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AFRICAN
NATION OF
CABO VERDE
Uses ArcGIS®
for Its Census





A portal powered by ArcGIS Online makes census data publicly available and easily accessible for use in decision making. Maps and apps include data on demographics, housing, and employment.

Cabo Verde is a nation made up of 10 volcanic islands 350 miles away from the western coast of Africa. This country, also known as Cape Verde, is home to more than 500,000 people. Until its last census in 2010, Cabo Verde relied on paper maps during all phases of census processes. The varied scales of these maps often made it difficult to identify enumeration areas, and it was challenging to produce maps of small areas. Additionally, preparing these paper maps and working with them was time-consuming and required significant staffing.

During the 2010 Census, the National Statistics Organization in Cabo Verde—Instituto Nacional de Estatística de Cabo Verde—worked with Esri to understand how location-based technology could benefit staff across the entire organization. They decided to use ArcGIS® software to improve workflows and business processes.

For additional guidance, Cabo Verde looked to the United Nations *Handbook on Geographic Information Systems and Digital Mapping*, which helps countries better understand census cartography to improve census planning, data collection, and analysis. The publication has since been updated and now is called *Handbook on Geospatial Infrastructure in Support of Census Activities*.

“We understood that it was time to follow United Nations recommendations towards the use of new technologies and GIS [geographic information system technology] in the census,” said Clodomir Pereira, team leader of the Cartography and GIS Department, National Statistics Organization, Cabo Verde. “Also, we wanted to further improve the information we produce with spatial analysis and meet the demand for georeferenced statistical information.”

The goal of the National Statistics Organization is to produce and disseminate authoritative statistical information. The high-quality information supports

objective knowledge of a changing society. It helps Cape Verdeans learn about their country and strengthen it through a better understanding of its resources, economy, society, and culture.

The Process

ArcGIS is a key component in Cabo Verde’s preenumeration, enumeration, and postenumeration/ dissemination processes.

During preenumeration, the statistics organization staff used ArcGIS for robust planning. They mapped administrative boundaries, roads, and streams in digital format. Roads and waterlines were important for defining the enumeration areas; therefore, the limits of these areas coincide with roads or streams, which helped field staff orient themselves. All buildings were marked by a point, encoded with a unique geocode; these buildings were classified according to the type of use. The census blocks of the 2000 Census were also put into digital format. Using ArcGIS in the 2010 Census resulted in a 50 percent reduction in the number of staff required to prepare census cartography, compared to the 2000 Census.

“For a census, it is necessary to determine statistical units or information collection areas—enumeration areas or census block[s]—and, to this end, it is necessary to make a map that covers the entire territory, divided into statistical units, census blocks, where the inquirer collects information, so that there is no duplication or omission,” said Pereira. “The census blocks should be easily recognizable, so its limits must be clearly visible and represented in a clearly visible scale. In this context, GIS is a good tool, faster and more reliable for making census cartography.”

During enumeration, field staff used ArcGIS to collect data and report to management. For data collection, an

application was developed to capture the coordinates of new buildings and send that data to the central database.

“ArcGIS improved the representation of enumeration areas and allowed better control of work during the census operation,” said Pereira.

He also stressed the importance of creating maps of small areas.

“Presently, statistical information available for small geographic areas or specific areas is very important and [necessary] for decision making; therefore, the National Statistics Organization decided to conduct a census that responds to this need, so all information collected in the census [was] georeferenced,” Pereira said.

During the 2010 Census, it took an estimated 40 percent less time to produce maps with ArcGIS than it had taken a decade earlier—only a few weeks in 2010, compared to months during the 2000 Census.

During the postenumeration/dissemination phase, the organization used ArcGISSM Online to deliver online maps including story maps and thematic maps (inecaboverde.maps.arcgis.com/).



Above is the gallery of maps and applications that help the Cabo Verde citizens better understand demographic characteristics such as housing and at-risk populations.

Visitors to the site can see maps of population counts, population change, and housing and employment data.

“There is a large demand for thematic maps by our users—researchers, university students, etc.—so we decided to produce thematic maps with information collected in the census,” Pereira said. “Since the Internet covers the whole country and much of the population has access to Internet, it’s a cheap and easy way to get the information to users with ArcGIS Online and the story maps.”

The Results

GIS technology enabled Cabo Verde staff to improve their business process, data accuracy, and communication and collaboration within the organization. In addition, they were able to more easily manage and disseminate data in useful information products and story maps.

“The greatest benefit was the quality improvement of data collected and the accuracy thereof, as well as better data analysis,” Pereira said. “Also, the preparation of the census mapping and data processing was shorter, allowing the availability of information to users as soon as we finished the data collection.”

The efforts of the National Statistics Organization modernized its systems and reshaped and optimized the data models and workflows for operations, management, and analysis. GIS is currently being used for an agricultural census and will be a critical component of upcoming censuses.

In Africa, where many nations continue to conduct censuses with manual, paper-based data collection processes, Cabo Verde is a leader. The National Statistics Organization recently hosted its Regional Workshop on the Use of Mobile Technologies for Data Collection and Statistical Production in Africa, in partnership with the African Centre for Statistics of the United Nations Economic Commission for Africa, the Partnership in Statistics for Development in the 21st Century, and the African Development Bank. The workshop is among the National Statistics Organization’s many efforts to share knowledge and best practices in the region.



The map application above shows populations greater than 15 years of age and employment status, allowing the Cabo Verde government to make decisions on where to implement job programs or other initiatives.