

Adjusting Prices for Inflation and Creating Price Indices

FEWS NET Markets Guidance, No 3

May 2009

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INTRODUCTION

Prices are a standard and important component of market and food security analysis because they serve as an indicator of both food availability and food access. Prices are a measure of availability because they tend to rise as the supply of food falls in relation to demand (e.g., poor production, constrained imports of food), and they tend to fall when supply expands in relation to demand (e.g., a bumper harvest). Food prices are also a measure of food access because they affect the household's purchasing power: the ability of a household to acquire goods and services based on the amount of money or other forms of wealth they possess. Consumer prices of food determine how much food a household can buy given their level of income or wealth.

The relationship between the price of food and other basic goods and services on the one hand and wages, household income or household wealth on the other hand determines the households' level of purchasing power. Generally, in order for a household to have adequate access to food, they need to have adequate purchasing power. For the poorest households, food is likely to account for the largest share of the household budget. Consequently, consumer prices of food are probably the indicator most often monitored, analyzed and reported in the analysis of household food access. Regular monthly or weekly collection of consumer or retail price data for a set of key commodities is a standard component of most food security monitoring systems.

Traditionally, food security analysts have focused on the assessment and analysis of actual consumer prices found in the market (i.e., the spot price or the prices consumers face when they go to the market). These prices are analyzed and reported as a measure of the affordability of food. Early warning analysts watch the level of these prices, the changes over the season and how prices compare to normal levels and patterns. Early warning analysts look for price anomalies (irregular behavior) as an indicator of a potential improvement or deterioration in food security.

The purpose of this guidance is to expand upon the traditional level of price analysis by considering and using prices adjusted for inflation in regular FEWS NET analysis. While readers of FEWS NET products want to know actual prices that are found in the market (nominal prices), market analysts should also account for the effects of inflation and changes in relative prices to truly understand the implications on food security.

This guidance provides FEWS NET representatives and their partners with:

1. An introduction to concepts and terms related to prices, inflation, price indices and price adjustment;
2. An illustration of how price analyses reliant on real or nominal prices can yield significantly different conclusions;
3. An understanding of why and when (for what purposes) prices should be adjusted
4. An understanding of how to adjust prices; and
5. An illustration of how various price indices are calculated and interpreted.

INFLATION, PRICE, AND PURCHASING POWER

Inflation is an expression of the increase in prices in the overall economy. In particular, inflation is measured based on those goods and services that represent typical items in the average households' consumer food basket such as grain and flour, other food items, drinks, fuel and power, clothing, household goods, school fees, etc.

There is an inverse relationship between the prices of goods and services and the value of money in an economy. Other things being equal, as prices rise over time, a given amount of money will be able to purchase fewer and fewer goods and services. In the presence of inflation, a given level of wages, income or wealth will buy less goods and services. In other words, inflation typically translates into a loss of purchasing power, especially if the prices of goods and services is rising more quickly than wages or income. A FEWS NET representative would want to analyze how the rise in prices of food, for example, is affecting the purchasing power of consumers given their existing wages or income sources.

Inflation has an additional effect on prices when businesses, workers and others experiencing a loss in purchasing power attempt to adjust upward what they receive for their goods and services in order to keep pace with their rising costs. The result is further upward pressure on prices. Essentially, people notice an increase in prices and adjust their behaviors accordingly, further contributing to the effects of inflation.

A comparison between the rise in the price of a particular good or service to the overall inflation rate provides insight on whether the good or service is becoming cheaper or more expensive relative to other goods and services. For example, if the increase in the retail price for wheat flour is less than the inflation rate, wheat flour is becoming relatively cheaper.

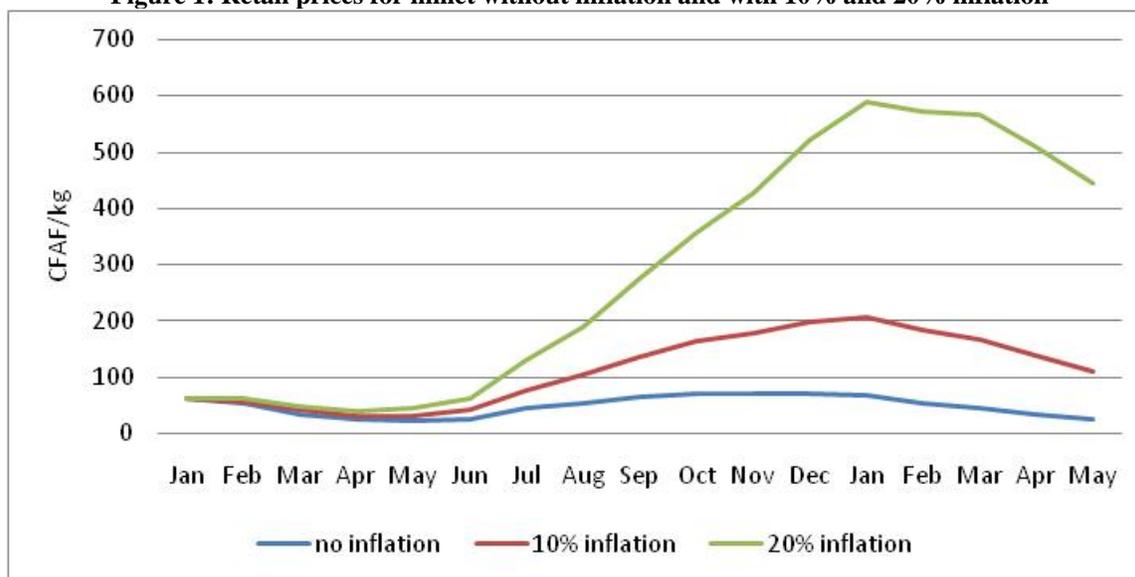
Depending on consumer preferences, this relative decline in wheat prices could make wheat more attractive to consumers in comparison to other staples. If wheat is the primary and preferred staple and comprises a large share of the average poor household's budget, this could imply that inflation is having a greater impact on the consumption patterns of middle and income households than on poorer households since more of their budget typically goes to wheat purchases. The actual burden of inflation will in large part be determined by typical consumption patterns and the ability of households to shift when the overall price level and relative prices change.

What is price?

Price - is the cost or value of a good or service expressed in monetary terms. Prices, in the purest sense, indicate value that has been added to a particular commodity.

- Price signals can carry information about the cost of production, transportation, storage, perceptions and desires as well as, in some instances, distortions.
- A price represents an agreement between a buyer and seller arrived at through a negotiated process.
- The prevailing price at a given level or stage of the market (e.g., farm gate, wholesale, retail) represents the negotiated equilibrium point reached between buyers and sellers at that stage in the market.

Figure 1 illustrates how different degrees of inflation affects nominal prices: in this case millet prices. When there is no inflation, prices are relatively low and follow a stable trend over time. However, for the same commodity (millet) over the same time period, 10 percent inflation results in higher prices. Twenty percent inflation leads to much higher prices. The figure also illustrates how over time (in this case over a few months) the impact of the inflation rate on prices is compounding— if you double the inflation rate the effect on prices is more than double as you move through time. The purchasing power of a consumer with a stagnant wage rate would be declining with either 10 or 20 percent inflation, but much more dramatically (e.g., steeply) over time with the higher rate of inflation.

Figure 1: Retail prices for millet without inflation and with 10% and 20% inflation

Source: Chopak, C. FEWS, 1998

WHAT ARE THE IMPLICATIONS OF INFLATION FOR CONSUMERS AND PRODUCERS?

In the absence of inflation, the value of money stays constant making it easy to compare prices over time.

- If a farmer sells a kilogram of millet for 100 CFA in October in 2006 and 125 CFA/kg in October of 2007, and there is little of no inflation, (s)he will earn more from the sale of that kilogram of millet 2007. The farmer will have more income and with that income (s)he will be able to buy more goods and services. Therefore, the farmer is better off.
- If a consumer buys one kilogram of wheat flour for 15 Rps in December 2006 and one kilogram of wheat flour for 25 Rps in December 2007, and there is very little inflation, it is possible to say that (s)he is worse off in December 2007 compared to December 2006 as the price of wheat flour has increased since December 2006.

