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Pilot tests of an international definition of urban – rural territories Summary report

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Acronyms and Abbreviations

CIESIN	Center for International Earth Science Information Network
CSA	Central Statistical Agency, Ethiopia
DANE	Departamento Administrativo Nacional de Estadística, Colombia
DEGURBA	Degree of Urbanisation
DG REGIO	Directorate-General Regional and Urban Policy
DOSM	Department of Statistics, Malaysia
EC	European Commission
FAO	Food and Agriculture Organization of the United Nations
GHSL	Global Human Settlement Layer
GSARS	Global Strategy to Improve Agricultural and Rural Statistics
GPW	Gridded Population of the World
HDC	High Density Clusters
IBGE	Instituto Brasileiro de Geografia e Estatística (IBGE), Brazil
INSEE	Institut national de la statistique et des études économiques, France
JRC	Joint Research Centre of the European Commission
MGN	Marco Geostatístico Nacional, Colombia
MDC	Moderate Density Clusters
PBS	Pakistan Bureau of Statistics
OECD	Organisation for Economic Co-operation and Development
SDG	Sustainable Development Goals
SMOD	Settlements Model
USDA	United States Department of Agriculture

Preface

A proposed internationally-consistent definition of urban–rural territories characterizes settlements based on population size and density. The definition is purely people-based and relies on a population grid with cells of one square kilometer (km^2). Its application has been tested in seven countries: Brazil, Colombia, Ethiopia, France, Malaysia, Pakistan, and the United States. There were two objectives of the test. First, it aimed to evaluate the definition in a country-specific context and contrast its characterization of population settlements with those currently in use domestically. Second, it sought to assess the feasibility of countries' employing the definition to report on a subset of Sustainable Development Goals (SDG) indicators using existing data collections. The test results show heterogeneity in the degree of congruence between domestic classifications and those of the definition. To varying degrees, the differences can be attributed to the use of legal, non-population based administrative boundaries for classification, adoption of other thresholds to separate the classes in the definition, and the imposition of additional non-population criteria, such as economic activity and remoteness, in classifying settlements. Nonetheless, all countries showed familiarity and agreement with the definition's portrayal of urban and rural as a continuum rather than as a dichotomy and acknowledged the value of having a consistent definition for international reporting and comparisons. As for indicator reporting, the major constraints to using the definition at present are the lack of congruence between the geography of statistical reporting and the areas in the classes of the definition. This mismatch is most problematic for survey data, where statistical validity depends on having the sampling strata line up with the definition's classes. Going forward, the increasing integration of geospatial and statistical information will address many of the current impediments to applying and using the international definition while countries continue to employ their own approaches to urban–rural classification for domestic purposes.

Acknowledgements

The European Commission, the Global Strategy for improvement of Agricultural and Rural Statistics (GSARS) and the Food and Agriculture Organization (FAO) would like to thank colleagues in national statistical agencies who so kindly participated in the test of the definition. These were informal tests, performed in addition to their regular duties, and the time it took to engage on these tasks is greatly appreciated. The lead contacts in each country and their affiliation are reported in Annex, though many analysts were involved in implementing the test protocols and their contributions are much valued, as well. In Brazil, Claudio Stenner was the lead; in Colombia, Angélica Maria Palma Robayo and Sandra Liliana Moreno Mayorga; in Ethiopia, Aberash Tariku; in Malaysia, Manisah Othman; in Pakistan, Munwar Ali Ghanghro; and in the United States, John Cromartie. The collective efforts of these colleagues and of involved staff ensured a robust evaluation of the usefulness of the definition in varied country settings.

Introduction

In 2016, the Global Strategy to Improve Agricultural and Rural Statistics (GSARS) and FAO joined a voluntary commitment (VC) comprised of the Directorate-General Regional and Urban Policy (DG REGIO) of the European Commission, the Organisation for Economic Co-operation and Development (OECD) and the World Bank to develop a proposal for an internationally-consistent classification of urban–rural territories. The proposed definition characterizes settlements across the urban–rural continuum based on population size and density. The definition is people-based and relies on a population grid with cells of 1 km^2. The grid is developed by the Joint Research Centre of the European Commission within the Global Human Settlement Layer (GHSL) project[1]. The Degree of Urbanization (DEGURBA+) is the conceptual schema that applies globally to the population grids of the GHSL[2]. Hereinafter, the layer with the urban-rural categorization is called SMOD/DEGURBA.

The context for this request is the ongoing emphasis of the United Nations Statistics Division on the integration of geospatial and statistical information and on the use of geospatial referencing in enumeration of the 2020 census[3]. Moreover, the United Nations General Assembly has stipulated that the Sustainable Development Goals (SDG) indicators be disaggregated by key demographic categories and by geographic location[4]. While the use of geocoded data and geographical information systems is not at present widespread among countries, there is consensus that moving toward global adoption is a goal that will enhance the value of statistics in a wide range of applications in the public and private sector. The pilot test results shed some light on the challenges and

[1] http://ghsl.jrc.ec.europa.eu/
[2] It can be freely downloaded here. The layer with the urban-rural categorization is called GHS-SMOD http://ghsl.jrc.ec.europa.eu/
[3] Principles and Recommendations for Population and Housing Censuses, available at https://unstats.un.org/unsd/demographic/meetings/egm/NewYork/2014/P&R_Revision3.pdf
[4] UN General Assembly resolution 71.313, Work of the Statistical Commission Pertaining to the 2030 Agenda for Sustainable Development, 6 July 2017.

opportunities in applying the urban–rural definition in reporting SDG indicators at the present time and in moving forward.

The refined urban–rural categorization delineates the urban versus rural areas to capture the full settlement hierarchy in a nested system with increasing level of disaggregation. A higher level of detail or disaggregation facilitates the analysis and understanding of how variations in people's circumstances and well-being are based on the places where they live and permits the design of policies meaningful to each reality. Table 1 below shows the first two levels of the urban–rural characterization.

Table 1. Levels 1 and 2 of the conceptual schema of the refined urban–rural definition.

Level 1			**Level 2**		
Code	Description	Rule	Code	Description	Rule
Rural (RUR)	*Rural grid cells*	Cells with a population <= 300 or > 300 but outside moderate density clusters (MDC)	**10**	*Uninhabited permanent water surfaces*	No population and less than 50% land area
			11	*Mostly uninhabited area*	Population density between 0 and 50
			12	*Dispersed rural area*	Population density between 50 and 300
			13	*Villages*	Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5 000; excluding MDC;
Moderate density cluster (MDC)	*Urban clusters*	Contiguous cells with a density of at least 300 residents per km^2 and a minimum population in the cluster of 5 000	**22**	*Suburbs*	Contiguous grid cells with a density of at least 300 residents per $km^2$and a minimum cluster population of 5 000; excluding

					cities (HDC) and towns
			21	*Towns*	Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5 000 and 50 000; excluding cities (HDC);
High density cluster (HDC)	*Urban centres*	Contiguous cells with a density of at least 1 500 residents per km^2 (or at least 50% built-up) and a minimum population in the cluster of 50 000. Gaps are filled and edges are smoothed	**30**	*Cities*	Same as Level 1

Note: "Contiguous" refers to the 4 cells adjacent to each cell in the grid (cells that touch at the corners are not included).

DG REGIO, the JRC, the GSARS and FAO tested in the **summer of 2018** this refined definition in seven pilot countries. Having both Level 1 and Level 2 tested in countries over the entire rural–urban continuum is expected to provide a more systematic and robust presentation of the concepts towards an agreed international definition and to help understanding the main constraints and challenges countries might face in adopting it. These were informal analytical tests, carried out with the kind cooperation of country statistical agencies. Countries were not asked to take an official position on adoption of the definition by their governments or by any international body.

Countries participating in the pilots are the following: Brazil, Colombia, Ethiopia, France, Malaysia, Pakistan and United States of America (USA). Countries vary widely by the distribution of their population as some have highly concentrated versus highly dispersed settlement patterns. They also differ by geographical features such as the heterogeneity of landscapes and of land cover types, climate and topography. This variability accounts for areas that may have pockets of settlements or may be entirely uninhabited, such as mountains or

glaciers. They also have diverse levels of development as they include both high- and low-income countries, which in turn may correspond to distinctive patterns of settlement density. Finally, the availability of relevant information also varies significantly in the pilot countries: in some cases, socio-economic and environmental data are only available by administrative unit whereas others already have data systems available in a georeferenced format and fully compatible with the cells of the population grid.

The objectives of the pilots were twofold.

1) The first aims at applying the urban–rural continuum in country-specific context to compare and contrast its characterization of population settlements with those currently in use domestically.
2) The second objective aims at assessing countries' opportunities, capacities and constraints to report a subset of core SDG indicators on livelihoods and wellbeing using the proposed definition and existing data and sources (e.g. Census, administrative sources, household surveys, multipurpose survey, and others).

Countries were provided with an instructions protocol and with supporting material including country factsheets and geo-spatial layers (Annex).

1

Comparison of the international categorization to national practices

Pilot countries compared and contrasted country practices to Level 1 and Level 2 characterizations of the international definition. Table 2 below summarizes and quantifies the reported agreement while specific country results are discussed below in more detail.

Table 2. Summary of Level 1 and Level 2 comparison in the countries.

Country	Unit in national system	Level 1 (*2 urban classes; 1 Rural*)	Level 2 (*3 Urban classes; 3 Rural Classes*)
Brazil	Admin, grid	Good agreement, approximately 80% correspondence; Ongoing activities-expected changes in view of the 2020 Census of Population	Comparable categorization in progress
Colombia	National Geostatistical Framework and international definition fundamentally different in scope. Comparison limited to spatial correspondence.		
Ethiopia	Admin	Multiple definitions in use; Good correspondence with the grid categorization and comparable thresholds of population; Ongoing activities-expected changes in view of the 2020 Census of Population	Good comparability at the extremes of the continuum – criteria other than population on the rural components
France	Stat	Level 1 already in use	Customized refinement on the rural component
Malaysia	Grid	Use grid system too (cell size larger); Very good comparability for the small areas used in country factsheet (>90%) - differences due to thresholds; Ongoing activities-expected changes in view of the 2020 Census of Population	Criteria other than population are applied on the rural categorization and associate discrepancies compound with differences in thresholds
PAKISTAN	Admin	Not suitable yet for quantification of agreement. Ongoing geo-referencing activities as part and following the 2017 Census of Housing and Population expected to provide valuable inputs.	
USA	Admin, stat	Also based strictly on population size and density. Overall good agreement for main cities. Thresholds reflect country specific population patterns and account for discrepancies.	Differences in thresholds cause mismatches to cascade down from the urban to rural categories at the refined level of categorization

1.1 Brazil

Brazil currently applies for statistical purposes the dichotomy urban–rural. By constitution, the 5 570 Brazilian municipalities are defined as urban, regardless of their population size. Whereas the Level 2 categorization of the international proposed method, does not currently find a direct correspondence in country practices, an on-going work in preparation of the Demographic Census 2020 shows many elements of comparability with the refined categorization of Level 2. The Brazil Institute of Geography (IBGE) published in 2017 a preliminary categorization[5], which closely aligns methodologically to those applied to the DEGURBA/SMOD grids. As part of this activity, the IBGE developed a 1 km^2 statistical grid with data of total population and households derived from the 2010 Census. The definition of urban includes cells with at least 300 inhabitants per km^2 and at least 3 000 inhabitants in the cluster. Unlike the more restrictive rules for cluster connectivity in the DEGURBA/SMOD grid, the preliminary categorization considers all neighboring cells, including on the diagonal (8-conn cells). Criteria for inclusion into the urban categories (both high and moderate densities) are thus less stringent than in the international definition. This discrepancy accounts for a larger share of the population (84%) defined as urban in the Brazil system when compared with the international definition (79.5%). Brazil reports that the new classification should coexist with the current one to ensure comparability with past years. The new form of delimitation aims to maintain the binary separation between the urban and rural categories but also introduces subcategories to show the diversity of settlements of the territory. The categorization aims to identify the territorial patterns that exist in the country such as dispersed rural occupation, rural occupation in riverside, rural occupation in planned settlements, rural occupation in villages, urban occupation, metropolitan urban occupation and natural areas. Brazil preliminary categories define the municipalities hierarchically taking into account their population size as well as the road distance from the principal urban center in the upper urban

[5] IBGE, 2017, Characterization and Classification of Rural and Urban Spaces in Brazil. As the categorization is in progress, this may differ from the final retained version.

hierarchy. The approach is thus comparable to the Level 2 of the international definition as it categorizes the urban–rural continuum from the 1) *Predominantly urban municipality* to 2)*Adjacent intermediate municipality* to 3) *Remote intermediate municipality,* 4) *Adjacent rural municipality* and to5)*Remote rural municipality.* Unlike the international categorization, it introduces an additional criterion of remoteness from the main urban centers to categorize the rural components.

1.2 Colombia

In Colombia, the National Administrative Department of Statistics (DANE) has created and is updating the National Geostatistical Framework (*Marco Geostatístico Nacional* – MGN), which is a system that allows the geo-referencing of statistical information from censuses, sample surveys, derived statistics, and administrative registers to their geographical location. It is composed of geostatistical areas that support DANE calculations and dissemination of statistics on population and built-up areas. The available level of information includes the Country, Departments, Municipalities and classes such as the Municipal Township *(Cabecera Municipal)*, the Populated Center *(Centro Poblado)* and rural area (*Área Rural Dispersa)* as well as other geostatistical areas, bounded mainly by geographical and cultural features, identifiable in the field.[6] The *Cabecera Municipal* or Municipal Township refers to a geographic boundary applied by DANE for statistical purposes, allusive to the geographical area bounded by the census perimeter. The administrative headquarters are located within, i.e. the town hall. The Municipal rest describes the remaining municipal territories. It includes the *Centros Poblados* or Populated Centers. This is a concept created by DANE for statistical purposes, whose scope is the geographic location of population nuclei or population settlements. A Populated Center corresponds to a concentration of at least 20 contiguous dwellings, neighbors or semi-detached houses.[7] The *Área Rural*

[6] For more information: https://geoportal.dane.gov.co/v2/?page=elementoMapaDane

[7] DANE. Methodology for the Codification of the Political-Administrative Division of Colombia -DIVIPOLA-.

Dispersa[8] is characterized by a sparse occupancy of the settlements and by the predominance of agricultural and livestock activities.

The MGN does not explicitly articulates a distinction of the urban and rural territories. Because the National Geostatistical Framework and the international categorization differ in scope, a comparison between them was done, at a general level, in terms of quantities, areas, population and density between the levels that were equivalent or approximately coincident with each other. The comparison suggests that there is no good degree of correspondence between the two systems; therefore, it is not possible to draw conclusions on the suitability of the international proposition to represent a categorization of the urban – rural continuum in the country. Although the urban cells of the international categorization coincide largely with 798 Municipal Townships of the 1,121 belonging to the MGN (71%); only 113 Municipal Townships (10%) have a spatial coincidence with cells belonging to cities of the international categorization. Cells belonging to the dispersed rural and mostly uninhabited categories largely coincide with the Dispersed rural areas of the MGN.

Even though there are differences in the results obtained with respect to the urban–rural classification and although DANE is not the official entity in the country to define this concept, the desktop assessment in Colombia indicates that methodologies maybe established to standardize the concepts worldwide allowing international comparisons of relevant statistics and calculation of sustainable development objectives.

1.3 Ethiopia

The Ethiopia Central Statistical Agency (CSA) defines, in its statistical system, as urban centers all the administrative capitals and entities regardless of their population size. These include the Regional capitals, Zone capitals, *Woreda* capitals, Localities with Urban Dweller Associations, Municipal towns. It also

[8] Available at: http://microdata.worldbank.org/index.php/catalog/490/download/14776

defines as urban all localities that do not belong to the above categories and that have a population of 1 000 people or more, and whose inhabitants are primarily (more than 50%) engaged in non-agricultural activities. On the other hand, all the localities with population less than 1000 people are considered rural.[9] Boundaries are natural and human made features, which are identified by the local, zonal, and regional administrative bodies. The national statistical system thus relies on a categorization based on criteria other than the population size and density as in the proposed international definition. Ethiopia also applies a categorization of the capitals based on cut-off values of population that indicate a good correspondence, if not directly quantifiable, between the national and international system. The national system defines as Large and Medium cities those having respectively 100 000 and more people and those with 50 000 to 100 000 inhabitants. Together, they would correspond to the Cities in the proposed international definition. Small Capitals are those with a population size of less than 50 000 inhabitants. These are expected to match well to the Moderate Density cells of the urban clusters. The lower bound on the rural domain is 1 000 people. This also agrees well with the rural component of the international definition, which however has a higher bound (maximum 5 000 in the cluster) for the rural areas. It is worth noticing however that the country is preparing for the forthcoming Census of Housing and Population. In this context, a new categorization of the urban areas (and thus of the rural areas) is under development.

