



Mission Report

from a short-term mission on the IPC

21 October - 1 November 2002

**TA for the 'Bridging Support Program to Strengthen the Institutional
Capacity of the National Statistics, Mozambique**

Randi Johannessen



Instituto Nacional de Estatística

This report contains
restricted information
and is for official use only.

Randi Johannessen
Statistics Norway
Postboks 8131
0033 Oslo

e-mail: Randi.Johannessen@ssb.no
telephone: +47 21094730

Table of contents

1. EXECUTIVE SUMMARY	4
2. INTRODUCTION	6
3. ACTIVITIES DURING THE MISSION	7
3.1 Terms of reference	7
3.2 Meeting with the users	7
3.3 Outline of some important terminology	7
4. FINDINGS AND RECOMMENDATIONS	9
4.1 Re-weighting - the new IAF	9
4.2 Resample, replacement and non-response	11
4.3 Quality change	14
4.4 Difficult areas	17
4.5 Expanding the price collection	20
4.6 Evaluating the new IT-system	21
4.7 Other related issues	25
APPENDIX 1. Persons met	27
APPENDIX 2. List of Literature	28
APPENDIX 3. Programme for the Mission	29
APPENDIX 4. Terms of Reference	30
APPENDIX 5. Short-term links and Chaining	33
APPENDIX 6. Treating seasonal items	34

List of abbreviations

CO	Scanstat Coordination Office in Statistics Denmark
Danida	Danish International Development Assistance
DKK	Danish Kroner
DSt	Statistics Denmark
EUR	European Euro
INE	Instituto Nacional de Estatística, Mozambique
INE-P	Instituto Nacional de Estatística, Portugal
MZM	Mozambique Meticaís
NOK	Norwegian Kroner
Scanstat	Consortium between Statistics Denmark, Statistics Norway and Statistics Sweden
SCB	Statistics Sweden
SEK	Swedish Kronor
SSB	Statistics Norway
USD	US Dollars
ZAR	South African Rand

1 EXECUTIVE SUMMARY

The main purpose of this mission was to evaluate the existing methodology in the consumer price index of Mozambique (IPC) as well as look into the new IT-system and discuss the conducting of the new household budget survey (IAF) and.

The main focus has been:

- Principle and methods to be used in replacement situations
- Principle and methods to be used in quality adjustment of specific products
- Evaluating the new IT-system
- Principles and necessary preparations of the expenditure data from the new IAF before deriving new weights to be used in the IPC
- The distinction between re-sampling and replacement

The impression is that the data collection phase has improved the recent years. The price collectors seem to be quite stable and they have a common understanding of what to look for when collecting prices. Still, as recorded in the last mission report there seems to be some lack of procedures for handling missing price observation and finding a replacement when a product is permanent out of stock. More work need to be done to establish good routines for handling non-comparable replacement and thus methods for quality adjustment.

Since the last mission, there seems to have been established a procedure for updating the sample of outlets on an annual bases. However, as laid down in the previous mission report, more effort should be put into updating the basket of goods and services on a regular basis..

As pointed out in the last mission a new IT-system system has been developed, all though the system has not yet been introduced in the monthly production of the IPC. Some parts of the new system need to be adjusted due to the recommendation in this report. Before starting to use the complete system, some more procedures, e.g. routines for estimating missing prices and chaining needs to be developed.

Above all the most important work for next year will be the conducting of the new IAF and constructing new weights for the IPC. Other important tasks will be introducing the new IT-system and analysing the possibility of expanding the geographical coverage of the IPC. Dr. Firmino Guiliche and the staff within the IPC-organisation will be occupied with several tasks concerning the new IAF the next year, as well as producing the monthly IPC. Taking into account that the IPC-staff also need to use the whole of 2003 to prepare the introduction of new weights and update the basket of goods, as well as introduction of the new IT-system and methodological changes recommended in this report, more recourse should be added.

This mission has been concentrated entirely on the Maputo-index. However, the changes must be introduced in the index for Beira, Nampula and the new provinces that may be included. This is extremely important, so that a national index is based on a consistent methodology.

The major changes that will take place in January 2004, e.g. a new set of weights and thus an updated basket of goods, introducing the COICOP-classification and more provinces, will provide a more suitable and updated IPC. The introduction of a revised IT-system that contains automatically control of the individual price observations as well as automatically procedures for imputing missing prices will provide a more robust and stable IPC.

In general, it seems to be the expression among some of the main users of the IPC that the IPC is reliable. The timing of the releasing of the Maputo-index is extremely quick. However, a national IPC based on more provinces is desirable. The users also raise the question of the possibility of splitting the new IAF into different subgroups like low- and high-income groups and derive separate IPCs in addition to an IPC that covers the whole population. Due to element of uncertainty in indices based on subgroups of the reference population, the computation and use of such indices is only recommended for analytical purpose.

The recommendations and tasks can be summarized as:

Short run (2003):

- Get assistance from those responsible for the National Account when deciding the necessary principles to be laid down in the IAF/IPC
- If possible, consider assistance from an expert on household budget surveys when starting to analysing the expenditures in the IAF
- Construct new weights of the IPC based on the results of the IAF
- Establish routines for imputing (estimating) missing price observation
- Distinct between re-sampling (updating the basket of goods and services) and replacement (price collector must find a replacement when a product is permanent missing in a specific outlet)
- Introduce more objective methods for quality adjustment (avoid judgemental methods) by looking at the main characteristics of specific items
- Abandon the carry forward method in treating seasonal items and introduce one of the recommended methods
- Redesign the questionnaires to allow more codes to obtain helpful information during the price collection
- Complete the IT-system, testing it and start to use it in the monthly production of the IPC
- Continue the price collection in the new provinces and analysis how their inclusion will influence the IPC
- Decide which of the new provinces that shall be included in the national index

Medium run (2004-2005)

- Incorporate new weights in the CPI by conducting the new IAF
- Introduce the geometric mean formula at the lowest level of the IPC
- Start to measure discount prices
- Introduce the COICOP-classification in the IPC
- Include the new provinces in the national IPC
- If necessary, adjust the new IT-system based on the experience of 2003
- Consider to establish short term links and chain them to long term index (2005)

Long run

- Evaluate the possibility of drawing the sample from the coming business register (at least for some types of outlets)
- Evaluate the possibility of using explicit methods of quality adjustment (hedonic regression) for some specific item groups
- Establish an Advisory Committee consisting of the main users of the IPC as well as economist or statisticians from the university

2 INTRODUCTION

The mission was carried out according to Terms of Reference, see appendix 1. Consultant of the mission and author of this report is Randi Johannessen, Statistics Norway. Main counterpart during the mission was Dr. Firmino Alberto Guiliche, Head of Price Statistics and Economic Trends.

The fourth visit to Instituto Nacional de Estatística (INE), took part in the period 21 October - 1 November 2002. A first mission within the same area took place 16 April - 7 May 1998, see MOZINE 1998:03, a second mission took place 29 November to 18 December 1998, see MOZINE 1998:09 and a third mission took place 13 - 31 March 2000, see MOZINE 2000:05.

The activities during the mission have involved working together with the IPC-staff as well as the price collectors to identify the main problems. During the mission a meeting with the main users from the Ministry of Planning and Finance took place. This mission has been concentrated entirely on the Maputo-index. However, the problems faced in Maputo are probably similar to problems faced in Beira and Nampula as well.

The consultant would like to express her thanks to all officials and individuals met for the kind support and valuable information which the team received during its stay in Mozambique, and which highly facilitated the work of the consultant.

This report contains the views of the consultant(s), which do not necessarily correspond to the views of Danida or INE.

3 ACTIVITIES DURING THE MISSION

3.1 Terms of reference

- Evaluate the implementations based on recommendations in the last mission and suggest new recommendations.
- Verify and check routines and procedures used for collection and computation of data.
- Discuss procedures on how to utilize the new HBS-data.
- Discuss the process of expanding the data collection to more cities and suggest steps to be taken.
- Verify the steps taken in the development of a new IT- system, and suggest new actions to be taken.

Most of the activities took place by working in close cooperation with the IPC-staff. All of the findings and recommendations concerning the activities during the mission are to be found in chapter 4.

