UN-SPIDER Spatial data Repository to monitor the SFDRR

Role of Earth observation in Multi–hazard disaster risk assessment and monitoring targets of the Sendai Framework” 4–8 December 2019
Disaster Management Centre (SDMC) at Gujarat Institute of Disaster Management (GIDM), India

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SFDRR 2015 - 2030

- **Adopted** at the **Third UN World Conference on Disaster Risk Reduction** (March 18, 2015)
- **Endorsed** by the **UN General Assembly (**May 15, 2015)
- 15-year, voluntary, non-binding agreement with 4 Priorities for Action and 7 Global Targets

Sendai Framework monitoring

Scope: The SFDRR applies to risk of small and large, frequent & infrequent, sudden & slow disasters caused by natural or manmade hazards across all level

Expected outcome: To substantially reduce existing disaster risk & losses in lives, livelihoods also economic, social, env, assets of persons business, community or country

Goals: Prevent and reduce existing disasters through multiple measures to prevent, reduce hazard exposure & vulnerability to disasters & increase preparedness for response & recovery. Thus strengthen resilience

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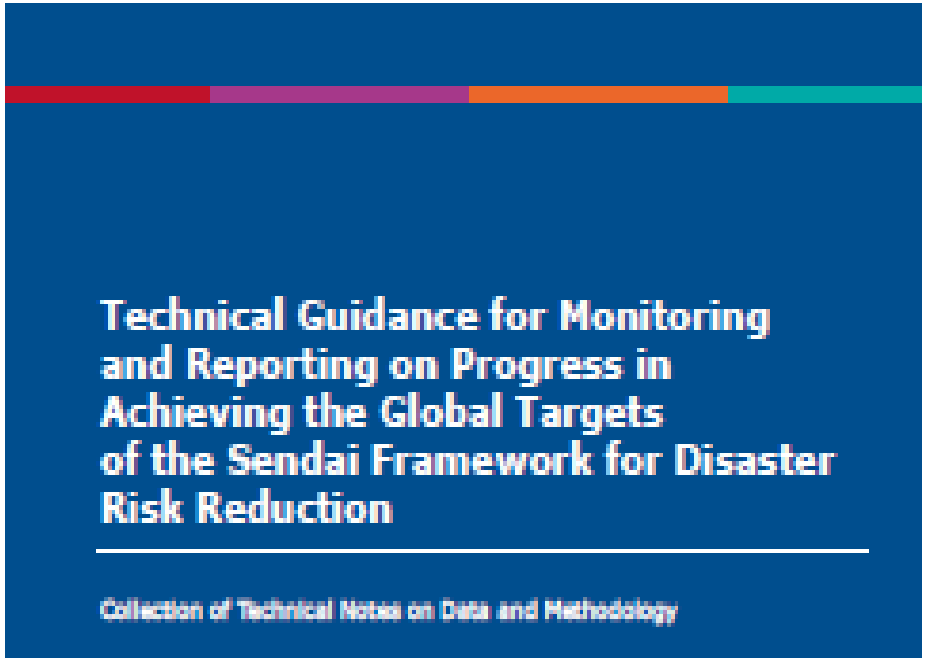

United Nations A/71/644

General Assembly

Distr.: General
1 December 2016

Original: English

Seventy-first session
Agenda item 19 (c)
Sustainable development: disaster risk reduction

Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction

UN-SPIDER
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Priorities of Action (can't be monitored)

Targets (could be monitored)

Geospatial technology application for monitoring the SFDRR 2015-2030

Space-based technologies

Geospatial technologies

Geographical Information Systems (GIS)

Remote sensed earth observation

Par: 24c, 24f, 25c, and 25g

- United Nations Statistics Division(UNSD)
- United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM)
- UNOOSA (UN-SPIDER)
- World Bank - Global Facility for Disaster Risk Reduction (GFDRR)
- Disaster Related Statistical Framework (DRSF)

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Identified SFDRR Targets which could be monitored by Geospatial information

Target B: The number of affected people

Indicators

1) B-3 People with damaged dwellings
2) B-4 People with destroyed dwellings
3) B-5 People with disrupted and destroyed livelihoods

Target C: Economic loss in relation to gross domestic product(USD-$)

Indicators

1) C-2 Direct agricultural loss
2) C-4 Economic loss in the housing sector
3) C-5 Economic loss resulting from damaged and destroyed critical infrastructure

Target D: Damage to critical infrastructure and basic services

Indicators

D-2 Destroyed and damaged health facilities

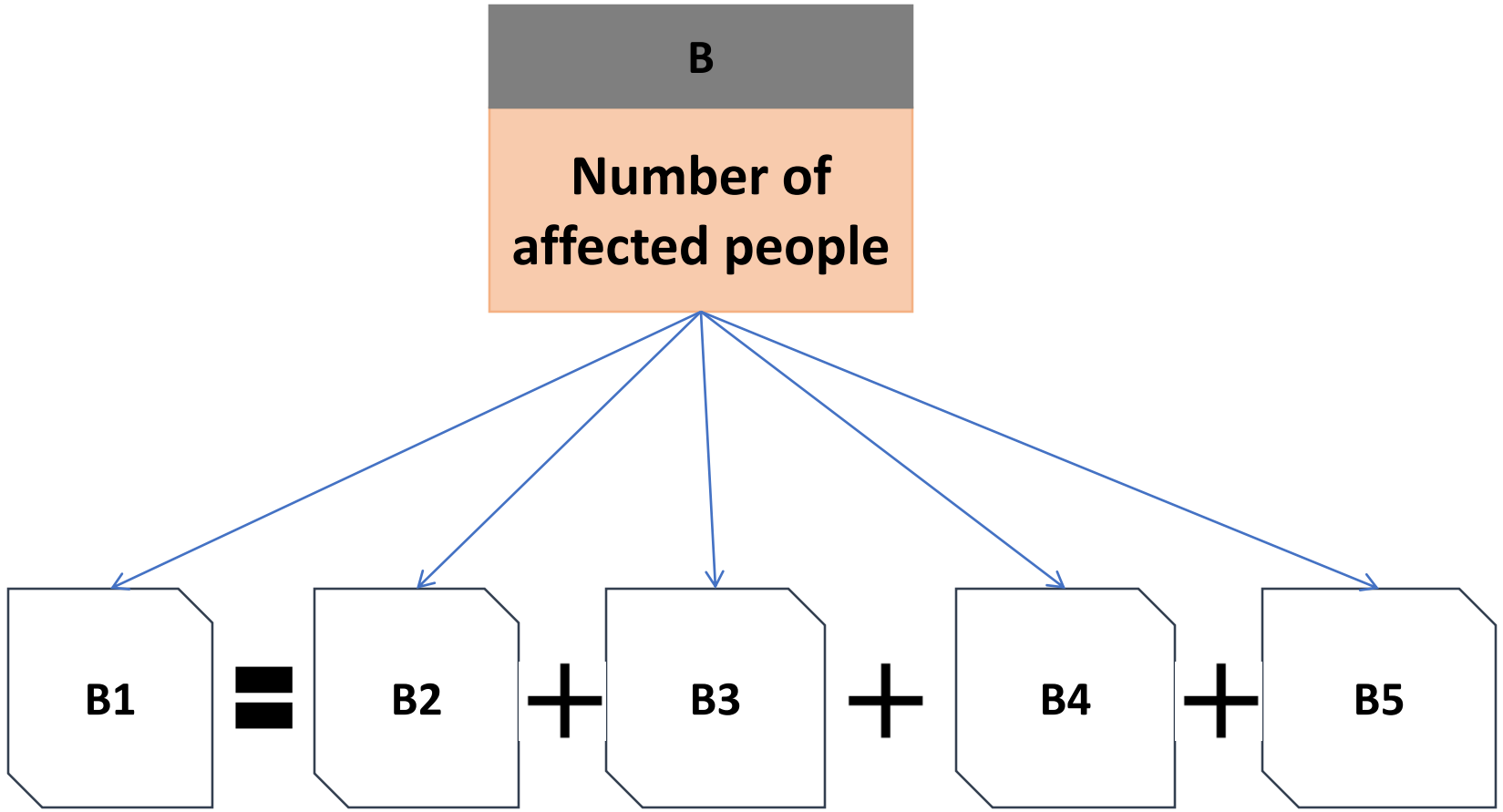
D-3 Destroyed and damaged educational facilities