1.4 France

In France, the National Institute of Statistics and Economic Studies (INSEE) already applies the Level 1 of the DEGURBA. National practice expands the rural component of the continuum and distinguishes further between thinly and very thinly populated rural areas. Thus, the national system matches fully the Level 1 – where the *Densely populated area (cities)* are those with at least 50%

[9] Statistical Concepts and definitions, Central Statistical Agency of Ethiopia.

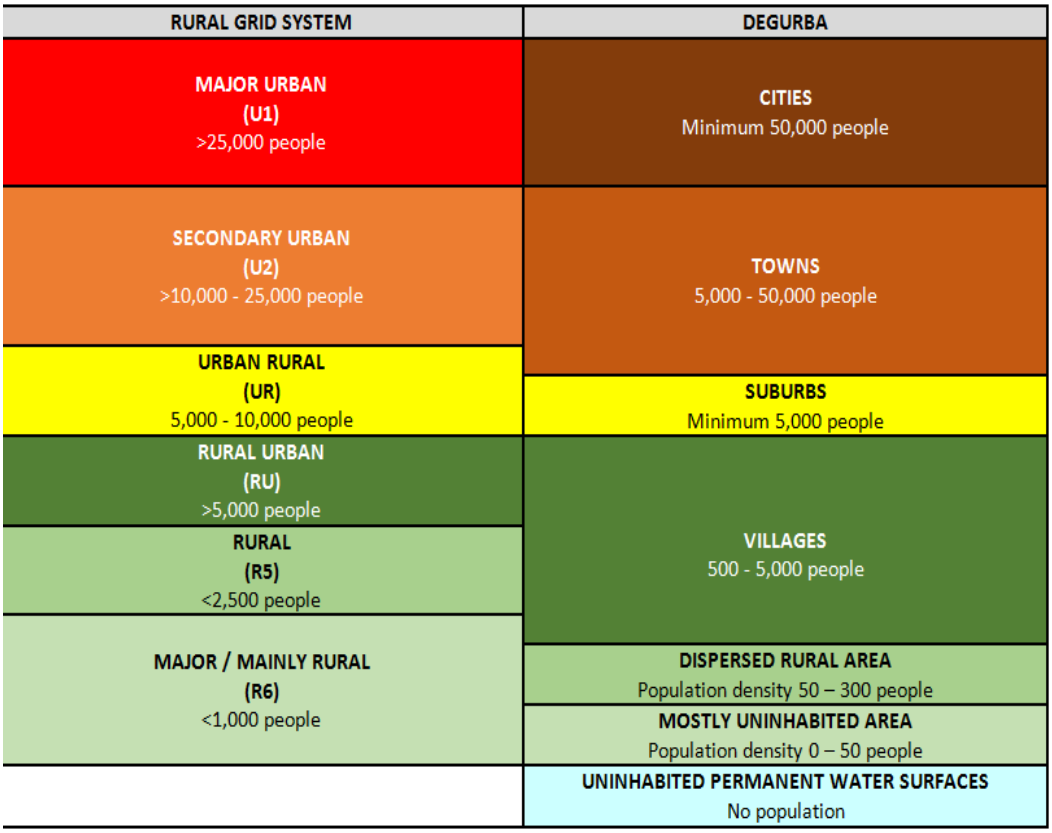
living in high density clusters, i.e. the cities; the *Intermediate*[10] *density areas* are those with less than 50% of population living in rural grid cells & less than 50% of population living in high density cluster, i.e. towns and suburbs. The *Thinly populated areas* (rural area) are those with less than 50% living in urban cells (1 and 2) & less than 50% living in very thinly cells. France also distinguishes the *Very thinly area* (deep rural area) with at least 50% living in very thinly density cluster. This distinction introduces criteria of distance from the main urban centers and their economic influence. Nonetheless, the distinction is expected to match closely to the refined categorization of the *Dispersed rural areas* and *Mostly uninhabited rural areas* of Level 2 in the SMOD/DEGURBA conceptual schema.

1.5 Malaysia

The Department of Statistics, Malaysia (DOSM) defines for statistical purposes the urban areas based on *i*) the Gazetted area: areas under the jurisdiction of a local authority that were classified based on their urban characteristics; *ii*) Threshold of at least 10 000 people; *iii*) Economics activities - Built-up area: with 60 per cent of the population (aged 15 years and over) involved in non-agriculture activities. In this categorization, agriculture activities are interpreted as common part and proxy for rural social characteristics. Rural is the residual of urban. A separate categorization is also in use in the country, which support the Rural Grid System (cell size of 10 km^2) of the Federal Department of Town and Country Planning (PlanMalaysia). Figure 1 reports this national definition compared to the SMOD/DEGURBA schema as from the country pilot.

[10] Coinciding with "Moderate density cluster" as renamed in most recent versions of the conceptual schema.

Figure 1. Rural Grid System vs DEGURBA, Malaysia.



Source: Malaysia pilot test

Level 1 of the proposed international definition matches the national categorization to reach over 90% of correspondence for the small areas that were tested in the Malaysia test. As it moves to a refined categorization, Malaysia introduces criteria other than only population size to include also the distance from the town centres as well as land cover and land use aspects, which are proxies for increasing rurality across the continuum. These criteria integrated within the Village Grid System are used to identify gaps and links between municipalities and rural areas arranged according to physical typography, demographics and economics. This system determines the physical position of a village and is able to solve the problem of the village boundaries. It assists the design and setting of specific policies based on village characteristics and according to their respective categories and needs. The application of criteria other than population together with the observed differences in thresholds,

contribute to the discrepancies on the rural component of the continuum that were observed between the national practice and the international definition.

1.6 Pakistan

In the 1981 census, the Pakistan Bureau of Statistics (PBS) moved away from a population size-specific criterion to adopt instead an administrative criterion. Urban areas and their boundaries are defined by official notification of the respective provincial governments. Rural on the other hand encompasses all population, housing and territory not included within an urban area. The country test revealed a correspondence between the High Density Cluster (City) of Level 1 with the Major cities notified by the administration. The Moderate Density Cluster would thus correspond to the rest of the urban area that is not a major city. The rural grid cells of the proposed international definition would then correspond to the residual of the urban areas and might be compared spatially to the smallest revenue unit of the country. This corresponds to the "Mauza/Deh" which is the term for Settled Rural Areas where as the term "Village" indicates the Unsettled Rural Areas[11]. To date, the congruence between the national and international methods could not be quantified. However, as part of the 2017 Population and Housing Census, the PBS produced geo referenced information of the Enumeration Blocks (EB)[12] applied to collect information on the urban areas, and work is in progress to extend the coverage to the EB of the rural areas. In the future, it will be then possible to measure the congruence between the two methods.

1.7 United States of America

In the USA, the Department of Agriculture's Economic Research Service (ERS) compared the US Census Bureau's definition of urban area to the international

[11] Settled Rural Areas have proper measurements thatmay be identified through cadastral paper maps (*massavies)*. Conversely, the Unsettled Rural Areasdo not have proper measurements (e.g. (KPK;- FATA,Tribal, Uper Dir, Lower Dir, Kohistan, Torgar. Balochistan: Awaran,WashuK, Makran Sherani etc).

[12] The EB is the smallest unit of enumeration. It comprises on average 250 to 350 households.

proposed method. This US definition is strictly based on measures of population size and density and on very small geographic building blocks– i.e. census tracts and block groups–that are closer in size to the cells of the population grid of the SMOD/DEGURBA. Table 3 below summarizes the thresholds of population size and density applied in the US definition to characterize the urban areas, urban clusters and the residual rural areas.

Table 3. Population size and density, cut-off values in the US Census Bureau's definition of urban areas.

US Census Bureau's definition of urban areas	Criteria
Urbanized areas	>= 50 000 people & pop. density >= 390/ km^2
	May contain suburban territory with pop. density >= 195/ km^2
Urban clusters	2 500 – 50 000 people & pop. density >= 390/ km^2
Rural	< 2 500 people & pop. density < 195/ km^2

As in the international proposed grid, cut-off values of both population size and density should be met to match the inclusion in a given class. A comparison of the two categorizations is therefore not straightforward. Nonetheless, the schema shows an overall good agreement between the national categorization and Level 1 of the SMOD although the USA practice applies less stringent conditions to define the urban areas given the lower cut-off value of population size (2,500 people as opposed to 5 000 people in the upper bound of the SMOD/DEGURBA). As the focus moves towards the comparison with the Level 2 categorization, mismatches become however significant. In general, ERS observed that cities, towns and villages are much more narrowly defined in the proposed international definition than in national practice. Differences in thresholds applied to the distinction of the urban areas cascade down to the rural level and its refined categorization. For instance, the country test reports that nearly 65 000 km^2 of territory that is characterized as urban (cities or towns) in the national definition, falls in the Level 2 category of "Dispersed rural areas" and over 20 000 km^2 correspond "Mostly uninhabited rural areas". In general, the country pilot observes that the thresholds of population density in the proposed international

method are set at a high level. This hinders a more adherent representation and categorization of the sparser density pattern that characterizes the urban areas in the USA.

2

Main conclusions on the comparison and the way forward

2.1 Urban and rural as a continuum

Heterogeneity in the geographical and socio-economic contexts of the pilot countries likely contributes to the variability in national practices when defining what territories are urban or rural. As noted in the field test reports of the United States, the existence of multiple definitions reflects the reality that rural and urban are multidimensional concepts, encompassing administrative, structural, and economic constructs. Thus, and included within the same country (e.g. USA, Malaysia), different definitions serve different research and policy applications. Notwithstanding this heterogeneity, all countries showed familiarity with the concept of urban and rural as a continuum rather than a dichotomy and appreciated the refined categorization along the spectrum that is offered by the Level 2 of the proposed international definition. Indeed, most of the countries already adopt or are in the process of establishing national categorizations of the urban–rural continuum for statistical purposes as well as for planning and fine-tuning of relevant policies.

Examples of country categorizations that take into account this concept were observed earlier in the text. Ongoing work in Brazil moves towards a refined categorization of the rural domain, considering primarily the distance from the urban domain as the main perspective. France already adopts the Level 1 of the SMOD/DEGURBA. The national definition expands the rural component of the urban–rural continuum to distinguish further between thinly and very thinly populated rural areas. This further category accounts for the fact that the majority of the settlement area in France is classified as rural cells according to the

international proposed system (country factsheet in Annex). France decided to combine a functional and a morphological approach to separate the rural cells within and outside the economic influence of the urban cores, i.e., those that offer economic opportunities to the surrounding population. Interestingly, the national practice in France focused on a refinement of the rural domain, there where Brazil works towards a categorization of the more densely populated components of the spectrum. This different emphasis finds a correspondence in the different results of the international categorization in the two countries. Unlike France, the SMOD/DEGURBA categorizes the Brazil population as primarily urban (country factsheet in Annex).

A statistical grid supports the urban–rural characterization of Malaysia. Despite the differences in applied cut-off values of population**,** this national statistical system articulates a categorization of the urban–rural continuum that closely resembles the Level 2 of the internationally proposed definition. Even in countries such as Colombia and Ethiopia where current national definitions rely on administrative units and legally prescribed entities, the categorizations incorporate elements that describe aspects of the urban–rural continuum in the national specific contexts. In Colombia, dispersed rural areas are identified by sparse settlements, prevalence of agricultural activities, and limited availability of services. In Ethiopia, the prevalence of agricultural income is part of the definition for rural locality. In the USA test, the reported definition characterizes the urban–rural continuum with a methodological approach that is similar to the proposed international definition as it is essentially based on population. Diverse definitions however coexist in national practices in support of different statistical processes including the gathering of socio-economic data across the urban and rural continuum.

Regardless of the technical differences, pilot countries share a common understanding of the need for categorizing the degrees of urbanization and rurality along the continuum. Pilot tests generally recognized that the Level 2

categorization of the SMOD/DEGURBA might contribute significantly to a refined description of their urban and rural territories.

2.2 Variables and criteria in country practices

The country tests confirm expectations based on background analysis and preliminary work and discussed in the UN Principles and Recommendations for Population and Housing Censuses[13]. The traditional distinction between urban and rural areas within a country has been based on the assumption that urban areas, no matter how they are defined, provide a different way of life and usually a higher standard of living than are found in rural areas. In many developed countries, this distinction has however become blurred, and the principal difference between urban and rural areas in terms of the living standards tends to be the degree of population concentration or density. On the other hand, the differences between urban and rural ways of life and standards of living remain significant in developing countries, but even here, rapid urbanization has created a great need for information related to different sizes of urban areas.

Country tests seem align well to these concepts. Typically, national practices adopt the classification by size of locality to supplement the traditional urban–rural dichotomy or even replace it there, where the major concern is with characteristics related only to the population density along the continuum. Thus, countries' definitions look at the continuum from the sparsely settled areas to the most densely built-up localities. However, pilot tests showed also that population density alone is not a sufficient criterion in many countries (e.g. Colombia, Ethiopia, and Malaysia) particularly where there are large localities that are still characterized by a truly rural way of life. These countries indeed include to their definitions additional criteria such as the prevalence of agricultural income, distance and remoteness, land use aspects that are more distinctive than a simple urban–rural dichotomy. The France test showed that, even in the industrialized

[13]Available at: https://unstats.un.org/unsd/demographic/meetings/egm/NewYork/2014/P&R_Revision3.pdf

countries, it was important to incorporate criteria other than the population size of localities to categorize appropriately the specific pattern of settlements and rural population.

2.3 Discrepancies and mismatches in classifications

Causes for the discrepancies that were observed between the national categorizations and the international proposition may be separated in three main groups. Firstly, differences are due to the statistical reporting unit that supports the national practice. Typically, definitions that are based on prescribed legal entities such as those observed in Colombia, Ethiopia and Pakistan agree less with the population grid that underlies the SMOD/DEGURBA. The second common reason for mismatches are the thresholds (cut-off values) in population size. This was observed particularly in the Malaysia and USA tests and to some extent in the preliminary categorization reported by Brazil. Thirdly, the inclusion of additional criteria to national practices – typically applied to the categorization in the rural domain –is another important cause for discrepancies. This was observed in the country reports of Brazil, Ethiopia, France and Malaysia. Often, all of these discrepancies are present in national categorizations of the urban–rural continuum, as was observed for Ethiopia and Malaysia.

France has welcomed the greater level of categorization offered by the Level 2 of the SMOD/DEGURBA particularly in providing more detail to distinguish between towns and suburbs. Categorization of the latter seems however challenging. For instance, Brazil reported that the class "*Suburbs*" is not directly meaningful in the national context and does not appear frequently in urban concentrations. It also suggested that a more neutral labeling might help understanding the correspondence in the national contexts. Also, Colombia, Ethiopia and Pakistan definitions do not have a correspondence for this category. USA test also pointed to the class "*Surburbs*" as source for mismatches and that, in the country context, suburbs are typically identified with the cities or towns of which they are a part. In this respect, very recent developments introduced at the

lowest hierarchical level (Level 3) of the SMOD/DEGURBA[14]made a refinement in the category "*Surburbs*", to account for the distance from the closest town. This might partially address some of the concerns expressed by country pilots on this category.

2.4 Going forward with regard to the international definition

As reported in Brazil, Ethiopia, Pakistan and Malaysia pilots, the 2020 round of the Census of Housing and Population offers great opportunities for the development of a geocoding and geo-referencing system at the national level (UN, 2009)[15]. In general, efforts to build a national spatial data infrastructure may be an opportunity for countries to integrate in country practices the population grid and the urban–rural categorization offered by the SMOD/DEGURBA. On a different angle, more recent and fine-grained census data will contribute to the refinement of the population grid – reducing some of the mismatches that were observed by countries, particularly in countries such as Ethiopia and Pakistan where the input census data is outdated and rather aggregated.

Countries also reported on the challenges presented by the integration to the SMOD/DEGURBA system. There, where the availability of georeferenced data is still limited, technical and financial constraints such as those mentioned in the Ethiopia pilot might hinder, at least in the short term, this alignment. Legal challenges were mentioned particularly by Pakistan given the political and constitutional basis of the urban definition.

