

## **Eoclima for climate risk assessment and monitoring**

We present **Eoclima**, GMV solution to support climate action through climate-related geo-information products, derived from satellite-based Earth Observation data. We will show how **Eoclima** contributes to **addressing wide-ranging climate challenges across socio-economic sectors and eco-biological systems**.

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**ACCELERATE  
CLIMATE  
ACTION  
FOR ALL SDGs**



## CHALLENGES

**Climate change** is the greatest environmental challenge in recorded human history. It poses a wide-range of impacts on ecosystems, human lives and livelihoods, with the most severe consequences being faced by poor, vulnerable, deprived and neglected communities.

As we move towards a 2°C warmer world, urgent action is required to better understand and more effectively manage climate risks as highlighted by the international agreements on climate change. **Risk reduction** should accelerate action towards the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction, the Paris Agreement and others, in line with the EU Strategy on Adaptation to Climate change, adopted on 24 February 2021.

## SOLUTION

The **climate crisis** can only be alleviated through investing in climate finance. However, building the climate case for targeting interventions requires good quality data, very often lacking in developing regions of the world.

**Earth observations (EO)** services provide large quantities of timely and accurate environmental information, which, when combined with socioeconomic data, can give unique insight for understanding exposure to present and future climate risks, designing climate resilience investments and incorporating adaptation solutions into climate policies to improve the resilience of livelihoods and production systems.

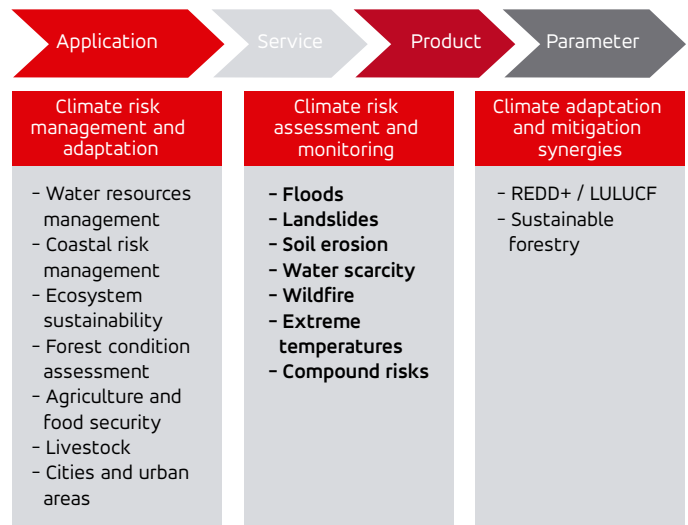
GMV has worked on several projects to integrate EO services into the decision making processes to help solve livestock challenges. As climate finance becomes increasingly aware of the strengths and benefits of EO data, they are being used for an even greater range of problem-solving to help build climate resilience in many different contexts.

**Eoclima** is GMV's catalogue of climate-related geo-information products to facilitate the management of environmental resources by organizations involved in the process: NGOs, multilateral climate finance initiatives, International Financial Institutions (IFIs), and environmental and conservation agencies as well as national and local Governments.

**Eoclima** meets all currently existing geospatial data standards so, our geospatial products can be downloaded into and/or consumed by any geo-viewer through Open Geospatial Consortium (OGC) standard services.

## Eoclima SUPPORT FOR CLIMATE POLICY

**Eoclima** supports the climate resilient pathways through the societal transformational process to achieve long-term emissions reductions and sustainable resilient development. This support is decoupled into main broad applications that lead to climate services tailored into products, here presented, and EO-derived parameters.



**Eoclima** services for **climate risk assessment and monitoring** offers the following **products on hazards**: floods, landslides, soil erosion, water scarcity, wildfire, extreme temperatures, and compound risks.

The identification of the relevant hazards for the area of interest is based on the regional synthesis of the IPCC Working Group I for reference regions. This component allows the exploration of key synthesized assessments building on multiple lines of evidence across the International Panel on Climate Change (IPCC) Sixth Assessment Report.

Along with the information on physical hazards, **Eoclima** covers the **vulnerability** and **exposure** aspects of the climate risk as defined by the IPCC. Using socio-economic data derived from satellite-based global sources (e.g. built-up area, population density, road density, night lights, settlements grid) and/or local data whenever available, the determinants of the risk are combined with the hazards to assess all the risk drivers.





