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Report
United Nations Subregional Workshop on the implementation of the Degree of Urbanisation methodology in South-East Asia Countries
Bangkok, Thailand, 28 November – 2 December 2022

<u>Prepared by United Nations Statistics Division</u>

Report of

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1. SUMMARY

Statistics Division conducted in cooperation with European Commission Joint Research Center and UN-Habitat, a training workshop to build capacity of statistics offices and mapping/geospatial agencies of 9 countries of South-East-Asia for implementing the Degree or Urbanisation methodology. Historically, countries use different criteria to define cities and urban areas in general which has made it difficult to compare urban performance across countries. With the adoption of Sustainable Development Goals (SDGs) in 2015, and the New Urban Agenda (NUA) in 2016 there was a need to work more actively towards the harmonization of how cities, urban and rural areas are defined. To respond to this need, the Degree of Urbanisation methodology was developed by the European Commission and partners; and was endorsed by the Statistical Commission at it 51st Session for delineation of cities, urban and rural areas for international and regional comparison purposes. The Statistical Commission also requested the Statistics Division and the sponsoring organizations to continue reviewing the implementation of the methodology for delineation of cities and urban and rural areas and report back to the Commission at one of its future sessions. It is in this framework that this workshop was organized. Participants of the workshop included statisticians and geospatial specialists of Brunei Darussalam, Cambodia, Indonesia, Malaysia, Nepal, Philippines, Thailand, Timor-Leste and Vietnam; two staff members of DESA Statistics Division, two staff members of European Commission Joint Research Center (EC-JRC) and one staff member of UN-Habitat data and analytics unit.

The objective of the workshop was to build capacity for each participating country on: 1) background on the need for this methodology 2) theory and concepts 3) data inputs and technical capacity 4) learning to apply this methodology through practical hands-on training sessions and its applications for future reporting of data and SDG indicators by degree of urbanization 5) exchange experiences and learn from the other countries of the region for the application of the Degree of Urbanisation methodology. The participants of each country worked together under the guidance of resource persons and produced a classification by degree of urbanisation for local units and respective population of their country or specific regions of their country. At level 1 of resulting classification there are three classes: cities; towns and semi-dense areas; rural areas. At the second level there are 7 classes. The city class remains the same, whereas the second and third class are further subdivided in a hierarchical manner with no gaps or overlaps.

The implementation of this methodology results in a harmonized delineation of cities, urban, and rural areas across countries that is people based and relies on three simple criteria: population size, population density and grid cell contiguity. The application of the methodology is a three-step process that results in the classification of population and local units of a country by the classes of the degree of urbanization. These local units being the same units for which countries collect data and compile statistics, makes possible the compiling and reporting of data for SDG and Urban Agenda indicators related to cities and urban areas, in a harmonized manner across countries for regional and international comparison and monitoring purposes.

The participating countries had positive feedback on using the Degree of Urbanisation for SDG reporting and for the Urban agenda indicators and would appreciate to have future training in this regard. The participants appreciated that both statistical offices and geospatial agencies were invited, and they had the opportunity to work together.

2. A DESCRIPTION OF WORKSHOP PROCEEDINGS

The workshop was comprised of conceptual/theoretical and practical sessions. The work as described below – with the entitled topics or themes in bold font - took place in consecutive order during this week-long workshop.

During the opening session remarks were delivered by the Statistics Division of UN DESA (UNSD), the UN-Habitat and the European Commission Joint Research Center (EC-JRC), followed by a tour-de-table introductions by each participant. All opening remarks underscored the milestones that led to the development of the Degree of Urbanization (DoU or DEGURBA/Degurba), endorsement by the Statistical Commission at the 51st Session (year 2020), and subsequent work.

During an introductory presentation on background, objectives and structure of the workshop, UNSD noted that in 2019 UNSD hosted an Expert Group meeting which noted the timeliness of this topic in relation to monitoring the implementation of the 2030 Sustainable Development Agenda and accompanying goals, targets and indicators; the 2020 World Programme on Population and Housing Censuses main recommendation regarding the production of geo-referenced small-area census statistics; the New Urban Agenda; and the overall need for comprehensive international and regional comparison purposes. In March 2020 the UN Statistical Commission at its 51st session endorsed the methodology for the delineation of cities, urban and rural areas for international and regional statistical comparison purposes, while emphasizing that the methodology is not intended to replace national definitions of urban and rural areas, but to complement them.

Rationale for Harmonizing urban/rural definitions

The presentation by EC-JRC explained that the work to develop the Degree of Urbanisation method started as a voluntary commitment launched in October 2016 during the United Nations Conference on Housing and Sustainable Urban Development (Habitat III Conference). As a background a summary of was provided of the diverse ways in which different countries define urban and rural areas, including the use of parameters such as population size and/or density, levels of services, administrative/historical demarcations, among others, and how these variations affect data comparability across countries.

The purpose of the development and application of the Degree of Urbanisation is not to replace national definitions but to enable the comparison of statistics across countries.

The EC-JRC noted that the Degree of Urbanisation is a scientific methodology which is people-based as it relies on population size and population density thresholds and a population grid. The method is applied in a two-step process – during the first step grid cells are classified, and during the second step local units are classified. If a population grid is not available, it can be produced with EC- JRC tools prior to stage one. The output of applying the Degree of Urbanisation method provides a new view of urbanization along the urban-rural continuum because it divides the population and related area into 3 classes - cities, towns and semi-dense areas, rural areas - rather than a dichotomy of urban versus rural.

