VALORADA
VALIDATED LOCAL RISK ACTIONABLE DATA FOR ADAPTATION

**CHAMPION STORY #5**
**APRIL 2026**

# Supporting Climate Change Risk Management in the Gabrovo & Burgas municipalities (Bulgaria)

## The Challenge

In VALORADA, Burgas and Gabrovo Municipalities were selected as demonstrators, one coastal and highly urbanised (Burgas), the other mountainous and forest-dominated (Gabrovo), to test how climate services and Earth observation (EO) can support local decision-making across multiple hazards.

Burgas is the fourth most populous city in Bulgaria, and the main urban centre in the southeastern part of the country. With around 200,000 inhabitants, the Municipality of Burgas covers around 500km$^2$. It is located on the western shore of the Black Sea and is surrounded by three large coastal lakes and wetlands – Lake Burgas (Vaya), Lake Atanasovsko, and Lake Mandrensko. The city is therefore an important maritime, economic and transport hub and home to an important port complex. Tourism contributes significantly to regional GDP, thanks to many Black Sea resorts nearby and Burgas Airport, one of the country's busiest airports, particularly in summer months.

Gabrovo is a medium-sized Bulgarian city located in central northern Bulgaria. The Municipality of Gabrovo counts more than 60,000 inhabitants and has a surface of around 555 km$^2$. It is located within the Balkan Mountains (Stara Planina), giving it a predominantly mountainous and forested landscape, and the Yantra River flows through the city. Gabrovo has a long-standing industrial tradition and remains an important manufacturing centre, but has actively transitioned towards innovation, entrepreneurship and energy efficiency initiatives. Tourism also plays a role, particularly cultural and mountain tourism.

*Figure 1 Location of Burgas & Gabrovo, Bulgaria*

The two cities have relatively different climates. Whilst Gabrovo is subject to a continental climate, characterised by greater temperature fluctuations, Burgas has a more Mediterranean climate, known for its hot and dry summers and cool winters. The impacts of climate change in Gabrovo and Burgas are therefore quite different. Over the past century, both cities have experienced a gradual warming trend, with an increase in the intensity and duration of heat waves. Seasonal variations in precipitation have led to short-term increases, resulting in flooding, especially in Burgas, where flash floods and sea floods are recurring issues. Both cities also face challenges related to droughts and water scarcity. These conditions are negatively impacting various sectors including agriculture, forestry, urban ecosystems, and public health.

The project has received funding from the Horizon Europe Framework Programme under grant agreement No 101112837

In Burgas, short, intense downpours can quickly turn into rapid surface runoff that overwhelms drainage, triggering flash floods that disrupt mobility and damage public infrastructure. This is compounded by coastal exposure, where storm-driven sea flooding and sea-level rise increase pressure on low-lying zones and can aggravate wastewater and water-quality risks in the lagoon system (including the Vaya Lake catchment).

In Gabrovo, hotter conditions and longer dry spells dry out vegetation in the surrounding forested terrain, raising wildfire risk and bringing knock-on impacts like smoke episodes, disruption to mobility, and pressure on ecosystem services and nature-based tourism.

Across both municipalities, a shared operational challenge is that decision-making is often constrained by fragmented local datasets, differing spatial units and limited interoperability between climate information, EO products and municipal data layers, so building a common, traceable evidence base is critical to identify hotspots, prioritise measures, monitor outcomes and communicate risk consistently across departments.

To connect the local hazards described above to actionable decisions, VALORADA applied the Climate Impact Chain (CIC)[1] approach together with municipal stakeholders and consortium partners. In Burgas, two CICs were co-developed: (i) flash floods impact on livelihoods, infrastructure and agricultural production and (ii) the degradation of social and environmental determinants of human and ecosystem health driven by urban warming. In Gabrovo, the CIC focuses on wildfire-risk escalation linked to drought, heat and land-use patterns.

Across all chains, the logic is traceable: drivers → hazards → exposure/vulnerability → impacts, and this framing directly guided the indicator package used in the demonstrator dashboards. The indicator development started with an initial long list designed to characterise and quantify how territorial, environmental and socio-economic factors interact with changing climatic conditions, and the most relevant indicators for Burgas and Gabrovo were then selected in collaboration with regional stakeholders to reflect local climatic, geographical and socio-economic characteristics.

In practice, this translates into linked indicator sets:

- **(i) Burgas floods** (extreme precipitation, wetness/runoff proxies, flood-prone zones, exposure of people and critical assets) and Burgas heat/health (hot days/tropical nights, LST hotspots, vegetation/shade and vulnerable groups)
- **(ii) Gabrovo drought/wildfire** (dry-spell and soil-moisture anomalies, fire-weather conditions, vegetation stress/fuels, exposure at the wildland-urban interface).

