GEO Mountains Task Group 3: Meeting #2
NAP supplementary Guidelines

GEO MOUNTAINS
Observing Mountain Environments

Monday 16th March 2026, 14:00 - 15:30

MOUNTAIN RESEARCH INITIATIVE

Consiglio Nazionale delle Ricerche

ADAPTATION AT ALTITUDE
Taking Action in the Mountains

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

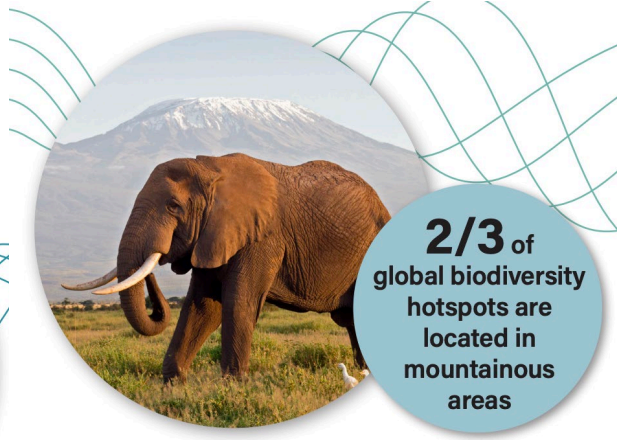
Swiss Agency for Development and Cooperation SDC

Housekeeping

- Please **raise your hand** to request the floor
- Any comments can be made / questions asked **in the chat**
- **The meeting is being recorded** – if you have any concerns about this, please let me know; **the recording will be made available upon request**
- **The slides will be circulated** to registered participants afterwards

Agenda

Item 1	Welcome and introductions
Item 2	Short updates from related initiatives (Zoï / UNIGE; EURAC)
Item 3	Background and objectives of the NAP Supplement initiative
Item 4	Positioning the supplement: scope, audience, and policy relevance
Item 5	Discussion of the proposed document structure
Item 6	Case studies and practical examples from other NAP supplements
Item 7	Contributors and drafting process
Item 8	Timeline and next steps

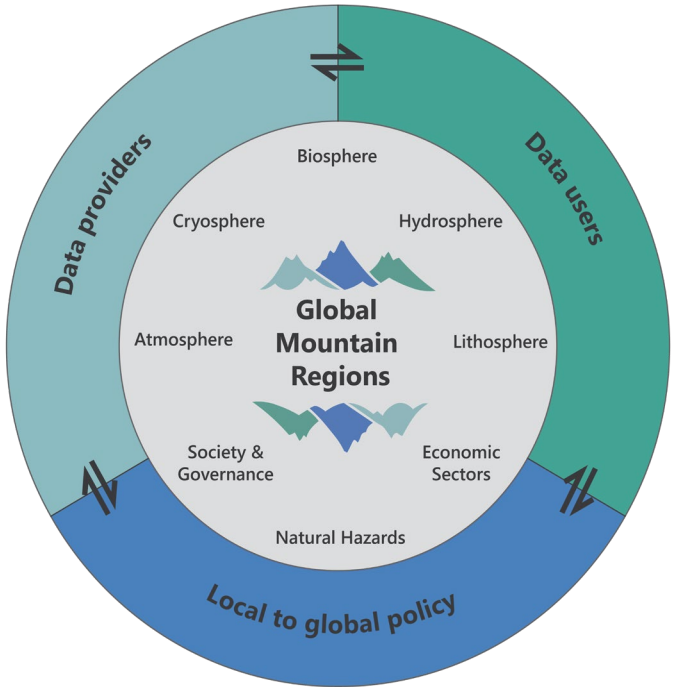


GEO Mountains

The Global Network for Observations and Information in Mountain Environments

Since 2016, the network has been a Group on Earth Observations (GEO) Work Programme Initiative, co-led by the Mountain Research Initiative (MRI) & the National Research Council of Italy (CNR)

- To **increase** the **discoverability**, **accessibility**, and **usability** of a wide range of **data and information** pertaining to **mountains globally**
- To **integrate** and **apply** such data and information for **scientific**, **policy**, and **practical impact**
- To **build**, **connect**, **coordinate**, and **share capacity** across **a community** of mountain researchers, practitioners, and policy makers



https://geomountains.org/

Adaptation at Altitude

- The **Swiss Agency for Development and Cooperation (SDC)** continues support the GEO Mountains Secretariat and network activities (via the Mountain Research Initiative) under the Adaptation at Altitude Programme from **2024 – 2027**

