Space technologies for early warning in the post-2015 development agenda

JUAN CARLOS VILLAGRAN, Head, UN-SPIDER Bonn Office, UN-SPIDER Programme
United Nations Office for Outer Space Affairs
United Nations Office at Vienna
www.unoosa.org
UN-SPIDER: Mission statement

„Ensure that all countries have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle.“

General Assembly Resolution 61/110 (2006)
The UN-SPIDER Knowledge Portal is a web-based tool for information, communication and process support.

UN-SPIDER fosters alliances and creates forums where both space and disaster management communities can meet.

UN-SPIDER facilitates capacity building and institutional strengthening, including the development of curricula and an e-learning platform (e-SPIDER).

UN-SPIDER provides support to countries in assessing national capacity and in evaluating disaster and risk reduction activities, policies and plans.

and many more...
Network of Regional Support Offices (RSOs)
2015: New goals for sustainable development

- March: Sendai Framework for Disaster Risk Reduction
- September: Sustainable Development Goals
- December: New climate change agreement
14-18 March 2015
Third UN World Conference on Disaster Risk Reduction

187 Member States met in Sendai, Japan to agree on a new global framework for disaster risk reduction for the period 2015-2030
Added value of EO for DRR

- **cost savings** based on reliable risk information that relies in particular on Earth observations.

- The **combinations of satellite EO data with other sources of data** improve the quality of the information provided to end users, including decision-makers.

- Satellite EO offers the **consistent coverage and scope to provide a synoptic overview** of large areas, repeated regularly.

- Satellite EO can be used to **compare risk across** different countries and time scales.

- EO data can be used to **represent complex dynamics and processes** through detailed, unbiased and up-to-date risk maps and models.

- Satellite data offers a **unique means to monitor the progress of the implementation of the post-2015 Framework** for Disaster Risk Reduction, using globally comparable metrics.
**Priority 1: Understanding disaster risk**

**National and local levels**

24(c) Develop, update periodically and disseminate, as appropriate, location-based disaster risk information, including risk maps, to decision makers, the general public and communities at risk to disaster in an appropriate format by using, as applicable, geospatial information technology;

24(f) Promote real-time access to reliable data, make use of space and in situ information, including geographic information systems (GIS), and use information and communications technology innovations to enhance measurement tools and the collection, analysis and dissemination of data;

**Global and regional levels**

25(c) Promote and enhance, through international cooperation, including technology transfer, access to and the sharing and use of non-sensitive data, information, as appropriate, communications and geospatial and space-based technologies and related services. Maintain and strengthen in situ and remotely-sensed earth and climate observations. […]

25(g) […] disseminate risk information with the best use of geospatial information technology; […]
Global partnership for Earth Observation
Global partnership: Voluntary commitments

- **Continue facilitating the dialogue among stakeholders** in EO, satellite-based technologies and the global community of DRR experts and policy makers;

- **Serve as a collective source and repository of information** on efforts carried out worldwide by the EO and the satellite-based technology communities, including surveys and guidelines to improve the applications of existing and emerging technology to monitor hazards, exposure and risks;

- **Generate policy-relevant advice** to contribute to the integration of EO and satellite-based technologies into development process and public policies relevant to DRR;

- **Facilitate the use of EO and related satellite-based technology** to monitor progress in the implementation of the post-2015 framework for DRR.
International Network on Multi-Hazard Early Warning (IN-MHEWS)
Aims of IN MHEWS

- Identify effective strategies and actions to promote and strengthen MHEWS in support of the implementation of the Sendai Framework (e.g. Words into Action guides), the UN Plan of Action on DRR for Resilience, GFCS, etc;

- Facilitate sharing of good practices and making available to governments and key stakeholders policy-relevant guidance to enhance MHEWS and related services, as an integral component of their national strategies for DRR, climate change adaptation, and resilience/sustainable development strategies;

- Promote synergies and partnerships between and among stakeholders at national, regional and international levels and those in charge of MHEWS at national and local levels and strengthening of user-interface platforms;

- Advocate usefulness of MHEWS in regional and international platforms and among key stakeholders, including donors, and across all sectors.
Drought Early Warning Efforts

Promoting the use of space-based products and geospatial information in drought early warning systems

Incorporating / enacting / strengthening national drought policies
A bit of history

- Central American countries have been experiencing more frequent and intense droughts (1997/98; 2000/01; 2009/10; 2014/15).

- El Niño events worsen droughts, but not all droughts behave the same way when there is an El Niño event.

- Some droughts manifest themselves when there is a significant temperature difference between the Pacific Ocean and the Caribbean sea (2009/10).

- A specific region has been identified to be more prone to droughts, called the “Central American Dry Corridor”

- Dominican Republic also started experiencing severe droughts in 2015.
Central American Dry Corridor
Project to Strengthen National Drought Early Warning Systems (SEWS-D)
The SEWS-D project aims:

- To strengthen national drought policies based on the principles of integral risk reduction and to enhance the capacity of ministries and meteorological observatories to generate and make use of space-based information on a permanent basis as a way to improve the routine operation of DEWS;

- To encourage the elaboration of geospatial products by inter-institutional, intergovernmental technical teams;

- To contribute to the efforts conducted by regional and international organizations, as well as by governments and stakeholders in this region regarding drought early warning.
Specific details

• Targeting Dominican Republic, El Salvador, Honduras and Guatemala;

• Promoting inter-institutional, technical teams as generators of relevant information for drought and other events triggered by different types of hazards;

• Promoting the use of space-based drought indexes such as the NDVI and the EVI in parallel with rainfall and weather data;

• Promoting the use of archived and up-to-date drought info (Vegetation Condition Index, Vegetation Health Index - ASIS of FAO. Similar to the Standard Precipitation Index;

• Introducing a visualization system that enables decision makers to view info on precipitation and weather (hazard), vegetation, soil types, socio-economic data (vulnerability) and other relevant info (presence of El Niño events, historic responses to droughts, other external factors).
Vegetation Condition Index

Comparison of the VCI for 4 different years using MODIS Composite Products (16 day EVI and NDVI products)

<table>
<thead>
<tr>
<th>Year</th>
<th>Day 129</th>
<th>Day 273</th>
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<tbody>
<tr>
<td>2001</td>
<td><img src="" alt="Image" /></td>
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<tr>
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<tr>
<td>2014</td>
<td><img src="" alt="Image" /></td>
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</table>
Example of the VCI in the Limpopo basin in South Africa.
Comparison of the SPI3 vs VCI(EVI) in different areas of the Limpopo basin
Comparison of VCI(EVI) drought and literature drought for whole Limpopo Basin

<table>
<thead>
<tr>
<th>Average Monthly VCI(EVI) Value</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35</td>
<td>Severe drought</td>
</tr>
<tr>
<td>&lt; 45</td>
<td>Moderate drought</td>
</tr>
<tr>
<td>45 - 55</td>
<td>Normal</td>
</tr>
<tr>
<td>&gt; 55</td>
<td>Wet</td>
</tr>
<tr>
<td>&gt; 65</td>
<td>Very wet</td>
</tr>
</tbody>
</table>
Thank You

Juan Carlos Villagran de Leon
Head, UN-SPIDER Bonn Office
United Nations Office for Outer Space Affairs
UN Campus, Bonn, Germany