However, in the presence of inflation, prices need to be adjusted for inflation in order to be compared in constant money terms over time and to determine whether the producers and consumers are better off or not.

- For the farmer, if annual inflation was 10 percent, the farmer is still better off because the price in December 2007 is more than 10 percent higher than it was in December 2006. Although, the farmer will have seen some decrease in the purchasing power of his/her income. If inflation was 30 percent, the farmer would be worse off because the difference in price from 2006 to 2007 is less than the rate of inflation.
- For the consumer, if annual inflation was 10 percent, the consumer would still be worse off and wheat flour would have gotten relatively more expensive than other goods and services. (S)he might choose to purchase less wheat flour and maybe more rice, a substitute cereal for wheat, if the price of rice did not rise as much as wheat flour. But, if inflation was 30 percent, wheat flour would be more attractive because it would now be relatively cheaper compared to other goods and services included in the consumer basket¹. The consumer may even purchase more wheat flour and less rice because flour may be relatively cheaper than rice. Although the nominal price of wheat flour has increased since December 2006, wheat is not getting relatively expensive as the rate of increase in nominal prices is smaller than the rate of inflation.

¹ A consumer basket is a typical market (expenditure) basket of goods, fees and services intended for tracking the prices of consumer goods and services. The basket may comprise the actual quantities of consumption goods or services acquired or used by households in some period. Sometimes, a consumer basket can also be made up from hypothetical quantities created.

The previous example illustrates why food security and early warning professionals need to analyze price behavior and trends and assess whether price levels are relatively high, low or stable. By adjusting prices, they can understand the following food security implications of a certain price level or of price changes:

1. How the commodity prices they observe in the market may be affecting the income of the food insecure and vulnerable farmers.
2. How the observed prices may be affecting the purchasing power of consumers and farmers who rely on the market for their consumption needs. This includes the terms of trade between livestock products and cereals or wage rates and cereals to gauge the food security of pastoralist populations and laborers, respectively.
3. How the observed prices may be affecting food availability, the margins of traders and their incentives to engage in trade.

HOW DO YOU ADJUST PRICES WHEN YOU HAVE A MEASURE OF INFLATION?

A measure of inflation can be used to transform nominal prices that are observed in the market into real prices.

- **Nominal prices** – are prices that have not been adjusted for inflation. The nominal price is equal to the money that is paid for a unit of a good or service in the market, at the shop, etc. These are the prices observed on the market.
- **Real prices** – are prices that have been adjusted for inflation. Real prices hold the value of currency constant, and allow you to compare the exchange value of a good or service in different time periods. Unlike nominal prices, real prices are not observed in the market, and are calculated.

The most common measure of inflation is the Consumer Price Index (CPI). The CPI is a measure of change in the purchasing power of a currency. The CPI expresses current prices of a typical consumer basket of goods and services in terms of the prices during the same period in a previous year (reference or base year), to show the effect of inflation on purchasing power. In other words, the CPI measures how the average price level of a representative basket of consumer goods and services purchased by households has changed between two periods. If the CPI were a national average CPI, it would measure the rise or fall in the costs of a consumer basket of goods and services for an average consumer. This guidance will describe how one can derive a CPI in later sections. The CPI can be used to calculate inflation using the following equation:

$$\text{INFLATION} = \frac{[(\text{Current period CPI}) - (\text{previous period CPI})]}{(\text{previous period CPI})}$$

For example, if the CPI for May 2007 is 150 and the CPI for May 2006 was 125, inflation from May 2006 to May 2007 was 20 percent.

If information on CPI is available, we can adjust nominal prices in order to calculate real prices using the following formula:

$$\text{REAL PRICE}_{\text{current year}} = \left(\frac{\text{CPI}_{\text{base year}}}{\text{CPI}_{\text{current year}}} \right) * \text{nominal price}_{\text{current year}}$$

For example if the nominal price of the current year (2009) of rice is \$2, the base year (2007) CPI is 100 and the current year CPI is 150, the real price of rice in 2009 is \$1.60.

We can also use the inflation rates to derive real prices. If the inflation from the base year is known, we can compute the real prices using the following formula:

$$\text{REAL PRICE} = \text{Nominal prices} / (1 + \text{inflation rate})$$

For example, let us suppose the nominal price of maize in a particular country was \$1.50 per kilogram in January 2008 and \$2.00 in January 2009. If we took January 2008 as the base year and the inflation rate in January 2009 equal to 35% in comparison with the base year, the real price using the previous formula will be computed as follows:

$$\text{Real price of maize in January 2009} = \$2.00 / (1 + 0.35) = \$ 1.48$$

WHY IS THE DISTINCTION BETWEEN NOMINAL AND REAL PRICE IMPORTANT?

In the presence of inflation, the analysis of nominal prices can lead to different conclusions than the analysis of real prices. The following numerical example illustrates this point.

If the national average nominal price of maize in Rwanda was 150 Rwandan Francs (RWF) per kilogram in January 2008, 200 RWF in June 2008 and 220 RWF in January 2009, how can a food security and early warning analyst interpret these prices and derive food security implications of the maize price changes?

Using only the nominal prices, the analyst could conclude that the price of maize has been increasing over time, which could suggest that maize is becoming scarce in the market or relative to demand. Moreover, reading a Ministry of Agricultural report, the analyst could also be surprised when the report states that there was an agricultural production shortfall in January 2008 due to weather conditions and yet prices were lower than they are now (2009). Furthermore, the report might state that the agricultural production in January 2009 was much better than last year and yet prices are higher now than last year. How can this be true? Why would the nominal price of maize in 2009 be much higher than the nominal price of the year before? How can high maize production in January 2009 be associated with high nominal prices?

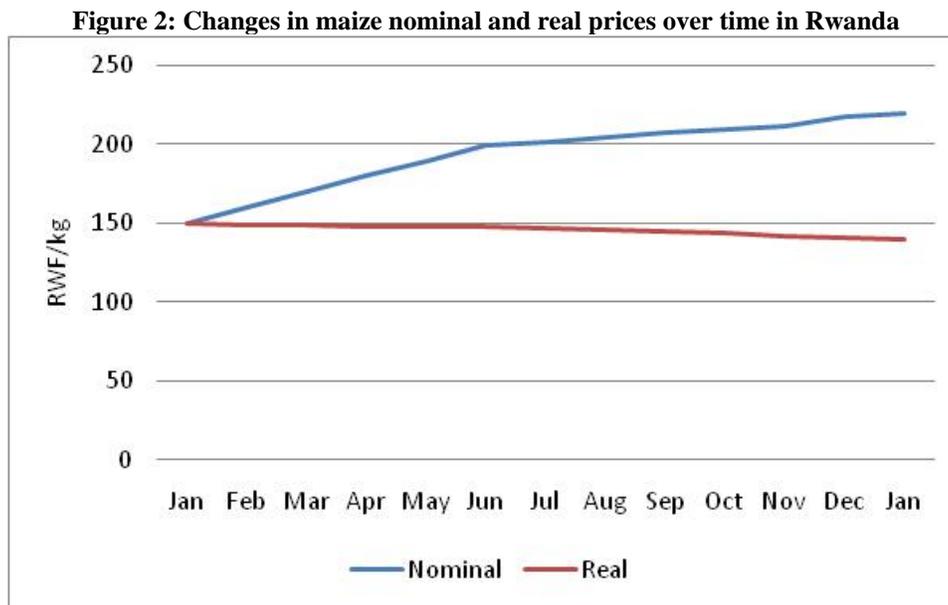
The analyst could then turn to the country's statistical office website to find that the inflation rate in June 2008 and January 2009 were 35 percent and 57 percent, respectively, in comparison with the base year, which is assumed here to be January 2008. The first step in this analysis will be to derive real prices using the previous formula that uses of inflation rates. Table 1 gives the nominal and computed real prices for this example.

