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TECHNICAL ASSISTANCE REPORT

KINGDOM OF THE NETHERLANDS—ARUBA

Report on National Accounts Review Mission (November 18–27, 2019)

DECEMBER 2019

PREPARED BY

Zia Abbasi

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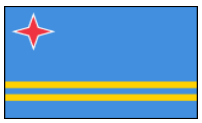
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Glossary

2008 SNA	*System of National Accounts 2008*
BOP	Balance of payments
CARTAC	Caribbean Regional Technical Assistance Centre
CBA	Central Bank of Aruba
CBS	Central Bureau of Statistics
CFC	Consumption of fixed capital
c.i.f.	Cost including insurance and freight
COE	Compensation of employees
COICOP	Classification of Individual Consumption According to Purpose
CPI	Consumer price index
CPV	Current price values
FCE	Final consumption expenditure
FISIM	Financial intermediation services indirectly measured
GDP-E	Gross domestic product by expenditure
GDP-P	Gross domestic product by economic activity
GFCE	Government final consumption expenditure
GFCF	Gross fixed capital formation
GVA	Gross value added
HFCE	Household final consumption expenditure
HIES	Household Income and Expenditure Survey
IC	Intermediate consumption
IMTS	International Merchandise Trade Statistics
I/O ratio	Intermediate consumption to output ratio
ISIC	International Standard Industrial Classification of All Economic Activities
LFS	Labor Force Survey
KPV	Constant price values
MFEC	Ministry of Finance, Economic Affairs and Culture
MOU	Memorandum of understanding
NAD	National Accounts Division
NAS	National Accounts Survey
NPISHs	Non-profit institutions serving households
PIM	Perpetual inventory model
PPI	Producer price index
SDDS	Special Data Dissemination Standard
SDGs	Sustainable Development Goals
SSB	Social Security Bank
SUT	Supply and Use Tables
TA	Technical assistance
TD	Tax Department
TES	Tourist Expenditure Survey
TTMs	Trade and transport margins

SUMMARY OF MISSION OUTCOMES AND PRIORITY RECOMMENDATIONS

1. A technical assistance (TA) mission was undertaken by the Real Sector Statistics Advisor in the Caribbean Regional Technical Assistance Centre (CARTAC) during November 18-27, 2019, to assist the Central Bureau of Statistics (CBS) in assessing and improving the national accounts. This was the first CARTAC real sector statistics mission to Aruba. Annual current price estimates of GDP by economic activity (GDP-P) and by expenditure (GDP-E) are disseminated by the CBS. Annual GDP constant price estimates prior to 2013 were derived by deflation using the All Items Consumer Price Index (CPI). Annual GDP constant price estimates for 2013-2017 were derived by directly deflating value added at the industry level. The International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4 is used.

2. The CBS plans to recompile and disseminate the revised annual current price estimates by January 2020, and improved constant 2013 price estimates by June 2020. The CBS is actively responding to the needs of the authorities for more timely and robust national accounts. It has compiled the SUT for 2013 and used the SUT estimates to produce annual GDP-E and GDP-P current price estimates for 2013 to 2017, as well as internal preliminary estimates for 2018 based on ISIC Revision 4. In addition, the CBS has started to develop quarterly GDP-P estimates. However, ongoing production of quarterly GDP-P requires additional staff and resources. In finalizing the supply and use tables (SUT) for 2013, the CBS will also implement the most relevant *System of National Accounts 2008 (2008 SNA)* changes. Use of the SUT benchmark estimates, more representative price indices and volume indicators, and improved statistical techniques will result in more robust debt and fiscal revenue to GDP ratios, and real GDP growth rates. The revised SUT will be used to update the Tourism Satellite Accounts, and used for fiscal gap analysis in order to improve tax compliance and collection.

3. The SUT estimates and source data were assessed and areas for improvement have been identified. The SUT estimates for 2013 cover 96 industries and 94 product groups. The input data and methodology used by the CBS are more comprehensive, internally consistent and detailed than the indicators and methodology used for the initial GDP estimates of the Central Bank of Aruba (CBA). It is worth noting that the CBA has already published the CBS's GDP estimates. The CBS has used data from the 2014 Economic Census and 2016 Household Income and Expenditure Survey (HIES) to produce good quality supply and use estimates. Areas for improvement have been identified, including greater use of financial statements data from the Tax Department (TD) for 2013. In addition, incorporating the cost of ownership transfer and the financial intermediation services indirectly measured (FISIM) methodology will result in a further upward revision in the GDP levels.

4. The CBS relies heavily on administrative data sources in compiling the GDP estimates due to an inadequate budget for data collection activities. The SUT and annual estimates for 2013 to 2017, and preliminary estimates for 2018, are based mainly on the balance

of payments (BOP) services and financial sector data, international merchandise trade statistics (IMTS), annual reports and financial statements for businesses, tax system turnover and wage bill data, Government accounts data and annual reports of extra-budgetary institutions, Tourist Expenditure Survey (TES) data, and employment and earnings data from the Social Security Bank (SSB). However, the CBS needs to expand the monthly TES sample to further improve tourist expenditure estimates, and conduct a quarterly National Accounts Survey (NAS) to further improve the quality of output and intermediate consumption (IC) estimates of businesses and non-profit institution serving households (NPISHs), as well as collecting more representative quarterly volume indicator data.

5. Improving the GDP-P methodology is a high priority for the CBS. Advice was provided on extrapolating the estimates from the 2013 SUT benchmarks to ensure that the informal sector activities continue to be covered, the calculation and allocation of FISIM, implementing the commodity flow approach for the construction and wholesale and retail trade, using representative composite weighted volume indicators and/or price deflators to estimate constant price output and IC, and improving IC to output (I/O) ratios at current prices. The methodology for compiling the 2012 estimates, and back-casting to 2000 was explained. To build capacity, the methods and techniques were demonstrated to or workshopped with the CBS staff.

6. The CBS plans to improve the current price GDP-E estimates and compile constant price GDP-E estimates. Advice was provided on expanding the benchmark-indicator method for household final consumption expenditure (HFCE) estimates, using the commodity flow approach for gross fixed capital formation (GFCF), adding cost of ownership transfer, and improving changes in inventories estimates. Suitable volume indicators and price indices were identified, and statistical techniques discussed with the CBS staff to compile the constant 2013 price GDP-E estimates. Albeit of small value, estimates of biological assets, exploration activities, research and development, database/software development, other intellectual property products, and net acquisition of valuables will be developed in the medium-term.

7. Subject to adequate funding, the CBS plans to compile another SUT, update the base year to 2018, and release quarterly GDP-P estimates. The 2018 GDP series will incorporate the other relevant *2008 SNA* changes and should result in more internationally comparable GDP estimates. The release of quarterly GDP-P estimates will allow for more timely assessment of economic developments by policymakers. The role of the authorities in resourcing and supporting the CBS in implementing the medium-term action plan will be critical.

8. The annual CBS budget needs to be increased by 350,000 Florins and six additional staff need to be recruited in order to expand data collection and the range of real sector statistics to meet the IMF's Special Data Dissemination Standard (SDDS) requirements. Ongoing compliance with SDDS requirements for macroeconomic statistics provides reassurance on data quality to key users, including creditors and credit rating agencies. Two statisticians are needed to improve the input data and methodology, compile the SUT, rebase the GDP to 2018, produce annual national accounts aggregates up to net borrowing/lending, quarterly GDP-P

estimates, and a hotels production volume index. A third statistician is required to assist with improving the monthly CPI, develop a monthly hotels and restaurants producer price index (PPI), and compile import price indices. Three statistical officers are required to conduct and process the input data from expanded monthly TES and prices surveys, and the quarterly NAS.

9. The mission and the Director of the CBS met with the Minister of Finance, Economic Affairs and Culture to discuss the rebased estimates and the 2020-2025 action plan. The budget, staffing and data coordination plans of the CBS were also discussed. The Minister agreed to establishing formal data coordination agreements between the CBS and other government institutions, and on the need for the legislation and related reporting procedures to be strengthened. She also agreed to the 2020-2025 action plan to implement the SDDS for real sector statistics, the need for benchmark and regular surveys, and to incrementally increasing the CBS budget and staffing, subject to Cabinet approval.

10. The action plan to finalize and release the final GDP-P estimates was jointly agreed with the CBS. The following priority recommendations were identified:

Table 1. Priority Recommendations

Target Date	Priority Recommendation	Responsible Institutions
January 2020	*Release the nominal GDP-P and GDP-E estimates for 2000 to 2018.*	**CBS**
June 2020	*Release the real GDP-P and GDP-E estimates for 2000 to 2018.*	**CBS**

PREREQUISITES, DATA SOURCES AND METHODS

A. Strengthening Prerequisites, Staff Capacity and Other Resources

11. The CBS has a medium-term strategy for improving economic statistics. The Minister has endorsed the CBS plans to improve economic statistics, and the associated need for adequate budget and staffing. As part of this strategy, the mission was asked to provide advice on implementing the SDDS requirements for real sector statistics. The CBS currently produces annual current and constant price GDP-P and GDP-E estimates, the monthly CPI, and annual labor force statistics. Annual population estimates distributed by age and gender are also produced. In addition, the CBS is responsible for producing the IMTS that are part of the external sector statistics covered by the SDDS.

12. The mission met with key data users from the CBA and Department of Economic Affairs to discuss their priority data needs and identify data gaps. The officials identified improvements in the timeliness of the annual GDP estimates and robust constant price GDP

estimates as their highest priority; followed by quarterly GDP-E, GDP-P, and employment and earnings; monthly import price indices, producer price indices for hotels and restaurants, hotel production volume index and a retail sales value index; and annual institutional sector accounts in the longer-term. It was agreed that implementing the SDDS for real sector statistics would address all of these requirements.

13. There is a need to expand and improve the range of real sector statistics being produced and disseminated to meet the SDDS requirements. The CBS needs to compile annual constant price GDP-P and GDP-E estimates, and other national accounts aggregates up to net lending for the economy. Quarterly GDP-P in current and constant prices also need to be produced. The associated annual and quarterly implicit price deflators/price indices also need to be compiled. In addition, the CBS needs to develop a monthly hotels and restaurants PPI and produce a monthly volume production index for the most significant industries, which would be accommodation and food service activities. The CBS can seek an exemption for only having an annual Labor Force Survey (LFS), instead of a quarterly LFS, as it can potentially compile quarterly employment and earnings by industry using the SSB data and the unemployment rate is not volatile. Forward-looking indicators are encouraged but not prescribed under the SDDS. However, depending on the volatility in the data source, the CBS could produce monthly retail sales using tax system turnover data. Finally, SDDS subscribers are encouraged to produce quarterly institutional sector balance sheet data for financial assets and liabilities. Critically, the CBS needs to ensure that the full range of real sector statistics are disseminated to the public according to the SDDS timeliness requirements set out in an advance release calendar.

14. Additional budget and staff are required. The CBS currently has approximately 14 staff dedicated to economic statistics. A further two statisticians are needed for the National Accounts Division (NAD) to improve the input data and methodology, including regular updating of the business register, conducting the quarterly NAS, compiling the 2018 SUT, rebasing the GDP constant prices to 2018, producing annual national accounts aggregates of gross national income, disposable income, saving and net borrowing/lending; producing quarterly GDP-P current and constant price estimates; and a hotels production volume index. A third statistician is needed to assist with improving the quality of the CPI in terms of quality adjustment and product substitution, developing a hotels and restaurants PPI, import price indices and building materials price indices. In addition, three statistical officers are required to conduct and process the input data from the expanded monthly TES and quarterly NAS and prices surveys. The CBS will then be able to assist the Customs Department, TD and SSB to code their register units using ISIC Revision 4; and expand collection of administrative data from other government institutions and public corporations. The CBS will further assist the Customs, SSB and TD in using these industry and occupational classifications of registered units to sort reported financial and contributions data by industry and size to identify outliers for further investigation, thereby improving data quality, compliance and potentially increased fiscal revenue collection.

15. Ensuring the quality of real sector statistics requires a stable budget to conduct regular data collection. The current budget arrangements require the CBS to request funding

every time, on a yearly budget basis, to conduct surveys. This results in delays that undermine the quality of economic statistics and make it difficult to monitor socio-demographic indicators like the Sustainable Development Goals (SDGs) properly. The authorities should provide a stable budget for core CBS data collections like the LFS, NAS, prices and TES, much as it does for processing of Customs declarations, income tax returns, and Immigration forms. In addition to the current CPI and TES data collection costs, additional funds of 70,000 Florins is required for the NAS, with a further 30,000 Florins to expand and improve the TES and prices collection.

16. The authorities need to provide annual funding for the CBS to conduct annual benchmark surveys to produce SUTs, and rebase GDP, price and volume indices on a 5-yearly cycle. Approximately 250,000 Florins per annum is needed to conduct one major socio-demographic or economic benchmark survey each year. This would smooth out the CBS budget and allow it to recruit, train and retain core staff and field enumerators. For example, following the 2020 Census of Population and Housing , the CBS would conduct a Household Income and Expenditure Survey (including an informal sector module) in 2021; Economic Census in 2022; National Health, Nutrition and Welfare Survey in 2023; National Education and Social Indicators Survey in 2024. The next 5-year cycle would commence with the Inter-Census Demographic Survey in 2025, with each of the above mentioned benchmark surveys being repeated. Without these additional staff and the associated budget, the scope to expand and improve real sector statistics to meet the SDDS requirements and monitor the SDGs is very limited.

17. Access to CBS vehicles for collection purposes also needs to be improved. Office space appears to be adequate; although a commensurate increase in computers, office equipment and other resources for the new staff will be needed.

18. Expanding the range of real sector statistics will also require additional data coordination and TA. Formal memoranda of understanding (MOU) need to be established with the Customs Department, CBA, Ministry of Finance, Economic Affairs and Culture (MFEC), SSB and TD to improve and expand the range of administrative data being provided to the CBS. During meetings with officials from the Aruba Tourism Authority, CBA and MFEC, it was agreed that the Technical Working Groups on Trade and Tourism Statistics meet more regularly and that a Technical Working Group on Balance of Payments and National Accounts be established. TA to support these activities, as well as the business register and surveys, is to be requested from other development partners. These recommended developments, and the associated TA, budget and staffing requirements, are included in the medium-term action plan 2020-2025 in Appendix I. The project timetable is included in Appendix II.

