# Deployment and Supervision of Field Personnel

## Introduction

Once you have recruited and trained your field staff, there are still many more considerations to ensure that they are effectively monitored in the field to safeguard the quality of the enumeration. In this chapter we discuss some of the tools that have been developed to assist with the deployment and supervision of field personnel including dashboards, issue resolution tools, central census support center, enumerator tracking and remuneration of field personnel.

### A comparison of field personnel deployment and supervision in the non-digital versus digital era

Some aspects of deploying the field force will be similar in a digital census to a non-digital census – ID badges, uniforms and other physical equipment will need to be provided in both cases. However, there are some major differences. The first being that instead of being equipped with copies of the paper questionnaire, the enumerators all need to be equipped with a CAPI device uploaded with the correct maps etc. for their location (See [CAPI](#_Enumeration_Instruments,_Applicatio) and [provisioning of devices](#_Provisioning_of_Devices)). Consideration must also be given to how the battery of this device will be kept charged and whether data will be transmitted using WiFi or Bluetooth. See also [data transmission](#_Data_Transmission).

Enumerators may upload the data they collect to their supervisor, if so checks can be carried out by the supervisor before the data is further uploaded to census headquarters. This step of supervisor checking may negate the need for supervisors to carry out random re-interviews. Instead, enumerators can be sent back to households where errors have been identified, and further training can be given to any enumerators who are making systematic errors.

Payment systems for field staff can be automated, with information required to enable this collected as part of the online recruitment system. (See also [recruitment and training](#_CHAPTER_SEVEN:_Recruitment)).

Real-time monitoring of progress with regards to data collection enables timely decision making and problem solving if some EAs are found to be harder to enumerate than initially planned for. [Dashboards](#_Real-time_Monitoring_with) allow the supervision of the census as a whole and stakeholders can be kept informed as to progress with meaningful up to date results. However, strategies need to be in place to make effective use of all the additional information that is now so readily available.

### Considerations for field personnel deployment and supervision in a digital census

The use of technology in a census undertaking includes the use of innovative ways such as cloud computing, smart mobile devices, GPS, and web GIS among others. During the 2020 Round, various technological innovations were used to improve the quality of census processes and efficiency of the census business model. Amongst the innovations made the following were offered by ECA: [provisioning of tablets](#_Provisioning_of_Devices_1), the use of census and survey monitoring dashboard, and Census support center/Issue tracker. Efforts have been made to ensure that the tools available to support digital census are affordable and readily accessed. For instance, all the UNECA census tools are made with open-source technology and are completely free to use by member states. Consider which tools will be most cost and time effective for your census.

## Key implementation areas in a digital census for deploying and supervision of field staff

The following sections describes the technology available to resolve issues in the field and via the central call center, monitor the progress of the enumeration in real-time using dashboards, track enumerators in the field and automation of payment of field staff.

### Resolving Issues in the Field

The Census Field Management Tool is a digital solution developed to address common challenges encountered during census, such as inconsistent support to enumerators in the field, difficulty in prioritization of issues, lack of self-help, and slow response to challenges faced during data collections. It consists of two key applications, a mobile application used by enumerators and supervisors, and a web application used by support providers who are typically stationed at the central or regional offices. The adoption of this tool by countries has shown a positive impact including improved data accuracy and efficiency, reduced time required to resolve issues, and enhanced collaboration and communication between field enumerators and support providers.

The digital solution is developed to improve the census process by providing a centralized platform for managing and tracking issues reported by field enumerators. This system is composed of two applications:

* A **mobile application** installed on the data collection devices. This enables field enumerators to request help, access self-help resources, and communicate with support providers through messaging and notification options.
* A **web application** that provides a platform for support providers to manage and track issues, collaborate with each other, and access additional data such as agent/device history and logs.

The Census field management tool offers various features that improve the efficiency and accuracy of the census process. These features include:

* Standardized workflow
* Communication tools
* Integrations with other systems
* Self-help
* Prioritization
* Customizable options for both the mobile and web applications.

