CLIM-WARN Metadata

Title:	Vulnerability
Indicator Code:	VUL
Component:	Vulnerability
Rationale:	Climate Change, climate variability, and climate extremes will have far reaching implications on societies in the 21st century (IPCC 2012, McElroy and Baker 2012, Parry et al. 2007). There's considerable policy interest in (1) identifying the specific vulnerabilities of populations that will be exposed to climate change impacts; (2) understanding how various climate impacts (e.g. secular declines in precipitation, extreme events, and heat stress) will impact urban and regional systems; and (3) how, in turn, populations will respond through *insitu* adaptation or migration.
Source Data Set:	Sixteen indicators have been used to develop the vulnerability layer. See indicators metadata for more. The following indicators have been used; **Exposure:** 1. Floods (frequencies in a 100 year return cycle; source UNEP/GRID) 2. Droughts (Longterm MIN SPI and SUM SPI have generated from CHIRPS Z-scores. This is a 34 year rainfall dataset 1981-2015 at the time of analysis). 3. Mean Annual rainfall 4. Mean March-April-May rainfall 5. Mean Oct-Nov-Dec rainfall 6. Temperature trends March-April-May (2002-2014) 7. Temperature trends Oct-Nov-Dec (2002-2014) **Sensitivity:** 1. Population density 2. Infant Mortality rates 3. Malaria stability/suitability 4. Soil Organic Carbon **Adaptive capacity:** 1. Education levels 2. Access to markets/distance to markets 3. Health Infrastructure density 4. Irrigation/Percent of irrigated lands over total land 5. Anthropogenic biomes
Units:	Units range from 0–100 and represent the increasing vulnerability from 0-100.

Computation:	Sixteen Indicators were standardized to values between 0 and 100 based on the minimum and maximum values in each indicator. This follows the IPCC definition and approach to mapping vulnerability. The assumption with this approach is that min and max values mean the same in relation to vulnerability and/or the component of vulnerability being measured (with considerations for indicators that have an inverse relationship with vulnerability). Example: High education levels mean low vulnerability/high adaptive capacity. A 100 therefore becomes 0 while a 0 becomes 100. Once standardization is done, an additive/averaging approach is used to aggregate indicators into components. This level gives the three components (Exposure, Sensitivity, Lack of Adaptive Capacity) which are then aggregated to develop the composite vulnerability layer. Note: At each averaging/addition level (indicators and components) values are standardized to the 0-100 reference. Once the vulnerability layer is achieved, it's normalized again to 0-100 so that this becomes the common reference scale across all levels of aggregation i.e, at indicator, components and composite vulnerability levels.
Scoring system:	See computation section above
Limitations:	Biases may result during aggregation due to the various assumptions that are included in the averaging and standardization of indicators. The assumption that min and max values mean the same in relation to the component being measured could be unrealistic for some of the indicators and their relationship with vulnerability.
Spatial Extent:	Turkana, Nzoia and Kwale
Spatial Resolution:	0.01 degree
Year of Publication:	2015
Time Period:	Apr, 2015
Additional Notes:	http://www.ciesin.org/documents/Mali-CV-Mapping-Revised-CLEARED.pdf http://www.itc.nl/library/papers_2014/phd/desherbinin.pdf
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