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REVISED VERSION

Mission Report

from a short-term mission on a model for predicting poverty

from February 27 to March 10 2006

TA for the Scandinavian Support Program to Strengthen the Institutional Capacity of the National Statistics, Mozambique

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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 Meticais
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

Mr. Geir Øvensen and Dr. Astrid Mathiassen, respectively senior statistical adviser and research fellow in the division for development cooperation at Statistics Norway have conducted a second mission on poverty analysis at Instituto Nacional de Estatística (INE), Mozambique. Mrs. Fàtima Zacarias, Director of Demographic and Vitals Statistics (DEMOVIS) at INE, was the counterpart for the mission.

The increased demand for more frequent measurement of poverty, typically for *annual* poverty estimates has generated the need for a supplement to the costly, full-fledged Household Income and Expenditure Surveys, which are usually only conducted every 5th year. Statistics Norway has developed a procedure for predicting poverty in years when no comprehensive household expenditure is available. Because the approach is based on the use of data from a "Light" household survey, it represents a cost-effective supplement to the poverty modeling that is done from the household budget surveys (IAF). In November/December 2005 a first mission with the specific goal to predict poverty for Mozambique in 2004-2005 on basis of the latest household expenditure survey (IAF 2002/03), and the labour force survey (IFTRAB 2004/05) was undertaken. Due to the complexity of the work and the focus on capacity building it was decided that a second follow up mission was to be undertaken in February 2006, which had the following objectives:

1. To further familiarize the participants with the idea and the procedure.
2. To finalize the predictions of the headcount ratio for 2005 based in IAF 2002-03 and the IFTRAB 2004-05, and to estimate the uncertainty in the predicted 2004-05 poverty headcount.
3. To identify the set of "best" indicators for predicting poverty based on IAF to be included in the forthcoming QUIBB and possible also one or two indicators to be included in the forthcoming Census.

The workshop consisted of hands-on SPSS training combined with theoretical discussions.

During the mission the objectives set were achieved, and the process and workshop will be described in detail in the next sections. The main results from the poverty analyses was presented and discussed in a seminar with staff at MPD.

The main tangible results are, however, summarized in the table below. The analyses indicate that the share living below the poverty line in 2004/05 has gone down since 2002/03[1]. The changes are significant within a 95 percents confidence interval. *However, we strongly recommend that the results below be used as an additional tool to other instruments for monitoring poverty in Mozambique.*

	IAF		**IFTRAB**	
	Actual headcount	St. error	Predicted headcount	St. error
Mozambique	54	1,4	49	2,1
Rural	55	1,7	51	2,6
Urban	51	2,3	46	2,5
North, Rural	59	2,4	63	3,7
North, Urban	47	5,6	44	4,2
Central, Rural	45	2,9	41	3,1
Central, Urban	47	3,1	40	3,2
South, Rural	75	1,9	64	3,5

[1] When we return to the results later on in this report, we will compare predicted headcount from IFTRAB to *predicted* headcount from IAF (rather than actual), as this may give a better picture of *changes* in the poverty level between the two surveys.

South, Urban	62	2,4	51	2,8
Maputo	54	3,1	43	3,4

Several recommendations can be made:

- First, it is our opinion that such estimates of headcount ratio can provide valuable insight in the development of poverty at an aggregated level. The methods should, however, be further tested and evaluated as new household expenditure and QUIBB surveys take place. The prediction should be used as an additional tool to other instruments for monitoring poverty in Mozambique.
- The models for predicting poverty would highly benefit from including additional variables capturing "inter-annual" fluctuation. Thus, one should include a set of these indicators in forthcoming light surveys, as described later in the mission report.
- Due to the limited set of indicators in the Census it is important to ensure that the phrasing of the questions in the Census and the IAF is *exactly the same*. We recommend that the participants at this workshop be given the responsibility of comparing the wording and comparability of the IAF and Census questionnaires before they are finalized. Also the poverty mapping analyses could highly benefit from including one to two additional poverty indicators, as described later on.
- This workshop should be followed up by a joint report/publication from MPD/ INE combining the analyses on predicting poverty based on IAF 97/98 and the QUIBB2000 as undertaken by MPD/IFPRI, with the analyses undertaken by INE/SN as described here. Such a document would require some further analyses as we should test the model by predicting "backwards", i.e. use a model estimated on basis of IAF2002/03 and predict for QUIBB 2000 and compare the results to those obtained by MPD/ IFPRI.

2 INTRODUCTION

Mr. Geir Øvensen and Dr: Astrid Mathiassen, both senior statistical advisers in the division for development cooperation at Statistics Norway have conducted a second mission on poverty analysis at Instituto Nacional de Estatística (INE), Mozambique. The counterpart for the mission was Mrs. Fàtima Zacarias, Director of Demographic and Vitals Statistics (DEMOVIS) at INE.

The Scandinavian project aims in general at assisting INE in collecting, processing, analyzing and disseminating good quality data on the status and development of the economy and the living conditions in Mozambique. The Ministry of Planning the donors, and researchers need both macro- and micro data to analyze and assess the development in the indicators of the new Mozambique Poverty Reduction Strategy (PARPA/MPRS). The current, second short-term mission on a model for predicting poverty was an important part of this endeavour.

Both the monitoring of the MPRS, and the monitoring of the Millennium Development Goals (MDG) have increased the demand for more frequent measurement of poverty, typically for annual poverty estimates. Traditionally, poverty measurement has been based on heavy duty, full-fledged Household Income and Expenditure Surveys. However, conducting such surveys are costly, both in terms of money and administration. Hence, in most developing countries they are usually only conducted every 5th year.
In response to this demand for more frequent poverty data, Statistics Norway has developed a procedure for predicting poverty in years when no comprehensive household expenditure is available. Because the approach is based on the use of data from a ”Light” household survey, it represents a cost-effective supplement to the more extensive poverty modeling that is done from the household budget surveys (IAF).

Before proceeding with the activities undertaken during the mission, the team would like to express its sincere thanks to all officials and individuals we met, and for the kind support and valuable information that we received during our stay in Mozambique, and which highly facilitated our work.
It should be mentioned, that this report contains the views of the consultants, which do not necessarily correspond to the views of Danida or INE.