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MOUNTAIN RESEARCH INITIATIVE

CONDESAN
Consorcio para el Desarrollo Sostenible de la Ecorregión Andina

ICIMOD

UN environment programme

SEI Stockholm Environment Institute

UNIVERSITÉ DE GENÈVE

ZOÏ environment network

https://adaptationataltitude.org/

Agenda Item 2 – Short updates from related initiatives

Johanna Zwahlen – Zoï Environmental Network

Claudia Notarnicola - EURAC

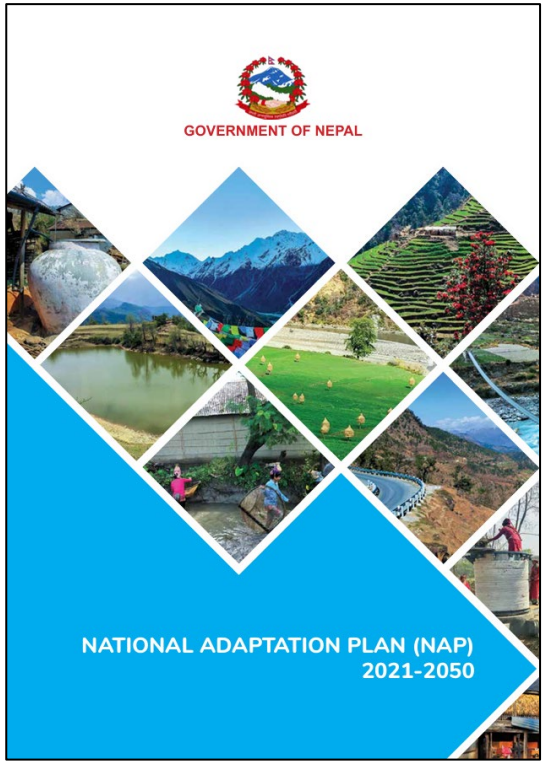
Agenda Item 3 – Background and Objectives

Quick Refresher on NAPs

National Adaptation Plans (NAPs) are **strategic planning processes** established under the UNFCCC's Cancun Adaptation Framework (2010). They help countries:

- ❑ Identify medium- and long-term climate adaptation needs
- ❑ Integrate adaptation into national development planning
- ❑ Apply for international adaptation financing (GCF / LDC fund etc)

- ❑ **All developing countries** are invited (not legally required) to formulate NAPs
- ❑ **Least Developed Countries (LDCs) are a particular focus**, as NAPs build on earlier efforts like National Adaptation Programmes of Action (NAPAs)
- ❑ Non-LDC developing countries are also encouraged to engage in the NAP process
- ❑ To date 75 countries have developed NAPs



https://www.napcentral.org/submitted-naps

What are NAP Technical Guidelines?

- The **NAP Technical Guidelines**, developed by the Least Developed Countries Expert Group, provide **practical guidance** to countries on how to **design and implement NAPs**.
- The guidelines are **flexible** and **non-prescriptive**, allowing countries to **adapt the process** to their national circumstances and institutional capacities.
- While the NAP Technical Guidelines provide a general framework for national adaptation planning, many countries require more detailed guidance on specific themes, sectors, or contexts.
- While the guidelines provide a framework for national adaptation planning, **guidance on how to address specific contexts such as mountain regions remains limited**.

https://napcentral.org/nap-guidelines

What are “NAP Supplementary Materials”?

- The NAP Technical Guidelines are supported by a range of supplementary guidance documents that provide more detailed technical advice.
- These materials help countries translate the general NAP framework into practical approaches for specific sectors, themes, and policy challenges.
- Supplementary guidance is typically developed by UN agencies, expert groups, and partner organisations working with the UNFCCC.
- To support the NAP process, the UNFCCC and its partners have developed a range of supplementary technical materials that provide more detailed guidance on specific sectors and themes.

https://napcentral.org/supplementary-materials-library

Why a NAP Technical Supplement on Mountains?

