



## NEWSLETTER

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### In Focus

## UN-SPIDER's Engagement in Promoting Science and Technology in the Implementation of the Sendai Framework

At the ground-breaking Third United Nations World Conference on Disaster Risk Reduction in Sendai in March 2015, the United Nations Office for Outer Space Affairs (UNOOSA) took a lead in organising a working session on "Earth Observation and High Technology to Reduce Risks". The session focused on the role of Earth observation and other technologies in supporting the Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) and contributed to the incorporation of relevant texts into the Sendai Framework.

Since then, UNOOSA, through its Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), has been engaged with the community that promotes science and technology for Disaster Risk Reduction (DRR). UNOOSA participated in and contributed to a number of events



**Cyclone Debbie captured by Copernicus Sentinel-3A satellite's Ocean and Land Colour Instrument as it struck eastern Australia on 27 March. (© ESA, CC BY-SA 3.0 IGO)**

aimed at supporting the implementation of the Sendai Framework, for instance the UNISDR Science and Technology Conference on Disaster Risk Reduction held in Geneva. The Conference formulated a Science and Technology Roadmap, which outlines the expected outcomes and actions required from the science and technology community to contribute to the delivery of the four Priorities of Action of the Sendai Framework.

Science and technology, including Earth observation, provide critical inputs for disaster risk reduction - not only at international, national and regional levels, but also at the local level. UNOOSA, through its UN-SPIDER programme, is committed to promoting integrated applications of space technologies for implementation of the Sendai Framework.

UN-SPIDER is working on making science and technology outcomes usable for developing countries by, for

instance, publishing recommended practices, links and resources and the Space application segments on the UN-SPIDER Knowledge Portal. Under the EVIDEnZ project, UN-SPIDER engages in applied research on Earth observation-based information products for drought risk on a national basis. The project develops approaches to contribute to the assessment of Sendai Framework global targets and indicators related to drought. The approaches have been piloted in the Republic of South Africa and Ukraine.

UN-SPIDER will be participating in the Science and Technology working session during the Global Platform on Disaster Risk Reduction, which takes place 22-26 May 2017 in Cancun Mexico. The session focuses on the contribution of science and technology to achieving the 2020 Sendai target on national and sub-national DRR strategies.

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# International Network on Multi-Hazard Early Warning Systems (IN-MHEWS)



Flood in Dresden, Germany, in 2006 (© UNOOSA)

In recent decades, government agencies have implemented early warning systems as a way to reduce the impacts of natural hazards of different types. Implemented along with other disaster risk reduction measures, these systems help reduce the number of people killed or injured by natural hazards, as well as losses and damages.

The Sendai Framework for Action 2015-2030 calls on countries to reduce the impacts of natural hazards through a variety of means, including through the establishment or strengthening of Multi-Hazard Early Warning Systems (MHEWS). At the same time, it asks regional and international organizations

to assist countries in these efforts.

In response to this call, several national, regional and international organizations launched the International Network on Multi-Hazard Early Warning Systems (IN-MHEWS) during the Third World Conference on Disaster Risk Reduction in March 2015. These include the World Meteorological Organization (WMO) and the United Nations Office for Outer Space Affairs (UNOOSA) through its Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER).

The multi-stakeholder network aims:

- To facilitate the sharing of expertise and good practices on multi-

hazard early warning systems worldwide;

- to provide policy-relevant advice to governments, organizations, and projects; and
- to conduct international conferences and events on the topic of MHEWS.

As a broad-based networking initiative on early warning, IN-MHEWS exemplifies the importance of multi-stakeholder cooperation in multi-hazard early warning systems. It guides and advocates for their implementation and/or improvement, facilitates sharing lessons learnt regarding early warning and increases the efficiency of investments in multi-hazard early warning systems to enhance societal resilience.

IN-MHEWS' first international activity is the International Multi-Hazard Early Warning Conference. The conference will be conducted in Cancun, Mexico on 22 and 23 May 2017, just before the 2017 Session of the Global Platform for Disaster Risk Reduction. It will bring together experts, practitioners and stakeholders to address recent advances on multi-hazard early warning and to discuss ways to improve multi-hazard early warning systems worldwide.

