REBASING OF NATIONAL ACCOUNTS: LESSONS AND EXPERIENCES FROM VNSO

Vanuatu National Statistics Office (VNSO)
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This information Paper is intended to share experiences acquired and lessons learnt from the 2009 undertaking of National Accounts Rebasing by the Vanuatu National Statistics Office. It is also intended to inform and clarify conceptual and methodological changes and improvements in official statistics. The views expressed are based on lessons learned from the undertaking, the Technical Reports from the consult to AusAID (through Australian Bureau of Statistics (ABS) and Pacific Financial Technical Assistance Centre (PFTAC) TA. Statistical estimates presented in the paper are based on new or revised official statistics compiled from the best available data. Comments and suggestions are welcome.

Contents

ACRONYMS

1993 SNA	System of National Accounts 1993
ABC	Annual Business Census
ABS	Australian Bureau of Statistics
BR	Business Register
CPV	Current Price Value
COFOG	Classification of the Functions of Government
COICOP	Classification of Individual Consumption by Purpose
CPI	Consumers Price Index
DCIR	Department of Customs and Inland Revenue
EC	Economic Section
FCEH	Final Consumption Expenditure of Households
FIBOS	Fiji Islands Bureau of Statistics
GDDS	General Data Dissemination Standard
GDP	Gross Domestic Product
GDP (E)	Gross Domestic Product – Expenditure Approach
GDP (E	Gross Domestic Product – Production Approach
GFCF	Gross Fixed Capital Formation
GFS	Government Finance Statistics
HIES	Household Income and Expenditure Survey
IMT	International Merchandise Trade
ISIC	International Standard Industrial Classification
KPV	Constant Price Value
NA	National Accounts
NPISH	Non-profit Institution Serving Households
PFTAC	Pacific Financial Technical Assistance Centre
QNA	Quarterly National Accounts
RBV	Reserve Bank of Vanuatu
USP	University of South Pacific
VAT	Value Added Tax
VNSO	Vanuatu National Statistics Office

HISTORICAL BACKGROUND

This section outlines some staffing challenges experienced by the Vanuatu National Statistics Office (VNSO) during the last two and a half decades, in its efforts to develop its economic statistics. VNSO has been no exception to challenges commonly known in small islands NSOs, such as staff turnover, staff capacity, data limitations etc.,

Economic Statistics is an area that requires a lot of technical skills and experiences, which are normally acquired after years of experience in NSO. National Account (NA), Consumer Price Index (CPI) and International Merchandise Trade (IMT) have been the most vulnerable areas in economic statistics. Graduate staffs with years of experience in Economic Statistics are most likely to leave before completing their third years of service in NSO. This is exactly what happened from mid nineties to mid two thousands.

In 1994, VNSO lost its first ever National Account officer to the Reserve Bank of Vanuatu (RBV). The latter was trained in Washington DC in late eighties. In late 90's, VNSO Economic Section (ES) lost two graduates who were also senior officers. One was the replacement officer for the National Accounts officer, who was promoted to head the VNSO, and the second one who was specialized in CPI, also departed for RBV. In 2003, NSO lost its new CPI officer to the Secretariat of the Pacific Community (SPC). The latter had been heavily involved in CPI rebasing, and was VNSO hope for future CPI rebasing exercises.

In 2006, VNSO ES lost another three of its senior officers. The first one was a French University graduate, who was later trained in NA. He later resigned from his new responsibility as National Coordinator for 2006 Household Income and Expenditure Survey (HIES) to assume new responsibilities with the Department of Foreign Affairs. The second officer was the third CPI officer who took over CPI responsibilities after returning from university studies. The latter passed away when assuming his responsibilities as the second coordinator for 2006 HIES. The third officer was the most senior staff who had occupied the position of Government Statistician. She left VNSO to take over responsibilities with the Asian Development Bank in Manila as a regional advisor to the board of Directors.

The increasing demand for economic statistics has seen a struggling VNSO exasperatedly looking for TAs to reestablish its system of NA. A series of TA was secured, but this was proven to be a quick fix method as the real issues such understaffing, lack of planning skills and staff capacity issues remained unaddressed. The problems had remained unchanged and VNSO continued to heavily depend on external assistance. However, to make its way through this escape-goat VNSO entered into agreement with the ABS. An agreement VNSO- ABS was initiated in 2002. ABS was engaged to assist with VNSO's Institutional Strengthening Program (ISP) with funding from AusAID. Unfortunately, the ISP had to be put on hold for lack of staffing. It was not until the end of 2006 when VNSO's urgent need for a HIES subject matter person finally kicked start the program. Despite the persistent staffing issue, ABS was convinced to assist VNSO to salvage its HIES. The ISP wouldn't be effective without a reliable HIES data which would warrant the rebasing of the NA. However, the staffing issue remained unresolved till this year 2010, when the vacant positions are being filled.

I. INTRODUCTION

1. The Vanuatu National Statistics Office (VNSO) has undertaken its ever rebasing of NA from the 1983 base to 2006 in 2009. The estimates of constant price gross domestic product (GDP) are now expressed in terms of prices prevailing in 2006. The rebasing exercise also made attempt to reconcile the two estimates of GDP, namely by production and expenditure. It also provides the opportunity for conceptual, methodological reviews and improvements. The estimates of economic growth on the basis of the rebased series were first reported in the preliminary release published in late 2009 for the years 1998 to 2008. However, VNSO could not release the Expenditure estimates as the Balance of Payments (BOP) information received from RBV were not sufficiently detailed to identify appropriate deflators.

2. This paper discusses the rebasing of national accounts in terms of lessons learnt and experience acquired by VNSO from the undertaking. The paper is structured as follows: Section II provides the rationale for rebasing GDP. Section III explains the rebasing and major changes in concepts, methodologies and data sources undertaken in this rebasing exercise. Section IV discusses VNSO capacity to compile NA. Section V outlines the areas identified for future improvements. Section VI concludes the paper with a summary of the main changes and outcomes.

II. THE RATIONALE FOR THE REBASING OF THE VANUATU GDP

3. National Accounts constitute a formal framework for the classification of information about the economic performance of a country. It serves as a tool for policy formulation, monitoring and evaluation as well as economic analysis. The data provided in the National Accounts shows the behaviors of the economic performance through various macroeconomic indicators. Over time, the production and the consumption pertains, the technology, the variety of goods and services, and price composition have changed. To get a real performance of the economy, it is essential that the accounts are revised regularly. This is done through the exercise, known as “rebasing”.

4. The growth rates of some important indicators are not reported exactly and might be confusing. Some important ratios, such as recurrent budget revenue to real GDP ratio, and Budget deficit to real GDP ratio, with which fiscal and monetary policies are related, may not be stated accurately. Hence, the policies based on these indicators can have adverse effects on the realization of targets.

5. For example, in 2007 (table.3) the budget target was 66 percent of the real GDP (base 1983). The realization was 59 percent indicating a short fall in revenue collection of 8 percent of total real GDP (base 1983). But, according to the 2006 base and new coverage, the shares have become 25, 23, and - 3 percent respectively (table.4). In general, the share of these indicators become significantly lower than forecasts based on the old base. This can be confusing, and misleading.