[14] Communication from the Joint Research Centre, August 2018.
[15] Handbook on Geospatial Infrastructure in Support of Census Activities. Available at: https://unstats.un.org/unsd/demographic/standmeth/handbooks/series_f103en.pdf

3

Assessment of the application of the definition to data collection and for indicators construction

The objective in this part of the pilot was the application of the urban–rural definition in collecting the data necessary to construct the SDG indicators. Countries were asked to focus on a subset (Table 4 is an excerpt from the complete table in the Tests Protocol, reported in Annex) of Tier I indicators, those for which the conceptual basis is clear, established methodology and standards are available, and data are regularly produced by countries. The test protocol requested an assessment of the feasibility of construction and calculation of a few of these indicators as selected by each country.

Table 4. Subset of SDG indicators for pilot tests*.

Goals	Selected SDG Indicators	Tier	Possible Data Source	Available at what geographic level?*	
				Grid cells	Spatial units (enumeration area or municipality)
				Cell size	*Type of unit and average surface or population size*
(Goal 1) End poverty	1.2.1 Proportion of population below the international poverty line, by sex, age, employment status, and geographical location (urban/rural)	I	Household surveys		

*Excerpt from the complete table in Test Protocol, Annex.

Because indicator construction depends on data collection appropriate to that use, countries were asked to comment on the sources of data for a sub-set of these indicators[16]: census, survey, or administrative record. The source of the data is important because it determines how observations can be aggregated to align with the classes in each of the two levels of the international definition. Grid cells are individually classified and then viewed as groups of cells with the same classification. These aggregations are compared against the boundaries of a country's own definition, as discussed earlier. The issue becomes how to align data collected using different methods and geographies with these aggregates.

3.1 Census data

Census data are population-wide observations on individuals and households. In the pilot countries, census-taking is done within enumeration units or blocks that cover the entire or just settled regions, where each unit usually contains 150-300 households. Because a census is a universal enumeration, these household observations can be aggregated as desired without concern for statistical validity. On the other hand, survey data, as discussed below, are not so easily handled.

The method of aggregation must thus be addressed. If individual household data are not georeferenced, they cannot necessarily be located in a particular SMOD/DEGURBA grid cell. However, enumeration units may be georeferenced. In that case, a list of households will be associated with each unit, which can be located on a map. The boundaries of the census blocks can then be superimposed on the SMOD/DEGURBA grid in which each cell is identified uniquely with one of the three (Level 1) or six (Level 2) classes.

The class of the enumeration unit could be derived as that to which the majority of cells belong. Depending on the area covered by each unit, the result could be

[16] Countries were asked to identify a sub-set of 4-5 indicators for which data collection processes are already available in the country and, whenever possible, to select indicators that rely on diverse data collection methods.

more or less representative of the grid cells contained within it. However, determination of the most representative class within an administrative unit by reference to the area covered by each could produce counterintuitive results. In very large spatial units, sparsely settled rural areas could account for much of the geography and so by area the dominant class would be rural. However, if a large densely settled city were contained within that unit, it would seem odd to categorize the entire unit as something other than urban. The solution to this dilemma lies in data collection according to the smallest possible geographic unit, with geocoding at the household level being the ultimate refinement.

3.2 Survey data

Survey data are a sample drawn from a larger population, and the characteristics of that population are estimated from the sample using statistical methodology. Many SDG indicators are to be constructed on the basis of survey estimates using sample stratification (see Table 4 above for examples). In the application of the urban–rural definition, equal reliability is required for each of the three (or six) classes. Therefore, the sampling strata would have to align with the areas associated with each class.

3.3 Administrative records

Not collected for statistical purposes, these data may not cover all of a country's individuals or households or be representative of the characteristics of the underlying population. If the records are geocoded to reflect location, then it may be possible to aggregate what records there are according to Level 1 or 2 of the SMOD/DEGURBA. Linking these records to statistical list or area frames could facilitate their use in indicator construction.

4

Feasibility assessment

Currently, this assessment was not possible for the pilot test of Colombia.

4.1 Brazil

At present, Brazil's statistical reporting is based on administrative units that are designated as either urban or rural. As discussed earlier, at Level 1, there is approximately 80 percent correspondence of these units with the international urban–rural definition. So, census and survey data might be used to construct indicators at Level 1, although with some inconsistency in alignment with the urban–rural definition's geographies. With the refinements envisioned for the 2020 census, the congruence is expected to increase and reporting at Levels 1 and 2 will likely be feasible for census data. Survey data would have to be collected according to the definition's boundaries, and this would likely require larger samples and more expense.

4.2 Ethiopia

Ethiopia evaluated the feasibility of indicators 3.c.1 (health worker density), 1.2.1 (proportion of population below poverty line), and 6.2.1 (proportion of population using safely managed sanitation services). For the indicator on health worker density, Ethiopia would rely on administrative reporting from each facility in the country. The indicator on poverty would use data from its Household Consumption and Expenditure Survey, and the indicator on sanitation services would draw from its Demographic and Health Survey.

Ethiopia reports statistical data at the regional level. There are eleven administrative regions, including two cities (Addis Ababa and Dire Dawa). As discussed earlier, there is some degree of correspondence between Ethiopia's administrative units classed as cities and the urban areas in the Level 1 and 2

definitions. However, cities may be found within regions that also encompass rural areas, so survey results at the regional level would not permit a distinction between the urban and rural areas within the region. This situation constrains indicator reporting at Levels 1 and 2.

4.3 France

France as noted is already using Level 1, with the added distinction of two classes of rural instead of one. Therefore, its statistical reporting is aligned with the international definition and so consistent indicators can be constructed. The National Statistical Institute (*Institut national de la statistisque et des études économiques* – INSEE) will release an update of the population grid at the beginning of 2019 in which it will further extend from the two rural classes of Level 1 to the four classes of Level 2 as in the international categorization. Thus, good perspectives for the adoption of Level 2 are also envisaged.

4.4 Malaysia

Malaysia evaluated indicator 1.2.1 (population below poverty line), 3.2.1 (under five mortality rate), and 4.6.1 (level of proficiency in literacy and numeracy). Indicator 1.2.1 is collected using a household income survey, and 4.6.1 using administrative data on skills assessment and national adult literacy. The indicator on under five infant mortality would also be collected using administrative records.

DOSM at present reports using units with administrative boundaries at the district and state level. The Department defines enumeration blocks that are used in census taking and in survey sampling. The major urban areas that Malaysia identifies do align with the cities category of the international definition. However, as discussed earlier, the agreement is limited for other classes because Malaysia's criteria for designating an area as rural includes more factors than population size and density. Consequently, meaningful reporting at either Levels 1 or 2 is not currently feasible because of these mismatches.

In future, the Department expects to finish construction of the Malaysia Statistical Address Register (MSAR), in which each living quarter will be assigned to a unique ID and geocoded. At that point, it will be able to switch its methodology from an area frame to a comprehensive housing unit frame. This will enable census results to be aggregated in accordance with the international definition, though survey data strata would still need to be aligned with the definition's classes.

4.5 Pakistan

PBS evaluated the feasibility of collecting data for nine of the sixteen selected SDG indicators in Table 4, addressing all Goals in Table 4 including indicators related to goals 15 and 16. Under Goals 15 and 16, indicators 15.3.1 and 16.6.2 are covered by PBS through Agriculture Census and Pakistan Social and Living Standards (PSLM) district level survey respectively. The data sources for monitoring of SDG indicators are surveys that mainly include those collected under the PSLM initiative and cover Household Income& Consumption, Education, Health, Employment, Water & Sanitation and Environment,. SDGs are monitored by the following surveys conducted by PBS:

i. PSLM District level Survey;
ii. HIES Provincial Level Survey;
iii. LFS Provincial level Survey.

These surveys' methodology samples from two strata, urban and rural. These strata are defined by administrative units, where the urban domain corresponds roughly to large-sized cities and then all other cities, and the rural strata is the residual. In District level survey, each administrative district has been taken as an independent stratum for four provinces. In Provincial level survey, each administrative division has been taken as an independent stratum for the urban domain. Conversely, for the rural domain, administrative district has been taken as an independent stratum for Punjab, Sindh and Khyber Pakhtunkhwa (KP). For the rural domain in Baluchistan, each administrative division has been taken as an independent stratum. For Azad Jammu and Kashmir (AJK) and Gilgit-

Baltistan (GB) each administrative division has been taken as an independent stratum for both urban and rural domains. The Major/Big cities are further stratified in to low, middle & high-income groups but after Census 2017 information related to low, middle and high income groups is not available. Hence, at this stage only urban and rural domains have been used. At present, as discussed, the congruence between these units and those delineated in the international definition has yet to be evaluated.

4.6 United States of America

The Economic Research Service (ERS) of the US Department of Agriculture (USDA),considered that, if a grid-based harmonized definition were found to be suitable for delineating urban categories (see its concerns in Section 2.7), then it would be feasible to construct a range of socio-economic indicators using census data, administrative sources, and household and multi-purpose surveys. ERS uses grid-cell methodology and GIS techniques to combine data based on different geographic building blocks. As an example of a possible strategy for constructing SDG indicators, urban-area geography, block-level population data, and a detailed road network map are downcast onto 0.5x0.5kilometer grid cells to identify remote areas in the USA. ERS did note the limitations of this approach, which include challenges in accurately allocating data reported using relatively large geographic units to grid-based urban–rural categories. It suggested that a better method would be to start with data collected using smaller geographic building blocks, as those available from the US Census. However, data on economic conditions, in particular, are collected at higher levels of aggregation in surveys.

5

Main conclusions regarding the indicators reporting

A country's ability to report indicators based on current data collections that are consistent with the proposed international definition depends on the alignment of its statistical data reporting with the classes in Levels 1 and 2. The possibilities vary according to the source of the data to be used in constructing the indicator.

- With census data identified by enumeration block or geocode, indicators could be reported according to the Level 1 urban–rural classes and for Level 2 where enumeration blocks can be associated with the areas in each class of the continuum. Because of the relatively good agreement about urban areas between the proposed urban–rural definition and countries' current classifications, reporting of some indicators at Level 1 seems possible for census data. Also, population data could be reported using this scheme. While Level 2 was endorsed as useful in policy analysis and in program administration, not all countries in the pilot saw reporting by Level 2 as immediately feasible. Without geocoded household or census block data, breaking existing data into smaller aggregates could not be done according to the six categories. France reported that an aggregated four levels might be possible. Brazil suggested it might be able to report at Level 2 for census data. The United States also believed it could report some indicators at Level 2 but that, in some cases, down casting from larger survey units would be necessary and result in a loss in accuracy.
- With survey data, reporting indicators using the definition appears at present problematic for most countries, especially for Level 2. To achieve consistency with the definition, data collection would need to be aligned

with the geography appropriate to each class in order to produce statistically valid results. Moving to align survey sampling frames with the classes in the definition would require changes in statistical strategies across most countries. While the Level 1 definition may compare reasonably well to individual country designations of urban and rural territory, the matches are not exact. Either sample strata must be aligned with the definition or a judgment must be made that reporting according to existing strata is acceptable. For Level 2, alignment of the definition classes and strata may well require more extensive sampling in order to produce statistically reliable results over a larger number of smaller geographies. The costs of data collection would be increased accordingly, a potential barrier to the use of the more highly disaggregated Level 2 definition.

- With administrative data, geocoding of each observational unit would be necessary for alignment with the definition's classes. To do so would likely have to be supported by a national geocoded address file. Malaysia currently has one under construction, but it is not clear this work is underway in any other country for use in statistical reporting.

6

Going forward regarding data collection and indicators reporting

Using Level 1 to report SDG indicators would be a move toward consistency on a global basis and therefore represent an improvement over the status quo. However, in the immediate future, there would not likely be precise alignment of the reporting with the urban–rural definition based on the SMOD/DEGURBA cell classes. The test results show that countries can roughly align their internal urban definitions with SMOD, which would still yield results that are more comparable on an international basis, especially for indicators based on census data. Level 2 is acknowledged as making meaningful distinctions across the urban–rural continuum. However, capability to align census and especially survey data with the more refined classes is not found in all countries. In this more detailed context, the question of aggregation of existing data to fit the classes has to be confronted on a county-by-country basis. Survey frames by geography vary across countries, as do the classifications according to the definition. In its principles for censuses, the UN Statistical Division has identified the need to move in the direction of small area reporting (see footnote 3). Having smaller reporting units would facilitate adoption of the Level 2 classifications by reducing the size of geographical aggregates that may contain different numbers of cells in different classes, complicating the determination of the appropriate class to which the large unit belongs.

The pilot tests demonstrate that, at least for the immediate future, there will be variability in the geographic resolution of each country's data collection and indicator reporting. Those differences should be recorded as a means of assessing data quality and as a resource for analysts. With adoption of a global urban–rural definition, it may be possible to assess each country's reporting against that

standard. The point would not be to say which reporting is "correct" and which is not, but to allow characterization of the sensitivity of global totals to variability in definitions across countries.

Annex 1.

National Institutions and Focal Points

Pilot Country	Institution	Lead contact	Email
Brazil	Instituto Brasileiro de Geografia e Estatística (IBGE)	Mr. Claudio Stenner, Geography Coordinator	claudio.stenner@ibge.gov.br
Colombia	Departamento Administrativo Nacional de Estadística (DANE)	Ms. Angélica Maria Palma Robayo, Coordinator Cooperation & International Relation Office	ampalmar@dane.gov.co
		Ms. Sandra Liliana Moreno Mayorga, Directora Técnica, Dirección de Geoestadística	slmorenom@dane.gov.co
Ethiopia	Central Statistical Agency (CSA)	Ms. Aberash Tariku, Deputy Director General, Data Quality and Standard Coordination	kaberash@yahoo.com
France	Institut national de la statistique et des études économiques (INSEE)	Mr. David Levy, Chef de pôle analyse territoriale, Région de Marseille	david.levy@insee.fr
Malaysia	Department of Statistics Malaysia (DOSM)	Ms Manisah Othman, Principal Assistant Director, Agriculture and Environment Statistics Division	manisah@stats.gov.my
Pakistan	Pakistan Bureau of Statistics (PBS)	Mr. Munwar Ali Ghanghro, Director	munwarghanghro@gmail.com
United States of America	Economic Research Service, US Department of Agriculture (USDA)	Mr. John Cromartie, Geographer	jbc@ers.usda.gov

Annex 2.

Tests Protocol

Paragraphs follow the numeration as in the original document.

PILOT-TESTING AN URBAN/RURAL DEFINITION AND ITS APPLICATION FOR REPORTING SDG INDICATORS

1. Overview

A harmonised definition of urban and rural areas is important for making cross-country comparisons of progress towards the Sustainable Development Goals (SDGs) and for meeting the associated rural policy objectives. Leveraging the work already dedicated to the SDGs, such a definition may also support national processes thus ensuring efficient use of limited resources.

Consultation with country experts has led to a consensus about the value of adopting such a definition for the purposes of international comparisons, and especially with respect to SDG indicators. The proposed internationally comparable definition is not intended to replace existing national schemas but rather to supplement them. Countries will always retain and use their own definitions based on administrative units or cultural and traditional political boundaries or other considerations. Still, in this test, it will be useful to know whether the proposed definition has value in national context and applications – for instance in supporting the design of data collection mechanisms amongst other considerations.

The urban-rural definition presents a continuum that characterizes settlements based on population size and density. This definition is thus people-based. This continuum allows delineation of Urban versus Rural areas and makes it possible to distinguish between Cities, Towns and Suburbs in densely settled urban areas and among Villages, Dispersed areas, and Mostly uninhabited areas in thinly populated areas. This higher level of detail or disaggregation facilitates the analysis and understanding of how variations in people's circumstances and well-being are based on the places where they live and to design policies meaningful to each reality.

The spatial population grid that underlies the definition assigns population to cells of uniform size across the landscape. These can then be aggregated using any administrative or political boundaries that have significance in domestic contexts, but they work best with small units.

This pilot test is a desktop exercise. This will help to save resources and to minimize the efforts required.

• For the **urban/rural definition**, the principles used in its design promote cost effective implementation. The method proposed for an international definition is globally applicable, feasible with input data currently available free of charge, and adaptable when more refined data become available. This activity builds momentum as several organizations FAO, GSARS, the European Commission, the World Bank, and the OECD closely collaborate to provide a platform that ensures consistency between international urban and rural definitions.

• For the **key indicators**, the set can be selected by your institute to leverage the resources currently devoted to producing the SDGs indicators. The value-added for countries is the context provided on urban and rural development, so that the SDG indicators can be placed in domestic use, in addition to meeting international reporting requests.