Table 1: Nominal and real prices of maize

Period	Nominal prices	Inflation rate	Real prices
January 2008	150.00	base	150.00
June 2008	200.00	38%	148.00
January 2009	220.00	57%	140.00

The results from Table 1 show that the analysis of nominal prices illustrates that the price of maize has been increasing since January 2008. One could, therefore, conclude that maize has become scarce over time causing the price to rise. However, using real prices, price analysis will tell a different story: the price of maize has gone down over time in real terms since January 2008. The analysis of nominal and real prices in this situation will lead to different conclusions and have opposite food security implications.

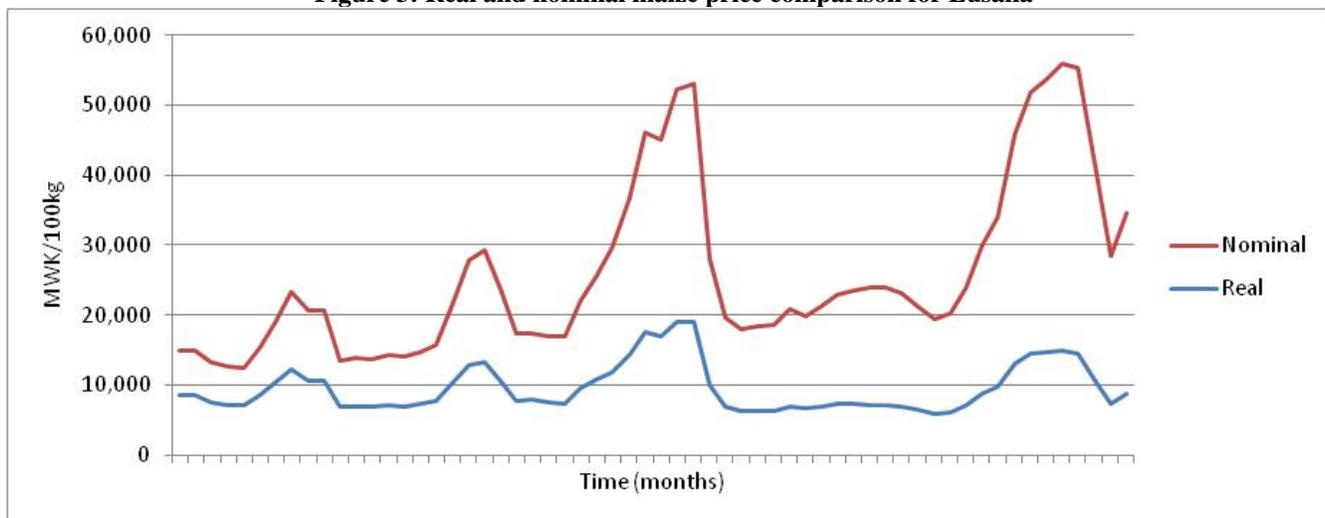
By analyzing change in nominal prices alone, analysts will conclude that consumers have become worse off as a result of the price increase in maize. This conclusion will be false because consumers have instead become better off as the prices of maize in real terms have fallen over time. The high nominal price of maize in January 2009 did not reflect a shortage of maize, but rather was a result of price inflation. This case illustrates how the analysis of nominal and real prices can lead to different conclusions. Early warning and food security analysts must be able to interpret the nominal and real prices and understand the food security implications of price changes of the two types of prices. Table 1 in graphical form is shown in Figure 2.



While nominal prices have been increasing over time, the graph shows that real prices of maize have not changed a lot, in fact, they have gone down. In other words, the maize price in 2009 is not more expensive than in January 2008.

Figure 3 illustrates another case why it is important to understand food security implication of nominal and real prices.

Figure 3: Real and nominal maize price comparison for Lusaka



Nominal and real retail prices for maize in Lusaka from June 1993 through June 1998 are shown in figure 3. Nominal and real prices were almost the same during 1993 and 1994 when inflation was low. In 1996, the two prices began to diverge and inflation became high. In February 1998, nominal prices were more than four times that of real prices.

The analysis of nominal prices would conclude that price of maize in Lusaka had significantly increased. However, the analysis of real prices would suggest that the price of maize is following its typical season pattern and within a range that should be expected. If the food security and early warning analyst looks only at the trends of nominal prices, the analyst can wrongly conclude that maize is getting scarce in Lusaka or the market of maize in Lusaka is not functioning well. It is therefore important for food security and early warning analysts to be aware of the differences between nominal prices and real prices and understand the food security implications of a certain price level or of price changes. That said, one has to

look at the behavior of wages and income over the same time frame in order to understand whether the households have become worse off.

LIMITATIONS OF USING REAL PRICES IN ANALYSIS

While computing real prices helps determine the effect of inflation on prices, real prices are not a perfect form of measurement and comparison. There are still various other factors that should be considered before making conclusions.

In most countries, staple food prices account for between 20 to 25 percent of the CPI. This means that in countries where food prices are rising faster than the remaining basket of goods and services also in the CPI, deflating prices using the CPI will underestimate the extent of the real food price increases. On the other hand, in countries where food prices are rising less rapidly than the remaining basket of goods and services, using the CPI as a deflator will overestimate the extent of food price increases relative to changes in general prices. This means that despite the appearance of decreasing or stable real prices, the adjusted prices do not explain how vulnerable low-income households are with respect to other goods they need in the market. In other words, the real prices do not provide the complete picture of how well or bad off consumers are relative to the prices of the other goods and services in the economy.

Another consideration is possible changes in wage or income. When making conclusions about purchasing power by simply looking at changes in real prices over time, an analyst is assuming that the wage or income level of this group is remaining constant. For example, it is misleading to assume that the decline of real prices over time is necessarily a good thing for consumers. If wages and income are also falling, there is no real benefit to consumers. If wages are falling faster than real prices, the population is actually becoming more vulnerable. For the portion of the population that remains unemployed or underemployed, real prices tell a better story. Be sure to note make generalizations without understanding the entire picture.

Real prices also carry very little information to consumers, farmers, traders and decision makers because these market participants observe nominal prices. That is why it is very important for food security and early warning analysts to report nominal prices, but analyze both nominal and real prices. An analysis of the two prices provides a first step in determining whether higher prices imply that commodities are scarce, production is in shortage, traders are manipulating markets, etc. The previous examples show how it is important to take into account inflation to understand food security questions.

SOME POTENTIAL CAUSES OF INFLATION

The price of any good is influenced by different market forces that can change the balance between supply and demand. Many of these forces come from domestic as well as regional and international markets. This section discusses some of the causes of inflation. FEWS NET representatives should monitor market prices which are affected by all causes of inflation and understand consumers' access to food in relation to price movements. Given the unique environment of each market and country, a good grasp of how individuals interact with markets is necessary to understanding the impact of price changes.

1. Production shortfalls

For locally produced goods, the differences in product prices reflect differences in local conditions of supply and demand. In general, prices are lower in regions of surplus production and higher in densely populated regions of deficit production such as urban areas where demand exceeds local production. Similarly, bad weather conditions and crop/animal diseases can lead to shortage in agricultural production. For instance, poor rainfall particularly in key production zones of a country or region can cause national and regional food prices to rise. When prices are pushed up over a period of time due to repeated production shortfalls, but the value of money remains the same, the area will experience inflation propelled by agricultural prices.

2. Effects of input markets

If the cost of inputs used in production of a good increases, this can cause a rise in the costs of production. The rise in input costs can also result in a drop in agricultural production, creating an excess demand of the product in question and inducing an upward pressure on prices. For example, high fertilizer prices can result in a reduction in the use of these inputs by farmers as they can no longer afford fertilizer expenses. Similarly, fuel prices increase can translate into increasing costs of other inputs that need to be transported to rural areas like fertilizers. The increase in cost of these inputs would decrease their use by farmers causing the drop in the agricultural production and inducing an upward pressure on food prices.