19. The CBS staff have benefited from capacity building activities of TA providers, including CARTAC. It is intended that CARTAC capacity building through TA missions and training workshops will be increased in the future, with two staff participating in the upcoming regional SUT and GDP rebasing workshop during March 9-13, 2020. In addition to the capacity building on national accounts undertaken during this mission, a price statistics mission is

tentatively planned for June 2020 that will also focus on building the capacity of price statistics staff.

Recommended actions:

- Establish the Technical Working Group on Balance of Payments and National Accounts.
- Build the capacity of the CBS staff on the use of improved source data, statistical techniques and dissemination practices for real sector statistics.

B. Finalization of the SUT Benchmark Estimates

20. The SUT estimates for 2013, and underlying source data and statistical techniques were assessed. The CBS has used data from the 2014 Economic Census and 2016 HIES to produce generally high quality supply and use estimates. The HIES expenditure data were price and volume adjusted to 2013 using the CPI and population growth rates. Other source data used to compile the SUT estimates include the CBA's BOP services and financial sector data, IMTS compiled by the CBS, government accounts and annual reports, financial statements for businesses, tax system turnover and wage bill data, tourism expenditure data, and employment and earnings data from the SSB. The HIES household consumption expenditure data were also used to derive informal sector agriculture and fishing production. The Economic Census data were used along with CBA financial sector data, financial statements for non-financial businesses from the TD, government accounts, and earnings data from the LFS and SSB to compile the output, IC, COE and gross capital formation estimates. The informal sector and subsistence activities are insignificant and have been indirectly estimated in the SUT from the demand side using household consumption expenditure data. Supply side data on the construction industry was weak but data on imported construction materials were used to improve the estimates.

21. The 2013 base year was selected because it was a normal year and more comprehensive source data were available. Although the 2016 HIES data were available, comprehensive production data for 2016 were not yet available for use. The data sources were cross-checked to ensure appropriate coverage and quality. For example, the 2014 Economic Census employment was verified using SSB employment data.

22. The SUT includes estimates for 96 economic activities classified according to ISIC Revision 4 and 94 product groups classified using the Central Product Classification. The industries were selected based on their contribution to GDP, the level of policy interest, and the ability to compile high quality output, IC and I/O ratios for 2013. The product groups in the SUT have been selected based on the need to be as detailed as the source data can adequately support; and to ensure outputs from one industry used as inputs to other industries can be identified. The resulting SUT estimates are being used to derive weights to develop composite IC price indices so that the double deflation methodology can be more fully implemented.

23. The SUT is compiled using an Excel-based system that can be maintained and updated by the NAD staff. The SUT estimates are compiled at the institutional sector level in separate templates and aggregated to produce the total economy estimates. The system is well designed, with separate worksheets to record and explain every balancing adjustment. Although data limitations have meant that taxes on products and trade and transport margins (TTMs) have had to be compiled at the total economy level. All the main imbalances were investigated and manually adjusted before applying the prorate method to allocate any residual small imbalances.

24. The detailed industry and institutional sector output, IC and gross value added (GVA) estimates were reviewed. A combination of administrative data, financial statements, HIES, LFS and SSB data have been used to improve the coverage of the agriculture, fishing and quarrying activities. The estimates were compared with the more limited agriculture and fishing data of the Ministry of Agriculture. Financial statements and turnover data from the TD, and employment and earnings data from the SSB have been used to compile output, IC, and TTMs for the non-financial corporate sector.

25. The financial sector data from the CBA have been used to compile estimates for the financial intermediaries. However, only consolidated financial data are available due to the confidentiality provisions in the CBA legislation. The TD financial statements and SSB earnings data have been used for insurance companies, other financial institutions, and financial and insurance agents and brokers.

26. The government accounts data and annual reports were used to compile the public administration, education, health, postal services, social work and SSB activities. A combination of government accounts data and other financial data were used to produce estimates for other public corporations, statutory authorities and local government.

27. For household businesses, financial statements, LFS and SSB earnings data, and HFCE estimates have been used to compile the revised estimates. For actual and imputed rentals of dwellings the HFCE estimates have been used. For the informal wholesalers and retailers, the TTM ratios developed for the corporate sector have been used.

28. Separate output, IC and GVA estimates for NPISHs have been incorporated in the SUT. The financial data of around 70 percent of NPISHs provided by the regulator of NPISHs has been grossed up using SSB earnings data to compile the output, IC and GVA estimates.

29. Detailed product level supply and use estimates have been compiled. In addition to the output product estimates, estimates are included for imports of goods and services, taxes less subsidies on products, and TTMs by product. Product taxes and subsidies have been allocated across the product groups and reconciled with the government accounts data. The HFCE and final consumption expenditure (FCE) for government and NPISHs have been allocated across product groups. The estimated output for NPISHs was added to derive the total FCE of NPISHs. The General Government output data were adjusted to deduct sales of government to

derive government final consumption expenditure (GFCE). The direct payment by the social insurance scheme of medical expenses incurred by households needs to be included in GFCE, as these are social transfers in kind.

30. Updated gross capital formation estimates have been incorporated and the IC estimates for each product group have been derived. The GFCF estimates for construction have been derived by adding the industry output less IC use for repairs and maintenance plus transfer taxes. For GFCF of machinery and equipment, the estimates have been compiled at the SUT product level.

31. Advice has been provided to improve the quality of the SUT estimates. The methodology to back cast the HIES to 2013 can be improved by using expenditure class level CPI and representative volume indicators at the SUT product level, such as the number of households, electricity connections, KWHs and volume of water supplied by utilities to households, motor vehicle registrations, number of rented and owner-occupied dwellings, student enrolments, resident departures, and number of deaths. The coverage of the financial statements data for 2013 needs to be expanded. The refinery has only been a distributor of refined petroleum products since 2013 and should be reclassified from manufacturing to wholesale and retail trade. If it starts refining again, it can be reclassified back.

32. Improved cost of ownership transfer and FISIM estimates are to be incorporated. Other costs of ownership transfer, such as legal and real estate agent costs, besides the transfer taxes need to be incorporated. The new FISIM estimates developed during the mission also need to be incorporated. The FISIM attributable to government and NPISHs as non-market producers needs to be added to both IC and output, and not deducted from GVA.

33. The estimates for accommodation services need to be improved. The coverage of the financial statements data for 2013 for accommodation services needs to be expanded. The CBA travel credits estimates includes non-resident owners payment of time-share and other owned dwelling maintenance costs, which is actually IC of imputed foreign-owned resident units. There is no imputation of accommodation services provided by these resident units to non-residents, which needs to be calculated. As an interim measure, the sum of costs approach can be used making this IC equivalent to output and hence exports of accommodation services. Therefore, these travel credits should be included in the SUT. The final SUT estimates for 2013 will be largely consistent with the *2008 SNA* concepts and classifications.

34. The coverage of gross capital formation needs to be expanded in the medium-term. Where relevant, the GFCF should also include biological assets, such as breeding livestock, dairy cows, and fruit trees; scientific research and development, development of intellectual property, databases and software. Estimates of changes in inventories and acquisition less disposal of valuables should be compiled. Relevant data from the HIES, government accounts, and financial statements should be used to compile these estimates.

Recommended actions:

- Collect additional data to update the 2013 SUT estimates.
- Implement the recommended methodological improvements discussed with the mission and recompile the 2013 SUT estimates.
- The medium-term action plan includes measuring biological assets, scientific research and development, other intellectual property, databases, and software.
- The medium-term action plan includes improving the coverage of acquisition less disposal of valuables.

C. Compilation of the Revised GDP Estimates

35. A range of administrative and survey data are used to compile the regular GDP-P current price value (CPV) estimates. These include timely quarterly employment and earnings data at the detailed ISIC Revision 4 level, and monthly turnover tax system unit record data. In addition, the aggregated data from CBA for financial and non-financial institutions, and government accounts data are used. For industries with limited supply side information, such as accommodation services, gambling, taxi operators, funeral homes, prostitution services, the estimates are compiled using various demand side data and indicators, such as tourist expenditure and number of tourist bed-nights. The Customs foreign trade data are edited, and quality adjusted to produce IMTS at the detailed commodity level for use in compiling the GDP-E estimates. Less timely but more comprehensive annual financial statements, and income tax system financial and wage bill data are used to produce final estimates. So, the 2013 to 2017 estimates are more robust than the preliminary 2018 estimates.

36. The business register was updated using the Economic Census data and is updated regularly using new SSB registration data that are cross-checked with the registration at the Chamber of Commerce. There are around 3,800 active units on the business register. The register variables of employment and the wage bill are used to gross up the financial statements data. Where deemed appropriate, earnings, turnover and employment data are used to impute for specific missing units.

37. The CBS makes extensive use of financial statements and wages data in compiling the annual GDP-P estimates. The financial statements of the largest businesses (about 32 percent), accounting for on average 71 percent of wage bill in the business register, are used to derive more reliable output and IC estimates, as more detailed income and expenses breakdowns are provided. This approach makes sense. However, the CBS needs to check financial statements for medium and small businesses to ensure any significant differences in output and IC per employee between large and medium and small businesses are reflected in the final estimates.

Table 2. Use of Financial Statements in Compiling the GDP-P Estimates

Coverage	2013	2014	2015	2016	2017	Average
Number of companies	2,514	2,704	2,862	2,984	3,272	2,867
Number of companies included in sample	661	661	964	924	1324	907
Coverage	26%	24%	34%	31%	40%	32%
Total wage expenses (Millions of Florins)	1,045	1,047	1,070	1,113	1,540	1,163
Wages in sample (Millions of Florins)	673	682	775	778	1,242	830
Coverage	64%	65%	72%	70%	81%	71%

38. The GDP-P estimates of the CBS are compiled at a sufficiently detailed industry level. Further splitting into government and non-government sectors for compilation purposes increases the industries to 102 industries. Use of different source data and price deflators increases the products to about 130 products, ensuring the estimation is being done at a sufficiently detailed level using a contemporary base year of 2013. In addition, the compilers cross-check the latest output, IC and GVA estimates of units within each industry, as well as comparing them to the estimates for the previous two years. This compares to the CBA compiling estimates for 16 industries and using base year weights from 1995 for its constant price estimates.

39. The CBS plans to improve the annual current price GDP-E estimates and compile constant price GDP-E estimates. Advice was provided on expanding the benchmark-indicator method for household final consumption expenditure (HFCE) estimates, using the commodity flow approach for gross fixed capital formation (GFCF), adding cost of ownership transfer, and improving the changes in inventories estimates using the two-year balance sheet data provided in financial statements. Suitable volume indicators and price indices were identified, and statistical techniques discussed with the CBS staff to compile the constant 2013 price GDP-E estimates. While not of significant value, estimates of biological assets, exploration activities, research and development, database/software development, other intellectual property products, and net acquisition of valuables will be developed in the medium-term.

40. The nominal GDP estimates for 2013 to 2017, and preliminary estimates for 2018, are aligned with the international standards. The CBS uses a range of administrative and survey data, such as the government accounts and annual reports, IMTS and TES, to compile the GDP-E estimates at a more detailed expenditure component level than the CBA. The main differences between the nominal GDP estimates compiled by CBA and CBS for 2013 to 2017 are in the import and export components. The fluctuations in oil prices explain most of the variance in imports. The other differences in the exports and imports are due to the CBS using IMTS, which records the gross value of all goods' exports and imports, and the TES tourist expenditure data; while the CBA continues to use the net financial transactions reported by commercial banks

that can be net or only partial payments. For example, prepayments abroad by some non-residents into overseas accounts for accommodation services in Aruba. The CBS has confirmed that the trade in goods data are correctly classified, adjusted for change of ownership and valuation, and correctly valued at free-on-board prices. However, as the CBA relies on financial transactions data, it cannot make these adjustments in order to improve consistency with the *Balance of Payments Manual 6th Edition* and *2008 SNA* standards.

41. The CBS GDP-E estimates include the partial allocation of FISIM that the CBA estimates do not. On the expenditure side, household consumption expenditure increased mainly due to FISIM expenditure on deposits, non-mortgage loans and advances. Increases in GVA, particularly in utilities and tourism related industries due to lower oil prices and more tourist expenditure also contributed to the higher GVA estimates of the CBS compared to the CBA estimates.

42. There are also differences in the way that the two institutions compile constant price value (KPV) estimates. The CBA is compiling KPV estimates of GDP-E and GDP-P using different combinations of a public sector wage index, a weighted index of trading partners' CPI indices, tourist expenditure price index, and the total CPI, using 1995 weights. In addition, three to five-year moving average growth rates are used to estimate the real growth rates for agriculture, fishing, mining and quarrying, manufacturing, pubic administration, education, health and social work that are then reconciled to the GDP-E total. By comparison, the CBS compiles KPV estimates using more disaggregated production-side price deflators, resulting in better quality estimates. The differences in the price indices and moving averages methodology also contribute to differences in the KPV estimates and real GDP growth rates.

43. However, there is scope to improve the constant price estimates of the CBS. Significant use has been made of sub-group level price indices to directly deflate nominal industry GVA estimates. Industry group level or the total GDP deflator are used to produce the KPV estimates for 31 out of the 96 industries. Industry level wage indices have been used for a number of industries, some for government and NPISHs, but this is not ideal for deriving KPV estimates of GVA that includes consumption of fixed capital, other taxes on production and net profits.

44. Detailed advice on implementing the double deflation methodology to improve the constant price GDP-P estimates has been provided. The techniques for deflating CPV output and IC independently, and using more representative price indices for output and composite price indices for IC, and then deriving the GVA as a residual, were demonstrated and explained in detail. The composite IC price indices will use the SUT absorption matrix weights and product level price deflators for each industry. In addition, advice was provided on use of various price deflators (e.g., domestic CPI indices, partner country export price indices, World Economic Outlook price indices) and volume indicators (e.g., cement, fuel, tourist bed-nights) that can be used to produce annual and quarterly constant price GDP-E estimates.

45. The NAD team has started working on redeveloping the constant price methodology. New files are being developed by NAD staff for price and volume indices, with 2013 = 100. The various detailed CPI will be adjusted by removing the turnover tax to be able to use them as proxy price indices for output and IC, assuming trade margins remain a fixed percentage of the sale prices over time. Volume indicators, such as KWHs electricity and cubic meters of water supply by type of customer, loaded and unloaded cargo, are being converted into volume indices (2013 =100), as required.

