CITIZEN SCIENCE GUIDE FOR UNITED NATIONS SDG INDICATORS

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13 CLIMATE ACTION

Indicator 13.1.2

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Goal 13 - Take urgent action to combat climate change and its impacts

Goal 13 has 5 targets focusing on mitigating and adapting climate changes globally through nationally formulated policies and determined contributions. These actions include efforts to integrate disaster risk measures, sustainable natural resource management, and human security into national development strategies. (UNDP, UN SDG), by 2030 all these targets will be achieved globally.

Targets: In total, the goal number 3 has 5 global targets to be achieved by 2030.

- Target 13.1 - Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries.
- Target 13.2 - Integrate climate change measures into national policies, strategies and planning.
- Target 13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
- Target 13.a - Implement the commitment undertaken by developed country parties to the United Nations Framework convention on climate change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate fund through its capitalization as soon as possible.
- Target 13.b - Promote Mechanism for raising capacity for effective climate change related planning and management in least developed countries, including focusing on women, youth and local and marginalized communities.

The Challenge

Climate change is affecting the planet and its life more than ever. Temperatures across the globe in 2017 were 0.90 degrees Celsius warmer than 1951 to 1980 mean, according to NASA. 2016 was the third consecutive year in which temperatures were more than 1 degree Celsius above late nineteenth-century levels.70 Each one degree Celsius of temperature increase in global mean temperature is estimated to reduce average global yields of wheat by 6 per cent, rice by 3.2 per cent, and maize by 7.4 per cent.71 Across all the world's oceans, absolute sea level has risen at an average rate of 0.06 inches per year from 1880 to 2013.72 Having spiked by almost 50 per cent since 1990, global carbon dioxide (CO 2) emissions have increased more quickly between 2000 and 2010, than in each of the three previous decades.

Target 13.1 - Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries.

Indicator 13.1.2 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.

Goal: By 2030, Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries.

What does it mean?

Currently, many countries around the world are not prepared to face and manage any type of disasters leading to significant human and economic loss annually. This indicator, by means of measuring, ensures that all the countries adopt a version of disaster risk reduction policy that is suited to the local needs and capacity of the country yet aligned with the global disaster risk reduction guidelines outlined in the Sendai Framework for DRR 2015-2030.