3.2 Meeting with the users

During the second week of the mission a meeting with some of the main users of the IPC took place. These users were representing the National Directorate of Planning and Budget within the Ministry of Planning and Finance (MPF-DNPO). The aim of the meeting was to have an informal discussion about their expression of the IPC. In general, these users find the IPC reliable and put much attention to it every month. The very quick release of the Maputo-IPC (around the 5 in each month) was pleased. However, a national IPC based on more provinces is desirable. The users also raised the question of the possibility of splitting the new IAF into different subgroups of the reference population like low- and high-income groups and derive separate IPCs in addition to an IPC that covers the whole reference population.

Another desirable feature was an annual inflation rate computed as the average of the 12 indices of the actual year compared with the same average the previous year.

The meeting with these main users of the IPC points out that INE should establish an Advisory Committee on the IPC. The members of the committee should consist of representatives from the most important users of the IPC such as the Ministry of Planning and Finance, the Central Bank, labour unions, employers unions as well as economist or statistician from the university. The aim of the Committee is benefit the ongoing work with the improvement of the methodology of the IPC by getting ideas and opinions from the users. Regular meetings (e.g. once a year) with the Committee are also a convenient way to inform of methodological changes that are about to take place.

3.3 Outline of some important terminology

Weight item: basic types of goods and services provided from the IAF, e.g. shirt.

Representative items: the items that the IPC-staff specify for the price collection, e.g. Shirt, cotton, short sleeves

Product: the specific variety of a representative item to be found in a specific outlet, e.g. Shirt, 100 % cotton, short sleeves, brand: Oxford. Note that the products do not have to be exactly the same in each outlet.

Re-weighting: replacing the existing weights with a new set of weights due to results of a new IAF

Re-sampling: updating the basket of goods and services by introducing new items and removing items that have become obsolete

Replacement: when a product is permanently missing in a specific outlet, the price collector has to find a new variety within the outlet that replaces the old product

Imputation: Estimation of a price that has not been collected

Index reference period: The period for which the value of the index is equal to 100. In the IPC this is December 1998 (the same as the price reference month. The most common is to use a year as the reference period, e.g. 1998 =100.

Price reference month: The period where the actual prices are compared to when computing the index, e.g. December previous year.

Elementary aggregate: The lowest level of aggregation where individual prices are combined. No weights are available at this level. It is often defined by product within a province, e.g. price observations of rice from Maputo.

Chain index: A continuous index number series formed by linking new index series.

Chaining: Joining together indexes by rescaling one of them to make its value for an overlap period equal to the value of the other index for that period, thus combining them into a single time-series.

Reference population: the population represented by the official IPC. This may differ from the population of the IAF.

4. FINDINGS AND RECOMMENDATIONS

4.1 Re-weighting - the new IAF

Re-weighting means updating the weights in the IPC by getting a new set of weights.

4.1.1. The IAF - an overview

The weights are derived from the household budget survey of Mozambique, the IAF. INE is by the time being conducting a new IAF that covers the period 1 of July 2002 - 31 of June 2003. The IAF is a sampled survey covering the whole country. The plan is to introduce new weights in the IPC in January 2004.

The expenditures data are used as basis for determining weights in the IPC. In general, the IAF includes expenditures that are not within the scope of consumer prices, like income taxes, goods that represent savings and investments, gifts and other transfers. Such expenditures should be excluded from the estimates of total expenditure used as basis for estimating the weights. The question on how to handle the household's own production is another issue that has to be dealt with in the very start of the processing of deriving weights for the IPC. In Mozambique own production is quite significant and an imputed value of this production should be included in total consumption. One problem that has to be solved is how to measure this own production.

There may be a difference in the reference population coverage between the intended scope of a consumer price and the actual scope of the IAF. The IAF should be representative for all private households in Mozambique, without excluding any particular group. However, when deriving the weights of a consumer price some countries are excluding the expenditures of very rich or/and very poor people of the population. Due to the assumption that some specific groups of the population purchase different goods and may face different rate of inflation, some countries also compute a consumer price index for different socio-economic groups, like low- and high-income households, for urban and non-urban households, elderly, etc. Computing IPCs for certain subgroups requires separate sets of weight based on the respective total expenditure on goods and services for each population group. All though, the difference in the weights between special groups and the reference population may be significant, an IPC for a given subgroup may not differ greatly from the IPC for the reference population. This is due to that the prices observed are based on the good and services purchased by the reference population. These prices may not represent those experienced by the subgroups. The subgroups may purchase different products, in different quantities, at different outlets. However, prices tend to follow the same trend, which should result in relative prices that do not greatly vary from one population group to another.

The quality of the item weights is dependent on the reliability of the household expenditures data. The results from the survey will most likely suffer from some non-response and underreporting of some types of consumer items (e.g. drugs, alcohol and tobacco that are frequently underreported). Estimates for durable goods may also be problematic, since they are only rarely purchased. In general, the IAF should be compared and if

possible adjusted with statistics from other sources when constructing weights in the IPC.

4.1.2 Recommendation

The IPC-staff that will work with the IAF as well as the monthly IPC should get assistance from the National Account-staff. First of all the different principles laid down in the IAF should be discussed with those responsible for producing the National Account, e.g. how to handle own production, which expenditures that should be omitted before constructing the weights, etc¹. Second, it is it very time demanding to produce both the monthly IPC and at the same time be involved with several tasks concerning the IAF. INE should also take into account the IPC-staff will have to spend much time on preparing the major changes that will take place in January 2004.

INE has to decide the reference population of the IPC. It may be decided to exclude top and/or bottom income groups if their expenditures pattern are thought to be very different from those of the rest of the population. Due to the meeting with the main users from the Ministry of Planning and Finance, INE should also analyse the possibility of constructing IPC for certain socio-economic groups (e.g. low-income-level groups). Low-income cut-offs can be used do define a household into the low-income group. All households with income below the cut-off is considered as a low-income household. However, it should be kept in mind that the number of households used to determine the weight for a subgroup can be relatively small and that the weights used to construct an IPC for this subgroup may have a greater sampling error than those based on the whole reference population. In general, IPCs for certain subgroups should be for analytical purpose use only.

Unless the sample of households in the IAF is biased, it is not necessary to gross up the expenditures within each province before deriving the new weights. However, if figures of total consumption within each province are needed for other statistics, figures of total consumption can be derived by multiply the average expenditure for each expenditure item by the estimated number of household within each province.

INE should also consider a short-term mission of an expert on household budget surveys, to guide the IPC-staff through the process of controlling and analysing the IAF-data before deriving the IPC-weights. When it comes to construct the weights for the IPC the principles laid down in the MOZINE 1998:09 should be followed².

In general it is desirable to update the households expenditure each year, especially in countries where the consumption pattern tend to change rapidly, thus conduct the IAF with annual periodicity. However, annual IAF will be very costly to conduct, and it is understandable that this survey has to

¹Information about principles laid down in national accounting is among other found in "The system of National Accounts (1993 SNA)". This framework recommend to use basic prices of similar goods or services sold on the market or by costs of production when suitable prices are not available when imputing the value of own production.

² The IPC-staff should pay attention to 4-digits groups where some item can represent other items, e.g. group 1107 where Limao and Tangerina could be represented by Laranja. The weight of Limao and Tangerina should be added to Laranja, and only Laranja should be followed in the price collection.

take place on longer intervals. In general, INE should conduct an IAF not less frequent than every 5th year.

When new weights are introduced, a new index calculation has to be undertaken. This means that from January 2004, the price reference month will be December 2003. To calculate a continuous index series, the new index has to be multiplied (chained) into the old index series. See appendix 5 for more information.

Suggestion to step-by-step procedures that have to take place when constructing weights from the new IAF is summarized in table 1.

