Metadata Sheet: Societal Wellbeing (Indicator No. 13)

Title:	**Societal Wellbeing**
Indicator Number	**13**
Cluster:	**Socioeconomics**
Rationale:	Low levels of socioeconomic development and human wellbeing put populations at higher risk to low and high flow extremes, and of water pollution. This indicator is composed of five sub-indicators, so the rationale for each is described in turn. (1) Access to improved drinking-water supply will indicate the efficiency of the basin's water governance structure. It will also be an indication of the population health as the lack of improved drinking-water often lead to an increase in water-related diseases, such as cholera and diarrhoea. Access to improved drinking-water can also provide economic benefits if less time is spent on securing household water supply. Access to improved water supply is of high global importance, as manifested by the global community in the Millennium Development Goal 7. (2) Access to improved sanitation will be an indication of population health as the lack of improved sanitation often lead to an increase in water-related diseases, such as cholera and diarrhoea. There are also economic aspects to consider as the diseases related to poor sanitation prevent people from working. Access to improved sanitation is of high global importance, as manifested by the global community in the Millennium Development Goal 7. (3) Adult literacy will indicate the level of education in the basin and provide an indication of the knowledge capacity to deal with issues in the basin. An educated population can more easily take on the development challenges it faces, such as ensuring environmental sustainability, increasing productivity and empowering women and creating gender equality. (4) Infant mortality rates (IMRs) serve as a useful proxy for overall poverty levels because they are highly correlated with many poverty-related metrics such as income, education levels and health status (de Sherbinin 2008). Low IMRs are an indication of a society where the population has access to nutritious food and healthcare, whereas high IMRs are a sign of low levels of economic development. Where IMRs are highest one would expect that fluctuations in water levels or growing water stress will have a detrimental impact on human wellbeing. Infant mortality is one of many parameters related to environmental health concerns and the health care service available to the population and this follows administrative borders. The indicator can therefore be relevant for other water systems within the same administrative borders. (5) Gini coefficients represent the level of inequality in a basin. Societal inequality is an important dimension of welfare, and indicates likely levels of participation in governance, representation in public authorities, and capacity for sound environmental management, where conflict may occur between welfare needs and environmental concerns. Gross inequality may lead to social or political unrest, which puts at risk efforts to create healthy, educated societies resilient to pressures on their water resources. The potential impacts related to economic inequalities within political units effect water systems with little differentiation with regard to type of water system. Thus the problems related to poor wealth distribution will potentially add to existing problems within basins and existing linkages between water systems.
Interlinkages:	(1, 2) The governance systems for improved drinking-water supply are not limited to river basins, but follow administrative borders. The indicator can therefore be relevant for other water systems within the same administrative borders.

	(3) Adult literacy is dependent on the level of education available and this follows administrative borders. The indicator can therefore be relevant for other water systems within the same administrative borders.. (4) Life expectancy is one of many parameters related to the health care service available to the population and this follows administrative borders. The indicator can therefore be relevant for other water systems within the same administrative borders. (5) The potential impacts related to economic inequalities within political units effect water systems with little differentiation with regard to type of water system. Thus the problems related to poor wealth distribution will potentially add to existing problems within basins and existing linkages between water systems.
Description:	(1) Percentage of population using an improved drinking-water source. Improved drinking-water sources include; piped water into dwellings, piped water to yards/plots, public taps or standpipes, tubewells or boreholes, protected dug wells, protected springs, rainwater. (Definition for improved drinking water is taken from the JMP, and further information can be found at http://www.wssinfo.org/definitions /infrastructure.html). (2) The definition of this indicator is the proportion of the population with improved sanitation. According to the Joint Monitoring Programme of the WHO and UNICEF, improved drinking-water sources include: flush toilets, piped sewer systems, septic tanks, flush/pour flush to pit latrines, ventilated improved pit latrines, pit latrines with slab, and composting toilets. The data sets used for this indicator include the percentage of a country's rural and urban populations with access to improved drinking water (updated 2010). (3) The definition of the indicator is the proportion of population aged 15 or above that can both read and write a short simple statement on their everyday life. The definition is taken from the UNDP Human Development Report (HDR) indicator on adult literacy. (4) Infant mortality rates at a subnational level were compiled from a number of sources, including country vital statistics, Demographic and Health Surveys, and Multiple Indicator Cluster Surveys. The subnational rates were adjusted to correspond to 2008 national level IMRs published by UNICEF. The data were gridded at 5 arc-minute resolution. (5) The Gini index is an estimate of inequality. It measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index score of zero implies perfect equality while a score of 100 implies perfect inequality (World Development Indicators Online. World Bank, 2009).
Metrics:	(1, 2) These sub-indicators were calculated using data from the WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (WSSinfo.org) (downloaded June 2013). (3) The data were obtained from the UNESCO Institute for Statistics (2012) and represent 2010 for almost all countries. (4) For this indicator we used CIESIN's gridded IMR data (CIESIN 2005) but updated for 2008, which is a compilation of subnational data (5) Gini coefficients were obtained for each country from the World Bank World Development Indicators. Because Gini coefficients are not calculated for all countries in all years, we used data ranging from the year 2000 to 2010. All data is collected at

	national level, and data are not typically reported by urban/rural breakdown.
Computation:	(1, 2) The computation steps were as follows: 1. Utilize CIESIN's Global Rural-Urban Mapping Project (GRUMP) urban/rural population grid to identify the proportion of the population that is urban and rural in each BCU. 2. Multiple '1' times the urban/rural percent improved drinking-water supply coverage to obtain an average percent of population with improved drinking-water supply per BCU. 3. Aggregate to basin level with weighting based on size of population in each BCU. The result is a measure of the average percentage of the population with access to improved drinking water supply in each basin. (3) All data is collected at national level, and data are not typically reported by urban/rural breakdown. To calculate this indicator, we used population count data from the GRUMP data set, and calculated the proportion of the basin population in each BCU. We used the proportion of the population in the basin to create a basIn-level weighted average of the national level literacy rates for each riparian country. (4) IMRs are measured as the number of deaths per 1,000 live births among 0-1 year olds. We used the gridded IMR data set and simply averaged the IMR for each basin using zonal statistics in ArcGIS 10.1. (5) To calculate this indicator, we used population count data from the GRUMP data set, and calculated the proportion of the basin population in each BCU. We used the proportion of the population in the basin to create a basin-level weighted average of the national level Gini coefficients for each riparian country.
Data Source/provider:	(1, 2) WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation, (3) UNESCO, (4) DHS, MICS, and country vital statistics, (5) World Bank World Development Indicators
Spatial Extent:	Global
Spatial Resolution:	Country level
Year of Publication:	2013
Time Period:	2010-11 for most countries
Unit:	(1, 2, 3) Percentage, (4) deaths per 1,000 live births, (5) Gini coefficient ranging from 0 (low inequality) to 100 (high inequality)
Risk categorization	Risk categories were defined by the following distribution: Risk categories 1, 2 and 5 include 10% of all basins (28 basins in each category), whereas risk category 3 includes 30% of all basins (83 basins), and risk category 4 includes 40% of all basins (110 basins). Raw values for the untransformed data varied across the different indicators. As an example, the highest risk category (category 5) had 9-65% coverage for access to improved water sources, and Infant Mortality rates of between 20 and 133 deaths per 1,000 live births.
Additional Notes:	

Date:	24 Aug. 2013
Format:	Excel
File Name:	multiple
Contact person:	Alex de Sherbinin
Contact details:	CIESIN, Columbia University, PO Box 1000, Palisades NY 10964, Tel. +1-845-365-8936, adesherbinin@ciesin.columbia.edu