3. Government policies

Government policies can take many forms and could potentially cause inflationary pressure. While this is not normally the goal of a policy, it is often an unintended side effect.

In many countries, the market for goods is subject to government price policies. The goals of these policies are often to stabilize producer and consumer prices or to keep food prices affordable to the poor or politically active urban groups. In this situation, prices of goods are no longer solely a function of demand and supply. A consequence of price-fixing policies can include the need to ration food sales during years of low production to the benefit of some consumer groups such as targeting the poor and food insecure households.

Another government policy that often results in inflation is the devaluation of the official exchange rate. Devaluation would, if local prices stay the same, mean more local currency will be needed in order to buy the same amount of imported goods and services (or goods and services dependent on some imported inputs). The devaluation of local currency will make prices of imported inputs increase, which will also affect prices of domestically produced goods. For countries that are energy dependent, oil must be purchased using foreign currency, which often creates inflationary pressures in this way. Local rises in diesel and petrol costs increase the prices of transportation and the prices of consumer goods such as staple foods that have to be transported from production zones to consumption centers. In other words, a devaluation of the exchange rate can lead to transport price inflation as a result of the price increase of fuels and transport charges due to speculation.

Inflation can also be caused by an increase in the quantity of money in circulation (money supply) relative to the expansion in the economy. This happens when governments print excessive amounts of money causing prices to increase. This was the situation in Zimbabwe in the past. If wages remain constant, both the devaluation of the official exchange rate and excess money supply would lead to a significant loss in purchasing power of consumers.

4. International trade and trade barriers

The 2008 price crisis has highlighted how global cereal markets have a significant influence on local markets. The shortage of cereals in international markets has resulted in high prices for imports and, in many cases, has pushed upward the price of domestically produced cereals, limiting access to food, including poor urban households and rural net-purchasing consumers. The effects were more pronounced for those dependent on imports and with limited opportunities to substitute between different staples (e.g., millet or cassava for imported rice).

Although a deficit of a particular good in the global market can cause prices to rise, a decline in international food prices can mitigate food insecurity through trade. For example, countries with production shortfalls can import at relatively low prices making food available to market-dependent consumers at a relatively lower cost.

Although food security can be addressed through international or regional trade, sometimes trade barriers can limit this possibility. In Malawi for example, domestic maize prices have been higher than the cost of importing maize from South Africa due to import restrictions². High food prices were found to be caused by trade restrictions rather than world food prices.

² Jayne et al., (2008). The 2008/09 Food Price and Food Security Situation in Eastern and southern Africa: Implications for Immediate and Longer run responses.

DIFFERENT TYPES OF CONSUMER PRICE INDICES

In many countries, consumer price indices are calculated and available. Different national statistical offices compile and disseminate a number of different CPIs, each serving a different purpose. In South Africa for example, the different types of CPI compiled include:

- (1) **Consumer Price Index (CPI)**: is used to calculate the official rate of inflation, and consists of price increases for all goods and services in the main metropolitan areas of the country;
- (2) **Core CPI**: is calculated such that certain items are excluded from the CPI basket on the basis that their prices are highly volatile, subject to temporarily influences or are affected by government policies. The index is used to calculate “core inflation” and reflects the underlying inflationary pressures in the economy.
- (3) **Food Price Index (CPIF)**: is used to assess the impact of price increases especially on the poor population, as food is the single biggest item in the total basket for the poor.

Table 2: Trends in the different CPI indices measured in South Africa, 2001-2002

Main indices	Indices (2000 = 100)			Percentage change between February 2001 and February 2002
	February 2001	January 2002	February 2002	
CPI (metropolitan areas)	104.1	109.0	110.4	+ 6.3
Core CPI	104.4	110.7	111.4	+ 7.5
CPIF	102.4	113.9	114.8	+ 12.1
CPI (excluding food price index)	104.1	107.7	110.2	+ 4.8

Source: StatsSA, 2002a

Table 2 shows that the CPIF increased faster than the other indices during the period. This indicates that food price increases contributed significantly to the high overall rate of inflation in South Africa. This can be due to the fact that food prices rose more quickly or that the weight of food products is relatively large or both, resulting in large percentage change in CPIF.

In most countries, an urban consumer price index is available. This price index is well suited for observing the way in which urban prices have changed on average. The same index will be, however, inadequate for observing the way in which prices have changed in rural areas. The combinations of goods and services consumed in the urban places typically differ from that of rural places. Even in urban areas, using an average CPI can be misleading if one analyses how changes of prices have affected different categories of people who live in the same urban area. For example in South Africa, the CPI in year to June 2002 rose between 11 and 14 percent for households earning below R 2,030 a month, compared to 8% for the very high-income group.

Statistical offices around the world compile and disseminate a number of different CPI aggregates, each serving different purposes. Generally, the precise way in which CPIs are defined and constructed depends mainly on what they are meant to be used for and who will be the main users of the indices. Moreover, since CPIs are often compiled to adjust wages to compensate for the loss of purchasing power caused by inflation, the responsibility for compiling CPIs is often given to a ministry or department of labor. Although CPIs measure only consumer inflation, they are often used by central banks or ministries of finance and economic planning of some governments as a proxy for the general rate of inflation. These are potential sources of CPI series or the data used to calculate consumer price indices. See Annex A for a list of sources of CPI information for FEWS NET countries.

In places where this type of information is not already available or in places where you want to understand a price index that is specific to one population, creating and calculating a price index might be necessary. The next sections describe steps in computing the consumer food price index and the general consumer price index (CPI).

Calculations of the consumer food price index and the general consumer price index require access to a significant amount of data on prices and quantities purchased for a range of basic consumer items over time. Information on the consumer basket of goods and services and their respective shares is also needed to compute inflation indicators. When a country does not have a CPI or some other type of index available to analysts, the analyst can use the data on prices and expenditures' shares of the different components of the consumer basket to create price indices.

COMPUTING THE FOOD PRICE INDEX

The **food price index** is a price index where only food items are used to calculate the index. This then excludes the other non-food goods and services that a consumer generally purchases, including clothing, housing, health services, etc. Steps of computing of a food price index are as follows:

1. Identify commodities and weights for the consumer food basket

The weights of the consumer basket are a set of numbers that represent expenditure shares of the different commodities that form the basket. Expenditure shares are the portion of a household's expenditures allocated to a particular good, service or group of goods and services. The weights generally sum up to one. Conventionally, weights are determined using data from household expenditure surveys or household budget surveys. These weights are also called budget shares.

Statistical offices around the world use data obtained from household expenditure surveys to compute budget shares. A FEWS NET representative does not need to collect his or her own survey data to derive these weights. The representative can get access to this information by contacting the country's statistical office. Many offices disseminate this information through their websites which can be used to get price indices that are already computed or derive new indices based on what the representative needs to analyze.

Using the results of the 2001 household expenditure survey conducted in Rwanda, table 3 shows the different commodities consumed by Rwandan households with their respective budget shares. The different types of foods are grouped into similar categories. They are grouped because they have a common end use or because they are substitutes. For instance, there may be multiple varieties of rice sold in the market, such imported rice and locally produced rice but all are grouped as rice.

Table 3: Weights of commodities consumed by Rwandan households in 2001

Commodity	Budget share	Commodity	Budget share
Rice	1.10%	Cooking banana	4.21%
Maize	1.99%	Tomatoes	1.36%
Sorghum	2.46%	Onions	0.53%
Powder maize	1.46%	Eggplants	0.58%
Cassava	5.08%	Carrots	0.11%
Sweet potatoes	15.97%	Cabbage	0.76%
White potatoes	8.45%	Meat	1.59%
Cassava flower	1.97%	Fish	0.41%
Soy	0.46%	Fresh milk	0.43%
Peanuts	0.53%	Eggs	0.18%
Dried beans	13.59%	Banana beer	1.49%
Peas	0.17%	Sorghum beer	1.14%
Fruit banana	0.50%	Palm oil	1.72%

Source: Author's calculations from the Rwandan household expenditure survey conducted in 2005-2006

2. Compute average prices of the commodities that form the consumer food basket

Price data are collected for a basket of goods and services from a sample of places where households make purchases. Prices are generally collected monthly, but some can be collected weekly, every two weeks, quarterly or annually depending on the recall period determined by an office of statistics.