The pilot exercises will inform a judgment about the extent to which this effort at parsimony has been successful. Cost-effectiveness is but one criteria by which the definition and indicators should be evaluated. Their value in domestic decision making and in international reporting is equally, if not more, important. For instance, the proposed people-based definition may support the design of data collection efforts.

2. What are the objectives

In the context above, these pilot tests have two main objectives:

1) The first aims at applying the urban/rural continuum in country-specific context to compare and contrast its characterization of population settlements with those currently in use domestically.

2) The second objective aims at assessing countries' opportunities, capacities and constraints to report a subset of core SDG indicators on livelihoods and wellbeing using the proposed definition and existing data and sources (e.g. Census, administrative sources, household surveys, multipurpose survey, and others).

3. Technical specifications of the urban/rural definition

The definition of urban/rural areas applied to this pilot testing is based on *the Degree of Urbanisation* or "DEGURBA"[17] concepts and models developed by the European Commission.

The DEGURBA relies on a population grid with cells of 1 square kilometre. The population grid is developed by the Joint Research Centre of the European Commission within the Global Human Settlement Layer project[18]. The DEGURBA is applied to the population grid[19]. Table 1 explains what thresholds are used to assign each grid cell to one the classes in this urban -rural typology. This means that all areas, inhabited or not, cities and towns, rural and suburban places are classified.

The refined urban-rural categorisation subdivides the three main classes to capture the full settlement hierarchy. Table 1 shows the subdivisions created by level two.

- At Level 1, the DEGURBA distinguishes Urban centres (which define cities); Urban clusters (which define towns and suburbs); and Rural cell (which define rural areas);
- At Level 2 it divides the rural cells into Mostly uninhabited rural, Dispersed rural areas and Villages. It splits the Towns from the Suburbs, which are a single class at Level 1. The Cities are not subdivided.

It should be noted that the rural categorization is developed from the best available data globally. Higher spatial resolution data, more detailed and updated information

[17] http://ec.europa.eu/eurostat/web/degree-of-urbanisation/background
[18] http://ghsl.jrc.ec.europa.eu/
[19] It can be freely downloaded here. The layer with the urban-rural categorisation is called GHS-SMOD http://ghsl.jrc.ec.europa.eu/

on human population and detailed statistics on the actual use of the built-up areas will overcome current data constraints, when available.

Table 5. Levels 1 and 2 of the conceptual schema of the refined urban-rural categorisation

LEVEL 1			**LEVEL 2**		
Code	Description	Rule	Code	Description	Rule
Rural (RUR)	*Rural grid cells*	Cells with a population <= 300 or > 300 but outside moderate density clusters (MDC)	**10**	*Uninhabited permanent water surfaces*	No population and less than 50% land area
			11	*Mostly uninhabited area*	Population density between 0 and 50
			12	*Dispersed rural area*	Population density between 50 and 300
			13	*Villages*	Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5,000; excluding MDC;
Moderate density cluster (MDC)	*Urban clusters*	Contiguous cells with a density of at least 300 residents per square km and a minimum population in the cluster of 5,000	**22**	*Suburbs*	Contiguous grid cells with a density of at least 300 residents per sq km and a minimum cluster population of 5,000; excluding cities (HDC) and towns

			21	*Towns*	Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5,000 and 50,000; excluding cities (HDC)**;**
High density cluster (HDC)	*Urban centres*	Contiguous cells with a density of at least 1,500 residents per square km (or at least 50% built-up) and a minimum population in the cluster of 50,000. Gaps are filled and edges are smoothed	**30**	*Cities*	Same as Level 1

Note: Contiguous refers to the 4 cells adjacent to each cell in the grid (cells that touch at the corners are not included).

Figure 1. Summary representation of refined urban-rural categorisation

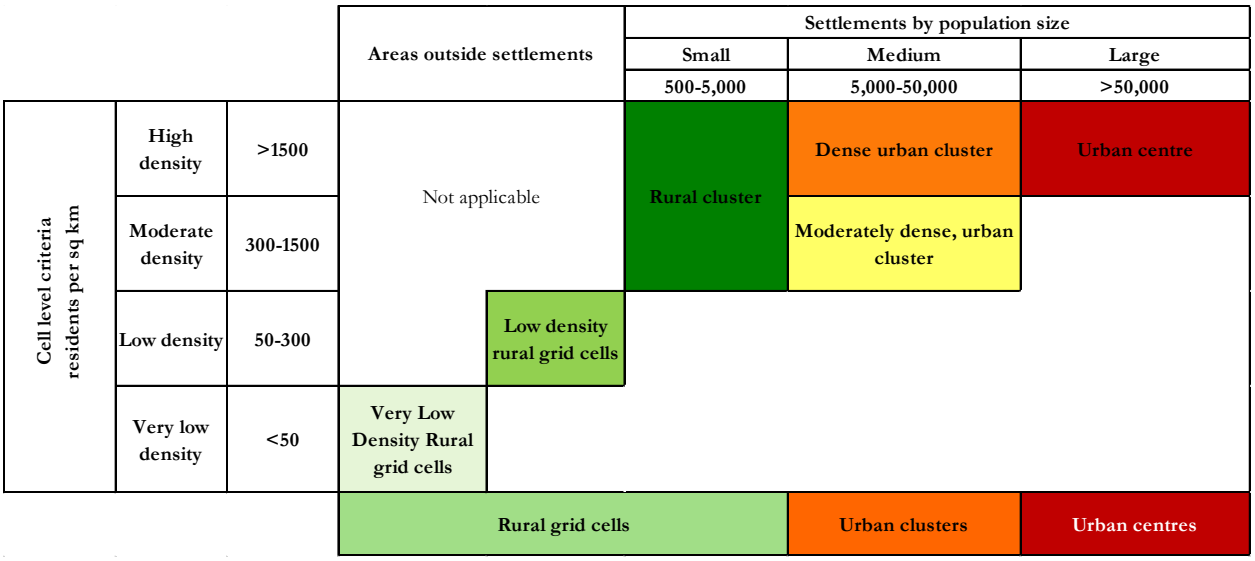
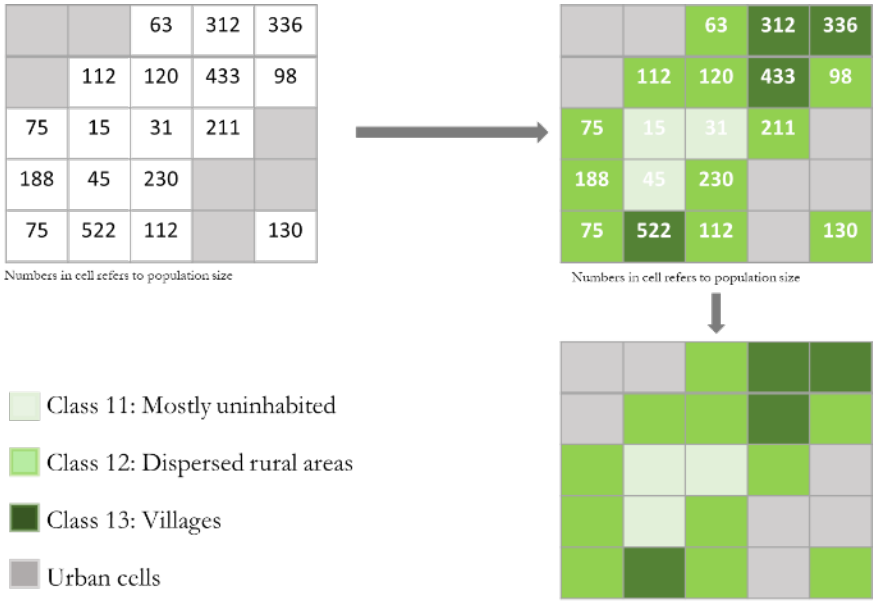


Figure 2. Refined categorisation of rural cells in the population density grid



4. Key questions

The pilot testing should cover both the Level 1 and Level 2 classifications. Comparing the definition with current domestic practices is intended to provide insight into feasibility of use in international reporting and the value it may have in a domestic context. The first questions concern the application of the definition

itself, and the next ones explore how the definition can be used to organize statistics for reporting for internationally-comparable SDG indicators.

- How does the Level 1 urban and rural definition compare to the national urban-rural definition(s)?
- Do the more refined classes in Level 2 provide helpful distinctions about where the population lives and in what circumstances? In particular, does having a consistent people-based classification of settlements across the country facilitate policy and program analysis?

- What would be the main constraints (institutional, technical, and financial) for this Level 2 definition to be applied as a valid categorization?
- How could the definition be applied to existing data to construct a few SDG indicators as demonstrations? Is georeferenced data used in indicator construction currently available? Are there plans to adopt georeferencing in sampling and collecting data?

Based on these questions, the testing may be subdivided in two complementary parts: the evaluation of the rural definition with respect to current national practices (**section 5** in this document) and the evaluation of its application in the context of developing key indicators (**section 6**).

5. Evaluation of the definition

Specific results of the application of the proposed definition in your country are provided together with these instructions. Thus, based on the evaluation of these results and comparison to national practices:

a) Please indicate how the Level 1 and Level 2 categorisation in urban and rural areas differ from national practices. Are differences due to the identified thresholds?

b) A key aspect of the evaluation is to understand the value of the refined Level 2 classes in your country. Please review the thresholds and rules applied in the categorisation of the urban and rural areas and compare them with those currently in use in the national context. If applicable, could you prepare a corresponding

table between urban and rural categories in use in your Country and the proposed Level 2 categorisation?

c) Please also indicate to what extent the method appears to identify rural areas at the expense of urban centres and clusters and/or if the opposite occurs. Note that, with the proposed definition, the assignment of rural to urban (or urban to rural) areas may occur at Level 1, the highest hierarchical level (urban and rural), as well as between categories of the same type (e.g. Villages that are coded as Dispersed rural areas) in Level 2 (see Table 6).

Table 6. Mismatches in detection of rural and urban areas

		Under-detection	**Over-detection**
URBAN	Cities	Some urban are missing	Some rural are included
	Towns and Suburbs		
RURAL	Villages	Some rural areas are missing	Some urban areas are included as rural
	Dispersed rural areas		
	Mostly inhabited areas		

d) Please indicate to what extent the use of the urban/rural continuum would be valuable in domestic policy decision making and analysis.

6. Assessing the application of the definition

The objective of this section is your assessment of the application of the proposed definition of urban and rural areas in constructing indicators and in data collection. Here, the emphasis is on Tier One indicators, those for which the conceptual basis is clear, established methodology and standards are available, and data are regularly produced by countries. Calculation of the specific indicator values is not needed; instead an assessment of the feasibility of construction and calculation is sought.

The following list of key indicators of wellbeing are drawn from the existing SDG set. Metadata (as of June 2018) are available from download from https://unstats.un.org/sdgs/metadata/.

Table 7. Subset of SDG indicators for assessing the application of the definition

Goals	**Selected SDG Indicators**	**Tier**	**Possible Data Source**	**Available at what geographic level?***	
				Grid cells	Spatial units (enumeration area or municipality)
				Cell size	*Type of unit and average surface or population size*
(Goal 1) End poverty	1.2.1 Proportion of population below the international poverty line, by sex, age, employment status, and geographical location (urban/rural)	I	Household surveys		
(Goal 2) End hunger	2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Index (FIES)	I	Household surveys		
(Goal 3) Ensure healthy lives	3.2.1 Under five mortality rate	I	Households surveys, administrative records		
	3.c.1 Health worker density and distribution	I	Census, labor and employment surveys, administrative records		
(Goal 4) Ensure inclusive and equitable quality education	4.1.1 Proportion of children and young people: (a) in grades 2-3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex	II	Cross-national learning assessments		
	4.6.1 Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex	II	Skills assessment and national adult literacy surveys		
(Goal 6) Ensure availability of water and sanitation	6.1.1 Proportion of population using safely managed drinking water sources	I	Household surveys, administrative records		
	6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water	I	Household surveys, censuses		
(Goal 7) Ensure access to energy	7.1.1 Proportion of population with access to electricity	I	Household surveys		
	7.1.2 Proportion of population with primary reliance on clean fuels and technology	I	Household surveys		
(Goal 8) Promote economic growth	8.3.1 Proportion of informal employment in non-agriculture employment, by sex	II	Household and labor surveys		

	8.5.2 Unemployment rate, by sex, age and persons with disabilities	I	Household and labor surveys		
(Goal 9) Build infrastructure, promote industrialization, foster innovation	9.c.1 Proportion of population covered by a mobile network, by technology	I	Information and communication ministry data collected from internet providers		
(Goal 11) Make cities and human settlements inclusive, safe, resilient and sustainable	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	I	Ground measurements monitoring networks, satellite remote sensing, topography, population		
(Goal 15) Protect ecosystems, manage forests, combat desertification, halt land degradation, halt biodiversity loss	15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	I	Inventories and surveys, remote sensing observations		
(Goal 16) Significantly reduce all forms of violence and related death rates everywhere	16.1.1 Number of victims of intentional homicide per 100,000 population, by sex and age	I	a) Criminal justice system; b) Public health/civil registration.		

*Both grid and area units may be applicable.

Your Institution is kindly requested to identify a subset of 4–5 indicators for which data collection processes are already available in the country. Whenever possible, it would be ideal to select indicators that rely on diverse data collection methods (e.g. Census, administrative sources, household surveys, multipurpose survey, and others).

A key issue concerns aggregation of grid cells into the administrative or political units that define the geographical areas over which data are collected. If data are not georeferenced, they cannot necessarily be located in a particular grid cell. In that case, the boundaries of a census enumeration unit, for example, could be overlaid on the underlying settlement grid cells, and the classification of that group of cells could be derived as the class to which the majority of cells belong (see Country Fact Sheet). Depending on the area covered by each administrative unit, the result could be more or less representative of the grid cells contained within it. A census unit could contain all the same class (say, suburb) or could have more than one class (say, town and suburb).

In the context of the definition, this part of the evaluation seeks to answer the following questions:

a) What data collection method are used for each selected indicator? Are these indicators all relying on the same national definition of urban and rural areas? If not, please specify how these differ. Is your Institution the one primarily responsible for the collection of the selected indicators?

b) What would be the opportunities to apply the Level 2 definition for each particular indicator?

c) What would be the main constraints in apply the Level 2 definition to each data process? Would these constraints be of technical, financial, or of institutional nature?

7. Supporting material

For each country participating in the testing, a factsheet is provided jointly to these instructions to facilitate the quantitative and qualitative components of the evaluation. Additional material will include:

a) Country Fact Sheet with results from the categorisation;

b) Interactive visualisation of categorisation in the country in Google Earth (KMZ files) and instructions for visualisation (1 page).

Annex 3.

Country factsheet: Brazil

Introduction

This country summary is provided to support the assessment of an international definition of urban and rural areas by National Statistical Institutes. The goal of this assessments is to see whether the proposed definition and its categorisation accurately captures a country's rural and urban areas.

Please note that inaccuracies in this country summary may be due to data quality. The results presented here are based on a combination of two data sources: population and built-up areas. The method ensures greater comparability and a harmonization of spatial concepts. The urban and rural characterisation can be applied to other data (e.g. census updates, better spatial resolution) that may improve the available classification of both rural and urban components.

The **population** source data are collected by the Center for International Earth Science Information (CIESIN) mostly from the National Statistical Offices. For Brazil, baseline data source are summarised in Table 1.

Table 8. *Summary of the population data used by CIESIN for* ***Brazil***

Country	Highest administrative level used	Number of units (polygons)	Population year	Population Source type
Brazil	5	316,461	2010	Final Census
Population source citation ***The Brazilian Institute of Geography and Statistics (IBGE), Synopse do Censo Demografico 2010, ftp://ftp.ibge.gov.br/Censos/Censo_Demografico_2010/Sinopse/Agregados_por_Setores_Censitarios/, Accessed 07/05/2011.***				

Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer to define a Degree of Urbanization (DEGURBA). The DEGURBA classification schema is described in: http://ec.europa.eu/eurostat/web/degree-of-urbanisation/background. This classification in further refined into 6 classes instead of 3 (see the Global Human Settlement Layer or "GHS-SMOD" by the Joint Research Center of the European Commission – http://ghsl.jrc.ec.europa.eu/).