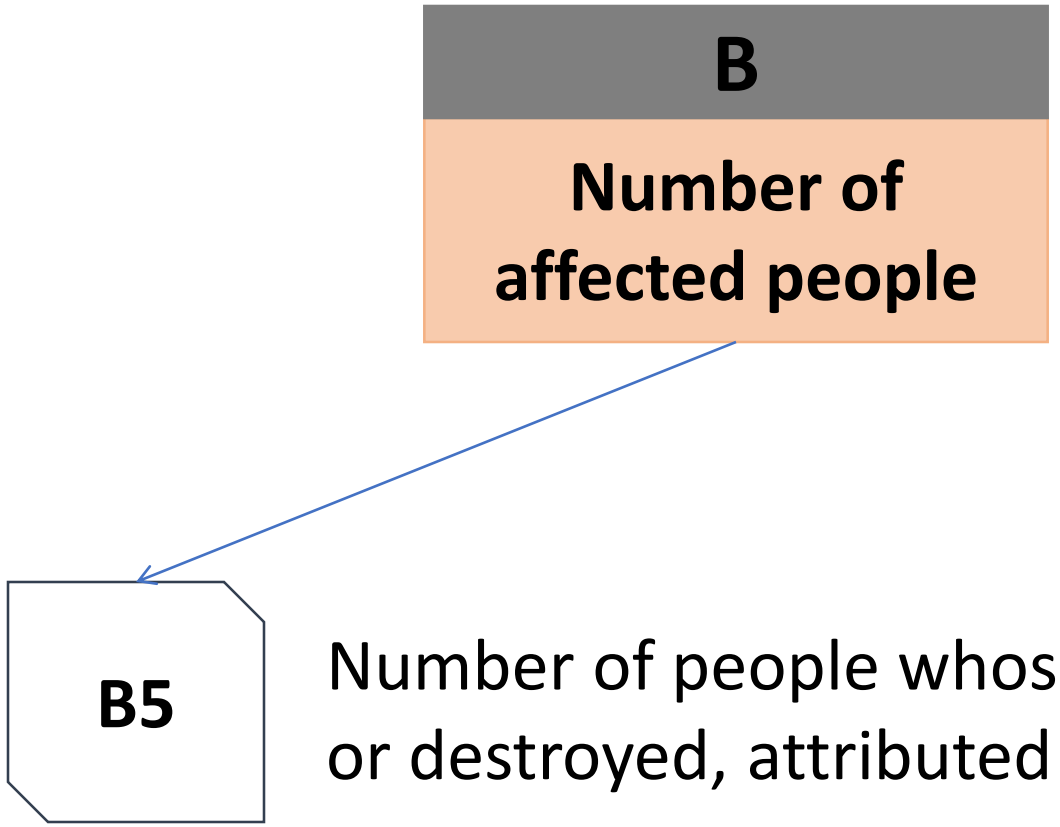
D-4 Destroyed or damaged critical infrastructure units