3 ACTIVITIES DURING THE MISSION

The objective of the mission was to enable INE to produce poverty estimates for years when no expenditure survey is available, but a light survey is conducted. The specific aim of the current mission was to predict poverty for Mozambique in 2004-2005 on basis of the latest household expenditure survey (IAF 2002/03), and the labour force survey (IFTRAB 2004/05), but the method can also be applied to future light surveys.

The mission was conducted as a workshop, which took place the first week at Hotel Cardoso, and the second week in the 9th floor of the INE headquarter in Maputo. Due to the complexity of the work to be undertaken, it was agreed with INE that a fairly limited number of persons should participate. The overall objective is to enable INE to produce poverty estimates for years when no expenditure survey is available. This objective translates into the following aims for the workshop:

1. To review the basic idea of the previous mission's consumption model using consumption data from the IAF 2002/03 household income and expenditure survey to identify poverty correlates
2. To use the SPSS syntax programs developed during the first mission.
3. To finalize the consumption model for Mozambique in 2005 on basis of the latest household expenditure survey (IAF 2002/03 and the labour force survey (IFTRAB 2004/05).
4. To predict poverty for Mozambique in 2005 on basis of the latest household expenditure survey (IAF 2002/03 and the labour force survey (IFTRAB 2004/05).
5. To estimate the uncertainty in the predicted 2004-05 poverty headcount
6. To prepare a consumption model that can be applied to the next QUIBB survey for the purpose of poverty estimation.
7. To review the draft Census questionnaire in relation to the IAF 02 survey, and the possibility of recommending questions for use in the 2007 Census.

On 2. to 5. above, the statistical package SPSS was used to allow for hands-on training of the workshop participants.

3.1 To review the basic idea of the previous mission's consumption model

The first workday of the mission was used to review the basic idea of the consumption model. The Power-point file with the presentation is enclosed with this report. (Slide 8 provides an overview of the approach).

3.2 To use the SPSS programs developed during the first mission.

The SPSS programs for the consumption model that were developed during the first mission in December 2005 were fairly complicated. Approximately 2 days of the first week were used to familiarize the participants with how to run, and modify these programs.

3.3 Finalize the consumption model for predicting consumption from the IAF 2002/03 household income and expenditure survey with IFTRAB data

This task was 95% finished during the first mission, although some errors and small changes had to be implemented. The SPSS program which generates the IAF household level data file for the joint IAF-IFTRAB module is still called:
"Mozambique_SPSS13_Poverty_Predictors_Make_Household_File.sps ".
This program first reads the "HHData" table from the MS-Access database "IAF 2002Data.mdb". Then the "INData" table with individual data is read, transformed and aggregated up to the household level. Next comes the "BD" table with the consumer durables, also from the MS-Access database "IAF 2002Data.mdb".

Finally, these three files are joined with a file containing the poverty lines and aggregate consumption data (obtained from the group in the Ministry of Planning and Development working with Mr. Arndt Channing), and a file with information about the IAF survey clusters (AEs), such as the "agro-ecological zones" in the rural clusters, and "socio-economic classification" in the urban clusters. The resulting file with all the household-level data information from the IAF is called "Hhdata2.sav".

The second step was to run a series of bivariate regressions, with the (log of) household consumption expenditure as the dependent variables and a long list of potential candidates (approximately 170) for independent variables. Based on experiences from other African countries, we deemed it essential to make separate models for urban and rural localities[2]. This step is documented under the SPSS syntax filenames:
"Mozambique_Poverty_Predictors_Bivariate_Regressions_V13.sps" (National)
"Mozambique_Poverty_Predictors_Bivariate_Regressions_Urban_V13.sps"
"Mozambique_Poverty_Predictors_Bivariate_Regressions_Rural_V13.sps".

These files run the 170 bivariate regressions automatically. The program is neither dependent on the names of the variables that appear as candidates for the bivariate regressions, nor the total number of candidate variables. The program generates a new datafile, listing the variable names, the R-square for each bivariate regression and other relevant information to judge their performance[3].

The final step of making the IAF consumption model was to make the multivariate, "stepwise" regression with a selected sub-group of variables from the bivariate regressions. Given some preliminary considerations, the stepwise method automatically selects the best set of independent variables to *jointly* appear in the regression. However, exactly *which* variables are included is quite strongly dependent on relatively small changes in the input: If only one independent variable is taken out as input, the whole set of independent variables selected at the end of the stepwise regression changes quite substantially[4].

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[2] However, a national model was also made, mostly to test out the workings of the program on the full dataset, since all households are included in this case.

[3] A key feature of the program is that a list with names of the potential independent variables is read from an SPSS output "pivot table" and transformed into a new SPSS data file. (Note that this feature is new from SPSS 13.0, which implies that the program will not function on version 12.0, or older versions). However, even version 13 *is* vulnerable towards the case of 100% missing on a variable for the sub-population in question. For example, in the IAF dataset there was not a single rural household that possessed an air-conditioner or a computer. Hence, it had to be manually checked that none of the candidates have the missing value for *all* cases in the (sub-) sample.

[4] This is an unavoidable feature of the "stepwise" procedure, and only shows the importance of leaving time for experimentation and testing of the consumption model. It should be noted that given the same input, both the "stepwise" procedures in the SPSS and the SAS statistical packages gave the same output.

What remained after some experimentation in December last year was that the stepwise regression procedure yielded different independent variables for the urban and the rural model. The urban variables were mainly knit to ownership of various consumer durables, while the rural model mainly contained independent variables that described the households' size and composition. The various rural models also had much smaller explanatory power with respect to aggregate household expenditure per capita than the urban models[5]. This partially reflects that the rural localities, dominated by self-subsistence farmers, tend to be much more economically homogenous than urban areas. However, the list of consumer durables is, as in many other countries, dominated by "urban" items, which, for example, often require electricity. In future surveys, it should be aimed at finding relevant items also for rural areas, e.g. types of agricultural equipment found among some, but not all self-subsistence farmers.

This time the set of consumption models was also expanded with seven new models: Four "regional" urban models; (North, Center, South (-Maputo), Maputo City), and three "regional" rural models; (North, Center and South).