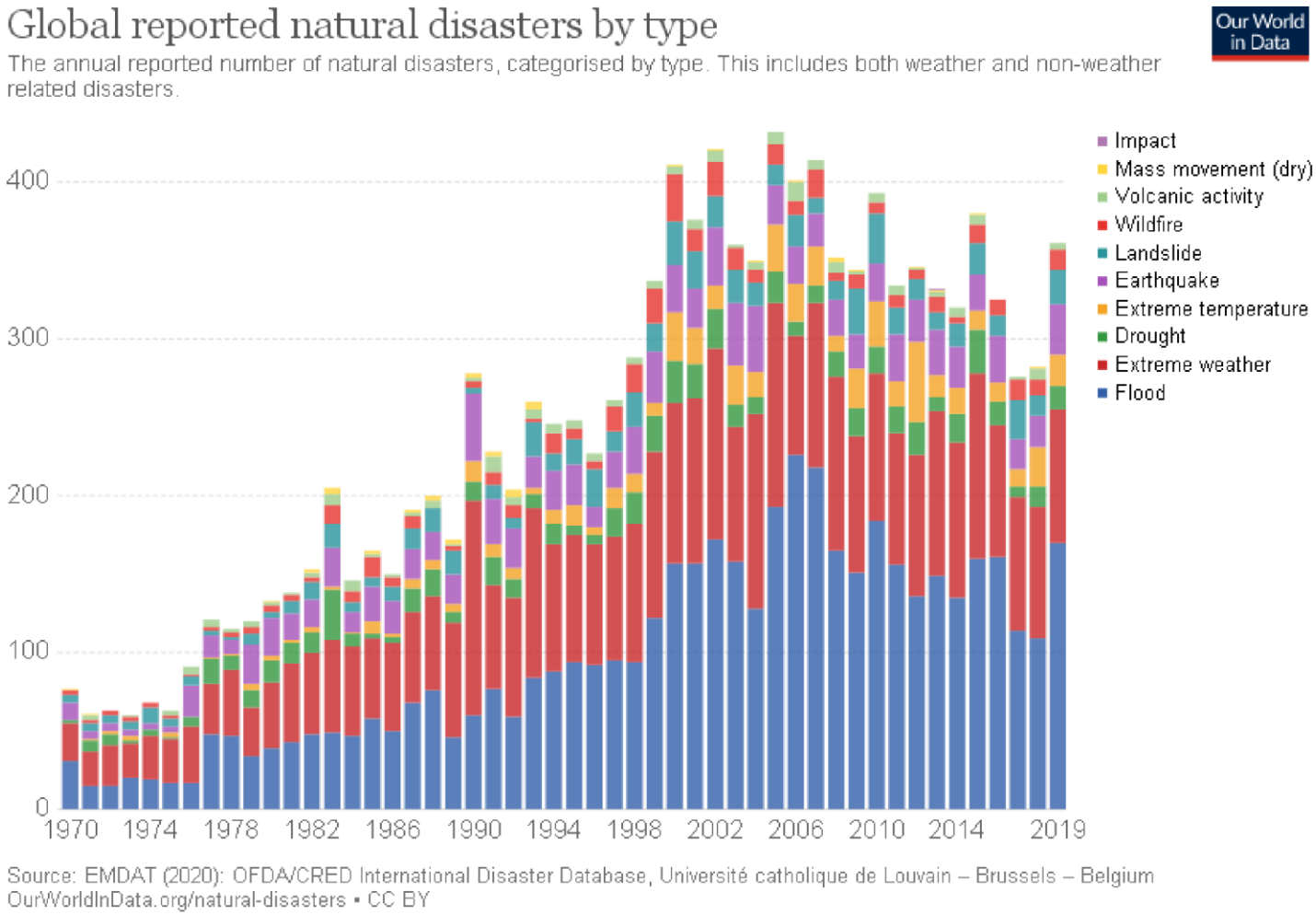
Rationale

- The indicator will build a bridge between the SDGs and the Sendai Framework for DRR and will be used to report on this indicator.
- The indicator 13.1.2 focuses on the target E of the Sendai Framework for Disaster Risk Reduction Strategies which focused to increase the number of countries with national and local disaster risk reduction strategies by 2020" will contribute to sustainable development and strengthen economic, social, health, and environmental resilience.
- The economic, environmental and social perspectives would include poverty eradication, urban resilience and climate change adaptation.
- The UN general assembly established an open-ended intergovernmental expert working group (OIEWG) which has developed a set of indicators to measure global progress.

Sendai Framework for Disaster Risk Reduction (2015–2030) is an international document which was adopted by UN member states between 14th and 18th of March 2015 at the World Conference on Disaster Risk Reduction held in Sendai, Japan and endorsed by the UN General Assembly in June 2015. It is the successor agreement to the Hyogo Framework for Action (2005–2015), which had been the most encompassing international accord to date on disaster risk reduction it of body text.

Alarming Statistics

- Over 700 thousand people have lost their lives, over 1.4 million have been injured and approximately 23 million have been made homeless as a result of disasters.
- Overall, more than 1.5 billion people have been affected by disasters in various ways, with women, children and people in vulnerable situations disproportionately affected.
- The total economic loss was more than $1.3 trillion. In addition, between 2008 and 2012, 144 million people were displaced by disasters.



General Computation Method: All the member States count the number of local governments that adopt and implement local DRR strategies in line with the national DRR (which is implemented in line with Sendai Framework for DRR) strategy and express it as a percentage of the total number of local governments in the country.

- Each Member State will calculate the ratio of the number of local governments with local DRR strategies i.e. states that have disaster management policies in line with national strategies and the total number of local governments.