A listing of the implementing tools was provided: GHS-POP2G from population layer to population grid; then by GHS-DUG to apply population density, size and grid cell contiguity to the population grid at 1km resolution to obtain the degree of urbanization classification at grid level; then by GHS-DU-TUC to classify the territorial unit by degree of urbanization. The output of on step serves as input to the next.

Some of the advantages of the Degree of Urbanisation include also: application of the same population sizes and density thresholds across the globe, allows the comparison of results at a global level; b) providing a harmonized way of mapping the urban - rural continuum globally c) uniformity in measurement which is not influenced by an areas' levels of development – i.e. as opposed to using services to identify an urban area, the method helps to identify areas that qualify as urban and where services should be available; its ability to capture agglomeration economies; its easy application and cost effectiveness. EC-JRC provided examples of applications of the Degree of Urbanisation for SDG reporting and described the work and milestones to support implementation at country level.

UN-Habitat presented the SDGs' indicator framework with emphasis on the urban SDGs, the agency's responsibilities as the main custodian agency for SDG 11, the need for a harmonized definition for urban and rural areas in the measurement of the urban indicators. The presentation also provided an overview of the New Urban Agenda, its linkages with the SDGs framework, priority areas, targets and indicators and its emphasis on the spatial frameworks and local capacity in the delivery of the SDGs, its pillars, transformative commitments, and their means of implementation. The presentation introduced the Global Urban Monitoring Framework which aims to harmonize urban monitoring trends across all SDGs and other global frameworks, but also provides a means for countries and cities to gauge their progress towards attainment of sustainable urbanization (based on global and local targets) and to make necessary interventions to accelerate their progress.

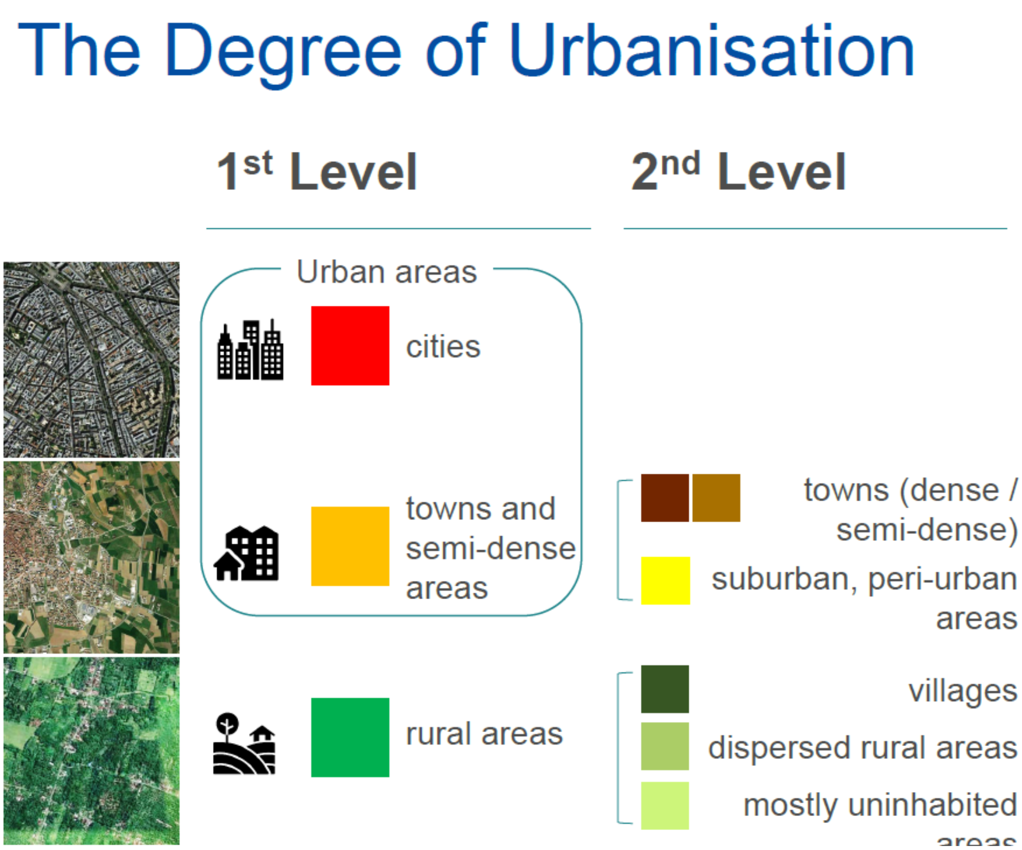
<u>Introduction to the Degree of Urbanisation</u>

The EC-JRC trainers made the following key points:

The Degree of Urbanisation classifies the entire territory of a country/region along the urban-rural continuum, combining population size and population density thresholds to classify the entire territory with no gaps or overlaps. The method starts by producing a population grid, using as inputs geo-coded population data and built-up area rasters. EC-JRC produces built-up area rasters using satellite imagery. Countries can use nationally produced built-up area rasters or the one produced by JRC. Once a population grid is produced the method is applied in a two-step process: Step 1- 1 km^2 grid cells are classified based on population size, population density, and grid cell contiguity. Step 2 - local units are classified based on the type of grid cells their majority of population resides. The application of the Degree of Urbanisation results in two hierarchical levels for both Step 1 and Step 2.

