

Satellite image (TELEOS-1) provided by CRISP



Satellite image (THEOS1) provided by GISTDA

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## 2. [News] Emergency Observation of Disasters (as of 28 May)

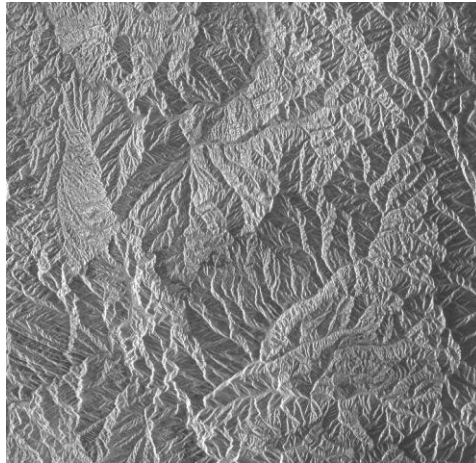
### (1) Landslides and Mudflows in Tajikistan

Landslides and Mudflows occurred in Tajikistan on 11 May 2021. According to Radio Free Europe / Radio Liberty (RFE / RL), at least 9 people died. Houses and infrastructures such as roads and bridges were damaged in 15 districts.

<https://rus.ozodi.org/a/31250786.html>

The Central Asian Institute of Applied Geosciences (CAIAG) made an EOR to Sentinel Asia on 14 May. Among DPNs, JAXA and NARL provided their observation data. Information on the latest response by Sentinel Asia is available from the following link:

<https://sentinel-asia.org/EO/2021/article20210511TJ.html>



Satellite image (ALOS-2) provided by JAXA



Satellite image (FORMOSAT-5) provided by NARL

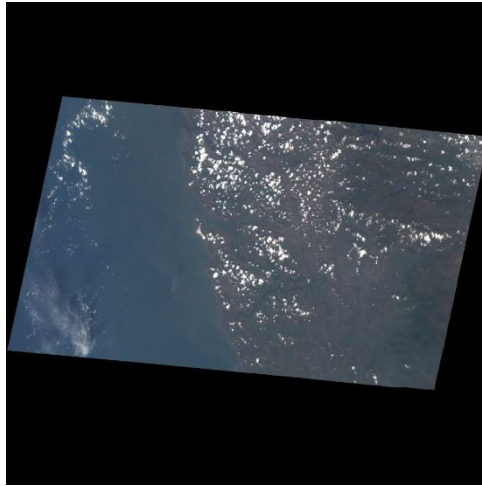
## (2) Floods and Storm in India

Cyclone Tauktae attacked several states on the western coast of India on 17 May 2021. New Delhi Television Limited (NDTV) said that at least 6 people were killed, and several people were injured in Maharashtra. Eight people died in cyclone-affected coastal Karnataka. Thousands of people were evacuated in Gujarat, Kerala, Daman and Diu.

<https://www.ndtv.com/india-news/cyclone-tauktae-live-updates-very-severe-cyclonic-storm-likely-to-intensify-further-warns-weather-office-2443064>

ISRO made an EOR to Sentinel Asia on 14 May. Among DPNs, GISTDA, JAXA and NARL provided observation data. Information on the latest response by Sentinel Asia is available from the following link:

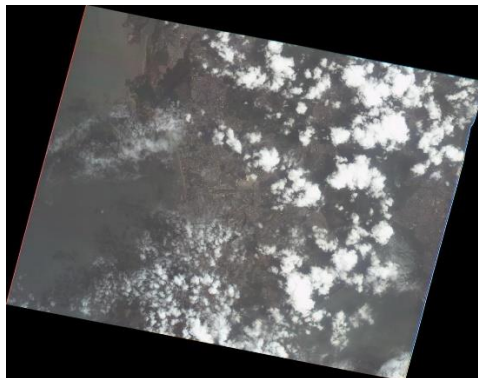
<https://sentinel-asia.org/EO/2021/article20210517IN.html>



Satellite image (THEOS1) provided by GISTDA



Satellite image (ALOS-2) provided by JAXA



Satellite image (FORMOSAT-5) provided by NARL

(3) Cyclone YAAS in India

Cyclone YAAS attacked West Bengal, Odisha, Bihar and Bengal of India on 27 and 28 May 2021. The Times of India and ABC News said that 2 people died, and more than 1.1 million people had evacuated.