D-5 Disruption to basic services

38 Indicators

38 Indicators



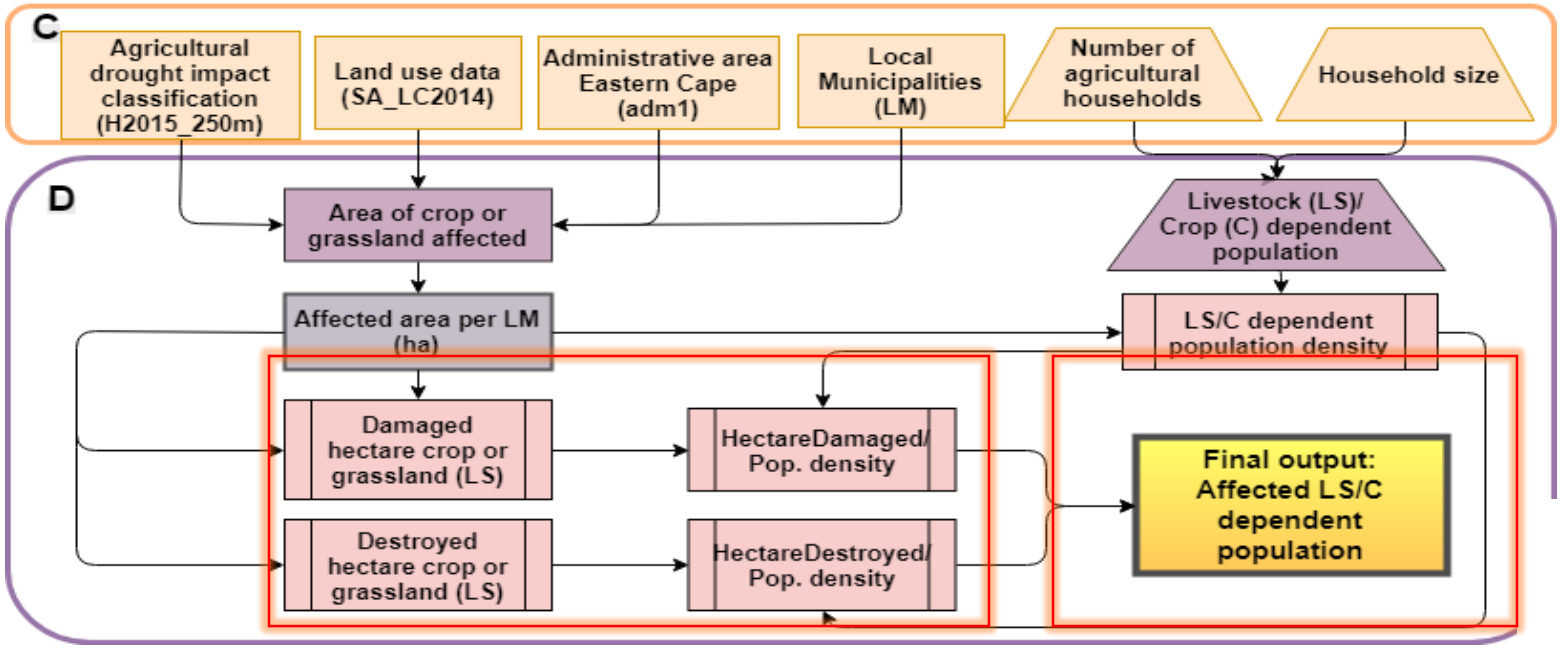


Number of people whose livelihoods were disrupted or destroyed, attributed to disasters

EvIDENz

Resources required for monitoring sub-target B5

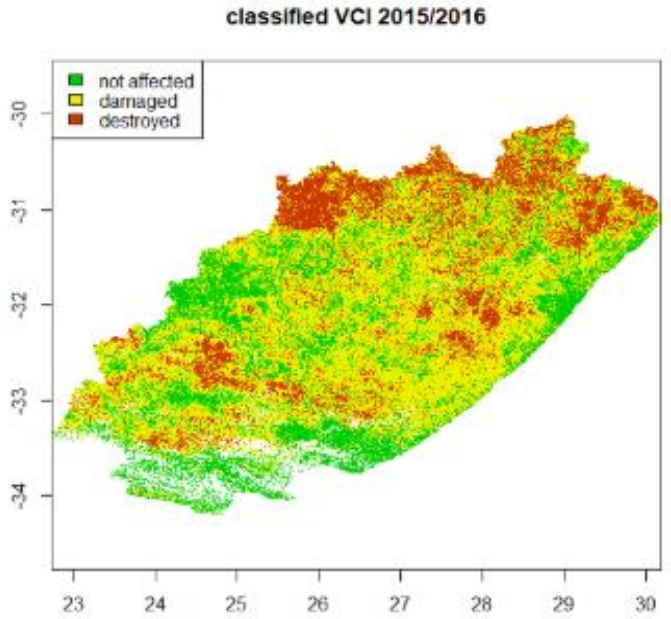
1	Agricultural drought impact map
2	Administrative border shape file of the municipality
3	Statistical data from Statistics South Africa
4	Land cover / land use maps
5	Other information…



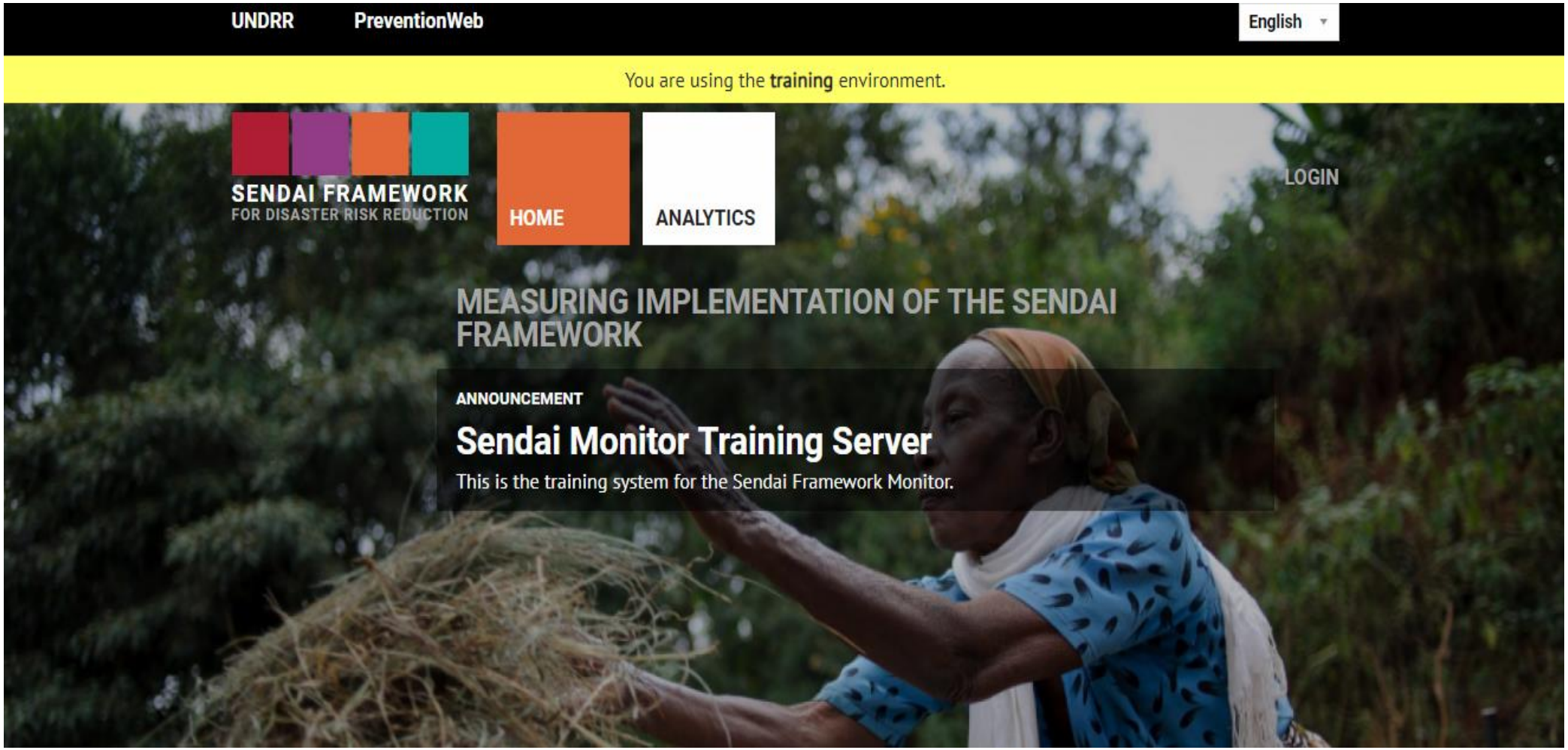
$$Affected\ crop\ dependant\ poulation\ = H1 + H2$$