Table 2: Gov'nt Budget and Recurrent Revenue (million VT).

Year	Budget	Revenue	Budget against revenue
1998	**8,197**	**7,054**	**(1,143)**
1999	7,662	7,278	**(385)**
2000	7,717	6,996	**(720)**
2001	7,699	6,887	**(813)**
2002	7,477	6,891	**(586)**
2003	7,758	7,056	**(702)**
2004	7,785	8,241	**456**
2005	8,094	9,231	**1,136**
2006	8,668	10,015	**1,346**
2007	13,578	12,033	**(1,545)**

Table 3: Percentage share to Real GDP (1983 base)

Year	Budget ratio to real GDP old base	Revenue	Budget against revenue
1998	**47%**	**41%**	**-7%**
1999	**46%**	**44%**	**-2%**
2000	**45%**	**41%**	**-4%**
2001	**46%**	**41%**	**-5%**
2002	**48%**	**45%**	**-4%**
2003	**49%**	**44%**	**-4%**
2004	**46%**	**49%**	**3%**
2005	**45%**	**52%**	**6%**
2006	**45%**	**52%**	**7%**
2007	**66%**	**59%**	**-8%**

Table 4: Percentage Share to Real GDP (2006 base)

Year	Budget share (%)	Revenue share (%)	Budget against revenue
1998	**20%**	**17%**	**-3%**
1999	**18%**	**17%**	**-1%**
2000	**17%**	**16%**	**-2%**
2001	**18%**	**16%**	**-2%**
2002	**18%**	**17%**	**-1%**
2003	**18%**	**17%**	**-2%**
2004	**18%**	**19%**	**1%**
2005	**17%**	**20%**	**2%**
2006	**17%**	**20%**	**3%**
2007	**25%**	**23%**	**-3%**

III. RABASING AND MAJOR CHANGES

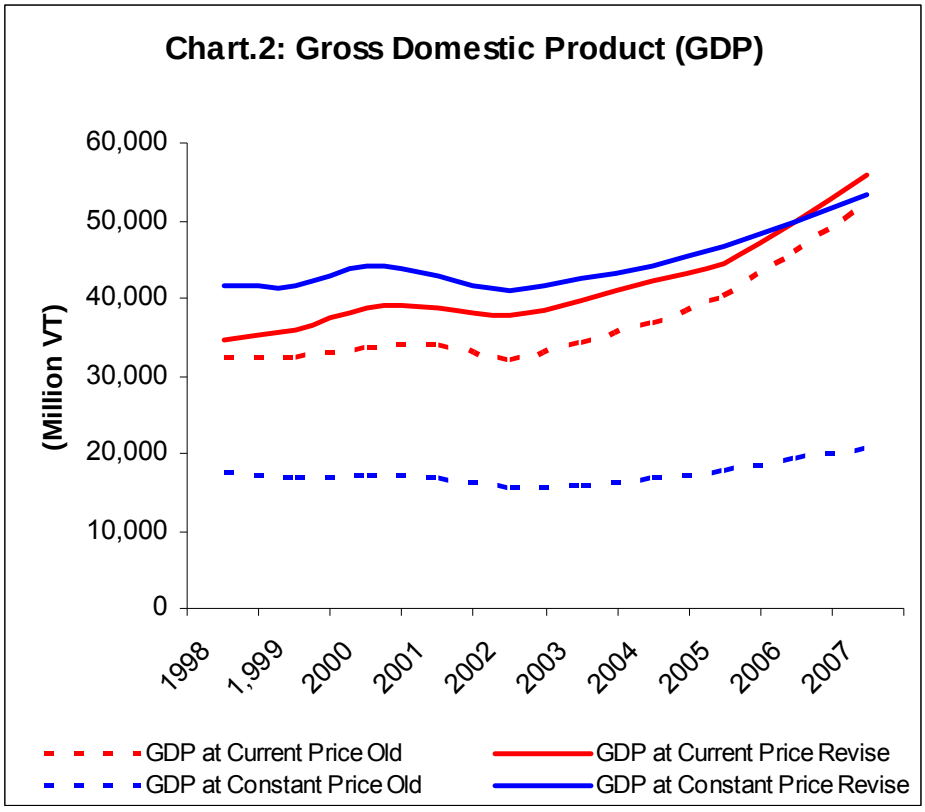
6. Table.4 shows the decomposition of the total changes[1] in real GDP. The table contains the total GDP estimates in real and current prices in old base 1983 and in 2006 base for the period 1983-2006. The total change in real GDP in 2007 was 158 percent, 115 percent of each was due to price effect, and 6 percent to coverage changes. In 1998, from the 139 percent change in total real GDP, 87 percent was due to price effect, and 53 percent to Coverage effect. The total average change for the period 1998-2007 was 158 percent, 115 percent of which was due to price change, and 42 percent to changes in coverage. This is saying that almost three quarter of the total changes in Real GDP for 1998-2007 was caused by the price changes from 1983 to 2006; and slightly more than a quarter was attributed by the coverage enhancements.

Table.4: Decomposition of Total Change in Real GDP

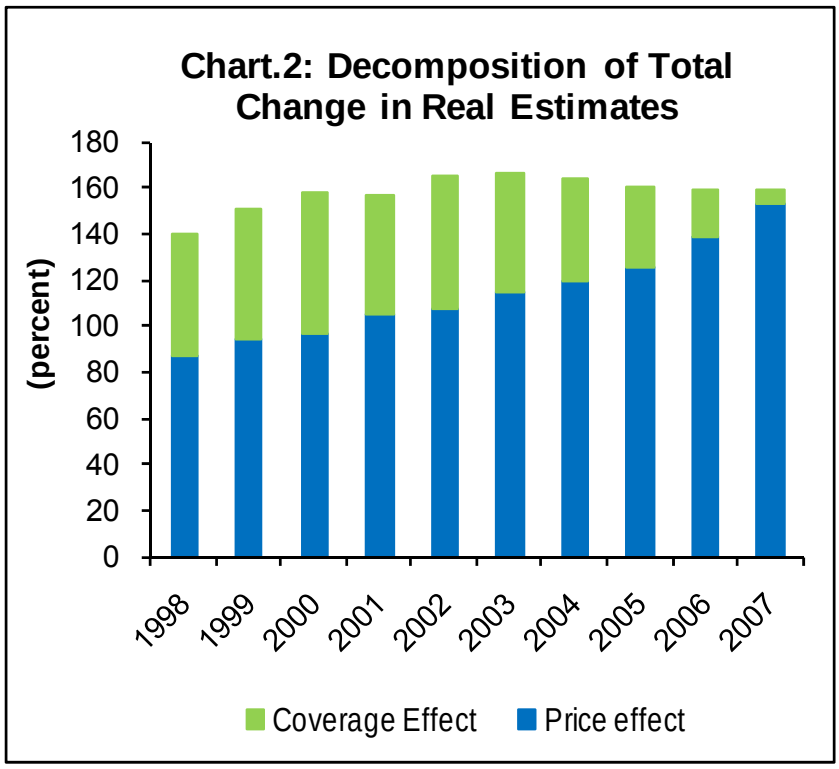
	Total Change	Price effect	Coverage Effect	GDP Current (Old)	GDP Current (Revised)	GDP Contant (1983 base)	GDP Contant (2006 base)
Year	Rate of Change			Million Vatu			
1998	139	87	53	32,423	34,562	17,363	41,569
1999	150	94	56	32,399	35,745	16,668	41,745
2000	158	97	61	33,649	38,648	17,115	44,171
2001	156	105	51	34,125	38,801	16,678	42,705
2002	165	107	58	31,957	37,810	15,444	40,906
2003	166	115	52	34,185	39,684	15,936	42,407
2004	163	119	44	36,863	42,074	16,812	44,274
2005	160	126	34	40,387	44,400	17,906	46,547
2006	159	139	21	45,944	49,894	19,236	49,894
2007	159	153	6	51,980	55,784	20,550	53,255
1998-2007	158	115	42	373,912	417,401	173,708	447,472