[Read more](#)

[wmo.int/pages/prog/drr/documents/IN-MHEWS/IN-MHEWS.html](http://wmo.int/pages/prog/drr/documents/IN-MHEWS/IN-MHEWS.html)

UN-SPIDER works to ensure that all countries and international and regional organizations have the capacity to use all types of space-based information to support disaster management efforts. When using space technologies for disaster risk management and emergency response, it is not only important to have access to the right data and software, but also to be aware of practices that have proven effective in a specific context.

For this reason, UN-SPIDER and its Regional Support Offices (RSOs) regularly develop Recommended Practices that provide hands-on instructions on how to use satellite information for addressing floods, droughts and other hazards. In line with UN-SPIDER's mandate, the Recommended Practices cover various phases of the disaster management cycle.

UN-SPIDER also regularly delivers training on these practices as part of its advisory support activities.

# GP-STAR: Conceptual Guidance on Using Space-Based Technology Applications for the Implementation of the Sendai Framework

The goal of the Sendai Framework for Disaster Risk Reduction 2015-2030 is to reduce existing disaster risk, all the while preventing the incidence of potential new exposures. In order to achieve this, measures spanning from economic, educational and legal, all the way to social, health, and environmental, need to be implemented based on a strong evidence base that accounts for the geographical distribution of environmental phenomena and economic activity.

Space technology applications continue to prove to be a persistently advantageous resource in this regard, being both timely and commensurable from global to local levels. A large number of applications, procedures and tools that can support disaster risk reduction efforts have been developed. At the same time, many potential users are either not aware or have difficulty in evaluating which application best fits their purpose.

The Global Partnership using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR) was launched during the 2015 Sendai Conference. It represents a platform for innovative space technology to be effectively translated into strategies for disaster risk reduction at a local, national and global level. The voluntary multi-stakeholder partnership has since been actively leading efforts in incorporating the use of Space-based Technologies and Applications and



**Participants at the International Expert Meeting on the Global Partnership Using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR), 1-2 December 2016 (© UNOOSA)**

Earth Observation in the context of the Sendai Framework.

The initial work plan establishes five thematic working groups on the use of satellite technology applications and Earth observation to focus on (1) the monitoring of volcanic activity, (2) drought risk assessment and drought monitoring, (3) sand and dust storms, (4) tsunamis and (5) floods. These working groups follow an agreed approach to develop conceptual guidance on applications, procedures and services that can be used to support Sendai Framework requirements.

The GP-STAR collective regularly conducts expert meetings and side events in order to reaffirm the partnership's interests in advancing

the use of space-based technology for disaster risk reduction. A prime example of their recent enterprising offerings is the dissemination of factsheets highlighting key applications, policies and services that have been developed by GP-STAR partners and could support the implementation of the Sendai Framework.

GP-STAR is a relatively new voluntary initiative. Its intentions are not to duplicate efforts, but to serve as a global hub, interface and network for Space technology applications and Sendai Framework implementation.

[Read more](#)

[un-spider.org/network/post2015\\_drr](http://un-spider.org/network/post2015_drr)

The following Recommended Practices have been published so far and are available on the UN-SPIDER website:

[Burn Severity Mapping](#)

[Exposure Mapping](#)

[Cartographie des inondations](#)

[Flood Mapping](#)

[Drought Monitoring Using the Vegetation Condition Index \(VCI\)](#)

[Flood Hazard Mapping](#)

[Drought Monitoring Using the Standardized Vegetation Index \(SVI\)](#)

[La Generación de Mapas de Expansión y Contracción de Cuerpos de Agua](#)

[www.un-spider.org/advisory-support/recommended-practices](http://www.un-spider.org/advisory-support/recommended-practices)

# Strengthening Early Warning Systems for Drought (SEWS-D)

More frequent and intense droughts are taking place in the so-called “Dry Corridor” of Central America, in the Dominican Republic and in other developing countries in South America, Africa and Asia. Rural communities in these countries are highly vulnerable and the impact of a drought on these populations can lead to loss of livelihoods and other devastating effects. As a result, national and local governments in countries affected by drought have started to implement a series of measures in order to respond to the consequences of droughts.