Since early warning and food security analysts are more concerned with monitoring the availability and access to food for vulnerable consumers, they should use recent nominal prices to forecast and analyze the food security situation in upcoming months. For instance, they can use nominal prices that were observed since the previous agricultural season in order to look at the patterns of price changes and try to understand how and why the prices are changing.

The next example shows how average prices are computed. People who live in the Southern province of Rwanda buy maize in four main markets, so the average is taken across these four markets. The average nominal prices in December 2000 in the four markets were collected by averaging observed prices of maize in the four weeks of December 2000, as shown in Table 4.

Table 4: Consumption of maize average prices in Southern province of Rwanda*

Name of the market	Average nominal prices in December 2000
Butare	105
Nyanza	110
Gikongoro	120
Gitarama	115
Average for province	112.5

* All the prices are expressed in Rwandan Francs (RWF) per kilogram.

The average price of maize in December 2000 is computed as a simple arithmetic average of the maize nominal prices. For this example illustrated in table 4, the average price is computed as follows: $(105 + 110 + 120 + 115)/4 = 112.5$

Similarly, provincial average prices are computed for all commodities that form the consumer food basket.

3. Determination of the price reference period

There are three types of reference period that need to be distinguished to compute price indices:

- **Price reference period** - is the period to which the prices in other periods are compared. It is also called the base year. For the rest of the paper, the base year will refer to the price in the reference period. The weight reference period is typically an earlier point in time than the price reference period, however, it should time spread between the two should not exceed two years.
- **Weight reference period** - is the period used to compute the household expenditures shares or budget shares. The weight reference period is usually a year. In some cases, data for a single year may not be adequate because of unusual economic conditions or because the sample is not large enough to calculate the reliable weights. In this situation, an average of several years of expenditure data is used to calculate the weights. The choice of the weight reference period is very critical. The year chosen should be characterized by economic conditions that are considered reasonably stable or normal. A drought year, for example, should not be used as a weight reference period.
- **Index reference period** - is the period for which the value of the index is set at 100.

The price analyst must choose these periods in order to compute the price index. The next example illustrates the use of one of the types of reference period.

Rwanda has four administrative provinces and the capital city. Commodity average prices of January 2001 in the four provinces and the capital city are used to compute the national average prices. These prices will form the prices of the

reference period because the prices of goods from different parts of Rwanda will be compared to national average prices of the same goods. Table 5 gives a numerical example.

Table 5: Computation of maize prices in the reference period

Names of provinces	Provincial average prices in January 2001
Capital City	127
East	116
North	103
South	113
West	112
National average prices	114

The national average price of maize in January 2001 is computed by taking the simple arithmetic average of the provincial average maize prices in January 2001. From data of table 4, the national average prices of maize in January 2001 = $(127 + 116 + 103 + 113 + 112)/5 = 114$.

4. Calculation of the price relative (Pr)

A price relative is the ratio of the price of a good or service in one period to the price of that same good or service in the price reference period. The price reference period, or index reference period, is the period for which the value of the index is set at 100. This is the same as the base year. Using the previous example of maize prices in Rwanda, the price relative of maize in December 2000 can be calculated using the following formula:

$$\text{PRICE RELATIVE of maize in December 2000} = \frac{\text{Provincial average price of maize in December 2000}}{\text{National average prices of maize in January 2001}}$$

Using the maize example, if the price relative is greater than 1 in December 2000, it implies that the nominal price of maize in December 2000 was higher relative to the national average prices of maize in January 2001. This indicates that maize was relatively more expensive in the Southern Province in December 2000 compared to the national average prices of maize in January 2001.

5. Calculation of the food price index

5.1 Different approaches to computing price indices

There are different ways to compute the price index. The two main approaches are the fixed basket approach and the cost of living approach.

- **The fixed basket approach:** A basket of goods is priced in each period and the price index is calculated as the cost of the basket in one period (the comparison period) divided by the cost of the same basket in the reference period. This fixed basket approach is also referred as the Laspeyres approach³. This is the approach that this guidance will use to calculate different price indices.

- **The cost of living approach:** Prices in the comparison period and reference period are compared using the ratio of the cost of living in the two periods to derive the cost of living index. The cost of living index is an index that measures the change between two periods in the minimum level of expenditure that would be incurred by a

³ ILO/IMF/OECD/UNECE/Eurostat/The World Bank. (2004). Consumer Price Manual: Theory and Practice. Geneva. International Labour Office.

consumer, whose preferences or tastes remain unchanged, in order for that consumer to maintain a given standard of living (welfare or well-being). In other words, the cost of living index measures the amount of expenditure required for a consumer to be equally satisfied in one time period as in another.

The key difference between the two approaches is that the fixed basket approach compares the cost of two baskets of goods over time whereas the cost of living approach compares the cost of maintaining the same standard of living in both the comparison period and reference periods. Moreover, as consumers may be expected to change the quantities they consume in response to changes in relative prices, the expenditures in one or the other or possibly both periods cannot typically be observed. The cost of living index is, therefore, not directly calculated but can only be approximated.

To measure the cost of living, we need to compare different baskets of goods and to check if they result in the same “standard of living.” When defined in terms of the consumption of goods and services, the standard of living is a measure of the extent to which preferences are satisfied. In this case, it can be measured by the amount of money spent given a set of prices that remain constant over a number of periods. Consumers always think that more goods are better (or at least no worse) than less goods. Consumers’ choices are determined by preferences but constrained by the size of their income. More generally, the standard of living also captures broader aspects of well-being such as health, education, etc.

5.2 Preferred price index

This guidance focuses on how to calculate the food price index and the general CPI using the Laspeyres approach (also referred to as the Laspeyres price index). The main advantage of using the Laspeyres price index is that it uses constant weights, thus allowing the computation of price indices with the same constant consumer basket over time. The Laspeyres price index is less demanding from the point of view of data collection unlike other methods that require an update of the goods and services weights in every period. The Laspeyres index has, therefore, an important practical advantage: once the weights of the reference period have been set, a Laspeyres index can be produced on the same schedule as prices are collected. The idea of continuously re-pricing a fixed basket is easily explained to non-specialists, which is why the Laspeyres price index is the method most frequently used by statistical offices around the world. The Laspeyres price index is therefore recommended for food security and early warning analysts because it can be evaluated in a timely and consistent manner.

5.3 Calculation of the food price index using the Laspeyres approach

The Laspeyres price index is a basket of goods and services index that measures the change in the value of the basket of goods and services actually purchased in the earlier of the two time periods. It is a weighted sum of the price relatives computed in step 4, where the weights are the budget shares of the weight reference period budget devoted to each of the goods. The Laspeyres food price index can be computed using the following equation:

$$\text{LASPEYRES FOOD PRICE INDEX} = 100 * (\sum w_n Pr) / \sum w_n$$

where w_n is the budget share of the different commodities that form the food basket (table 3) and Pr are the price relatives computed in step 4.

The next example illustrates how to use the Laspeyres formula to compute the food price index.

Suppose consumers use a food basket that is composed by five commodities (maize, beans, sweet potatoes, cassava and meat) with equal budget share of 20 percent each. Table 6 gives the price relatives of the five commodities across provinces of Rwanda and shows how the food price index was computed given commodity budget shares and their price relatives in September 1999.