The degree of urbanisation has three classes based on three types of grid cells:

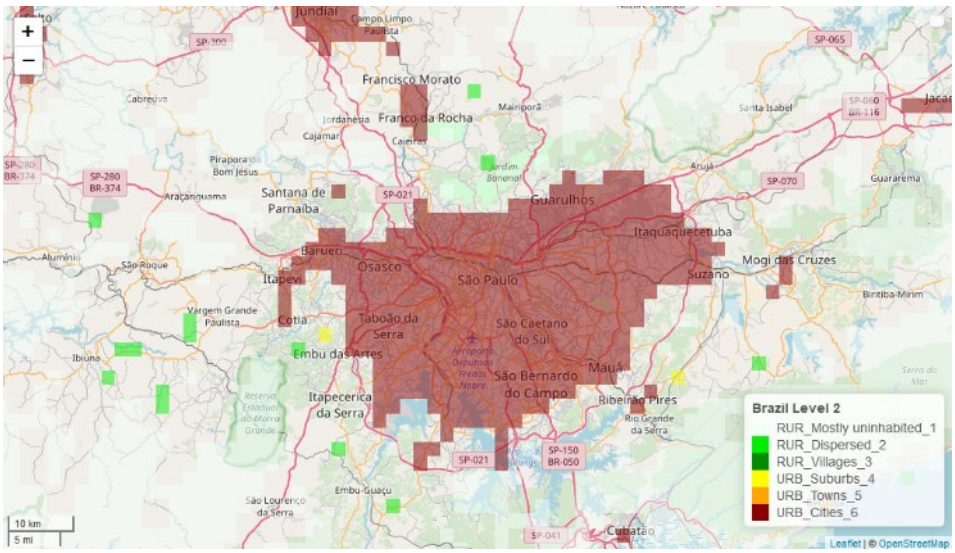
1. R**ural grid cells** is as all grid cells with a population density of less than 300 residents per square km and other cells that are outside an urban cluster.
2. An **urban cluster** consists of contiguous cells with a density of at least 300 residents per square km and a minimum population in the cluster of 5,000.
3. An **urban centre** consists of contiguous cells with a density of at least 1,500 residents per square km and a minimum population in the cluster of 50,000.

These three classes of local spatial units are defined using the three types grid cells as following:

1. A rural area has the majority of its population in rural grid cells.
2. Towns and suburbs have the majority of their population in an urban cluster (and it is not a city).
3. A city has the majority of its population in an urban centre.

Urban areas consist of cities, towns and suburbs. Please note that in some countries, the intermediate category 'towns & suburbs' is considered as part of the rural domain. The refined degree of urbanisation has six classes. It splits the **towns** from the **suburbs**. The **rural** areas are divided into **villages**, **dispersed rural** areas and **mostly uninhabited** areas.

Figure 2. *Refined urban-rural categorisation – São Paolo,* ***Brazil***



Definitions:

Rural grid cells (1 sqkm) include low density population cells

Mostly uninhabited _1 (pale green): Grid cells with a density below 50 residents per sq km;

Dispersed rural areas_2 (bright green): Grid cells with a density between 50 and 300 residents per sq km;

Villages_3 (dark green): Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5,000; excluding urban clusters;

Urban cells (1 sqkm) include urban clusters (or moderate density clusters) and urban centres (or high density clusters)

Suburbs _4 (yellow): Contiguous grid cells with a density of at least 300 residents per sq km and a minimum cluster population of 5,000; excluding cities and towns;

Towns_5 (orange): Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5,000 and 50,000; excluding cities;

Cities_6 (dark red): Contiguous grid cells with a density of at least 1,500 residents and a cluster population of at least 50,000;

*Figure 3. Country results for **Brazil** based on the refined urban-rural categorisation*

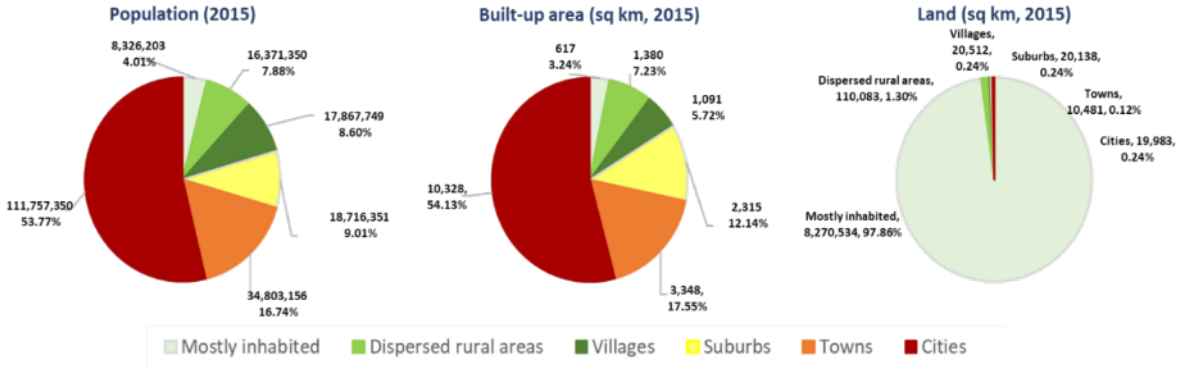
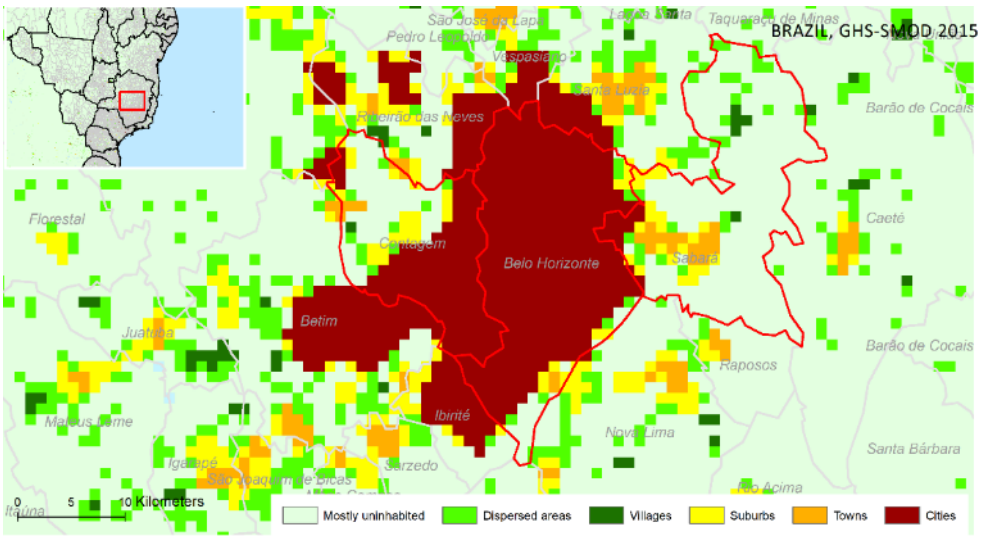


*Table 9. Distribution of population by the refined urban-rural categorisation, example for three administrative zones – Minas Gerais, **Brazil****

Administrative unit (Level 2)**	Mostly uninhabited	Dispersed rural areas	Villages	Suburbs	Towns	Cities	Total Population
Belo Horizonte	0.0%	0.1%	0.0%	0.3%	0.3%	99.3%	2,491,174
Contagem	0.1%	0.3%	0.1%	1.9%	1.3%	96.2%	639,437
Sabará	0.9%	2.0%	2.5%	12.7%	41.9%	39.9%	144,822

**FAO calculations based on the Global Administrative Areas (GADM version 3.6); the refined urban-rural categorisation (v9s10C, 2015 results) and the population grid (GHS_POP_GPW41MT_GLOBE pre-Release version 2018); **Corresponding spatial representation is shown in Figure 3.*

*Figure 4. Spatial representation of example in Table 2 – Minas Gerais, **Brazil***



Notes about data:

In case of cross-border settlement areas, only population and surfaces estimates related to the Country are considered in this summary. The summary includes results from automatic data analytics workflows including global best available satellite data records collected by Earth Observations and census data made available by National Statistical Offices. The data in the GHS-SMOD model is aggregated for four reference years 1975, 1990, 2000, 2015. This fact sheet only shows results for the most recent year (2015). These years should be considered as nominal dates aggregating the best suitable data in any given period. The statistics presented in this document are based on the country borders as defined in the database of Global Administrative Areas (GADM version 2.8). The underlying data for this assessment are expected to be released publicly by late 2018.

Annex 4.

Country factsheet: Colombia

Introduction

This country summary is provided to support the assessment of an international definition of urban and rural areas by National Statistical Institutes. The goal of this assessments is to see whether the proposed definition and its categorisation accurately captures a country's rural and urban areas.

Please note that inaccuracies in this country summary may be due to data quality. The results presented here are based on a combination of two data sources: population and built-up areas. The method ensures greater comparability and a harmonization of spatial concepts. The urban and rural characterisation can be applied to other data (e.g. census updates, better spatial resolution) that may improve the available classification of both rural and urban components.

The **population** source data are collected by the Center for International Earth Science Information (CIESIN) mostly from the national statistical offices. For Colombia, baseline data source are summarised in in Table 1.

Table 10**. Summary of the population data used by CIESIN for **Colombia

Country	Highest administrative level used	Number of units (polygons)	Population year	Population Source type
Colombia	3	932	2010	Final Census
Population source citation ***Department of Statistics - Colombia, Population and Housing Census 2010, Tables 18.3 - 32.3: Total population by sex, households and living quarters, administrative district and state, http://www.statistics.gov.my/, Accessed 06/06/2013.***				

Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer to define a Degree of Urbanization (DEGURBA). The DEGURBA classification schema is described in: http://ec.europa.eu/eurostat/web/degree-of-urbanisation/background. This classification in further refined into 6 classes instead of 3 (see the Global Human Settlement Layer or "GHS-SMOD" by the Joint Research Center of the European Commission – http://ghsl.jrc.ec.europa.eu/).

The degree of urbanisation has three classes based on three types of grid cells:

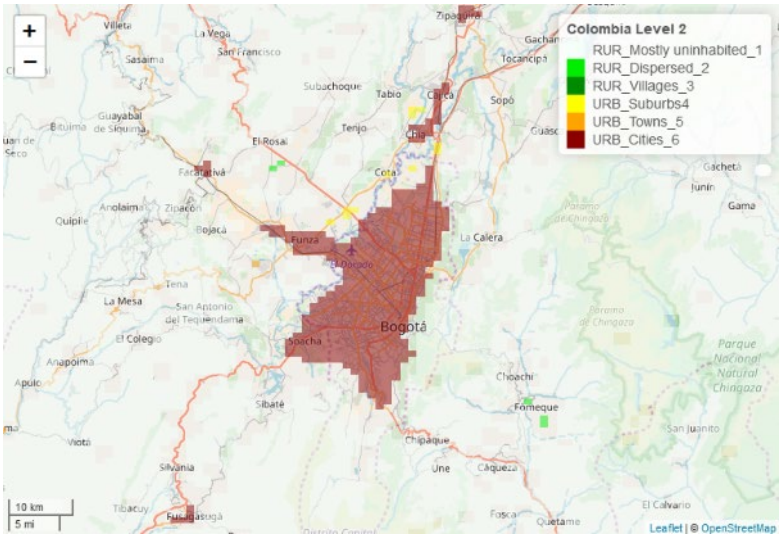
4. R**ural grid cells** is as all grid cells with a population density of less than 300 residents per square km and other cells that are outside an urban cluster.
5. An **urban cluster** consists of contiguous cells with a density of at least 300 residents per square km and a minimum population in the cluster of 5,000.
6. An **urban centre** consists of contiguous cells with a density of at least 1,500 residents per square km and a minimum population in the cluster of 50,000.

These three classes of local spatial units are defined using the three types grid cells as following:

4. A rural area has the majority of its population in rural grid cells.
5. Towns and suburbs have the majority of their population in an urban cluster (and it is not a city).
6. A city has the majority of its population in an urban centre.

Urban areas consist of cities, towns and suburbs. Please note that in some countries, the intermediate category 'towns & suburbs' is considered as part of the rural domain. The refined degree of urbanisation has six classes. It splits the **towns** from the **suburbs**. The **rural** areas are divided into **villages**, **dispersed rural** areas and **mostly uninhabited** areas.

Figure 5**. Refined urban-rural categorisation – Bogotá, **Colombia



Definitions:

Rural grid cells (1 sqkm) include low density population cells

Mostly uninhabited _1 (pale green): Grid cells with a density below 50 residents per sq km;

Dispersed rural areas_2 (bright green): Grid cells with a density between 50 and 300 residents per sq km;

Villages_3 (dark green): Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5,000; excluding urban clusters;

Urban cells (1 sqkm) include urban clusters (or moderate density clusters) and urban centres (or high density clusters)

Suburbs _4 (yellow): Contiguous grid cells with a density of at least 300 residents per sq km and a minimum cluster population of 5,000; excluding cities and towns;

Towns_5 (orange): Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5,000 and 50,000; excluding cities;

Cities_6 (dark red): Contiguous grid cells with a density of at least 1,500 residents and a cluster population of at least 50,000;

*Figure 6. Country results for **Colombia** based on the refined urban-rural categorisation*

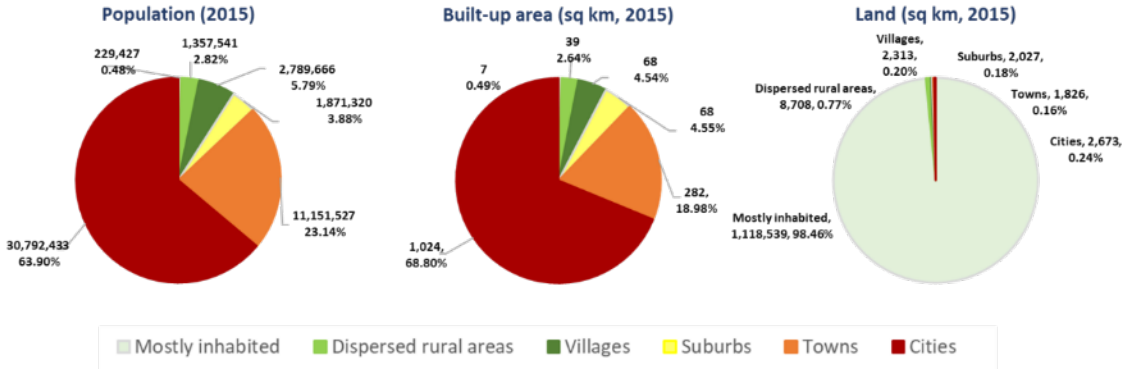
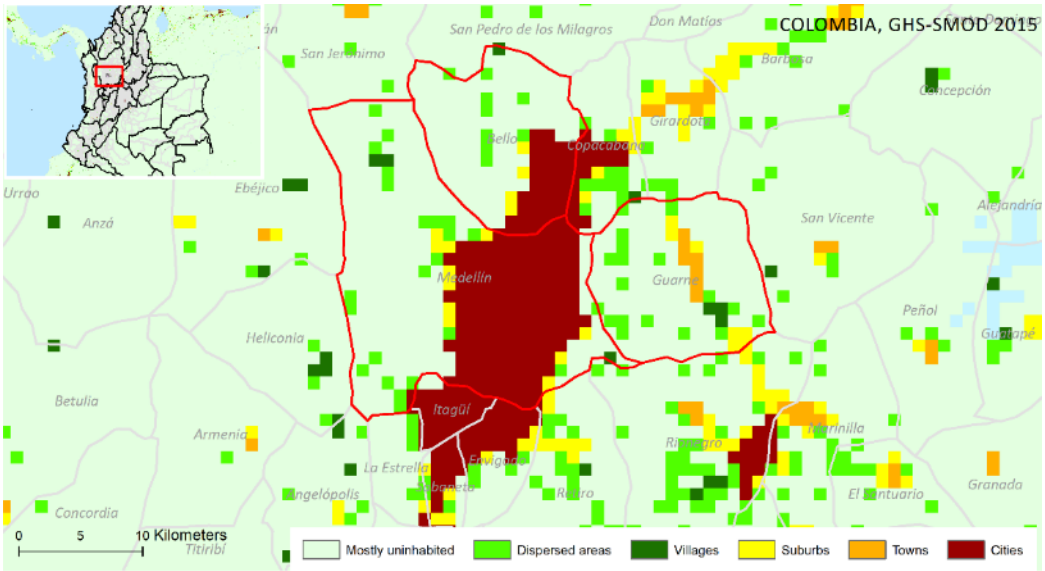


*Table 11. Distribution of population by the refined urban-rural categorisation, example for three administrative zones – Antioquia, **Colombia****

Administrative unit (Level 2)**	Mostly uninhabited	Dispersed rural areas	Villages	Suburbs	Towns	Cities	Total Population
Bello	0.0%	0.2%	0.1%	0.6%	0.0%	99.0%	525,032
Guarne	0.8%	4.9%	7.4%	18.2%	68.8%	0.0%	42,449
Medelín	0.0%	0.1%	0.1%	0.4%	0.0%	99.4%	2,302,470

**FAO calculations based on the Global Administrative Areas (GADM version 3.6); the refined urban-rural categorisation (v9s10C, 2015 results) and the population grid (GHS_POP_GPW41MT_GLOBE pre-Release version 2018); **Corresponding spatial representation is shown in Figure 3.*

*Figure 7. Spatial representation of example in Table 2 – Antioquia, **Colombia***



Notes about data:

In case of cross-border settlement areas, only population and surfaces estimates related to the Country are considered in this summary. The summary includes results from automatic data analytics workflows including global best available satellite data records collected by Earth Observations and census data made available by National Statistical Offices. The data in the GHS-SMOD model is aggregated for four reference years 1975, 1990, 2000, 2015. This fact sheet only shows results for the most recent year (2015). These years should be considered as nominal dates aggregating the best suitable data in any given period. The statistics presented in this document are based on the country borders as defined in the database of Global

Administrative Areas (GADM version 2.8). The underlying data for this assessment are expected to be released publicly by late 2018.