As a way to contribute to the efforts conducted by government agencies in Central America and the Dominican Republic, UN-SPIDER and nine other partners, including two Regional Support Offices, launched the project entitled Strengthening Early Warning Systems for Drought (SEWS-D) in the spring of 2015. The project, currently conducted in the Dominican Republic, El Salvador, Guatemala and Honduras, has three objectives.

Firstly, SEWS-D works to strengthen such systems by providing technical advisory support on how they can be included in national drought policies.

Secondly, the project aims to encourage the routine use of

information generated via the Agricultural Stress Index System (ASIS) which has been developed by the Food and Agriculture Organization of the United Nations (FAO), as well as information generated by the International Centre for the Research on the El Niño Phenomenon.

Finally, SEWS-D also aims to support countries in incorporating the use of indexes based on satellite composite products.

Traditionally, Drought Early Warning Systems (DEWS) are operated by meteorological observatories or institutes in countries of this region using rainfall data (rainfall anomalies). The Standardized Precipitation Index (SPI) is being promoted for such purposes. However, there is no real use of indicators to track changes in the condition of the vegetation as a way to complement rainfall anomaly data in order to enhance the scope and effectiveness of the DEWS.

Therefore, the project promotes the use of indicators that can assess the status of vegetation such as the Normalized Difference Vegetation Index (NDVI), the Enhanced Vegetation Index (EVI); and indicators that compare current and historical data such as the Vegetation Condition Index (VCI), and the Standardized

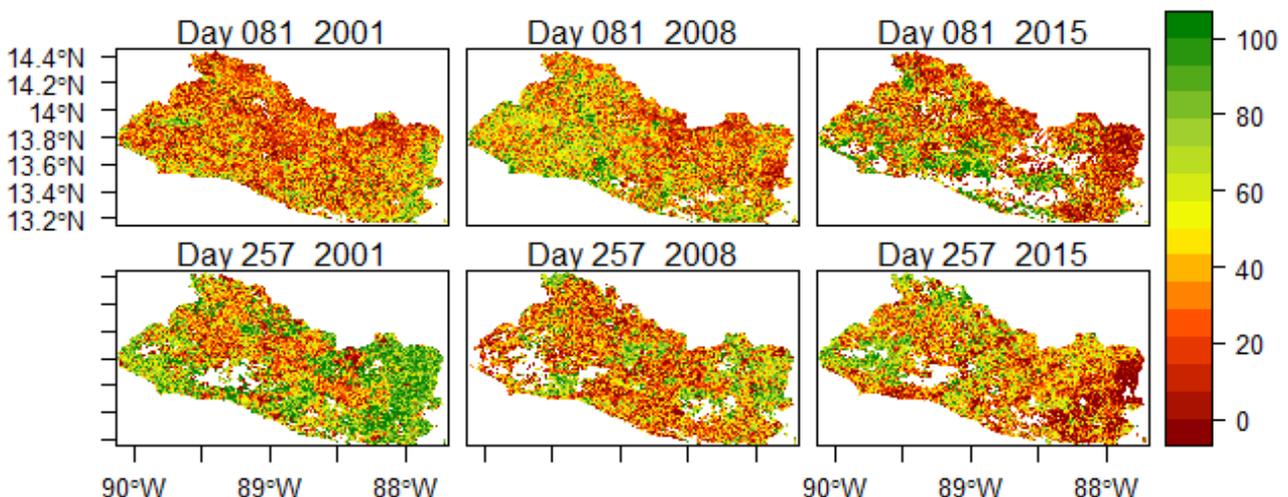
Vegetation Index (SVI) or vegetation anomaly. These indexes address vegetation as a vulnerable element, thus complementing the observations on rainfall deficit that are related to the drought hazard.

SEWS-D partners provide technical advisory support to the government agencies in the countries where the project is implemented. Regional and national training activities facilitate the incorporation of the use of space-based information, while outreach efforts at regional and international events raise awareness about the benefits of satellite composite products.