$$Affected\ livestock\ dependant\ poulation\ = H1 + H2$$

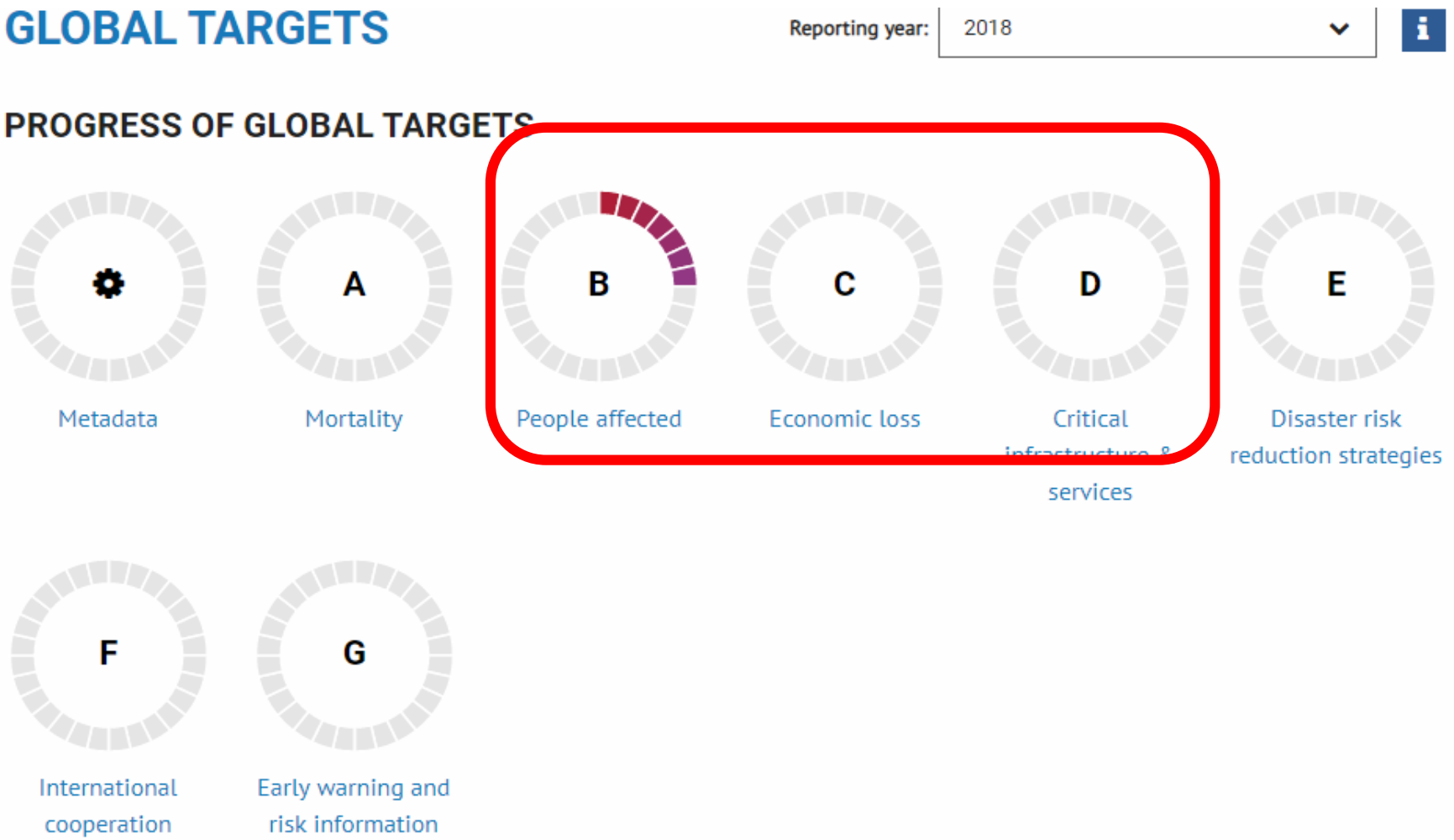
$$Affected\ poulation$$
$$= Affected\ livestock\ dependant\ poulation$$
$$+\ Affected\ crop\ dependant\ poulation$$



Sendai Monitoring



SFDRR Monitor



GLOBAL TARGETS: Reporting

- Metadata
- A Mortality
- B People affected
- C Economic loss
- D Critical infrastructure & services
- E Disaster risk reduction strategies
- F International cooperation
- G Early warning and risk information

Target B

STATUS: Ready for validation

Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2022-2030 compared to 2005-2015.

B-1 Number of directly affected people attributed to disasters, per 100,000 population

2017	2018	BASELINE: 2005-2014
		N/A

CALCULATE COMPOUND INDICATOR B-1

+ **B-2** Number of injured or ill people attributed to disasters — Ready for validation

+ **B-3** Number of people whose damaged dwellings were attributed to disasters — Not started

+ **B-4** Number of people whose destroyed dwellings were attributed to disasters — Not started

+ **B-5** Number of people whose livelihoods were disrupted or destroyed, attributed to disasters — Not started

Disaster Risk Reduction (DRR)

HAZARD **EXPOSURE** **VULNERABILITY**

Risk = f( ,  , )