Table 1. Constructing new weights based on the IAF

Step	Activity
1	Definition of consumption in the IPC, e.g. inclusion or exclusion of certain expenditures
2	Decide how to handle households own production
3	Define the reference population coverage of households in the IPC, e.g. the whole population regardless of income Eventually; define subgroups for separate IPCs
4	Analysing of expenditure data to identify outlier and suspected errors
5	If alternative data sources exist, adjust expenditures due to over- or/and underreporting of certain expenditures
6	Add up total expenditure for each weight item across provinces to derive estimated total expenditure for each weight item
7	Add up the expenditures for each weight item to total expenditures on all goods and services of an average household
8	Construct weights by taking each weight items share of the total expenditures on all goods and services
9	Identify basic types of goods and serviced - weight items - and focus on the coverage of weight items within the 4-digit consumption level according to the principles laid down in MOZINE 1998:09.

4.2 Resample, replacement and non-response

4.2.1 Re-sampling

Re-sampling means to update the sample of goods and services by omitting obsolete items and introduce new items.

Re-sampling is taking place between the re-weighting that occurs rather infrequent. Such update of the basket of goods and services is not the same as a replacement situation that can arise every month due to permanently missing price observations.

There seems to be a lack of routines to update the basket of goods and services on a regular basis. By updating the basket one can introduce new goods that has become significantly important to the consumers. Waiting for the re-weighting procedures of the IPC before incorporating the new goods may lead to errors in the measurement of price changes, especially if the re-weighting is infrequent. The main advantages of updating the basket more frequent is that not only will the "new" basket in a better way reflect the products that the consumers are buying, but also prevent a lot of missing products and thus less need for replacement and thereby quality adjustment. If not updating the basket on frequent intervals, the old sample will include older varieties and comparable replacement could be hard to find and thus

more quality adjustment is necessary. Note that it is not necessary to wait until an item is totally obsolete before introducing a new one. If the IPC-staff suspect that an item is likely to become obsolete in near future, the item should be removed when updating the basket.

As long as the new goods fit in to the existing weighting structure, it can be included when updating the basket. If a new good does not fit into the existing weighting structure, then of course the introduction of the new goods has to wait until a new set of weights is derived. Examples of new goods are mobile phones, computers, DVD-players, video cameras, etc. Video rentals and internet access are examples of new services. A mobile phone is an example of a new good that can be introduced into the sample of goods without having a new set of weights as long as there exist a 4-digit group containing telephone equipment, e.g. a fixed telephone. Computers and video rentals may be examples of new goods and services that do not fit into one of the existing 4-digit groups.

When introducing new goods within a 4-digit group, one has to redistribute the weights within the specific group so that the new good gets a weight. When updating the basket between re-weighting there will not exist a new IAF that can provide information about the weights on detailed level. Due to this, redistributing the weights requires a judgmental method to decide the weight of the new item. Figures from trade association can be used to estimate a weight. If such information is not available, one simply has to use common sense to decide the weight of the new good. In general, a new good when entering the market often has a low sale and thus a low expenditure weights until it gets substantial sales. The timing of the introduction of new goods is therefore extremely important when giving it a new weight. In general, the earlier a new item is introduced, the lower weight it should have in the IPC.

4.2.2. Short-term links and long-term index

As mentioned above, when introducing new weights the new index has to be chained to the old index series to get continuous index series. The same approach can be used to calculate the index as a short-term link and chain it to the long-term official index. This approach requires that the IPC each year is calculated by comparing price observations in actual month to the price observations obtained in December previous year. The short-term links are for internal use only, and the results of the monthly indices are linked (chained) to the long-term index, that has December 1998 as reference period³. This long-term index will be comparable to the official index published each month. The short-term links and the chaining of the results to the long-term index, has to be done on every level in the consumption classification as well as on item level.

One advantage of this approach is that it allows for annual updating of the basket by establishing base prices that are referring to a period which are not so far away. See appendix 5 for more information.

³ This means that the price reference month and the reference period will not be the same. In many countries the reference month is a year (e.g. 1998) rather than a single month.

4.2.3. Missing price observations, imputation and replacement

Missing price observation (non-response) can be separated into two groups; prices of products that have become temporarily unavailable, and prices of products that have become permanently available. Temporarily unavailability may among others occur for seasonal items (fruits, vegetables and some clothing), from supply shortage as well as difficulties during price collection (e.g. an outlet was closed). Seasonal items will be further discussed in section 4.4.1.

Temporarily missing price observations for non-seasonal products is by the time being solved by omitting the product for which the price is missing. This is not recommended because there is a danger that the sample size may be continually reduced over time to only cover those prices which can be collected regular each month. Price for a temporarily missing product should be imputed⁴ (estimated) by the average price change of the remaining prices of the specific item. An example is given in table 2.

Table 2. Imputing temporary missing price observation

	Des01	Jan02	Feb02	Mar02	Feb02*	Mar02*
Outlet 1	14000	14000	14000	14000		
Outlet 2	13500	14000	14000	14500		
Outlet 3	16500	17500	17500	17812,5		
Average	14666,67	15166,67	15166,67	15437,50	14000	14250
Index	100	103,4	103,4	105,3		

*The average is based on the price observations from only outlet 1 and 2.

Table 2 shows the price observations for white sugar measured in Meticais (Mc.). The prices of white sugar are collected from 3 different shops. In March 2002 the price of white sugar is temporarily missing in outlet 3. The price of white sugar in outlet 3 is estimated by multiplying the February price in outlet 3 with the average change from February to March 2002 of the price observation from outlet 1 and 2. The index series of white sugar is calculated by dividing the average price for each month by the averaging price in December 2001 and multiplied by 100. For simplicity the indices is rounded to 1 decimal.

Permanent unavailability occurs where it is no longer possible to collect a price for a specific product in a specific outlet or market. A variety of reasons can cause permanent disappearance of products. The product may disappear from the market because new products have been introduced (e.g. new models of a cd-player) or the outlets from which the price has been collected have stopped selling the product. When a product is permanent missing, the price collectors have to find a replacement product. This procedure is often referred to as a forced replacement.

⁴ In general, a temporarily missing price observation should not be imputed more than for the following 3 month. After this the missing price should be regarded as permanently missing.

A replacement means that the price collector due to a permanent missing price observation selects a new variant of the sampled item to supersede a replaced product.

Replacements are a convenient way of maintaining the sample of products and thus keep it up to date between the annual re-sampling of the basket. Replacement requires that the price collectors judge the quality of the new products to decide whether it is a product of similar quality to the old product⁵. The comparing should be based on a set of specific characteristics that are supposed to determine the price of the product. In this way one can prevent the comparison to be based on judgmental methods. If the replacement is not of similar quality, a suitable method for quality adjustment has to be done, see chapter 4.3.

4.2.4 Recommendation

INE ought to develop routines for annual updating the basket within the existing weighting structure. Such updating is necessary to reflect the actual items that the consumers are buying. It will also make future forced replacement less likely and thereby the need for quality adjustment.

To update the basket, prices for the old and new sample are returned in the same month, December. The new index in January is compiled on the new sample only and the results being linked to the old sample. This means that prices both for the old and new basket has to be collected in December to establish a base price for the new items. To handle the annual updating of the basket, INE should base the computation of the IPC on short-term links that are chained to the long-term index.

INE should also take into account that the price collection in spring 2003 will require more time, because prices for both the old and the new basket has to be collected⁶. This is extremely important to obtain base prices for the new items that are going to be included in the IPC from January 2004. Such updating of the basket and thus expanded price collection in some months should however be established as a yearly routine.

4.3 Quality change

4.3.1 Quality change

As discussed in section 4.3.2 several situations can lead to permanent missing price observations and requires a replacement. When the replacement product has been selected, a decision must be made as to whether the new and the old product are:

- direct comparable
- non-comparable

If the replacement is comparable to the old product or if the quality difference between the new and old product is negligible, that means that the new and old items are nearly comparable one can use direct comparison. Direct price comparison means that we just continue to compare the prices as if no

⁵ Note that similar in quality not necessary means that the replacement has the same price level as the old product. If the new product has a higher price level than the old product, the price collector should obtain the price as long as the quality is similar.

⁶ To verify the stability in the availability of the new items, the price collecting of these items should start earlier than December, even though the prices will not be a part of the computation of the IPC before January.

replacement has taken place. This means that the actual price of the new product is compared to the base price of the old product.

Lack of correspondence between the new and old product means that the characteristics of the new product do not match the characteristics of the old product.