Table 6: Computation of the food price indices

Provinces	Commodities	Budget shares	Price relatives in September 1999	Food price index in September 1999 Using the Laspeyres formula
CAPITAL CITY	Maize	0.200	0.967	$100 * (0.2*0.967 + 0.2 * 1.2 + 0.2 * 1.042 + 0.2 * 0.781 + 0.2 * 1.193)/1 = 103.7$
	Beans	0.200	1.200	
	Sweet potatoes	0.200	1.042	
	Cassava	0.200	0.781	
	Meat	0.200	1.193	
EAST	Maize	0.200	0.799	$100 * (0.2*0.799 + 0.2 * 1.017 + 0.2 * 0.904 + 0.2 * 0.779 + 0.2 * 1.065)/1 = 91.3$
	Beans	0.200	1.017	
	Sweet potatoes	0.200	0.904	
	Cassava	0.200	0.779	
	Meat	0.200	1.065	
NORTH	Maize	0.200	0.799	$100 * (0.2*0.799 + 0.2 * 1.017 + 0.2 * 0.5 + 0.2 * 0.65 + 0.2 * 1.021)/1 = 79.7$
	Beans	0.200	1.017	
	Sweet potatoes	0.200	0.500	
	Cassava	0.200	0.650	
	Meat	0.200	1.021	
SOUTH	Maize	0.200	0.682	$100 * (0.2*0.682 + 0.2 * 1.101 + 0.2 * 0.715 + 0.2 * 0.59 + 0.2 * 1.124)/1 = 84.2$
	Beans	0.200	1.101	
	Sweet potatoes	0.200	0.715	
	Cassava	0.200	0.590	
	Meat	0.200	1.124	
WEST	Maize	0.200	0.670	$100 * (0.2*0.67 + 0.2 * 0.988 + 0.2 * 0.378 + 0.2 * 0.457 + 0.2 * 1.145)/1 = 72.76$
	Beans	0.200	0.988	
	Sweet potatoes	0.200	0.378	
	Cassava	0.200	0.457	
	Meat	0.200	1.145	

It is important to know the composition of the consumer basket used to calculate the price index. If the good has a very high proportion in the index, it is recommended to exclude it in the calculation of the price index. For example, if the budget share of a good has a proportion of 100 percent, its relative price will not change. In this extreme case, the price index will no longer be related to the consumer basket but instead, it will only reflect the price changes of one good. The same applies for goods with a high proportion. Generally, a good with a budget share of more than 30 percent is excluded from the index computation because the price index we obtain will be heavily influenced by that good.

For example, if maize has a 40 percent budget share, it would be desirable to calculate the food price index by including all the commodities in the Laspeyres formula, except maize. In practice, we will compute the food price index by excluding the price of maize from the formula and dividing the weights of all the remaining products by 0.6, i.e. 1 – 40 percent. Using the same formula, table 7 gives the values of the monthly food price index for selected months and years based on the analysis of the 2001 household expenditure survey conducted in Rwanda. Using the same procedure, values of the monthly food price index across Rwanda were calculated for selected periods.

Table 7: Values of the monthly food price index across provinces in Rwanda for selected months and years

Provinces	September 1999	December 1999	October 2000	December 2000	March 2001	June 2001
East	101.61	90.59	117.94	116.34	100.14	77.38
Capital	113.77	101.16	138.21	129.08	117.70	102.73
North	83.53	72.99	105.46	102.27	94.57	78.04
West	75.95	67.75	103.23	104.91	94.41	80.40
South	95.20	83.86	126.21	112.03	104.71	92.84

INTREPRETING THE FOOD PRICE INDEX

The analysis of food price indices is very important for food security and early warning specialists because it can be a useful tool to assess the impact of price increases. This is especially important for poor households as food is the main item in the total consumption basket. Vulnerable and food insecure groups are more likely to be worse off in places where the food price index is very high, i.e. the cost of food is very expensive. The food security and early warning analysts can, therefore, make use of the food price index to make informed decisions in targeting food insecure populations.

The discussion of results from Table 7 relates to the data collected in Rwanda. However, the principles of computing and interpreting the price index apply to any country. The values of the food price index of Table 7 are used here to illustrate the interpretation of the price index more generally.

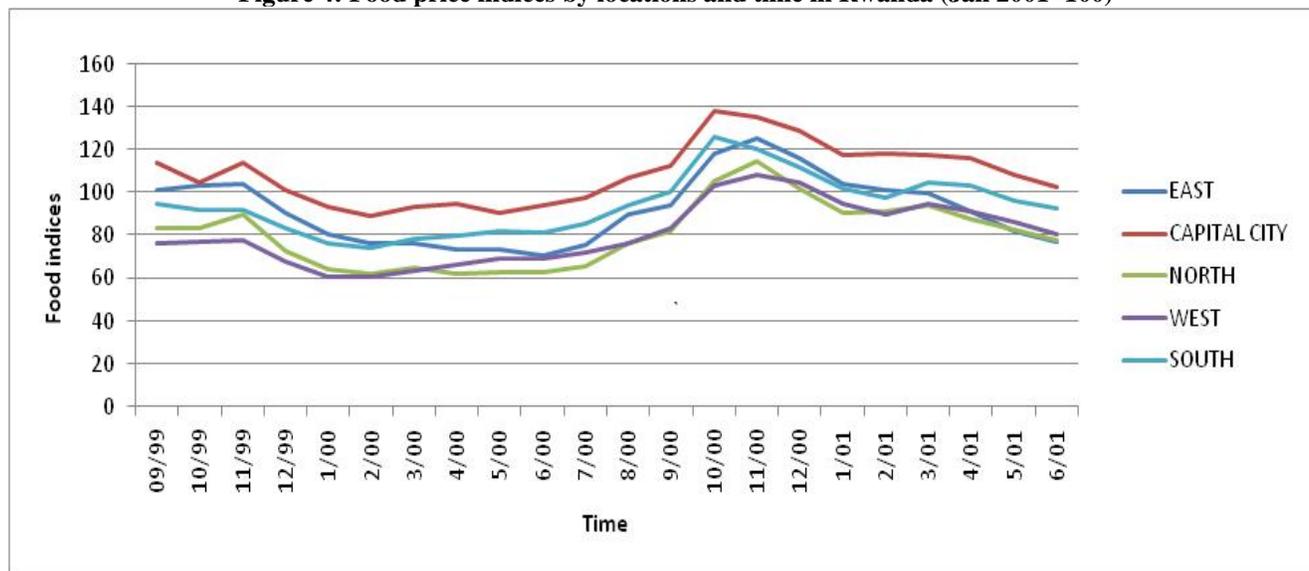
Food price inflation over time in Rwanda is summarized using a provincial food price index, which reports the cost of a given consumer food basket in the average prices of each province in each time period. The reference basket is the national average consumption pattern in January 2001, the reference year for the index. The food price index for each province and each month is computed by valuing the cost of the food basket in the prices for that province and month and comparing it to the cost of buying the same basket in national average prices of January 2001.

From Table 7, the food price index for the Southern province in September 1999 is 95.20 percent; relative to the reference basket and reference period (January 2001) indexed at 100. This means that in order for a household to buy the specific food basket in the Southern Province of Rwanda in September 1999 it would cost 4.8 percent (100% - 95.20%) less than it would cost in January 2001. The food index for Western Province in October 2000 is 103.23 percent, which indicates that the basket costs 3.23 percent more in that month compared to the cost of the same basket in January 2001.

These indices can be used by FEWS NET representatives to inform decision makers on availability and, in particular, access to food in these provinces. Consumers with low purchasing power would be the most affected in the three provinces compared to the rest of the country because the food prices they face are relatively high. The analysis of food price index can therefore help identify food insecure regions and even suggest some form of prioritization of policy or program response.

Food price indices can also be presented in graphical form. Figure 4 shows how the food prices have changed over time and across provinces. There are important variations in the cost of the consumer food basket over time and between provinces in Rwanda.

Figure 4: Food price indices by locations and time in Rwanda (Jan 2001=100)



This graph shows how one can compare food price indices across time and locations. FEWS NET representative may not need to go back further in the past to look at trends in price indices but the purpose of the graph was to show how it is possible to identify locations and periods when the cost of food was relatively high or low compared to the base year using food price indices.