All procedures involved in making the consumption model from the part of the IAF questionnaire, that also appear in the IFTRAB), has been gathered in one syntax file, the: "Mozambique_Poverty_Predictors_METAFILE.sps". This file both creates the IAF household file, runs the bivariate regressions and, (allowing for manual selection of variables), executes the stepwise, multivariate regression.

The stepwise procedure is straightforward and identifies variables for each of the four and three regions in respectively urban and rural areas. The R-square for the urban models is high (around 70-80 percent) in rural areas the models tend to explain less. About 40-50 percent is explained. As mentioned, this is likely to be due to limitation of the *common* pool of variables in the IAF and the IFTRAB surveys.
In other countries we have found that variables capturing whether the household consumed any of various food items, if they used transport, how many meals they had during last week etc. are good and important variables for differentiating between poor and non-poor household in the rural (and urban) areas. We estimated, however, the models by applying the given set of indicators and used these to predict the expenditure per capita and in the next instance the likelihood that a household is poor, utilizing only the information on the selected indicators from IFTRAB. (We refer to the discussion about identifying variables for a future QUIBB on this issue).

Finally, the file: "Mozambique_Poverty_Predictors_Make_IFTRAB_File.sps" creates an SPSS datafile from the part of the IFTRAB questionnaire that are also found in the IAF. For simplification, all original variables have been renamed, using the IAF questionnaire as the reference, and derived variables have been given exactly the same names as in the IAF based "Hhdata2.sav".

3.4 To predict the 2004-05 poverty headcount ratio from the IFTRAB 2004-05 labour force survey.

A program for executing this task in SPSS was developed and utilized during the end of the second week. (As an add-on to the existing program: "Mozambique_Poverty_Predictors_METAFILE.sps"). Else, the calculations were made in the SAS statisical package. We refer to the Appendix for details.

[5] Regretably, the best performing rural variable, nr. of rooms in the dwelling had to be taken out, because the IAF asked for the number of *divisions* of the dwelling, while the IFTRAB asked about the number of rooms used for *sleeping*.

3.5 To estimate the uncertainty in the predicted 2004-05 poverty headcount

This fairly time demanding task has not yet been developed in SPSS. So far, the calculations are made in the SAS statisical package. Also here, we refer to the Appendix for details.

3.6 Prepare a consumption model that can be applied to the next QUIBB survey for the purpose of poverty estimation.

The modeling of poverty was based on the common set of variables in IAF and IFTRAB. The indicators in IFTRAB was not designed with this type of modeling in mind, thus we had no influence on the potential set of indicators. The indicators based on the constrained set covered; demographic issues; education issued; assets; housing; and location. However, an important dimension is lacking, namely variables capturing inter-annual changes in/current consumption. Thus the models could be improved by including other predictors in the model (we will discuss this further in the next section). However, this improvement would not be reflected in the standard error, as the standard errors are based on the assumption that we have specified the "correct" model.

In the workshop we estimated models when we selected indicators among all possible indicators in the IAF that should be used in predicting poverty based on this method. The table below show the changes in explained variation with these indicators (what we lable unconstrained model) compared to when we select for the common indicators in the IFTRAB and QUIBB (constrained model). R-square increases from 2 to 12 percentage point. In particular R-square for the rural models show that more of the variation is explained by the new indicators. The new indicators all belong to section G, in IAF, that is the section specified for poverty indicators. The new indicators comprise variables like consumption of particular food last week (e.g. meat ; number of meals yesterday; expenditure to various items last 3 months (e.g. building material); expenditure to various items last month (e.g. transport). The complete list of indicators used in the models is given in the end of this document. The first list gives the recommendation for new indicators to include. The second list gives the variables necessary to construct the indicators that were used to estimate the model to predict for the IFTRAB. Many of these variables will also be included in the forthcoming Census as indicated.

	Adjusted R^2 Constrained Model	Unconstrained Model
Mozambique	0,56	0,66
Rural	0,48	0,55
Urban	0,67	0,72
North, Rural	0,50	0,59
North, Urban	0,61	0,64
Central, Rural	0,36	0,48
Central, Urban	0,59	0,63
South, Rural	0,48	0,58
South, Urban	0,58	0,62
Maputo	0,78	0,80

3.7 Review the draft Census questionnaire in relation to the IAF 02 survey, and the possibility of recommending questions for use in the 2007 Census.

The information in Census will most probably be used for poverty mapping. The basic idea in poverty mapping is to estimate a model based on the latest household expenditure survey including common variables as in IAF and Census. Since the information in Census is limited the model has to rely on a small set of variables. To ensure the maximum utilization of the data, it is important to that exactly the same information about the variable is captured. We have compared the question in the

forthcoming Census to the latest IAF and found some discrepancy. However, what will be important is to compare the forthcoming Census with the forthcoming IAF, and if possible change the wording of essential poverty predictors in one of the questionnaire to ensure comparability. The INE team participating in the workshop will be able to do this. Also of possible the Poverty Mapping would highly benefit from introducing one or two of the poverty indicators in the list as given below. In that case the two best variables would be *whether the household bought clothes or shoes last twelve months, and whether the household paid for transport ticket last months*. Again, using the same wording as in the QUIBB.

4 RESULT FROM THE WORKSHOP: Poverty in Mozambique today

The analyses are based on a statistical method for predicting poverty in years when no comprehensive household expenditure is available as described in Mathiassen (2005). The basic idea is to estimate a consumption model based on indicators and consumption per capita in a household expenditure survey and then use information on the same indicators from a light survey in a following year together with the estimated model, to predict consumption per capita and therefore poverty. An estimate for the uncertainty in the poverty predictor can be calculated. Also the method can be used to identify a set of good indicators that can be used to predict poverty and can be included in a forthcoming light survey. Below we will present the main results from this work, for a detailed description of methodology consult Mathiassen (2005).

The result from these analyses indicates that there has been a decline in the share of poor at from 2003 to 2005, and the level of reduction in the share of poor is in accordance with the trend in decline of the share of poor previous years. Over a six years period, from 1996/7-2002/03 (based on the two household expenditure surveys), national poverty level fell by 15 percent, to comparison we find a decline in poverty from 2002/03-2004/05 at about 5 percentage points, which is a yearly decline at the same level as the previous poverty decline. The table below shows actual headcount ratio based on IAF with corresponding standard errors (due to sampling), predicted poverty headcount based on IFTRAB (and a consumption model estimated on basis of IAF) with corresponding sampling error as well as number of observations in IAF03 and IFTRAB05.

