High resolution Population and Poverty Maps to assess Purchasing-Power in Rwanda and Uganda

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Abstract

With the African economies growing, the emergence of a middle class and rapid urbanization, we see an increasing demand for purchasing-power data by private companies wanting to expand their markets.

While to some, Africa is still the continent of no data, and others – e.g. in conjunction with the SDGs – see the emergence of a data revolution, purchasing power data for marketing purposes seems to remain elusive for most Sub-Saharan Countries.

This presentation explains, how a combination of satellite imagery and official census data was used by the University of Columbia (CIESIN) to derive a high resolution population density map (30 meter resolution) for several Sub-Saharan Countries, and how the author corrected the data combining it with poverty data from official Rwandan and Ugandan statistics to derive high resolution poverty maps. The lists the many steps used to compute these maps and emphasizes that they should be automated, e.g. by using ArcGIS Model Builder.

The authors stipulate, that in the absence of readily available market data, the poverty maps computed are a good reverse proxy for purchasing power enabling private enterprises to plan and assess their expansion strategies in areas previously considered to be uncharted territories devoid of data.

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Content

+ **The Client**

+ **Availability of Data for Sub-Saharan Africa**

+ **Open CIESIN Population Data**

+ **Methodology applied to combine the CIESIN Population Data with poverty data from official Rwandan and Ugandan statistics to derive high resolution poverty maps**

+ **The Maps produced**

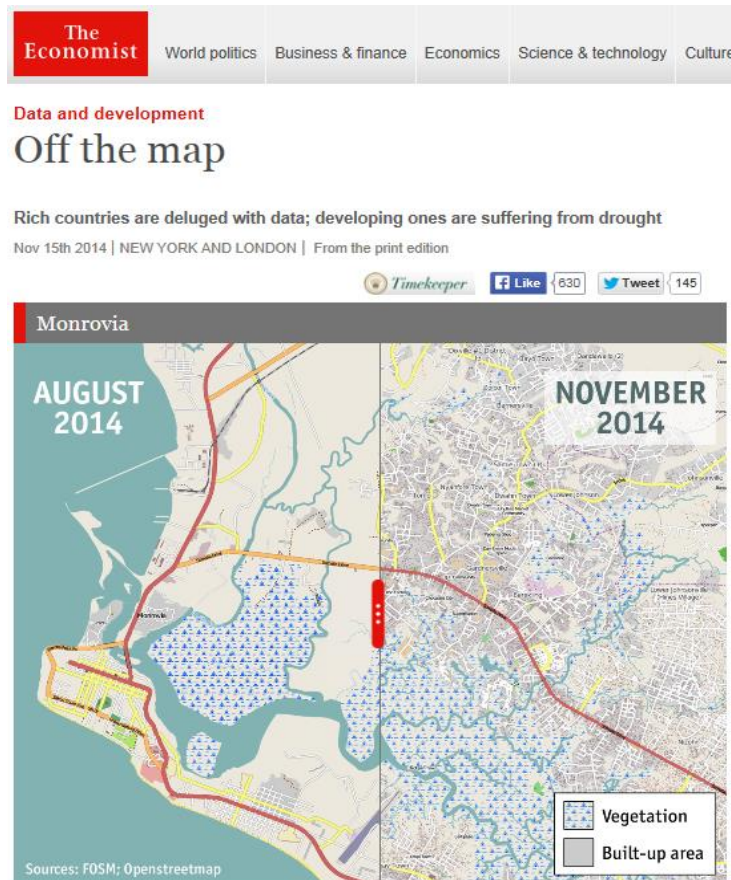+ **Lessons learnt: Automate and document the approach**

+ **Outlook**

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The Client

+ **Jibu makes daily necessities more accessible, with drinking water as an anchor product**

+ **Jibu uses the power of franchising and its trusted brand to rapidly scale a network of locally-owned businesses across six African countries**

+ **To support its expansion and market penetration, Jibu sought purchasing power data and respective maps of its current and future franchise zones**

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"There is no Data in Africa"

AFRICA is the continent of missing data. Fewer than half of births are recorded; some countries have not taken a census in several decades. On maps only big cities and main streets are identified; the rest looks as empty as the Sahara. Lack of data afflicts other developing regions, too. The self-built slums that ring many Latin American cities are poorly mapped, and even estimates of their population are vague. Afghanistan is still using census figures from 1979—and that count was cut short after census-takers were killed by mujahideen.