There are regular and seasonal patterns to the price variation over time, which, in this example, are the same across all provinces because all provinces experience the same agricultural and marketing seasons. This is not true of all countries, but it happens to be a characteristic in Rwanda. Food prices in Rwanda reach their peak levels around September or October, increase steadily from about March to September and begin to fall after September or October. Using the food price indices, real prices of key commodities over time can be generated. We can then look at trends in real prices and compare them to the prices of the reference period.

Beside variations of food prices over time, there are also price variations between different provinces. The capital city is more expensive than the other provinces as expected. In the rural areas, the cost of the food basket, in this example, appears to be cheaper in the Northern and Western Provinces than in the East and the South. Populations that live in the Eastern and the Southern provinces could be more likely to need more food aid than other provinces.

COMPUTING AND INTERPRETING THE GENERAL CONSUMER PRICE INDEX

Like the food price index, there are different ways to compute the general consumer price index. In the United States, the consumer price index tracks the price of 218 categories of goods, which include food and non-food products, and disaggregates within these categories to account for different qualities of goods. In other countries with more limited resources, the consumer basket can only be formed with limited number of goods that have large budget shares. This guidance is presenting a simple way of calculating the CPI with a limited number of goods in the consumer basket and will follow the same procedure used to compute the food price index.

In calculating the food price index, only food prices and proportions of selected food items of the consumer food basket were used. Generally though, a consumer buys other goods and services other than food. These other goods and services can include clothing, housing, health services, etc. In order to understand the effect on households of the movement of prices other than food, an index needs to be created to account for this. Table 8 gives the sources of change in the consumer price index in Tanzania.

Table 8: Sources of change in the National Consumer Price Index (NCPI) in Tanzania, 1972-1989

	1972-1979	1980-1989
Food	45.4	65.8
Clothing and Footwear	16.3	9.5
Transport	9.3	3.9
Fuel, Light, and Water	8.4	9.1
Beverages and Tobacco	7.6	3.2
Furniture and Utensils	5.0	2.3
TOTAL OF SIX ITEMS	92.0	93.5

Source: Doriye, J. 1990

With this information, an analyst could then compute a clothing price index, a housing price index, a health index, etc using the same steps used to compute the food price index. These goods and services form the different components of the consumer basket. From all the goods of the consumer basket that are not food, one can also compute the non-food price index.

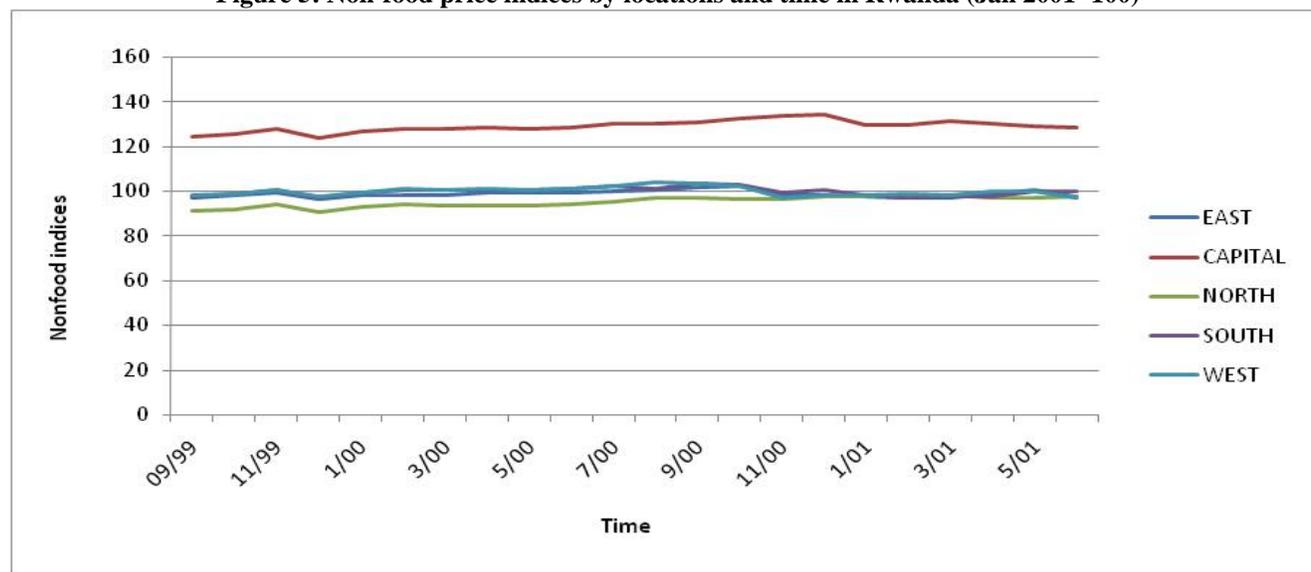
From the household expenditure data that were used to calculate the food price index, Table 9 gives selected non-food prices indices for the same period as Table 7 computed using the Laspeyres formula.

Table 9: Selected non-food price indices across time and provinces

Provinces	September 1999	December 1999	October 2000	December 2000	March 2001	June 2001
East	97.30	96.50	102.01	97.98	96.87	97.67
Capital	124.69	123.88	132.64	134.25	131.09	128.59
North	91.50	90.88	96.43	97.50	98.24	97.81
West	98.15	97.53	102.39	98.45	98.55	97.18
South	97.62	97.04	102.86	100.50	97.19	100.01

The calculation of a non-food price index can help food security analysts identify what impact non-food prices have on a households' ability to make necessary non-food purchases, which ultimately affects access to food. High prices on essential non-food goods can negatively affect how much money is left to spend on food: households cannot always choose food over non-food expenditures. The non-food price indices can be interpreted using the same principles used in analyzing the food price indices. Figure 5 shows the variation of non-food price indices across time and provinces, a graphical representation of Table 9.

Figure 5: Non-food price indices by locations and time in Rwanda (Jan 2001=100)



We can see that the variations of non-food prices over time are much less severe than for food, which is to be expected in developing countries. There are also minor variations across provinces, except that non-food price indices are significantly higher in the capital city. In this context, the food price index is more suited to be used than the non-food price index or the overall consumer price index in assessing the vulnerability to food insecurity.

Using the household expenditure survey, the food price indices and the non-food price indices were computed separately. Both indices used the national average consumer basket in January 2001. The price indices computed from the food and non-food components of the consumer basket were used to compute the general CPI. The CPI is, therefore, the weighted average of the indices computed for different components of the consumer basket. The next example illustrates how to compute the consumer price index.

Assume that the average shares of food and non-food in total household consumption in Rwanda were 80 percent and 20 percent respectively in January 2001. Given the food price and non-food price indices shown in table 7 and table 9, how can we compute the consumer price indices of September 1999 for all provinces? The CPI is calculated as a weighted average of the food and non-food indices. The weights are the average shares of food and non-food in total consumption. Table 10 shows how the CPI is computed for this example.

Table 10: Computation of the consumer price indices using food and non-food price indices

PROVINCES	Food price indices in September 1999	Nonfood price indices in September 1999	Consumer price indices in September 1999
East	101.61	97.30	$CPI = 0.8 \times 101.61 + 0.2 \times 97.30 = 100.75$
Capital	113.77	124.69	$CPI = 0.8 \times 113.77 + 0.2 \times 124.69 = 115.95$
North	83.53	91.50	$CPI = 0.8 \times 83.53 + 0.2 \times 91.50 = 85.124$
West	75.95	98.15	$CPI = 0.8 \times 75.95 + 0.2 \times 98.15 = 80.39$
South	95.20	97.62	$CPI = 0.8 \times 95.20 + 0.2 \times 97.62 = 95.68$

CHOOSING THE APPROPRIATE INDEX FOR ANALYSIS

The variation over time of food and non-food indices as shown in Figure 4 and Figure 5 have important implications regarding what type of price indices food security and early warning analysts would use to identify populations in need. In

other words, should food price indices, the non-food price indices, or the general consumer price indices be used in food security analysis?