Grid cells classification: Level 1 has three classes (urban centers, urban clusters, and rural grid cells); and Level 2 has seven classes splitting urban clusters into dense urban clusters, semi-dense urban clusters, and sub-urban/peri-urban grid cells; and rural grid cells into rural clusters, low-density rural grid cells, and very low-density rural grid cells, while urban centers are not split further.

Local unit classification: Level 1 has three classes (cities, towns and semi-dense areas, rural areas) and Level 2 has seven classes (cities, dense towns, semi-dense towns, suburban/peri-urban areas, villages, dispersed rural areas, mostly un-inhabited areas. The method is open and reproducible. Below is a schematic overview of the local unit classes according to the Degree of Urbanisation. These classes are the final output of applying the Degree of Urbanisation.



Following discussion:

Questions	Answers
How is the built-up map constructed?	A group on EC team works to get the built-up areas based on satellite images. The methodology relies on symbolic machine learning or neural networks.
How do you distinguish a residential pixel from a non-residential pixel? How do you distinguish an airport as a non-residential area? Can we	Built-up map is an input to the methodology. If you have more detailed information on the built-up area you can create a new map to use as input.

modify the build-up areas by validating (what is provided by JRC)?	
Follow up to the answer to the above question: Will it affect the resulting population grid?	Yes, because the disaggregation/distribution of population is done according to the build-up area. If you have cadaster data as polygons that is good. The population is distributed proportionally to the number of buildings. Now JRCs is also working to include the height of buildings; so far only the 2D footprint. The global built-up layer is revised frequently, and Copernicus GHSL will be produced every 2 years. If your census is such that every household is geo-located than the population grid can be created by aggregation from points.
Regarding population data - the censuses are not frequently conducted. We may need to use administrative data too which are not properly geo-referenced. Can admin data be used for applying the Degree of Urbanisation?	In principle yes, any survey or data collection including geocoded data (points or polygons) and population counts can be used to apply the DoU. The Built-up surface layer can be of an epoch close to the population data, for example built-up surface of 2020 would work well for population counts of 2021-2022.

<u>Country experiences: The Philippines and Nepal</u>

Detailed presentations were delivered by the participants of the Philippines which included a historical overview of urbanization processes, the developments and the legal acts that led to the delineation of settlements and their classification, the criteria and the institutions involved. The latest information was provided on the number of cities and municipalities in the Philippines and the cadastral survey program. The second presentation by the participants of the Philippines introduced the administrative divisions in the Philippines and the Philippines Standard Geographic Codes (PSGC), explained the national urban-rural definition and elaborated on the work done during the "*Workshop on Application of the Degree of Urbanization for Production of Comparable Urban Data in the Philippines*" organized in collaboration with UN-Habitat and EC-JRC on 18-22 July 2022. The presenter showed and commented maps of the Degree of Urbanisation produced during the July workshop.

The participants of Nepal delivered a presentation on Urbanization work which included an introduction to the Survey Department and a historical overview; its role as National Mapping Agency which includes topographical survey and land use management, geodetic survey, cadastral survey and geographic information infrastructure divisions. The presenter described the National Geoportal and the products and services it offers. Next the role of the Central Bureau of Statistics was described, as the central agency for the collection, consolidation, processing, analysis, publication and dissemination of statistics. The current activities and publications of the CBS were presented in detail. Among them are censuses of population, agriculture, manufacturing industries, several surveys, as well as Cartography and GIS Mapping of Enumeration Areas for Censuses. The participant informed that Nepal has been selected as a pilot country in 2022 and a technical committee is formed to implement in cooperation with UN-Habitat the Pilot project on "*Application of the DEGURBA approach to generate comparable urban data in Nepal*".

Technical aspects of the Degree of Urbanisation

EC-JRC delivered a video presentation on the principles of digital cartography, geospatial data and geographic information systems (GIS).

Following the video presentation, the participants of each country took the floor to answer the questions below which referred to the datasets they had prepared in advance to use as input data to the tools for applying the Degree of Urbanisation.

- Do you have population census data in geospatial format? Specify the reference year.
- Are they polygon or point data?
- Does the geo-dataset cover the entire country or a specific area?
- Are there gaps or overlaps?
- Do you know the projection or coordinate system?

The discussion which took place while reporting on the input data was very useful for all as it provided a good opportunity of learning and understanding the data requirements and sharing information among the participants of countries of the region and with the resource persons of EC-JRC, UN-Habitat and UNSD. Then, the trainers from EC-JRC assisted the participants to install on their computers the tools that were used during the week to apply to Degree of Urbanization; the following is a summary table of the installed tools.