7. Chart.1 shows the levels for the old and new series of GDP for both current and real estimates for the period 1998- 2007. The blue lines represent the real GDP estimates and red the current estimates. Also the plain lines are the levels of the new series, whereas the old series are indicated by the dashed lines. We can notice from the graph, the shift of the level of real GDP from the blue dashed line (real GDP old base) to the blue line (new real GDP) that as a result of the rebasing.

[1] See formula for Total Changes, Price Effect and Coverage Effect in Appendix 3



8. In a NA rebasing exercise, the total change in real GDP from the old base level to the new level is caused by the effect of the change in price base and the coverage enhancements. As it can be seen from Chart.2, the bar indicates the composition of the total change in real GDP from the old level to the new level for the period 1998-2007. The blue colored bars indicate the changes by prices effect and the green ones the change attributed to coverage changes. The chart also tells us that the farer we get from the base year (2006) the less the price effect (or less representative the prices), and more the coverage effect becomes significant.



9. The coverage effect, can be explained by the following changes: (a) Change in methodology; (b) Improvements in data sources; and (d) Updating of classification. The fourth factor of changes is the conceptual treatment, which has not been improved during Vanuatu NA rebasing exercise.

A. CONCEPTUAL TREATMENT AND ENHANCEMENT

10. The old series of NA contained indirect estimation for National Income and Expenditure, mostly obtained by applying fix ratios to output, however due to outdated ratios and data limitation, the income approach was temporarily dropped. With new available data such as 2006 HIES the Expenditure approach was improved to become an independent estimate. Hence, the paper only discusses the production and expenditures approaches.

11. From the two approaches we can come up with the following identities knowing that in an economy, the total supply of goods and services must be equal to the total uses of those goods and services:

Total Supply of Goods and Services = Total Uses of Goods and Services

12. Goods and services are supplied by domestic production and imports. These are either consumed in the process of production as intermediate consumption by industries or as final consumption by households and the government, used in gross fixed capital formation, held as inventories, or exported to the rest of the world. Therefore,

O + M = PCE + GCE + GFCF + Changes in Inventories + X + IC
where O = Domestic Output
M = Imports
PCE = Private Consumption Expenditure
GCE = Government Consumption Expenditure
GFCF = Gross Fixed Capital Formation
X = Exports
IC = Intermediate Consumption

Re-arranging the identity gives us:
O – IC = PCE + GCE + GFCF + Changes in Inventories + (X – M)

13. In Vanuatu's national accounts, output for most services is valued at basic prices, which is the preferred method of valuation particularly because of its system of value added tax. Components of expenditure as well as intermediate consumption are valued at purchaser's prices, as they are measured from the perspective of the purchaser. As such, taxes (less subsidies) on products need to be added to output to balance GDP by the output approach to GDP by the expenditure approach:

O – IC + T = PCE + GCE + GFCF + Changes in Inventories + (X – M)
 GVA + T = PCE + GCE + GCF + (X – M)
 GDP by Output Approach = GDP by Expenditure Approach
where T = Taxes less Subsidies on Products
GVA = O – IC
= Gross Value-Added valued at Basic Price

14. Conceptually, the two approaches should produce the same GDP estimate. However, as the two measures of GDP are derived separately from diverse and independent data sources, discrepancies are often times very volatile and significantly high. Without adequate data preparation and the input-output (I-O) tables, VNSO may not benefit from the opportunity of a rebasing exercise to effectively reconcile the two estimates of GDP one would normally expect.

15. In the old series the discrepancy for the two approached was placed on the expenditure side due to the fact that consumption estimates were dependent on the production side. With the undertaking the expenditure methodology has seen a significant improvement. In exception of the Gross Fixed Capital Formation (GFCF), all the other components are estimated from reliable administrative data sources. The results so far obtained from the consumption estimates which are yet to be released, reveal high and consistent statistical discrepancies. This is flagging the need to critically check the level of the output side estimates, which may be too low.

B. CHANGE IN METHODOLOGY

a. In production methodology

16. Constant price estimates are generally derived by price deflation – where volume extrapolation is used this is mentioned below where relevant. Methods different from the general VAT method are explained as are those where the industry has a special treatment in the NA.

17. In general, the methodology used in the rebased NA closely follows the previous methodology. This is largely because of the lack of alternative data sources. Attempts were made to ensure that the data are consistent over time although this proved very difficult.

18. Some changes have been made to the spreadsheet system to make them easier to update and to follow the sequence of calculations. In particular, centralised spreadsheets are used for each key source data where the data from that source is used in different places. This is the case for the CPI, IMT, HIES data, GFS, and the volume indicators data sheets. The industry spreadsheets are linked to the five centralised files and are automatically update when the source data files are updated.

19. The spreadsheets have also been simplified as much as possible. A number of outputs produced by the old system have been ceased in the rebased NA because they could not be accurately estimated. The old system used ratios to other variables which have been fixed for many years (in most cases since the present base year, 1983) and are unlikely to reflect the current or recent past structure of the accounts or industries

b. In consumption methodology

20. The methodology used to produce GDP(E) aggregates was redeveloped to enable an independent estimation of annual and quarterly FCEH and improved annual FCEG estimates. FCEN estimates were not previously compiled. A new methodology to produce FCEN estimates using BOP, household expenditure and other source data has been implemented. The statistical techniques used to compile GFCF and changes in inventories have been improved and a new methodology to produce acquisition and disposal of valuables has been implemented. Similarly, improvements have been made to the methodology to produce annual and quarterly estimates for external trade in goods and services. Significant effort has been made to improve the price deflators and volume indicators used to produce the constant 2006 price estimates.

C. IMPROVEMENTS IN DATA SOURCES;

a. Improvements in production data sources

i. VAT data;

21. The methodology used for many industries uses VAT data. Benchmark estimates were developed using comprehensive VAT data for 2000 to 2008. For these years all the fields collected on the VAT forms were provided by the Customs Office.