46. The mission has provided advice and demonstrated techniques on linking the 2013 series to the previous 2000 GDP-P series. The first step is to compile the 2012 nominal GDP-E and GDP-P estimates. The next step will be to incorporate data revisions and adjust for industry reclassifications in the 2000 to 2011 nominal GDP series, as appropriate, before adjusting backward for coverage improvements. How far back the coverage adjustments are taken or phased out will depend on how far back that additional activity was known to have been undertaken. Finally, the revised 2000 industry production estimates will be extrapolated forward using suitable volume indicators to derive the KPV estimates for 2000 to 2012, which can then be linked to the 2013 GDP KPV series.

47. The GDP estimates are to be recompiled and linked by June 2020. The CBS will collect the additional value, volume and prices data needed; incorporate the SUT benchmark estimates, the additional source data and methodological improvements; and recompile the nominal GDP-E and GDP-P estimates for release by end-January 2020. The updated and linked GDP-E and GDP-P constant 2013 price estimates will be compiled for release by end-June 2020.

Recommended actions:

- Collect the additional value, volume and prices data needed to recompile the annual GDP-P and GDP-E estimates.
- Incorporate SUT estimates into the compilation workbooks.
- Recompile the current price GDP-E and GDP-P estimates for 2000 to 2018 and release the revised estimates.
- Compile the annual constant 2013 price GDP-E by expenditure component and GDP-P estimates at the industry level, using ISIC Revision 4 classification, for 2012 to 2018.
- Compile annual constant 2000 price GDP-P estimates at the industry level, using ISIC Revision 4 classification, for 2000 to 2012.
- Complete the linking of the 2013 GDP series to the 2000 GDP series.
- Release the constant 2013 price annual GDP-E and GDP-P estimates for 2012 to 2018, linked to the 2000 to 2012 constant 2000 price GDP series.

DETAILED TECHNICAL ASSESSMENT AND RECOMMENDATIONS

Priority	Action/Milestone	Target Completion Date
Outcome: Build institutional capacity to produce and disseminate real sector statistics		
H	Build capacity on the use of improved source data, statistical techniques and dissemination practices for real sector statistics.	10/31/2020
H	Establish the Technical Working Group on Balance of Payments and National Accounts.	10/31/2020
Outcome: Data are compiled using the framework, concepts and definitions of the 2008 SNA		
H	Collect additional value, volume and prices data to update the 2013 SUT and recompile the annual GDP-P and GDP-E estimates.	01/31/2020
H	Recompile and balance the 2013 SUT estimates.	01/31/2020
H	Incorporate SUT estimates into the compilation workbooks.	01/31/2020
H	Recompile and disseminate the current price GDP-E and GDP-P estimates for 2000 to 2018.	01/31/2020
H	Compile the annual constant 2013 price GDP-E by expenditure component and GDP-P estimates at the industry level, using ISIC Revision 4 classification, for 2012 to 2018.	05/31/2020
H	Compile annual constant 2000 price GDP-P estimates at the industry level, using ISIC Revision 4 classification, for 2000 to 2012.	06/15/2020
H	Link to 2000 and 2013 constant price GDP-P estimates.	06/15/2020
H	Release the constant 2013 price annual GDP-E and GDP-P estimates for 2012 to 2018, linked to the 2000 to 2012 constant 2000 price GDP series.	06/30/2020
H	Publicly disseminate the initial 2019 current and constant 2013 price annual GDP-E and GDP-P estimates.	10/31/2020

A. Officials Met During the Mission

Name	Title/Institution
Honorable Ms. Xiomara Ruiz-Maduro	Minister, Ministry of Finance, Economic Affairs and Culture (MFEC)
Mr. Edgar Croes	Advisor to the Minister, MFEC
Ms. Shanoulle Bikker	Communications Officer, MFEC
Ms. Desiree Helder	Acting Director, Central Bureau of Statistics (CBS)
Mr. Herry Koolman	Manager, National Accounts Division (NAD), CBS
Mr. Harold Helder	Statistician, NAD, CBS
Mr. Jose Hernandez	Statistician, NAD, CBS
Mr. Herby Kock	Statistician, NAD, CBS
Ms. Roslyn Salas-Vrolijk	Statistician, NAD, CBS
Ms. Deborah van Rijn	Statistician, NAD, CBS
Mr. Jonathan Upegui	Statistician, NAD, CBS
Ms. Marjolène van den Biezen-Marques	Specialist, Information Services, CBS
Ms. Miriam Boekhoudt-Helder	Specialist, International Merchandise Trade Statistics, CBS
Ms. Cheryl Feliciano	Specialist, Tourism Statistics, CBS
Mr. Leo da Silva	Manager, Business Statistics, CBS
Ms. Melanie Kelly	Manager, Research Department, Aruba Tourism Authority
Mr. Ryan Peterson	General Manager Economic Policy, Central Bank of Aruba (CBA)
Mr. Wakidi Atmowirono	Advisor, Statistics Department, CBA

Ms. Sherina Arends	Manager, Statistics Department, CBA
Mr. Leo de Haan	Manager, Research Department, CBA
Mr. Giantcarlo Croes	Deputy Manager, Research Department, CBA
Mr. Derrick Werleman	Director, Department of Finance, MFEC
Mr. Giovanni Ridderstaat	Staff, Department of Finance, MFEC
Ms. Judesca Briceno	Head, Economic Policy and Research, Department of Economic Affairs, Commerce and Industry
Mr. Mercelino (Gino) Kock	Policy Advisor, Economic Policy and Research, Department of Economic Affairs, Commerce and Industry
Mr. Jason Lejuez	Economist, Macro-Fiscal Unit, Department of Economic Affairs, Commerce and Industry
Ms. Luenne Gomez-Pieters	Director, Tax Department (TD)
Mr. Darrel Farro	Information Manager, TD
Ms. Juelle Thode	Specialist, TD
Ms. Celina Tromp	Policy Officer, Social Security Bank

Appendix I. Action Plan 2020-2025

This section includes the medium-term action plan to expand and improve real sector statistics.

Priority	Action/Milestone	Target Completion Date
Outcome: Staff capacity increased through training, especially on developing source data, compilation methods and dissemination		
H	Increase CBS staffing for economic statistics by three statisticians and three statistical assistants/officers, progressively over three years starting in 2020.	12/31/2022
H	Continue to build capacity of the staff on the use of improved source data, statistical techniques and dissemination practices.	12/31/2025
Outcome: Data are compiled using the framework, concepts and definitions of the 2008 SNA		
H	**Prerequisites:** Secure additional TA from CARTAC and other development partners to implement this project.	12/31/2020
H	Implement or improve formal data coordination through MOUs with key data providers (i.e., ATA, Customs, CBA, Labor Department, MFEC, SSB and TD).	12/31/2021
H	Ensure the budget for the HIES and other data collection activities, office facilities and other resources are adequate.	12/31/2022
M	Implement a Data Quality Assurance Framework for economic statistics.	12/31/2022
H	**Data Sources:** Conduct the Census of Population and Housing and produce the results.	10/31/2021
H	Assist Customs, Labor Department, SSB and the TD in implementing ISIC Revision 4.	12/31/2021
H	Provision of detailed monthly employment, earnings and contributions data by SSB within 8 weeks after the reference quarter.	12/31/2021

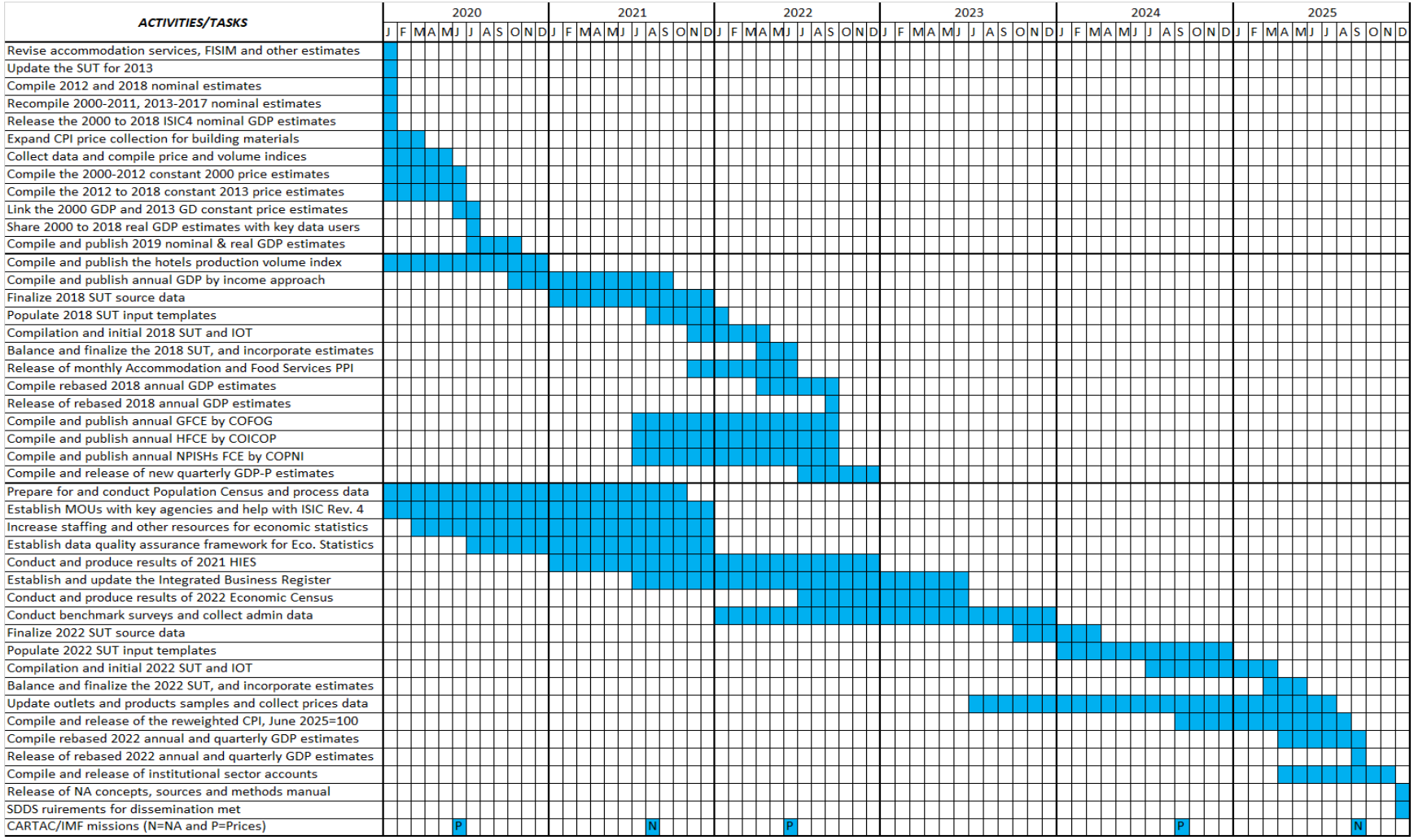
Priority	Action/Milestone	Target Completion Date
H	Provision of monthly turnover data and other tax system monthly data by TD within 8 weeks after the reference quarter.	12/31/2021
H	Regular provision of annual tax system data by the TD commences.	12/31/2021
H	Conduct and produce results of the 2021 Household Income and Expenditure Survey, including the informal sector module.	06/30/2022
H	Assist the SSB with occupation classification coding.	12/31/2022
H	Conduct and produce results of the 2022 Economic Census.	06/30/2023
H	Establish the Integrated Business Register, and ensure comprehensiveness for the 2022 reference year.	06/30/2023
H	Conduct the National Accounts Survey for the 2021 and 2022 reference years and produce the survey output data for the SUT.	12/31/2023
H	Complete data collection to improve industry and institutional sector coverage and compile the 2022 SUT.	03/31/2024
H	**Compilation Methods:** Compile the annual and quarterly implicit price deflators/price indices for GDP and industries.	09/15/2020
H	Compile and release the monthly volume production index for accommodation services (December 2017=100)	12/31/2020
H	Populate 2018 SUT input templates with source data.	01/31/2021
H	Compile the 2018 SUT industry and product balances.	04/30/2021
H	Compile the make and absorption matrices estimates.	04/30/2021
H	Balance the 2018 SUT estimates.	06/15/2021
H	Incorporate 2018 SUT estimates into the national accounts system.	06/30/2021
H	Compile rebased annual and quarterly GDP-P current and constant 2018 price estimates, as well as implicit price deflators.	09/15/2021
M	Link the GDP 2018 series to the 2013 series.	09/15/2021

Priority	Action/Milestone	Target Completion Date
H	Compile gross national income and other aggregates up to net lending for the economy.	09/15/2021
M	Measure biological assets, scientific research and development, other intellectual property, databases, and software.	09/30/2024
M	Improve coverage of acquisition less disposal of valuables.	09/30/2024
H	Populate 2022 SUT input templates with source data.	12/31/2024
H	Compile the 2022 SUT industry and product balances.	03/31/2025
H	Compile the make and absorption matrices estimates.	03/31/2025
H	Balance the 2022 SUT estimates.	05/15/2025
H	Incorporate 2022 SUT estimates into the national accounts system.	05/31/2025
H	Incorporate 2022 SUT estimates and compile CPI June 2025=100.	08/22/2025
H	Compile rebased annual and quarterly GDP-P current and constant 2022 price estimates, as well as implicit price deflators.	09/15/2025
M	Link the GDP 2022 series to the 2018 series.	09/15/2025
H	**Dissemination:** Release of the monthly production volume index for hotels, 2017=100.	12/31/2020
H	Release annual GDP by income approach estimates.	09/30/2021
M	Publish annual Government final consumption expenditure by Classification of the Functions of Government.	09/30/2022
M	Publish annual final consumption expenditure by NPISHs by Classification of the Purposes of Non-Profit Institutions Serving Households.	09/30/2022
M	Publish HFCE by Classification of Individual Consumption According to Purpose	09/30/2022

Priority	Action/Milestone	Target Completion Date
H	Release rebased annual GDP-E and GDP-P current and constant 2018 price estimates, as well as implicit price deflators.	09/30/2022
H	Release of quarterly GDP-P current and constant 2018 price estimates.	12/31/2022
H	Release of the monthly Accommodation and Food Services PPI.	06/30/2022
H	Release of the reweighted monthly CPI, June 2025=100.	08/31/2025
H	Release rebased annual and quarterly GDP-P current and constant 2022 price estimates, as well as implicit price deflators.	09/30/2025
H	Release rebased annual and new quarterly GDP-E current and constant 2022 price estimates, as well as implicit price deflators.	09/30/2025
M	Release of institutional sector accounts estimates.	11/30/2025
M	Release the revised national accounts concepts, sources and methods manual.	12/31/2025
H	Ensure that the full range of real sector statistics are disseminated to the public according to the SDDS timeliness requirements set out in an advance release calendar.	12/31/2025

Appendix II. Project Timetable 2020-2025

This section includes a timetable for the implementation of the new action plan, including task commencement and completion dates.