Together, these indicators support SDG 13, especially Target 13.2 (mainstreaming climate in planning) and Target 13.3 (early warning, awareness and capacity).

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[1] The Climate Impact Chain (VALORADA public deliverable 2.1 shows climate change mainly through higher temperatures and shifting rainfall patterns, which together intensify compound hazards—heatwaves and drought that raise wildfire risk, alongside episodes of extreme precipitation. These interconnected pressures create cascading impacts across water, ecosystems, land management and exposed assets, highlighting why impact chains are useful to trace how hazards turn into risk and where vulnerabilities amplify impacts.

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SDG 13: Climate Action calls for urgent action to combat climate change and its impacts by strengthening resilience and adaptive capacity worldwide. It emphasizes the integration of climate measures into national policies, strategies, and planning (Target 13.2), and the need to improve education, awareness, and institutional capacity for climate change mitigation, adaptation, and early warning (Target 13.3).

## How can VALORADA help ?

VALORADA supports Burgas and Gabrovo in transforming fragmented data into a unified, decision-ready climate-risk overview by integrating three main information streams:

- **(1) C**limate baselines and projections to describe current trends and plausible future scenarios,
- **(2)** EO layers to detect signals on the ground (land cover, vegetation stress, heat patterns, fire-related conditions) and
- **(3)** Municipal datasets that show what is exposed and what can be acted upon (population distribution, critical assets, infrastructure, plans and response capacity).

The toolchain makes these inputs usable together through data ingestion (better interoperability and metadata), normalisation (common spatial units and time references), analytics (indicator calculation and comparison) and dashboards (including ARLAS-based exploration) that keep results traceable to source data.

After agreeing the indicator package, the next step was to secure and prepare the local data needed to compute it. This meant collecting and formatting local non-climate spatial data, such as demographics, flood risk, and urban infrastructure layers. In doing so, VALORADA also faced practical issues, including data access restrictions and inconsistent INSPIRE compliance, which made integration harder. To complement the local data with a solid and consistent climate basis, VALORADA used the Copernicus Climate Data Store for key variables and indices (mean temperature, tropical nights, extreme precipitation days, extreme wind events and flood occurrence). These were combined with C3S baselines and future scenarios to place local risks in context and to test how adaptation options perform under different climate futures.

The dashboard inputs were then organised around what the municipalities need to manage. For Burgas, flood-related layers combine available data from the Copernicus Global Human Settlement Layer and local flood records to map flood-prone zones and highlight exposed assets and potential cascading impacts. For Gabrovo, data sources included Copernicus CORINE Land Cover (2018) and local datasets to map forest indicators. For both Burgas and Gabrovo, vegetation mapping was done using commercial satellite imagery and EO-products. Crucially, VALORADA is designed to complement existing local systems, not replace them.

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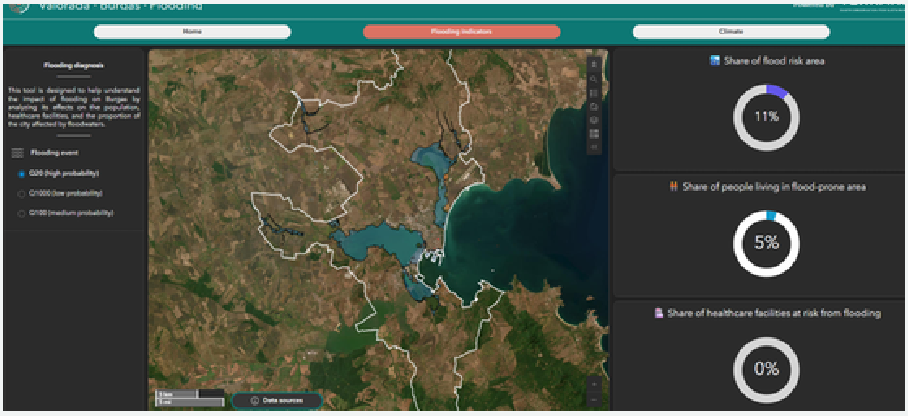