22. The fields provided for these years facilitated estimates of gross output and intermediate consumption. Adjustments were required to deduct the value of VAT included in sales and purchases since the NA require valuations exclusive of refundable VAT.

23. Adjustments were made to exclude capital sales and purchases, where the analysis suggested that these flows were included. Capital sales and purchases are valid taxable supply for VAT purposes but should not be included in gross output or intermediate consumption. Further adjustments have been made for the years 2004 to 2007 to compensate for the improved compliance of the VAT system achieved by the Customs Office over this period. It is assumed that 2008 has the best coverage and compliance.

ii. Major Enterprises

24. Estimates for the major enterprises which are derived directly from their financial accounts and annual reports were reviewed. In general the methodology is sound, although minor adjustments were made in a few cases to correct technical errors (e.g., interest paid should not be included in intermediate consumption).

b. Improvement in expenditure data sources

25. The methodology being used to produce GDP(E) aggregates was redeveloped. The methodology enables independent estimation of annual and quarterly FCEH and improved annual FCEG estimates. FCEN estimates were not previously compiled. A new methodology to produce FCEN estimates using BOP, household expenditure and other source data has been implemented. The statistical techniques used to compile GFCF and changes in inventories have been improved and a new methodology to produce acquisition and disposal of valuables has been implemented. Similarly, improvements have been made to the methodology to produce annual and quarterly estimates for external trade in goods and services. Significant effort has been made to improve the price deflators and volume indicators used to produce the constant 2006 price estimates.

26. The GDP(E) compilation system is based on a series of linked Excel files for: primary source data; adjusted source data and commodity flow analysis; compilation worksheets for various GDP(E) aggregates; a consolidated time series file, and a publication tables file. The input data required for compilation of GDP(E) aggregates is automatically updated in the GDP(E) compilation worksheets using formulae to link to the source data and GDP(P) compilation worksheets. It is expected that the source data worksheets will be updated electronically by data providers from within VNSO and other Government agencies and provided to the NA counterparts. The source data worksheets for GDP(E) estimation include: BOP time series data; CPI price indexes; a volume indicators file; trade data on

exports and imports of goods; Government finance data; and 1998 and 2006 HIES data. This approach should reduce errors in transferring data between files and worksheets.

D. UPDATE OF CLASSIFICATION

27. The industry classification adopted for the rebased NA is the International Standard Industrial Classification, Revision 4 (ISIC Rev4). This replaces the ISIC Rev 2 previously used by VNSO. The structure of the classification is somewhat different from the previous versions, in particular in the services industries where more detail is included at the classification's highest level. This reflects development of most economies around the world where services have increased their importance over primary and secondary industries.

28. The estimates are compiled at a lower level of the classification in some industries, with the classification adapted to suit the Vanuatu economy. Following the missions recommendations the publication follow the industrial classification, which groups together similar activities. In previous publications, the NA published "industries" are a mixture of industries and destinations of the goods and services produced. The main examples are:

a. Agriculture

29. Agriculture, where the institutional type of the producing enterprises is used to provide detail rather than industry (i.e., traditional/custom agriculture which includes farming, fishing and forestry activities carried out by households for their own use; export agriculture; other commercial agriculture; and forestry and logging (other than that done by households)). The proposed presentation is: Agriculture – Animal Production; Agriculture – Crop Production; Forestry and Logging; Fishing. A separate table will present own-account production of agricultural activities along with other own-account and informal sector activities (handicrafts, nakamals, etc.).

b. Government Services

30. Government Services includes health and education as well as public administration. These are three significantly different types of industrial activity and it is proposed to separate these activities in the rebased NA (if data can be obtained to support the analysis).

31. For some industries there was little change from the previous industrial classification and the data did not need to be reworked. However, for those industries which are estimated using Value Added Tax (VAT) data, the new classification was applied. The VNSO reviewed its existing list of enterprises and added a new field for the new classification. This update list of businesses with the ISIC code was shared with VAT office for the updating of their classification.

IV. CAPACITY TO PRODUCE NATIONAL ACCOUNTS STATISTICS

32. The understaffing staffing issue in VNSO ES, after the loss of its senior officers in 2006, was not only required to sustain its normal activities, but also had to work round the clock to salvage its 2006 HIES and subsequently released its preliminary report. This was quite an achievement with the external assistance from the AusAID funded ISP, the SPC and the Fiji Islands Bureau of Statistics (FIBOS). It was only until 2008 and 2009, that the loss of the officers was really felt. The ES was in need for experience staff as it embarked on its CPI and NA rebasing initiatives. The two projects required a lot of staff commitment to carry out data review, editing and revision for the period 1998- 2008. The section had no choice but to hunt for additional temporary staff and to get the junior officers to assume senior level responsibilities. The ES was not ready for the rebasing exercises as it had no adequate staff, thus no adequate data preparation to get the most from the technical assistances.

33. Learning the hard way, the VNSO EC made it its policy, to involve the entire section staff in the compilation of NA as opposed to the old mindset “one NA officer”. The section believes that by building a strong NA team, by familiarizing the staff with the concepts and definition of the NA, and with hands-on-trainings, would finally have a long lasting impact on the development of sustainable Economic Statistics.

34. In its efforts to strengthen its EC capacity, VNSO has maintained a list of the University (USP) students, who have undertaken either Official Statistics or both Official Statistics and Economics. This has proven to be very effective, as in 2008 VNSO managed to recruit the first Ni-Vanuatu graduate in Official Statistics who was double majored in Official and Economic Statistics. The latter also happened to be the first graduate in Official Statistics in the region. The officer is now taking over the NA compilation, and is responsible for the NA in-house trainings. Another student is completing his degree program in Official Statistics the end of this year, and VNSO has already been in contact with him. The ES also has two other officers currently undertaking diploma program in Official Statistics and Economics. “National Accounts and Allied Statistics” is part of the courses.

V. AREAS FOR FUTURE IMPROVEMENT

A. Future Development Work

35. There are needs for new products and enhancement in National Accounts statistics that need to be aware of when discussing NA development. This is to ensure that survey undertakings are designed to meet NA requirements.

36. The key data users indicated that production of quarterly national accounts was a high priority, preferably with both GDP(P) and GDP(E) measures available. Users are also interested in an independently produced income measure of GDP, but recognize that this will require the introduction of regular surveys (e.g. Labor Force Survey, Company Profits Survey). Producing estimates of saving and net lending for each institutional sector was also considered a priority.

37. GDP by Income Approach is the missing approach which was omitted in this undertaking due to lack of data. VNSO and RBV efforts have seen Vanuatu National

Provident Funded (VNPF) release some employment and salaries & wages data. This information on quarterly employment and salaries & wages are yet to be improved to meet the requirements of the VNSO NA and the RBV.

38. Vanuatu has 6 provinces and 2 Municipalities. With the recent rising issues related to urban drift and the wide disparity between urban and rural economic development, VNSO has now established its branches in the Provinces to start addressing provincial data needs through provincial head quarters' networks.

