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# NSO SOFTWARE USE SURVEY ANALYSIS RESULTS, 2020

**Compiled by the Pacific Community (SPC) Statistics for Development Division  
(SDD) at the request of the  
Pacific Statistics Steering Committee (PSCC)**

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## Background

Pacific Island National Statistical Offices (NSOs) have experienced remarkable transformations in the last two decades. Recent advances in information technology protocols have changed how routine business processes such as survey design, data capture, data processing, and to a large extent data dissemination, are being carried out. The emerging issues of restructuring NSO business processes to match the evolving needs of data users in terms of timely release of accurate, reliable, and acceptable results are key considerations in terms of software use.

The survey on statistical and data related software use in Pacific Island NSOs was undertaken in late 2020. It focussed on countries and territories of SPC including US territories where SPC is engaged in regular training; all countries and territories participated except for PNG resulting in the participation by 14 countries.

The survey was carried out as part of the Pacific Statistics Methods Board to investigate what types of statistical tools, systems or software are being used for data collection, data analysis data visualisation and dissemination. A brief online questionnaire was developed to capture accurate information on data collection methods, statistical related software used in National Statistics Offices (NSOs) of the Pacific and better understand software for data collection, analysis and reporting needs.

Pacific Island NSOs are adapting and responding to the new data needs and demands of the COVID-19 pandemic and there are examples of some who are using alternative methods, primarily phone surveys, administrative data, and online surveys for data capture in addition to traditional approaches. Remote work, training, data collection, and data storage are vital for NSOs to operate during the pandemic but many, PICTs are, are constrained by inadequate ICT equipment, statistical software and infrastructure. This calls for balanced investments in the use of statistical software tools and digital technology.

It is important to state up-front when considering the types of software and tools used by various NSOs, that this survey provides a **snapshot of the situation prevailing in these offices at the time**. In general, the focus of this first report is to provide an **overview and a general snapshot of the major findings**. This survey is expected to help NSOs make informed decisions on which platform might best suit their institutional needs.

## Executive Summary

The main method of data collection in the Pacific remains **Pen-and-Paper Personal Interview (PAPI)** however, many Pacific Island NSO have moved, or are in the process of moving, from these tools to more standardised and centralised systems, which are easier to maintain, and can improve consistency of the statistics produced.

NSOs are changing their collection processes by embracing new technology and committing to a tablet-assisted questionnaire using a **computer-assisted personal interview** approach (**CAPI**) as their preferred method of data collection in the future.

In some PICTs technology changes and the impact of Covid-19 have influenced the ability of NSOs to undertake face-to-face surveys in 2020 and therefore prompting potential changes in approaches to data collection and survey techniques. The use of Computer Assisted Telephone Interview (**CATI**) and Computer Assisted Web Interviewing (**CAWI**) are not part of a main data collection method however the Cook Islands and Tokelau believe SPC should provide support in these approaches. There is a mix of **CAPI** software being used in the Pacific. The main and preferred data collection software used for **CAPI** in the region is **Survey Solutions** (71%). The current main software used for data processing in the region is **Microsoft Excel**, followed by **Stata** and **CSPRO**. There was a slight preference towards **Stata** as the future main data processing software.

The main software used by Pacific Island NSOs for **data analysis** is overwhelmingly **Excel**. However, there is clearly a wide range of preferred main software and tools for data analyses by Pacific NSOs ranging from **Stata**, **CS Pro**, **Excel**, **R** and **SPSS** reflecting that choosing the right data analytics tool is challenging, as no tool fits every need. As mentioned previously many PICTs are likely to use more than one software in undertaking data analysis work. Data Visualisation software use is limited in Pacific NSOs currently with **Excel**, **GIS mapping** and **Powerpoint** the main software being utilised.

## Data Collection

Respondents were asked what their main data collection method in their organisation.