Appendix III. Data Quality Assessment Summary

Data Quality Assessment Framework

Assessment Ratings: 5 – Fully observed and implemented to 1 - Practice not observed/not implemented.

DQAF Element	Assessment	Comments
Overall Assessment	**3.3**	
0. Prerequisites of quality	**3.2**	
0.1 Legal and institutional environment is supportive of NA statistics.	**3.8**	
0.1.1 The responsibility for collecting, processing, and disseminating the statistics is clearly specified.	3.6	Statistics Act 1991 governs CBS activities and is being updated. Improve consistency.
0.1.2 Data sharing and coordination among data-producing agencies are adequate.	2.5	Need to improve data/metadata coordination and sharing across agencies.
0.1.3 Individual reporters' data are to be kept confidential and used for statistical purposes only.	4.7	Publich how data is kept confidential (e.g., Rule of 3, 85/90).
0.1.4 Statistical reporting is ensured through legal mandate and/or measures to encourage response.	4.3	Need to improve compliance/response timeliness from some data providers.
0.2 Resources are commensurate with needs of NA statistical program.	**2.9**	
0.2.1 Staff, facilities, computing resources, and financing are commensurate with statistical program.	2.8	Inadequate budget, staffing, salaries, IT programming, and access to vehicles.
0.2.2 Measures to ensure efficient use of resources are implemented.	3.0	Regular program reviews are required.
0.3 NA statistics cover relevant information on the subject field.	**3.0**	
0.3.1 The relevance and practical utility of existing statistics in meeting data users' needs are monitored.	3.0	Need to improve stakeholder consultations.
0.4 Quality is a cornerstone of NA statistical work.	**3.1**	
0.4.1 Processes are in place to focus on quality.	3.1	Need more resources/staff to implement effectively.
0.4.2 Processes are in place to monitor the quality of the statistical program.	2.6	Implement a data quality assurance framework.
0.4.3 Processes are in place to deal with quality considerations in planning the statistical program.	3.7	Only by CBS. The authorities do not understand the technical complexity or costs of producing real sector statistics.
1. Assurances of integrity	**4.1**	
1.1 Statistical policies and practices are guided by professional principles.	**3.9**	
1.1.1 Statistics are produced on an impartial basis.	4.3	-
1.1.2 Choices of sources and statistical techniques as well as decisions about dissemination are informed solely by statistical considerations.	3.5	Source data decisions influenced by budget constraints. Rely mostly on administrative data.
1.1.3 The appropriate statistical entity is entitled to comment on erroneous interpretation and misuse of statistics.	3.8	-
1.2 Statistical policies and practices are transparent.	**3.5**	
1.2.1 The terms and conditions under which statistics are collected, processed, and disseminated are available to the	4.7	-
1.2.2 Internal governmental access to statistics prior to their release is publicly identified.	2.0	Public not informed of government pre-release access.
1.2.3 Products of statistical agencies/units are clearly identified as such.	4.4	-
1.2.4 Advanced notice is given of major changes in methodology, source data, and statistical techniques.	3.0	Need to make use of information papers and media releases.
1.3 Policies and practices are guided by ethical standards.	**5.0**	
1.3.1 Guidelines for staff behavior are in place and are well known to the staff.	5.0	-

DQAF Element	Assessment	Comments
2. Methodological soundness (Quality of compilation methods)	**3.7**	Quality of compilation of GDP estimates is good, but other NA aggregates not produced.
2.1 Concepts and definitions used are in accord with internationally accepted statistical frameworks.	**4.0**	
2.1.1 The overall structure in terms of concepts and definitions follows internationally accepted standards,	4.0	2008 SNA is to be followed.
2.2 The scope is in accord with internationally accepted standards, guidelines, or good practices.	**2.5**	
2.2.1 The scope is broadly consistent with internationally accepted standards, guidelines, or good practices.	2.5	Only GDP-P and GDP-E current price estimates compiled.
2.3 Classification and sectorization systems are in accord with internationally accepted standards, guidelines, or	**4.3**	
2.3.1 Classification/sectorization systems used are broadly consistent with internationally accepted standards, guidelines,	4.3	ISIC Revision 3.1 used, no COFOG.
2.4 Flows and stocks are valued and recorded according to internationally accepted standards, guidelines, or good	**3.9**	
2.4.1 Market prices are used to value flows and stocks.	4.0	-
2.4.2 Recording is done on an accrual basis.	2.8	Government is recorded on a cash basis. Company records can be off calendar year.
2.4.3 Grossing/netting procedures are broadly consistent with internationally accepted standards, guidelines, or good	4.8	-
3. Accuracy and reliability (Source data and statistical techniques are sound and statistical outputs sufficiently portray reality)	**3.0**	Source data and statistical techniques are sound and GDP estimates sufficiently portray reality. But other NA aggregates are not produced.
3.1 Source data available provide an adequate basis to compile statistics.	**3.4**	
3.1.1 Source data are obtained from comprehensive data collection programs that take into account country-specific conditions.	3.1	Expand use of SSB and TD financial data; improve ISIC Revision 4 coding; introduce NAS and expand TES and prices collection.
3.1.2 Source data reasonably approximate the definitions, scope, classifications, valuation, and time of recording required.	3.6	Improvements in classifications, valuation and scope planned. Off calendar year data, not accrual, and based on revenue not adjusted for inventory changes.
3.1.3 Source data are timely.	3.6	Need more staff for follow-up/improving responses.
3.2 Source data are regularly assessed.	**4.0**	
3.2.1 Source data—including censuses, sample surveys, and administrative records—are routinely assessed, e.g., for coverage, sample error, response error, and nonsampling error; the results of the assessments are monitored and made available to guide statistical processes.	4.0	-
3.3 Statistical techniques employed conform to sound statistical procedures	**3.4**	
3.3.1 Data compilation employs sound statistical techniques to deal with data sources.	3.6	-
3.3.2 Other statistical procedures (e.g., data adjustments and transformations, and statistical analysis) employ sound	3.2	Improvements are needed to a number of techniques, especially for constant prices.
3.4 Intermediate results and statistical outputs are regularly assessed and validated.	**3.2**	
3.4.1 Intermediate results are validated against other information where applicable.	4.0	-
3.4.2 Statistical discrepancies in intermediate data are assessed and investigated.	3.0	-
3.4.3 Statistical discrepancies and other potential indicators or problems in statistical outputs are investigated.	2.6	-
3.5 Revisions, as a gauge of reliability, are tracked and mined for the information they may provide.	**1.0**	
3.5.1 Studies and analyses of revisions are carried out routinely and used internally to inform statistical processes	1.0	Need to undertake revision studies on regular basis.

DQAF Element	Assessment	Comments
4. Serviceability (Statistics, with adequate periodicity and timeliness, are consistent and follow a predictable revisions	**2.7**	Timeliness of GDP releases to be improved to within 9 months after the reference year.
4.1 Periodicity and timeliness follow internationally accepted dissemination standards.	**2.3**	
4.1.1 Periodicity follows dissemination standards.	2.5	Only annual GDP-P and GDP-E available.
4.1.2 Timeliness follows dissemination standards.	2.0	Annual GDP estimates are published 10 months, not 6-9 months after reference year.
4.2 Statistics are consistent within the dataset, over time, and with major datasets.	**3.2**	
4.2.1 Statistics are consistent within the dataset.	3.8	Largely consistent. GDP-P not based on benchmark extrapolation in nominal terms.
4.2.2 Statistics are consistent or reconcilable over a reasonable period of time.	2.9	-
4.2.3 Statistics are consistent or reconcilable with those obtained through other data sources and/or statistical	3.0	BOP and GFS not consistent with 2008 SNA.
4.3 Revision policy and practice—Data revisions follow a regular and publicized procedure.	**2.5**	
4.3.1 Revisions follow a regular and transparent schedule.	1.6	Users need more information.
4.3.2 Preliminary and/or revised data are clearly identified.	5.0	-
4.3.3 Studies and analyses of revisions are made public (see	1.0	No regular revision studies.
5. Accessibility (Data and metadata are easily available and assistance to users is adequate.)	**3.1**	
5.1 Statistics are presented in a clear and understandable manner, forms of dissemination are adequate, and statistics are made available on an impartial basis.	**2.7**	
5.1.1 Statistics are presented in a way that facilitates proper interpretation and meaningful comparisons (layout and clarity of text, tables, and charts).	3.0	Additional details should be provided.
5.1.2 Dissemination media and format are adequate.	3.8	-
5.1.3 Statistics are released on a preannounced schedule.	1.0	No schedule of release dates.
5.1.4 Statistics are made available to all users at the same	3.0	-
5.1.5 Statistics not routinely disseminated are made available	2.8	-
5.2 Up-to-date and pertinent metadata are made available.	**3.0**	
5.2.1 Documentation on concepts, scope, classifications, basis of recording, data sources, and statistical techniques is available, and differences from internationally accepted standards, guidelines, or good practices are annotated.	3.0	Metadata needs to be updated regularly.
5.2.2 Levels of detail are adapted to the needs of the intended audience.	3.0	-
5.3 Assistance to users— Prompt and knowledgeable support service is available.	**3.7**	
5.3.1 Contact points for each subject field are publicized.	2.8	-
5.3.2 Catalogs of publications, documents, and other services, including information on any changes, are widely available.	4.5	-

Appendix IV. Improving Data Sources and Indicators

Administrative Data

1. A range of administrative data are available from government agencies that are used or could be used by the Central Bureau of Statistics (CBS) to produce the GDP estimates, including registration data from the Chamber of Commerce; foreign trade data from the Customs Department; financial sector data from the Central Bank of Aruba (CBA); employment and earnings from the Social Security Bank (SSB), and tax system data/financial statements from the Tax Department (TD); and government accounts data from the Ministry of Finance, Economic Affairs and Culture (MFEC). Coverage of illegal activities can be improved using information from Customs and the Police Departments, on drug seizures and percentage of seizures compared to the estimated supply. The police could also provide information on other illegal activities. The CBS is expected to establish memorandum of understanding (MOU) with the relevant institutions as soon as practical, to assist with data sharing and implementing classifications, standards and quality assurance frameworks.

Agriculture and fishing data

2. The Agriculture and Fisheries Departments are significantly under-resourced, so very limited administrative and regulatory data are available, such as numbers of slaughtered animals by type of livestock. Given that the tax paying units data are available and these activities are insignificant, the CBS will need to rely on indicator data on imported inputs and more frequent Household Income and Expenditure Surveys (HIES), annual Labor Force Surveys (LFS), and the ten-yearly Census of Population and Housing to estimate these activities.

Central Bank of Aruba data

3. The mission met with staff from the CBA to discuss the coverage, data quality and international standards relating to balance of payments (BOP) and monetary and financial statistics. CBA codes all financial institutions it regulates to International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4 and institutional sector. The monetary and financial statistics provide good coverage of commercial banks. However, deposits and loans data for depository corporations other than commercial banks are not collected or provided to the CBS. Special purpose entities without physical presence, and other credit-granting (i.e., retail stores and money lenders) are also not covered. In the meantime, the CBS will need to collect financial data and stocks of deposits and loans data directly from the other depository corporations and credit-granting institutions. At this stage, the CBA regulates financial intermediaries only. However, its regulatory role is expected to be expanded to cover all credit granting institutions when the revised legislation is enacted.

4. The BOP is being produced on a quarterly and annual basis using a range of source data, including the International Transactions Reporting System, which is the core of the data

collection of the CBS for the BOP. This reporting system comprises monthly reports on settlements between residents and nonresidents of Aruba made through intermediation of banks in Aruba, and quarterly reports by residents on settlements they make through intermediation of non-resident banks and on transactions settled through intercompany accounts and foreign investment accounts.

5. The reporting system is supplemented with quarterly surveys on portfolio investment and other investment, and an annual survey on direct investment. Banking transactions and CBA transactions are derived directly from balance sheets. The supplementary data sources are essential for the compilation of International Investment Position. The reporting system and supplementary surveys provide a good coverage of BOP transactions and IIP stocks as they are supported by foreign exchange regulations that impose licenses for outgoing payments and prescribe that accounts with non-resident banks and other accounts are reported to the CBA. The data on residents' deposits with, and loans from non-resident banks and interest payable and receivable can be used to derive imports of financial intermediation services indirectly measured.

6. The additional data needed for full compliance with the *Balance of Payments Manual 6th Edition* and *System of National Accounts 2008* standards are available from these surveys; as well as from the CBS data sources, such as the International Merchandise Trade Statistics (IMTS) and the Tourism Expenditure Survey (TES). The CBA is planning to fully implement the standards by incorporating these source data into the BOP by 2022. These additional data will enable the compilation of the BOP on an accrual basis, as the cash-based reporting system does not provide that information. The direct investment survey provides information on retained earnings by direct investment enterprises, which has not been used for the compilation of reinvested income. Interest income on portfolio investment and other investment is available on an accrual basis, but this information is also not used for the compilation of the BOP. To the extent that the CBA has not implemented the *Balance of Payments Manual 6th Edition* standards, the GDP by expenditure estimates produced by the CBS will be different to the current published BOP estimates being produced.