Annex 5.

Country factsheet: Ethiopia

Introduction

This country summary is provided to support the assessment of an international definition of urban and rural areas by National Statistical Institutes. The goal of this assessments is to see whether the proposed definition and its categorisation accurately captures a country's rural and urban areas.

Please note that inaccuracies in this country summary may be due to data quality. The results presented here are based on a combination of two data sources: population and built-up areas. The method ensures greater comparability and a harmonization of spatial concepts. The urban and rural characterisation can be applied to other data (e.g. census updates, better spatial resolution) that may improve the available classification of both rural and urban components.

The **population** source data are collected by the Center for International Earth Science Information (CIESIN) mostly from the National Statistical Offices. For Ethiopia, baseline data source are summarised in in Table 1.

Table 12**. Summary of the population data used by CIESIN for **Ethiopia*

Country	Highest administrative level used	Number of units (polygons)	Population year	Population Source type
Ethiopia	3	734	2007	Final Census
Population source citation ***Central Statistics Agency, The 2007 Population and Housing Census, Published 06/18/2010, http://www.csa.gov.et/newcsaweb/images/documents/surveys/Population%20and%20Housing%20census/ETH-pop-2007/survey0/data/Doc/Reports/National_Statistical.pdf, Accessed 10/26/2010.***				

**Data for the 2017 Population Census not available yet*

Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer to define a Degree of Urbanization (DEGURBA). The DEGURBA classification schema is described in: http://ec.europa.eu/eurostat/web/degree-of-urbanisation/background. This classification in further refined into 6 classes instead of 3 (see the Global Human Settlement Layer or "GHS-SMOD" by the Joint Research Center of the European Commission – http://ghsl.jrc.ec.europa.eu/).

The degree of urbanisation has three classes based on three types of grid cells:

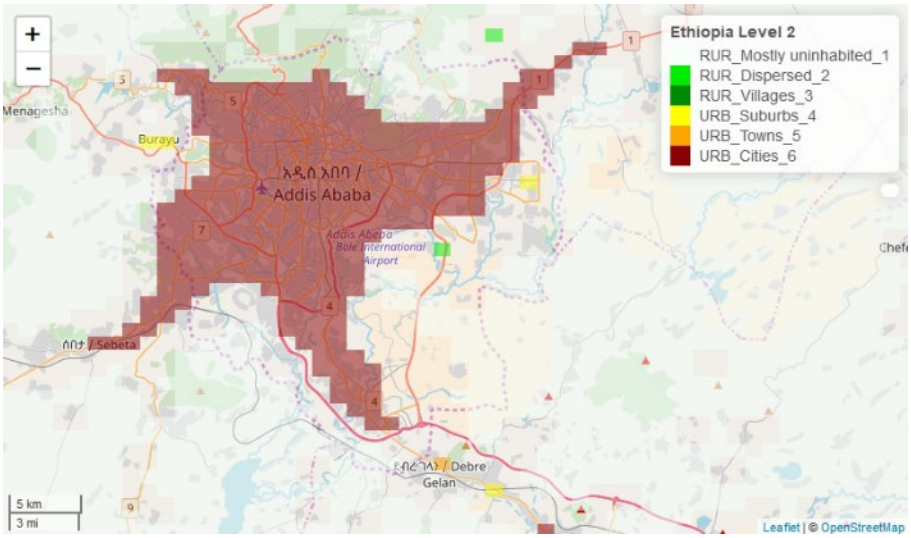
7. R**ural grid cells** is as all grid cells with a population density of less than 300 residents per square km and other cells that are outside an urban cluster.
8. An **urban cluster** consists of contiguous cells with a density of at least 300 residents per square km and a minimum population in the cluster of 5,000.
9. An **urban centre** consists of contiguous cells with a density of at least 1,500 residents per square km and a minimum population in the cluster of 50,000.

These three classes of local spatial units are defined using the three types grid cells as following:

7. A rural area has the majority of its population in rural grid cells.
8. Towns and suburbs have the majority of their population in an urban cluster (and it is not a city).
9. A city has the majority of its population in an urban centre.

Urban areas consist of cities, towns and suburbs. Please note that in some countries, the intermediate category 'towns & suburbs' is considered as part of the rural domain. The refined degree of urbanisation has six classes. It splits the **towns** from the **suburbs**. The **rural** areas are divided into **villages**, **dispersed rural** areas and **mostly uninhabited** areas.

Figure 8**. Refined urban-rural categorisation – Addis Ababa, **Ethiopia



Definitions:

Rural grid cells (1 sqkm) include low density population cells

Mostly uninhabited _1 (pale green): Grid cells with a density below 50 residents per sq km;

Dispersed rural areas_2 (bright green): Grid cells with a density between 50 and 300 residents per sq km;

Villages_3 (dark green): Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5,000; excluding urban clusters;

Urban cells (1 sqkm) include urban clusters (or moderate density clusters) and urban centres (or high density clusters)

Suburbs _4 (yellow): Contiguous grid cells with a density of at least 300 residents per sq km and a minimum cluster population of 5,000; excluding cities and towns;

Towns_5 (orange): Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5,000 and 50,000; excluding cities;

Cities_6 (dark red): Contiguous grid cells with a density of at least 1,500 residents and a cluster population of at least 50,000;

*Figure 9. Country results for **Ethiopia** based on the refined urban-rural categorisation*

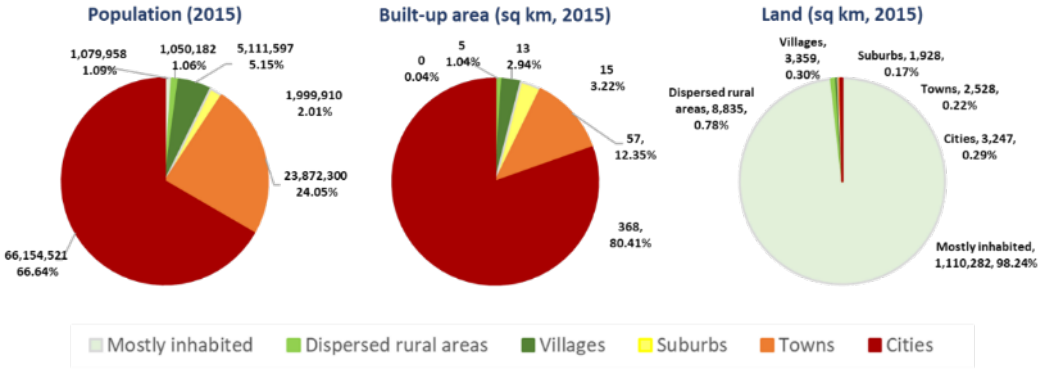
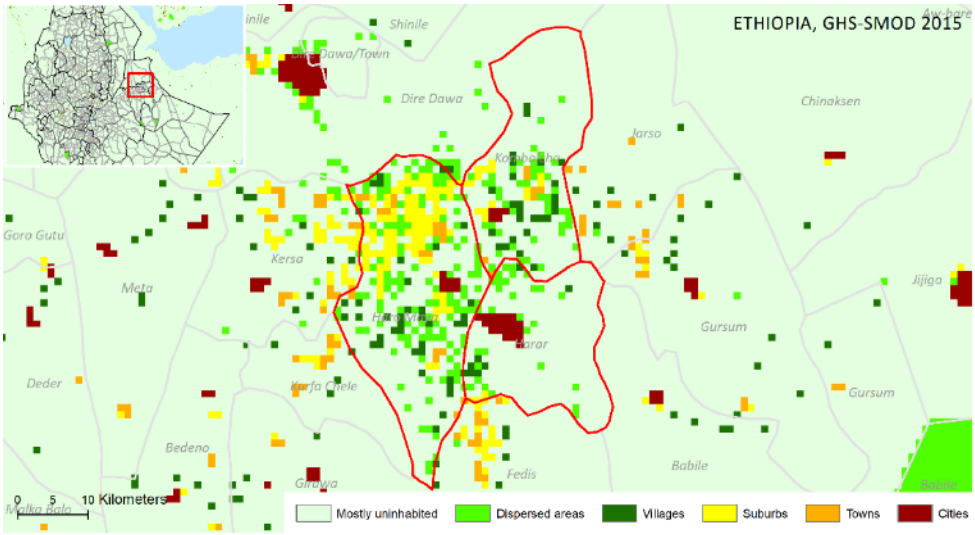


*Table 13. Distribution of population by the refined urban-rural categorisation, example for three administrative zones – Harari People / Oromia, **Ethiopia****

Administrative unit (Level 3)**	Mostly uninhabited	Dispersed rural areas	Villages	Suburbs	Towns	Cities	Total Population
Harar	0.0%	2.1%	3.8%	0.5%	0.0%	93.7%	246,252
Haro Maya	0.0%	7.1%	9.7%	26.0%	30.0%	27.2%	388,798
Kombolcha	0.0%	6.4%	14.5%	7.7%	23.8%	47.6%	193,900

**FAO calculations based on the Global Administrative Areas (GADM version 3.6); the refined urban-rural categorisation (v9s10C, 2015 results) and the population grid (GHS_POP_GPW41MT_GLOBE pre-Release version 2018); **Corresponding spatial representation is shown in Figure 3.*

*Figure 10. Spatial representation of example in Table 2 – Harari People / Oromia, **Ethiopia***



Notes about data:

In case of cross-border settlement areas, only population and surfaces estimates related to the Country are considered in this summary. The summary includes results from automatic data analytics workflows including global best available satellite data records collected by Earth Observations and census data made available by National Statistical Offices. The data in the GHS-SMOD model is aggregated for four reference years 1975, 1990, 2000, and 2015. This fact sheet only shows results for the most recent year (2015). These years should be considered as nominal dates that aggregate the best suitable data in any given period. The statistics presented in this document are based on the country borders as defined in the database of Global Administrative Areas (GADM version 2.8). The underlying data for this assessment are expected to be released publicly by late 2018.

Annex 6.

Country factsheet: France

Introduction

This country summary is provided to support the assessment of an international definition of urban and rural areas by National Statistical Institutes. The goal of these assessments is to see whether the proposed definition and its categorisation accurately captures a country's rural and urban areas.

Please note that inaccuracies in this country summary may be due to data quality. The results presented here are based on a combination of two data sources: population and built-up areas. The method ensures greater comparability and a harmonization of spatial concepts. The urban and rural characterisation can be applied to other data (e.g. census updates, better spatial resolution) that may improve the available classification of both rural and urban components.

The **population** source data are collected by the Center for International Earth Science Information (CIESIN) mostly from the National Statistical Offices. For France, baseline data source are summarised in Table 1.

Table 14. *Summary of the population data used by CIESIN for* ***France***

Country	Highest administrative level used	Number of units (polygons)	Population year	Population Source type
France	5	36,610	2009	Final census
Population source citation: ***The Institut National de la Statistique et des Études Économiques (INSEE), Recensement de la Population 2009, Table: Densité de population, generated using INSEE Statistiques locales, http://www.statistiques-locales.insee.fr/carto/ESL_CT_cartethematique.asp?nivgeo=COM&submit=Ok, Accessed 08/08/2013.***				

Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer to define a Degree of Urbanization (DEGURBA). The DEGURBA classification schema is described in http://ec.europa.eu/eurostat/web/degree-of-urbanisation/background. This classification in further refined into six classes instead of three (see the Global Human Settlement Layer or "GHS-SMOD" by the Joint Research Centre of the European Commission – http://ghsl.jrc.ec.europa.eu/).

The degree of urbanisation has three classes based on three types of grid cells:

10. R**ural grid cells** is as all grid cells with a population density of less than 300 residents per square km and other cells that are outside an urban cluster.
11. An **urban cluster** consists of contiguous cells with a density of at least 300 residents per square km and a minimum population in the cluster of 5,000.

12. An **urban centre** consists of contiguous cells with a density of at least 1,500 residents per square km and a minimum population in the cluster of 50,000.

These three classes of local spatial units are defined using the three grid cells types as following:

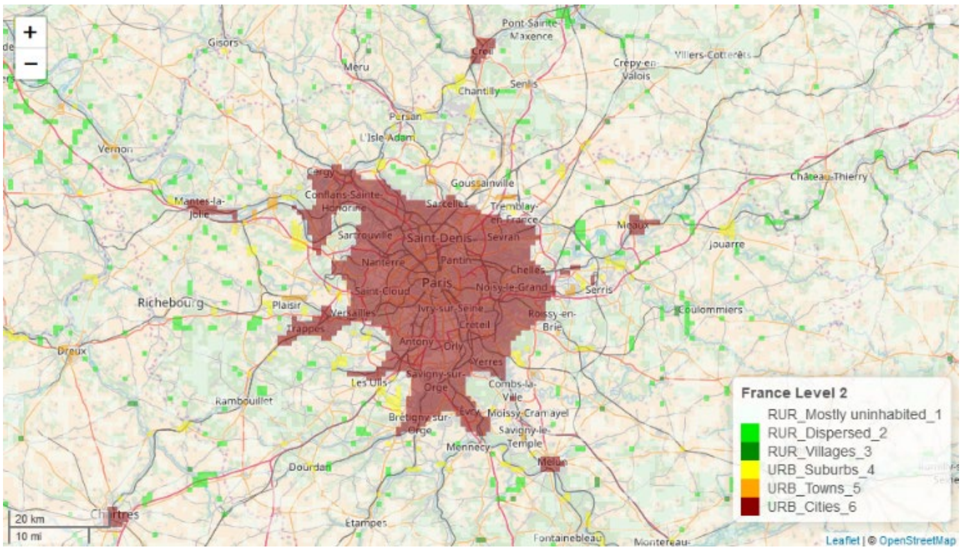
10. A rural area has the majority of its population in rural grid cells.

11. Towns and suburbs have the majority of their population in an urban cluster (and it is not a city).

12. A city has the majority of its population in an urban centre.

Urban areas consist of cities, towns and suburbs. Please note that in some countries, the intermediate category 'towns & suburbs' is considered as part of the rural domain. The refined degree of urbanisation has six classes. It splits the **towns** from the **suburbs**. The **rural** areas are divided into **villages**, **dispersed rural** areas and **mostly uninhabited** areas.