The Time of India

<https://timesofindia.indiatimes.com/city/kolkata/cyclone-yaas-live-tracking-odisha-west-bengal-brace-for-severe-cyclonic-storm/liveblog/82962051.cms>

ABC News

<https://www.abc.net.au/news/2021-05-26/india-cyclone-yaas-causes-mass-evacuation/100168472>

ISRO made an EOR to Sentinel Asia on 26 May. Among DPNs, JAXA provided observation data. In addition, NARL has planned to conduct emergency observations. Information on the latest response by Sentinel Asia is available from the following link:

<https://sentinel-asia.org/EO/2021/article20210526IN.html>



Satellite image (ALOS-2) provided by JAXA

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### 3. Interview

3. Interview - Dr. Giriraj Amarnath, International Water Management Institute (IWMI)

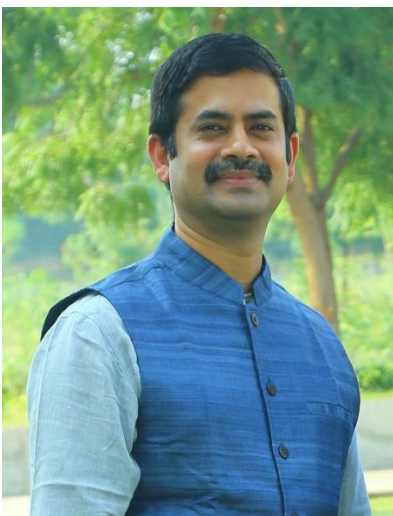
*This interview is also posted on the Sentinel Asia Website:*

<https://sentinel-asia.org/interview/interview.html>

The International Water Management Institute, or IWMI, is a research-for-



development (R4D) organization, with offices in 13 countries and a global network of scientists operating in more than 30 countries, and is a member of the Consultative Group on International Agricultural Research (CGIAR), whose mandate is “a water-secure world,” and which addresses the water and land management challenges faced by poor communities in developing countries. IWMI promotes demand-based innovative and scientifically tested water management solutions for sustainable development and is a longtime member of Sentinel Asia. Dr. Giriraj Amarnath from IWMI has been one of the leading supporters of Sentinel Asia and won the World Geospatial Excellence Award in 2020. The Sentinel Asia Secretariat interviewed Dr. Amarnath about how he has worked with Sentinel Asia and his future plans in the Sentinel Asia community.



Dr. Giriraj Amarnath, Research Group Leader  
Water Risks to Development and Resilience

- (Sentinel Asia Secretariat) Please introduce yourself to the readers of Sentinel Asia and tell us about your experiences with Sentinel Asia:

(Dr. Giriraj Amarnath)

Thank you for this great opportunity to share my memories about Sentinel Asia. I recall my first involvement was back in 2009 while I was working for the International Centre for Integrated Mountain Development (ICIMOD) in Nepal. At that time, I attended my first Sentinel Asia meeting and I developed a great interest in matters, including the establishment of emergency observation and data transmission via WINDS satellite\* communications for rapid satellite data access. Then, I moved to IWMI in 2011 and strengthened the use of space technology in Disaster Risk Reduction with input and support from Sentinel Asia and development partners. Basically, I lead a research group on water risk and disaster recently, and look after programs managing floods and droughts in Asia and Africa.

\* WINDS, or Wideband InterNetworking engineering test and Demonstration Satellite, is a satellite to demonstrate high-speed internet technology operated by JAXA from 2008 till 2019.

- How do you think Sentinel Asia can contribute to regional collaboration, particularly in terms of flood management?

When we look back some years ago, Sentinel Asia implemented Step 1 and then Step 2. This is when the Flood Working Group was established. At that time, many colleagues led this initiative as their responsibility and brought best practices from member states in Asia and the Pacific. We have to thank the Asia-Pacific Regional Space Agencies Forum (APRSAP) for this excellent initiative to bring together diverse stakeholders. Through Sentinel Asia, we can present best practices on disaster risk management at Sentinel Asia's JPT (Joint Project Team) meeting, which can help countries prepare and respond to crisis management. Though the initiatives are voluntary, they promote innovative knowledge products and tools among member states in building resilience and managing climate shocks.