## USE CASE: ASSESSING COMPOUND RISKS FOR CLIMATE RESILIENCE INVESTMENTS AND CLIMATE FINANCING IN TAJIKISTAN

Central Asia region comprises the countries contributing the least to global warming with a GHG emission attribution of only 0.55 percent of the total global level, however, climate change has great importance for Central Asia. The Global Facility for Disaster Reduction and Recovery (GFDRR) ThinkHazard! tool shows that the region is already highly vulnerable to natural disasters – climate-related and unrelated – such as droughts, extreme heat, wildfire, floods, earthquakes, and mudslides. In the past three decades alone, the region has experienced 500 severe flooding, landslides and earthquakes, impacting 25 million people, and causing \$80 billion in damages. This will worsen with climate change as the Sixth Assessment Report of the IPCC indicates that mountain permafrost degradation at high altitudes has increased the instability of mountains, the reduction of the annual snow will increase with elevation in mountain areas, and frequency of heavy precipitation is projected to increase with strong spatiotemporal differences with overall decreasing precipitation in summer with the opposite tendency in winter. Anomalously hot summers are more frequent in Central Asia with temperatures rising up to 43C in July in Tajikistan. With 9 percent of Tajikistan’s population suffering from food insecurity, Tajikistan is within the most vulnerable to malnourishment in Central Asia. The country has identified the need to build resilience and address climate vulnerabilities in their nationally determined contributions (NDCs), and global development institutions such as the World Bank or the International Fund for Agriculture Development (IFAD) are supporting them in this process.

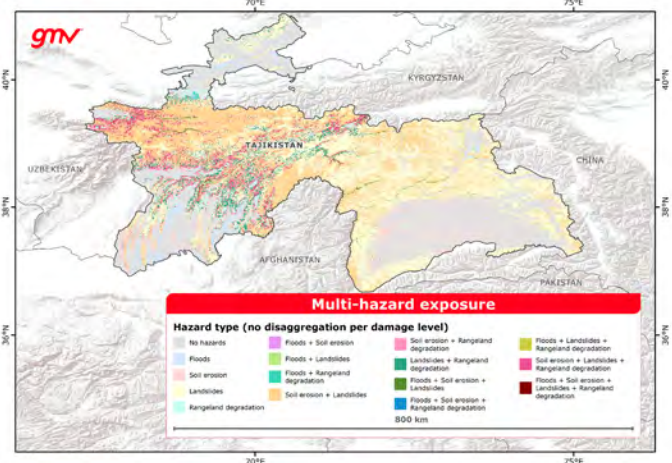
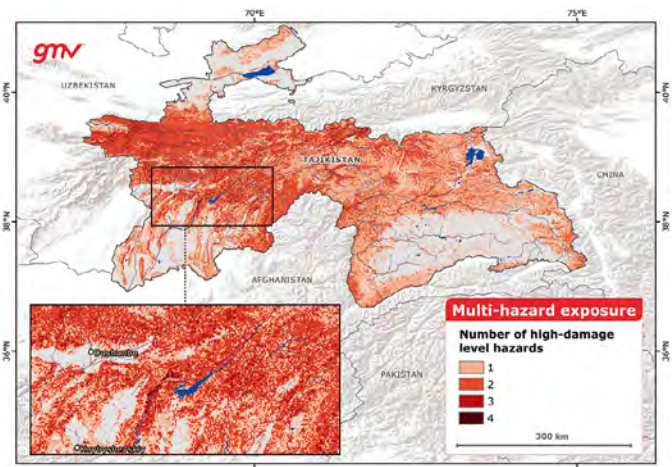
Accessing climate finance is a technically complex process that demands applicants to shape detailed climate risk evidence in support of their applications. This requirement remains a barrier for many of the countries that would benefit most from such financial support. Providing high quality, credible EO data in support of climate finance applications can therefore help developing countries unlock climate finance, and ultimately enable them to access the resources to advance toward their climate resilience goals.

GMV, in the context of an initiative of the European Space Agency, worked with IFAD to address the information and skills that place structural constraints on Tajikistan’s ability to unlock climate finance. Through the customized provision of **EO-based climate risk assessment** services in support of an application for climate finance to the Green Climate Fund (GCF), GMV assisted IFAD and Tajikistan’s counter parts to build climate-evidence base and rationale to support their co-funding application.

GMV assembled a **bespoke selection of EO-derived climate-related hazards** at high-resolution and at country scale, such as related to soil erosion, floods, landslides and rangelands degradation. The hazard information relied on tailored products from state-of-the-art models from highly recognised and renowned institutions, and on satellite-based in-house developments. In brief, landslide susceptibility is obtained from the NASA’s global Landslide Hazard Assessment for Situational Awareness (LHASA) model and landslide reports from the Cooperative Open Online Landslide Repository (COOLR); flood hazard is derived from the World Resources Institute (WRI) Aqueduct tools; soil erosion is computed following the European Soil Data Centre RUSLE2015 methodology; and rangelands degradation is calculated using time-series satellite information on vegetation, soil moisture and burned area indexes.

Using the United Nations Office for Disaster Risk Reduction definition of **multi-hazard**, bespoke **exposure maps** were created using GIS techniques by classifying the hazard potential (low hazard to high hazard) and overlaying the information of the hazardous events. Maps on the factsheet emphasize the simultaneous occurrence of high hazards in Tajikistan and the individual presence of hazards of any potential in the country.

These results enabled IFAD and beneficiaries to harness the evidence required to unlock and channel climate finance for maximum resilience impact, and to target interventions so they can be directed at those areas with the greatest potential to benefit from climate resilience investments.



# Remote Sensing & Geospatial Analytics

For more information on the products under this service and the parameters included contact us on [eoclima@gmv.com](mailto:eoclima@gmv.com)!

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