Figure 11. *Refined urban-rural categorisation – Paris,* ***France***



Definitions:
Rural grid cells (1 sqkm) include low density population cells
Mostly uninhabited _1 (pale green): Grid cells with a density below 50 residents per sq km;
Dispersed rural areas_2 (bright green): Grid cells with a density between 50 and 300 residents per sq km;
Villages_3 (dark green): Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5,000; excluding urban clusters;
Urban cells (1 sqkm) include urban clusters (or moderate density clusters) and urban centres (or high density clusters)
Suburbs _4 (yellow): Contiguous grid cells with a density of at least 300 residents per sq km and a minimum cluster population of 5,000; excluding cities and towns;
Towns_5 (orange): Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5,000 and 50,000; excluding cities;
Cities_6 (dark red): Contiguous grid cells with a density of at least 1,500 residents and a cluster population of at least 50,000;

*Figure 12. Country results for **France** based on the refinedurban-rural categorisation*

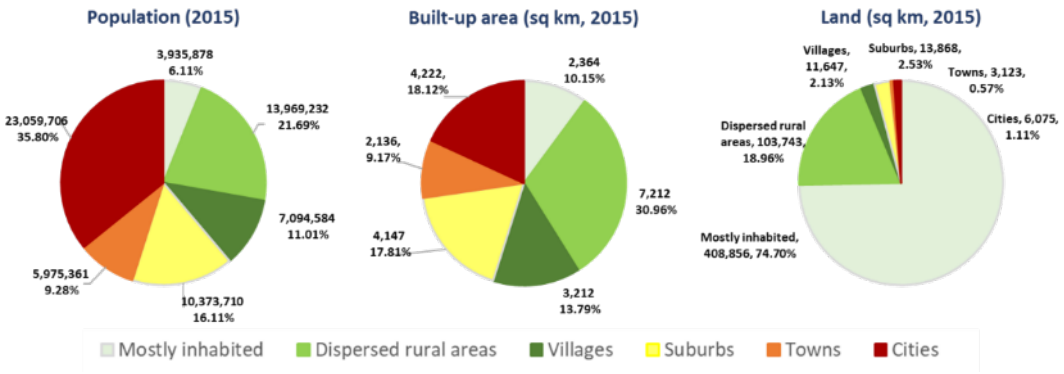
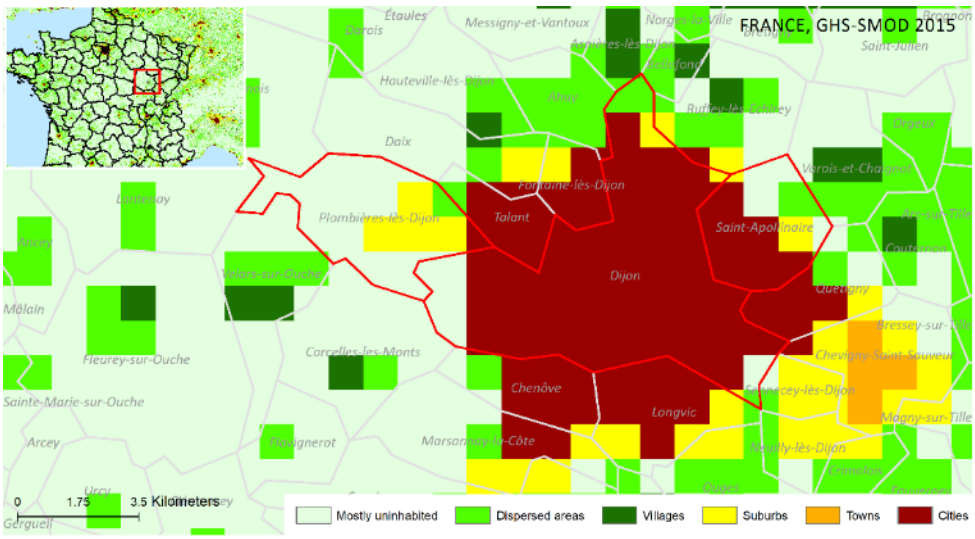


*Table 15. Distribution of population by the refined urban-rural categorisation, example for three administrative zones – Côte d'Or, **France****

Administrative unit (Level 5)**	Mostly uninhabited	Dispersed rural areas	Villages	Suburbs	Towns	Cities	Total Population
Dijon	0.0%	0.2%	0.0%	0.6%	0.0%	99.2%	150,297
Plombières-lès-Dijon	0.9%	8.8%	0.0%	22.4%	0.0%	67.9%	9,932
Saint-Apollinaire	18.0%	82.0%	0.0%	0.0%	0.0%	0.0%	269

**FAO calculations based on the Global Administrative Areas (GADM version 3.6); the refined urban-rural categorisation (v9s10C, 2015 results) and the population grid (GHS_POP_GPW41MT_GLOBE pre-Release version 2018); **Corresponding spatial representation is shown in Figure 3.*

*Figure 13. Spatial representation of example in Table 2 – Côte d'Or, **France***



Notes about data:

In case of cross-border settlement areas, only population and surfaces estimates related to the Country are considered in this summary. The summary includes results from automatic data analytics workflows including global best available satellite data records collected by Earth Observations and census data made available by National Statistical Offices. The data in the GHS-SMOD model is aggregated for four reference years 1975, 1990, 2000, 2015. This fact sheet only shows results for the most recent year (2015). These years should be considered as nominal dates aggregating the best suitable data in any given period. The statistics presented in this document are based on the country borders as defined in the database of Global Administrative Areas (GADM version 2.8). The underlying data for this assessment are expected to be released publicly by late 2018.

Annex 7.

Country factsheet: Malaysia

Introduction

This country summary is provided to support the assessment of an international definition of urban and rural areas by National Statistical Institutes. The goal of this assessments is to see whether the proposed definition and its categorisation accurately captures a country's rural and urban areas.

Please note that inaccuracies in this country summary may be due to data quality. The results presented here are based on a combination of two data sources: population and built-up areas. The method ensures greater comparability and a harmonization of spatial concepts. The urban and rural characterisation can be applied to other data (e.g. census updates, better spatial resolution) that may improve the available classification of both rural and urban components.

The **population** source data are collected by the Center for International Earth Science Information (CIESIN) mostly from the National Statistical Offices. For Malaysia, baseline data source are summarised in in Table 1.

Table 16**. Summary of the population data used by CIESIN for **Malaysia

Country	Highest administrative level used	Number of units (polygons)	Population year	Population Source type
Malaysia	3	932	2010	Final Census
Population source citation ***Department of Statistics - Malaysia, Population and Housing Census 2010, Tables 18.3 - 32.3: Total population by sex, households and living quarters, administrative district and state, http://www.statistics.gov.my/, Accessed 06/06/2013.***				

Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer to define a Degree of Urbanization (DEGURBA). The DEGURBA classification schema is described in http://ec.europa.eu/eurostat/web/degree-of-urbanisation/background. This classification in further refined into six classes instead of three (see the Global Human Settlement Layer or "GHS-SMOD" by the Joint Research Centre of the European Commission – http://ghsl.jrc.ec.europa.eu/).

The degree of urbanisation has three classes based on three types of grid cells:

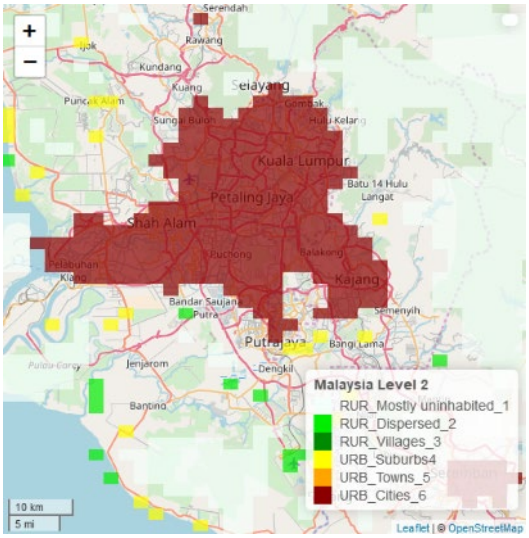
13. R**ural grid cells** is as all grid cells with a population density of less than 300 residents per square km and other cells that are outside an urban cluster.
14. An **urban cluster** consists of contiguous cells with a density of at least 300 residents per square km and a minimum population in the cluster of 5,000.
15. An **urban centre** consists of contiguous cells with a density of at least 1,500 residents per square km and a minimum population in the cluster of 50,000.

These three classes of local spatial units are defined using the three grid cells types as following:

13. A rural area has the majority of its population in rural grid cells.
14. Towns and suburbs have the majority of their population in an urban cluster (and it is not a city).
15. A city has the majority of its population in an urban centre.

Urban areas consist of cities, towns and suburbs. Please note that in some countries, the intermediate category 'towns & suburbs' is considered as part of the rural domain. The refined degree of urbanisation has six classes. It splits the **towns** from the **suburbs**. The **rural** areas are divided into **villages**, **dispersed rural** areas and **mostly uninhabited** areas.

Figure 14**. Refined urban-rural categorisation – Kuala Lumpur, **Malaysia



Definitions:

Rural grid cells (1 sqkm) include low density population cells

Mostly uninhabited _1 (pale green): Grid cells with a density below 50 residents per sq km;

Dispersed rural areas_2 (bright green): Grid cells with a density between 50 and 300 residents per sq km;

Villages_3 (dark green): Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5,000; excluding urban clusters;

Urban cells (1 sqkm) include urban clusters (or moderate density clusters) and urban centres (or high density clusters)

Suburbs _4 (yellow): Contiguous grid cells with a density of at least 300 residents per sq km and a minimum cluster population of 5,000; excluding cities and towns;

Towns_5 (orange): Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5,000 and 50,000; excluding cities;

Cities_6 (dark red): Contiguous grid cells with a density of at least 1,500 residents and a cluster population of at least 50,000;

*Figure 15. Country results for **Malaysia** based on the refined urban-rural categorisation*

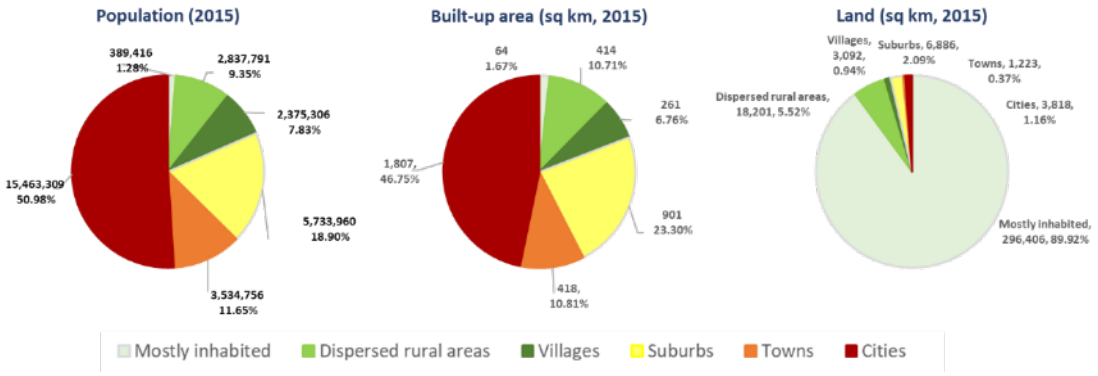
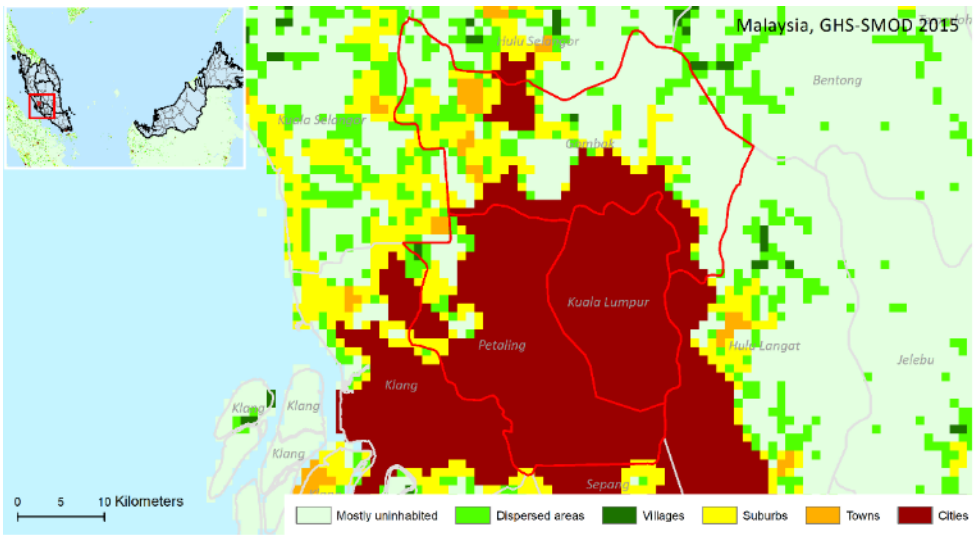


*Table 17. Distribution of population by the refined urban-rural categorisation, example for three administrative zones – Selangor, **Malaysia****

Administrative unit (Level 2)**	Mostly uninhabited	Dispersed rural areas	Villages	Suburbs	Towns	Cities	Total Population
Gombak	0.1%	1.4%	0.1%	10.7%	5.2%	82.5%	849,017
Kuala Lumpur	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	1,867,580
Petaling	0.0%	0.1%	0.0%	1.5%	0.0%	98.4%	1,909,086

**FAO calculations based on the Global Administrative Areas (GADM version 3.6); the refined urban-rural categorisation (v9s10C, 2015 results) and the population grid (GHS_POP_GPW41MT_GLOBE pre-Release version 2018); **Corresponding spatial representation is shown in Figure 3.*

*Figure 16. Spatial representation of example in Table 2 – Selangor, **Malaysia***



Notes about data:

In case of cross-border settlement areas, only population and surfaces estimates related to the Country are considered in this summary. The summary includes results from automatic data analytics workflows including global best available satellite data records collected by Earth Observations and census data made available by National Statistical Offices. The data in the GHS-SMOD model is aggregated for four reference years 1975, 1990, 2000, 2015. This fact sheet only shows results for the most recent year (2015). These years should be considered as nominal dates aggregating the best suitable data in any given period. The statistics presented in this document are based on the country borders as defined in the database of Global Administrative Areas (GADM version 2.8). The underlying data for this assessment are expected to be released publicly by late 2018.

Annex 8.

Country factsheet: Pakistan

Introduction

This country summary is provided to support the assessment of an international definition of urban and rural areas by National Statistical Institutes. The goal of this assessments is to see whether the proposed definition and its categorisation accurately captures a country's rural and urban areas.

Please note that inaccuracies in this country summary may be due to data quality. The results presented here are based on a combination of two data sources: population and built-up areas. The method ensures greater comparability and a harmonization of spatial concepts. The urban and rural characterisation can be applied to other data (e.g. census updates, better spatial resolution) that may improve the available classification of both rural and urban components.

The **population** source data are collected by the Center for International Earth Science Information (CIESIN) mostly from the National Statistical Offices. For Pakistan, baseline data source are summarised in in Table 1.

Table 18. Summary of the population data used by CIESIN for Pakistan

Country	Highest administrative level used	Number of units (polygons)	Population year	Population Source type
Pakistan	3	396	2010	Population Estimate/Projection
Population source citation *United States Census Bureau, Demobase - Gridded Mapping, Table: 3rd administrative level (Tehsils) with 1998 census data and 2010 estimates, http://www.census.gov/population/international/data/mapping/demobase.html, Accessed 03/07/2013.*				

Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer to define a Degree of Urbanization (DEGURBA). The DEGURBA classification schema is described in: http://ec.europa.eu/eurostat/web/degree-of-urbanisation/background. This classification in further refined into 6 classes instead of 3 (see the Global Human Settlement Layer or "GHS-SMOD" by the Joint Research Center of the European Commission – http://ghsl.jrc.ec.europa.eu/).

The degree of urbanisation has three classes based on three types of grid cells:

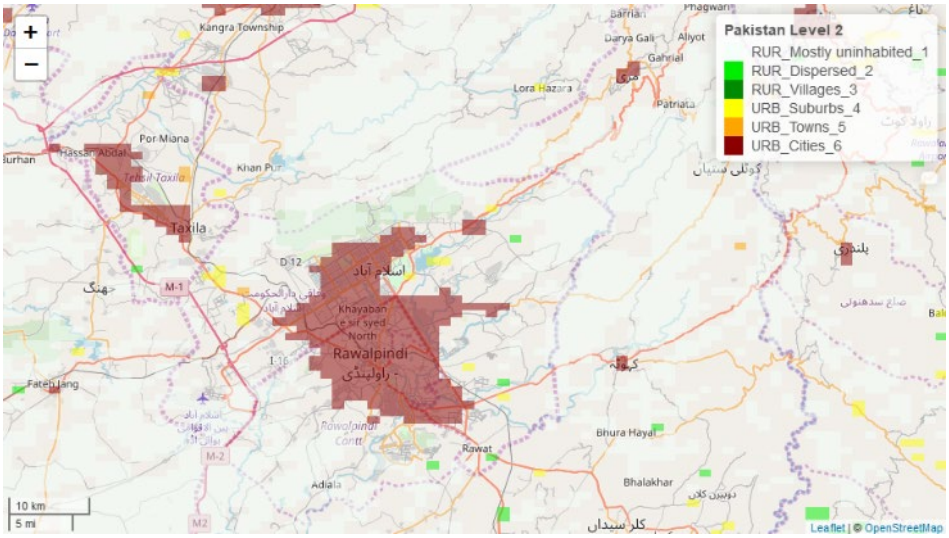
16. R**ural grid cells** is as all grid cells with a population density of less than 300 residents per square km and other cells that are outside an urban cluster.
17. An **urban cluster** consists of contiguous cells with a density of at least 300 residents per square km and a minimum population in the cluster of 5,000.
18. An **urban centre** consists of contiguous cells with a density of at least 1,500 residents per square km and a minimum population in the cluster of 50,000.