Government accounts data

7. Quarterly and annual government accounts data are provided to the CBS by the MFEC. Timeliness for detailed quarterly revenue and expenditure data at the organizational unit level can be provided by six weeks after the quarter. The mission and CBS staff met with the Director and staff of the Department of Finance to discuss data access, coverage, quality and standards. The coverage is for all of General Government. However, there can be significant delays in quarterly financial reporting and annual financial reports of extra-budgetary units. Tax revenues are recorded on a cash basis, expenses are recorded on a payments order basis, and capital expenditures and non-tax revenues are recorded on an accrual basis. Compensation of employees and purchases of goods and services data are available at a lower organizational unit level, such as sports and youth development, to be able to sort output, IC and GVA using the

Classification of Function of Government. The coverage, and classification of revenue and expenditure needs to be improved in line with the *Government Finance Statistics Manual 2014*.

8. There is an inventory stock of government assets. All purchases of assets that can be used for more than one year and are valued at or above 2,500 Florins are added to the stocks, while sales of assets are deducted from the stocks. The Department applies business accounting standards regarding the life of the asset and uses historical cost for valuation. The classification of the assets is non-standard but there is enough information to classify the assets into buildings (including additions, alterations, and refurbishment); and transport equipment, ICT equipment, other machinery and equipment, furniture, and other durables. There is sufficient data for CBS to use to develop a perpetual inventory model for government, and price adjust the assets to develop better estimates of consumption of fixed capital (CFC).

International Merchandise Trade Statistics

9. The Customs Department provides detailed foreign trade exports and imports data to the CBS that is used to produce the IMTS. All imports into and exports and re-exports out of the economy are recorded (including the duty free zone) on a general trade basis. Adjustments are made for fuel imports not measured by Customs, as well as sales of fuel to non-resident carriers. In addition, the CBS industry codes the registered exporters and importers by ISIC Revision 4. The trade in goods data are correctly classified, adjusted for change of ownership and valuation, and correctly valued at free-on-board prices. All major equipment imports are reviewed to determine if they are financial or operational leases.

Social Security Bank data

10. The SSB earnings data are used extensively by the CBS in updating the business register, and for grossing up the financial statements based estimates for the non-financial sub-sector, NPISHs and formal sector household businesses. The SSB has data for around 3,500 employing units and 50,000 job holders, including employed persons with more than one job. The employer contributions are collected by TD on behalf of the SSB. Compliance levels are around 97 percent. Self-employed persons are not required to make social contributions but it is expected that the SSB will start collecting contributions from own-account workers in the medium-term. The employing units are not classified by industry and there is no coding of employees by type of occupation. Hours worked data are also not collected.

11. The need to establish a MOU between CBS and SSB is a high priority. The CBS can support the SSB in industry coding all employing units to the ISIC Revision 4, as well as occupational coding. As long as there is a unique identifier for each worker, it should also be possible to identify multiple job holders and consolidate these so that employment and wages statistics by main job and industry can be compiled and published on a quarterly basis. Support in developing risk management techniques (e.g., outlier analysis) to identify under compliance is also required but this will require the SSB also collecting hours worked per job/employee data.

Tax Department data

12. Access by the CBS to financial statements submitted to the TD is absolutely critical for producing good quality GDP estimates. The CBS staff select and extract detailed information from the financial statements of the largest units for each industry. Unfortunately, the taxpaying units are not classified by industry. The CBS staff need to help the TD to code all the taxpaying units to ISIC Revision 4. Virtually all businesses are registered for the tax, with around 14,000 active units reporting monthly data. Of these, around 8,000 units are registered for company income tax. Some 4,000 units are large and medium taxpayer units. The turnover data correctly coded to ISIC Revision 4 would enable the CBS to improve its business register and quarterly GDP-P estimates in the medium-term. The turnover reported includes all sales, whether or not subject to the turnover tax. However, the timeliness of reporting to the TD needs to be improved in order for the data to be available to the CBS within 8 weeks after the reference quarter.

13. The mission and CBS staff met with the TD staff to discuss data access, classification and quality issues. The CBS currently has access to monthly data from the turnover tax system, as well as financial statements and reports provided to the TD by taxpayer units. The TD is currently implementing a modernization strategy, to be completed by 2020, to improve online lodgment, compliance and management information systems. Currently, timeliness of reporting is monitored and a tax audit system is in place to improve tax payments. It is intended that taxpayer units will enter financial statement information online. As reports are filed at the enterprise group level for around 200 businesses, it is necessary for the CBS to use financial statements data to prorate the turnover across the different ISIC activities. It will be essential that the TD ensures that these large taxpaying units continue to provide the detailed establishment level data to TD online.

14. The need to update the MOU between CBS and TD has been agreed. The TD is interested in receiving CBS support in industry coding all taxpayer units to the ISIC Revision 4 that can be extended to occupational coding of personal income tax payers. Support in developing risk management techniques to identify tax minimization is also required. There is scope for the TD to modify its online forms to include requiring taxpayer units to regularly update their primary and secondary economic activities to ensure correct industry allocation and to improve outlier analysis and risk assessment. The CBS staff need to review all the online tax forms in detail and provide advice to the TD on additional data needed to improve data quality and compliance.

Tourism Surveys and Immigration Data

15. The CBS conducts a monthly TES of cruise ship passengers and stayover tourists. The sample for cruise ship passengers is around 1,800 a year, and a sample of 4,500 stayover tourists a year. A returned resident travelers survey has also been conducted since October 2018. The cruise ship passenger is sufficient. The stayover tourists sample provides very good coverage of tourists from Europe and North America, but the sample needs to be increased to 500 interviews per month to improve the coverage of tourists from other destinations.

16. The Aruba Tourism Authority works closely with the Immigration Department to process the data from the immigration cards. The official from the Authority was very confident about the quality of the immigration data. While visitors can provide their information through an online form, the Immigration Department does flag visitors from some countries requiring them to speak to an Immigration Officer on arrival. There is attention given to ensuring that residents are recorded as residents and non-residents as visitors. While there have been delays in data processing due to resource constraints, the Authority is improving processing rates and expects to be able to provide CBS with monthly data within 8 weeks from June 2020 onward. The Authority also surveys tourists, although the information collected is more geared towards promoting tourism to Aruba. The need to establish a MOU between CBS and the Authority is a high priority in order to combine the TES with the Authority's survey, and to collaborate on developing and improving tourism statistics.

Business Register and Surveys

17. The CBS maintains a business register of around 3,800 institutional units that was updated using the 2014 Economic Census and is maintained using new employer registrations with the SSB, as well as by monitoring the media and Internet for changes in structure and activities of the 200 largest business units. Careful attention needs to be paid to splitting out credit granting activities of some retailers of appliances and furniture. The SSB registration, employment and earnings data allows for regular and reasonably comprehensive updating of the employment and earnings variables. However, the register needs to include the turnover variable available from the TD system.

18. The business register should be strengthened using the TD registration, financial and turnover data for registered taxpayer units, once all the taxpayer units have been properly coded to ISIC Revision 4. The CBS should use turnover from the TD in preference to earnings for grossing up financial statements data or business survey results. The proposed strategy is to use the feedback from the Chamber of Commerce initially, and then use the SSB and TD registers to help keep the CBS business register up to date. Units on the business register would constitute the formal sector; with data for other units (i.e., own-account workers) from the Census of Population and Housing, HIES and LFS used to measure informal sector and subsistence activities.

19. The CBS needs to conduct a quarterly partial coverage National Accounts Survey (NAS) of the largest 200 businesses and 20 largest non-profit institutions serving households (NPISHs), supplemented by an annual sample survey of around 500 medium and small businesses and NPISHs. The survey is needed to collect more accurate data, including changes by type of inventories, to correctly calculate output and IC, as well as changes in inventories and gross capital formation. In addition, industry specific volume data by main products can be collected.

20. The annual sample would be selected from the updated business register for the annual NAS, including 250 medium and 250 small business units using turnover for businesses and

earnings for NPISHs. The annual samples would need to be determined at the industry level to complement the quarterly survey and ensuring that representative responses are available by industry. The medium and small business units would remain in the NAS sample for three years before being rotated out, although the two-thirds of the first sample will be in for four to five years. Separate forms will be needed for different industries, to capture their different outputs and volume data.

21. To improve the response rates for the NAS and any other economic surveys, the Impact 4-2-1 methodology should be implemented. This involves reminder/follow-up action that is four times greater for large units and twice more for medium sized units than for the small units. For the largest units, this would involve four reminder actions before the official notice of direction letter (copied to the Director of Public Prosecutions) is sent by the CBS Director to the non-responding unit. The first reminder email/visit would be dealt with by the lower level staff, the second reminder would be via telephone/visit by the supervisor, the third reminder via telephone by the Division Head and the fourth via telephone by the CBS Director. This is because the response rate targets for the large units needs to be 100 percent even if the data provided are partial. The response rates for these units in terms of completed forms should be 90 percent for preliminary results (as opposed to getting basic indicators/partial data) within three months after the reference year and 100 percent for the final results. For medium sized units there would be two reminders (also escalated), as the response rates need to be around 70 percent for preliminary and 80 percent for the final results. For small units (that will be largely homogenous for most industries) there would only be one reminder, as response rate targets are around 50 percent for preliminary results and 60 percent for final results. This approach would ensure the CBS is focusing the limited resources on ensuring the largest contributors to GDP respond.

Household Surveys

22. The CBS conducted a HIES during May and June 2016. Approximately 1,891 out of a sample of around 2,000 households responded to the survey. Aside for the known problems with non-response by wealthy households, the CBS methodologists have reviewed the reported data for non-response bias and made non-response estimates. Consumption per capita or household was used to verify the estimates. In addition to monetary purchases, data on backyard and subsistence production of agricultural products for own final use were also collected. The CBS also conducts an annual LFS with a similar sample size.

23. The CBS Director has agreed to conducting the next HIES, timed for 2021, over the whole of the calendar year, following discussions on the benefits in terms of capturing seasonality, ensuring good quality data collection due to the more skilled but fewer enumerators collecting information continuously over the calendar year, reduced supervision requirements and more easily managed logistics. Using tablets would also mean the edited output data can be produced within a moth after the field phase is concluded.

24. For the informal sector, the proposed approach is to calculate values per informal sector worker by industry multiplied by the number of these workers from the Census and grossed up HIES - if conducted through the year - or LFS, if not. Additional questions need to be added to capture expenses data for informal sector own-account workers, using the informal sector module questions provided by the mission. The HIES and LFS questionnaires also need to be amended to collect information on secondary paid activities/jobs, as these would be informal (e.g., art, handicrafts, tutoring, after school care). The HIES and LFS data on own-account workers without employees not registered with the TD, along with data on their revenue and expenses can be used to calculate output and GVA per informal sector worker by industry. The data per worker by industry will then be multiplied by the number of these workers from the Census.

Benchmark Studies and Surveys

25. The current funding model for the CBS requires bidding for additional resources for major surveys like the HIES. This often results in delays in financing that then adversely impacts on the frequency of the rebasing of the CPI and the GDP. The adoption of the international best practice model of having a continuous survey program is recommended. This involves five-yearly program of censuses and surveys. Following the 2020 Census of Population and Housing , the CBS would conduct a Household Income and Expenditure Survey (including an informal sector module) in 2021; Economic Census in 2022; National Health, Nutrition and Welfare Survey in 2023; National Education and Social Indicators Survey in 2024. The next 5-year cycle would commence with the Inter-Census Demographic Survey in 2025, with each of the above mentioned benchmark surveys being repeated. It would provide more certainty in terms of rebasing the CPI and GDP, as well as meeting the benchmark monitoring needs of various key data users (e.g., for the Sustainable Development Goals) and policy-makers on regular basis.

26. The CBS needs to conduct studies during 2021 to collect data by SUT product group on the trade and transport margins, and to update construction industry costs and mark-ups by type of construction. It is expected that the gross trade and transport margins can be derived by deducting the import or producer unit price plus percent taxes from the equivalent CPI price of products. However, the trade margins study will still be needed to split out the trade margins and identify any differences in business versus household prices. It should be based on a small sample of the largest supermarkets and specialty stores, and collect margins for broad categories of goods as classified in the SUT. The percentage of goods traded can be derived using the methodology explained during the mission of using IMTS data classified by ISIC Revision 4 to get ratios at the Harmonized System (HS) product level of direct imports versus imports by wholesalers and retailers. It can be assumed that the agents acting on behalf of importers are split similarly. The value of the splits can then be aggregated from HS to CPC and then to the SUT product level. The construction study is required so that the CBS can produce separate benchmark estimates for construction of dwellings, commercial properties, and civil works.

Prices and Price Indices

27. The monthly CPI series (June 2019=100) is based on the 2016 HIES expenditure weights and classified using the Classification of Individual Consumption According to Purpose. The prices coverage is the whole of the country and the CPI is released within three weeks after the reference month. In addition to the update of expenditure weights, the CBS updated the products being priced, sample of outlets, and reviewed the frequency of prices collection, based on the HIES two-week households' diary data. The frequency of prices collection is adequate and consistent for most priced products. However, there is considerable scope for improvement.

28. The CBS does not have a rental of dwellings survey, instead it uses inter-Census and HIES trends. Implementing a quarterly rentals survey is a high priority. The CBS needs to start collecting rates for accounting, cleaning, gardening, financial, and legal services; as well as wages of builders, carpenters, electricians and plumbers. The wages and earnings collection could be coordinated with the Labor Department that also collects earnings and hours worked. Use of the annual LFS data could also be investigated, as that also collects hours worked. In addition, the CBS needs to introduce proper imputation for missing prices and make quality adjustments. The alternate to quality adjusting is to use US CPI indices for telecommunications and ICT equipment. The final expenditure weights can also be improved by properly adjusting the HIES data for the usual areas of under-reporting, such as alcohol, tobacco, computer, electronics and telecommunication equipment, luxury goods and gambling by cross-checking with supply side data sources and using weights from a balanced SUT. The CBS needs to request a CARTAC price statistics capacity building mission for June 2020.

29. The CBS needs to develop of monthly or quarterly import price indices, at least for the more homogeneous products. To improve the construction industry and possible wholesale and retail trade industry estimates, the CBS needs to use the CPI field team to commence collecting building materials prices for bathroom ceramics, steel rods and sand and gravel; and selected import prices for heterogeneous products.