Tool	Description	Version and Installation Type
GHS-POP2G - Population to Grid	The Population to Grid (GHS-POP2G) is a flexible tool to produce geospatial population grids in GeoTIFF format from vector census data (polygons or points).	Version: • Standalone • ArcGIS/QGIS
GHS-DUG - Degree of Urbanisation Grid	The Degree of Urbanisation Grid (GHS-DUG) is a flexible tool to produce a geospatial settlement classification from a population grid, according to the Degree of Urbanisation	Version: • Standalone • ArcGIS/QGIS
GHS-DU-TUC – Degree of Urbanisation – Territorial Units	The Degree of Urbanisation – Territorial units classifier (GHS-DU-TUC) is a tool to classify local units from a settlement classification grid, according to the Degree of Urbanisation (DEGURBA).	Version: • Standalone • ArcGIS/QGIS

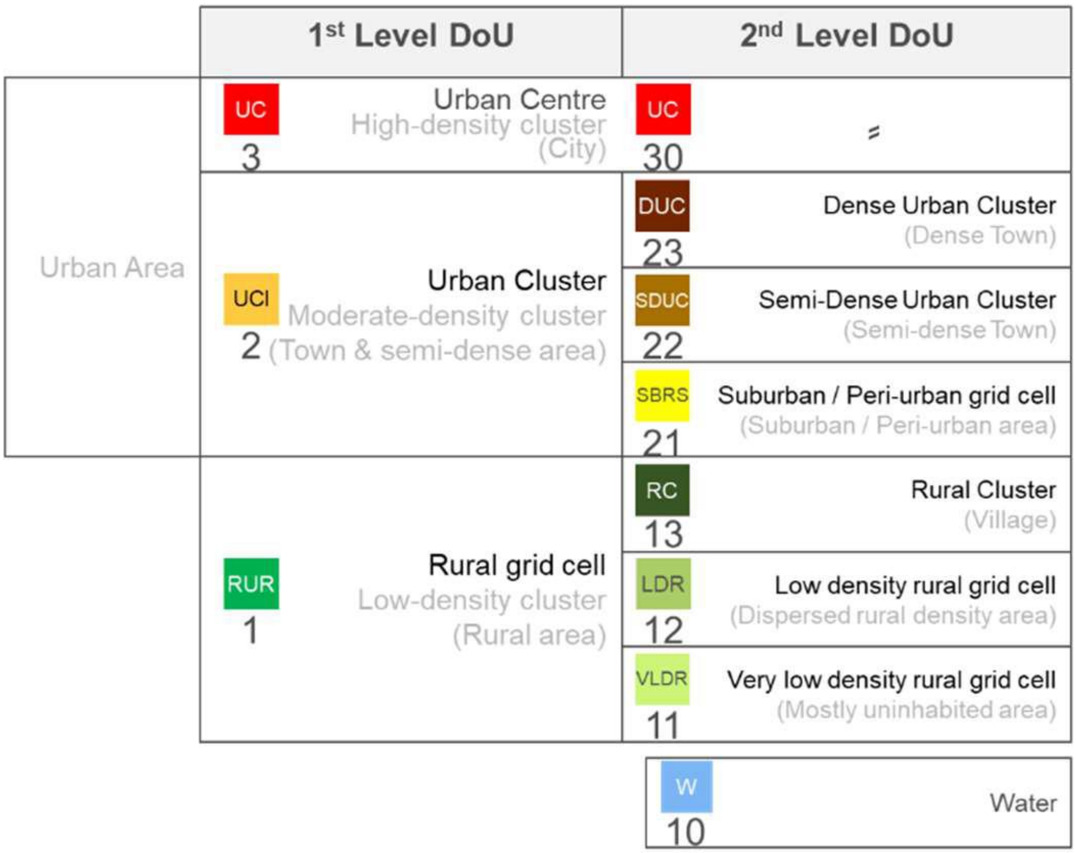
Generating population grid using GHS- POP2G tool

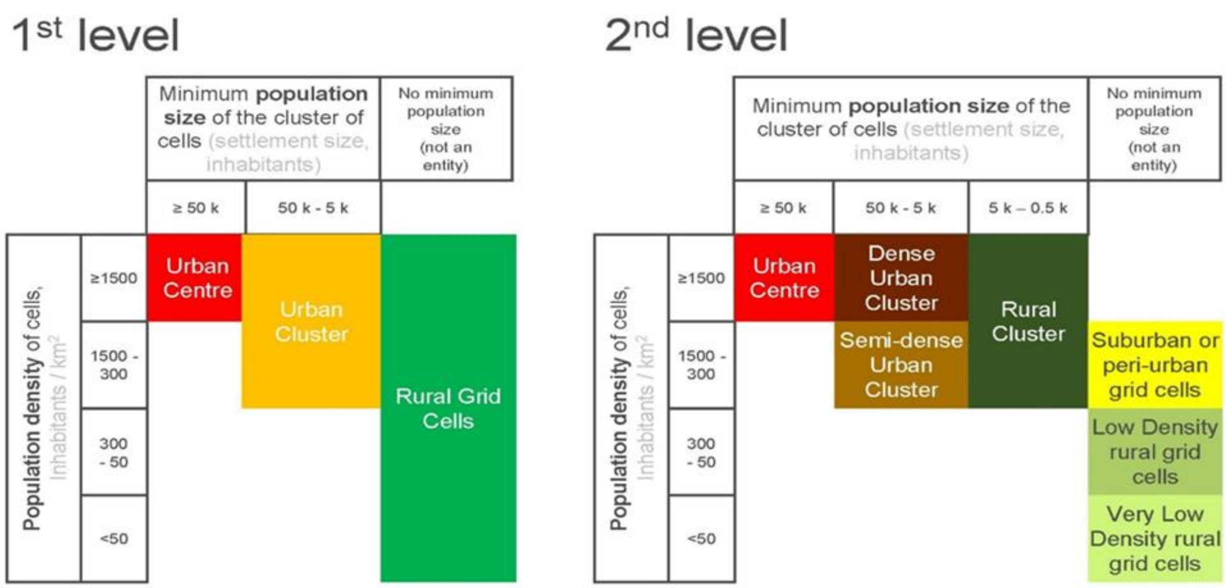
EC-JRC presented the theory of disaggregating population into grids: definition of population and population grids, input data for POP2G tool and POP2G workflow. It was explained that the population data used as input are typically resident population as enumerated in a population census. If the population data are geolocated at the housing unit/dwelling level then the population grid can be produced by the aggregation method (bottom-up). When population data are geolocated only down to the level of administrative/local units or census enumeration areas, then the population grid is produced via the disaggregation method (top-down) using the built-up area as a co-variate to disaggregate the population into equal grid cells. This is done using the POP2G Tool. A population census vector map and built-up area raster are used as input. The workflow of POP2G tool was explained in detail as well as quality checks on resulting population grids. Population grids can be used for several applications other than the Degree of Urbanization. They can for example be crossed with hazard layers to determine the effect of natural disasters. A future application could be producing grids of population estimates by age and sex. In responding to a question whether such grids of population estimates and projections for the future would consider fertility and mortality assumptions, it was explained that fertility, mortality and migration assumptions need to be included for population projections down to the territorial unit level, then population data can be disaggregated to grid cells using built-up area.