1. Mountains are critical for climate adaptation

- ❑ Cover ~25% of the Earth's land surface
- ❑ Provide freshwater for more than half of the world's population
- ❑ Climate impacts in mountains trigger floods, landslides, droughts and downstream risks
- ❑ Mountain communities are often socially and economically vulnerable

2. Yet mountains remain underrepresented in NAPs

- ❑ Zoï's analysis of 46 National Adaptation Plans shows:
  - ❑ 75% mention mountains
  - ❑ 60% describe climate impacts in mountains
  - ❑ Only 40% include specific adaptation actions

https://adaptationataltitude.org/wp-content/uploads/2023/12/aaa-brochure-nap-final.pdf

➞ Recognition exists, but implementation gaps remain

3. Opportunity

- ❑ A technical supplement can help countries:
  - ❑ Translate mountain climate risks into adaptation actions
  - ❑ Use Earth observation and monitoring to address data gaps
  - ❑ Integrate mountain adaptation across sectors and scales

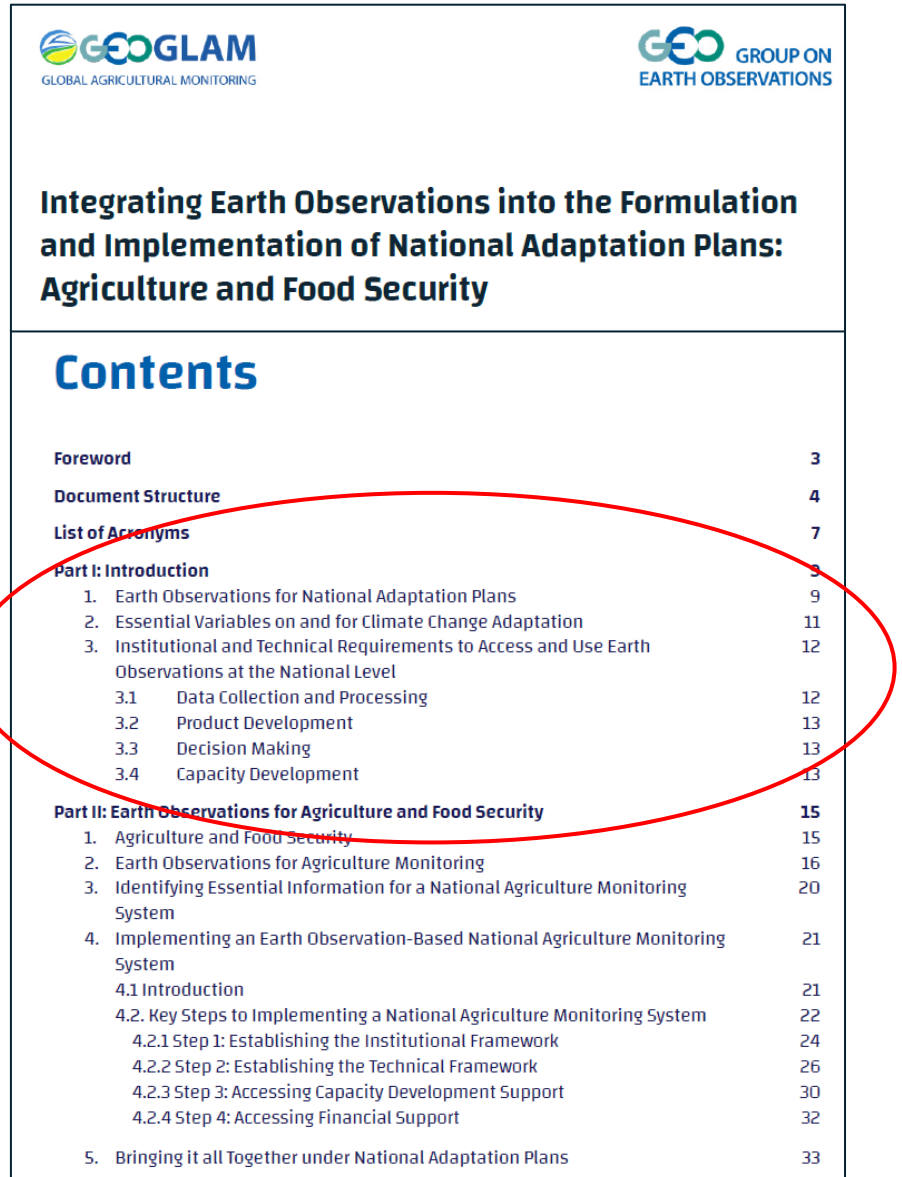
Mountains are widely recognised in country NAPs — but practical guidance for adaptation planning is still missing.

