

**Metadata Sheet: Change in Population Density - 2030  
(Indicator No. 16: Projected for 2030)**

| <b>Title:</b>            | <b>Change in Population Density – 2030 and 2050</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |  |                          |                                           |   |          |       |   |     |        |
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| <b>Indicator Number:</b> | n/a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |  |                          |                                           |   |          |       |   |     |        |
| <b>Thematic Group:</b>   | <b>Socioeconomics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |  |                          |                                           |   |          |       |   |     |        |
| <b>Rationale:</b>        | <p><i>Population growth is one of the main drivers of water use for domestic, industrial and agricultural sectors. In many regions it is a more significant determinant of future water scarcity than changes to the hydrological system induced by climate change (Vörösmarty et al. 2000). While efficiency gains from water-saving technologies and demand management measures may play an important role in helping to mitigate the impacts of growing water demand, there will still be important pressures on water resources in the future, especially in low-income countries with rapid population growth.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                           |  |                          |                                           |   |          |       |   |     |        |
| <b>Interlinkages:</b>    | <p><i>This indicator has been chosen as a proxy future-oriented indicator for the socioeconomics thematic group because it is challenging to project changes in economic development or societal wellbeing. Population change is also a pragmatic way of assessing likely changes in pressures on natural resources, and would impact other water systems in area.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                           |  |                          |                                           |   |          |       |   |     |        |
| <b>Description:</b>      | Change in Population Density – 2030 and 2050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |  |                          |                                           |   |          |       |   |     |        |
| <b>Metrics:</b>          | The gridded data representing population per grid cell for 2010, 2030, and 2050.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |  |                          |                                           |   |          |       |   |     |        |
| <b>Computation:</b>      | <p>The gridded data representing population per grid cell for 2010, 2030, and 2050 were aggregated using BCU and basin boundaries, and then divided by land area to yield population density estimates for each time slice. Percentage change in population density was then calculated for 2010-2030 and 2010-2050. No basins approach that level for 2010-2030, but some exceed it during the period 2010-2050.</p> <p>For the baseline of 2010, we used the same Gridded Population of the World v3 (GPWv3) 2010 future estimates data set as that used for other parts of this assessment. These data represent projections from the year 2000 census-based population distribution, using UN country-level projections to project the population. For the projections to 2030 and 2050, we used data developed by IIASA for the Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP) in which current population densities were projected using country-level population projections for those years. The projections assume constant population distribution based on year 2000 census data. While this assumption is obviously incorrect owing to different sub-national rates of natural increase and net migration (de Sherbinin et al. 2012), creating alternative distributions would have required multiple scenarios which was beyond the scope of this assessment.</p> |                                           |  |                          |                                           |   |          |       |   |     |        |
| <b>Units:</b>            | %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |  |                          |                                           |   |          |       |   |     |        |
| <b>Scoring system:</b>   | <p>Risk category thresholds were developed based on an analysis of the distribution of the data and expert opinion. Anything above 100% reflects a more than doubling of population density.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 10%;"></th> <th style="width: 40%;">Relative risk categories</th> <th style="width: 50%;">Percentage Increase in Population Density</th> </tr> </thead> <tbody> <tr style="background-color: #D9E1F2;"> <td align="center">1</td> <td>Very low</td> <td align="center">0-25%</td> </tr> <tr style="background-color: #D9E1F2;"> <td align="center">2</td> <td>Low</td> <td align="center">25-50%</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |  | Relative risk categories | Percentage Increase in Population Density | 1 | Very low | 0-25% | 2 | Low | 25-50% |
|                          | Relative risk categories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Percentage Increase in Population Density |  |                          |                                           |   |          |       |   |     |        |
| 1                        | Very low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0-25%                                     |  |                          |                                           |   |          |       |   |     |        |
| 2                        | Low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 25-50%                                    |  |                          |                                           |   |          |       |   |     |        |

|                             |                                                                                                                                                                                                                                                                                                                                     |           |          |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|
|                             | 3                                                                                                                                                                                                                                                                                                                                   | Moderate  | 50-75%   |
|                             | 4                                                                                                                                                                                                                                                                                                                                   | High      | 75%-100% |
|                             | 5                                                                                                                                                                                                                                                                                                                                   | Very high | >100%    |
| <b>Limitations:</b>         | More spatially-explicit global population projections would have been beneficial for this assessment. Such projections have been undertaken using the Shared Socioeconomic Pathways (SSPs) associated with the Representative Concentration Pathways (RCPs) of the IPCC, but were not available in time for use in this assessment. |           |          |
| <b>Spatial Extent:</b>      | global-scale                                                                                                                                                                                                                                                                                                                        |           |          |
| <b>Spatial Resolution:</b>  | 0.5°                                                                                                                                                                                                                                                                                                                                |           |          |
| <b>Year of Publication:</b> |                                                                                                                                                                                                                                                                                                                                     |           |          |
| <b>Time Period:</b>         | 2010 - 2070                                                                                                                                                                                                                                                                                                                         |           |          |
| <b>Additional Notes:</b>    | Source : ISI-MIP Project (IIASA)<br>Projection : WGS84<br>Scenario : SSP2<br><br>Allocation of future population according to current density                                                                                                                                                                                       |           |          |
| <b>Date:</b>                | 20.08.2014                                                                                                                                                                                                                                                                                                                          |           |          |
| <b>Format:</b>              | netcdf                                                                                                                                                                                                                                                                                                                              |           |          |
| <b>File Name:</b>           | ISI-MIP_population_05deg.zip                                                                                                                                                                                                                                                                                                        |           |          |
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