Appendix V. Improving the GDP-P Methodology

1. The compilation methodology and worksheets for producing the annual gross domestic product by economic activity (GDP-P), output, intermediate consumption (IC) and gross value added (GVA) component estimates were reviewed during the mission. The revised estimates to be published by June 2020 will be broadly consistent with the *System of National Accounts 2008 (2008 SNA)* and the International Standard Industry Classification of All Economic activities (ISIC) Revision 4. The following improvements to the annual compilation methodology are planned in the short and longer term:

- Compile the 2012 GDP-P estimates and implement the ISIC Revision 4 classification for 2000 to 2012.
- Increase the number of business financial statements from the Tax Department (TD) used in estimating industry level estimates for 2012 onward.
- Use the monthly/quarterly turnover data to adjust non-calendar year financial statements data to a calendar year basis.
- Use the current price value (CPV) estimates by industry, developed using financial statements and earnings data, to extrapolate the base 2013 estimates to ensure that the coverage of informal sector activities is continued.
- Use the annual growth in earnings to update the compensation of employees (COE), output, IC and GVA from the previous year for businesses where the current year financial data or statement are not yet available, using the previous year's ratios of COE to other variables.
- Estimate the output, IC and COE of units where financial data are not available by using their turnover and earnings data applied to the turnover and earnings ratios of COE to output and IC for similar-sized units within the same industry for which financial data are available.
- Allocate the financial intermediation services indirectly measured (FISIM) between GDP-E expenditure components and IC initially, and allocate it by industry in the medium-term.
- Compile supply and use tables (SUT) for 2018 and rebase the GDP-P constant price value (KPV) estimates.
- Discontinue the use of fixed intermediate consumption (IC) to output (I/O) ratios for the current price value (CPV) estimates.
- Develop composite weighted IC price indices for the independent deflation of IC estimates, using weights based on the SUT for 2013 using adjusted consumer price index (CPI)-based price indices (2013=100), to reflate the KPV IC to derive the CPV IC estimates or to deflate CPV estimates to derive the KPV estimates.

- Adjust the CPI price indices to remove the turnover and other taxes when used to deflate CPV output at basic prices, and use the 2013 SUT output weights for composite weighted output price indices for industries with more than one output.
- Use the benchmark-indicator approach to extrapolate the base year benchmark output estimates using more representative composite price indices or volume indicators to derive the KPV estimates.
- Improve the work-in-progress methodology for construction in the short-term and implement it for the agriculture industry in the medium-term.
- Implement the commodity flow approach for construction, and wholesale and retail trade.

2. As far as possible, an integrated compilation system for producing the annual and quarterly constant price GDP-P estimates is to be developed. Quarterly GDP-P estimates at current and constant 2013 prices are being developed. The industry estimates are based on single value or volume indicators benchmarked to the annual output and IC estimates using the Proportional Denton Method. However, where sub-annual indicator and prices data are being used to compile the annual estimates, the quarterly estimates will be compiled first with the annual estimates being the sum of the relevant quarterly estimates. The resulting estimates are to be deflated or reflated using relevant CPI or other price indices and benchmarked to derive the equivalent KPV or CPV estimates. A more disaggregated commodity flow approach is to be used for construction and for wholesale and retail trade.

ISIC A Agriculture, Forestry and Fishing

3. The current contribution to GDP of the crops, livestock and fishing industries is very small. There are no administrative production data. Agriculture, fishing and quarrying activities are combined. There is no forestry activity. The CPV estimates are based on sparse data on formal sector activities from financial statements, grossed up using earnings data from the Social Security Bank (SSB). The 2016 Household Income and Expenditure Survey (HIES) consumption of own produced agriculture products has been used to improve coverage. The SSB earnings and TD turnover data are available to compile the quarterly CPV output estimates.

4. The CPV estimates for agriculture crops can be deflated using the CPI for fruit and vegetables to derive the KPV output estimates. Separate data on quantity for animals slaughtered are available to compile the KPV estimates. If not timely, the adjusted CPI for meat and poultry could be used as a deflator for livestock. The annual KPV output, IC and GVA estimates would be derived as the sum of the quarterly KPV estimates. The quarterly CPV output estimates would be benchmarked to the annual CPV IC estimates to derive the quarterly CPV IC estimates, with the GVA derived as the residual. The adjusted CPI for fresh fish can be used as the price deflator for fishing.

ISIC B Mining and Quarrying

5. Financial statements and turnover data are available to compile the annual and quarterly CPV estimates. The output can be deflated using the adjusted CPI for sand and gravel or the materials used for dwelling repairs, if necessary. Once the National Accounts Survey (NAS) is implemented, quarterly production volumes of sand, stone and gravel should be collected.

ISIC C Manufacturing

6. The manufacturing activities include production of bakery products, other food products, beverages, wearing apparel, paper and wood products, printing, petroleum refining (now ceased), chemical products, concrete products, fabricated metal products, boat building and repairs, furniture, handicrafts and jewelry, and other manufacturing. The CPV estimates for the refinery and all other manufacturing are compiled using financial statements and earnings data. The preference is to use volume indicators for output products that are largely homogenous, such as beer, rum, other types of alcohol, soft drinks, bottled water, and cement.

7. In the absence of suitable volume indicators, the proposed price deflators include adjusted CPI for bread and bakery products for bakeries, CPI food, CPI for non-alcoholic beverages, CPI for beer, CPI for wine and spirits, composite weighted CPI for textiles, wearing apparel and footwear, and CPI books and newspapers for paper products and printing. For each of the other industries' producing building materials, use the elementary price indices for wood products, paints and varnishes, rubber and plastic products, glass, concrete and other non-metallic products, and fabricated metal products used to produce the CPI for materials used for dwelling maintenance and repairs. Use the various adjusted CPI for pharmaceuticals, medical appliances, household appliances, vehicle parts, computers, telecommunication equipment, sports and recreation goods, furniture, jewelry, and other goods to deflate the CPV output estimates for pharmaceuticals, medical appliances, machinery and equipment, ICT equipment, vehicle spare parts, furniture, jewelry, and other manufactures.

8. The NAS should be used to collect detailed level quarterly volume data (where the prices are not representative or where the SSB employment numbers are small and unstable) to compile the quarterly KPV estimates. For example, the volume of bread, beer, rum, bottled water and soft drinks, and paints. To the extent possible, the quarterly estimates should be compiled at the same level of detail as done for the annual compilation. For cases where a quarterly volume indicator is not available, use the TD turnover data can be used as a value indicator to derive the quarterly CPV estimates; with the relevant CPI used to deflate the CPV estimates to derive the annual KPV estimates.

ISIC D Electricity, Gas, Steam and Air Conditioning Supply

9. The financial statements data are used to compile the CPV output, IC and GVA estimates, with KWHs data available by type of consumer from the suppliers to compile the annual and quarterly KPV estimates. SSB earnings and TD turnover data are available to compile the

quarterly KPV estimates. The CBS needs to develop estimates of electricity generation by businesses and households for own use for the next SUT.

ISIC E Water Supply, Sewerage and Waste Management Activities

10. For water supply, sewerage and waste management, financial statements data are used to compile the annual CPV estimates, with turnover and earnings data available as value indicators to benchmark to the annual estimates to compile quarterly CPV estimates. Water supply volume data by type of consumer are available to compile the annual and quarterly KPV estimates. If possible, the sewerage activities should be estimated separately. The number of consumers billed for sewerage can be used as the volume indicator for sewerage. The estimates for the private industrial and solid waste management companies is included here in ISIC Revision 4, with employment data available to compile the quarterly estimates. However, the coverage of informal own-account refuse/waste truck operators needs to be improved.

ISIC F Construction

11. The annual CPV estimates for construction are compiled using the financial statements and earnings data. The commodity flow approach using detailed domestic output and imports of construction materials and the 2013 SUT ratios and weights should be used to derive the CPV and KPV estimates. The mission explained the methodology in detail and provided a worksheet template for compiling construction quarterly CPV and KPV estimates, with the annual estimates derived by summing the quarterly estimates; as well as the related repairs and maintenance and gross fixed capital formation (GFCF) estimates.

12. The annual financial statements and NAS data would be used to update the CPV I/O ratios moving forward from the 2013 SUT ratios. All imports of the relevant codes for construction materials would be included using the international merchandise trade data for value, including product cost, insurance and freight plus import duties and other taxes, and the turnover tax. Trade margins would then be applied. The local production of sand, gravel, wood, paints and varnishes, glass and concrete products, and fabricated metal products, less any exports, and adjusted for taxes and trade margins would be added to derive total construction material inputs. Deductions to imports for materials used in producing domestic concrete, wood and fabricated metal products should be based on extrapolating the 2013 SUT estimates using the CPV and KPV IC for those domestic industries. Mark-ups are then applied to derive the CPV IC and GVA components, as well as the total output estimates. The CBS needs to conduct a construction study, employing the services of a quantity surveyor, to develop estimates of materials, services and labor inputs; as well as profit margins by type of construction (i.e., dwellings, other buildings and civil works) for the 2018 SUT.

13. The methodology groups the CPV construction materials to align with the product level price indices from the CPI or based on any additional building material prices collected for sand and stone, steel bars, and ceramic bathroom and kitchen products. The CBS already collects

quarterly prices for a wide range of building materials and some services used to produce the CPI for dwellings repairs and maintenance. For other non-construction goods and services such as, electricity, water, hire of equipment, fuel, machinery/vehicle repairs and maintenance, legal and accounting services, various adjusted CPI can be used as proxy price deflators and the services CPI can be used for other services. A construction industry wage index based on employment and earnings data can be produced and applied to the CPV COE component. The profit margin can then be applied to the aggregated COE and IC components to derive the remainder of the CPV and KPV GVA. The same methodology can be used to compile the quarterly estimates; with the annual estimates being the sum of the quarters' estimates.

ISIC G Motor Vehicle Sales and Repairs, and Wholesale and Retail Trade

14. The annual CPV gross margins/output estimates for wholesale and retail trade are compiled using the financial statements and earnings data, with turnover data used as a proxy value indicator to compile the quarterly CPV gross margin estimates. The estimation methodology can be improved by implementing the commodity flow approach to compile the quarterly and annual KPV estimates at a disaggregated product group level. The motor vehicle repairs industry estimates are compiled separately from the various wholesale and retail trade industries.

15. The quarterly CPV and KPV output estimates for agriculture, fishing, quarrying, and the various manufacturing industries can be adjusted to remove the non-traded component (i.e., own consumption or where sold and delivered by the producer to the final user directly using the 2013 SUT product level ratios of traded and non-traded) and then used to extrapolate the 2013 base year estimate of output sold through traders domestically or exported to derive the volume indicators. The non-refundable product taxes would then be added. To this would be added the CPV of traded imports (i.e., adjusted to remove imports by end users directly, with excise, import duties and other non-refundable taxes added). The traded imported goods would be grouped into categories corresponding to the equivalent proxy CPI and deflated to derive the equivalent KPV estimates – until import price indices are available. Different margin rates should be applied by type of broad product group (e.g., fresh fruit and vegetables versus building materials). The domestic and imported components would then be added and used as value indicators to benchmark to the annual CPV gross trade margins to derive quarterly CPV gross margin estimates. The equivalent quarterly volume indicators would be benchmarked to 2013 SUT gross trade margins to derive quarterly KPV gross margin estimates. The annual financial statements data would continue to be used to derive and apply the I/O ratios to derive CPV IC and GVA; with the base period I/O ratio used to derive the KPV IC and GVA estimates. Import volumes of fuel and lubricants by the main distributors can be used as a volume indicator to extrapolate the 2013 SUT benchmarks for gas stations to derive quarterly and annual KPV gross margin estimates.

16. Annual CPV output, IC and GVA estimates for sales of vehicles and parts are based on financial statements and earnings data. The quarterly CPV estimates would be derived by

benchmarking the turnover data to the annual CPV estimates. The compiler can use the adjusted CPI for purchases of vehicles and spare parts to deflate the quarterly CPV estimates based on turnover data to derive the quarterly KPV output estimates. The annual KPV output estimates can be compiled by summing the quarterly estimates. Financial statements and earnings data are used to compile the annual CPV vehicle maintenance and repairs estimates, and the turnover data can be used as a value indicator benchmarked to the annual CPV estimates to produce the quarterly CPV estimates. These CPV estimates can then be deflated using the CPI for vehicle repairs and maintenance to derive the quarterly KPV estimates.

ISIC H Transport and Storage

17. The financial statements and earnings data are used to compile the annual CPV estimates for transport and storage, except for minibuses and taxis. For minibuses and taxis, the number of licensed/registered operators multiplied by benchmark 2013 estimates of output and GVA are used to derive the KPV estimates. The CPV output estimates for taxis are based on Tourism Expenditure Survey (TES) data with a 2.5 percent coverage adjustment for residents using these services. A volume indicator of cruise ship passengers and stayover tourist bed-nights is used to extrapolate the tourist expenditure benchmark estimate to derive the KPV estimates. For minibuses, the base year estimates are extrapolated using population growth to derive the KPV estimates, and any changes in fares are applied to derive the CPV output estimates. A fuel price index is used to adjust the KPV IC to derive the CPV IC for both.

18. The quarterly CPV output estimates for the tourist component can be compiled by multiplying the average land transport expenditure per cruise ship passenger by the number of cruise ship passengers, and the expenditure per stayover tourist by the number of stayover tourists. This can be deflated using the CPI for taxis and the CPI for minibuses to get the equivalent quarterly KPV output. The resident passengers' component can be derived by extrapolating the resident 2013 benchmark expenditure estimate for taxis and for minibuses using population growth to compile the quarterly KPV output estimates of each and then reflated using the CPI for taxis and the CPI for minibuses to derive the quarterly CPV output estimates. The benchmark 2013 I/O ratios can be used to derive the KPV IC and GVA as a residual. The KPV IC can be reflated using the composite weighted IC price index to derive the quarterly CPV IC that can be deducted from the CPV output to derive the CPV GVA for both. The annual CPV and KPV estimates would be the sum of the quarters' estimates.

19. For road freight transport, the CPV estimates are based on financial statements and earnings data. The non-fuel cargo (or containers) volumes for exports and imports should be used as a volume indicator to estimate the annual and quarterly KPV output. The annual CPV IC would be deflated using a composite IC price index to get the annual KPV IC, with KPV GVA derived as the residual. If the same composite IC price index cannot be used for quarterly estimates, the quarterly KPV output estimates can be benchmarked to the annual KPV IC to derive the quarterly KPV IC estimates, with the KPV GVA derived as a residual. The transport CPI

can be used to reflate the quarterly KPV output to derive the quarterly value indicator to benchmark to the annual CPV output to derive the quarterly CPV output estimates.

