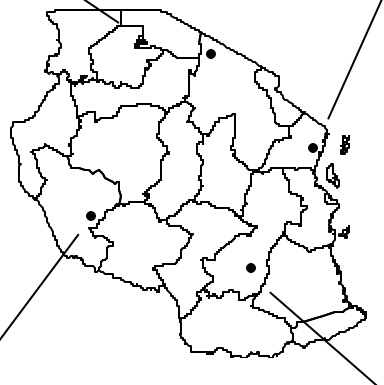
Map:

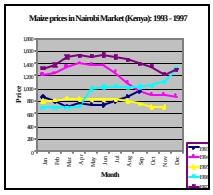


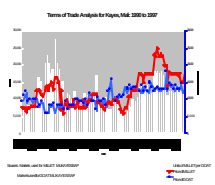
Combination format:











6.4.2 Presentation suggestions

- Keep it *simple* (as already stated) and focus on one concept/message.

- Keep the *number and types of fonts* simple (just because you have a bamboo font does not mean it should be used!) Keep a similar font style throughout a document. There should be a size hierarchy of fonts. Titles should be bigger than labels and legend, which should be bigger than the source. The choice of fonts should enhance the document and not distract the reader.

- The selection between *color and black/white patterns* depends on a number of issues. First, there is an issue of resources that are available for publication. Color is more expensive and—depending on the color selection—often does not photocopy well. Second, how many copies are required? If there are only a few copies required, maybe making color presentations is not a problem. Finally, who is the intended audience? One suggestion is a combination of color and shading which will present well in color, but will still be clear when photocopied or printed in black and white.

- *Appropriate size on page* is also an important issue to consider. Not all graphics require a full page to present them in a useful way, especially if there is little detail and the graphic illustrates a clear message. The size depends also on the purpose. A small graphic may be appropriate for a document, but a full-page graphic is always useful for an overhead in an oral presentation.

- *Clear titles, labels, and source* are essential. This information should be clear enough to inform the reader the issue presented in the graphic even if the accompanying text is missing.

List of Appendices

Appendix A

Bibliography of useful price analysis materials

Alderman, H. 1992. Intercommodity price transmittal: analysis of food markets in Ghana. World Bank Working Paper No. 884.

Alderman, H. and A. Bernard. 1991. Prices and markets in Ghana, Cornell Food and Nutrition Policy Program, Working Paper No. 10.

Bartel, P., E. Mamboue, J. Wright. Undated. Identifying market catchment areas using thiessan polygons. FEWS Internal Working Paper.

Cutler, P. 1984. Famine forecasting: prices and peasant behavior in northern Ethiopia. Disasters 8 (1): 48-56.

D'Souza, F. 1989. Famine and the art of early warning: the African experience. Report to OFDA.

Goetz, S. and M. Weber. 1986. Fundamentals of price analysis in developing countries' food systems. Michigan State University Working Paper No. 29.

May, C. 1992. Price data in a famine early warning system, FEWS Working Paper No. 2.7.

May, C. 1991. Market Information System (SIM) in Chad: Issues and proposals. FEWS Working Paper No. 2.4.

Marion, B. 1986. The Organization and Performance of the U.S. Food System. Lexington Books, Lexington, Massachusetts.

Ravaillion, M. 1987. Markets and famine. Oxford: Oxford University Press.

Steffen, P. and S. Addou. "Markets and Marketing Systems", training materials developed for a FSAU training workshop in Hargeisa, Somalia, May 9 – 16, 1998.

Timmer, C. et al. 1983. "Market functions, markets, and food price formation" (Chapter 4) in Food policy analysis, John Hopkins University Press, Baltimore.

Tomek, W. G. and K. L. Robinson. 1981. Agricultural Product Prices. Cornell University Press, Ithaca.

Wantz, W. 1959. Towards a geography of prices.

Webb, P. 1990. Prices and markets during famine: current understanding of early messages in price data from Ethiopia, IFPRI mimeo.