We have chosen to present the main result at the national and national rural/urban level. The next level is at Regional urban/rural level as well as a separate for Maputo. The reason for separating between urban and rural at the regional level is that the economy (and thus our consumption models that the prediction relay on) differs considerably between rural and urban (we will return to this later on), and in particular Maputo.

	IAF			**IFTRAB**		
	Actual headcount	St. error	# obs.	Predicted headcount	St. error	# obs.
Mozambique	54	1,4	8700	49	2,1	17361
Rural	55	1,7	4695	50	2,6	8790
Urban	51	2,3	4005	46	2,5	8571
North, Rural	59	2,4	1494	63	3,7	2697
North, Urban	47	5,6	816	44	4,2	1888
Central, Rural	45	2,9	1924	41	3,1	3535
Central, Urban	47	3,1	1176	40	3,2	2853
South, Rural	75	1,9	1277	64	3,5	2339
South, Urban	62	2,4	1090	51	2,8	2350
Maputo	54	3,1	923	43	3,4	1699

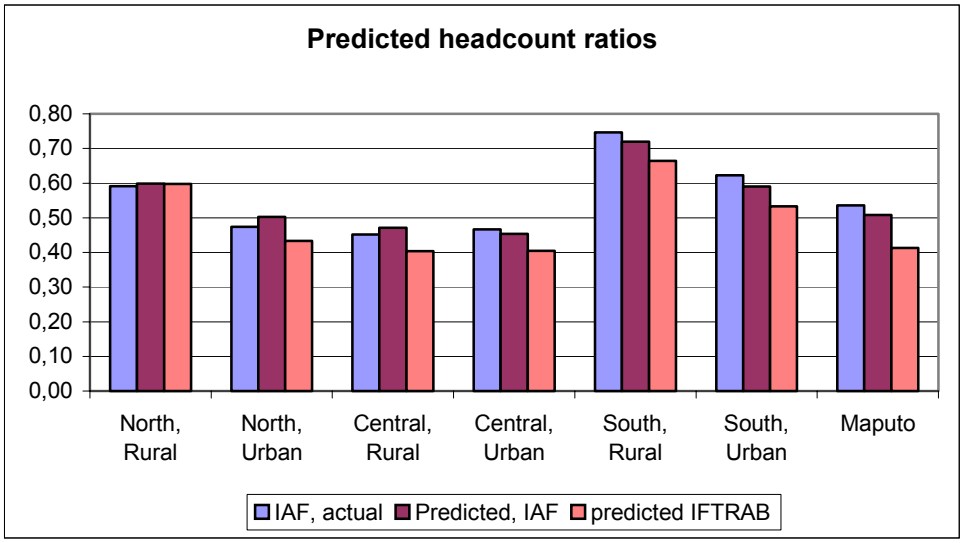
The standard errors to the predictions for the predicted headcount ratio from IFTRAB are in general higher than the IAF03 standard errors. The differences are in most cases, however, not large. The

main part of the standard error is due to uncertainty in the estimated model parameters (between 70 and 80 percent), the uncertainty due to sampling consist of about 20-30 percent.

Rather than compare actual headcount ratio from IAF to the predicted headcount from IFTRAB, we will in the following use the prediction of the headcount ratio from the IAF03 as the basis for comparison. That is, we predict poverty within the IAF sample by using the model estimated on basis of the same sample. We do this because the within sample predictions will deviate from the actual, and thus we avoid including these deviations in the predicted changes that occurred between the surveys. The within sample predictions of the headcount ratio is also a measure of how well the models perform, and we see from the table below that in general they do not deviate much from the actual headcount ratio. At the aggregated national levels, the headcount ratio differs with one percentage point when we apply the model rather than the actual headcount ratio. At the regional level the deviations vary between 0 to 3 percentage points between the regions – urban/rural.

	IAF	
	Actual headcount	Predicted headcount
Mozambique	54	55
Rural	55	56
Urban	51	51
North, Rural	59	60
North, Urban	47	50
Central, Rural	45	47
Central, Urban	47	45
South, Rural	75	72
South, Urban	62	59
Maputo	54	51

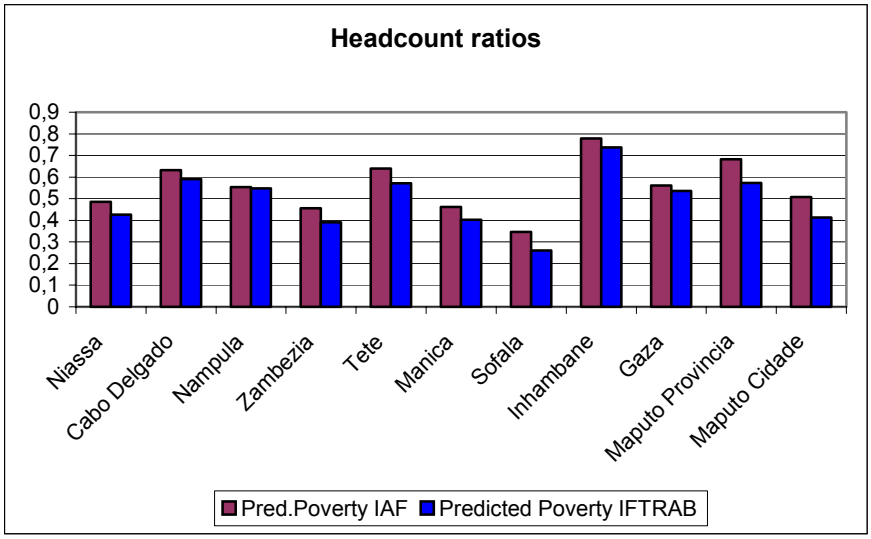
The figure below illustrates the changes in headcount ratio comparing predicted ratios in the two surveys. We have also included the actual headcount ratio (the bar to the left.)