39. With the above raising issues and the needs for further enhancements to the Vanuatu NA estimation, *the VNSO authorities are yet to prepare a funded medium-term development plan, in consultation with development partners, in order to address these user priorities once the rebased annual NA estimates are released.* The missions involved in the NA rebasing noted that there is a need for at least one more statistician on an ongoing basis to manage the extra workload of compiling quarterly national accounts and expanded institutional sector statistics. Conducting regular surveys in order to produce an income measure of GDP will also require additional survey staff.

40. It would be desirable to develop a revisions policy in consultation with the RBV and the Department of Finance, so that consistent policies are adopted by the three agencies. It is necessary to involve the other two agencies, as they are responsible for compiling the balance of payments and the GFS statistics. Many data items from these sources should feed directly into the national accounts and it is obviously essential for data released by all three agencies to be consistent.

B. Coordination and Integration

41. The VNSO is responsible for the coordination and leadership of the Vanuatu national statistical system, including all government agencies. Currently coordination is limited due to limited resources. VNSO has seen the importance of the coordination and integration of statistics, and made it one of its priorities by creating an additional section: the Statistical Leadership and Coordination Section. This unit is especially important in the context of access and use of administrative and survey data in compiling NA statistics.

42. The 1993 SNA provides standard concepts, definitions and classifications that enables all economic statistics and some socio-demographic statistics to be integrated in a consistent way. Statistical Leadership and Coordination Section will need to institute a sign-off process within Government that requires VNSO to ensure the use of standard classifications and that NA statistics data requirements are addressed in relation to data collection and compilation of statistics across Government agencies. Ensuring effective coordination and implementing standard classifications and definitions for all Government agencies is a major project that will take several years.

C. Data Collection Issues

43. The VNSO planned for another HIES in 2011, however due to the mounting pressures from donor's end of funding cycle, NSO has to adjust its program to accommodate the HIES in 2010. Preparations are now underway, and funding is already assured from the Millennium Challenge Account (MCA). The ES, the HIES data main user has taken responsibility and transferred a senior ES officer to the Statistical Leadership and

Coordination Section to coordinate the national survey. The officer is now developing the survey under the leadership of the Senior Statistician, the current coordinator for the 2009 Population and Housing Census. With this development, the ES has to readjust its program to release the 2009 GDP earlier than normal schedule to ensure the ES staff are available for HIES training in September.

44. Surveys and censuses undertakings are very expensive exercises. The ES, learning from its past mistake, sees the need to share VNSO's draft survey questionnaires with external advisors. It is necessary therefore that outside assistance and guidance be made accessible to ensure NA needs are met. Following are examples of issues identified and steps taken during the NA rebase project:

- The needs for information on secondary activities were discussed with the census developers, and relevant questions were incorporated into the census questionnaire – e.g., operators of nakamals are often wage earners as well (previous surveys only collected information on one source of income, omitting significant economic activities).
- Consider how the data from the surveys will be used – to ensure that the data collected will actually meet the needs identified in the planning phase (example of problem is the collection of "last sale" information in the Agriculture Census – may be easier to collect, but how can the data be used if don't also ask the frequency of sales?). This recommendation was submitted to the 2010 HIES developer to ensure frequency of sales is captured to avoid any over/under estimation of sales.
- The 2009 census has finally registered the geographic location of households with the use of Geographic Positioning System (GPS). The update list and maps from the 2009 Census are expected to be used for sampling for the 2010 HIES, and for a purposive sampling for informal sector activities. The NA team requested that the informal sector activities survey be run in conjunction with the 2010 HIES.

45. The VNSO ES has been too ambitious in its undertaking. Due to the adversities experienced thus far, VNSO ES needs to be more conservative on estimating how long tasks will take. Include in planning, down time for meetings, island and overseas visits, problems with data collection, etc. A possible rule of thumb for planning could be "estimate time, double it and double it again". It is also very important, as delays with one project impact on other projects, as has happened with the CPI rebase taking much longer than estimated and limiting the involvement of the ES staff in the NA rebase project.

46. At present, the Customs and Tax Offices use different tax payer identifier numbers. This makes it difficult to compare data sets to ensure compliance. It is recommended that VNSO encourages Customs and VAT offices to use a common identifier that can also be adopted by the VNSO for its statistical purposes. The effectiveness of compliance can be further improved if Customs insists on the inclusion of the identifier of the importer or exporter on the entry documents, even if the documents are completed by a customs agent. This has been applied in Solomon Islands where the Inland Revenue Department and Customs are finding it very useful and easy to check across data sets for auditing purposes.

VI. CONCLUSION

47. In 2009, VNSO, through its ISP and PFTAC's Technical Assistance had undertaken its first ever NA rebasing. The Vanuatu NA base year has now become the reference year 2006 replacing the base of 1983 which had been in use since the inception of NA compilation in mid 80's. The economy over time may be affected by a lot of changes, therefore a periodic rebasing of NA is essential, in order to measure the real change of the economy. This is normally done through a rebasing exercise which requires the updating of the base years prices to a more up-to-date base. The base year prices are then used to measure the real changes in economy.

48. In this rebasing exercise, the changes were not only due to price effect, but also to some underlying changes such as change in conceptual treatment, change in methodology, improvements in data sources; and updating of classifications. The total average change in real GDP was 153 percent, three quarters of which was due to price effect and a quarter to the coverage effect. This shows how much the old base was outdated.

49. Data limitation prevented the improvement in income estimates. The expenditure side on contrary has now become an independent method. There are also methodological changes in the two systems. In the output estimation, there has been an improvement the estimation of some major services. Access to new VAT data details enables a direct estimation of the output and intermediate consumption of the main services and the manufacturing industries. The methodological enhancements in the expenditure estimates were effected in HFCE, GFCE and NFCE. Both methods also have improved and better organized and enter-linked workbooks will enable the automatic updating of the sheets. There were also improvement in data sources and classifications.

50. The VNSO may well inherit a new system, and may be well able to compile annual GDP, nevertheless some identified areas for improvement and outstanding work; and the increasing demand for timely and quality economic statistics may require external assistance from time to time. It is therefore, necessary that NA technical assistance be made accessible at the regional level in order that NSOs can have access to.

APPENDIX I: ESTIMATION METHODOLOGY FOR PRODUCTION INDUSTRIES

Agriculture

51. The general method used in the rebased NA largely follows the previous methodology. Current price estimates for commercial farms and small holdings use a benchmark based largely on Agriculture Census data extrapolated by a combination of volumes time prices data. For own-account production the benchmark is derived from the HIES. Constant price estimates are derived in the same way but exclude the price component from the calculation.

Animal Production

52. Cattle – a model based on stock levels of animals, additions to the stock due to births (using estimated birth rates), less removals from the stock due to slaughtering (data collected from the two abattoirs in Vanuatu), live exports, own consumption on farms and other deaths. The benchmark price level is estimated separately for commercial farms and small holdings from the total value of sales recorded in the Agriculture Census divided by the number of animals slaughtered at the abattoirs. The change in inventories is calculated explicitly in the stock level model.

53. Other Livestock – eggs and chickens are largely estimated directly from data obtained from a commercial grower which supplies volume and value data. A separate estimate is made for eggs consumed from own-account production by households.