- Pen and Paper Personal Interviews (PAPI)
- Computer Assisted Personal Interview (CAPI)
- Computer Assisted Web Interviewing (CAWI)
- Computer Assisted Telephone Interview (CATI)

Table 1: Main data collection method and software

Country	Main data collection method?	Main data collection software?	Other data collection software?
American Samoa	PAPI	CSPRO	Excel, Access, SPSS
Fiji	PAPI	Excel	
FSM	PAPI	Excel	Web based
Guam	PAPI	Excel	CSPRO
Nauru	PAPI	Excel	
Niue	PAPI	CSPRO	Access, Excel
Northern Marianas	PAPI	CSPRO	Access, Excel
Solomon Islands	PAPI	CSPRO	
Tokelau	PAPI	CSPRO	Excel
Cook Islands	CAPI	Survey Solutions	
Kiribati	CAPI	Survey Solutions	CSPRO CAPI
Marshall Islands	CAPI	Survey Solutions	
Samoa	CAPI	Survey Solutions	CSPRO CAPI
Vanuatu	CAPI	Survey Solutions	

Table 1 shows the main statistical software used in NSOs undertaking PAPI data collection is CSPRO while a combination of Microsoft Excel and Access is used as additional data collection tools. In those countries employing the use of CAPI (Table 2) the main data collection software particularly for survey administration and data capture, is Survey Solutions. The use of **Survey Solutions** involves entering data on a tablet as part of the data collection phase and syncing with a centralised database server. In some select cases another CAPI system is being used as another data collection software known as **CSPRO CAPI**, for example in Kiribati and Samoa (Table 2) to undertake their recent UNICEF MICS survey.

The main method of data collection in the region is **Pen-and-Paper Personal Interview (PAPI)** with nine PICTs still using PAPI. While this traditional approach to data collection is overall more common in the region, five Pacific Islands have however changed their data collection processes embracing new technology and committing to a tablet-assisted questionnaire using a **computer-assisted personal interview** approach (**CAPI**).

The **CAPI** method is the tech evolution of face-to-face research. Data are collected by an interviewer in a face to face (and not virtual) meeting with the respondent. Using a tablet, PC or other device the interviewer can carry on the interview and send back the answers in real time to the main server. For example, five PICTs now use **CAPI** as their main data collection method.

Statistical collection and production activities are overly dependent on desktop tools such as **Microsoft Access**, **Excel** and **CSPRO**. However, many Pacific Island NSO have moved, or are in the process of moving, from these tools to more standardised and centralised systems, which are easier to maintain, and can improve consistency of the statistics produced.

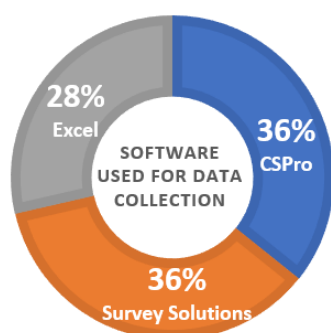


Figure 1: Main statistical software used for data collection.

The adoption of digital approach to data collection is recognised by all PICT NSO responses as a preference for future statistical development (shown in Table 3). Respondents were asked what method they preferred to use in the future to meet their statistics development plan. All countries in the Pacific region listed CAPI approaches as the main future data collection method. PICTs also believe SPC should provide support in CAPI and in particular the majority of NSOs prefer CAPI support in **Survey Solutions** software and in some cases **CSPro CAPI**. Other data collection software requiring support mentioned by PICTs include **Stata**, **CS Pro**, **CSPro CAPI**, **Excel**, **Access** and **R**.

Table 2: Main future data collection method and software SPC should provide support in

Country	Future method of data collection?	Future main data collection software SPC should support?	Other data collection software to be supported by SPC?
American Samoa	CAPI	CSPro CAPI	
Cook Islands	CAPI	Survey Solutions	
Fiji	CAPI	Survey Solutions	CSPro CAPI, Stata, CS Pro, and R
FSM	CAPI	Survey Solutions	CSPro CAPI, Excel, Access and online data collection
Guam	CAPI	CSPro CAPI	
Kiribati	CAPI	Survey Solutions	CSPro CAPI
Nauru	CAPI	CSPro CAPI	
Niue	CAPI	Survey Solutions	
Northern Marianas	CAPI	CSPro CAPI	Access
RMI	CAPI	Survey Solutions	
Samoa	CAPI	Survey Solutions	CSPro CAPI
Solomon Islands	CAPI	Survey Solutions	
Tokelau	CAPI	Survey Solutions	CSPro CAPI, Excel, Access
Vanuatu	CAPI	Survey Solutions	