When the price collectors must find a substitute, a comparison of the market price and some basic characteristics is necessary to state whether the replacement is comparable or not. An example of a non-comparable substitute observed in the sample of outlets in Maputo is a Sony stereo at the market price 3.375 000 Mc. and a Sony stereo with karaoke at the market price 5.000 000 Mc. The karaoke-model is assumed to be of a higher quality. Other examples of substitutes with better quality are faster home computers, light bulbs that last longer and use less energy, specific clothes items of another brand, fabric, etc.

Price changes due to quality changes should not be included in the IPC. To ensure that the index only reflects pure price movements, e.g. the sampled prices refer to products of the same (or equivalent) quality, an adjustment of the price of the substitute has to take place. Especially goods that are undergoing rapid technical changes such as household appliance and high-tech products are among items where the necessity of quality adjustment will occur.

It is not recommended to just delete a disappearing product from the computation altogether without replacement rather than adjust for quality. This implies that the price change between the actual month and the price reference is based only on matching items. This method can cause significantly lower numbers of price observations.

Several techniques are available for adjusting prices to account for quality changes. The methods may be categorised as:

- explicit quality adjustment
- implicit quality adjustment

Explicit quality adjustment would give a more precise way of handling quality difference than the implicit methods. The explicit method involves assigning a monetary value to the quality difference and then adjusting the price observation for the quality difference. A very popular method the last years is to use a hedonic regression for estimating price changes. Hedonic regressions are especially used to quality adjust household appliance and computers. The method consists in estimating the value of the characteristics through multiple regressions with price as the dependent variable and by using the estimated coefficients. When there are replacements during the year, these coefficients are then used for adjusting the reference price. It is a complex and costly method and requires substantial knowledge of product differences and detailed information to make statistical estimates of the effects of quality change.

Link-to-show-no-change means that the price difference between the new and old product is treated as a quality difference.

Most countries are using an implicit method for quality adjustment. Implicit quality adjustment requires the use of observed price information when the price index is compiled. One of the most common implicit quality adjustment methods is "link-to-show-no-change". This method implies that the price difference between the new and old product is treated as a quality difference, thus assuming that there has been no price change. Usually the reference

price is adjusted by use of the average of all the remaining prices for the specific item⁷, see an example in table 3.

Table 3. Quality adjustment based on average price change

	Product	Des01	Jan02	Feb02
Outlet 1	OSAKA stereo	1200 000	1300 000	1300 000
Outlet 2	SONASH stereo	1550 000	1610 000	1610 000
Outlet 3	SONASH stereo	1575 000	1600 000	-
	Replacement	1.984 536		2100 000
Average*		1444 166	1503 333	
Average**		1375 000		1455 000
Average***		1578 178		1670 000
Index		100	104,1	105,8

* The average is based on price observations from outlet 1, 2 and 3 in December and January.

**The average in December 2001 and February 2002 is based on price observations from only outlet 1 and 2.

***The average in December 2001 is based on price observations from outlet 1, 2 and the imputed price of the replacement from outlet 3. In February 2002 the average is based on the price observation from outlet 1 and 2 and the real price of the replacement from outlet 3.

The average in December and January and thus the index in January is based on the original products from outlet 1, 2 and 3. The index in January 2002 is computed by using the price ratio of 1503 333/1444 166. In February the product in outlet 3 is permanently missing and a replacement of different quality with the price 2100 000 Mc. is recorded. To estimate a base price for the replacement the inverse price ratio of 1455 000/1375 000 is multiplied with the price of the replacement. The estimated base price of the replacement from this method is 1984 536. In February 2002 the index is compiled by using the price ratio 1670 000/1578 178.

Adjusting prices to account for changes in quality is complex, especially with regard to the quality of services. Monitor changes in rail or bus tickets are fairly easy, but rather difficult to state if the price change is due to quality change. The assumption is generally made that the quality of the service provided remains unchanged. An example where quality adjustment of a service is necessary is the rehabilitation of the cinema at Avenida J. Nyerere. Before the rehabilitation the price of a performance was 3000 Mc. while after the price increase to 50 000 Mc. If one assume that the consumers have a higher utility of watching a performance in the new cinema due to better seats, sound, pictures and other facilities, the price increase is due to higher quality and thus must be adjusted to measure the correct price change. Link-to-show-no-change should be used for quality adjustment for services as well.

4.3.2. Recommendation

One of the most difficult conceptual problems faced in compiling a price index is the treatment of quality changes. Ignoring such changes can result in substantial overstatement of price changes, as price increases due to quality improvements are included in the index. A method for quality adjustment is strongly recommended. The method described above make it possible to link

⁷ This method is in some countries referred to as "bridged overlap".

the price of the replacement directly to the old without an explicit quality judgement and just assume that price changes reflect quality changes.

To avoid judgemental methods when comparing the new and old product, the IPC-staff is recommended for some items that are likely to undergo quality changes (e.g. household appliance and high-tech products) or will become permanent unavailable (e.g. some clothing) to define some main characteristics that are assumed to determine the price of the item. When a forced replacement is taken place, the price collector should compare the characteristics of the new and old product to decide whether the replacement is comparable to the old product. The price collector then ought to mark by a code if it is comparable or not. This information will be used to decide whether to quality adjust the base price or not. The questionnaires should be expanded to allow for more remarks, especially a code for marking if a replacement is comparable or not to the product it has replaced.

In the future more effort should be put into taking advantage of the price collectors possibilities to judge differences in the characteristics of the replacement and the product it replace. This information can be used to introduce explicit quality adjustment, e.g. hedonic regression. However, INE should take into account whether the gains achieved by the hedonic method are large enough to motivate its higher cost in the long run.

4.4 Difficult areas

4.4.1 Seasonal items (except clothing)

Seasonal items are those goods and services that are available only at certain times of the year, or to a very limited extent when not in season, so that a meaningful price can not be observed.

Seasonal items⁸ are to be found among fruit, vegetables, meat and fish. If an item is unavailable because it is out of season, no substitute should be selected. Off-season, the price of the seasonal items must be estimated.

If the seasonal availability of specific items is predictable from year to year, it is recommended to make a list of these items and define the seasonal period. The staff will then know in advance when to collect prices and when to estimate and a price (or more correct an index) of the seasonal item. By the time being INE is solving seasonal items by carrying forward last observed price of the item. A more recommended method of estimating a price (or an index) for a seasonal item is to assume that if the item had remained available, the price would have moved in the same proportion as the price of the available items within the consumption group. This is equivalent to redistribute the weight to other items within the 4-digit consumption group. Another method is to calculate the average of the prices of the item when in season and use this average price off-season. The methods are described in table 4 and 5.

⁸ The term seasonal items should not be mixed up with seasonally varying prices, which occur for several goods during the year even if they are available year around, and a meaningful price is possible to obtain. Seasonally varying prices are caused by seasonal variation in supply and demand, regular seasonal sales, etc.

Table 4. Imputing an index for Manga.

NOME	Shares	Base	January	February	March
LARANJA	0,1111	100,0000	134,6933	168,6079	157,4215
LIMAO	0,0238	100,0000	208,8000	202,0103	158,4927
TANGERINA	0,0079	100,0000	169,1728	169,1728	169,1728
ANANAS	0,0317	100,0000	60,1199	60,1398	78,3978
BANANA	0,0794	100,0000	129,3719	132,8494	132,3050
COCO	0,6667	100,0000	112,0131	116,0429	132,1682
MANGA	0,0500	100,0000	119,0790	121,6666	135,0503
PAPAIA	0,0238	100,0000	152,0393	155,4285	158,7878
MAÇA	0,0159	100,0000	146,3186	164,7951	138,6976
	1,0103				
Group		100,0000	120,0280	127,1012	136,4437

Table 4 shows the weighted index from January - March 2001 based on the assumption that Manga is a seasonal item and disappears from the marked in March. All the indices from January - February 2001 are based on all the items within the consumption group 1107. In March, the weighted price increase for the group 1107 based on all items except Manga from the price reference month December 1998, is 35,05 per cent. This price change is multiplied with the price index of Manga in the price reference month that is equal to 100 to obtain an index in March. As shown in table 4 this gives a quite price increase from February to March for Manga due to the large increase of the group 1107 for the same period.