- For example: - As of May 11, 2015, 22 out of 47 local governments have implemented a national resilience plan directed by the National Resilience Promotion Office, Cabinet Secretariat, Japan. For detailed information on the National Resilience Plan for Disasters refer http://www.bousai.go.jp/kaigirep/hakusho/pdf/WP2015_DM_Full_Version.pdf.

Use Case: In this section, let us understand what it means to actually implement the SDG 13.1.2 at a national and local level in India, and what are all the processes involved in it. In line with SDG 2030 and UNDRR guidelines, in 2016, India introduced its first ever disaster risk management framework based on the Sendai Disaster Risk Reduction Framework 2015.

National Disaster Management Authority (NMDA) developed the framework for the integration of numerous actions needed for strengthening disaster resilience focused on the theme Understanding Risk.

Priority 1: Understanding disaster risk, we have described some aspects as examples, to achieve the priority. To achieve this, it is important:

- To promote the collection, analysis, management and use of relevant data and practical information and ensure its dissemination
- To develop, periodically update and disseminate, as appropriate, location-based disaster risk information
- To systematically evaluate, record, share and publicly account for disaster losses and understand the economic, social, health, education, environmental and cultural heritage impacts, as appropriate, in the context of event-specific hazard-exposure and vulnerability information
- To make non-sensitive hazard-exposure, vulnerability, risk, disaster and loss-disaggregated information freely available and accessible, as appropriate;
- To strengthen technical and scientific capacity to capitalize on and consolidate existing knowledge and to develop and apply methodologies and models to assess disaster risks, vulnerabilities and exposure to all hazards;

For complete information please refer: https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

In order to understand the existing disaster risk, **in this case floods**, it imperative to assess how vulnerable is the target demographic to particular disaster. In the following example, we will elaborate how **vulnerability index** is calculated and integrated in the overall analysis to understand the existing risk in the target demographic due to flood related hazards.

What is vulnerability? The United Nations Development Programme (UNDP) defines vulnerability as: a human condition or process resulting from physical, social, economic, and environmental factors, which determine the likelihood and scale of damage from the impact of a given hazard. (UNDP, 2004, p. 11)

To see India's vulnerability and hazard profile, please visit https://www.gktoday.in/gk/disastermanagement-indias-vulnerability-and-hazard-profile/ https://ndma.gov.in/en/vulnerability-profile.html

How is Vulnerability profile calculated?

The composite vulnerability index approach was used to map the districts in India vulnerable to natural and climate-induced disasters. Vulnerability indices were calculated using data for each district in India. By aggregating the relative indices of exposure, sensitivity, and adaptive capacity.

Apart from the indicators selected for exposure, the spatial database was created for sensitivity and adaptive capacity for each district. Since each indicator was measured on different scales, dimension indices for each of the indicators for a district were calculated by normalizing the data using equations.

$$\text{Index} = \frac{X_a - X_{min}}{X_{max} - X_{min}}$$

Where, **Index** is the normalized value of an indicator, $\mathbf{X_a}$ is the actual value of the same indicator, and $\mathbf{X_{min}}$ and $\mathbf{X_{max}}$ are the minimum and maximum values, respectively, of the same indicator.

After normalizing all the indicators, each indicator of the respective element was assigned weights using the AHP. The AHP was used as a multi-criteria decision-making tool to develop priorities that best represent the respective element (exposure, sensitivity, and adaptive capacity.

Refer: https://www.tandfonline.com/doi/pdf/10.1080/19475705.2014.897656

The normalized weighted values of the indicators were added to generate the three sub-indices of exposure, sensitivity, and adaptive capacity.

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$$\text{Sub-index} = \sum_{i=1}^{n} w_i \times u_i$$

where w is the weight of each indicator, u is the value of each indicator, and n is the total number of indicators, i ¼ 1, 2, 3…, n.

$$V = \frac{[E + S + (1 - AC)]}{3}$$

To obtain the final composite vulnerability index, these sub-indices were combined using the additive (averaging) approach. This equation is for calculating the disaster vulnerability. Where V, E, S, and AC represent vulnerability, exposure, sensitivity, and adaptive capacity, respectively.