54. Pigs – the number of pigs owned by households is obtained from the Agriculture Census along with data on the number of animals disposed of during the year, by type of disposal (sale, own consumption or natural death). Prices are moved by a CPI price for pork while volumes are moved by the number of rural households (adjusted for the change between benchmarks of the number of pigs held per household).

55. Goats – as for pigs.

Crop Production

56. All types of crop are estimated using volume data from purchases by processors or exporters, plus estimates for own-production based on HIES data. Fruit and vegetable crops are estimated using data from the Agriculture Census on the number of plants or trees grown, the average yield per plant or tree and price data based on the CPI, adjusted to rural prices and reconciled to estimated values of purchases and own account production recorded in the HIES. Export values and volumes, and therefore the estimates of output and value added, are subject to the errors described earlier in section on weaknesses in trade data.

Forestry

57. Firewood collected by households, either for own use or for sale, is estimated by a model, based on the number of households using firewood from the Agriculture Census, multiplied by the quantity used, multiplied by a price based on market sales as measured in the CPI, adjusted to reflect rural prices. Note that estimates are made separately for timber and for coconut shells used for firewood.

58. Logging is based on the volume and price of timber exported, adjusted to the price received by the producer.

Fishing

59. Fish catch volumes are obtained from the Village Fisheries Development Scheme, supplemented with number of households catching fish from the Agriculture Census, shellfish and other marine exports data and CPI price data.

Wholesale and Retail Trade

60. Trade activities in the NA are treated as a margin activity, i.e., gross output is estimated as sales less cost of goods sold. Intermediate consumption is deducted from gross output to estimate value added as for other industries. In practice, however, the purchases data from VAT do not distinguish between goods purchased for resale and other goods and services purchased. Therefore, no margin is calculated. However, value added is still obtained consistently with the NA concepts. Separate estimates are made for the major petroleum companies and key commodity exporters, and separately for wholesale and retail trade activities.

Financial Intermediation (and Bank Service Charge)

61. Banks are exempt VAT and their value added is derived directly from their financial accounts. However, their income largely comprises interest earned which is not included in gross output in the NA. Output of the banks is derived as the sum of actual fees for services provided plus an estimate for services indirectly charged. The latter is estimated as the difference between interest received and interest paid and called bank service charges. It should be noted that there are insufficient data to estimate the preferred measure, Financial Intermediation Services Indirectly Measured (FISIM). The bank service charge is not allocated to users (i.e. industries and final consumers). Rather, it is added to the sum of industry values added and shown in the summary tables.

62. Insurance companies and other financial intermediaries are estimated as for other industries which use VAT data. This is less than ideal for insurance, because, like banks their output comprises a service charge which is only one part of their premiums received. However, data were not available to estimate output correctly. This is not considered to significantly affect the relevance or accuracy of GDP overall.

63. The Vanuatu National Provident Fund (VNPF) has been reclassified as a financial intermediary in the rebased NA (it was previously classified in the government services industry). Its output is estimated as a service charge, in a similar way as for insurance.

Public Administration

64. Central government's value added comprises only compensation of employees and is derived directly from the draft, revised, Government Finance Statistics tables (developed during and after the second mission). Depreciation is not recorded as an expense in the data provided to the mission for the GFS tables and is consequently excluded from these estimates (depreciation should be included in value added in the NA). It should be noted that public administration is a "non-market" activity where the output is not sold and therefore must be indirectly measured as the sum of inputs.

65. As noted earlier, the activities of providing public administration, education and health services are quite different and should be estimated separately. This is particularly true in constant prices where output per employee or productivity can differ significantly between these activities. Similarly, policy changes can lead to changes in priorities for government expenditure and therefore the mixture of number of employees (used as a volume indicator of production) can change between the various activities.

66. After the third mission the detailed expenditure data by activity was compiled into a functional analysis for 2006. This involved classifying all activities to the COFOG, applying the COFOG to all transactions as well as applying the same economic classification of transactions that was used to compile the GFS tables in the second mission. The summary GFS tables are included in Appendix I.

Non-profit Institutions Serving Households (NPISHs)

67. No separate estimate is made for NPISHs as these enterprises are not separately identified in the data. The final consumption expenditure for NPISHs is however on the basis of funding received from overseas (from the BOP) and from domestic households (from the HIES). To the extent that NPISHs are captured by the VAT system their contribution to GDP will be included.

Taxes less Subsidies on Production

68. The value of import duties and VAT (net receipts of Government) has been added to the sum of industry values added and shown in the summary GDP table as "Taxes on products". These taxes are not paid out of industry value added, but are included in the costs of final and intermediate consumption and therefore need to be included in the production measure of GDP. The data are obtained directly from the GFS tables.

Deflators

69. In order to estimate value added in constant prices (indicating the "quantity" of value added) there are two basic methods possible – price deflation or volume extrapolation.

70. In price deflation the current price (nominal) value is deflated by a price index which indicates change in prices over time. The only data available to use for price deflation are the CPI and export import unit value price indexes (value divided by volume). The CPI has been used extensively but at a fine level of detail where relevant prices are included in the CPI. For example, the deflator for the manufacture of food products comprises a weighted

average of CPI sub-indexes for meat and meat products; beer; bread; soft drinks and cordials; and coffee, tea and other food based drinks. Where a relevant deflator could not be developed, the all groups CPI has been used as a last resort. Future development should include identifying ways to improve the deflators.

71. In volume extrapolation, the physical volumes of production are used to extrapolate a base year value which may be value added, gross output or other NA items. This method is used only where high quality volume data are available and where the goods or services produced are homogeneous. Volume extrapolation is used extensively for own-account production, where the number of households is the volume indicator. Volume extrapolation is also used in a number of areas of agriculture where tonnes of kava, coffee, copra, etc., purchased by processors or exporters are known accurately.

72. A few industries where price deflation is currently used are good candidates for volume extrapolation. These include the abattoir, brewery, soft drink and water producing industries, and telecommunications. It is recommended that the VNSO investigate whether data on volumes could be obtained from these industries. The candidates are identified in the list of data requirements included in the previous mission report.

APPENDIX II: ESTIMATION METHODOLOGY FOR CONSUMPTION

Final Consumption Expenditure of Households

73. The main recommended change to the methodology made during the previous mission was to calculate FCEH directly, rather than as a residual. This recommendation has now been implemented and the new methodology enables independent estimation of both annual and quarterly FCEH estimates.

74. The new estimates are benchmarked to adjusted 1998 and 2006 HIES data. The data from both surveys were reviewed and adjusted for undercoverage, misreporting and valuation. The 2006 HIES data are considered to be more reliable than the 1998 data. The former survey included rural households, whereas the latter survey was restricted to provincial towns and the two main cities. As a result, the 1998 survey significantly underestimated production for own consumption and, therefore, only the 2006 production for own consumption data have been used as the benchmark. The lack of detailed 1998 data also made it difficult to compare and reconcile the survey results with the 2006 data. This comparison had to be done at a more aggregated level, i.e. 2-digit COICOP.