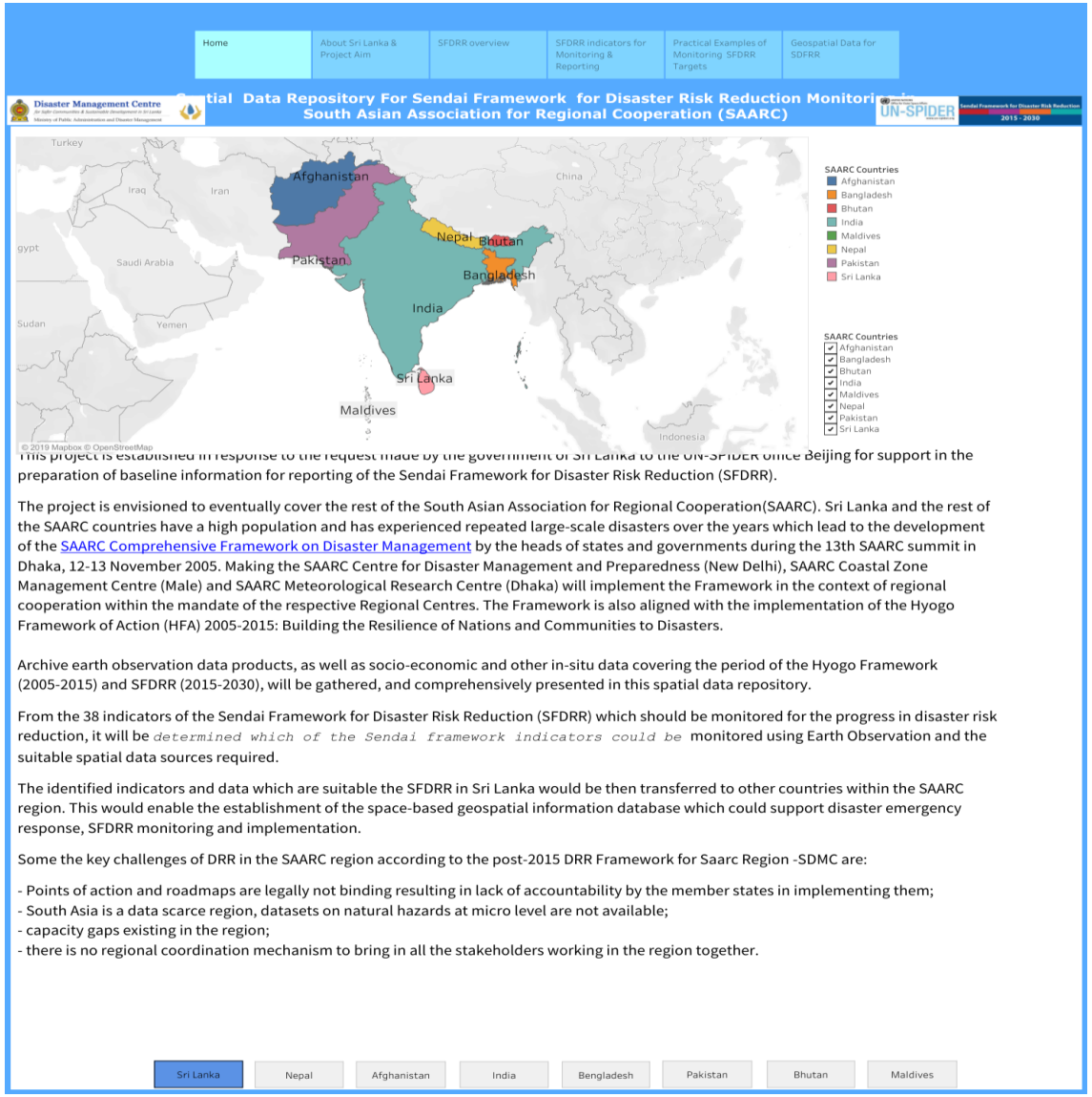
Spatial Data Repository

- An online geospatial dashboard containing possible data combination for SFDRR monitoring
- Sri Lanka as pilot country (DMC)
- To be transferred to the South Asian Association for Regional Cooperation (SAARC)

  Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka
- Corporation at SAARC level to be with the SDMC

Types of data & the Spatial repository

- Online platform
- Baseline geospatial information for reporting SFDRR
- Socio-economic data
- Other in-situ data
- Achieve of previous disasters



This project is established in response to the request made by the government of Sri Lanka to the UN-SPIDER office Beijing for support in the preparation of baseline information for reporting of the Sendai Framework for Disaster Risk Reduction (SFDRR).

The project is envisioned to eventually cover the rest of the South Asian Association for Regional Cooperation(SAARC). Sri Lanka and the rest of the SAARC countries have a high population and has experienced repeated large-scale disasters over the years which lead to the development of the SAARC Comprehensive Framework on Disaster Management by the heads of states and governments during the 13th SAARC summit in Dhaka, 12-13 November 2005. Making the SAARC Centre for Disaster Management and Preparedness (New Delhi), SAARC Coastal Zone Management Centre (Male) and SAARC Meteorological Research Centre (Dhaka) will implement the Framework in the context of regional cooperation within the mandate of the respective Regional Centres. The Framework is also aligned with the implementation of the Hyogo Framework of Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters.

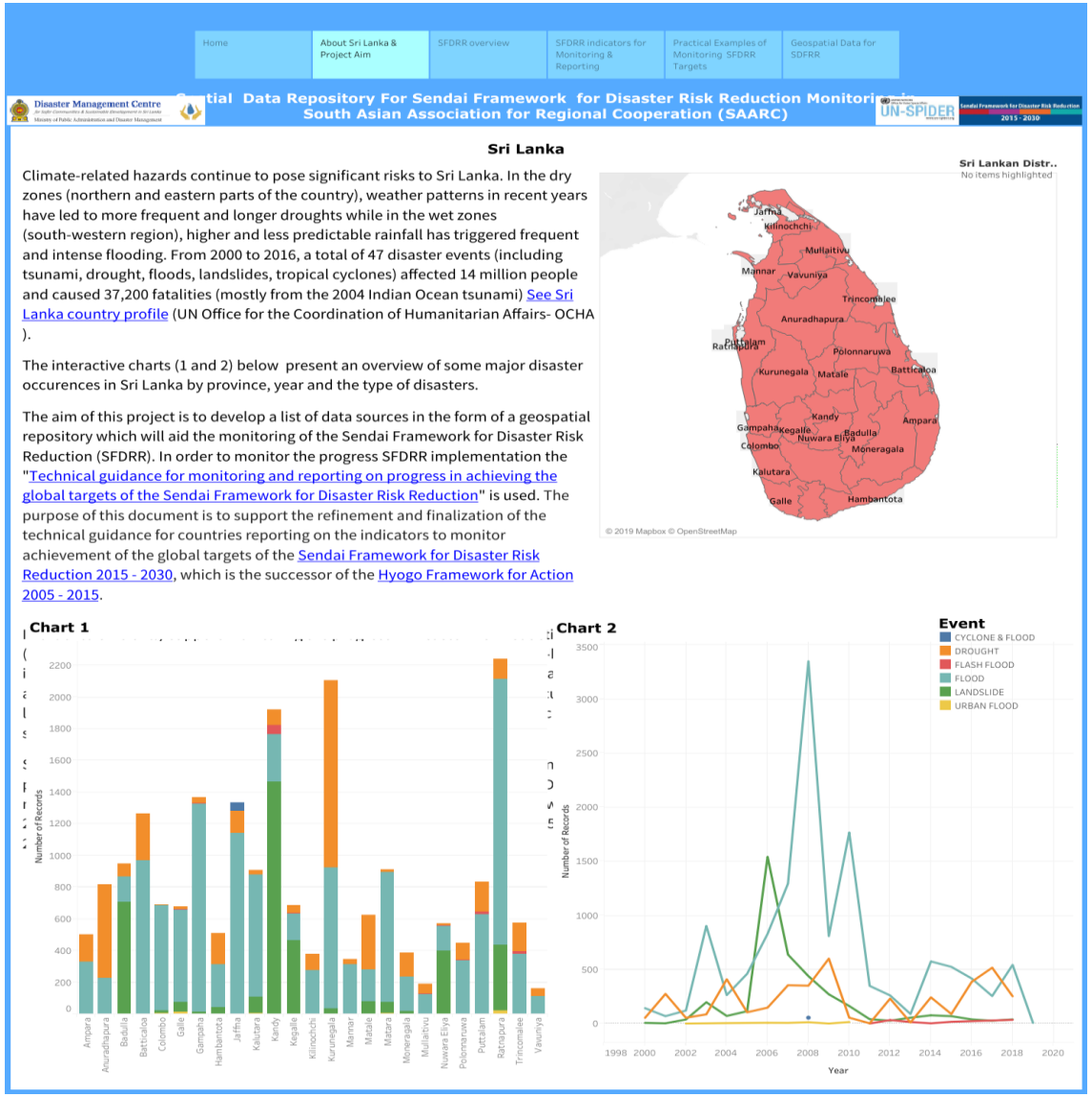
Archive earth observation data products, as well as socio-economic and other in-situ data covering the period of the Hyogo Framework (2005-2015) and SFDRR (2015-2030), will be gathered, and comprehensively presented in this spatial data repository.