There is a mix of **CAPI** software being used in the Pacific. The preferred future main software for CAPI data collection in PICT NSOs is **Survey Solutions** (71%), followed by **CSPro CAPI** (29%). Data collections including Census, HIES, LFS, Disability Survey and Agricultural Census/Survey use **Survey Solutions** software and involve technical assistance by SDD. The UNICEF MICS survey use CSPro – CAPI software. Perhaps unsurprisingly American affiliated territories who receive assistance from the US Census Bureau prefer **CSPro CAPI** and mention that this is a US standard for the territories. One important distinction with regards to the use of CAPI software is that MICS is using the Windows-based **CSPro CAPI** system while **Survey Solutions** is an Android-based system. As such, different tablets are required and require separate investment.

Table 3: Main future data collection method SPC should provide support in

Main data collection method SPC should provide support in?				
Country	CAPI	CAWI	CATI	PAPI
American Samoa	*			
Cook Islands	*	*	*	
Fiji	*			
FSM	*			
Guam	*			
Kiribati	*			

Nauru	*			
Niue	*			
CMNI	*			
RMI	*			
Samoa	*			
Solomon Islands	*			
Tokelau	*	*		
Vanuatu	*			

There remains a mix of **PAPI** and **CAPI** (and now **CATI**) collections conducted in the Pacific region. Furthermore, in some Pacific Island countries and territories (PICTS) technology changes and the impact of Covid-19 have influenced the ability of NSOs to undertake face-to-face surveys in 2020 and therefore prompting potential changes in approaches to data collection and survey techniques. The use of Computer Assisted Telephone Interview (CATI) and Computer Assisted Web Interviewing (CAWI) are not part of a main data collection method however the Cook Islands and Tokelau believe SPC should provide support in these approaches.

## DATA PROCESSING

NSOs use statistical software to undertake data processing. Data Processing involves translating the answers on a questionnaire into a form that can be manipulated to produce statistics. In general, this involves coding, editing, data entry, and monitoring the whole data processing procedure. Information technology and specialised statistical software provides NSOs the ability to process data faster, more efficiently and help to improve business process involved in data production.

A well-designed data collection, with minimal errors in the final product, is an invaluable resource for a nation. To obtain accurate results data must be free, to the greatest extent possible, from errors and inconsistencies, especially after the data processing stage. The procedure for detecting errors in and between data records, during and after data collection and capture, and on adjusting individual items is known as the data processing and editing phase. Respondents were asked what their main software used for data processing in their organisation.

Table 4: Main data processing software used by Pacific Island NSOs

Country	Current main data processing software being used?	Other data processing software being used?	Preferred data processing software?
American Samoa	SPSS	Excel	CSPRO
Cook Islands	Excel	Access	Stata
Fiji	Excel	SAS, R	Stata
FSM	Stata	Excel, CSPRO	Stata
Guam	Excel		
Kiribati	Stata	Excel	Stata
Nauru	Excel	CSPRO	
Niue	Excel	Access, CSPRO,	Excel
Northern Marianas	CSPRO	CSPRO	R
RMI	Excel	Access, CSPRO	Stata
Samoa	CSPRO	CSPRO CAPI, STATA, SPSS, Access, Excel	CSPRO, CSPRO CAPI, Excel, STATA, SPSS, Access
Solomon Islands			
Tokelau	Excel	CSPRO	Excel
Vanuatu	Excel	R, SQL, Access, CSPRO	R, SQL Server

Table 4 shows there are a range of different software being used in the Pacific (Table 4) for data processing related activities however the current main software used for data processing in the region is **Microsoft Excel**, followed by **Stata** and **CSPRO**. Eight PICTs currently use **Excel** as their main data processing method. Other Data Processing software being include **Access**, **SAS**, **R**, **SPSS**, and in some cases **CSPRO CAPI**.