75. Adjustments have been made to the benchmark estimates for known areas of under reporting, such as alcohol, tobacco and kava, in line with the adjustments made for the CPI rebasing exercise. Both surveys had reasonably high non-response and refusals from households. The 2006 HIES coordinator indicated that these households were generally wealthy Ni-Vanuatu or expatriates. As a result, expenditure on most durables and a few non-durables was under estimated. Therefore, adjustments have been made to the benchmark estimates for dairy products, non-alcoholic beverages, clothing and footwear, household and other durables, and most services (e.g. education, health, recreation). Valuation adjustments were made to reduce the value for imputed rents on owner occupied dwellings in rural areas and increase the value of maintenance and repairs.

76. Benchmark FCEH estimates at the COICOP 2-digit and 3-digit level have been compiled for 1998 and 2006 using adjusted HIES data. The finalized data has been used to produce the 2006 FCEH estimates. Expenditure weights from these estimates and expenditure item CPI have been used to develop COICOP 2-digit and 3-digit price indexes (2006=100.0) for March quarter 1998 onwards.

77. The revised methodology uses the adjusted 2006 HIES benchmark data to KPV benchmark estimates for FCEH on production for own consumption, purchases of locally produced goods and services and purchases of imported goods and services. These benchmark KPV estimates are then interpolated back to March quarter 1998 and extrapolated forward to December quarter 2008 using various volume indicators and measures from the Volume Indicators for NA.xls file.

78. For production for own consumption KPV estimates, volume indicators on the number of subsistence farmers and fishermen are used to estimate volume change for most food items. The rural population growth rate has been used for other food items and production of durable goods (e.g. furniture, mats). For KPV estimates of expenditure on purchased goods and services, the volume data for: local beef sold at markets has been used to derive local beef consumption estimates; households with access to piped water has been used to estimate water charges; households using electricity has been used to estimate electricity charges; households using gas for cooking purposes has been used to estimate expenditure on gas use; households using kerosene has been used to estimate expenditure on kerosene; households using firewood for cooking purposes has been used to estimate expenditure on firewood. It is recommended that the KPV estimates for FCEH on electricity and water charges be improved by VNSO collecting quarterly data from the utility companies on volume of water and electricity supply to households.

79. Ministry of Public Health data on the volume of outpatient visits and hospital stays (i.e. inpatient bed nights) has been used to derive KPV estimates for expenditure on hospital and other health services. Census, HIES and Ministry of Education data on student enrollments has been used to extrapolate KPV estimates for education services by education level. New vehicle registration data have been used to derive KPV estimates of purchases of transport equipment and the cumulative registration data have been used to derive KPV expenditure on operation of transport equipment. Resident departures data have been used to extrapolate international transport expenditure estimates. It is recommended that VNSO compile separate estimates of resident departures for personal purposes and use this more appropriate series as the volume indicator.

80. The volume of domestic mail and international outbound mail has been used to derive KPV estimates of expenditure on postal services. New telephone subscriber/connection data have been used to derive KPV estimates of purchases of telecommunication equipment and the cumulative data have been used to derive KPV expenditure on telecommunication services. Volume data from the Census and HIES on recreational equipment has been used to derive KPV expenditure on recreational goods. The general population growth rate has been used to derive KPV estimates for other goods and services purchased for individual use.

81. Volume indicators of the number of rented and owner-occupied dwellings has been used for KPV estimates of actual and imputed rents – separately for rural and urban areas, while

the number of rented and owner-occupied dwellings have been used for KPV estimates for repairs and maintenance of dwellings for rented and owner-occupied dwellings. The number of private dwellings has been used as the volume indicator for all other goods and services for household (as opposed to individual) use.

82. COICOP 2-digit and 3-digit price indexes (2006 =100.0) for March quarter 1998 onwards have been used to inflate the KPV estimates in order to derive the equivalent quarterly CPV estimates of FCEH.

Final Consumption Expenditure of NPISH

83. Estimates for FCEN have been compiled using BOP, 2006 HIES benchmark data, volume data on household formation rates and FCEH implicit price deflator (IPD) data. It has not been necessary to use GFS as the Vanuatu Government does not provide funding for NPISH. CPV estimates are based on quarterly BOP estimates of current transfers received by NPISH from abroad and donations received by households in Vanuatu. The latter estimates are based on extrapolating the 2006 HIES data using the household formation volume data and inflating to CPV estimates using the FCEH IPD. KPV estimates of FCEN are derived by deflating the CPV estimates using the FCEH IPD. This methodology, while adequate, can be improved on.

84. An estimation model based on both supply (financing) and use (provision of goods and services) source data is recommended. Current price data on provision of goods and services by NPISH will need to be sourced from a donor/NGO survey. KPV estimates should then be derived by deflation using FCEH and industry output IPDs. Actual data from donors and NGOs or ratio estimates should be used to split NPISH financing between FCEN and GFCF by NPISH. Subject to the availability of NPISH expenditure by main activity reported through a donor/NGO survey, estimates using the Classification of the Purposes of Non-Profit Institutions Serving Households (COPNI) should be produced.

Final Consumption Expenditure of Government

85. CPV estimates of FCEG have been compiled for Central Government using more detailed GFS data, separately for compensation of employees (COE) and intermediate consumption (IC) components, adjusted for revenue from sales (i.e. cost recovery). KPV estimates are derived using volume indicators (i.e. employment) for COE and price deflation (i.e. 3-digit FCEH and CPI price indexes) for IC components at a detailed expenditure level. For local governments, only limited data are available and CPV estimates are only produced for total COE and IC. The Central Government IPD for COE is used to derive local government COE KPV estimates and the all items CPI has been used to derive KPV estimates of local government IC.

86. It is recommended that more detailed data be collected on local governments' expenditure, in order to improve the KPV estimates. Compilation of FCEG by Classification of Function of Government (COFOG) is also recommended. However, detailed Government finance data by program unit for 1998 onwards needs to be produced and provided by the Budget Section to VNSO. Additional information on extra-budgetary grants also needs to be collected from embassies and international organizations.

Gross Fixed Capital Formation Cultivated Assets

87. Estimates for cultivated assets were not previously compiled. The new methodology to estimate CPV estimates is based on a supply side approach, using partial data only. The model uses international trade data on imports of plants and working livestock (valued at c.i.f. plus import duties and VAT) less exports adjusted for trade margins. No data are currently available for increases/decreases in domestic cultivated assets and working livestock. KPV estimates are derived by deflating the CPV estimates using the best proxy COICOP or CPI price indexes.

88. It is recommended that an estimation model for livestock by type of animal and plantations by type of crop/forestry product be developed, subject to adequate source data becoming available in the future, to produce estimates of GFCF of cultivated assets. The livestock model can then be used to compile estimates of change in working livestock, as well as other livestock (change in inventories). Appropriate indicator data are needed to develop modeled estimates for livestock and plantations benchmarked to the AGC data. It should be possible to compile both working livestock and plantation estimates on an ongoing basis once the recommended annual Agriculture Survey is implemented.