Appendix B

Worksheet to identify historical agricultural production patterns

Purpose: This worksheet will guide the analyst through a series of steps to identify the major historical agricultural production patterns in their country. The steps described below are intended to be sequential, and should be done in order. The objective for this worksheet is to have an spatial understanding of agricultural production patterns throughout the country. This input will be very important in selecting which markets (in which parts of the country) will be monitored intensively, and which markets will be monitored extensively.

Steps:

1. Photocopy this worksheet. Use only the photocopy for the steps described below. The original should remain unmarked in the manual for future use.

2. Fill out the table below answering the following questions:

    a. List the major staple food or cash crops produced in your country.
    b. Is the crop a staple food or cash crop, or both.
    c. Rank each of each staple food crop in terms of its share of national production.
    d. Rank in terms of share of national production.
    e. For each staple food or cash crop, state whether poorer households, wealthier households, or all households produce that crop.
    f. Indicate the major supply areas for each crop?

Crop Name (a)	Staple, Cash, or Both? (b)	Rank as staple crop? (c)	Rank as cash crop? (d)	Poor/wealthy/ all HH's? (e)	Region (f)
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

3. Print out a map of the country at the district level for each staple food and cash crops listed above that have a specific production pattern. If the district level is not available, then print out a map at the provincial level.

4. For each major staple food crop, draw on one of the maps the area of the country where that food is the primary agricultural crop for a majority of the people.

5. Use a thematic or GIS mapping software to prepare the maps sketched out in steps 4 and 5.

6. Write a brief summary of the insights you have learned from this process. Include in the summary comments about:
    - For stable food crops:
        1. What is the major staple food crop grown in the country?
        2. What other important staple food crops are grown in the country?
        3. Are there any staple food crops that are specific to (or produced more in) a particular part of the country? If yes, what part of the country?
    - For cash crops:
        1. What is the major cash crop grown in the country?
        2. What other important cash crops are grown in the country?
        3. Are there any cash crops that are specific to (or produced more in) a particular part of the country? If yes, what part of the country?

Tips if the answers to the above questions are not easily available:

- Try to identify any agricultural production studies that have been done for your country. A good source to acquire these studies are universities, donors (who sometimes fund these studies), other government ministry offices, and NGOs.

- Send out a very brief (2-3 questions) questionnaire to be completed by extension workers to ask what are the agricultural production patterns in their area.

Appendix C

Worksheet to identify cereal consumption patterns

Purpose: This worksheet will guide the analyst through a series of steps to identify the major consumption patterns in their country. The steps described below are intended to be sequential, and should be done in order. The objective for this worksheet is to have a spatial understanding of consumption patterns throughout the country. This input will be very important in selecting which commodities will be monitored intensively, and which commodities will be monitored extensively.

Steps:

1. Photocopy this worksheet. Use only the photocopy for the steps described below. The original should remain unmarked in the manual for future use.

2. Fill out the table below answering the following questions:

    a. List the major staple foods consumed in your country.
    b. Rank each staple food in terms of its importance in national consumption.
    c. For each staple food, state whether it is consumed by poorer households, wealthier households, or all households.
    d. For each staple food, state whether it is consumed by rural households, urban households, or all households.
    e. Is this commodity consumed or in the entire country or only in specific parts?

Staple food (a)	Rank (b)	Poor/wealthy/all HH's? (c)	Rural/urban/ all HH's? (d)	Region Specific (e)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

3. Print out a map of the country at the district level for each of the commodities listed above that is consumed in a specific part of the country. If the district level is not available, then print out a map at the provincial level.

4. For each major staple foods draw on one of the maps the area in the country where that food is the primary staple food for a majority of the people.

5. Write a brief summary about the consumption pattern in your country. The summary should include comments about:
    - What is the major staple food in the country?
    - What other important staple foods are there in the country?
    - Are there any staple food that are specific (or consumed more) to a particular part of the country? If yes, what part of the country?
    - What commodities that should be monitored and why?

Tips if the answers to the above questions are not easily available:

- Try to identify any consumption studies that have been done for your country. A good source to acquire these studies are universities, donors (who sometimes fund these studies), other government ministry offices, and NGOs.