The above explained vulnerability score is just a part of the national disaster resilient score which is a composite index reflecting the ability of nations/states in line with the UN Sendai Framework for Disaster Risk Reduction. Resilience Index. It is a combination of 7 aggregate indicators of disaster resilience. (i) Risk Assessment, (ii) Risk Prevention and Mitigation, (iii) Risk Governance, (iv) Disaster Preparedness, (v) Disaster Response, (vi) Disaster Relief & Rehabilitation, (vii) Disaster Reconstruction.

Each aggregate indicator has 10 sub-indicators. The performances of the State Governments and Union Territories have been evaluated on each aggregate indicator in a scale of 50, as per the norms of evaluation, for more details refer: https://www.ndmindia.nic.in/images/gallery/scorecard1.pdf

National SDG indicator 13.1.2 score - 0.32 on a scale of 1
This score indicates that India needs to progress very much with respect to the indicator 13.1.2.

Country: **Japan**, Region: **Asia**

Japan is made up of 47 prefectures and Tokyo is one of these regional authorities. Municipalities are local public entities that have a strong and direct relationship with local residents and handle affairs directly related to the residents. As of January 1, 2015, there are 790 cities (including Designated Cities), 745 towns, and 183 villages in Japan

National SDG 13.1.2 score - 0.46 on a scale of 0 to 1

As of May 11, 2015, 22 out of 47 local governments have implemented a national resilience plan directed by the National Resilience Promotion Office, Cabinet Secretariat, Japan.

For detailed information on the National Resilience Plan for Disasters refer: http://www.bousai.go.jp/kaigirep/hakusho/pdf/WP2015_DM_Full_Version.pdf

Country: **Australia** Region: **Australia**
https://www.unisdr.org/campaign/resilientcities/assets/toolkit/Scorecard/UNDRR_Disaster%20resilience%20%20scorecard%20for%20cities_Detailed_English.pdf

Country: **Nigeria** Region: **Africa**

https://www.homeaffairs.gov.au/emergency/files/national-disaster-risk-reduction-framework.pdf

https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1920/Quick_Guides/EmergencyManagementDisasterResilience

Country: **The US** Region: **North America**
https://www.refworld.org/pdfid/5b3f84874.pdf https://reportcard.statesatrisk.org/

Country: **Brazil** Region: **South America**
https://www.preventionweb.net/files/53129_brazilbra.pdf

General concepts and definitions

What is a disaster? A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic, environmental losses and impacts.

What is a natural disaster? A natural disaster is characterized by the abnormal intensity of a natural agent (flood, mudslide, earthquake, avalanche, drought) when the usual measures to be taken to prevent this damage were not able to prevent their emergence or were not able to be taken.

What is Climate Mitigation? Climate Change Mitigation refers to efforts to reduce or prevent emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behaviour. It can be as complex as a plan for a new city, or as simple as improvements to a cook stove design. Efforts underway around the world range from high-tech subway systems to bicycling paths and walkways.

Greenhouse gases (GHG): Much like the glass of a greenhouse, gases in our atmosphere sustain life on Earth by trapping the sun's heat. These gases allow the sun's rays to pass through and warm the earth, but prevent this warmth from escaping our atmosphere into space. Without naturally-occurring, heat-trapping gases—mainly water vapour, carbon dioxide and methane—Earth would be too cold to sustain life as we know it.

Amongst the numerous greenhouse gases, three are of primary concern because they are closely associated with human activities.

- **Carbon dioxide** is the main contributor to climate change, especially through the burning of fossil fuels.

- **Methane** is produced naturally when vegetation is burned, digested or rotted without the presence of oxygen. Large amounts of methane are released by cattle farming, waste dumps, rice farming and the production of oil and gas. Oil and gas drilling and hydraulic fracturing ("fracking") operations are major sources of methane pollution, via leaks from damaged or improperly fitted equipment and intentionally vented gas.
- **Nitrous oxide**, released by chemical fertilizers and burning fossil fuels, has a global warming potential 310 times that of carbon dioxide.