As rich countries collect and analyse data from as many objects and activities as possible—including thermostats, fitness trackers and location-based services such as Foursquare—a data divide has opened up. The lack of reliable data in poor countries thwarts both development
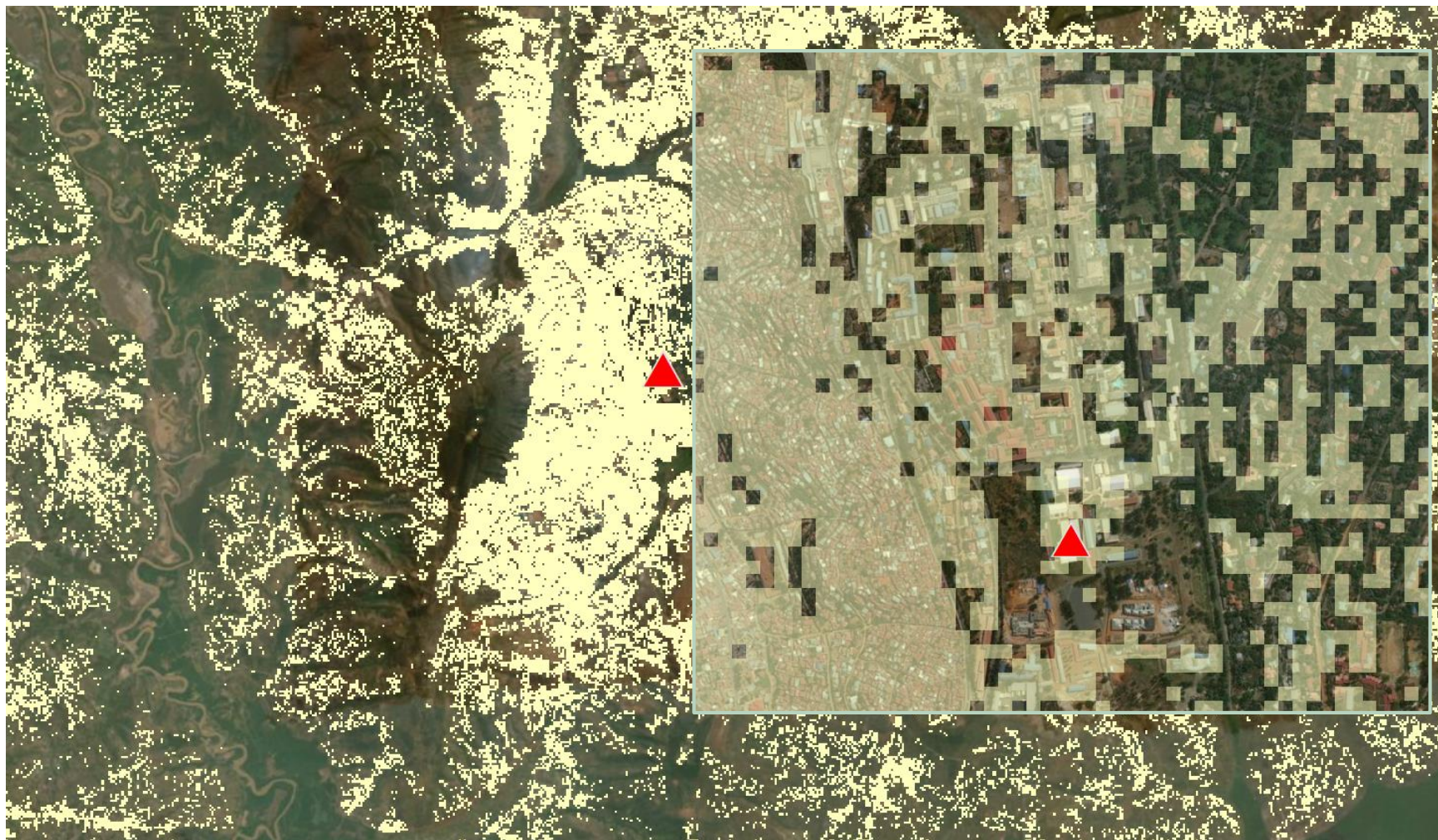
The Economist: Nov 15th 2014 | NEW YORK AND LONDON | From the international print edition

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Is there really NO DATA in Africa ???