- Send out a very brief (2 - 3 questions) questionnaire to be completed by extension workers to ask what are the consumption patterns in their area.

- Ask provincial staff (agriculture, social welfare, health, …)

Appendix D

Worksheet to identify domestic marketing patterns

Purpose: This worksheet will guide the analyst through a sequential series of steps to identify both the movement and structure of major cereal markets in a particular country. The concept is to offer a practical guide to identify the contextual information necessary to use market and price data and information for early warning.

Steps:

1. Collect and review past studies on the marketing of agricultural products in your country. Universities (both local and international), government, donors, or NGOs has often done these studies.

2. This step is to identify the movement of cereals within the country.
   a) Based on the previous two appendices, list the three most important staple foods. If there are more than three important staple foods then continue the list on another copy of Appendix D.
   b) For each staple list the name of the market, the location of the market (e.g., province), and the type of market (rural assembly, transit, or terminal market). If there are more markets for any staple food then continue the list on another copy of Appendix D.

Staple food	Major assembly markets	Major wholesale markets	Major consumption centers
1. _____	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
2. _____	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
3. _____	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

c) Print out a map of the country at the district level for each of the commodities listed above at the provincial level with both the market locations (Worksheet in Appendix C) and the production areas (worksheet in Appendix B).

d) For each staple food draw on a separate map the markets that you identified as important for the marketing of that commodity. Next show the direction of the movement of the commodity with arrows.

e) Write a brief summary of the insights that you learned in this process. The summary should include comments about:
    - What are the major markets for the main staple food in the country?
    - What major markets for the other important staple foods are there in the country?
    - What are the flows from farmer to consumer of the major staple foods in terms of spatial movement?

Tips if the answers to the above questions are not easily available:

- Try to identify any marketing studies that have been done for your country. A good source to acquire these studies are universities, donors (who sometimes fund these studies), other government ministry offices, and NGOs.

- Visit some of the major traders and millers in a country and discuss the structure and performance of the marketing of specific commodities.

Appendix E

Worksheet to identify external trade patterns

Purpose: This worksheet will guide the analyst through a series of steps to identify the trade of major staple foods with other countries. The concept is to offer a practical guide to identify the contextual information necessary to use market and price data and information for early warning.

Steps:

1. Collect and review past studies on the trade of agricultural products between your country and other countries (both within the region and internationally). Universities (both local and international), government, donors, or NGOs has often done these studies.

2. Identify the movement of cereals within the country.
   c) Based on the Appendices B and C, list the three most important staple foods. If there are more than three important staple foods then continue the list on another copy of Appendix D. Pay special attention to staple foods consumed by urban households.
   d) For each staple food list the main **regional** external markets and the location of the local market that has direct linkages to that external market. If there are more markets for any staple food then continue the list on another copy of Appendix D.

Staple food	**External market**	**Local market link**
1. _____	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
2. _____	_____	_____
	_____	_____
	_____	_____
	_____	_____
3. _____	_____	_____
	_____	_____
	_____	_____
	_____	_____

e) For each staple food list the main **international** external markets and the location of the local market that has direct linkages to that external market. If there are more markets for any staple food then continue the list on another copy of Appendix D.

Staple food	**External market**	**Local market link**
1. _____	_____	_____
	_____	_____
	_____	_____
2. _____	_____	_____
	_____	_____
	_____	_____
3. _____	_____	_____
	_____	_____

d) Print out a map of the country at the national level for each of the commodities listed above.

e) For each staple food draw on the map the regional markets that you identified as important for the marketing of that commodity. Next show the direction of the movement of the commodity with arrows.

f) Write a brief summary of the insights you have gained during this process, including:

- What are the major regional and international external markets for the main staple foods in the country?
- Do these flows occur each year or during an emergency?

Tips if the answers to the above questions are not easily available:

- Try to identify any trade studies that have been done for your country. A good source to acquire these studies are universities, donors (who sometimes fund these studies), other government ministry offices, and NGOs.

- Visit some of the major traders and the World Food Programme in a country and discuss the nature of trade for specific commodities.