All the national participants worked to apply the POP2G tool and create population grids for their countries or specific regions within their countries. The participants of one country worked together. The trainers of EC-JRC and UN-Habitat provided bilateral help and instruction to each of the countries and reviewed and discussed the results. All countries successfully produced population grids from national population data at 100 m and 1000 m grid cell resolution. Distribution of population (population grid by disaggregation using POP2G tool) reflects the settlement distribution of the country or area chosen within the country. The use of POP2G required some geospatial data pre-processing for some of the countries, mainly to join population counts and geometries, setting coordinate systems and cartographic parameters. The participants were instructed that the population grids that were produced would be used as an input to the next tool in the sequence (GHS-DUG). The template of a survey was distributed to participants by EC-JRC for entering the output of the completed work during each step.

Implementing the Degree of Urbanisation at the grid level using GHS-DUG tool

A presentation was delivered by EC-JRC where it was explained that after having produced a population grid from population data by disaggregation method using a built-up layer for the same area of reference, the next step is to produce a degree of urbanization grid using GHS-DUG Tool. Several processes contribute to urbanization such as: natural change, migration, re-classification, sub-urbanization, peri-urbanization, conurbation. The inputs to the DUG Tool are: The population grid at 1km resolution produced in the previous step, a built-up area raster (in case it is preferred to use the optional built-up area criteria to define urban centers; the built-up layer is therefore an optional input) and a raster of land and water. The output is a Degree of Urbanisation Grid for the area of reference, with classes at its first and second levels as summarized in the figures below. The classification criteria used to delineate these classes are population density, population size, and contiguity (4 or 8 point) of the patch of cells. Quality checks for the outputs were highlighted, for example having isolated urban centers in the output is unusual as there is usually a smooth gradient in population density. Applications for statistics by degree of urbanization class were described.





Following discussion:

Questions:	Answers:
Clarify population criteria vs built-up criteria in the DUG tool; and residential vs. non-residential built-up?	Either criteria being met - OR - results in urban center classification. The tool can work with residential vs. non-residential built-up surface, like with GHS-BUILT-S data, but non-residential pixels can be masked out of the GHS-BUILT layer if countries have land use maps.
Is the Degree of Urbanization Grid aligned with latitude vs. longitude coordinates?	No, not necessarily, the origin of the 1x1 km grid is arbitrary the tool will generate the DoU at grid level using the input of population grid at 1km2.
Coastal areas: Is it possible to group them, for the cells that do not have enough contiguity?	Urban areas (urban cluster grid cells) are defined with 8-contiguity rule to adapt well to geographic conditions such as coastlines and valleys.
Further questions on housing unit/built-up criteria vs. population criteria (population size and density thresholds) in producing the Degree of Urbanization Grid	DoU thresholds are based on population counts and densities and not on housing units. At the request of countries an OR built-up rule is added to DUG tool. This is also useful when there are large retail areas in the middle of the city, and if the 50% built-up rule is not applied there could be breaks in the output (city/urban center).

The GHS-DUG tool implementation was done in groups moderated bilaterally by trainers of EC-JRC and UN-Habitat. It is important to use the 1km population grid to the DUG tool because the tool needs to calculate the population density per 1 km square in order to determine the DoU classes at grid level. All national participants worked with GHS-DUG tool to produce the Degree of Urbanization grids. This was followed by a tour de table to share the work and discuss the results. The points raised were of the following type: 1) technology and geospatial 2) visual inspection of the geospatial grids and analysis of the quantitative results and 3) methodology of the Degree of Urbanization.

