Indicator name	**Disaster risk index**
Prepared by	WMO, UNU-EHS, ISDR*
Example	**WWDR2, Chapter 10, Box 10.4**
Rationale	The number of deaths per unit of exposed population would give an indication of the vulnerability of the nation to the impacts of disasters.
Position in DPSIR chain	State
Definition of indicator	This indicator compares the average population exposed to water-related hazards with average annual deaths caused by these hazards. Risk is modelled using socio-economical parameters.
Underlying definitions and concepts	Disaster: destructive event triggered by natural hazards, with impacts on human life and activities; overwhelming the capacity of available relief response Deaths: human life lost directly as a result of the disaster (e.g. drowning in the event of a flood).
Specification of determinants needed	Number of people living in flood-prone areas (per year or other period) Number of deaths in this population directly caused by disasters (e.g. flooding) in the same year or over the same period
Computation	Global Vulnerability Index (GVI) is the evaluation of the vulnerability only. $K = C * (PhExp)^{\alpha} * V_1^{\alpha_1} * V_2^{\alpha_2} ... * V_p^{\alpha_p}$ Where: K = Number of persons killed by a certain type of hazard. C = Multiplicative constant. PhExp = Physical Exposure: population living in exposed areas multiplied by the frequency of occurrence of the hazard. V_i = Socio-economical parameters. α_i = Exponent of V_i, which can be negative or similarly using natural logarithms: $\ln(K) = \ln(C) + \alpha \ln(PhExp) = \alpha_1 \ln(V_1) + \alpha_2 \ln(V_2) + ... + \alpha_p \ln(V_p)$ The weight for each variable is calibrated using past casualties in the period 1980-2000, parameters and variables being different for each hazard. For example, physical exposure to each hazard (as computed from geophysical datasets) was always selected by the statistical analysis. But then the socio-economical parameters were: • For floods: GDP per capita and local population density • For cyclones: HDI and percentage of arable land • For drought: percentage of population with access to improved water supply
Units of measurements	Estimation of risk (expressed in number of people killed)
Data sources, availability and quality	For the identification of hazard prone areas and census of inhabitants and modelling of population distribution: sources: CIESIN. GIS modelling of hazard area For the number of deaths caused by disasters: State services; relief organisations (UN; Red Cross/Crescent; NGOs; etc.) Sources: EM-Dat, CRED For socio-economical parameters: UNEP, World Bank, FAO,
Scale of application	Initial scale of application is nation-wide. Yet the methodology might be applied to regional and local levels, for instance in order to produce categories of communities exposed to natural hazards
Geographical coverage	Global, although population census might be flawed or inexistent, in particular in hazard-prone areas where illegal settlement or urban sprawl (slums) occur. Too, deaths statistics might be flawed by official services, so as to receive more relief

	funding or aid from the international community and donors.
Interpretation	The higher the rate of deaths per unit of exposed population, the more vulnerable a nation is to the impacts of disasters. The Disaster Risk Index provides statistical assessment of countries according to their relative vulnerability. Although informative about the rate of exposed people dying of natural hazards, additional explanations can be found in the report Reducing Disaster Risk (UNDP). From this information can be developed a global ranking of the relative risk and vulnerability of nations exposed to water-related and other natural hazards.
Linkage with other indicators	These are already included, except for the overall losses, as we have no reliable data on economic losses or loss of livelihood.
Alternative methods and definitions	For general application, this indicator indicates the percentage of hazard-prone and disaster-stricken people who actually lost their lives because of a disaster. The index includes Drought, Cylones, Floods and Earlthquakes. In some cases, the number of both disaster-prone communities and disaster victims can be difficult, both for technical and political reasons.
Related indicator sets	In order to improve accuracy of the GVI, collection of disaster-related, statistical data should be fostered, as well as access to these data. Second, consolidation of disaster data could be improved by increased communication among UN agencies; relief organisations and the international community of donors
Sources of further information	CRED-OFDA disaster database operated in Louvain University, Belgium. UNEP/GRID-Geneva, Project for Risk Evaluation, Information and Early Warning (PREVIEW)
Other institutions involved	Line agencies in various countries, including Ministries of Civil Defense and/or Emergencies and Disasters, of Health, of Public Works, and of Natural Resources UN agencies and partners, including UN-OCHA, UN-ISDR, WMO, UNESCO, UNU-EHS, WHO and development and financial institutions such as ADB; World Bank; etc. Regional agencies, including OAS, CEPREDENAC (Coordination Center for the Prevention of Natural Disasters in central America), Panama; Asian Disaster Preparedness Center (ADPC) Bangkok, ThailandOFDA (Office of Federal Disaster Assistance, Washington DC; International Federation of Red Cross/Red Crescent (IFRC)
Other institutions involved	*This indicator was originally developed by United Nations Development Programme (UNDP) and Bureau for Crisis Prevention and Recovery (BCPR).