Appendix F

Worksheet to identify historical and current agricultural marketing policies

This worksheet will guide the analyst through a series of steps to identify the major marketing policies that affect the marketing system. The information generated in this worksheet will be important to put past and future changes in price and market behavior into context. This worksheet can be used for any agricultural commodities (staple foods, cash crops, or livestock).

Steps:

1. *Controlled prices*:

   a) Describe past (in the last twenty years) policies to control food prices.
   _____
   _____
   _____

   b) Describe any current policies to control food prices.
   _____
   _____
   _____

2. *Cereal marketing boards*:

   a. In the last twenty years was there a cereal marketing board? Yes No
   (If no go to the next section)
   b. If yes, please describe the changes in how the cereal marketing board functioned during this period. _____
   _____
   _____
   c. Is there still a cereal marketing board? Yes No
   (If no go to the next section)
   d. If yes, please describe how the cereal marketing board currently functions.
   _____
   _____
   _____

c) *Assembly*:

Describe any policies that enhance or constrain the assembly of cereals in your country (e.g., encourage or discourage competition).

_____
_____
_____

d) *Transportation*:

Describe any policies that enhance or constrain the transportation of cereals in your country (e.g., encourage or discourage competition).

_____
_____
_____

e) *Storage*:

Describe any policies that enhance or constrain the storage of cereals in your country (e.g., encourage or discourage competition).

_____
_____
_____

f) *Processing*:

Describe any policies that enhance or constrain the processing of cereals in your country (e.g., encourage or discourage competition).

_____
_____
_____

Appendix G

Worksheet to identify macroeconomic factors

This worksheet will guide the analyst through a series of steps to identify the major macroeconomic influences on the marketing system. The information generated in this worksheet will be important to deciding whether to adjust the price data during analysis and reporting.

Steps:

3. *Inflation*:

    a. Who in government collects data that shows the inflation rate?
    _____
    b. Collect the rate of inflation data and plot the last 10 years (or the amount of time that is available).
    c. Describe the long-term trend in the inflation rate (stable, increasing, high, variable)? _____
    _____
    d. Describe what factors have contributed to inflation in the recent past.
    _____
    _____
    _____

4. *Exchange rate*:

    a. Who in government collects data that shows the exchange rate?
    _____
    b. What is the current exchange rate against the currencies of the country's major trading partners?

Currency	Rate (per local currency)	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

    c. Collect the exchange data and plot the last 10 years (or the amount of time that is available).
    d. Describe the long-term trend in the exchange rate (stable, increasing, high, variable)? _____
    _____

5. *Availability of foreign exchange*:

    a. Is the availability and access to foreign exchange a constraint to traders to import food? Yes No (If no, go to the next section; if yes continue)
    b. Describe how the availability of foreign exchange is a constraint to traders.
    _____
    c. _____
    d. Describe how the access to foreign exchange is a constraint to traders.
    _____
    _____

Appendix H

Priceman features

Priceman is a very easy software program to use. Although the features are only summarized in this appendix, most of the features are clearly documented in both the help menus and program manual. This appendix provides an overview of the main file management, data management, analysis, and utility features in Priceman.

File management features

- *General*: Priceman has the basic features that are available with almost all windows programs, including the ability to create a new file, open an existing file, close a file, and set preferences.

- *Import/export*: This feature allows the importing and exporting using simple text formats (e.g., TXT and CVS).

- *Merge*: This feature allows two Priceman data sets to be combined into one larger data set.

Data management features

- *Data entry and editing*: This feature allows the easy data entry and editing of market, commodity, market group, or commodity group information.

- *Packing database*: This feature—similar to that provided in dBase—allows for the refreshing of the data set (an essential database management activity).

- *Data browser*: This feature allows the examination of the data set while still in the Priceman.

- *Data coverage*: This feature allows a summary presentation of the number of months of price data for each year by market and commodity.

Analysis features

- *Market/Commodity/Time Analysis*: This feature allows the analysis of price data for any combination of commodity and market for a specified time period.

- *Terms of Trade Analysis*: This feature allows the comparison of relative prices between two commodities (e.g., between millet and sheep, between maize and wages, and so on).