The following points were underscored: Population totals of level 1 and level 2 should be the same in the Degree of Urbanisation Grid (output of DUG tool); Follow the same data stream; Output of one tool serves as input to the next; Built-up layer and Population layer should refer to the same reference area. To the question whether to apply the DoU to regions or to the entire country, it was recommended to apply it to the entire country, then do the comparison with the national definition by looking at the distribution of settlements. DoU urban cluster class 21 areas (sub-urban or peri-urban grid cells) are in some countries classified as urban as in others classified as rural. But in any case, (when they are classified as rural in national definition) they are “urban areas to be” because of urban-type density. They are settlements where most likely future urbanization will take place. The participants were instructed that if national built-up layers are available to please use them. EC-JRC provided built-up layers in case national ones were not available. EC-JRC is happy to receive feedback on built-up layers. Please fill out the EC-JRC survey template with the results of continuous work that is being done by each country group.

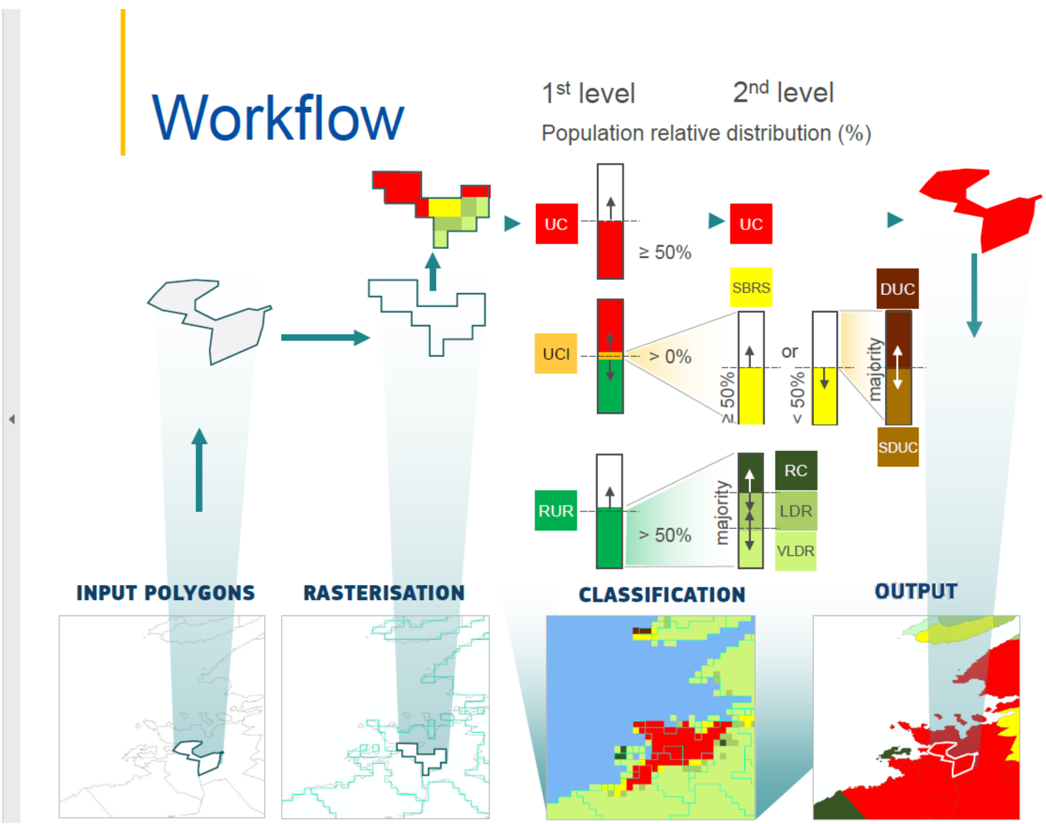
Implementing the Degree of Urbanisation at the territorial unit level using GHS-DU-TUC tool

The trainers gave a presentation on how to classify the territorial units by the degree of urbanization using the GHS-DU-TUC tools. The territorial Units (TU) can be administrative or statistical subdivisions of the territory or census units. At this point we are moving from the degree of urbanization at the grid level to the degree of urbanization at the territorial unit level. The input data for DU-TUC tool are: The layer of territorial unit polygons; the population grid raster (output of step 1 via POP2G); the Degree of Urbanization grid raster (output of step 2 via DUG).

