Results of Global Mapping Project

The majority of the worldâ€™s population will soon live in urban rather than rural areas. Adding a spatial dimension to population estimates, a new study finds that as much as 3% of the Earthâ€™s land area has already been urbanised, which is double previous estimates. Led by the Center for International Earth Science Information Network (CIESIN) at Columbia Universityâ€™s Earth Institute, this study has resulted in the construction of a suite of products constituting the first detailed and systematic data sets on urban population distribution and the extents of human settlements across the globe. Although population census and satellite data have been available for some time, until now minimal effort had been made to combine these two kinds of information to capture the geographic boundaries of human settlements. This new data collection, known as the Global Rural Urban Mapping Project, or GRUMP, has provided the basis for a number of important insights not previously known.
A few key insights from GRUMP:

- GRUMP shows that 20% of the worldâ€™s urban settlements have populations below 500,000. This is an important finding considering that the UN Population Division only reports on urban settlements of 500,000 inhabitants or more.
- GRUMP data indicate that roughly 3% of the Earthâ€™s surface is occupied by urban areas, an increase of at least 50% over previous estimates that urban areas occupied 1-2% of the Earthâ€™s total
- Coastal environments have much higher concentrations of urban land area (10%) and urban populations (65%) than other ecosystems.
- Far fewer Asian and African urban residents live in coastal and cultivated areas than residents of the Americas, Europe and Oceania; however, population densities in coastal cities of Asia and Africa are much greater than those on other continents.
- GRUMP shows that approximately 7% of urban dwellers now reside in the worldâ€™s largest mega-cities, whereas experts had previously estimated this number to be around 4%.
- GRUMP has identified about 75,000 distinct settlements worldwide, but only 24,000 urban areasâ€”the result of many agglomerated urban settlements.

The GRUMP data collection consists of three individual databases that build upon population datasets mostly from national statistical offices, satellite data and other representations of settlements. GRUMP Human Settlements is a global database of cities and towns of 1,000 persons or more, each represented as a point, and includes information on population sizes, longitude and latitude coordinates, and data sources. Populations were estimated for 1990, 1995 and 2000. The GRUMP Urban Extent Mask is the first systematic global-scale attempt to portray the boundaries of urban areas with defined populations of 5,000 and larger. The GRUMP Population Grid represents the distribution of human population across the globe, accounting for urban population concentration more precisely than previous efforts. It allows for inferences about urban versus rural populations, and cities of different sizes, when used in combination with the Urban Extent Mask. In contrast, prior data sets such as those from the United Nations or the Digital Chart of the World indicated either the population size or extent of urban areas, but not both.
GRUMP delineates urban boundaries across the planet ranging in size from 1 km2 to the largest of urban extents, Tokyo, which includes more than 500 connected settlements and is the largest urbanised area in the world at 30,000 km2.
GRUMP data took four years to compile. It drew on years of investment from the Gridded Population of the World (GPW) project in which population counts are converted from irregularly and administratively defined census units to a uniform latitude-longitude grid.
The GRUMP datasets, as well as the newest release (version 3) of GPW, may be accessed through the NASA Socio-economic Data and Applications Center (SEDAC), operated by CIESIN, at http://beta.sedac.ciesin.columbia.edu/gpw/
GRUMP and GPW datasets and map collections are distributed free of charge.
GRUMP is a collaborative project with partners from IFPRI, the World Bank and the International Center for Tropical Agriculture. Primary financial support was provided by the US National Aeronautics and Space Administration, IFPRI, and the World Conservation Monitoring Center for the Millennium Ecosystem Assessment.