*Figure 2 VALORADA Dashboard for Burgas*

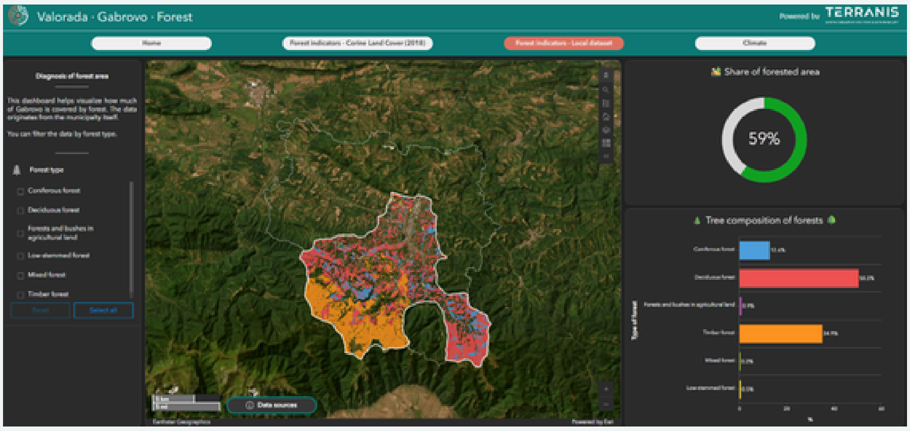


*Figure 3 VALORADA Dashboard for Gabrovo*

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In Burgas, it adds harmonised Copernicus-based indicators and scenario context that can be reused across departments and compared with other regions and used alongside the Smart Burgas integrated platform.

In Gabrovo, it can align with municipal GIS workflows and portals such as "Gabrovo Green," strengthening preparedness through consistent EO-driven layers and documented methods.

In the first operational implementation, the platform prioritised Burgas flooding indicators using local flood layers (e.g. I1004 flood-prone areas, I1008 population in flood-prone areas, I1010 critical infrastructure in flood-prone areas), a Gabrovo forest dashboard (e.g. I1051 share of mixed forest) based on land-cover information, and an urban climatology module using Landsat-derived land surface temperature (I1100) for both municipalities.

The result is an incremental but immediately usefulset of dashboards: they deliver value where robust local layers are already available, and they clearly document remaining data and resolution needs to extend from screening and monitoring toward deeper vulnerability analysis and more targeted measures.

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## Who is concerned?

Climate-risk management in Burgas and Gabrovo is influenced by different levels of policies and legislations. Nationally, Bulgaria's National Climate Change Adaptation Strategy and Action Plan (2019-2030) sets the direction for adaptation, and the Climate Change Mitigation Act provides the legal basis for climate governance. For Burgas, flood-risk management is further guided by Flood Risk Management Plans developed through the Black Sea river basin directorate, which structure prevention, protection and preparedness measures over planning cycles. Locally, these requirements are translated into municipal instruments—such as Burgas' integrated development and energy/climate planning and Gabrovo's SECAP implementation.

These instruments are themselves aligned with the EU level framework, including: the EU Strategy on Adaptation to Climate Change (2021), which calls for all regions and cities to become more resilient by 2050, emphasising improved data, risk assessment and cross-sectoral coordination[2]; the European Climate Law (Regulation (EU) 2021/1119) which establishes adaptation as a legal obligation, requiring Member States to develop coherent national and regional adaptation strategies and to report regularly on progress to support climate-resilient development in line with the Paris Agreement; and the Regulation on the Governance of the Energy Union and Climate Action (EU) 2018/1999 which imposes reporting obligations that require regions to contribute data and updates on adaptation policies, actions, and observed impacts[3].

Within this setting, VALORADA's indicators and dashboards are designed to fit real municipal workflows—preparedness, planning, prioritising measures and tracking progress—while remaining traceable to the underlying data so results can be reused across departments and reported upward when needed. The outputs can directly support local adaptation and mitigation strategies and urban/spatial planning, inform regional and national decision-making, and—downstream—benefit local economic actors in sectors such as agriculture, forestry and tourism. Ultimately, this supports more targeted flood and heat management in Burgas, stronger drought and wildfire preparedness in Gabrovo, and healthier, more resilient outcomes for citizens.