The choice of an appropriate index will depend on the focus of analysis as well as data availability. Using the Rwandan example, if food security and early warning analysts compute and analyze the different price indices, it would be appropriate to use the food price indices to analyze the trends of the food security situation in Rwanda. This would be a better choice than the non-food price index because the variation of non-food price index over time has been minor.

In this situation the food price indices will reflect very well how consumers are being affected by the rise or drop in prices as the prices of non-food items did not change much across time and provinces. Similarly, in analyzing the implications of real and nominal prices for food security, nominal food prices will need to be adjusted using the consumer food index, i.e. the food price inflation instead of the general consumer price inflation. The adjusted prices using the general price inflation will, therefore, be misleading and should not be used for monitoring the availability and access to food for market-dependent households.

As mentioned before, an urban CPI is usually calculated and disseminated by the statistical offices. This index will only be suited to analyze how urban prices have changed on average, but will not be a good index to use for analyzing impact on rural consumers. Generally, goods consumed in urban areas often differ from that of rural areas. Moreover, urban and rural areas face different market prices. Moreover, even within rural or urban communities, there could be differences in the combinations of goods and services used by different groups of consumers depending on their level of income, their consumption habits, etc. Food security analysts need to understand some of the limitations associated of using an average price index and how it is specific to their country.

CONCLUSIONS

This guidance illustrates why it is important for food security and early warning analysts to take inflation into account. The process of adjusting prices for inflation provides a practical tool for analysts and helps them understand the origin and the food security implications of a certain price level or of price changes. Through examples, we showed that looking at trends in real and nominal prices can lead to different conclusions. Food security and early warning analysts therefore should understand nominal and real price movements in relation to consumers' access to food.

By using price indices, an analyst can better understand how the market prices they observe may be affecting vulnerable populations' access to food. The choice of an appropriate price index will depend on the issue being analyzed as well as data availability. For example, if an urban consumer price index exists, the analysts should be cautious in terms of how he or she uses this information in monitoring food security of different categories of consumers in different geographic locations. A high urban CPI may reflect high price level in urban areas that will limit access to food and other services for poor urban households but cannot be generalized to rural net-consumers because the two categories of consumers may be facing different prices.

Furthermore, poor households are often more affected by food price inflation than other types of expenditures because the poor tend to allocate a larger budget share on food purchases. As illustrated in the Rwandan case, food price variations were more significant than non-food price movements. Food security and early warning analysts can improve their monitoring of the food security situation by making use of available food price indices or by calculating them to show impact on a particular population.

Finally, as inflation can be caused by a variety of different factors. Analysts should have a good understanding of potential causes of price increases for goods consumed especially by poor households. Understating the potential causes of high prices can improve food security monitoring and be able to take timely actions to mitigate food insecurity.

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ANNEX A: SELECT SOURCES OF CPI DATA

Country	Department or Organization	Website (all accessed on April 19, 2009)
Afghanistan	Central Statistics Office	http://h1296563.stratoserver.net/cso/index.php?page=9&language=en&menu=title=CPI
Botswana	Central Statistics Office	http://www.cso.gov.bw/index.php?option=com_frontpage&Itemid=1
Burkina Faso	National Institute of Statistics and Demography	http://www.insd.bf/
Chad	l'Institut National de la Statistique des Etudes Economiques et Démographiques	http://www.inseed-tchad.org
Djibouti	Department of Statistics	
Ethiopia	Central Statistics Agency	http://www.csa.gov.et/Consumer_Price_Index.htm
Guatemala	National Institute for Statistics	http://www.ine.gob.gt/
Haiti	Institut Haitien des Statistiques et de l'Informatique	http://www.ihsi.ht/
Kenya	National Bureau of Statistics	http://www.cbs.go.ke/
Malawi	National Statistics Office	http://www.nso.malawi.net/data_on_line/economics/prices/prices.htm
Mali	Direction Nationale du Plan et de la Statistique	http://www.dnsi.gov.ml/
Mauritania	Office National des Statistiques	www.ons.mr
Mozambique	Instituto Nacional de Estatistica	http://www.ine.gov.mz/Ingles/
Niger	l'Institut National de la Statistique	www.ins.ne
Nigeria	Central Bank of Nigeria	http://www.cenbank.org/
Pakistan	Federal Bureau of Statistics	http://www.statpak.gov.pk/
Rwanda	National Institute of Statistics	http://www.statistics.gov.rw/index.php?option=com_content&task=view&id=144&Itemid=191
South Africa	South African Reserve Bank	http://www.reservebank.co.za/
Southern Sudan	Commission for Census, Statistics and Evaluation	http://sccse.org/blog/node/53
Tanzania	National Bureau of Statistics	http://www.nbs.go.tz/
Uganda	Bureau of Statistics	http://www.ubos.org/
United States	US Department of Labor, Bureau of Labor Statistics	http://www.bls.gov/CPI/
Zambia	Central Statistics Office	http://www.zamstats.gov.zm/media.php?id=6
Zimbabwe	Central Statistics Office	

GLOSSARY

Budget share – is the portion (percentage) of the household budget spent on a given good (maize), service or grouped goods and services (food). This is essentially the same thing as expenditure shares.

Consumer basket – is a typical household's market (expenditure) basket of goods, services, fees, etc. It is used for tracking the prices of consumer goods and services and the overall cost of living. The basket may be comprised of the actual quantities of consumption goods or services acquired or used by households in some period. Sometimes, a consumer basket can also be made up from hypothetical quantities created.

Consumer price index (CPI) – an index of consumer prices which measures the change in prices associated with a typical market basket of goods and services over time. The CPI expresses current prices in terms of prices during the same period in a previous year (base or reference year), to show inflation or changes in purchasing power.

Core CPI – a price index where certain items are excluded from the CPI basket on the basis that their prices are highly volatile, subject to temporary influences or are affected by government policies. The index is used to calculate "core inflation" and reflects the underlying inflationary pressures in the economy.

Cost of living index – an index that measures between two periods the change in the minimum expenditures that would be incurred by a consumer, in order to maintain a given level of standard of living or welfare, assuming that his/her preferences or tastes remain unchanged.

Expenditure shares – is the portion of a household's expenditures allocated to a particular good, service or group of goods and services. This is essentially the same as budget shares.

Food price index – is a price index where only food items appearing in the consumer basket are included in the calculation of the index.

Index reference period – is the period for which the value of the index is set at 100. This is the same as the base year.

Inflation – is an overall rise in the prices of goods and services in an economy.

Laspeyres price index – is an index that measures the change in the value of the basket of goods and services actually purchased in the earlier of the two periods.

Nominal prices – are prices that have not been adjusted for inflation. The nominal price is equal to the money that is paid for a unit of a good or service in the market, at the shop, etc.

Price – is the cost or value of a good or service expressed in monetary terms. It is the financial cost paid when one buys a unit of a specific product or service. 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 carry information about cost of production, transportation, storage, perceptions and desires as well as, in some instances, distortions.

Price reference period – is the period to which prices in other periods are compared. This is used when calculating the CPI.

Price relative – is the ratio of the price of an individual product in one period to the price of that same product in the reference period.

Purchasing power – is a measurement of the relative value of money in terms of the quality and quantity of goods and services it can buy. It represents the ability of a household to acquire goods and services based on its access to money or other forms of wealth.

Real prices – are prices that have been adjusted for inflation. Real prices hold the value of currency constant, and allow you to compare the exchange value of a good or service in different time periods.

Standard of living – is a level of material comfort as measured by the goods, services, and luxuries available to an individual, group, or nation. The standard of living can also capture broader aspects of well-being or the quality of life such as health, education, etc.

Weight of the consumer basket – is a set of numbers that represent expenditure shares of the different commodities that form the basket. The weights generally sum up to one. Conventionally, weights are determined using data from expenditure household surveys or household budget surveys. These weights are also called expenditure shares or budget shares.

Weight reference period – is the period used to compute the household expenditures shares or budget shares. The weight reference period is usually a specific year.