20. The CPV estimates for the foreign airline offices (using the sum of costs approach) are compiled using financial statements and earnings data. For foreign airline operations, the number of employees should be used to derive the annual and quarterly KPV estimates. For quarterly CPV estimates, the CPI for airfares can be used to reflate the quarterly KPV estimates to derive a value indicator to benchmark to the annual CPV estimates.

21. The financial statements and earnings data are used to compile the CPV estimates for the airport and port activities. The KPV estimates can be produced using a composite volume indicator of air passengers, cargo and aircraft movements for the airport and air support services; and a composite volume indicator of passengers, cargo and ship movements for the harbor/port activities.

22. For freight agents, tour operators and travel agents the CPV estimates are derived using financial statements and earnings data. The KPV estimates will be based on the same indicators as for the airport and port. Only the cargo volume indicators should be used to derive the KPV estimates for freight agents and forwarders, with turnover used as the value indicator for quarterly CPV estimates. The government accounts data are used to compile CPV estimates for postal and financial statements and earnings data are used for courier services. The turnover data can be used as the value indicator for quarterly CPV estimates, with freight volumes or employment used to derive the annual and quarterly KPV estimates. If adequate quality turnover data are not available, the transport CPI can be used to reflate the KPV estimates to derive the value indicator to benchmark to the annual CPV estimates to derive the quarterly CPV estimates.

ISIC I Accommodation and Food Service Activities

23. The annual CPV estimates are derived from the financial statements and TES tourist expenditure data, adjusted for resident expenditure using the 2013 benchmark estimates. The CBS plans to use a weighted volume index of tourist bed-nights to derive the annual KPV estimates for hotels and deflation using the CPI for outside consumption of beverages and meals for restaurants. The CPI for events catering will be used for deflating CPV estimates for conferences and events. The same demand-side methodology can be used quarterly to produce value and volume indicators to benchmark to the annual estimates to derive the quarterly CPV and KPV estimates.

ISIC J Information and Communication

24. For telecommunications and cable TV, the annual CPV estimates are compiled using the financial statements and earnings data. As the CPI for communications is not quality adjusted and employment is not a good volume indicator for this industry group due to the significant technological changes, the preference is to use volume indicators such as internet downloads,

and fixed and mobile phone call minutes to derive the annual KPV estimates. A better approach is to extrapolate the base 2013 output for each type of service using the relevant annual/quarterly volume indicators (e.g., fixed lines and calls, mobile phone call minutes, internet down loads/usage, and cable TV subscriptions) sourced from the companies or the regulator, given that the real growth in recent years has been in internet services. If this is not possible, it may be better to use the US price index for telecommunications as a proxy price deflator.

25. The financial statements and earnings data are used to compile the annual CPV estimates for publishing, and audio-visual broadcasting services. For the KPV estimates, it would be best to collect prices data on advertising slots to derive a price deflator. Otherwise, use the CPI for newspapers to deflate rather than using employment data to extrapolate. For audio-visual production and distribution activities, and computing and related activities, the financial statements and earnings data is supposed to provide adequate coverage. The CPI for cinemas should be used for cinemas. The SSB employment data can be used as volume indicators for the KPV estimates, or else the CPI for services as a deflator. The quarterly turnover and earnings data can be used as value indicators to derive the quarterly CPV estimates.

ISIC K Financial and Insurance Activities

26. Financial sector data sourced from the CBA, financial statements and earnings data are used to compile the CPV estimates. For the CBA, employment can be used as a volume indicator to derive the KPV COE estimates, with the CPI for major appliances and composite IC price indices used to derive KPV CFC and IC. The imputed bank services charges method (i.e. interest receivable less interest payable) was previously used but the CBS have since developed the worksheets to compile FISIM for banks and other financial intermediaries. The compilation methodology was improved during the mission to use the mid-point reference rates and improve the partial allocation between IC and GDP-E expenditure components. The KPV FISIM estimates are to be derived by extrapolating the benchmarks using deflated loans and deposits of commercial banks that are deflated using the All Items CPI. Then explicit fees and charges and other operating income CPV and KPV (again using All Items CPI) are added to compile total CPV and KPV output. The CPV IC and GVA are based on source data; with the KPV IC derived using a composite IC price deflator and the GVA being derived as a residual. There is a need to improve the coverage of, and collect deposits and loans data for, non-bank financial institutions.

27. The mission provided advice on calculating and allocating FISIM by institutional sector. The *2008 SNA* states that a general measure of inflation should be used to deflate deposits and loans, so the All Items CPI can be used to deflate the value of quarterly deposits and loans to derive quarterly and annual (sum of quarters) volume indicators. As practiced in other countries such as Australia and New Zealand, the SNA interest rate can be derived using the mid-point of the weighted interest rates on deposits and loans. The SNA rate is applied to the average of the opening and closing stocks of deposits for the quarter to derive the SNA interest payable for the quarter. From this estimate the actual interest payable is deducted to derive the FISIM on deposits. Similarly, the SNA rate is applied to the average of the opening and closing stocks of

loans and advances for the quarter to derive the pure interest receivable for the quarter that is then deducted from the actual interest receivable to derive the FISIM on loans and advances. The respective 2013 benchmark estimates of FISIM on deposits and FISIM on loans are then extrapolated using the deflated value of deposits and loans using the All Items CPI to derive the respective KPV FISIM estimates.

28. The CPV FISIM is then added to other CPV operating income to derive the total CPV output estimates. The All Items or services CPI can be used to deflate other operating income, depending on the type of income, to derive other operating income KPV to compile total output. The CPV IC estimates can then be compiled from the source data and a composite IC price index used to derive the KPC IC estimates; with the CPV and KPV GVA estimates derived as residuals.

29. The FISIM on loans for corporations is allocated to industry IC using the data on the value of loans by industry, with FISIM on deposits allocated to industry using a composite indicator of the sum of output and IC by industry (i.e., as most deposit accounts would be working accounts not investment deposits). FISIM on mortgages is added to real estate IC. FISIM for Government and NPISHs is added to both IC and output in the public administration and other relevant workbooks reflecting the sum of costs approach for output, as the final consumption expenditure for Government and NPISHs is calculated using the output adjusted for sales. FISIM attributable to non-residents and to households for deposits and non-mortgage loans are to be allocated to exports of services and household final consumption expenditure respectively.

30. For other financial services, the CPV estimates are based on financial statements and earnings data. The KPV estimates can be derived using the CPI for financial services or all services, otherwise an employment volume indicator can be used. The coverage of special purpose entities without physical presence needs to be investigated. The CPV estimates for the special purpose entities can be compiled using the sum of costs approach by adding the financial fees paid to the CBA or government that are basically other taxes on production, plus any COE and CFC to derive the GVA, plus any IC based on payments for accounting, legal and other services and any other inputs where there is a physical presence like electricity, rent and so on. The KPV estimates can be derived using the All Items or services CPI.

31. The CPV output for insurance companies is based on financial statements data and the *2008 SNA* compilation methodology. The annual and quarterly KPV estimates can be compiled by using the stock of registered motor vehicles, dwellings and cargo volumes for non-life vehicle, building and freight insurance; or the deflated value of the non-life insurance policies using the price index for the underlying asset being insured (e.g. construction implicit price deflator). For life insurance, the deflated value of life insurance policies (using the All Items CPI) can be used as a volume indicator. The commission fees paid by insurance companies and shown in their financial statement are paid to local insurance agents that are not covered. These fees should be treated as CPV output of the agents and data should be collected to estimate IC and GVA. The

services CPI can be used as a deflator or SSB employment used as a volume indicator to derive the KPV estimates.

ISIC L Real Estate Activities

32. The Census of Population and Housing, HIES, electricity connections, financial statements and earnings data are all used to compile the CPV estimates for owner-occupied and rented dwellings, commercial property rentals, and real estate agents. For rented and owner-occupied dwellings, the dwellings are sorted by type, geographic area and size before applying the actual rents. Benchmark rents data for 2010 from the Census and for 2016 from the HIES are interpolated and used for 2013 onward. The CBS needs to conduct a quarterly rental of dwellings survey. The base 2013 rents are applied to the volume change in dwellings to derive the KPV rental values. For commercial property rentals, the CPV estimates can be improved by including government rentals as well as the IC on rentals by businesses sourced from the financial statements' expenses data. Also, it would be better to use this as a value indicator to extrapolate the 2013 SUT estimate as that estimate should have even broader coverage.

33. The CBS plans to use 90 percent of new electricity safety certifications to move the volume indicator of number of dwellings used to compile the KPV estimates. The mission explained an improved methodology and provided an example workbook that could be used that uses the inter-census growth rate to work out what percentage of the new electricity connections should be used to move the volume indicator as the 90 percent ratio likely overestimates the growth of dwellings. Also, the 2013 benchmark estimates for commercial property rentals can be extrapolated the same way to derive the KPV estimates using the quarterly inter-census trend rates in the growth of commercial properties. The CPI actual rents can be used to reflate the KPV estimates to derive the annual and quarterly CPV output estimates, with the financial statements I/O data used to derive the annual CPV IC and GVA. The total movement in the commercial and dwelling KPV estimates can be used as a volume indicator to derive KPV estimates for real estate agents and property managers. The turnover and earnings data can be used as the quarterly value indicator for these agents and managers to derive the CPV estimates.

ISIC M Professional, Scientific and Technical Activities

34. The financial statements and earnings data are used to compile the annual CPV estimates. The annual and quarterly KPV output and IC estimates can be derived using the CPI legal services and CPI services to deflate CPV output and a composite IC price index to deflate CPV IC. Given the variance in productivity levels for these industries, using an employment volume indicator may not be appropriate. As this industry includes accounting, auditing, legal and other professional services, it should be possible to use the turnover (or earnings) data as a value indicator benchmarked to the annual CPV estimates to compile the quarterly CPV estimates. The quarterly CPV output estimates can be deflated using the same CPI deflators to

produce a volume indicator to benchmark to the annual KPV estimates to derive the quarterly KPV estimates.

ISIC N Administrative and Support Service Activities

35. The annual CPV estimates are compiled using the financial statements and earnings data for these industries. As this industry includes rental of durable goods, machinery and equipment; building cleaning, gardening and landscaping, security services, and other business services, it should be possible to use the turnover data benchmarked to the annual CPV estimates to derive the quarterly CPV output and IC estimates, with the GVA derived as a residual. The CPV output and IC would then be deflated using the relevant CPI for major appliances, cleaning, gardening or services, to derive the KPV output and a composite IC price index to derive the KPV IC estimates, with the KPV GVA derived as a residual. The same price indices can be used to deflate the quarterly CPV output to derive a volume indicator to benchmark to the annual KPV output and IC estimates to derive quarterly KPV estimates.

36. For rentals of vehicles, the annual CPV estimates can be deflated using the transport CPI and a composite IC price index to derive the KPV estimates. The turnover or earnings data can be used as value indicators to compile the quarterly CPV estimates; deflated using the transport CPI to produce a volume indicator to benchmark to the annual KPV estimates to derive the quarterly KPV estimates. Quarterly registration of rental vehicles could also be used as a volume indicator for the KPV estimates. Data on the number of patents and copyrights and royalty payments can be used as the quarterly volume and value indicators benchmarked to the 2013 estimates to produce the annual and quarterly estimates for licensing of intangible assets.

37. It would be better to use TES data as a quarterly value indicator for tour operators and a composite volume indicator of cruise ship passengers and stayover tourist bed nights as a quarterly volume indicator to benchmark to the annual CPV and KPV estimates to derive quarterly estimates. As travel agents provide services mainly to residents, the turnover data can be used as the value indicator and resident departures as a volume indicator to derive the quarterly estimates. For the other administrative and support service activities, the turnover data can be used to derive the annual and quarterly CPV estimates, with the employment used as a volume indicator to produce the quarterly KPV estimates.

ISIC O Public Administration; Compulsory Social Security Activities

38. For government services, the CPV estimates are based on government accounts data. The sum of costs approach is used to add COE, CFC and IC components to derive the output estimates. For the SSB, annual financial data provided by the SSB is used to derive the CPV estimates. An employment indicator is used to derive the government and SSB KPV estimates. The same methodology is used for public education, health and social work.

39. As discussed during the mission, the compilation workbook needs to be redeveloped to include detailed annual and quarterly CPV estimates of output, IC, GVA and final consumption expenditure by Classification of the Functions of Government and ISIC Revision 4 based on quarterly and annual Government accounts data. The KPV estimates would be derived by separately for CFC, COE and IC components, including FISIM. The CBS needs to collect the relevant wages and employment by level data from MFEC to develop and use a weighted wage index to better deflate the CPV COE estimates to derive the KPV COE estimates. The detailed expenses on other goods and services in the government accounts can be aggregated into the various expenditure products, with the best proxy adjusted CPI (i.e., 2013 = 100) used to deflate the estimates to derive the KPV estimates.

ISIC P Education

40. The annual CPV estimates for private education are derived from the financial statements and earnings data; with the KPV estimates compiled using the adjusted CPI for education. The employment data can be used as a volume indicator benchmarked to the annual KPV estimates to derive the quarterly KPV estimates. The turnover data can be used as a value indicator to derive the quarterly CPV estimates, or the quarterly KPV estimates can be reflated using the CPI for education and benchmarked to the annual CPV estimates. The annual CPV and KPV estimates for public education are compiled using the same approach as for public administration. Coverage of informal sector and after hours provision of private tutoring services, music and other non-formal education needs to be improved using Census, HIES and LFS data, as long as secondary jobs are identified.

ISIC Q Human Health and Social Work Activities

41. The financial statements and earnings data are used to compile the CPV estimates for private human health and social work, including aged care. Various medical services CPI can be used to compile the annual KPV estimates. For child care services, data on average care costs, child care center registration and the population of children up to four years old is used to derive the CPV and KPV estimates. The employment data can be used as a volume indicator benchmarked to the annual KPV estimates to derive the quarterly KPV estimates, and then can be reflated using the CPI for medical services rather than using the turnover data as a value indicator to derive the quarterly CPV estimates, if the coverage is inadequate. As most social work will be done by NPISHs, the KPV estimates can be compiled using employment as a volume indicator to derive the KPV estimates; with the adjusted CPI for social protection or hired care being used to reflate the KPV output estimates to derive the CPV output estimates. The annual CPV and KPV estimates for public health and social work are compiled using the same approach as for public administration.