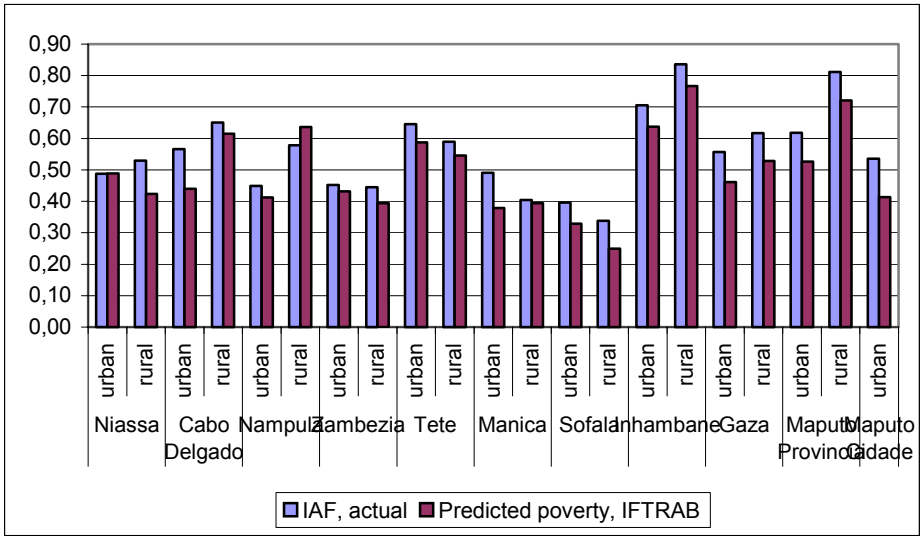


The analyses give that decline has been highest in Maputo at ten percentage points.

It is interesting to note that the largest changes in poverty are observed in the southern regions, as these regions hardly benefited from decline in poverty in the previous years. While poverty decline in the Central and North is more moderate. Overall poverty level in urban has gone down more than

rural poverty. Except for rural North where there hasn't been any change, the poverty rate is lower for all Mozambique regions in 2005 than 2003.





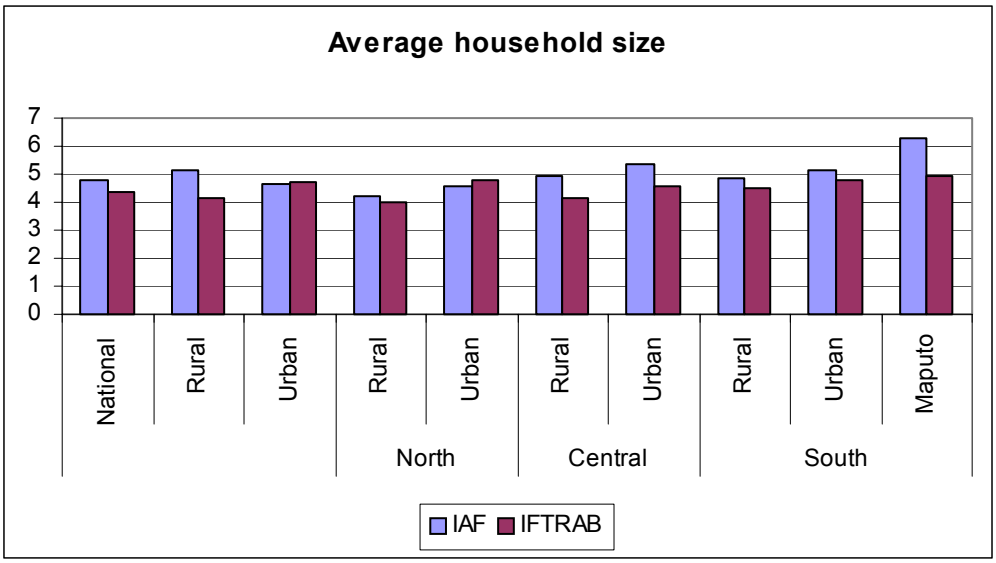
The provincial figures, confirms the overall picture, in general there has been a decline in poverty, which is more outspoken in South. In Sofala as well the predicted headcount ratio in 2005 is considerable lower than
the actual poverty level in 2003.

Even though the standard error is acceptable, there is uncertainty not reflected in the estimates. The results critically depend on whether the poverty predictors are trustable, as well as whether the relations in the model are stable over time. For the latter we do not have any possibility for testing without having the actual poverty headcount fro 2005.
The poverty predictors are composite from the following groups:

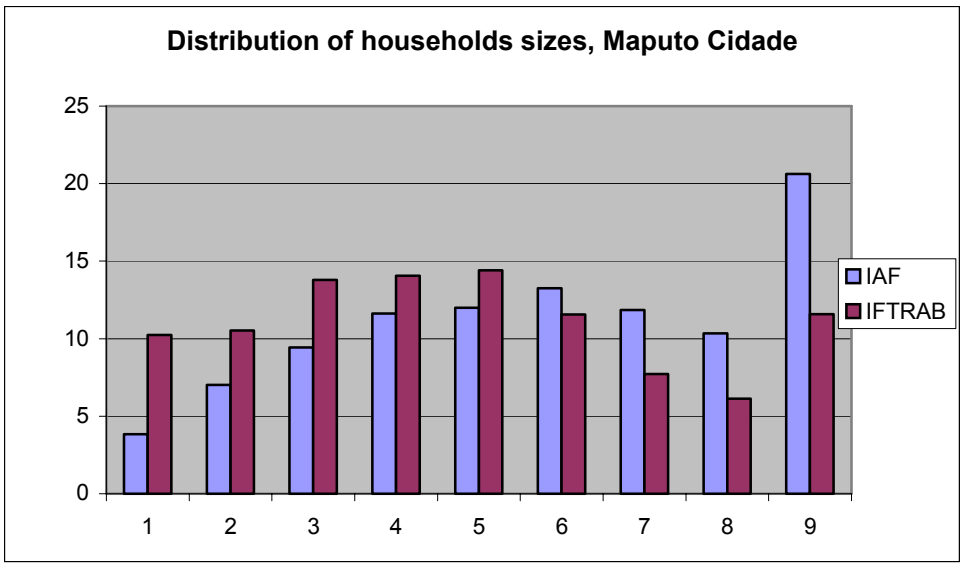
- Household Size and Composition
- Sex of household head
- Assets
    - asset indexes: total and expensive assets
    - individual assets
- Assets per capita
    - bicycles, mobile phones, radio, bed
- Education and literacy
- Type of light used

- Type of roof
- Type of toilet
- Type of energy used for cooking

One of the important poverty predictors in the analyses is number of members in the households; it is used as separate variable, and also in constructing other variables. Household with a high number of individuals tend to have a lower consumption level cet. Par. There has been a decline in the average number of members in the households between the two surveys, and the decline is significant. The 95 % confidence intervals for national average household size for respectively IAF and IFTRAB is National average household size (4.68, 4.92), (4.29, 4.40).