Many of the software used for data processing and editing reflect technical support provision, for example SPC is processing and analysing data using **Stata** while UNICEF is processing using **CSPRO** and tabulating using **SPSS**. PAPI census and surveys have traditionally used **CSPRO** for data entry and processing. There are several capacity constraints involved with acquisition of software (financial implications) and the provision of support to the various data processing approaches between both NSOs and Technical Assistance providers for example:

- World Bank no longer hosts servers, so SDD has adopted this role.
- COVID is constraining access to tablets and logistical problems with acquisition
- The Pacific Group on Disability Statistics has proposed the development of standardised Stata syntax to be developed to tabulate data produced using the Washington Group tools.
- There is a need for more transparent and replicable processing/editing procedures. There is still fairly widespread use of **Excel** and **Access** which are less appropriate for data processing and editing applications.
- Data sharing constraints

However there has been considerable investment into capacity building initiatives such as:

- ADB/FAO have developed CAPI resources (e.g., [the CAPI Effect](#)) and MOOCs (e.g., [CAPI](#), which covers both CSPRO and Survey Solutions). The World Bank and the US Census Bureau provide significant resources in Survey Solutions and CSPRO respectively.

- FAO is providing training in SDG 2.1:
  - SDG 2.1.1 (POU) using Stata
  - SDG 2.1.2 (FIES) using [R]
- The World Bank has proposed the development of standardised Stata syntax to analyse poverty data.
- Regional capacity building initiatives, including:
  - WB/SPC/UNICEF in **Stata**
  - The MICS programme provides training in **SPSS**
  - Statistics NZ in [R]
  - SPC in **CSPro**
  - Development of the Pacific Islands Population and Housing Census Editing Handbook

## DATA ANALYSIS

Table 5: Main statistical software used by Pacific Island NSOs for data analysis

Country	Main data analysis software in use?	Other data analysis software used?
American Samoa	Excel	SPSS, CPro
Cook Islands	Excel	Access
Fiji	Excel	
FSM	Excel	Stata, CPro
Kiribati	Excel	Stata, Access
Nauru	Excel	CPro, Mortpak
Niue	Excel	Excel, Access, CPro
Northern Marianas	Access	Excel
RMI	Excel	
Samoa	CPro	Stata, SPSS, Excel
Solomon Islands	Access	
Tokelau	Excel	Excel, CPro, R
Vanuatu	Excel	R, Access, CPro, Stata

The main software used by Pacific Island NSOs for data analysis is overwhelmingly **Excel**, while two PICTs use **Access** as their main data analysis software and one uses CPro. It is noticeable that almost all PICTs are likely to use more than one software in undertaking data analysis work. In particular they use a wide range of other data analysis software including **STATA**, **CS Pro**, **SPSS** and **R**.

Some PICTs reported that they use different software to be able to meet their data usage requirements from different organisations for example, UNICEF are more familiar with SPSS but other organizations they prefer the STATA format. Different users and organisations prefer different data formats and NSOs want to ensure we can meet their needs in the future. While only 7% of NSOs listed **CSPRO** as their main data analysis software, many listed it as an-other data analysis software in addition to Excel due to its ease of use for data cross-tabulation (simple using drag and drop).

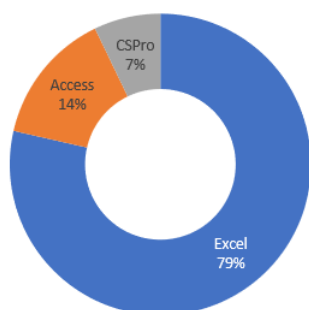


Figure 2: Main data analysis software used by NSO

Table 6: Preferred main data analysis software of Pacific Island NSOs

Country	Preferred main data analysis software	Other Data Analysis preferred
American Samoa	SPSS	
Cook Islands	Stata	
Fiji	Stata	
FSM	Stata	
Kiribati	Excel	Stata, SPSS, R
Nauru	CPro	Stata, SPSS, Excel
Niue	Excel	CPro, Access, Data Visualisation software
Northern Marianas	R	Excel
RMI	Stata	CPro
Samoa	CPro	Stata, SPSS, Excel
Solomon Islands		
Tokelau	CPro	SAS, R
Vanuatu	R	Data Visualisation software

There is a wide range of preferred main software and tools for data analyses by Pacific NSOs ranging from Stata, **CS Pro**, **Excel**, **R** and **SPSS** reflecting that choosing the right data analytics tool is challenging, as no tool fits every need. As mentioned previously many PICTs are likely to use more than one software in undertaking data analysis work. Officers tend to utilize the one which better suits their data analysis work.