Once implemented, the project will allow decision makers to visualise the effects of droughts on the vegetation in different regions of their countries. Operators of the DEWS will become aware of the severity of current droughts in comparison with historical droughts which took place in the last 15 to 30 years. Finally, SEWS-D supports decision makers in identifying measures as a way to cope with the effects of such droughts.

[Read more](http://un-spider.org/projects/SEWS-D-project-caribbean)  
un-spider.org/projects/  
SEWS-D-project-caribbean

## Drought Monitoring in El Salvador



Application of the Vegetation Condition Index (VCI) to monitor drought in El Salvador (© UNOOSA)

## Daniel Tsegai, Programme Officer, United Nations Convention to Combat Desertification (UNCCD)



Daniel Tsegai, UNCCD  
© Gesellschaft für Umweltbildung

### **Daniel, could you say a few words about the global approach to dealing with droughts and UNCCD's efforts in supporting countries in combatting them ?**

Drought is increasing in frequency, severity, duration and spatial extent. So, the way drought is perceived and managed also has to change. In the past, drought was viewed as a one-off event to which society reacted. For far too often, this approach has proven to be costly, ineffective and disastrous, and is creating a culture of dependency. UNCCD is promoting a paradigm shift from “reactive” to “proactive” approaches that increase drought resilience.

UNCCD's mandate is to strengthen the development and implementation of national drought policies for disaster prevention and response. We are focusing on a management approach that prioritizes “prevention” over “recovery”. The last two Conferences of the Parties (COP 11 and COP 12) called for increased emphasis on mitigating drought impacts for long-term drought resilience at all levels. Parties also want to improve partnerships to promote capacity development at the national level.

At the next Conference of the Parties (COP 13) to be held in Ordos, China, from 6 to 15 September 2017, ministers will focus on the importance of a comprehensive Drought Early Warning System that includes vulnerability assessments and

**Dr. Daniel Tsegai** is a Programme Officer at UNCCD and responsible for the “Drought and Water Scarcity” portfolio. Before joining UNCCD, he was Programme Officer at the UN-Water Decade Programme on Capacity Development (UNW-DPC) and lead coordinator of the UN-Water Initiative on “Capacity Development to support National Drought Management Policies”. Dr. Tsegai also served as Senior Researcher and lecturer at the University of Bonn and holds a Ph.D. in Development Economics from the University of Bonn and an M.Sc. in Agricultural Economics from the University of Göttingen.

measures to mitigate risk. We are expecting that governments will agree on a policy framework on drought preparedness. Pilot projects on drought early warning systems are underway in Namibia, Nigeria and Colombia that will showcase these new approaches to drought resilience.

### **Are Early Warning Systems part of national drought policies suggested by UNCCD?**

Yes, “Early Warning System” is one of the three important pillars of drought preparedness. Declaring a drought too late can have a devastating impact on lives and livelihoods. Early Warning Systems provide timely information that helps countries to reduce risks and prepare better effective responses. Such a system needs good data and, equally important, local and traditional knowledge.

The second pillar is vulnerability assessment. Not all people, systems, regions and sectors are equally vulnerable to drought. It is important to combine forecasts with detailed knowledge on how landscapes and societies respond to the lack of rain. That knowledge is turned into an early intervention. We need to understand who is vulnerable and why as well as the processes that contribute to vulnerability in order to assess the risk profiles of vulnerable regions and population groups.

The third pillar is drought risk mitigation measures. Here, you identify actions to address these risks head on. What can be done, at a very practical level,

to reduce drought risk and deliver, real, immediate and tangible benefits to communities? For example, developing sustainable irrigation schemes for crops and livestock, rain water harvesting schemes and rehabilitating degraded land.

### **Are there specific elements that UNCCD considers essential when addressing Drought Early Warning Systems?**

Our approach to Drought Early Warning Systems goes beyond meteorology and forecasts. We urge countries to work on four elements of early warning (i) analyze drought risk; (ii) monitor and predict the location and intensity of an upcoming drought; (iii) communicate alerts to authorities, media and vulnerable communities and (iv) respond to drought warnings. A comprehensive Drought Early Warning System must embrace all four aspects.