Table 5 shows the index for Manga in March based on the average of the indices for Manga from January - February 2001.

Table 5. Imputing an average index for Manga.

NOME	Share	BASE	January	Ferbruary	March
LARANJA	0,1111	100,0000	134,6933	168,6079	157,4215
LIMAO	0,0238	100,0000	208,8000	202,0103	158,4927
TANGERINA	0,0079	100,0000	169,1728	169,1728	169,1728
ANANAS	0,0317	100,0000	60,1199	60,1398	78,3978
BANANA	0,0794	100,0000	129,3719	132,8494	132,3050
COCO	0,6667	100,0000	112,0131	116,0429	132,1682
MANGA	0,0500	100,0000	119,0790	121,6666	120,3728
PAPAIA	0,0238	100,0000	152,0393	155,4285	158,7878
MAÇA	0,0159	100,0000	146,3186	164,7951	138,6976
Group		100,0000	120,0280	127,1012	135,7098

The two methods give rather different indices in March. The first method gives quite a price increase from February to March because the rest of the items show price increases in this period (and for the period December 1998 to March 2001 as well). The second method gives a small price decrease for Manga from February to March.

However, the average of the indices as well as the carry forward method (current method) will face problems when Manga is reappearance at the market in November because there will be a discontinuity comparing with the actual price of Manga in November. The imputed method illustrated in table

4 gives a price level of Manga that are close to the actual price in November, see Appendix 6 for more information.

Above we have discussed the treatment of seasonal items. This should not be mixed up with the term seasonal adjustment index. Introducing a method for seasonal adjustment of an index is a much more complex task and requires standard adjusted routines, plausible seasonal adjustment factors and regular examination of whether the adjustment method yields sensible results. Whether or not the index should be seasonal corrected depends on the user needs and the purpose of the index.

4.4.2 Clothing

Clothing and to some extent footwear requires a lot of attention. Some clothing and footwear products are seasonal. Typically winter clothes may be available in shops from March to August and then being replaced by summer clothes. The price of some clothing, especially women garments, also shows a characteristic seasonal movement pattern. At the very start of the season, new fashion products are introduced at high prices. At the end of the season the products are still available, but may sold at very low prices. This seasonal drop should be captured in the IPC.

The price collectors must distinguish between fashion changes and quality changes.

When a specific product is no longer available, a replacement has to be found. As mentioned above, when facing a replacement situation the price collectors should take into account those characteristics that will be most influential in determining the price of a product. Fashion and style can be important determinant of how much the consumers are willing to pay for some specific clothes. Unfortunately, they are very difficult to describe objectively. The price collectors therefore have to distinguish between fashion changes and quality changes. When comparing the similarity of a replacement to the old product, main characteristics as fabric (cotton or synthetic), country of origin, brand, etc. are essential. An example of a replacement of different quality could be a short-sleeved cotton shirt that replaces a long-sleeved synthetic shirt.

The price of the replacement will often be much higher than the reduced sales price of product it replace due to the introduction of a new season product. If the replacement is of similar quality the price of the replacement should be recorded, thus cause a price increase and the index return to "normal". If the replacement is of different quality, the base price has to be adjusted assuming that the price difference is equal to the quality difference (link-to-show-no-change, see section 4.3.1).

However, in many cases the only difference is fashion and style, and direct comparison between the new and old product is possible. After all, there still will be a large amount of clothing sold all year, which will follow normal price collection procedures.

4.4.3 Household appliance and high-tech products

Household appliance includes refrigerators, freezers, washing machines, dishwashers, microwave ovens, toasters, etc. These are examples of items that will undergo some quality improvement over a long period. The characteristics of these items are the change of models from year to year. When describing the representative items, the IPC-staff should use examples

The characteristics of household appliance and high-tech products are the frequent change of models.

of different models of different brands but within the same quality group, that means models and brands that are comparable in quality but may differ in price level. The price collectors use this as a guide and find a specific model of a specific brand that fits into the description of the representative item. Note that the price collectors do not have to find exact the same model or brand in each outlet.

The key to solve the problem with items that are likely to undergo some quality change is to update the models to be collected each year when updating the basket. As long as the IPC-staff does not choose models that are likely to become obsolete in near future, the chosen models should be available for the whole year. The more infrequent the basket of goods is updated, the more replacement situations of non-comparable quality occurs. This points out the importance of an annual updating of the basket.

High-tech products include a wide range of goods like radio, TV, stereo, video-recorder, cameras, computers, etc. Except for computers the situation for these products is similar to household appliance. The key is to define examples of models and brands that are comparable in quality and instruct the price collector to look for more than just one brand. An example is a TV. The price collectors are looking for a TV of the size 21", brand Phillips. The problem rise when it is not possible to find Phillips within all the specific outlets in the sample. The price collectors ought to follow several brands. In this way they will always be able to have at least some observation of a TV. What should be done in practice is to identify a TV of size 21" of a certain brand (e.g. Phillips) in one specific shop and a TV of Size 21" of another brand (e.g. Sony) in another specific shop. The price collector should stick to the same model and brand within the specific shops as long as it is available and play a major role in consumers purchase. If the TV of a specific brand is temporarily missing, the price could easily be estimated based on the other price observations of a TV, size 21". However, if the TV is permanently sold out, this requires finding a replacement as described in section 4.2.3.

For computers the quality improvement is likely to be faster since new models are introduced more frequently. Even if the basket is updated annual and new models are introduced in the IPC, computer products almost probably will have to be adjusted for quality. The method to be used is link-to-show-no change as described in section 4.3.1.

4.5 Expanding the price collection

4.6.1 New provinces and a national index

According to the demographics of Mozambique the prices are obtained in three different urban areas (provinces); Maputo in the south, Beira in the middle and Nampula in the north. An all item index and sub-indices are computed for each province. The three all-item indices are weighted together to a National Urban Consumer Price Index by using household expenditure on consumption derived from the 1996 IAF as weights. INE also construct and publish an IPC for Mauto only. In addition, price collecting is now taking place in 7 more provinces⁹. The price collection in the new provinces started

⁹ The new provinces are Cabo Delgado, Niassa, Tete, Zambizia, Manica, Inhambane and Gaza.

in October/November 2001. The aim of the price collection in the new provinces is to establish stable price collection procedures as well as analysing how the inclusion of more provinces will affect the all item index and sub-indices.

A national index should take into account that price movements can differ between provinces.

The main reason for including more provinces in a national index is the fact that rural and urban price movement may well be different. If this is the case in Mozambique, it is potentially dangerous to reduce the measurement of a national index to only three provinces. Taking into account the different composition of the population of consumers, outlets, products and country of origin of imported goods it is likely to believe that the price movements is different in Maputo than the rest of Mozambique. Whether the price movements differ between the existing and the new provinces remains to be analysed.

4.5.2. Recommendation

The price collection in the new provinces should continue until final analyses on the price movements in these provinces compared to the existing provinces have been done. The IPC-staff should based on historical price data compute index series for all the provinces as well as compute a national index by including some and all of the new provinces. In that way, the IPC-staff can decide how and which provinces that do affect an index on national level.

When constructing a reliable national index is extremely important to define in advance which provinces that will be included, and stick to the defined provinces every month. If the IPC-staff suspect that one or more of the new provinces will not be able to conduct the price collection, entry and transfer the data in time for releasing the national index, they should not be a part of a national index.

The users of the IPC ought to be informed about the expanded coverage of provinces in the national index.

4.6 Evaluating the new IT-system

4.6.1. The IT-system - an overview

A new IT-system based on the software Access is developed for the IPC. The new IT-system consists of a data entry phase as well as a phase for analysing possible errors on price observation level (price change per each outlet/marked). These phases are based on a user-friendly menu for selecting the different steps. Several test based on historical price data has been used to verify that the new system gives the same results as the current system.

The IT-system also contains a phase for analysing possible errors both on item level as well as subgroups and main groups. However, these phases are based on Excel and cannot be selected by a menu and thus are not as user friendly as the data entry phase. Still, the use of different Pivot tables in Excel creates a lot of opportunities.