The standardized workflow ensures consistent support to enumerators and supervisors, while data provided from the mobile application enables support providers to diagnose and resolve issues more quickly. In addition, the tools include messaging and notification options, improving collaboration and communication between enumerators and support providers. Finally, the system is integrated with other systems, such as the census operation monitoring dashboard for tracking status and providing insight and time take to resolve an issue during census.

Zimbabwe was the first country to adopt the field management tool for census in the 2020 Census round. Other countries that have identified the benefits of the tool and have either started using it on pilot or are in the process of customizing it include Namibia, Uganda, Benin, and Burundi. The customizable nature of the tool allows it to be adapted to the specific needs and requirements of each country, making it a flexible and scalable solution for census processes globally.

The adoption of the census field management tool has significantly impacted the census process. It has improved efficiency by providing a centralized platform for managing and tracking issues reported on the field. The tool has also reduced the time required to resolve issues, enhancing the efficiency of support providers. Moreover, it has improved collaboration and communication between field agents and support providers, ensuring that issues are addressed promptly, and enumerator and supervisors feel supported throughout the census process.

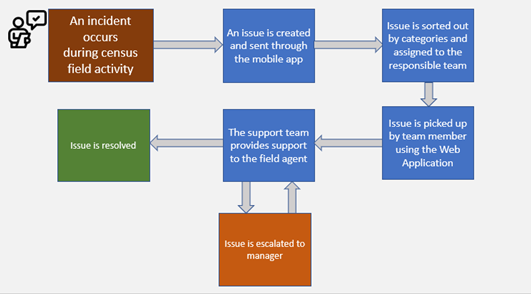
The most frequently used features of the issues tracker include the self-help function, the messaging and notification options. The self-help function allows enumerators to search for solutions to common issues on their own, reducing the burden on the support team. The messaging and notification options allow for real-time communication between the enumerators and the support team, ensuring that issues are addressed in a timely manner. Finally, data integration provides support providers with additional context and history about the enumerators and supervisors and their devices, helping them to better understand and resolve issues.

In conclusion, the census field management tool (issues tracker) was a valuable addition to ECA’s support to countries. This tool impacts an area that is often not addressed yet critical to census taking. Like many digital tools it is evolving and addressing key areas of country needs.

### Census support center

Given that a census exercise runs into various logistical and technical issues, it is very important to have in place a system of handling and resolving these issues ahead of time. A support center, staffed with knowledgeable operators and the right information at their fingertips will ensure that the exercise is able to resolve arising issues on time and easily. Common challenges include but are not limited to: Inconsistent support provided to field agents; lack of prioritization of issues; lack of mechanisms for self-help; untimely response, etc.

UNECA developed a support center system (with a backend system and a field agent application) that is easily customizable and deployable and integrated with the UNECA tablet provisioning system to help address the challenges highlighted above. The application comes with a dashboard to monitor Issue resolution for management. The flow of the issues can be summarized as shown below:



source: ECA

This application has been used in Botswana, Ghana, Zimbabwe, Zambia, and Namibia with successful and encouraging feedback.

### Real-time Monitoring with Dashboards

Digital platforms provide supervisors with tools to monitor enumerator progress and performance, track coverage and identify areas that may have been missed, and review data submitted by enumerators and provide feedback.

Examples of supervisory tools include supervisor dashboards which display enumerator activity, completion rates, and error flags; and re-interview modules which allow supervisors to conduct follow-up interviews to verify data accuracy.

Indicators monitored can include:

* Number of households and individuals enumerated.
* Data completeness rates (percentage of questionnaires fully filled).
* Enumerator productivity (number of interviews per day).
* Geographic coverage (percentage of enumeration areas completed).
* Identification of outlier cases (e.g., unusually long or short interviews).