- Could you tell us about the current activities and responsibilities of IWMI?

IWMI is basically a water management institute that promotes a water-secure world. Crucial areas we work on in our strategic program are Water, Climate Change, and Resilience (WCCR), to promote improved climate change adaptation and mitigation with greater resilience to natural disasters. The projects we lead in Africa and Asia look at four pillars of Disaster Risk Management, that is: Prevention, Preparedness, Response, and Recovery, and guiding countries in strategic climate investments. This is where risk transfer comes into the picture. We have several projects looking at how we understand the risk, and what levels of disaster risk governance are critically important to help communities manage the climate crisis. We also look at areas of how development partners like the World Bank and the Asia Development Bank could promote evidence-based investment in disaster resilience. In a way, we look at consolidating research priorities across disaster risk management and aligning the implementation steps of the Sendai Framework. For example, the project in Sri Lanka looks at how climate adaptations are critically important in managing droughts and floods among smallholder farmers and building a resilient economy through the use of open access data and disruptive technologies.

- IWMI covers a broad area of water issues. Could you tell us more details and what is the main application of your activities?

As an example, in South Asia, we have laid a foundation for promoting and integrating a drought management program, and innovations in promoting drought monitoring and an early warning system using multi-mission satellite data aided by the cloud platform. We use subseasonal and short-term weather forecast data from Global Forecast System (GFS) data of the National Oceanic and Atmospheric Administration (NOAA) and the Indian Institute of Tropical Meteorology (IITM) to provide drought forecasts. Then, we use satellite data such as MODIS data from NASA's Terra and Aqua satellites and Sentinel satellite images from the European Copernicus Programme to monitor the drought and flood situation. We monitor water bodies using Sentinel-1 data and share the data through a bulletin. The bulletin is being used by an agriculture extension and agrarian development agencies to promote timely drought response strategy among farming communities. Importantly, we are working in Sri Lanka with the UN World Food Programme (WFP) to prepare a joint bulletin with all members and departments. The information is not limited to disaster management, it is being used across different sectors as well. Space technology is very beneficial in building a regional drought monitoring system that countries can share and utilize the data. IWMI's significant contribution in this field led to the recognition of the World Geospatial Excellence Award in 2020.

- Congratulations on winning the World Geospatial Excellence Award in 2020! Could you tell us the story? What was the situation when the system started and what was the key point to winning?

We really take pride in having done this work in South Asia since 2005. When we established it, we had a lot of challenges on access to satellite data, information processing, limited computation capabilities and institutional coordination. In 2014, in collaboration with World Meteorological Organization (WMO) and the Global Water Partnership (GWP) through the Integrated Drought Management Programme (IDMP), Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF) and the CGIAR Research Program on Water, Land and Ecosystems (WLE) highlighted the importance of a regional drought mechanism in South Asia. IWMI initiated regional efforts with government partners in South Asia to promote access to drought knowledge products for timely early warnings for early action. Today, the platform is being used by member states in South Asia as well as by various institutes, not just for knowing about the drought situation but also about how we promote drought resilient among



agricultural systems against climate change. The key point is that the monitoring system has been continuing as of today, and we have been ensuring that countries get the right information to make timely decisions at the field level, some information is used practically even at the farmer level. With the success in South Asia, we are expanding the activities in Africa through the Water Secure Africa Initiative (WASA) and Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA). We are getting quite good recognition from African stakeholders to promote broader drought resilience initiatives among drought-affected communities. We are also implementing a similar framework in the Middle East and North Africa. Lastly, our recent activities include developing a drought risk profile among the southern African region with assistance from the World Bank to promote wider drought investment for better preparedness among various sectors.



Dr. Amarnath and his team © IWMI

- Drought contains three meanings, Meteorological, Hydrological, and Agricultural. Do you cover all of them?

Yes, drought is a very complex phenomenon. It is difficult to quantify the impact from one type of drought, for example, understanding the rainfall and soil moisture deficit and the crop condition can help policymakers determine the extent of severity for drought relief and provide a guide for timely drought response plans. We developed the first Google Cloud-based early warning system for Afghanistan with assistance from the World Bank to promote a near real-time drought early warning tool (AF-DEWS) for more than 35 drought indices across meteorological, hydrological, and agricultural droughts. We would like to share such knowledge products in our Sentinel Asia platform so that member countries can develop a low-cost early warning system without the need for larger investment in hardware and physical-based computers in the future.