When entering the collected prices and other useful information the system is checking the collected price observations for processing errors identified by the price change from last month. In general the limit for this control is set to

+/- 5 per cent¹⁰. Whenever registration an actual price outside this limit, the system will give a warning. It is not possible to record duplicates in the system. The system can easily provide different reports based on the both the markets and the outlets, as well as only the markets or the outlets.

The phases based on Excel provides different tables for analysing possible errors on the item level (top-down list, number of price observations per item, etc.). The system also reports the total number of price observation that has been recorded. This information is helpful to the IPC-staff to verify the correct number of price observation entered by comparing with last month number of recorded observations. A procedure for imputing missing prices has been developed in the system.

The system consists of catalogues for outlets and items in the sample as well as a catalogue for the different item weights. This could easily be updated when necessary.

Aggregating the indices on item level is based on the weight for each item, thus making it possible to aggregate into other consumptions classifications like COICOP. This of course requires that the preferred consumption classification have to be defined within the system (in an own catalogue).

Computation of the IPC can (for analysing purpose) be done on outlets or markets only. Databases for both item level indices and aggregated indices are part of the new system.

4.6.2 The IT-system - necessary adjustment

The IT-system should store a raw database containing the information on observed price form each outlet/market and other information obtained during the price collection. The system should also store a production database containing the data to be used in the computation of the IPC, that means actual prices, estimated prices and the base prices¹¹.

When collecting prices the quantity of some food products are recorded (e.g. gram, kg. liters, etc.). This quantity needs sometimes to be adjusted. The system ought to be a little bit more flexible in allowing different quantity. For the time being, the system only allowing one code when entering the data (product exist or not exist). Different outlet- and item codes obtained during price collection that identify different situations such as outlet is closed, product is temporary or permanently missing, seasonal items, replacement is not comparable, etc. should be incorporated in the system. This of course requires that the questionnaires used during the price collecting will be expanded to contain such information.

¹⁰ The IPC-staff should consider whether this parameter is to narrow or to wide by analyzing the current price data. If to narrow, the IPC-staff has to control to many price changes that may be correct.

¹¹ Due to different situations that involves finding a replacement and this may require an ajustement of the base price, it is important to store the base price together with the rest of the price observations used in the computation. Whenever adjusting the base price for a specific product, the base prices will be different from those used last month. When computing next months IPC, the system should then use last month (adjusted) base prices.

An automatic routine for imputing (estimating) missing prices due to non-response ought to be developed (or adjust the existing routine). Whether actual prices needs to be estimated or base prices needs to be adjusted, depends on the code obtained during the price collection. In general, the actual price should be estimated when a price is temporary missing. It is recommended to use a fairly simple formula in such routines, e.g. using the average price change from last month of a specific item based on actual price observations for this item.

When a replacement situation takes place and the replacement (new product) is not comparable in quality to the old product, the base price needs to be adjusted.

The adjustment of the base price will be based on the price movement of the other collected price observations for the same item. Seasonal products require another method and should be solved manually as these items probably are few and the off-season period is predictable from year to year. Since it is not possible to obtain prices of seasonal items off-season, an index rather than a price should be imputed for the specific seasonal item. The indices for the predefined seasonal items should be in an own catalogue and be manually changed when out of season. The indices in this catalogue will of course be used in the computation phase of the IPC.

The computation step ought to be adjusted to make it possible to compile both short-term indices as well as long-term indices (see section 4.2.2). This includes a formula for chaining the IPC to the reference month, December 1998. One minor adjustment has to be done to use the geometric mean formula in averaging the price observations on the lowest level of the index.

It is not recommended to build the consumption classification directly into the code system. The consumption classification should be stored in a separate consumption catalogue where each item is linked to its corresponding 4-digit consumption classification level. The major advantage of having the classification (or several classifications) in a catalogue is that this simplifies any types of future updates of the classification to be used.

A top-down list (item level) sorted by the influence each item has on the all-item index, that means item weight multiplied with the items price change should be provided. This list should be used for further control of possible errors. When identifying possible errors on item level, the system ought to provide a routine for manually correcting the errors (price observation level).

One should consider making an automatic report (screen/paper) for the current month the number of price changes and the different codes for items and outlets (e.g. missing price observations, replacements, comparable or not, etc.).

4.6.3 The IT-system - next step

Documentation - both technical (IT) and user related needs to be developed. Training of the staff in using the new system is also necessary. This is extremely important taking into account that the person in charge of the new IT-system will probably leave INE in a short time. The possibility of maintaining the new system should also be taking into account. This may require some competent IT-person. The necessary adjustment as laid down in 4.6.2 should be implemented in the new system as fast as possible.

It is strongly recommended to start using the new IT-system as fast as possible. If not possible to start using the whole system in 2003, one should consider start using only the data entry phase and transport the data to Excel for further treatment. When the system is fully completed, that means including the adjustments mentioned in section 4.6.2 as well as develop a full documentation, the whole system ought to be used. The system will then provide a stable and timesaving production of the IPC due to more automatic routines as well as better control of possible errors.

Before starting to use the new system in the monthly production of the IPC the IPC-staff should test the system to verify that it will generate the same results as the current system.

When working satisfactory in Maputo, IT-system should also be used in the other provinces. Whether the whole system should be transferred to the provinces depends on the skills of the IPC-staff in each province. It is likely to believe that at least some of the provinces only should transfer the (corrected) price data to Maputo for further control and aggregation, that means only using the data entry phase.

The monthly step procedures in making the IPC based on a new IT-system are summarized in table 6. The table shows whether the procedures already exist or not in the new system, and point out the necessary adjustment.

Table 6. Different steps in producing the IPC

Procedure	Exist	Adjustment recommended?
1. Record collected prices	Yes	
2. Check of collected prices - automatically	Yes	
3. Correction of collected prices	Yes	
4. Analyse on item-level (top-down list)	Yes	Yes, e.g. sorted by weight *price change
5. If possible errors (identified on item-level) - corrections on price observations level	Yes	
6. Estimating missing prices in actual month or adjusting of the base prices - automatically	Yes	Adjustment due to the recommended method of imputing prices
7. Checking on item-level after estimating prices (top-down list)	Yes	
8. Compute indices on item-level	Yes	Yes, if introducing short-term links and/or the geometric mean formula.
9. Own catalogue to handle the indices for seasonal items	No	
10. Aggregating into sub-groups and groups	Yes	Yes, probably when introducing COICOP
11. Chaining each item, subgroup and group to the long-term index	No	

4.7 Other related issues

4.7.1 Sample of outlets

By the time being INE is not collecting prices in expensive shops. These shops seem to have more or less the same assortments of goods as the cheaper shops. The sole difference seems to be the price level. If the reference population does the purchases in these types of shops, they should be covered in the sample of the IPC.

Economic theory assumes that the consumers substitutes to cheaper outlets.

One way to reflect the facts that the consumers according to economic theory substitutes to cheaper outlets which sells a variety of the same item is to use the geometric mean formula on the most detailed level¹² in the IPC. The advantages of this formula is that it is independent of the price level and assigns equal weight to each individual price change irrespective of the price levels. This formula assumes that the consumer's holds constant expenditure shares for all products in each period and thus allow for substitution among the products within an elementary aggregate. The opposite formula, the ratio of arithmetic mean prices, on the other hand assume that the consumers purchase equal and constant quantities of all products within an elementary aggregate, that means do not allow any substitution. In this formula higher prices implicit gets a higher weight. The differences between the two formulas are illustrated in table 7.

Table 7. Arithmetic and geometric mean formula

	Arithmetic mean	Geometric mean
Outlet 1	14000	14000
Outlet 2	17300	17300
Outlet 3	14000	14000
Outlet 4	15000	15000
Outlet 5	23300	23300
	16720	16396,45

Table 7 shows that the geometric mean formula gives a lower average price than the arithmetic mean formula. The reason is that the arithmetic mean formula implicit gives the price 23300 Mc. a higher weight. Note that the geometric formula should only be used to combine the individual price observation at the most detailed level (elementary aggregate). Further aggregating should be used on the traditional Laspeyres formula.