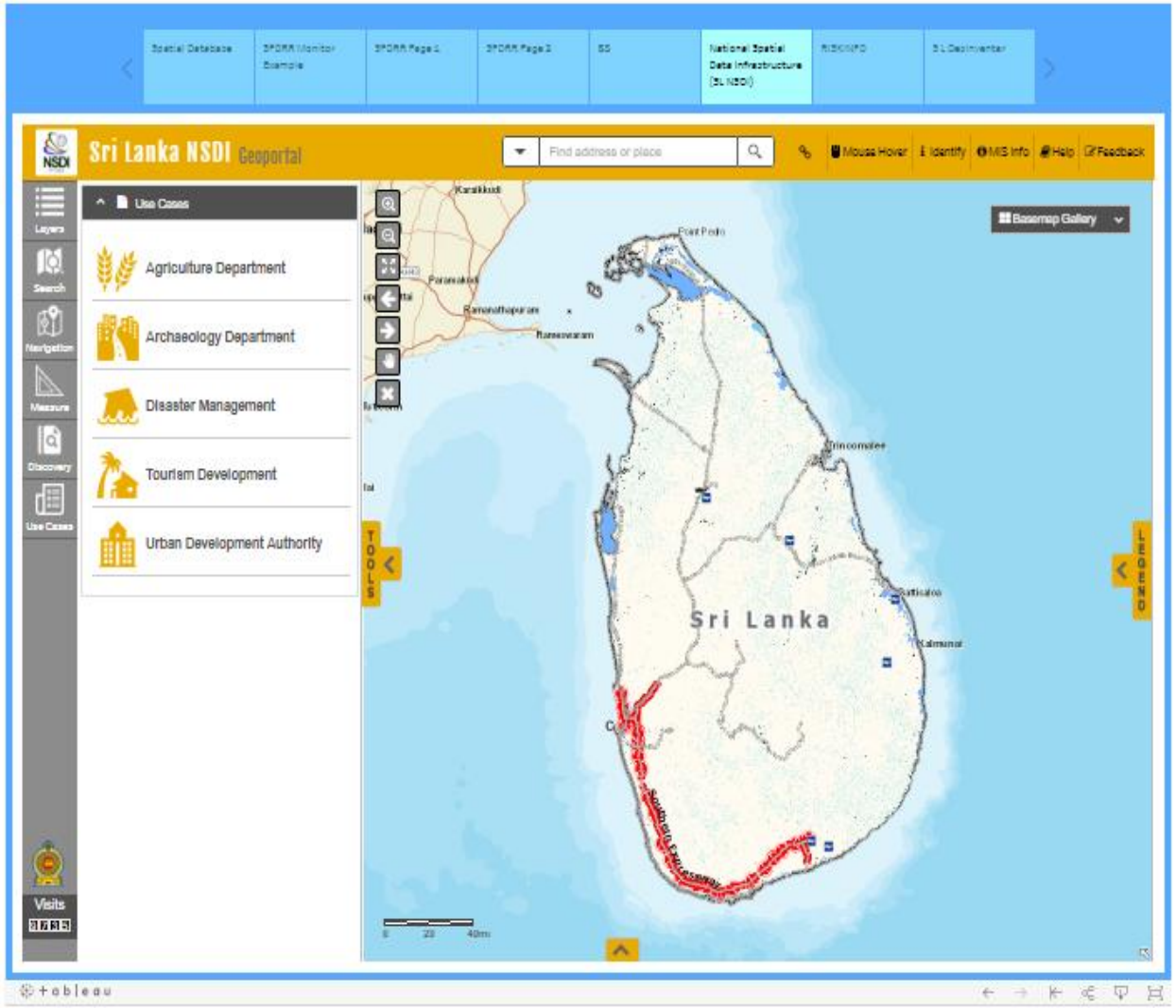
From the 38 indicators of the Sendai Framework for Disaster Risk Reduction (SFDRR) which should be monitored for the progress in disaster risk reduction, it will be *determined which of the Sendai framework indicators could be* monitored using Earth Observation and the suitable spatial data sources required.

The identified indicators and data which are suitable the SFDRR in Sri Lanka would be then transferred to other countries within the SAARC region. This would enable the establishment of the space-based geospatial information database which could support disaster emergency response, SFDRR monitoring and implementation.

Some the key challenges of DRR in the SAARC region according to the post-2015 DRR Framework for Saarc Region -SDMC are:

- Points of action and roadmaps are legally not binding resulting in lack of accountability by the member states in implementing them;
- South Asia is a data scarce region, datasets on natural hazards at micro level are not available;
- capacity gaps existing in the region;
- there is no regional coordination mechanism to bring in all the stakeholders working in the region together.





Spatial Data Repository For Sendai Framework for Disaster Risk Reduction Monitoring in South Asian Association for Regional Cooperation (SAARC)

Click to get back to menu: Practical Examples of Monitoring SFDRR Targets

Target C

The third target only has one element – a ratio of the global direct economic loss per global GDP.

At present the average annual loss as per the GAR 2015 is about USD 250 billion. According to the Figure 2 below, direct economic losses have increased by 230% from 1990 to 2011. This means that by 2030, it is possible that unchecked, economic losses can reach USD 750 billion.

Table 2: Global GDP and Total Economic Loss for 2014 and 2030. Source: Present global GDP: World Bank. Projected 2030 GDP: Oxford Economic Forecasting. Economic losses from GAR 2015 and AIR Worldwide, 2015

Year	Global GDP	Total economic loss	Economic loss per global GDP
2014	75'621'900'000'000	250'000'000'000	3.30592E-05
2030	122'771'000'000'000	750'000'000'000	6.10896E-05

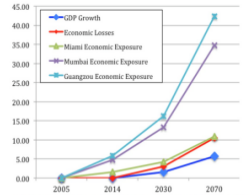


Figure 3: Rate of GDP growth as compared to the growth of economic losses and growth of economic exposure of Miami USA, Mumbai India and Guangzhou China, graph by Jerry Velasquez based on GAR data

Global target C: Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030.