The decline in number of average size of members in household has in particular been pronounced in Maputo. (The 95 % confidence intervals for average household size in Maputo are for IAF and IFTRAB respectively (5.96, 6.59) and (4.77, 5.13)).
The change in household size in Maputo is mainly due to a large decline in the share of large households. In IAF03 about 22 percent of all households had 9 or more members (this is the same as one gets from DHS one year later), in IFTRAB 2 years later only 10 percentage had 9 or more members, and there is a shift towards households with few members. During the workshop we organized a meeting for discussing reasons for this decline, whether it reflects actual changes and/or whether it could be due to other factors (e.g. definition). The minutes from this discussion as well as the list of participant are given in the appendix.



To test how sensitive the results are to the change in distribution of household size, we estimated the model for Maputo when removing household size and other demographic variables. We predict, however, an even lower poverty level for Maputo 2005 without these variables, indicating that the change in households size is not the sole responsible indicators for the decline in poverty rate.

Other "technicalities"
We have removed observations with extreme values by observing the plots. This does not come to more than a few observations for each region.

We have not corrected for heteroscedasticity. Inspection of various plots (plots of residual and predicted log consumption per capita, squared residual and predicted log consumption per capita) indicates that homoscedasticity is not a large problem.

We use the probit model to estimate the probability of being poor, thus we rely on the assumption of normally distributed error term. According to our plots of the log consumption as well as the residual this does not seem to be unreasonable.

5 RECOMMENDATIONS

- We still need more evidence whether the estimated relation between the poverty predictors and consumption per capita prevail over time as the economy changes. If there is a large time lag between the surveys this assumption is more likely to be broke. Thus, one should continue test the models in years when one has a new IAF. Also, *the estimated headcount ratio should be used in addition to other poverty indicators*
- The poverty estimates also critical rely on the indicators used in the analyses. An important dimension lacking in the set of possible indicators between IAF and IFTRAB is a dimension reflecting current consumption. The group has identified a set of variables that capture this dimension and *we recommend that these variables will be included in a forthcoming light survey*.
- During the mission we had a meeting with Mr. Diogo at Ministerio De Agricultura to discuss the possibility of linking up the TIA to this modelling approach. *We should follow this up and go through the questionnaire in the two surveys (IAF and TIA) to see if we can identify sufficient common variables to predict poverty for the rural areas covered by TIA*.
- The INE participants have gotten more experience in analytical work. This should be followed up in order to bolster their competence. If one were able to combine the data from the TIA and IAF *one could invite some of the participants for a study trip to Norway* to help to improve the model.
- We have compared the questions in the forthcoming Census to the latest IAF and found some discrepancies. It is important for the poverty mapping to ensure that **exactly the same wording** of essential poverty predictors in the questionnaire to ensure comparability. *The INE-team participating in the workshop should be consulted to make sure that the Census questionnaire has the same wording and comparable categories as the IAF for important poverty predictors that will be used in the poverty mapping* (the forthcoming IAF 2007 or the IAF 2003?).
- The Poverty Mapping procedure would highly benefit from introducing one or two of the poverty indicators in recommended above.
- This workshop should be followed up by a joint report/publication from MPD/INE combining the analyses on predicting poverty based on IAF 97/98 and the QUIBB2000 as undertaken by MPD/IFPRI, with the analyses undertaken by INE/SN as described here. Such a document would require some further analyses as we should test the model by predicting "backwards", i.e. use a model estimated on basis of IAF2002/03 and predict for QUIBB 2000 and compare the results to those obtained MPD/IFPRI.

APPENDIX 1. Persons met

The workshop participants comprised the following persons:

Fátima Zacarias, Director of Demographic and Vitals Statistics (DEMOVIS)
Cassiano Soda Chipembe, Leader of Divition for Data Analysis, DEMOVIS
Cristóvão Muahio, Leader of the Division for Methods and Sampling (DCI)
Elisio Mazive, Census and Survey (DCI)
Xadreque Maunze, demographic studies, DEMOVIS
Maria Mazive, DEMOVIS

Else, the mission met with:
Manual da Costa Gaspar, Vice president, Social & Demographic, INE
Arndt Channing, Ministério da Planificação e Desenvolvimento, Direcção Nacional de Estudos e Análise de Políticas
Arão Balate, Director, Census and Survey, INE
Lars Carlsson, Team Leader, Scandinavian Program, INE
Karsten Bormann, Scanstat resident advisor
David J. Mergill, Chief International Projects Staff, US Census Bureau
Dag Roll-Hansen, Scanstat resident advisor

APPENDIX 2. List of Literature

Elbers, C., Lanjouw, J.O. and Lanjouw, P. (2003): "Micro Level Estimation of Poverty and Inequality" *Econometrica*, Vol. 71, No. 1.

