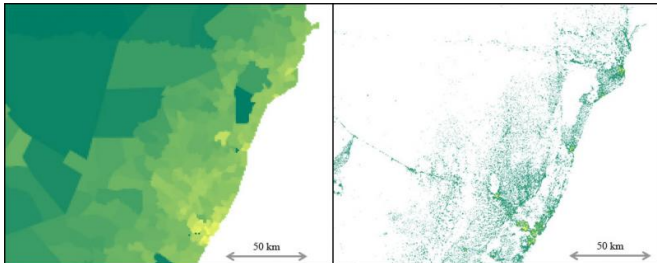


Working with Facebook to create better population maps

23 February 2016, by Robert Chen, Earth Institute, Columbia University



Left, 2015 estimates of population density of a coastal region in Kenya from CIESIN's Gridded Population of the World, version 4 (GPWv4), which is based on census data. Right, new Facebook estimates of population density in the same coastal region in Kenya. This allocation, which is derived from processing of third party satellite imagery and incorporates GPWv4, provides a higher resolution map of population distribution.

Understanding population density, especially in rural areas around the world, is vital to assessing human exposure to hazards and climate change, access to markets and health services, impacts on land cover and ecosystems—and potential connectivity to the Internet. How settlements are distributed across the landscape—e.g., in clusters, along roads or waterways, or scattered widely—has important implications for designing infrastructure, improving access, and promoting sustainability, not only for communication technologies but also for transportation, water and sanitation, energy, disaster risk management, and many other aspects of sustainable development.

Facebook's Connectivity Lab was established in 2014 to improve and extend Internet access to the world. The Lab recognized that, to achieve Facebook's goal to help connect more than four billion people who are not yet online, higher resolution data on population distribution around the world are needed to design and optimize

strategies and technologies for reaching rural populations throughout the developing world.

In the spring of 2015 the Lab decided to launch an interdisciplinary project involving its Core Data Science, Infrastructure, and Artificial Intelligence teams, aimed at utilizing high resolution remote sensing imagery to develop better data on the distribution of buildings and other structures. The project adapted Facebook's image recognition engine to recognize structures in recent 50-cm resolution satellite imagery obtained from [DigitalGlobe](#). To date, they have applied their method to more than 20 million square kilometers of land area in 21 countries, processing more than 14 billion images with Facebook's neural networks.

To determine population distribution at a resolution of 5 meters (about 15 feet), the team applied the data on structures and settlements to gridded population estimates based on recent census data: the Gridded Population of the World version 4 (GPWv4) data set developed by the NASA Socioeconomic Data and Applications Center (SEDAC), which is operated by the Center for International Earth Science Information Network (CIESIN) here at the Earth Institute. CIESIN is now working with the Facebook team to conduct systematic validation and quality assessment of the high-resolution data. As announced by Facebook at the Mobile World Congress in Barcelona February 22, [Facebook plans](#) to make these new population distribution data openly available by summer 2016 and to continue expanding the data's coverage to additional countries.

In September 2015, the international community adopted the [2030 Agenda for Sustainable Development](#), which set out 17 ambitious Sustainable Development Goals (SDGs) covering a wide range of issues and sectors. [Goal 9](#), to "Build resilient infrastructure, promote sustainable industrialization and foster innovation," includes the specific target to "significantly increase access to

information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020." The international community has also recognized the potential value of utilizing "big data" approaches to help achieve a wide range of SDG targets and improve monitoring of progress towards the SDGs. The [innovative population distribution data produced through this collaboration](#) will not only be useful to Facebook, governments, and other public and private groups in optimizing efforts to expand Internet access, but will also be available to the broader development community as a unique resource to help all parts of the world achieve the SDGs, wherever people live.

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APA citation: Working with Facebook to create better population maps (2016, February 23) retrieved 22 October 2021 from <https://phys.org/news/2016-02-facebook-population.html>

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