C-1 (compound)	Direct economic loss attributed to disasters in relation to global gross domestic product.
C-2	Direct agricultural loss attributed to disasters. *Agriculture is understood to include the crops, livestock, fisheries, apiculture, aquaculture and forest sectors as well as associated facilities and infrastructure.*
C-3	Direct economic loss to all other damaged or destroyed productive assets attributed to disasters. *Productive assets would be disaggregated by economic sector, including services, according to standard international classifications. Countries would report against those economic sectors relevant to their economies. This would be described in the associated metadata.*
C-4	Direct economic loss in the housing sector attributed to disasters. *Data would be disaggregated according to damaged and destroyed dwellings.*
C-5	Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters. *The decision regarding those elements of critical infrastructure to be included in the calculation will be left to the Member States and described in the accompanying metadata. Protective infrastructure and green infrastructure should be included where relevant.*
C-6	Direct economic loss to cultural heritage damaged or destroyed attributed to disasters.

A comparison of the present and projected global gross domestic Production (GDP) in 2030 can be seen in Table 2 above. Note that direct economic loss data varies for different countries and usually it is not openly available but if a country intends to monitor the progress of the SFDRR Taget C, then the the country total GDP and total economic loss per GDP needs to be computed.

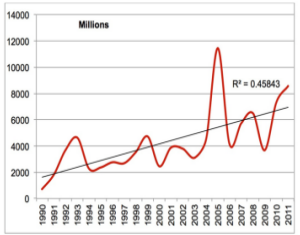


Figure 2: Direct Economic losses for 81 countries sample - USD of 2011. Source: Julio Serje, UNISDR, 2015

However, using total economic losses for this exercise, this would mean that to meet the Sendai Framework global target, either the "global GDP increase" should be doubled by 2030, effectively quadrupling the present GDP, or the projected increase in losses (USD 500 billion) is halved by 2030. Both of these requirements are very ambitious. The first condition is highly unlikely. The second condition may be possible, but extremely difficult.

One of the key drivers of the increasing economic losses is the increase in economic exposure of assets to hazards. Economic and urban growth, natural and artificial subsidence, sea level rise and climate change will likely contribute to increasing this exposure dramatically, particularly in low and middle-income countries. ..

C2: Direct agricultural loss attributed to disasters

This indicator is calculated based on five sub-indicators:

- C2(C): Impact to crops
- C2(L): Impact to livestock (and apiculture)
- C2(FO): Impact to forestry
- C2(AQ): Impact to aquaculture
- C2(FI): Impact to fisheries

$$\textbf{\textit{Impact to Agriculture}}: \boldsymbol{C2} = C2(C) + C2(L) + C2(FO) + C2(AQ) + C2(FI)$$

Material impacts to Agriculture

C-2 Summary of material impacts to Agricultrue by hazards types

Measurement units: see column at right

		Hazard types						Geospatial Data Required							
		Geo-physical (Landslide)	Hydrological (floods,Flash floods, Urban floods)	Meteorological & Climatological (Drought)	Other	TOTAL	Measurement units	Department of Cencus and Statistics (DCS)	Survey Department (LULC)	International water management Institute (IWMI)	Conservation of the Coastal Zone and Management of Sustainable Coastal	Ministry of Fisheries and Aquatic Resources Development	National Building Research Organisation (NBRO)	National Water Supply and Drainage Board (NWSDB)	National Aquatic Resources Research and Development (NARA)
1-Crops															
1,1	Area affected by crop type	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai C-2	hectares		■	■			■		
1.2	Stored produce destroyed	Sendai C-2C	Sendai C-2C	Sendai C-2C	Sendai C-2C	Sendai C-2C	tonnes								
1.3	Strored inputs destroyed	Sendai C-2C	Sendai C-2C	Sendai C-2C	Sendai C-2C	Sendai C-2C	tonnes								
1,4	Equipment/machinery destroyed	Sendai C-2C	Sendai C-2C	Sendai C-2C	Sendai C-2C	Sendai C-2C	units								
1.5	Discounted yield value of perrenial trees until replanting						currency	■							
1.6	Post-diaster short-run maintenance costs						currency	■							
2-Livestock		SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai C-2									
2,1	Number of animals killed	Sendai C-2L	Sendai C-2L	Sendai C-2L	Sendai C-2L	Sendai C-2L	animals								
2,2	Strored products, feed and fodder destroyed	Sendai C-2L	Sendai C-2L	Sendai C-2L	Sendai C-2L	Sendai C-2L	tonnes								
2,3	Equipment/machinery destroyed	Sendai C-2L	Sendai C-2L	Sendai C-2L	Sendai C-2L	Sendai C-2L	units								
2,4	Discounted value of livestock products from dead animals until full recovery						currency								
2,5	Post-diaster short-run maintenance costs						currency								
3-Forestry		SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai C-2									
3,1	Area damaged or destroyed	Sendai C-2Fo	Sendai C-2Fo	Sendai C-2Fo	Sendai C-2Fo	Sendai C-2Fo	hectares		■				■		
3,2	Stored wood volume destroyed	Sendai C-2Fo	Sendai C-2Fo	Sendai C-2Fo	Sendai C-2Fo	Sendai C-2Fo	tonnes								
4-Aquaculture		SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai	SDG 1.5.2, Sendai C-2	currency	■							
4,1	Production from land-based ponds	Sendai C-2A	Sendai C-2A	Sendai C-2A	Sendai C-2A	Sendai C-2A	tonnes					■			■
4.2	Production from water based cages and	Sendai C-2A	Sendai C-2A	Sendai C-2A	Sendai C-2A	Sendai C-2A	tonnes					■			■
4.3	Stored production lost	Sendai C-2A	Sendai C-2A	Sendai C-2A	Sendai C-2A	Sendai C-2A	tonnes					■			■
4.4	Facilities destroyed						units					■			■

UNDRR DesInventar

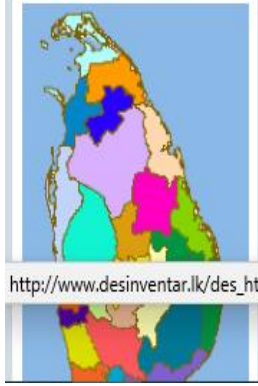
Disaster Information Management System - SRI LANKA

WELCOME to Disaster Information Management System in Sri Lanka

ABOUT US

- What is Disaster Information Management System
- Data Sources
- Data Collection Process
- Data Validation
- Disaster Definitions
- Incident Reporting Formats
- User Manual
- Training and Awareness

DISTRICTS PROFILES



http://www.desinventar.lk/des_html/what_disas_info/what_des.html

Welcome to .....