Mathiassen, A. (2005): "A Statsistical Model for Simple, Fast and Relaible Measurement of Poverty" *Discussion Paper* No. 415, Statistics Norway

APPENDIX 3. Common IAF and IFTRAB Variables

IFTRAB 04-05	IAF 02-03
Q4	B1
Q3	B3
Q5	B4
Q10	B5
Q11	B6
Q15	C1
Q16	C2
Q18	C5
Q19	C6
Q20	C7
Q21	C8
Q22	D1
Q23	D2
Q24	D4
Q25	D5
Q26	D6
Q27	D7
Q28	F9
Q30	F14
Q31	F10

Q32	F11
Q33	F12
Q34	F1
Q35	F2
Q37	F6
Q38	F7
QP2A	E2A
QP2B	E2B
QP3	E3
QP16	E8
QP27	E9
QP15	E10

APPENDIX 4. Recommendation for variables to include in forthcoming QUIBB

- Acquired clothes or shoes last 3 months
- Acquired domestic utilities last 3 months
- Acquired furniture last 3 months
- Acquired building materials last 3 months
- Acquired building materials last month
- Consumed Eggs
- Consumed Milk Products
- Consumed Cooking Oil
- Consumed Maize Flour
- Consumed Rice
- Consumed Sweet Potatoes
- Consumed Meat
- Consumed Bread
- If household have Poultry
- If household used paid Transport last month
- If household contracted agricultural labor last season
- If household normally use detergent for washing clothes
- If household used soap last month

In addition to the following variables will most likely be included in a new QUIBB /they are already in the IAF (below is indicated if they are not planned to be included in the forthcoming Census):

- Number of people in household
- Marital status
- Age
- Relationship
- Education
- Literacy
- Type of Wall
- Type of Roof
- Type of Floor
- Nr rooms
- Type of Sanitation
- Source of Water
- If Own house
- Energy used for Light
- Energy used for Cooking (Not in Census)
- Total assets index (Not in Census)
- Expensive assets index (Not in Census)
- Beds per capita (Not in Census)
- Bicycle per capita
- Car (Not in Census)
- Computer
- Telephone
- Wall watch (Not in Census)
- Washing machine (Not in Census)
- Mobile phone per capita (Not in Census)
- Radio per capita
- Sewing machine (Not in Census)
- Air conditioner (Not in Census)
- Hi Fi (Not in Census)

APPENDIX 5. Minutes from the discussion on changes in household size

ACTA DA REUNIÃO REALIZADA NO HOTEL CARDOSO

No dia vinte oito de Fevereiro de dois mil e seis, realizou-se uma reunião no recinto do Hotel Cardoso, em que participaram os Senhores:

Dr. Arão Balate – Director de Censos e Inquéritos
Dra Maria de Fátima Zacarias – Directora da DEMOVIS
Cristovão Muhaio – Chefe de Departamento de Metodos e Amostragem
Dr. Elisio Mazive
Dr. Xadreque Maunze
Dra Maria Alfeu
Lars Carlsson
Dag Roll-Hansen
Astrid Mathiassen
Geir Øvensen
Miguel Jackson
Ramiro Mousinho
Ernesto Langa
Mário Mungói
Zelma
Amélia Tivane
Amélia Vilanculos
Janita
Ana Paula
Isabel Maninha

Esta reunião tinha como agenda os seguintes pontos:

Diferença entre o tamanho de membros encontrados nos agregados familiares, durante o Inquérito aos Agregados familiares(IAF 2002/3) e Inquérito Integrado à Força de Trabalho(IFTRAB 2004/5)

Conceitos sobre agregado familiar nos dois inquéritos

Período de referência nos dois inquéritos, para considerar-se uma pessoa de membro do agregado familiar

Tratamento dado no campo às casas com dois ou mais agregados familiares

Tratamento dado no campo às pessoas sem nenhuma relação de parentesco

Tratamento dado no campo às pessoas individuais

Antes de entrar nos pontos acima, a Senhora Astri, apresentou aos participantes da reunião, o gráfico referente à Cidade sobre o número de membros encontrados nos agregados familiares no IAF 2002/3 e IFTRAB 2004/5. Neste gráfico verificou-se que o número de membros nos dois inquéritos era baixo, isto é, rondava entre 5.8 %– 5.4%.

Verificou-se também que a diferença percentual era mais grave nos agregados familiares com 9 e mais membros encontrados no IAF e IFTRAB.

Esta diferença era mais acentuada nas províncias da região Sul.

Relativamente ao gráfico, segundo o número de membros, da Cidade de maputo, notou-se que:

· No IAF, a percentagem de agregados com nove e mais membros era de 21%

· No IFTRAB, a percentagem de agregados com nove e mais membros era de 11%

O equivalia dizer que o número de membros nos agregados familiares, tende a reduzir-se.

Esta tendência era mais notória na Cidade de Maputo e Província de Maputo, comparativamente com as outras província de Sul(Gaza e Inhambane)

Por seu turno, o Sr. Geir, falou sobre a população de 15-64 anos de idade. Segundo o gráfico, a proporção da população adulta no IFTRAB era menor em relação a do IAF.

Falou também sobre agregados com uma criança. Acerca deste ponto, verificou-se que existia uma tendência por parte dos casais de ter apenas uma criança.

Durante a sua apresentação, Geir fez menção aos IDS, onde a percentagem de agregados com 8, 9 e mais membros tendia a subir na área urbana em relação à área rural.

Na Centro, a Província de Manica a percentagem de agregados familiares com 8, 9 e mais membros a tendência é de subir duma maneira galopante, de acordo com análise feita pelo Geir, segundo dados do IDS.

No Sul, a Cidade de Maputo a par da província de Manica, a percentagem de agregados familiares com 8,9 e mais membros a tendência era a mesma, segundo também os dados do IDS.

Vimos gráfico sobre migração. Neste gráfico, falou-se sobre idade para trabalhar.

Terminada as apresentações feitas pelos Srs. Geir e Astri, os participantes centraram-se mais nos pontos inicialmente agendados, para a reunião. Para discussão destes pontos, foram formados três grupos.

Sobre os pontos em discussão, todos os participantes as ideias convergiram nos mesmos pontos a saber:

Sobre o ponto 1

Os membros estão a sair dos agregados familiares, para formar novos agregados familiares e como consequência, o tamanho de membros é menor.

Sobre o ponto 2

A questão do conceito, deixou-se de lado, pois verificou-se que o conceito de agregado familiar no IAF e no IFTRAB foi o mesmo,

Sobre o ponto 3

A questão de período de referência, também, deixou-se de lado, pois o período de referência para considerar-se uma pessoa de membro do agregado familiar, também foi o mesmo nos dois inquéritos (IAF e IFTRAB)

Sobre o ponto 4

O tratamento dado no campo às casas com dois ou mais agregados familiares, foi em função do conceito do agregado familiar.