Low emission of GHG Increasing greenhouse gas emissions are driving climate change. In 2017, greenhouse gas concentrations reached new highs, with globally averaged mole fractions of CO2 at 405.5 parts per million (ppm), up from 400.1 ppm in 2015, and at 146 percent of pre-industrial levels. Moving towards 2030 emission objectives compatible with the 2°C and 1.5°C pathways requires a peak to be achieved as soon as possible, followed by rapid reductions.

Climate resilience: As defined by Shaw (2012, p. 309), climate resilience is a dynamic process of "bouncing forward" (as opposed to "bouncing back to what it was"), which requires reacting to crises by moving up to a new state that is more sustainable in the current environment. So described, the resilience-building process is often called evolutionary resilience, as it entails the ability of complex human and natural systems to change, adapt and crucially transform in response to climate hazards rather than return to normality (Davoudi, 2012).

What is Disaster Risk Reduction? It is a systematic approach to identifying, assessing and reducing the risks of disaster. It aims to reduce socio-economic vulnerabilities to disaster as well as dealing with the environmental and other hazards that trigger them.

For more information regarding Disaster Risk Reduction (DRR) strategy and Target E, please refer: https://sendaimonitor.undrr.org/analytics/global-target/13/6

Concepts: DRR strategies set out goals and objectives by using specific targets and indicators in various different time frames. DRR strategies that are aimed at reducing existing disaster risks and strengthening economic and social resilience should be formulated in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.

What is the role of the Community in Strengthening their country against Disasters?

Hazard reduction policies and practices need to be integrated into the mainstream of community activities throughout the globe. This process should build on successful programmes, encourage

governmental cooperation, find new ways to implement decades of research. The result should be the widespread existence of new and expanded hazard reduction programs that are compatible with community goals.

- Risk awareness and assessment including hazard analysis and vulnerability/capacity analysis;
- Knowledge development including education, training, research and information;
- Implementing hazard mitigation policies and practices, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;
- Preparing for emergency response, recovery and reconstruction,
- Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities.

As a citizen, the responsibility of maintaining the stable ecological balance with the rapid growth in modernization, industrialization, and globalisation is of foremost importance. For every activity that poses a threat to the balance needs to be properly planned with counter measures ready at hand.

The flora and fauna of a geological region has a significant impact in controlling any natural calamity. Any discrepancies in the habitat increases impact of disaster significant number of times. With the tested simulation of practices to control the disaster's impact, such practices should be implemented and the natural habitat should be left undisturbed.

For Reference

Here we have taken a few countries to analyse how each of them have implemented a national disaster risk reduction framework with respect to floods.

Denmark - https://www.dst.dk/en/Statistik/Sdg/13-klimaindsats/delmaal-01/indikator-2#istart

USA - https://www.sdgdata.gov.au/goals/climate-action/13.1.2#metadata1

UK - https://sustainabledevelopment-uk.github.io/13-1-2/

Ghana - https://sustainabledevelopment-ghana.github.io/13-1-2/

Quantification concept the numerical concepts of SFDRR targets have been elaborated by the UNDRR expert group

https://www.preventionweb.net/documents/oiewg/Technical%20Collection%20of%20Concept%20Notes%20on%20Ind icators.pdf

Sustainable development methods in other countries, refer

US- https://sdg.data.gov/13-2-1/
UK- https://sustainabledevelopment-uk.github.io/13-2-1/
Australia - https://sdg.data.gov/13-2-1/
Denmark - https://www.dst.dk/en/Statistik/Sdg/13-klimaindsats/delmaal-02/indikator-1
Poland - https://sdg.gov.pl/en/statistics_glob/13-2-1/
Belarus - http://sdgplatform.belstat.gov.by/en/sites/belstatfront/index-info.html?indicator=13.2.1.1

Picture's source -
http://archive.boston.com/bigpicture/2008/06/chaiten_volcano_still_active.html
https://www.pinterest.com/pin/620230179924562446/