The Disaster Management Centre (DMC) of the Ministry of Disaster Management with technical and financial support from the Disaster Risk Management (DRM) programme of the United Nations Development Programme (UNDP) and the UNDP Regional Centre in Bangkok (RCB) has initiated the development of a database on the past disaster incidents from 1974 to date.
The Disaster Information Management System is a sustainable arrangement within an institution for the systematic collection, documentation and analysis of data about losses caused by natural and man maid disasters

Please click on Following Link to Enter in to the Database:

This querying system will provide you with basic data about the effects of many types of natural

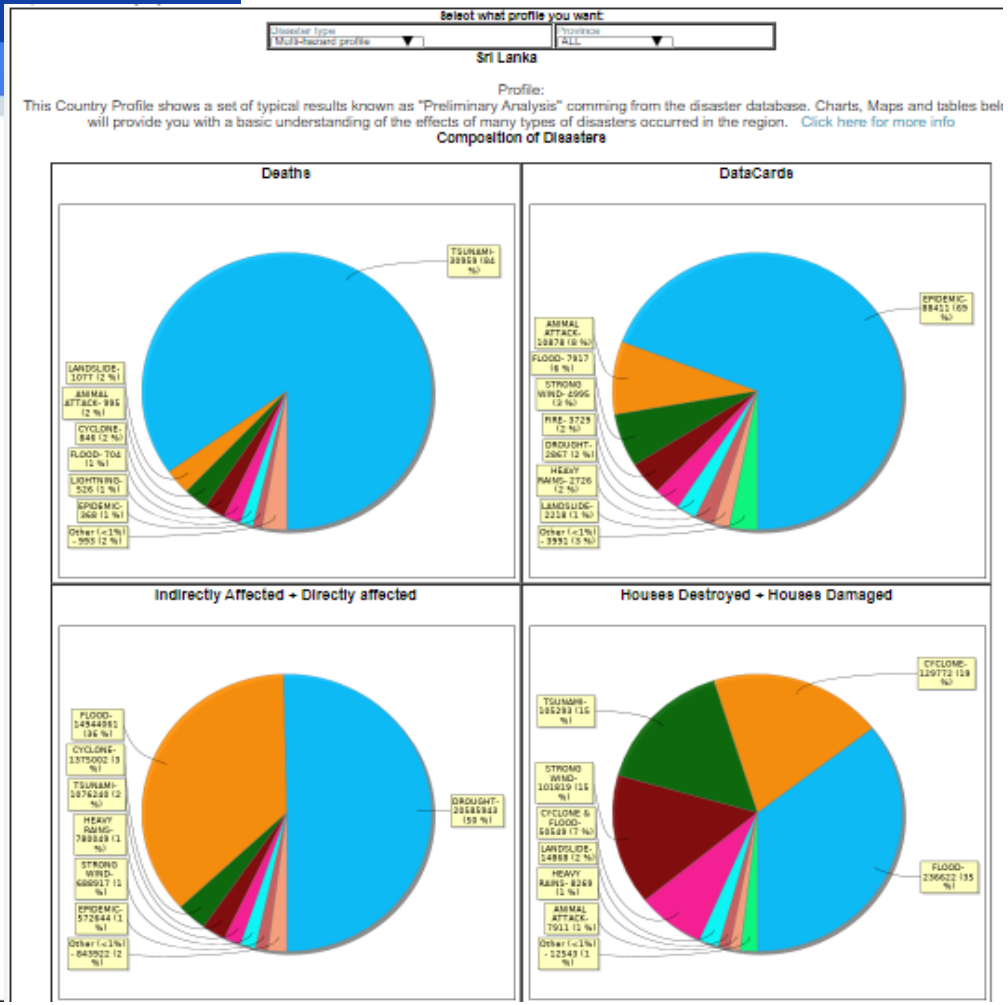
RECENT DISASTERS

May 2017,
Flood

Heavy rains were received on 25 of May to the South-western watersheds in the country. Large amount of rains were received within 12 hours in SW regions including Namunuthanna (619mm) of, Bulathsinghela(419mm),Morawaka (406mm) and Walasmulla (437mm) leading riverine floods of the Kalu, Nilwala and Gin rivers. Around 717,622 People were affected in 15 Districts. 212 Deaths reported as per the situation report issued by DMC on 04-06-2017 1800hrs. Further, over 2,313 houses fully destroyed and around 12,529 houses partially damage.

March 2017,
Drought

Nearly 951,597 people in several districts have been affected by the prevailing drought. 95,334 people in Eastern Province, 428,181 people in Northern Province 133,198 people in North Western Province, 101,498 people in Sabaragamuwa Province, 7660 people in North Central Province, and 185,726 people in western province are facing a water shortage due to the drought in Sri Lanka.



RiskInfo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Disaster Risk
Information Platform
A public platform for GIS Data
to support development in Sri Lanka
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Advanced Search
Discover the available datasets.

Stakeholders and partners

- Government of Sri Lanka (ministry)
- Disaster Management Centre(DMC)
- International water management institute (IWMI)
- South Asian Association for Regional Cooperation (SAARC)
- UN-SPIDER

Event	Date
Sri Lanka TAM	17-21Oct, 2011
Follow up UN-SPIDER Training	Aug 2012
TAM follow up	Nov 2014
TAM on recommended Step by step drought & flood monitoring	24-27 April, 2017
Sri Lanka TAM follow up	22-30 Mar, 2018
UN-SPIDER TAM follow up & SFDRR monitoring	August 2019


DISASTER MANAGEMENT
CENTER SRI LANKA
DMC MEDIA UNIT


Targets (could be monitored)
Reduce
Increase
UN-SPIDER
DMC MEDIA UNIT


DISASTER MANAGEMENT
CENTER SRI LANKA
DMC MEDIA UNIT


Thank you
UN-SPIDER
DISASTER MANAGEMENT
CENTER SRI LANKA
DMC MEDIA UNIT

Institutes providing disaster Specific Spatial data in Sri Lanka

Disaster and Sector information	**Department/Institutes Responsible**
Droughts	International water management institute (IWMI)
Floods	Disaster management Centre (DMC), IWMI, CCMD
Landslides	National Building research organization(NBRO)
Tsunami information & early warning	Meteorological department
Aquatic resources and fisheries data	National aquatic resources and research department(NARA),Marine Environment Protection (MEPA)
Coastal Erosion	Department of coastal conservation (CCMD)
Economic losses	Department of census and statistics
Additional Spatial data and in-situ information	National Spatial Data Infrastructure (NSDI)

Evaluation Framework

LINKED OBJECTIVES	Success measure	Verification	Risks and assumptions
Goals: Develop a spatial data repository implementation of SFDRR in Sri Lanka	The spatial data repository will support the implementation of SFDRR	SFDRR monitor records using geospatial information	SFDRR does not change or get modified
Purpose: monitor the progress in DRR	Promoting the use of space info	Increase in geo data use for SFDRR	Spatial data will continue to be available
Outcomes: Spatially monitored SFDRR indicators (B, C, D)			Cooperation of the stakeholders concerning the use of geospatial
Inputs: Spatial data mining ...			

Challenges of the Use of Geospatial information for the SFDRR monitoring

- Discontinuity of geospatial data by data providers.
- Unavailability of resources for the awareness raising among disaster managers.
- Difficulties due to trans-boundary cooperation of regional partners in the use of geospatial data for disaster emergency response (SAARC).
- Finding suitable methodologies for the accurate SFDRR monitoring

Thank you