Sobre o ponto 6

O tratamento dado no campo às pessoas individuais foi em função do conceito do agregado familiar.

APPENDIX 6. Terms of Reference

for a second short-term mission on Analysis and Poverty Modelling Advanced Course
Within the Scandinavian Assistance to Strengthen the Institutional Capacity of INE/Mozambique, 2003-2007 27.2 to 10.3.2006

Background

Statistics Norway has developed a procedure for predicting poverty in years when no comprehensive household expenditure is available. The method represents a cost-effective supplement to the more extensive poverty estimation that is done in relation to the household budget surveys (IAF). The model can satisfy a user demand for more frequent reporting of poverty rates.

Objectives

The first objective is to enable INE to produce poverty estimates for years when no expenditure survey is available: To finalize the prediction of poverty for Mozambique in 2005 on basis of the latest household expenditure survey (IAF 2002/03 and the labour force survey (IFTRAB 2004/05). Secondly, the objective is to prepare a consumption model that can be applied to the next QUIBB survey for the purpose of poverty estimation. Finally, the INE may prepare a consumption model for use in the 2007 Census.

In all three cases above the main principle is to identify a small set of *indicators* and *estimate per capita expenditure* from the latest IAF. For the IFTRAB, the indicators are already given because the survey was completed in 2004-2005. For the QUIBB it may be possible to add 10 new variables from the IAF 2002/03, that are highly correlated with consumption expenditure. Finally, for the Census, most indicators must already be in the draft questionnaire, but 1-3 high-performing poverty indicators may possibly be added. For all three surveys, the aim is to estimate the *number of people* living in poverty the year IFTRAB is conducted. For the QUIBB and the IFTRAB the results will be available for urban and rural areas and at the provincial level, whereas for the Census, the model may be used as basis for very detailed Poverty Mapping.

The core of the mission is a hands-on workshop, using SPSS in a regression-based approach to estimate the percentage of the population living in poverty. The participants will learn how to do the calculations by doing them in cooperation with the consultants.

Benefactors of the mission

All parties interested in the development of the poverty situation in Mozambique; The Mozambican government, the donors, researchers and INE.

Names of Consultants and Counterpart

Consultant: Dr. Astrid Mathiassen and Mr. Geir Øvensen
Counterparts: Fàtima Zacarias

The Mission Schedule

The general idea behind the calculations will be repeated in a seminar on Monday 27th of February for the management at INE and the course participants. The seminar will start giving the general perspectives to both the management and the participants, to continue with a more thorough repetition for the course participants.

The work will be done in a workshop lasting two weeks, from the 27th of Februrary until the 10th of March . The workshop will be lead jointly by Mr. Øvensen and Dr. Astrid Mathiassen, but Mr. Øvensen will be the main responsible person for SPSS programming, while Dr. Mathiassen will be the main responsible person for the statistical work.

In addition to the work done in Maputo, the Consultants will each need 3 days to prepare, and finalize the workshop, among other things, to familiarize themselves with the relevant documentation (if possible the Census questionnaire and a draft for the next QUIBB), as well as the preparatory work done by the workshop participants. These three days also include the time needed to fulfill administrative tasks and to write a mission report. As usual, four days will also be added for each person, for the travel Oslo-Maputo-Oslo.

In addition, Dr. Mathiassen will use five workdays prior to the workshop in order to work on solving outstanding issues from the November/ December 2005 workshop. Preliminary findings show that the models predict a suspicious large decline in poverty for the IFTRAB for most provinces. This can

partly be explained by the fairly large reduction in the mean household size in the IFTRAB, since demographic variables are crucial poverty indicators in the consumption models. Thus, one main issue will to be to analyze to which extent the modeling results depend on the decline of members in household, or whether there seems to be a general trend with improvements with the poverty indicators improve – so to reflect higher welfare. The results from this work will also used to discuss with the workshop participants whether the fairly large reduction in the mean household size in the IFTRAB, particularly in Maputo City, reflects the situation on the ground, or may be caused by problems in the survey field work.

Work to be carried out by the consultants during the mission

1. Familiarize participants who did not take part in November/ December with the idea and the procedure.
2. Finalize the methodological work to combine the IFTRAB 2005 with the IAF 2002/03 for identifying a set of variables and estimate a consumption model that can be used to predict poverty for 2005.
3. Prepare a consumption model for a set of 10-15 variables to be added to the next QUIBB survey.
4. Prepare a consumption model for a set of variables already included in the draft Census questionnaire, possibly including a very small set of new variables to be added to the Census

Tasks to be done by INE to facilitate the mission.

1. Ensure availability and documentation of draft questionnaires for the next QUIBB and the Census at least 2 weeks before the mission, if possible.
2. Provide a suitable location for the workshop. Three computers with SPSS version 13.0 must be available in the room.
3. Ensure staff to participate in the analyses. The staff needs basic knowledge of statistical analyses like regression and to be familiar with SPSS. The participants also have to be able to use English as a working language. The name and qualifications of staff should be informed to the consultant before the start of the mission.
4. As stated in the November/ December 2005 Mission Report, there is a need to bolster the acquired skills of the workshop participants. Hence, the participants for this second workshop should be enabled to practice their new knowledge and skills as soon as possible, and preferably working together as a team. The team should *prior* to the workshop, based on the draft QUIBB and Census questionnaires, prepare an extended IAF 2002/03 data file that allows for an (unconstrained) selection of the best-performing poverty correlates.
5. If time allows, the participants should start to prepare draft consumption models for the QUIBB and the Census.
6. Ensure the availability of the participants. There is a lot of work to be done, and it is crucial that the participants are present during the whole workshop. If possible, the workshop should take place outside of INE.

Finalization of the report

The consultants will prepare a draft mission report to be presented and discussed with INE the second last day of the mission to give time for discussions and changes. They will submit a final draft to INE for final comments within one week of the end of the mission, and return it to Statistics Norway for finalizing one week later. The final version of the mission report will be available within 3 weeks of the end of the mission.

The Counterparts have to ensure that the final printed report has at least a summary in Portuguese if the main report is in English – or vice versa

These Terms of Reference were prepared by (date and name)

/ / ……

Approved by/in the name of the President of INE

/ / ……