Agenda Item 4 – Positioning the supplement: scope, audience, and policy relevance

Scope of the Supplement

- ❑ Initial concept: a supplement focused on Earth Observation for mountain adaptation.
- ❑ However, the existing supplement developed by GEOGLAM already provides detailed guidance on the use of Earth observations in NAP processes.
- ❑ A supplement focused narrowly on EO for mountains would risk replicating existing EO-focused guidance.
- ❑ The proposed approach therefore shifts the focus to mountain adaptation challenges, while positioning Earth observation and monitoring as enabling tools within that context.

Q → Does a mountain-focused supplement provide the most useful contribution within the existing NAP guidance ecosystem?



GEOGLAM GLOBAL AGRICULTURAL MONITORING

GEO GROUP ON EARTH OBSERVATIONS

Integrating Earth Observations into the Formulation and Implementation of National Adaptation Plans: Agriculture and Food Security

Contents

Positioning the supplement: scope, audience, and policy relevance

Target Audience

- ❑ The NAP Technical Guidelines are primarily designed to support developing countries preparing and implementing National Adaptation Plans.
- ❑ In practice, NAPs are often prepared by national climate change units or NAP coordination teams, typically located in environment or climate ministries.
- ❑ This has implications for how supplementary guidance should be written:
  - ❑ Guidance should be policy-relevant and practical
  - ❑ Language should be clear and accessible, avoiding overly technical terminology
  - ❑ Technical tools (e.g. Earth observation and monitoring) should be presented in applied and decision-relevant ways

Q → How can the supplement best support **NAP practitioners and policymakers**, while still drawing on the expertise of the EO and mountain research communities?

Positioning the supplement: scope, audience, and policy relevance

Policy Relevance

- ❑ The supplement could support countries by:
  - ❑ Identifying mountain climate risks into translating these into concrete adaptation actions
  - ❑ Addressing data and monitoring gaps in mountain regions
  - ❑ Providing case studies and examples from mountain adaptation initiatives
  - ❑ Supporting evidence-based planning and investment decisions

Q → What would make this supplement **most useful for countries developing or updating NAPs**?

Agenda Item 5 – Discussion of proposed structure

Possible Structure of the Supplement

Many NAP supplementary materials follow a two-part structure:

Part 1: Context and issues

Framing mountain adaptation and the role of Earth observation in national planning

This part situates mountain regions within the National Adaptation Plan (NAP) process and clarifies how Earth observation (EO) can support national adaptation planning, implementation, and monitoring in mountain contexts. It introduces the rationale for focusing on mountains, outlines common mountain-related adaptation challenges identified in NAPs, and explains how EO and related observation systems can contribute at different stages of the NAP cycle.

Part 1 is intended to orient NAP teams, policymakers, and technical practitioners to both the NAP process and the role of EO, providing a shared conceptual foundation before moving to practical application.

Part 2 – Applying EO for Mountain Adaptation

Practical guidance for using EO in mountain-relevant adaptation domains

This part provides practical, application-oriented guidance on how Earth observation can be used to support adaptation planning, implementation, and monitoring in mountain regions. Building on the NAP-cycle framing introduced in Part 1, it focuses on key mountain adaptation domains where EO has demonstrated value, including water security, disaster risk reduction, ecosystem-based adaptation, and mountain livelihoods and infrastructure.

Each section highlights common adaptation questions faced by NAP teams, relevant EO-derived indicators and datasets, and illustrative workflows. Short case examples are presented in standalone text boxes to demonstrate how EO has been applied in practice to inform adaptation decisions or track outcomes in mountain contexts.

Discussion of proposed structure

Part I – Mountains, Adaptation, and Earth Observation in the NAP Context

- ❑ Importance of mountain regions for climate adaptation
- ❑ Distinctive risks and vulnerabilities in mountain systems
- ❑ Entry points for mountain issues within the NAP process
- ❑ Role of Earth Observation as a decision-support system
- ❑ Complementarity between satellite EO, in-situ monitoring, and other knowledge systems

Part 2 – Applying Earth Observation Systems to Mountain Adaptation Priorities

- ❑ Mountain adaptation challenges and information needs
- ❑ EO-supported information for key mountain systems and risks
  - ❑ Hydro-meteorological hazards
  - ❑ Water and cryosphere systems
  - ❑ Ecosystems and land use
  - ❑ Mountain livelihoods and agriculture
- ❑ Translating adaptation priorities into EO-based monitoring systems
- ❑ Institutional arrangements and technical frameworks
- ❑ Integration into NAP monitoring, evaluation and learning
- ❑ Case study boxes will be used throughout to illustrate practical applications.