+ But there are good sources for Open Data already and they are getting more, e.g.:

  > National Institute of Statistics of Rwanda (NISR) and other countries

  > OpenStreetMap

  > High-resolution population data by CIESIN/Facebook

  > Sentinel (EU) and Landsat (USA, NASA), Digital Earth Africa

  > Africa Geoportal and ArcGIS Online by Esri

+ Several African countries have Open Data Policies and developed Open Data Portals

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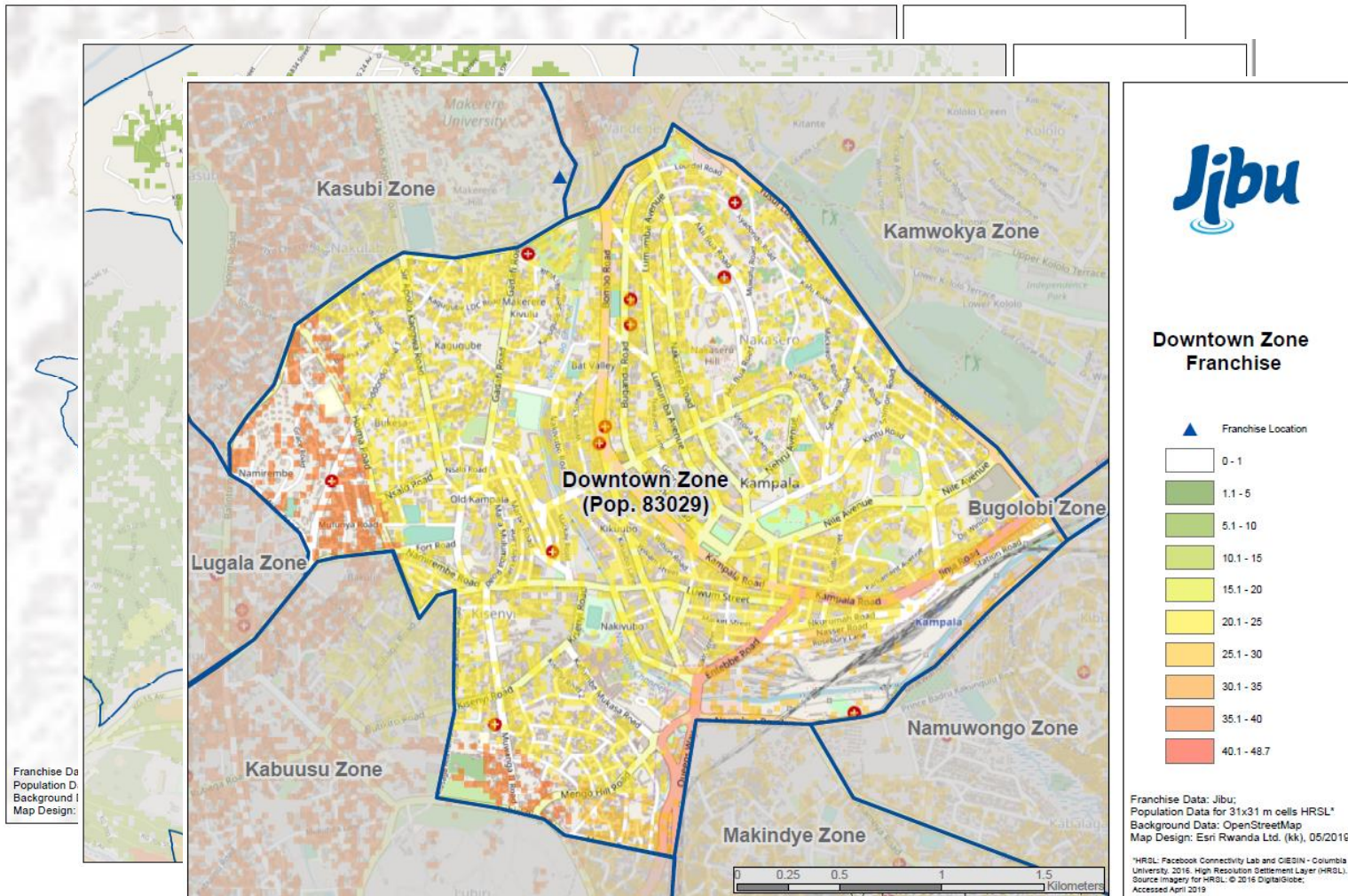# Open High Density Popluation Data
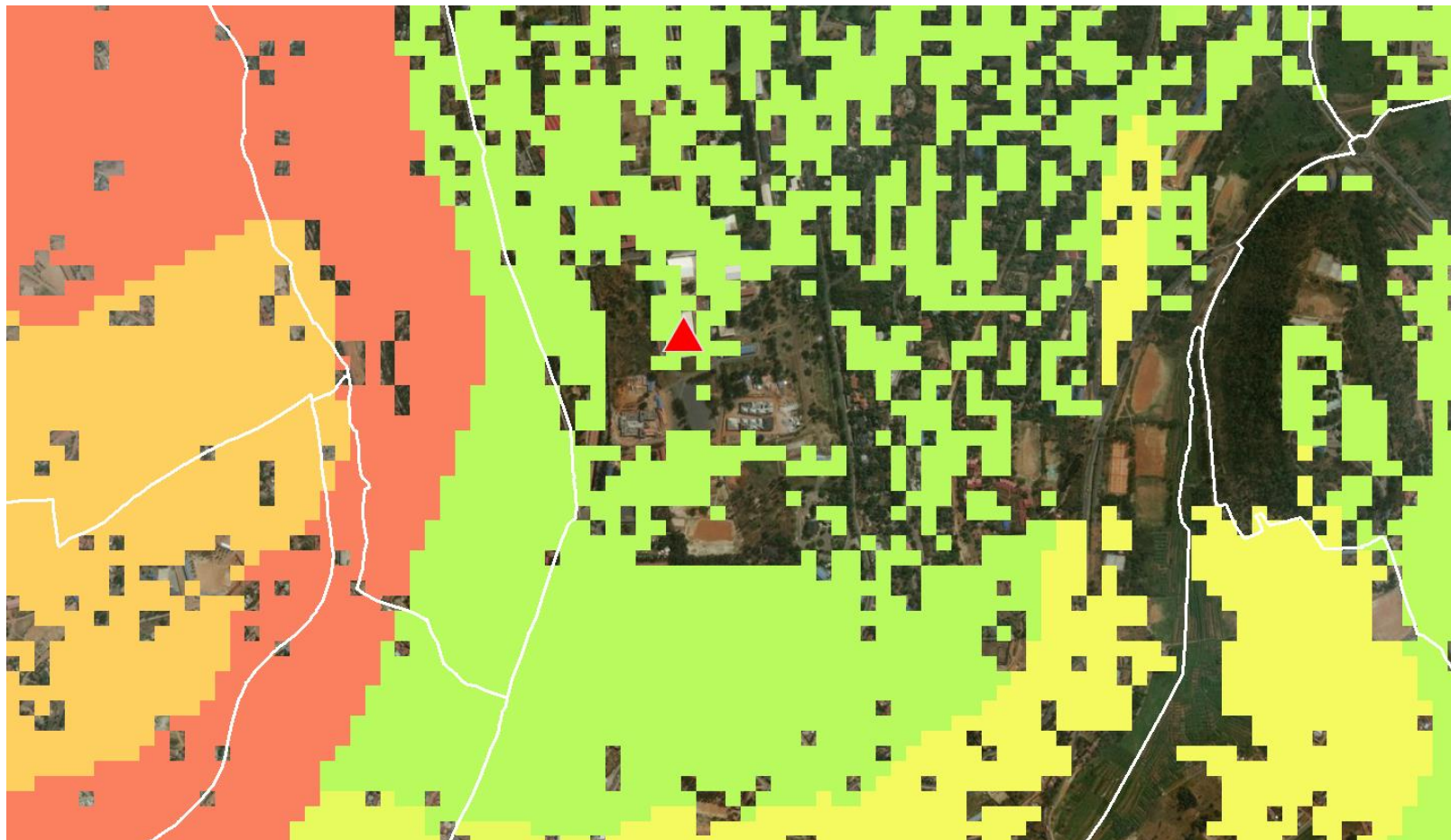
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Methodology

+ CIESIN used the satellite classification to distinguish between areas where people live and areas where they don't live to re-distribute population data from the official census not evenly across entire administrative areas (in Rwanda Cells), but only to the places likely to be populated. The resulting map is a dasymetric map, i.e. a (choropleth) map refined by additional geographic information.

+ The authors took these dasymetric maps one step further by overlaying the CIESIN high-resolution population maps with the official poverty data, as it is published by the National Statistics both in Rwanda and Uganda

+ The resulting trio of maps show the total population per ~30 x 30 m raster cell, the number of people living below and those living above the poverty line.

+ Overlaying the client's franchise areas and calculating the spatial statistics for each zone results in the maps shown on the next the following slides.

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The Maps produced

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Lessons learnt: Automate and document the approach

Outlook

+ **The maps created for Jibu stirred quite some interest in Rwanda, both in the private and public sector**

+ **Rather than be intimidated by missing data, or erroneous data, we encourage GIS professionals to use existing data, work diligently with what we have and come up with new products**

→ **Demand for innovative mapping will be growing**

→ **Africa deserves better than being named 'the continent with no data' or 'of the map'**

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