If an outlet is closed, the price collector ought to record whether this is a temporary or permanently closing. If temporary, the outlet could be omitted from this month computing of the IPC or the missing prices from this outlet could be imputed based on the method described in chapter 4.3.2. As a general rule if the shop is permanently closed, a replacement shop has to be found. But, the price collectors should note whether this is a shop that sells quite homogenous goods, like milk, washing powder, etc. If this is the case, and this kind of shops is in a large scale within the sample, one should not bother to find a replacement.

¹² The most detiled level is often refered to as elemantary aggregates. The stratification of elementary aggregates in IPC is item*province where province = Maputo, Beira or Nampula.

If the outlets change purposes, that means start to sell something completely different, the outlet should be replaced as well. However, the same judgement as mentioned above should be done.

4.7.2 Sales prices and other discounts

Discounted and sales prices should be recorded in the IPC.

One of the principles relating to consumer price indices is that only transaction prices, that is prices actually paid by consumers should be included in the index. This may differ from the advertised price, if for example, a discount is offered. In general discounted prices should be recorded as long as they are not discriminatory, that means available to a restricted group only. Sales prices should also be collected if these are either temporary reduction on goods, which are likely to be available again at normal prices, or are stock-clearing sales (e.g. summer sales of clothing). Bonus offers like buy 2 get 1 for free or a free gift with every product purchased should on the other hand be disregarded. Discount on products close to the expiry date should be disregarded, as these kinds of products can be considered as of poorer quality. Some times the price will be permanently reduced, e.g. due to lower producer prices. In this case the reduced price will be the new advertised price and should be recorded in the IPC.

APPENDIX 1. Persons met

National Institute of Statistics Mozambique:

Mr. Saide Dade Director of National Accounting and Global Indicators (DCNIG)

Mr. Luis Mungamba, Acting Director of Coordination and External Relations (DICRE)

Mr. Firmino Alberto Guiliche, Head of Department of Prices and Economic Trends

Mr. Jeremias Guambe, Department of Prices and Economic Trends

Mr. Jose Luis Beira de Sousa, Department of Prices and Economic Trends

Mr. Armando Daniel, Department of Prices and Economic Trends

Mrs. Alda Maria Bragarca Dias Rocha, Coordination and External Relations (DICRE)

Scandinavian Bridging Support program:

Mr. Hans Erik Altvall, Team-Leader

Mr. Bo Yttergren, Consultant, information technologies

Mrs. Irene Tuveng, Consultant, economic statistics

The price collectors in Maputo

Representatives of the National Directorate of Planning and Budget, Ministry of Planning and Finance (MPF - DNPO)

APPENDIX 2. List of Literature

Bråten, A. and Andersen, T. L. (1998): The Consumer Price Index of Mozambique, An analysis of current methodology - proposal for a new one, a short-term mission 16 April -7 May 1998, MOZINE 1998:03

Johannessen, R. and Andersen, T. L. (1998): The Consumer Price Index of Mozambique, A Short Term Mission 29 November - 19 December 1998, MOZINE 1998:09

Johannessen, R. (2000): The Consumer Price Index of Mozambique, A Short Term Mission 13 -31 March 2000, MOZINE 2000:05

Turvey, R. (1989): Consumer price indices - An ILO manual (to be revised, se www.ilo.org)

APPENDIX 3. Programme for the Mission

Agenda for the mission

Planned activity	Period
Welcome by DDCNIG	21.10.02
Discussion of the agenda	21.10.02
Evaluation of the substitution process	21.10.02
Evaluation of the process of adjusting prices	22.10.02
Evaluation of the process of expanding data collection	23.10.02, 24.10.02
Development of the IT	25.10.02
Transition of data from IAF to IPC	28.10.02 29.10.02
Writing a report draft	30.10.02
Discussion of the mission findings with technicians in the department	30.10.02
Presentation of the report to DDCNIG e VPINEE	31.10.02
Training of the staff	21.10- 01.11.02

APPENDIX 4. Terms of Reference

Within the Scandinavian Bridging Support Program

For a short-term mission 21 October - 1 November 2002 on

1. Background

With support from the Twinning Arrangement the Instituto Nacional Estadística (INE) has in its five year plan (1998-2002) given priority to the needs for a review of the methodology used for the Consumer Price Index (CPI). Due to this, INE has during this period had three short-term missions on CPI.

The first mission, that took place in the period 16th of April and 7th of May 1998, was devoted to review the existing methodology, routines, and to propose methodological adjustments in the compilation of the CPI (*MOZINE 1998:03*)

Between 29th of November and 19th December 1998 a second short term mission took place, (*MOZINE 1998:09*). The terms of reference was to evaluate the achievements in implementing the new methodology recommended in the first mission, develop criteria for treatment of products that according to IAF has small or no weight at all, suggest routines for data entry and processing of CPI at province and national level, monitor activities and suggest new.

Finally, a third mission took place in the period from 13th to 31st March 2000, (*MOZINE 2000:05*). This mission aimed to evaluate the principle and methods used in re-sampling and the price-collecting phase, and to pose guidelines for a revised publication.

With this support it has been possible to give the users a CPI much more in hand with their needs. The following improvements have been effectuated:

- A new methodology for the CPI
- CPI baskets and weights were actualised based on a more solid methodology
- Improved questionnaires for price collection
- Higher capacity and competence of CPI-staff both at central and provincial level;
- Instructions and manuals for the price collectors have been elaborated;
- New reference periods for data collection have been established;
- Annual adjustments of prices in case of substitutions of products or establishments;
- A new application for data processing is under development.

2. Main reasons for the mission

At the actual stage of development of the CPI, there is a need for assistance to evaluate steps already implemented and to suggest new. The further development of CPI presupposes periodic short-term missions for evaluation and elaboration of new recommendations.

There is a need to discuss the transition of data from IAF 2002/3 to actualise the CPI- basket and weights.

Concerning the question on how to make CPI more representative, there is a need to discuss how to enlarge the indexes to include more provincial capitals.

3. Benefactors of the mission

The mission will benefit the CPI-staff at INE through improved capacity and competence in the makings of CPI. The users will benefit by getting a higher quality price index.

4. Objectives of the mission

- Evaluate the implementations based on recommendations in the last mission and suggest new recommendations.
- Verify and check routines and procedures used for collection and computation of data.
- Discuss procedures on how to utilize the new HBS-data.
- Discuss the process of expanding the data collection to more cities and suggest steps to be taken.
- Verify the steps taken in the development of a new IT- system, and suggest new actions to be taken.

5. Expected results

- Recommendations to further development of the CPI-methodology and of the new IT-system.
- Definitions of activities to be taken for updating basket and weights for the CPI, and for expanding the data collection to more cities.
- Improved capacity in the processing of CPI

6. Work to be carried out by the consultant

- Evaluate the process of how to substitute products and establishments and adopt the procedures for adjustment of the prices in the database as well as the status of the process to expand data collection to more provincial capitals.
- Verify the procedures of control and identification of “outliers” and imputations, the processing of the index and the analysis and validation of data in the IT-system that is under development.
- Define the procedures for actualisation of basket and weights
- Train personnel through “on the job training”
- Present and discuss a draft of the mission report

7. Agenda for the mission.

Planned activity	Period
Welcome by DDCNIG	21.10.02
Discussion of the agenda	21.10.02
Evaluation of the substitution process	21.10.02
Evaluation of the process of adjusting prices	22.10.02
Evaluation of the process of expanding data collection	23.10.02, 24.10.02
Development of the IT	25.10.02
Transition of data from IAF to IPC	28.10.02 29.10.02
Writing a report draft	30.10.02
Discussion of the mission findings with technicians in the department	30.10.02
Presentation of the report to DDCNIG e VPINEE	31.10.02
Training of the staff	21.10-01.11.02

8. Tasks to be done by INE to facilitate the mission

- Elaborate ToR for the mission
- Prepare and supply the consultant with necessary documents and information
- Supply good working conditions for the consultant

9. Consultant and Counterpart

Consultant: Randi Johannessen, INE/Norway

Main counterpart: Firmino Alberto Guiliche

10 Timing of the mission

21st of October to 1st of November 2002

11 Report

The consultant will prepare a draft report to be discussed with INE before leaving Maputo. She will submit a final draft to INE for final comments within one week of the end of the mission. Statistics Denmark as Lead Party will print the final version within 3 weeks of the end of the mission.