- How about your recent activities in IWMI under COVID-19? How do you sustain your key businesses to keep each project and component active?

In my opinion, COVID is not a never-ending problem, but it is a very challenging issue today in addition to the climate crisis. Last year, during the time of COVID, we had a major cyclone called “Burvei” that caused a few casualties and severe damage. Therefore, we requested support from Sentinel Asia and the International Disasters Charter via Sentinel Asia to prepare a response map. We all worked online due to travel restrictions and used social platforms like WhatsApp and Twitter to share what was happening. We used weather forecast data on likely landfalls to ensure the space community can provide satellite images of the target areas for damage analysis. These days, we have increasingly seen how digital platforms are quite innovative and helpful. A crisis can always be managed if we work collectively as a team and use digital tools successfully.

- As you mentioned, dialogues with member countries of Sentinel Asia are one of the key points, but communication is sometime not easy. Do you have any cases in which member countries request from you more information than the data you provided?

We are looking at working with partners in disaster management, meteorology, agriculture, and water resources in all those countries. We did need an assessment to identify gaps and constraints regarding the Sentinel Asia Step 3 implementation on the four priorities of the Sendai Framework for Disaster Risk Reduction. One of the initiatives we looked at was using satellite data information with field validations to bring more ownership on how we they interpret our knowledge products and how we make use of the data in drought management and measures. We are doing a lot of trials, I would not say they are completely successful, but we are co-designing with stakeholders including farmers.

- From the lessons you have learned, do you have any suggestions for Sentinel Asia to get good feedback from members?

I am very confident that the IWMI initiatives can fit very well with the four priorities of the Sendai Framework that also link to the Step 3 implementation of Sentinel Asia. For example, when it comes to monitoring and early warning about priority one—understanding the disaster risk—if you generate useful disaster information, the policymakers and donors can invest in disaster risk reduction strategies. I think the practical achievements we have done so far at IWMI on various activities can contribute directly to the users of Sentinel Asia. It is important to promote best

practices among member states on new innovations, tools and knowledge products so they find opportunities to build resilient societies. We need to highlight the impact of climate change on local communities, urban systems, and improving water resources to accelerate action and support adaptation solutions. I think Sentinel Asia members can adopt our knowledge and solutions to mitigate current and future climate risks. In summary, I would say we need to communicate more and to build more awareness among members in achieving the Sendai Framework as well as SDGs by 2030. With the Sentinel Asia Secretariat, we should work more with countries to share our findings more than we have done to date.

- Another key word is donors to keep Sentinel Asia activities sustainable as you mentioned. What kind of activities should the Sentinel Asia community do more to increase appeal?

I think one of the reasons Sentinel Asia has been successful over years is partnership and cooperation among member states. It is all about the members actively participating in Sentinel Asia initiatives. One of my suggestions is to work with new partners including universities, NGOs, and some private sectors in achieving Step 3 implementation. In times of COVID, people are moving online more, so it would be good to organize more webinars. We need to ensure disaster management professionals are aware of the usefulness of Sentinel Asia, which is not only the responsibility of the Secretariat but also of the members. Reporting best practices on the use of space technology in flood and risk management is critically important for the success of Sentinel Asia. Guiding countries to promote regional information platforms might be the next step and reaching out to donors to support such initiatives in achieving the global commitments. I do not think any other initiative on disaster risk management exists in the Asia-Pacific region other than Sentinel Asia. Capacity development is also very important to ensure the future human resources that will advance in using new technologies. In fact, jointly with volunteer Sentinel Asia experts including the Indian Space Research Organisation (ISRO) and the Sentinel Asia Secretariat, we are planning to organize webinars dedicated to Sentinel Asia colleagues. Particularly, from our part, we will be organizing specific training webinars on flood and drought monitoring and its application.

- Do you have any comments on a longer-term perspective?

We need to keep reaching out to Sentinel Asia member states to highlight the role of space technologies in disaster risk management. Individuals always think satellite