These three classes of local spatial units are defined using the three types grid cells as following:

16. A rural area has the majority of its population in rural grid cells.
17. Towns and suburbs have the majority of their population in an urban cluster (and it is not a city).
18. A city has the majority of its population in an urban centre.

Urban areas consist of cities, towns and suburbs. Please note that in some countries, the intermediate category 'towns & suburbs' is considered as part of the rural domain. The refined degree of urbanisation has six classes. It splits the **towns** from the **suburbs**. The **rural** areas are divided into **villages**, **dispersed rural** areas and **mostly uninhabited** areas.

Figure 17. Refined urban-rural categorisation – Islamabad, Pakistan



Definitions:

Rural grid cells (1 sqkm) include low density population cells

Mostly uninhabited _1 (pale green): Grid cells with a density below 50 residents per sq km;

Dispersed rural areas_2 (bright green): Grid cells with a density between 50 and 300 residents per sq km;

Villages_3 (dark green): Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5,000; excluding urban clusters;

Urban cells (1 sqkm) include urban clusters (or moderate density clusters) and urban centres (or high density clusters)

Suburbs _4 (yellow): Contiguous grid cells with a density of at least 300 residents per sq km and a minimum cluster population of 5,000; excluding cities and towns;

Towns_5 (orange): Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5,000 and 50,000; excluding cities;

Cities_6 (dark red): Contiguous grid cells with a density of at least 1,500 residents and a cluster population of at least 50,000;

Figure 18. Country results for Pakistan based on the refined urban-rural categorisation

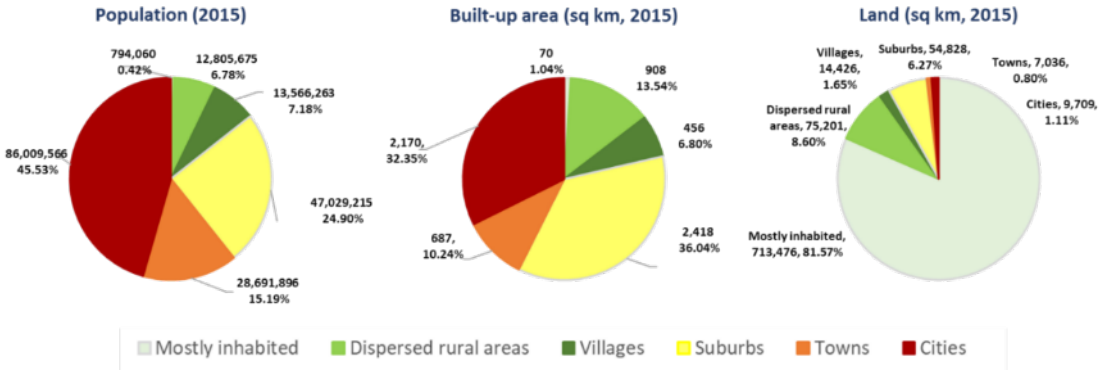
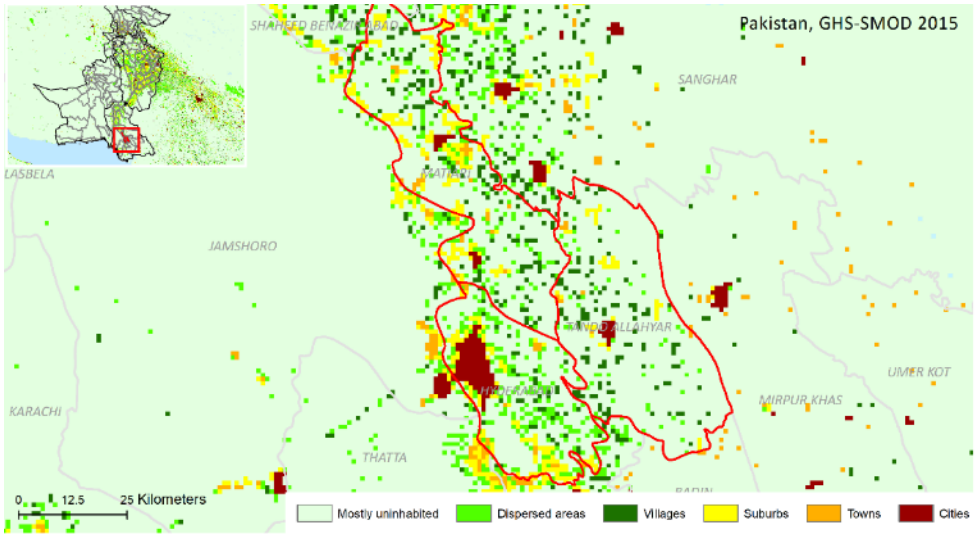


Table 19. Distribution of population by the refined urban-rural categorisation, example for three administrative zones – Sindh, Pakistan*

Administrative unit (Level 2)**	Mostly uninhabited	Dispersed rural areas	Villages	Suburbs	Towns	Cities	Total Population
Hyderabad	0.0%	1.6%	1.4%	7.8%	1.9%	87.3%	2,080,198
Matiari	0.0%	4.3%	21.3%	26.5%	24.6%	23.2%	666,936
Tando Allahya	0.0%	2.8%	19.0%	5.8%	7.7%	64.8%	677,908

**FAO calculations based on the 2017 Pakistan population census administrative boundaries; the refined urban-rural categorisation (v9s10C, 2015 results) and the population grid (GHS_POP_GPW41MT_GLOBE pre-Release version 2018); **Corresponding spatial representation is shown in Figure 3.*

Figure 19. Spatial representation of example in Table 2 – Sindh, Pakistan



Notes about data:

In case of cross-border settlement areas, only population and surfaces estimates related to the Country are considered in this summary. The summary includes results from automatic data analytics workflows including global best available satellite data records collected by Earth Observations and census data made

available by National Statistical Offices. The data in the GHS-SMOD model is aggregated for four reference years 1975, 1990, 2000, 2015. This fact sheet only shows results for the most recent year (2015). These years should be considered as nominal dates aggregating the best suitable data in any given period. The statistics presented in this document are based on the country borders as defined in the database of Global Administrative Areas (GADM version 2.8). The underlying data for this assessment are expected to be released publicly by late 2018.

Annex 9.

Country factsheet: United States of America

Introduction

This country summary is provided to support the assessment of an international definition of urban and rural areas by National Statistical Institutes. The goal of this assessments is to see whether the proposed definition and its categorisation accurately captures a country's rural and urban areas.

Please note that inaccuracies in this country summary may be due to data quality. The results presented here are based on a combination of two data sources: population and built-up areas. The method ensures greater comparability and a harmonization of spatial concepts. The urban and rural characterisation can be applied to other data (e.g. census updates, better spatial resolution) that may improve the available classification of both rural and urban components.

The **population** source data are collected by the Center for International Earth Science Information (CIESIN) mostly from the National Statistical Offices. For USA, baseline data source are summarised in Table 1.

Table 20. *Summary of the population data used by CIESIN for* ***USA***

Country	Highest administrative level used	Number of units (polygons)	Population year	Population Source type
United States of America	5	10,535,212	2010	Final Census
Population source citation: ***United States Census Bureau, 2010 Census, table: SF1_00004, http://www2.census.gov/census_2010/04-Summary_File_1/, Accessed 05/01/2012.***				

Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer to define a Degree of Urbanization (DEGURBA). The DEGURBA classification schema is described in: http://ec.europa.eu/eurostat/web/degree-of-urbanisation/background. This classification in further refined into 6 classes instead of 3 (see the Global Human Settlement Layer or "GHS-SMOD" by the Joint Research Center of the European Commission – http://ghsl.jrc.ec.europa.eu/).

The degree of urbanisation has three classes based on three types of grid cells:

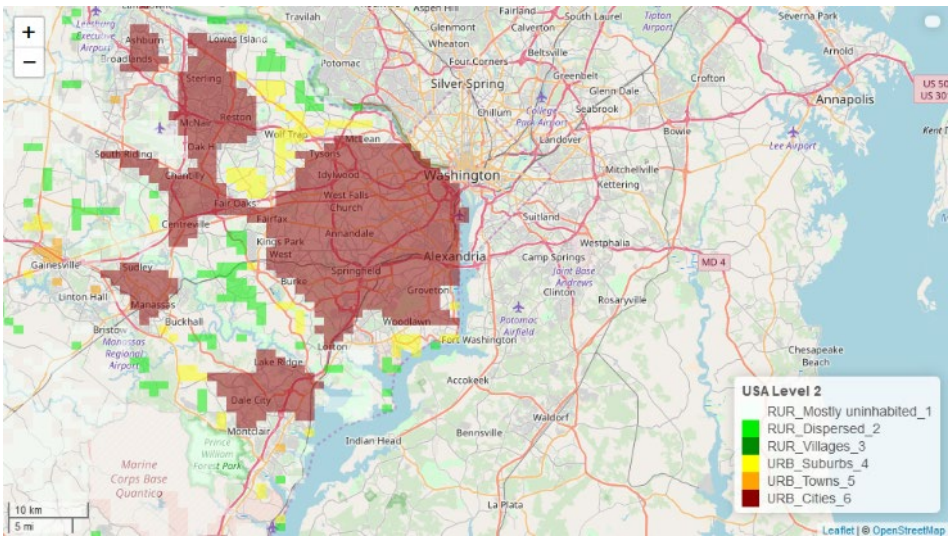
19. R**ural grid cells** is as all grid cells with a population density of less than 300 residents per square km and other cells that are outside an urban cluster.
20. An **urban cluster** consists of contiguous cells with a density of at least 300 residents per square km and a minimum population in the cluster of 5,000.
21. An **urban centre** consists of contiguous cells with a density of at least 1,500 residents per square km and a minimum population in the cluster of 50,000.

These three classes of local spatial units are defined using the three types grid cells as following:

19. A rural area has the majority of its population in rural grid cells.
20. Towns and suburbs have the majority of their population in an urban cluster (and it is not a city).
21. A city has the majority of its population in an urban centre.

Urban areas consist of cities, towns and suburbs. Please note that in some countries, the intermediate category 'towns & suburbs' is considered as part of the rural domain. The refined degree of urbanisation has six classes. It splits the **towns** from the **suburbs**. The **rural** areas are divided into **villages**, **dispersed rural** areas and **mostly uninhabited** areas.

Figure 20. *Refined urban-rural categorisation, Washington D.C.,* ***USA***



Definitions:

Rural grid cells (1 sqkm) include low density population cells

Mostly uninhabited _1 (pale green): Grid cells with a density below 50 residents per sq km;

Dispersed rural areas_2 (bright green): Grid cells with a density between 50 and 300 residents per sq km;

Villages_3 (dark green): Contiguous grid cells with population density of at least 300 and a cluster population between 500 and 5,000; excluding urban clusters;

Urban cells (1 sqkm) include urban clusters (or moderate density clusters) and urban centres (or high density clusters)

Suburbs _4 (yellow): Contiguous grid cells with a density of at least 300 residents per sq km and a minimum cluster population of 5,000; excluding cities and towns;

Towns_5 (orange): Contiguous grid cells with a density of at least 1,500 residents and a cluster population between 5,000 and 50,000; excluding cities;

Cities_6 (dark red): Contiguous grid cells with a density of at least 1,500 residents and a cluster population of at least 50,000;

*Figure 21. Country results for **USA** based on therefinedurban-rural categorisation*

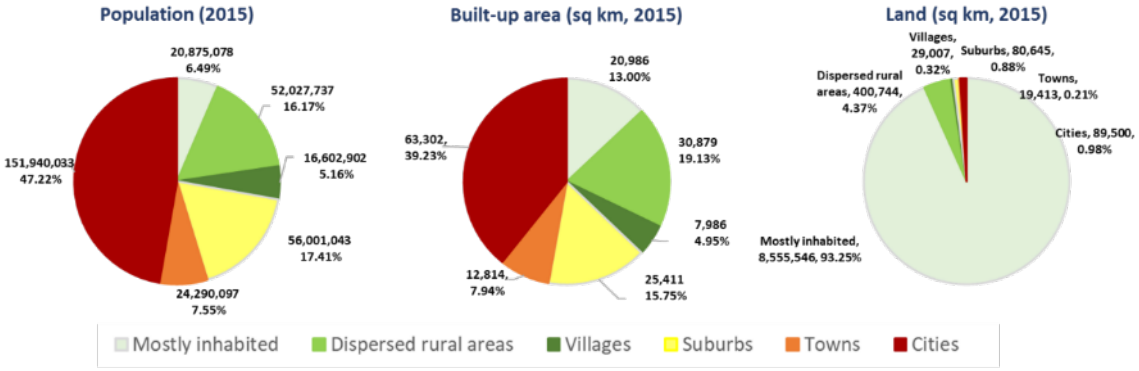
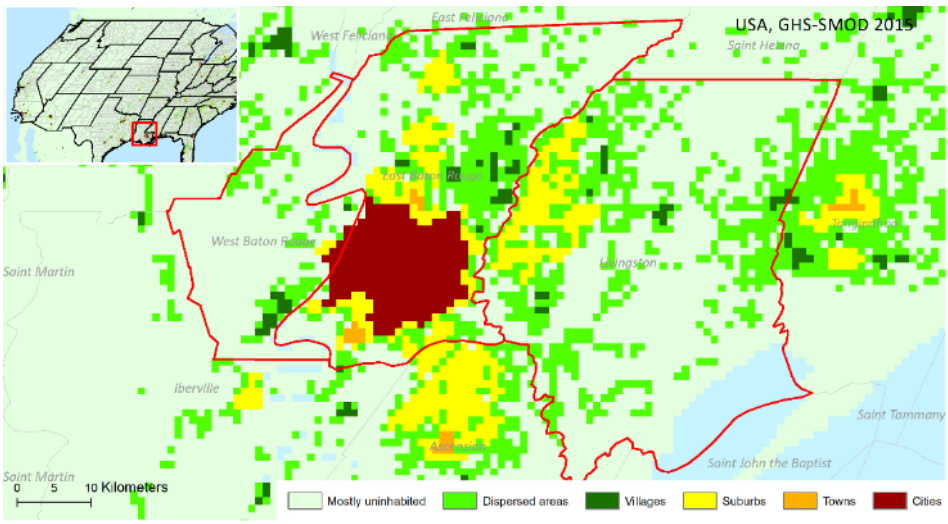


*Table 21. Distribution of population by the refined urban-rural categorisation, example for three administrative zones – Louisiana, **USA****

Administrative unit (Level 2)**	Mostly uninhabited	Dispersed rural areas	Villages	Suburbs	Towns	Cities	Total Population
East Baton Rouge	1.2%	9.6%	3.0%	22.3%	4.4%	59.5%	449,948
Livingston	5.0%	43.2%	6.2%	45.7%	0.0%	0.0%	149,286
West Baton Rouge	7.0%	42.1%	26.3%	12.9%	11.7%	0.0%	24,488

**FAO calculations based on the Global Administrative Areas (GADM version 3.6); the refined urban-rural categorisation (v9s10C, 2015 results) and the population grid (GHS_POP_GPW41MT_GLOBE pre-Release version 2018); **Corresponding spatial representation is shown in Figure 3.*

*Figure 22. Spatial representation of example in Table 2 – Louisiana, **USA***



Notes about data: In case of cross-border settlement areas, only population and surfaces estimates related to the Country are considered in this summary. The summary includes results from automatic data analytics workflows including global best available satellite data records collected by Earth Observations and census data made available by National Statistical Offices. The data in the GHS-SMOD model is aggregated for four reference years 1975, 1990, 2000, 2015. This fact sheet only shows results for the most recent year (2015). These years should be considered as nominal dates aggregating the best suitable data in any given period. The statistics presented in this document are based on the country borders as defined in the database of Global Administrative Areas (GADM version 2.8). The underlying data for this assessment are expected to be released publicly by late 2018.

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