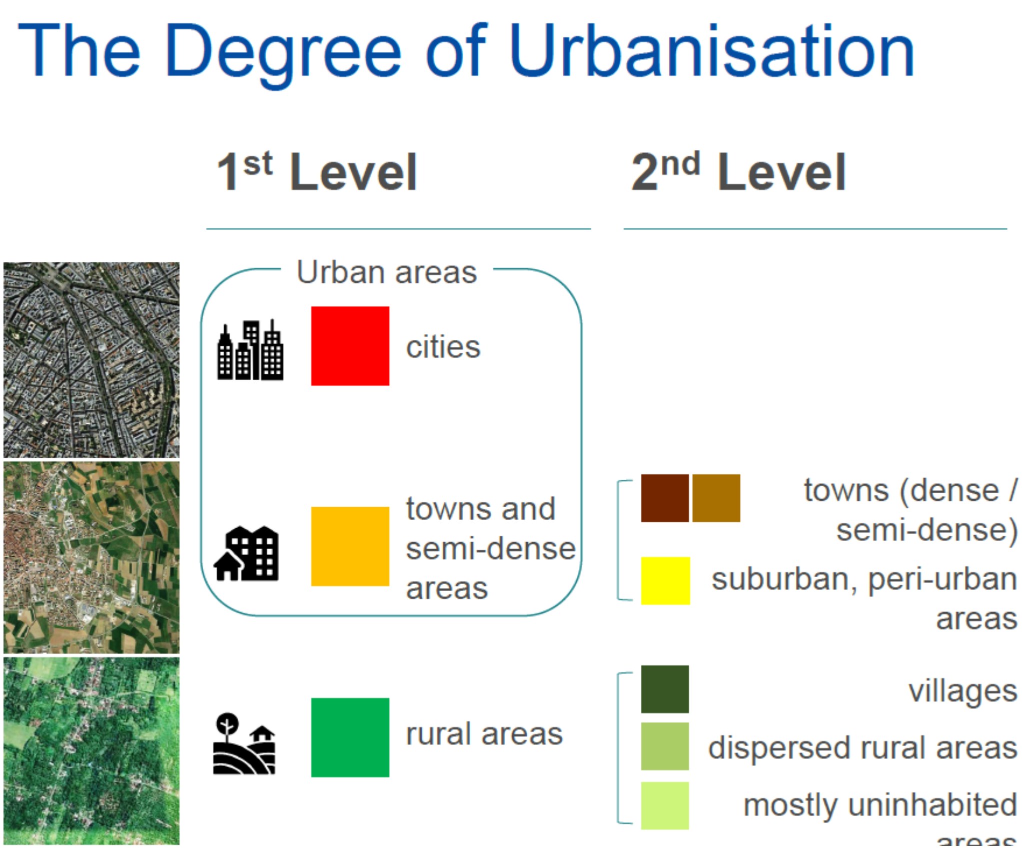
As a first step the DU-TUC tool rasterizes the input TU polygons. The entire workflow of DU-TUC tool from input to output is explained, including the quality checks and tips to evaluate the output. With this the process comes back to territorial units for which countries produce statistics. These statistics can so be reported by the Degree of Urbanisation.

Step 1 (POP2G) starts with the input of population data by territorial units such as administrative areas or census enumeration areas. Step 3 (DU-TUC) outputs population data of territorial units by their degree of urbanization, and a delineation of territorial units by their degree of urbanization. Territorial units of steps 1 and 3 do not need to be the same. It was emphasized that territorial units in the output of step 3 need to be the territorial units for which countries collect and produce statistics so that these statistics can be joined to the respective degree of urbanization class. This is important for a harmonized reporting of SDG indicators that have an urban/city component.

The following represents a schematic overview of the GHS-DU-TUC workflow.



The output of GHS-DU-TUC tool produces a classification of territorial units as summarized in the figure below:



Following discussion:

Questions/comments	Answers
An area may be classified as urban (in national definition) because of the existence of facilities, but may not result so according to DoU.	The DoU classifies urban areas based on population. You can use the 50% built-up option. Moreover, population can be concentrated in small places also in rural areas. The classification resulting from population may look different from what the landscape may indicate. In response to similar questions EC-JRC responded that very heterogeneous territorial units can be broken up in separate polygons, and each one will be classified separately according to the respective population majority.
If there is under-representation or over-representation (in terms of degree of urbanization in the output) what do we do?	The majority rule of population criteria is strict. However, you can test different levels of boundaries, and in geospatial processes break or merge administrative subdivisions or can draw

	polygons to highlight certain parts. Do some testing of territorial units because if a polygon is made too big you may get urban bias.

The participants were instructed to set-up the DU-TUC tool to use the specific data stream that were used/produced from the previous two tools. The territorial units can be different, but all the maps and layers need to match the same reference area. The user guide for GHS-DU-TUC tool was distributed to participants as it was done for the other tools as well.

The participants worked on classification of territorial units by the Degree of Urbanization using the GHS-DU-TUC tool. The three experts of EC-JRC and UN-Habitat provided bilateral help and instruction to each country, and reviewed results. All groups successfully obtained the results of the GHS-DU-TUC.

Implementing the degree of urbanisation in your country

The participants of each participating country worked together, to upload to the survey template the screenshots and results of the work done so far and to complete the cross-tabulation part of the survey. This part evaluates the match between the resulting Degree of Urbanization categories and the urban/rural areas according to the national definition.

Then the participants of each country worked together to prepare the presentations to be delivered during the second to last session of the workshop. The completed survey with the results of all steps and related maps could serve as a presentation. One presentation per country in PPT or ArcGIS/QGIS. The main results to be presented: population grid, degree of urbanization grid, classification of territorial units (DoU and national definition) and cross-tabulation between DoU and national definition. The trainers continued with instructions, answering questions, bilateral discussions with each country group.

National presentations and feedback

The participants of each country were invited to deliver the national presentations which are the result of the work done during the entire workshop. Participants of one country presented together. As it was requested the national presentations included the output of the work completed, namely: population grid, degree of urbanization grid, classification of territorial units (according to the Degree of Urbanization and national definition) and cross-tabulation of matching levels between the degree of urbanization and national definition.