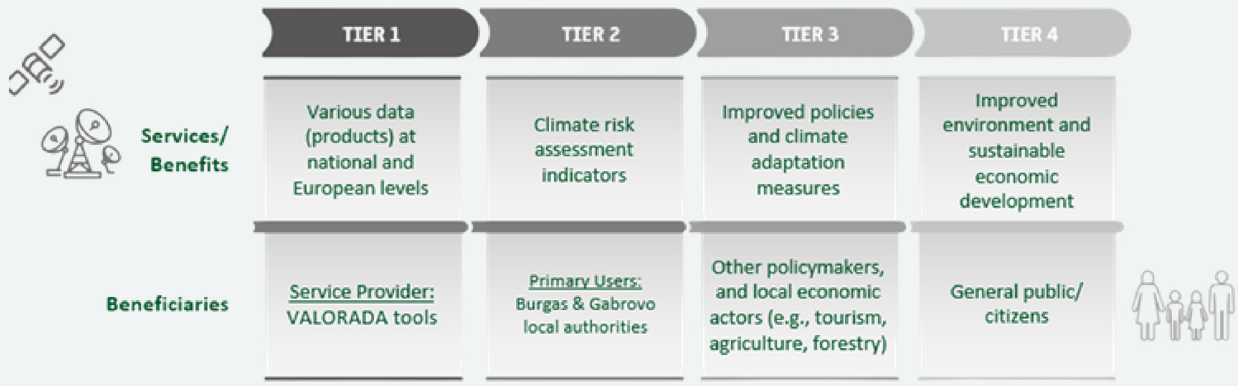


*Figure 4 Value chain for Burgas & Gabrovo*

[2] This strategy will be complemented by a new integrated framework for European climate resilience and risk management, which should be adopted by the end of 2026. This new framework aims to overcome existing barriers to climate adaptation and acknowledge the different nature of climate risks and impacts between EU members states and their regions.
[3] This information is then fed into national submissions to the European Environment Agency (EEA) and the European Commission. The regulation should be revised in 2026 to ensure an adequate response to the increasing impacts from climate change and other crises while fostering and supporting regional cooperation.

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## What are the benefits?

Using the VALORADA tools generates a wide range of scientific, regulatory, societal, economic and environmental benefits, strengthening the capacity for climate adaptation across the Burgas and Gabrovo areas.
By combining validated EO inputs with climate data and information, stakeholder-driven indicators and accessible dashboards, the tools improve the availability and usability of climate risk information. This supports more informed decision-making, more efficient governance processes and more resilient regional development. The following are some of the key benefits:

**Economic**

- Improves local resource allocation through turning non-climate data to support the decision-making (tier 2, 3)
- Minimises climate-related damages by enabling early detection of risks (tier 2, 3, 4)
- Enhances efficiency of infrastructure maintenance through predictive monitoring (tier 2, 3)

**Regulatory**

- Enables continuous monitoring of compliance with environmental and climate regulations (tier 1, 2, 3)
- Supports evaluation of policy effectiveness through long-term, consistent datasets (tier 1, 2, 3)

**Scientific**

- Advances understanding of climate processes through long-term observations (tier 1, 2, 3)
- Enables interdisciplinary research combining EO and socio-economic data (tier 1, 2, 3)

**Innovative/entrepreunarial**

- Enables the development of new EO-based services and climate adaptation solutions (tier 1)

**Societal**

- Can improve disaster preparedness and response, reducing risks to lives and property (tier 2, 3, 4)
- Enhances public awareness through visualisations of geospatial information (tier 2, 4)
- Informs citizens and stakeholders, fostering more engagement in climate adaptation issues (tier 2, 3 ,4)

**Environmental**

- Supports protection and restoration of ecosystems through continuous monitoring (tier 2, 3, 4)
- Enables early detection of environmental degradation (tier 1, 2,3)
- Improves management of natural resources such as water, soil, and biodiversity (tier 2, 3, 4)
- Tracks impacts of climate change on ecosystems (tier 1, 2, 3, 4)

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## Extended impact

The Bulgaria demonstrator shows how the same VALORADA methods can be replicated across other Bulgarian municipalities facing combined coastal, urban and forest-interface risks. Because the approach is based on documented indicators, co-developed impact chains and FAIR-aligned data handling, it supports scale-up beyond the two municipalities and contributes to the EU Adaptation Mission's objective of accelerating climate-resilience transformation in regions and cities.

Beyond Burgas and Gabrovo, VALORADA results already include transferable tools relevant for Bulgaria: the urban-vegetation observatory 'Landia' (adapted from the Occitanie case) and the Copernicus Risk Relay Web Portal (TAKT-IKI), which can be populated with local datasets and extended with additional indicators, including fire-risk layers. This provides a practical route for deployment through Bulgarian portals and municipal systems, while keeping the indicator logic consistent. Potential other users could include among others the Ministry of Environment and Water, the Ministry of Energy, the Ministry of Agriculture and Food, the General Directorate "Fire Safety and Civil Protection" and the National Regional Administration authorities.

At European level, the demonstrator strengthens interoperability: Copernicus-based indicators can be compared across regions, while local municipal layers retain value through transparent metadata, governance and traceability. This creates a concrete bridge between local knowledge and European EO and climate infrastructures.

## Contact us

https://www.valorada-project.eu

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