Examples of dashboard software or tools (Note: Specific recommendations depend on a country's infrastructure and needs) include:

* Census and Survey Monitoring Dashboard: Designed to work with various census questionnaire databases and offers customizable indicators.
* Geospatial Information System (GIS) dashboards: Allow for visualization of enumeration progress on maps, providing insights into geographic coverage and potential gaps.

By comparing these indicators against pre-defined targets, census managers can proactively allocate resources, address bottlenecks, and ensure the enumeration stays on schedule and maintains quality.

UNECA has developed a robust census and survey monitoring dashboard. In the 2020 Census round many countries including Kenya, Rwanda, Namibia, Sierra Leone, Seychelles, Zimbabwe, Liberia, Ghana, Mauritius, Zambia, and Nigeria were all supported to use the dashboard.

Key features of the UNECA census monitoring dashboard are as follows:

* It is designed to work with any census questionnaire database.
* It is easy to deploy and requires only read-only access to the census database.
* The indicators to be monitored have increased daily and vary from country to country. Indicators may provide insights on coverage, data quality and operational metadata including but not limited to enumerated number of households, enumerated population, Total Fertility Rate, population distribution, population pyramid, average interview time, etc.
* The dashboard presents these indicators using the most intuitive visualizations, such as charts, infographics, maps, and tables. These components are designed to convey summarized information at different levels of geographic area.
* Users have options to view indicators at the national level or drill down to the geographic area to zoom in for a narrow geographic coverage for more focused information.
* For selected indicators, the dashboard captures target and/or expected values to compare with the actual census performance.
* The dashboard is also equipped with a multi-language feature, currently working in English and French, with the language framework already implemented to include local languages if the requirements arise.
* A role-based access scheme is implemented in the dashboard, which allows system administrators to define roles with privileges and assign them to system users. Different user groups can access only those indicators of interest instead of overloading users with all the available indicators.
* Users can also be restricted from viewing information filtered to selected geographic areas per the countries' specific requirements.

### Enumerator Tracking

The integration of GPS technology into digital enumeration devices allows for the tracking of enumerator movements. This has several benefits:

* It helps to ensure comprehensive coverage of assigned enumeration areas, minimizing the risk of omissions.
* It provides supervisors with a tool to monitor enumerator progress and identify areas where they may be facing difficulties or require support.
* It can enhance the security of enumerators, particularly in challenging or remote areas.

Software and technologies used for enumerator tracking include:

* ArcGIS Survey123: This tool can capture and track location data during enumeration.
* Custom-developed mobile applications: Some countries may develop their own applications with GPS tracking functionality.

### Remuneration of field personnel

Experiences in the 2020 Census round have demonstrated the need for a more efficient method of paying census field staff. Due to the huge number of people being employed on a temporary basis, it is important to have an automated system in place that enables straight forward payment and tracking of payments. Information required to make electronic payments, such as bank details should be collected at the time of recruitment using the [automated recruitment system](#_CHAPTER_SEVEN:_Recruitment). It should be borne in mind that the payroll system generally used by the census implementing institution may not be adequate to cope effectively with the huge number of additional payments required for temporary staff during the census. The use of an electronic payment platform makes it easier to manage the bulky payments expected during the census process.

## Selected Country experience

**Botswana** employed the Manage Engine Mobile Device Manager Plus (MDM) application to remotely manage census devices. This tool offered a comprehensive suite of features including device enrolment, app management, remote troubleshooting, security enforcement, location tracking, and audit reporting. A virtual server was set up to support the MDM system, and IT officers were granted access to log in using domain credentials. They also used Zoho Assist for remote support. This setup allowed for real-time monitoring, inventory tracking, and secure data wiping in case of device loss or theft, enhancing both operational efficiency and data security.

**Tanzania** developed an innovative backup data collection system using enumerators’ personal Android devices. A custom Android container was created to temporarily lock personal devices for census use, ensuring secure data collection and synchronization with census servers. Although this solution was not deployed during the actual enumeration, pilot testing showed it to be a viable contingency option. Further testing is recommended to refine the tool for broader use, especially in resource-constrained or emergency scenarios.