Specialised statistical programs such as **R**, **Stata** and **SPSS** were preferred due to their scripting abilities as they were considered less prone to errors and allowing for a log of the process that the analyst took (e.g. the Do or R file) can be used to regenerate the result and allow others to understand what was done with the data analysis which therefore builds reproducibility and helps to provide transparency. This software were also considered faster in terms of speed of analytical tasks and the most powerful tool to work with large size “heavy” datasets. **R** software was mentioned specifically because it was Open-Source software capable of creating additional products such as data visualisations

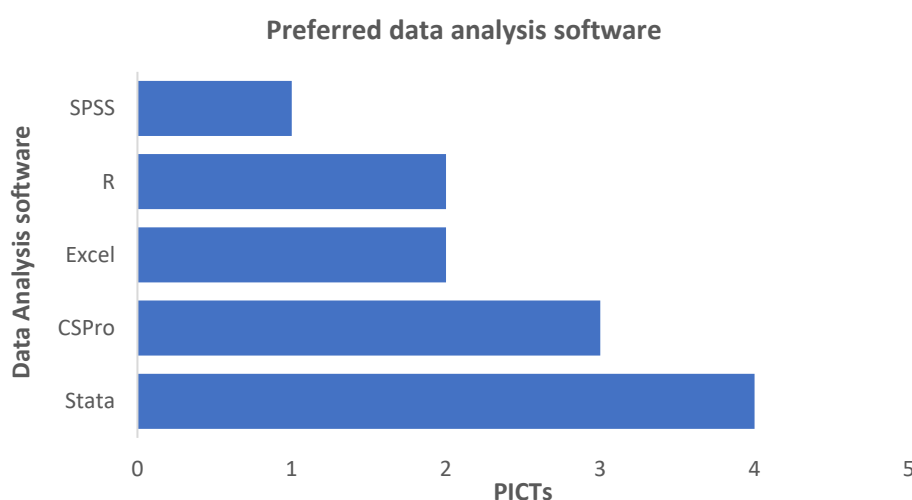


Figure 4: Preferred statistical software used for data analysis.

## Section 5: Data Visualisation

Table 7: Main data visualisation software used by Pacific Island NSOs

Country	Main Data Visualisation software being used?	Other Data Visualisation software used?
American Samoa	Excel	Powerpoint, Word
Cook Islands	Excel	Powerpoint
Fiji	GIS mapping	ESRI ArcGIS, Powerpoint, Excel
FSM	GIS mapping	Data Visualisation, Excel
Kiribati	GIS mapping	Powerpoint, Excel
Nauru	Excel	Powerpoint, Word
Niue	Excel	Word, Powerpoint
Northern Marianas	Excel	Word, Data Visualisation software, GIS, Powerpoint
RMI	Excel	Word, Powerpoint
Samoa	GIS mapping	Powerpoint
Solomon Islands		
Tokelau	Excel	Powerpoint
Vanuatu	Powerpoint	GIS mapping

**Excel** is the main data visualisation software (58%) being used by PICT NSOs. Similar to data analysis NSOs use a wide range of other software and tools for data visualisation including **GIS Mapping** (33%), **Word**, **Powerpoint** (8%) and in some cases specific proprietary **data visualisation** software.

PowerPoint is used mainly for presentation and infographic data visualisation. Some NSOs mentioned that there are now a lot wider range of visualisation options to choose from that are open source and free to use and that are

compatible with HTML and CSS which is web friendly. **GIS mapping** and geospatial tools are a preferred data visualisation software of choice.

*Table 8: Preferred main data visualisation software used by Pacific Island NSOs*

Country	Preferred Data Visualisation Software	Other preferred Data Visualisation Software
<b>American Samoa</b>	GIS	PowerPoint
<b>Cook Islands</b>	R	Data Visualisation Software
<b>Fiji</b>	Data Visualisation Software	
<b>FSM</b>	GIS	Data Visualisation Software
<b>Kiribati</b>		PowerPoint
<b>Nauru</b>	GIS	Data Visualisation Software
<b>Niue</b>	GIS	PowerPoint, Data Visualisation Software
<b>Northern Marianas</b>	Data Visualisation Software	GIS
<b>RMI</b>	GIS	
<b>Samoa</b>	GIS	PowerPoint
<b>Solomon Islands</b>		
<b>Tokelau</b>	GIS	
<b>Vanuatu</b>	R	