ISIC R Arts, Entertainment and Recreation

42. The annual CPV estimates are compiled using the financial statements and earnings data. For gambling, the tax on winnings is used as a value indicator. Some but not all prostitution services are covered using visa permits data for the number of sex workers sponsored by bars, by number of clients, days worked, and average price per client data. Other non-observed prostitution is not measured but could be estimated based on information normally available to the police. There is also a need to measure the value of recreational/charter fishing and add that here. There is scope to improve the methodology by compiling the estimates at a more detailed ISIC level. Where possible, turnover data can be used as a value indicator benchmarked to annual CPV estimates to derive the quarterly CPV estimates. Where more representative volume indicators (e.g., gym and sports club memberships) are not available, the employment data can be used as a volume indicator to extrapolate the 2013 estimates to compile the quarterly KPV output estimates, with the 2013 I/O ratios used to derive the KPV IC and GVA estimates. Where turnover data are not available, the quarterly KPV output estimates can be reflated using the CPI for cultural and recreational services to produce quarterly value indicators to benchmark to the annual CPV output and IC estimates to compile the quarterly CPV estimates.

ISIC S Other Service Activities

43. The annual CPV estimates are compiled using the financial statements and earnings data. The methodology can be improved by compiling the estimates at a more detailed ISIC 4-digit level. Where possible, turnover data can be used as a value indicator benchmarked to annual CPV estimates to derive the quarterly CPV estimates. Where more representative volume indicators (e.g., number of deaths) are not available, employment data can be used as a volume indicator to extrapolate the 2013 estimates to compile the quarterly KPV output estimates, with the 2103 I/O ratios used to derive the KPV IC and GVA estimates. Where turnover data are not available, the quarterly KPV output estimates can be reflated using the relevant CPI of the services provided (e.g., hair salons, drycleaners) to produce quarterly value indicators to benchmark to the annual CPV output and IC estimates to compile the quarterly CPV estimates. Coverage of informal sector hairdressers and massage providers working from home needs to be improved using Census, HIES and LFS data, as long as secondary jobs are identified.

44. Volume indicators based on the number of members (or population projections as the fallback option) can be used for religious and other membership organizations. For repairs of personal and household goods, the annual and quarterly estimates will need to be compiled using employment data. The number of deaths can be used as a volume indicator for funeral services; and population growth rates for hair and beauty salons, laundry and dry-cleaning, and other services. In the absence of turnover data, the services CPI can be used for religious and other membership organizations and other services; repairs of personal and household goods CPI for repairs of personal and household goods; CPI for haircuts and personal care for hair and beauty salons; and funeral services CPI for funerals. Composite IC price indices should be used to calculate independent CPV IC estimates.

ISIC T Activities of Households as Employers

45. The annual CPV and KPV output and GVA estimates are based on the minimum wage and population growth. The number of households would be a better volume indicator but the staff indicated that this has not changed from 1.6 for several years. Nevertheless, the number of households should be used as the volume indicator to extrapolate the 2013 estimates to derive the quarterly KPV estimates. The KPV estimates can be reflated using the minimum wage to compile the quarterly CPV estimates. The annual estimates can then be obtained by summing the quarterly estimates.

Taxes less Subsidies on Products

46. The CPV estimates are compiled from annual government accounts data for taxes less subsidies on products. Any grants/interventions for public sector corporations are being treated (and deducted) as subsidies on products. For example, relevant bus passenger numbers for the bus services subsidy. The various taxes on products and sales of products as classified in the government accounts have been checked to ensure correct treatment as a product tax or a sale given that the government accounts are not based on the *Government Finance Statistics Manual* standards.

47. The deflated value of imports, and KPV output of relevant industries should be used as volume indicators to extrapolate the relevant 2013 benchmark tax and subsidy estimates. Use deflated imports to extrapolate import duties, and deflated output for domestic product taxes. As the turnover tax is cumulative and not exempt, the deflated value of both domestic output and imports should be used as a volume indicator. Deflated values of the underlying imports (e.g., beer, other alcohol, refined petroleum products) should be used as volume indicators, as relevant, for imports duties and excise. Similarly, KPV output of relevant industries would be used as volume indicators for domestic excise and taxes. For example, KPV output of beer and other alcohol would be used for domestic beer and other alcohol excise respectively. The volume of fuel would be used for the fuel excise. The KPV output for accommodation services should be used to extrapolate the 2013 room levy. The construction output implicit price deflator can be used to deflate the value of property transfers to derive the volume indicator for transfer taxes, and passenger arrivals and departures can be used as volume indicators, as appropriate, for the airport and passenger taxes.

Appendix VI. Improving the GDP-E Methodology

1. The CBS compiles annual current price value (CPV) estimates for GDP by expenditure (GDP-E). The mission provided advice on improving the CPV estimates and developing constant price value (KPV) estimates, including implementing the relevant *System of National Accounts 2008* recommendations (e.g., biological assets, artistic originals) as part of the development process. The difference between the sum of the GDP-E components independently compiled and the GDP by economic activity (GDP-P) is the statistical discrepancy. As the GDP-P estimates are usually more robust than the estimates of the expenditure components, the CPV and KPV discrepancies should be shown explicitly on the expenditure side. This provides transparency to data users that the GDP-P estimates are more accurate than the GDP-E estimates, as well as demonstrating the need to increase budget and staffing to address input data limitations.

Government Final Consumption Expenditure

2. The CPV estimates of government and Social Security Bank (SSB) output is used to produce the government final consumption expenditure (GFCE). The sale of government services are deducted from government sector output recorded in the production worksheets (e.g., public administration, public education, public health), and then the SSB and the Central Bank output are added. The output will also include financial intermediation services indirectly measured (FISIM). Any purchases of goods and services by government provided to households would also need to be added, such as the payment of health care and medical expenses on behalf of households. The KPV GVA estimates are to be derived separately for consumption of fixed capital (CFC) using a weighted composite CPI price index for transport, major appliances and ICT equipment; and compensation of employees (COE) using an employment volume indicator or a wage index as a deflator. The KPV estimates of intermediate consumption (IC) components should be compiled at a detailed expenses level using representative adjusted CPI price indices.

3. This will require modifying the compilation workbook to include the annual and quarterly CPV estimates of government output, IC, GVA (to include CFC) and GFCE by Classification of the Functions of Government and ISIC Revision 4 based on quarterly and annual government accounts data. The detailed expenses on other goods and services in the government accounts should be aggregated into 12-15 broad expenditure groups with the best proxy adjusted consumer price index (CPI), where 2013 = 100, is used to deflate the estimates to derive the KPV estimates. Although if timely, volume indicator data from utility companies on KHW electricity and cubic meter water sold to government can be used as well.

4. Prices indices that could be used include: CPI electricity, and CPI water and sewerage for the utilities expenses (if volume data not available); a goods CPI for supplies and materials; communications CPI for communications; CPI dwellings maintenance and repairs for building maintenance; CPI vehicle maintenance and repairs for vehicle maintenance; insurance CPI for insurance; land transport CPI for local travel; air transport CPI for international travel; education

CPI for training; meals away from home CPI for hosting and entertainment; a services CPI for professional and other services; and the goods CPI for other expenses. The CPV and KPV estimates for GFCE would then be derived by deducting Government sales revenue from the government output estimates at the function/industry level, using the implicit price deflator for government output to deflate government sales to derive the KPV sales estimates.

Final Consumption Expenditure of NPISHs

5. The CPV estimates of FCE by NPISHs are compiled using the output estimates that are currently compiled using financial data for around 70 percent of NPISHs provided by the regulator responsible for NPISHs, grossed up using SSB earnings data. From the output estimates, any sales of goods and services produced by NPISHs are deducted to compile the FCE of NPISHs. The CBS needs to add any purchases of goods and services by NPISHs provided to households to the FCE. The KPV output estimates can be derived by deflating the CPV COE estimates using a wage index derived from the SSB and LFS data, and a composite price index can be used for IC to deflate the CPV estimates to derive the KPV estimates.

Household Final Consumption Expenditure

6. There are CPV estimates of household final consumption expenditure (HFCE) compiled by extrapolating forward from the benchmark 2013 estimates using various value indicators for 14 product groups that represent 78 percent of HFCE in 2013. The percentage change for these expenditures are then applied to the remainder to derive total HFCE.

7. It would be better to compile the HFCE at a more detailed product level, rather than at the high level currently compiled, using relevant value or volume indicators to extrapolate the base year estimates using the Classification of Individual Consumption According to Purpose (COICOP). The available data sources include the detailed monthly imports data and the various other value (e.g., data on sales to residents from utility companies) and volume (e.g., household formation, population by gender, electricity connections, student enrolments) to produce the annual estimates. The same approach could be used in developing the quarterly estimates, with the annual estimates then being compiled by summing the relevant quarters' estimates.

8. The mission demonstrated an HFCE template that can be used to compile separate CPV and KPV estimates of own-produced, domestically produced purchases, and purchases of imported goods and services at the detailed COICOP level.

9. For consumption of own-produced goods, the CPV and KPV estimates can be compiled using the CPV and KPV output of relevant industries (e.g., agriculture, fishing) as value and volume indicators. The same approach can be used for imputed rents/owner-occupied dwellings.

10. For purchases of domestic produced goods and services, the KPV estimates can be compiled using the KPV output from the production side at the detailed industry level as volume indicators to extrapolate the base year estimates, and then reflate using the relevant CPI to

derive the CPV estimates. That way the KPV estimates reflect the base period margins for goods and product taxes. As the CPI includes changes in margins and product taxes, reflation to derive the CPV estimates would reflect these changes.

11. Imports adjusted for re-exports, classified using the Standard International Trade Classification, or mapped from the Central Product Classification to COICOP can be used to derive the relevant imported consumer goods estimates that could be used as value indicators in the compilation of the CPV estimates for the imported component. The import values would need to be adjusted for import duties, excise and other product taxes and fees; and trade margins. The imports of services would be based on the equivalent balance of payments estimates, although the resident expenditure abroad survey data would be used to provide a further breakdown. The detailed product level adjusted CPI would then be used to deflate these estimates to derive the equivalent KPV estimates.

Gross Capital Formation

12. The gross fixed capital formation (GFCF) CPV estimates are derived using government expenditure and imports data for construction materials and machinery and equipment. The mission explained that the construction GFCF should be compiled using total construction output adjusted for IC repairs and maintenance; with the commodity flow approach used to estimate GFCF for transport, ICT equipment, and other machinery and other equipment. The GFCF estimates should be compiled using the commodity flow approach at a more detailed product level (i.e. properly adjusting for HFCE rather than using fixed ratios). The government GFCF component can then be deducted to provide separate estimates of non-government GFCF.

13. The GFCF should be compiled by adjusting for legal and real estate fees, and any other transfer of ownership costs, in addition to the current adjustment for relevant transfer taxes. The same methodology can be used to compile the annual and quarterly estimates. The coverage of own capital formation needs to be improved. A start can be made by developing estimates using the sum of costs approach for database and software development of the government. Improvements to the methodology for calculating construction output and deflating the CPV estimates are discussed in the construction industry section in Appendix V.

14. For machinery, transport and other equipment, the CPV estimates can be compiled by adding imports and domestic production of capital goods plus taxes and margins, less exports and HFCE, at a disaggregated product level. The KPV estimates can then be derived by deflating the detailed CPV commodity values using import unit value indices. As there are likely to be significant variations in the unit value indices, the unit values will need to be trimmed for outliers.

15. The estimates for biological assets, for example, breeding livestock and mango trees; intellectual property products; database development; artistic originals; and any scientific research and development will need to be compiled in the longer-term in the production

worksheets and then used. The work-in-progress compilation methodology needs to be implemented to compile the estimates for biological assets, if significant.

16. The CFC estimates are being compiled using financial statements and government accounts data. However, the depreciation data from the financial statements and government accounts needs to be adjusted using a perpetual inventory model (PIM) to ensure replacement prices are used and the economic life of the asset is reflected (i.e., estimated useful life of dwellings, other buildings, other structures, transport, machinery and equipment and other durables). The financial statements data, along with data on net imports of various industry specific machinery and equipment and loans can be used to develop a detailed PIM to compile estimates of the stock of GFCF by activity and then apply CFC rates to derive the CFC estimates.

17. For inventories, changes in inventories can be derived from the financial statements data. The relevant output or IC price deflators or import price indices should be used for deflation.

18. The estimates for acquisition less disposals of valuables can be compiled using the commodity flow approach, using the Customs trade data. The HBS household expenditure, government accounts, trade and financial statements data can be used to develop the benchmark 2013 estimates. Quarterly net imports of precious metals and stones, antiques and collectibles (adjusted for international visitors' purchases) can be used to extrapolate the base year estimate to derive the quarterly CPV estimates. The All Items CPI can be used to deflate the CPV estimates to derive the KPV estimates.

Exports and Imports of Goods and Services

19. The staff use the IMTS data for goods and the BOP data on services to compile the CPV estimates. The FISIM on exports and imports needs to be included in services credits and debits. There is a need to ensure the regular survey to collect expenditure data for resident expenditure abroad continues. The data from the survey should be supplemented by more detailed benchmark data collected via the HIES. The KPV estimates for goods can be compiled using unit value-based import price indices. As the travel credits are to be allocated across products in the HFCE compilation, the relevant product level CPI should be used for deflation purposes.

20. For imports of freight and insurance on freight services, cargo volumes of imports could be used as volume indicators to extrapolate the benchmark estimates to derive the KPV estimates. The CPI for the main destination countries or the advanced economies inflation index from the IMF's World Economic Outlook database can be used to deflate travel debits. For other exports and imports of services, the equivalent implicit price deflator from the production worksheets can be used. There is a need to access the BOP income and services data by predominant country available from the CBA. This would help identify the main partner countries and weighted price indices that can be developed using the relevant price indices for those countries, as well as identifying the most relevant inter-bank lending rate to apply to FISIM imports.