### About the Convention to Combat Desertification (UNCCD)

Established in 1994, UNCCD is the only legally binding international agreement on land issues. The Convention promotes good land stewardship. Its 196 Parties aim, through partnerships, to implement the Convention and achieve the Sustainable Development Goals. The end goal is to protect our land, from over-use and drought, so it can continue to provide us all with food, water and energy.

[Read more: unccd.int](http://unccd.int)

# UN-SPIDER, the Sendai Framework and the Space2030 Agenda

by Simonetta Di Pippo, Director of the United Nations Office for Outer Space Affairs (UNOOSA)



**UNOOSA Director Simonetta Di Pippo**  
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Since its launch in 2006, UN-SPIDER has been promoting the use of space-based information in disaster risk reduction and emergency response. As a programme of the United Nations Office for Outer Space Affairs (UNOOSA), it raises awareness and provides technical advisory support to developing countries in Asia, Africa, Latin America and the Caribbean. UN-SPIDER facilitates access to space-based information and data through its Knowledge Portal. Together with its Regional Support Offices, the programme is strengthening the capacity of civil protection agencies and disaster management centres in nearly 30 countries to take advantage of the opportunities that are being launched by the space community to access data, services and products.

In 2015, the international community reinforced its commitment to address three global challenges that are closely related to UN-SPIDER's efforts. It pledged to reduce disaster risks through the launch of the Sendai Framework for Disaster Risk Reduction, to confront the challenges of climate change via the Paris Climate Change Agreement and to foster sustainable development through the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs).

UN-SPIDER worked with nearly 20 partners to launch the Global Partnership Using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR) and teamed up with more than 10 national, regional and international organizations to establish the International Network on Multi-Hazard Early Warning Systems (IN-MHEWS) in order to contribute to the implementation of the Sendai Framework. In a similar fashion, UNOOSA is working with many partners to enhance the use of space applications in more systematic observations of the climate and in efforts targeting mitigation, adaptation, and loss and damage, as foreseen by the Paris Agreement.

The Committee on the Peaceful Uses of Outer Space (COPUOS), supported by UNOOSA, recently launched the UNISPACE+50 process with the purpose of articulating a long-term vision, Space2030. COPUOS and UNOOSA aim to actively build synergies with the outcomes of the 2030 Agenda for Sustainable Development, the Sendai Framework and the Paris Agreement.

In the lead-up to UNISPACE+50, UNOOSA is organizing a series of High Level Fora (HLF) on "Space as a Driver for Socio-economic Sustainable Development", the first of which took place in November 2016 and discussed the role of space science and technology in fostering global development.

The UNISPACE+50 process itself has been structured in terms of seven thematic priorities. Under thematic priority 6, "International Cooperation Towards Low-Emission and Resilient Societies", UNOOSA has four objectives (see boxes).

Define synergies between climate change mitigation efforts, disaster risk reduction and global development and reducing emissions by replacing carbon energy with renewable energy.

Develop a road map for enhanced resiliency of space-based systems and the affiliation of existing and future Earth observation, global navigation satellite system and telecommunication constellations for disaster risk reduction and climate change monitoring and mitigation.

Improve integrated space applications approaches and the interoperability of space-based systems and ground/in situ systems.

Provide requirements to new developers for coverage in geographical areas not sufficiently monitored or applications that need further development.

As a defining activity under this thematic priority, UNOOSA and the German Aerospace Centre (DLR) will organize the United Nations/Germany International Conference on "International Cooperation Towards Low-emission and Resilient Societies", which will be held in Bonn, Germany, from 22 to 24 November 2017.

The efforts conducted by UN-SPIDER, including those related to GP-STAR, IN-MHEWS and drought early warning, which have been addressed in this newsletter, aim to contribute to the implementation of the 2030 Agenda for Sustainable Development and in shaping the Space2030 Agenda, which will be launched in June 2018 as a way of continuing to bring the benefits of space to humankind.