- *Stacked Time Series Analysis*: This feature allows analysis of many years for a similar commodity and market combination.

- *Indexing and deflating*: This feature allows the data to be put on a common index or deflated.

Utility features

- *Viewing toolbars*: There is an option within Priceman to turn on or off the status bar, hints (words that appear when mouse is touching an icon), or button text (expanded information buttons).

- *Wizards*: For many of the features described above, there are wizards (step by step guided instructions) available to facilitate using the feature. These are clear and easy to use.

Appendix I

Key price and market analysis terminology

Administered pricing: Prices set by government. Examples are pan-territorial and pan-seasonal pricing.

Barriers to entry- Factors that prevent or place new entrants to trade at a cost disadvantage relative to established firms within an industry.

Barter - A method of exchanging goods and services directly for other goods and services without using a separate unit of account or medium of exchanges. A successful barter transaction requires a double coincidence of wants.

Buffer stocks - Stocks of a commodity held in an attempt to even out price fluctuations in primary commodities. The operators use the stock to mitigate fluctuations in prices by selling from the stock when prices are high (as a result of shortage in the market) and by buying the commodity when prices are low (as a result of surplus in the market).

Buyers' market- A market characterized by excess supply in which sellers consequently experience difficulty in selling all their output at anticipated prices to the advantage of buyers.

CIF- Cost, Insurance, Freight. A term which describes pricing or valuation of a good to include all of the costs (known as transfer costs) of delivering a good to the point of consumption. It may be contrasted with the FOB (or free on board) where the transfer costs are excluded. Imports are often valued at CIF prices and exports at FOB prices.

CPI (consumer price index) - The cost of a given basket of goods used by classes of consumers, with different commodities given different weights.

Cash crops - Crops grown by peasant farmers mostly for sale in the market as opposed to crops directly consumed for subsistence purposes. Some food crops can become cash crops when a surplus is produced (e.g., maize in southern Africa).

Competitive markets- A market in which a very large number of buyers and sellers trade independently, and no one trader can control significant quantities to be able to substantially influence prices.

Consumer- Any economic agent involved in the consuming of final goods and services. Households, not individuals, make many consumption decisions. This is important since households may take decisions based on some compromise of individual wants within the household.

Contestable markets – Markets in which firms can exit or enter without incurring significant costs. The threat of entry causes existing firms to maintain prices close to the level that would prevail if the number of firms were very large.

Currency devaluation - A fall in the value of one currency in terms of other currencies, i.e., a decline in its exchange rate, under a system of floating exchange rates. It is similar in its effects to a devaluation that denotes a lowering of the exchange rate under an adjustable peg system.

Demand - The quantity of a good or service which an individual or group desires at the ruling price. The total demand in an economy is referred to as aggregate demand. (see effective demand)

Derived demand - Demand for a factor of production is sometimes called a derived demand. This means that it is derived from the demand for the final good that the factor co-operates in producing.

Devaluation - A fall in the fixed (official) exchange rate between one currency and others. When the relative values of two currencies have been fixed at an officially agreed level, and reduction in the value of one currency against the agreed fixed level is a devaluation. Devaluation is used to correct a balance of payments deficit but only as a last resort as it has major repercussions on the domestic economy. For example, the price of a country's exportable goods will fall after devaluation. However, domestic consumers will pay higher prices for imports.

Disposable income - Income less tax payments or other "fixed" expenditures.

Dumping - The practice of selling a good abroad at a price lower than that charged for the same good in the domestic market.

Economies of scale - Reductions in the average cost of a product in the long run, resulting from being able to produce at an optimal level (volume) of production..

Effective demand - Demand for goods and services which is backed up with the resources to acquire them. This is to be distinguished from notional demand which refers to a desire for goods and services, which is unsupported by the ability to pay and thus cannot be communicated to suppliers through the price mechanism. Lack of effective demand implies lack of adequate income to purchase food in the marketplace

Exchange rate - The price of one currency in terms of another currency.

Farm gate price - The price a farmer receives for his product at the boundary of the farm - that is, the price without any transport to a market or other marketing service.