These Terms of Reference were prepared by

Day / /
.....

Approved by/in the name of the President of INE

Day / /

APPENDIX 5. Short-term links and Chaining

Appendix 5. Short-term links and chaining

The use of short-terms links with December previous year equal 100 that are chained to a long term official index. Computation is based on actual prices of Acusar.

Table 1. Short-term index, Acusar, January 1999.

Item code	Name	Weight	Shares	Av. price, Des98	Av. price, Jan99	Index
1110111	Acusar Amarelo	5,36	0,7929	8725,00	8406,78	96,3528
1110111	Acusar Branco	1,4	0,2071	9341,67	8855,93	94,8003
Total	Acusar	6,76				96,0312

Table 2. Short-term index, Acusar, January 2000.

Item code	Name	Weight	Shares	Av. price, Des99	Av. price, Jan00	Index
1110111	Acusar Amarelo	5,36	0,7929	9067,80	9103,45	100,3931
1110111	Acusar Branco	1,4	0,2071	9677,97	9737,29	100,6129
Total	Acusar	6,76				100,4386

Table 3. Short-term index, Acusar, January 2001.

Item code	Name	Weight	Shares	Av. price, Des00	Av. price, Jan01	Index
1110111	Acusar Amarelo	5,36	0,7929	10489,80	10217,00	97,3994
1110111	Acusar Branco	1,4	0,2071	11780,00	11496,00	97,5891
Total	Acusar	6,76				97,4387

Table 4. Short-term index, Acusar, January 2002.

Item code	Name	Weight	Shares	Av. price, Des01	Av. price, Jan02	Index
1110111	Acusar Amarelo	5,36	0,7929	12978,00	12587,00	96,9872
1110111	Acusar Branco	1,4	0,2071	15491,00	15130,00	97,6696
Total	Acusar	6,76				97,1286

Table 5. Changes in present, Januar each year.

Year	Short-term index		change
	Desember	Januar	
1999	100	96,0312	-3,9687
2000	100	100,4386	0,4386
2001	100	97,4387	-2,5613
2002	100	97,1286	-2,8714

Table 6. Chained index (long-term index) with des98=100 for Acusar.

	1998	1999	2000	2001	2002
Desember*	100,0000	105,3773	123,2894	154,7100	
Januar**		96,0312	105,8395	120,1316	150,2677
change***		-3,9687	0,4386	-2,5613	-2,8714

*The long-term (chained) index for December each year is computed by taking the price relative from December each year compared with december 1998.

**The long-term (chained) index for January each year is computed by multiplaing the December long-term index the previous year with the price relative from December to January each year based on the short-term index.

*** The change in January each year compared with December previous year.

APPENDIX 6. Treating seasonal items

Different methods of imputing the price for Manga off season.
All indices are for simplicity rounded to 1 desimal.

Table 1. Indices for each item and weighted index for the group 1107, with the imputed price for Manga based on the change of the total group 1107 without Manga.

NOME	Shares	Base	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
LARANJA	0,11	100	134,7	168,6	157,4	157,4	127,6	106,9	106,6	112,7	110,2	120,0	137,1	182,2
LIMAO	0,02	100	208,8	202,0	158,5	152,2	144,4	166,1	171,3	194,5	220,5	271,9	283,4	304,6
TANGERINA	0,01	100	169,2	169,2	169,2	169,2	164,5	128,3	152,6	189,5	189,5	319,7	521,1	521,1
ANANAS	0,03	100	60,1	60,1	78,4	82,8	81,4	87,2	74,8	87,2	89,4	88,9	93,6	92,8
BANANA	0,08	100	129,4	132,8	132,3	131,9	131,4	131,0	141,5	135,3	130,3	136,5	135,5	137,5
COCO	0,67	100	112,0	116,0	132,2	122,7	116,4	116,4	110,1	119,6	120,1	115,5	119,3	121,9
MANGA	0,05	100	119,1	121,7	135,1	128,2	120,0	117,9	114,5	122,6	123,2	124,1	125,0	131,7
PAPAIA	0,02	100	152,0	155,4	158,8	155,2	154,6	151,8	161,2	158,0	162,2	152,7	152,1	144,9
MAÇA	0,02	100	146,3	164,8	138,7	128,5	124,4	122,7	124,0	130,1	139,5	159,7	169,7	164,0
	1,01													
Group		100	120,0	127,1	136,4	129,5	121,2	119,1	115,7	123,8	124,5	125,4	131,9	139,4

Table 2. Indices for each item and weighted index for the group 1107, based on carry forward the index for Manga.

NOME	Shares	Base	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
LARANJA	0,11	100	134,7	168,6	157,4	157,4	127,6	106,9	106,6	112,7	110,2	120,0	137,1	182,2
LIMAO	0,02	100	208,8	202,0	158,5	152,2	144,4	166,1	171,3	194,5	220,5	271,9	283,4	304,6
TANGERINA	0,01	100	169,2	169,2	169,2	169,2	164,5	128,3	152,6	189,5	189,5	319,7	521,1	521,1
ANANAS	0,03	100	60,1	60,1	78,4	82,8	81,4	87,2	74,8	87,2	89,4	88,9	93,6	92,8
BANANA	0,08	100	129,4	132,8	132,3	131,9	131,4	131,0	141,5	135,3	130,3	136,5	135,5	137,5
COCO	0,67	100	112,0	116,0	132,2	122,7	116,4	116,4	110,1	119,6	120,1	115,5	119,3	121,9
MANGA	0,05	100	119,1	121,7	121,7	125,0	131,7							
PAPAIA	0,02	100	152,0	155,4	158,8	155,2	154,6	151,8	161,2	158,0	162,2	152,7	152,1	144,9
MAÇA	0,02	100	146,3	164,8	138,7	128,5	124,4	122,7	124,0	130,1	139,5	159,7	169,7	164,0
Group		100	120,0	127,1	135,8	129,2	121,3	119,3	116,1	123,8	124,4	125,3	131,9	139,4

Table 3. Indices for each item and weighted index for the group 1107, with the imputed average index for Manga.

NOME	Share	BASE	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
LARANJA	0,11	100	134,7	168,6	157,4	157,4	127,6	106,9	106,6	112,7	110,2	120,0	137,1	182,2
LIMAO	0,02	100	208,8	202,0	158,5	152,2	144,4	166,1	171,3	194,5	220,5	271,9	283,4	304,6
TANGERINA	0,01	100	169,2	169,2	169,2	169,2	164,5	128,3	152,6	189,5	189,5	319,7	521,1	521,1
ANANAS	0,03	100	60,1	60,1	78,4	82,8	81,4	87,2	74,8	87,2	89,4	88,9	93,6	92,8
BANANA	0,08	100	129,4	132,8	132,3	131,9	131,4	131,0	141,5	135,3	130,3	136,5	135,5	137,5
COCO	0,67	100	112,0	116,0	132,2	122,7	116,4	116,4	110,1	119,6	120,1	115,5	119,3	121,9
MANGA	0,05	100	119,1	121,7	120,4	125,0	131,7							
PAPAIA	0,02	100	152,0	155,4	158,8	155,2	154,6	151,8	161,2	158,0	162,2	152,7	152,1	144,9
MAÇA	0,02	100	146,3	164,8	138,7	128,5	124,4	122,7	124,0	130,1	139,5	159,7	169,7	164,0
Group		100	120,0	127,1	135,7	129,1	121,2	119,2	116,0	123,7	124,3	125,2	131,9	139,4

Table 4. Prices of Manga in and out season, based on the different methods.

Method	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
Change as group	9526	9733,3	10804,02	10255,76	9598,22	9430,67	9160,99	9805,79	9856,98	9928,06	10000	10533
Carry forward	9526	9733,3	9733,33	9733,33	9733,3	9733,3	9733,33	9733,33	9733,33	9733,33	10000	10533
Average of in season	9526	9733,3	9629,83	9629,83	9629,8	9629,8	9629,825	9629,825	9629,825	9629,825	10000	10533