The following is a summary of the discussion following the national presentations:

Questions/comments	Answers
One country to another: How often do you revise/change your national definitions? What is the way forward regarding national definitions and the degree of urbanization in your opinion?	Until 2010 we only had only sketch maps; now we are using digital maps. We need to improve the maps; I see errors we need to correct. Need to present the Degree of Urbanization to management. We had a good experience and exposure; it is useful to have international cooperation and cooperation with other countries.

Follow-up question by another country regarding geospatial inputs for GHS-DU-TUC tool	EC-JRC highlights the importance of correcting geospatial inputs (i.e. polygon overlaps). The territorial units polygons used as input for the GHS-DU-TUC tool should not be too small (can result in displacement of population). Another consideration is that when territorial units are too big it can result in overestimating urban, when they are too small, it can result is subclassifying units that are homogeneous. Test to find the right territorial units for your country (for the classification of territorial units by degree of urbanization).
Questions to a country: Which are the agencies involved in establishing urban/rural definitions? Would thresholds of urban/rural definitions have any national implications?	Several ministries and stakeholders. A Committee is formed. Have met with stakeholders; have looked at several factors; population size and density are sufficient. The Degree of Urbanization methodology is good for our country.
One country indicated that they have collected 2022 census data using GPS-enabled tablets. Housing units are geolocated. They appreciate the DoU, would like to improve GIS capacity and consider this training useful.	EC-JRC indicated that for this country the population grid can then be created by the aggregation (of points) method if point location can be joined to population count.
Can the thresholds be adjusted for the purpose of SDG indicators?	UN-Habitat clarifies that there is a need to understand urbanization from a practical perspective and to invest and plan on places with high population density which already depict urbanization. It is important to have conversations at national level on DoU for supporting SDGs and urbanization goals.

<u>Concluding session with discussion on the way forward</u>

While taking stock of the work accomplished during the week, the discussion focused on the priority areas regarding the implementation of the Degree of Urbanisation for the purpose of reporting and monitoring the SDG and urban agenda indicators; the support that the national institutions would need in this regard, and the ways to continue to learn and improve capacity and share knowledge. Several participants reported that they will present the degree of urbanization experience to their supervisors and heads of institutions to have discussions on how to move forward. For this the participants will be in contact for questions or support. The trainers also noted that they will follow up with the participants, for support and specific actions. The participants considered the experience gained during the workshop a very good opportunity, as well as a needed experience, and noted the potential of the Degree of Urbanization for a harmonized reporting of SDG indicators. The participants were grateful for having had the opportunity to share knowledge with the other countries of the region and learn from each-other's experiences. Given that the Degree of Urbanization is one of the applications that needs the expertise of the statistical and geospatial specialists, the participants expressed their gratitude to the organizers for having invited the statistical and geospatial/mapping institutions of each country, and they had the opportunity to work together throughout the duration of the workshop. The EC-JRC delivered a report containing the results of the survey to each country.

3. LIST OF PARTICIPANTS: Country or organization, institution, function

Country / Organization	Institution, function of participant
Brunei Darussalam	Senior Statistics Officer Department of Economic Planning and Statistics Ministry of Finance and Economy
	Assistant Statistics Officer Department of Economic Planning and Statistics Ministry of Finance and Economy
	Senior Town and Country Planning Officer Department of Town and Country Planning Ministry of Development
	Town and Country Planning Officer Department of Town and Country Planning Ministry of Development
Cambodia	Deputy Director General National Institute of Statistics Ministry of Planning
Indonesia	Statistician BPS-Statistics Indonesia
	Associate Mapping Surveyor Geospatial Information Agency of Indonesia
Malaysia	Assistant Director Population and Demographic Statistics Division Department of Statistics, Malaysia
	Statistical Officer

Country / Organization	Institution, function of participant
Nepal	Central Bureau of Statistics
	Survey Officer Survey Department
Philippines	Senior Statistical Specialist Philippine Statistics Authority (PSA)
	Chief Geodetic Surveys Division DENR - Land Management Bureau
Thailand	Director Policy and Statistical Technique Division National Statistical Office
	Statistician National Statistical Office
	Statistician National Statistical Office
	GIS analyst Geo-Informatics and Space Technology Development Agency (GISTDA)
	Specialist officer (geo-informatics) GISTDA
Timor-Leste	GIS/Mapping Analyst General Directorate of Statistics, Ministry of Planning and Finance
Viet Nam	Statistician Department of Population and Labour Statistics, General Statistics Office of Viet Nam
	Deputy Chief of Technology Division

Country / Organization	Institution, function of participant
	Department of Surveying, Mapping and Geoinformation of Viet Nam (DOSMVN)
European Commission	Project Officer Disaster Risk Management Unit, Joint Research Center
	Scientific Project Officer Disaster Risk Management Unit, Joint Research Center
United Nations	
Department of Economic and Social Affairs (DESA) Statistics Division	Statistician Demographic Statistics Section
	Associate Statistician Demographic Statistics Section
UN-Habitat	Spatial Data Expert Data and Analytics Unit
	Sustainable Urbanization Specialist Bangkok Office
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DESA Population Division	Associate Expert Population Estimates and Projections Section
Economic and Social Commission for Asia and the Pacific (ESCAP) Statistics Division	Associate Statistician Economic and Environment Statistics Section