Gross marketing margin – The difference between the price received by producers and that paid by consumers.

Imperfect market- (Note: market imperfection is not synonymous with market failure. See market failure for a distinction) One in which the following conditions, necessary for a perfect market, do not hold: (1) a homogeneous product, (2) a large number of buyers and sellers, (3) there is freedom of entry and exit for buyers and sellers, (4) all buyers and sellers have perfect information and foresight with respect to the current and future array of prices; (5) in relation to the aggregate volume of transactions, the sales or purchase of each market agent are insignificant, (6) there is no collusion amongst buyers and sellers, (7) consumers maximize total utility and sellers maximize total profits, (8) the commodity is transferable. If any one of conditions (1) to (8) are not fulfilled a market is to some degree imperfect.

Import substitution- Establishing domestic industries behind tariff and quota barriers. The objective is to replace imports by domestic production.

Income - The amount of funds, goods, or services received by an individual, corporation, or economy in a given time period.

Inferior good: This a good or service on which less money is spent as ones level of income increases. An example is small grains (millets and sorghums) in urban areas. As the income of a household increases less money is spent on small grains for consumption and more money is spent on rice or maize.

Inflation- The general increase in the price level of all goods and services in an economy from one period to another.

.

Law of demand- The widely accepted view that, other things being equal, more of a good will be bought the lower is its price, and the less will be bought the higher is its price.

Market- Any context in which the sale and purchase of goods and services takes place. There need be no physical entity corresponding to a market. See section 2.3 for more information about what a market is and what activities they perform.

Market distortions: These are government policies or practices by marketing agents that result in an unclear signal between the producers and consumers.

Market failure - The inability of a system of private markets to provide certain goods either at all or at the most 'optimal' level. In general, market failure arises because of (1) non-excludability and/or (2) non-rival consumption of a good. Non-excludability means that individuals who have not paid for a good cannot be prevented from enjoying its benefits because the cost of doing so would be too high. If a good is non-rival, its consumption by one person does not preclude its enjoyment by anyone else. Clean air is an example of a good that has both non-rival and non-excludable characteristics.

Marketing board, marketing parastatal- Semi-private government office that manages commercial and usually security stocks.

Market integration- Describes how efficiently the market functions in moving goods and services through the different stages in the production process to the final destination - the consumer of the end product (see spatial integration).
Market structure – the number of buyers and sellers, their size distribution, the degree of product differentiation, and the ease of entry of new firms into an industry.

Nominal- An adjective which describes the measurement of an economic magnitude in current prices. The opposite of real.

Normal good: This is a good or service on which more money is spent on as one's level of income increases.

Price- The price of a good or service shows what has to be given up in order to obtain a good or service. Prices act as signals that coordinate the actions of market participants. Supply and demand conditions are thus reflected in market prices. When market supply is large compared to demand prices are low. When demand is great relative to supply, prices are high.

Security stock- Government-managed food reserves also referred to as "strategic grain reserves - SGR."

Spatial average- Average across space.

Spatial integration- The degree to which price signals are transmitted between the different hierarchical levels (processing, transport, and storage), i.e., the different economic actors of a subsector (consumers, small-scale retailers, wholesalers, collectors, and producers). Common indicators of spatial integration are price margins between pairs of markets (the more constant these margins the more integrated the markets) and the coefficients of price correlation between markets (a strong degree of integration is implied by high coefficients).

Subsector: This is all aspects of the production through consumption of a particular commodity (including all aspects of marketing).

Temporal average- Average through time.

Thin market- Markets that do not have large volumes of trade. The implication is that there can be large swings in prices (up or down) as a result of increases in supply or demand. Prices obtained from thin markets are less reliable or informative about market conditions.

Transactions costs- Those costs other than price which are incurred in trading goods and services, for example the cost of information and the cost of legalizing transactions. These costs can be substantial.

Vertical integration - A situation where the activities of a firm extend over more than one successive stage in the production process of transforming raw materials into final goods. Vertical integration can be partitioned into two types: backward integration, where a firm extends itself into a previous stage of the production process and forward integration, where a firm moves into a succeeding stage of activity.