89. Additional information needs to be collected by VNSO in order to develop ratios of births, deaths, and the slaughter of animals at home. Ratios of working versus non-working livestock also need to be developed. Counterparts need to obtain the farm gate price of animals purchased from small holders and commercial farms by abattoirs. Own consumption and informal sector sale of livestock estimates need to be developed using HIES and other source data. Prices data for plants are required to apply to AGC volume data to derive benchmark estimates of the value of plantations.

Construction

90. The methodology for compiling GFCF estimates for construction is based on a supply side approach. The model uses international trade data on imports of building materials and other inputs (valued at c.i.f. plus import duties and VAT) less exports adjusted for trade margins based on 4-digit HS data from the Trade_HS4_98_Onwards.xls file. Domestic output of construction materials sourced from the GDP(P) compilation worksheets are then added and adjusted for trade margins and VAT to calculate total intermediate consumption. Then the construction industry value added is added to calculate total construction output. Routine maintenance and repairs for households, Government and businesses are then deducted to derive CPV estimates of total construction GFCF.

91. KPV estimates of intermediate consumption are compiled by deflating the various inputs (e.g. cement, timber) using the equivalent building materials and other (best proxy) price indexes. KPV estimates for value added are taken directly from the GDP(P) construction industry worksheets. For routine maintenance and repairs, a composite index, including weighted building material price indexes and labor cost indexes, has been developed and used.

92. The use of fixed ratios has been reduced. Domestic material used in construction is now estimated separately using output of relevant industries, rather than using a fixed ratio to imports. The trade margin ratios have been updated based on ES 2006 and VAT data.

93. Due to inadequate source data for sectors other than the Central Government, it has not been possible to develop demand-side measures of construction GFCF in order to cross-check the supply side estimates. It is recommended that, subject to adequate source data becoming available in the future, VNSO counterparts compile separate estimates of construction GFCF for Government, households, financial sector, NPISH and private non-financial corporate sector. The model should use actual Government finance data on construction expenditure rather than the fixed ratio currently used to derive Government sector construction in the GDP(P) construction industry worksheet.

Durable Equipment

94. The revised methodology for compiling GFCF durable equipment estimates is based on a supply side approach. The source data used in the model includes international trade data on imports of durable equipment (valued at c.i.f. plus import duties and VAT) less equivalent exports adjusted for trade margins based on 4-digit HS data from the Trade_HS4_98_Onwards.xls file. Domestic output of durable equipment sourced from the GDP(P) compilation worksheets are then added and adjusted for trade margins and VAT to calculate total supply of durable equipment. Separate CPV estimates for furniture, machinery and equipment (e.g. agricultural machinery, mining equipment, manufacturing machinery, office equipment), transport equipment (i.e. rail, road, air, sea and other) and other durables have been compiled. The CPV estimates are then deflated using the best proxy price indexes to derive the KPV estimates. FCEH CPV and KPV estimates of expenditure on durable equipment are then deducted to derive CPV and KPV estimates of durable equipment GFCF.

Other GFCF

95. If feasible, consideration should be given to developing CPV estimates for: mineral exploration; computer software; entertainment, literary and artistic originals; and other intangible fixed assets using available data sources (e.g. BOP statistics, international trade data). KPV estimates will then need to be derived on a case by case basis.

Consumption of Fixed Capital

96. There was insufficient time during the mission for the AusAID consultant and the RMSA to access appropriate data sources and redevelop the methodology for compiling consumption of fixed capital estimates. It is recommended that VNSO counterparts develop a perpetual inventory of fixed assets by industry and use the Budget Section depreciation schedule for various types of assets to derive CFC. KPV estimates would then be derived using deflation for each category of fixed asset. The benchmark estimate for 2006 will need to be derived using a range of data sources, including: 2006 ES, AGC, Government finance data, and RBV and VFSC financial sector data. The estimates would then be extrapolated based on partial source data for Government, financial sector and public enterprises where audited reports or other data are available, and ratio estimated for the private non-financial sub-sector.

Change in Inventories

97. There was insufficient time for the AusAID consultant and the RMSA to access appropriate data sources and redevelop the methodology for compiling changes in inventories' estimates. It is recommended that VNSO counterparts use the 2006 source data discussed in the previous chapter to develop the benchmark 2006 industry level changes in inventories' estimates. A combination of different methods will need to be used to produce estimates for previous and subsequent years. Livestock and construction estimates will need to be compiled as part of the estimation models being proposed for those industries. For other industries, the estimates will be extrapolated forward using CPV and KPV output and IC estimates – as appropriate.

Exports and Imports of Goods and Services

98. The methodology to compile CPV estimates for exports and imports of goods and services has been redeveloped. CPV estimates for exports and imports of goods are compiled in the Trade in Goods.xls file using VNSO 3-digit SITC data from the Trade_SITC_3D_98_Onwards.xls file. KPV estimates are derived at the 3-digit SITC level using the closest proxy price indexes (i.e. for building materials, 3-digit COICOP FCEH, and CPI expenditure items). The CPV and KPV estimates are then aggregated to the 1-digit SITC level for imports and exports, as well as by major export commodity for exports. The BOP c.i.f. to f.o.b. ratio is then applied to total imports c.i.f. to derive the total imports f.o.b. values.

99. For exports and imports of services, the CPV estimates are based on the BOP services data at the broad standard component level. With the exception of travel credits and debits, the KPV estimates are derived using the closest proxy price indexes (i.e. for detailed FCEH and CPI expenditure items). For travel credits, the 2006 benchmark estimates are interpolated back to 1998 and extrapolated forward using a volume indicator based on total expenditure days (i.e. total number of tourists multiplied by average length of stay in days/nights). For travel debits, the 2006 benchmark estimates are interpolated back to 1998 and extrapolated forward using a volume indicator based on resident departures.

Other GDP(E) Aggregates

Acquisition less disposal of valuables

100. Estimates of the acquisition less disposal of valuables are compiled using IMT data on imports and exports of precious stones (i.e. diamonds) and metals (i.e. gold, platinum and silver). The estimation model uses imports (valued at c.i.f. plus import duties and VAT) less exports adjusted for trade margins based on 4-digit HS data from the Trade.

Acquisition less disposal of non-produced non-financial assets

101. Estimates for the acquisition less disposal of non-produced non-financial assets are taken directly from the BOP estimates. No BOP transactions have been recorded for 1998 to 2008. It is likely that only transactions relating to the sale and purchase of embassy land will be measured in BOP statistics.

Appendix 3: FORMULA Decomposition of Total Change in Real Estimates

Total Changes

$$Total\ Change = \frac{KPV_{2006} - KPV_{1983}}{KPV_{1983}}$$

Price Effect

$$PriceEffect = \frac{CPV_{1983} - KPV_{1983}}{KPV_{1983}}$$

Coverage Effect

$$CoverageEffect = \frac{KPV_{2006} - CPV_{1983}}{KPV_{1983}}$$

Where, KPV_{2006} is real estimate at 2006 base, KPV_{1983} is real estimate at 1983 base, and CPV_{1983} is nominal estimate at 1983 base.

These formulae are for individual years.

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