LINK TO CASE STUDIES BELOW IN SEPARATE SECTION

**Tanzania**

Tanzania developed an alternative back-up means for data collection using enumerator-owned devices. Tanzania developed a custom Android container that could be installed on enumerators’ personal mobile devices. This provided a backup solution in case of mass failure of census tablets. The Android container locked the mobile device for census use only for a specified period. Data was securely synced to the census servers. The pilot was successful and demonstrated the feasibility of using personal devices as a backup. The container secured the device and ensured data was synced securely to servers. The tool wasn't used in the actual enumeration, so real-world challenges weren't fully explored, however, Tanzania would use this approach again as a contingency in case of mass failure of census tablets.

**Botswana**

The Manage Engine Mobile Device Manager plus App (MDM) was used to remotely manage the devices. It included features like device enrolment, App Management, Remote Troubleshooting, device security, location tracking and Audit Reports. It also helps in wiping the data in case the device is stolen or lost. A standard MDM tool can also track inventory of devices and perform real-time monitoring and reporting. A virtual server for MDM system was created. To allow for troubleshooting in the field, all Statistics Botswana IT Officers were given rights to log in to the system with their Domain Credentials to create Zoho account and use Zoho Assist.

## Lessons Learnt

There have been challenges in data transmission with not all data correctly received at the data center. This causes problems with census undercount if enumerated households are missing from the census data. Alternatively, if the problem is caught and the households renumerated, this can cause duplication in the census data. These challenges are often caused by poor internet connectivity. Ensure that you have a strategy for dealing with loss of connectivity such as an off-line solution that securely stores the data until there is a good enough Wi-Fi signal for transmission to be completed.

There is a need to have a high-speed bandwidth considering that multiple tablets (as many as 200) may be connecting to the network simultaneously with each one downloading files of considerable size. Experience from Kenya suggests to use devices that support a bandwidth of 10Gbps to achieve an overall speed of 10Gbps bandwidth throughout the network.

Botswana had no clear work cycle that systematically shows the flow and management of issues during enumeration, the issues coming though were resolved by either GPS specialist, IT System Support or Census Technical Officers and there was no mechanism to tell whether an issue had been closed or not.

Consideration should be given to those who should have access to the dashboard information, and technical capacity should be built up to avoid misinterpretation of the information.

Many countries had only a small team of programmers, system administrators and technical support teams who became overwhelmed during the enumeration process. This can lead to compromising on some of the quality assurance steps.

## Recommendations

* Countries are encouraged to use a high-speed bandwidth that is not internet dependent considering that multiple tablets are connected to the network simultaneously during provisioning of tablets to minimize costs as was the case in Kenya.
* The mobile device management software should be procured well on time to avoid last-minute device enrollment because without device enrolment, it is not possible to manage or install Apps in the devices and this delays the entire process.
* Unique identification for the tablets should be based on geocodes. This is key because batching of tablets should be done down to the sublocation level for easy tracking and allocation as was the case in Kenya and Botswana.
* Prioritize investments in digital infrastructure and tools to support efficient and high-quality field operations and logistics.
* Develop comprehensive training programs to ensure that all field personnel are proficient in the use of digital technologies.
* Set up a support center at the headquarters of the census implementing agency, staffed by employees who have been well trained on the questionnaire content and have ICT. Provision of efficient support center equipment such as laptops, phones, desks, and seats.
* The census call center should have a clear work cycle with an ICT incident Management System whereby problems and inquiries are received from the enumerator or supervisor during enumeration and the call Centre Agent sends the case to field or headquarters technical support team and an update should be provided as to whether the case has been resolved.
* Include the monitoring dashboard at the time of training of field staff so that its essence is made known at that stage. As a result, the data collecting exercise will function better as field staff are aware that their performance is continually being evaluated in relation to targets.