Metadata Sheet: Vulnerability to Climate-related Natural Disasters (Indicator No. 14)

Title:	**Vulnerability to Climate-related Natural Disasters**
Indicator Number:	**14**
Cluster:	**Socioeconomics**
Rationale:	Floods and droughts cause the greatest loss of life and economic losses of all natural disasters each year, and the likelihood and severity of floods and droughts is likely to increase with climate change. Impacts of floods and droughts are felt by humans and ecosystems, and include impacts on food security, damage to infrastructure, and displacement of people. Global analyses have been undertaken by CIESIN in 2005 (Dilley, et al., 2005) and the UNEP Global Assessment Report in 2009 and 2013. Hydrological variability induced by climate change will affect flow patterns in river systems. The risk of droughts and floods will increase, affecting both quantity and quality of water being transported through water systems. Potential human efforts to mitigate climate change effects by constructions on river systems will probably further impact downstream areas. This indicator is composed of two sub-indicators: (1) Coefficient of variation of monthly river discharge. The rationale for this indicator is that high variability in discharge signifies greater exposure to climate extremes, and particularly drought. (2) Aggregated economic exposure (in US dollars) to flood hazards divided by basin area. The rationale for this indicator is that flood hazards take a significant economic toll on economies, sometimes setting back development progress by a decade or more (Solomon et al. 2013).
Interlinkages:	Hydrological variability induced by climate change will affect flow patterns in river systems. The risk of droughts and floods will increase, affecting both quantity and quality of water being transported through water systems. Potential human efforts to mitigate climate change effects by constructions on river systems will probably further impact downstream areas.
Description:	(1) For each grid cell in the WaterGap 2.2. model, the mean, maximum and minimum, standard deviation, variance, and coefficient of variation (cv) of runoff was calculated. The statistical parameters were calculated from monthly discharge data of the climate normal period 1971-2000. The coefficient of variation (CV) is defined as the ratio of the standard deviation to the mean. Higher CVs imply greater variation in flows. (2) Data on Economic Exposure to Floods from the UNEP Global Assessment Report for 2013 provide the economic exposure in US Dollars for major rivers in each basin.
Metrics:	(1) See above. (2) Data on economical exposition to flood were obtained from UNEP PREVIEW (http://preview.grid.unep.ch/).
Computation:	(1) This indicator was calculated using data processed by Christof Schneider of the University of Kassel using the WaterGap 2.2 model. Using the CV of flow as calculated by Christof, CIESIN averaged the CV over each basin. The result is a measure of the flow variability, and therefore the dependability of flow for human activities. A total of 276 basins are included in this analysis. (2) The gridded data representing economic exposure were summed by basin and divided by river basin area to come up with a measure of total economic exposure per

	basin area.
Data Source/provider:	(1) Center for Environmental Systems Research (CESR), computations for basin averages by CIESIN, and UNEP PREVIEW (http://preview.grid.unep.ch/).
Spatial Extent:	Global
Spatial Resolution:	(1) 0.5° by 0.5° grid cell raster, (2) ??
Year of Publication:	(1) 2013, (2) 2011
Time Period:	(1) 1971-2000, (2) 2011
Unit:	(1) Coefficient of variation, (2) US Dollars per sq. km.
Additional Notes:	
Date:	24 Aug. 13
Format:	
File Name:	
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