Q → Should we have a stronger emphasis on Mountain ecosystems in a changing climate or a mix of Mountains and Earth Observations is fine?

Agenda Item 6 – Case studies and Practical Examples

Role of case studies in NAP supplements

- NAP supplementary materials often include short case study boxes along relevant sections of the document to illustrate practical applications.
- These examples are typically concise (200–300 words) and highlight real experiences from countries or programmes.
- They help translate technical guidance into practical implementation examples.
- Case studies often highlight:
  - Institutional arrangements
  - Use of data and monitoring systems
  - Practical adaptation actions
  - Lessons learned for NAP implementation

Case studies from GEO Blue Planet and GEOGLAM

Copernicus services

By Mercator Ocean International

ARTICLE

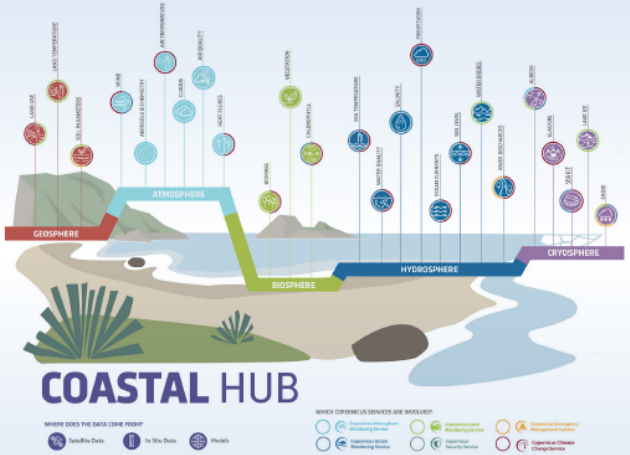
The European Union's Earth observation programme Copernicus integrates satellite, in-situ and modelling data to provide free, accessible services for monitoring the planet and environment. It delivers near-real-time and historical datasets for applications like urban management, agriculture, disaster response, MSP and climate monitoring. Policymakers and organizations use Copernicus to inform decisions, develop policies and create tailored value-added services, fostering sustainability and innovation.

One of six Copernicus services, Copernicus Marine Service delivers daily historical and forecasting information on ocean dynamics and ecosystems for global and European seas. It provides key inputs that support major policies and initiatives contributing to combating pollution, marine protection, maritime activities, climate monitoring and more.

This global service provides free, open and immediate access to scientifically validated and regularly updated information on the physical and biogeochemical state of the global ocean.

Key offerings supporting policy and decision-making include:

- Ocean observation and model products (including currents, temperature, wind, wave, salinity, sea level, sea ice and biogeochemistry)
- Annual ocean state reports
- Ocean monitoring indicators
- Visualization tools



Another service of the Copernicus programme is the Copernicus Coastal Hub. It offers open and free Earth observation data focused on coastal zones, encompassing air, sea and land products from the different Copernicus services. This data provides insights into the coastal environment and the intricate land–sea continuum through a wide range of variables. Only focused on the European coasts at this stage, it provides the first land-to-sea coastal approach to data and service providing.

Coastline erosion

By Lisa Rebello (Digital Earth Africa)

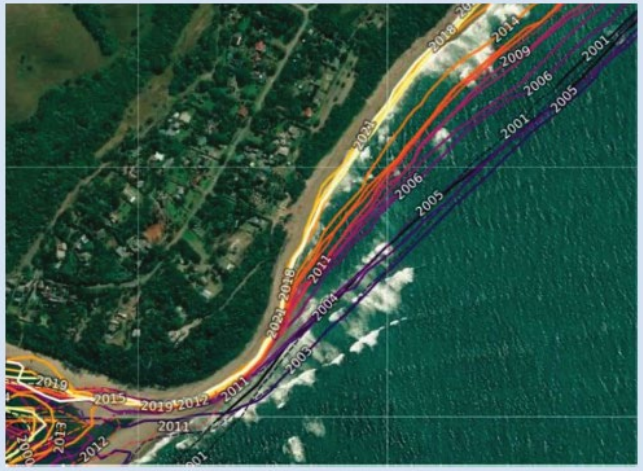
ARTICLE

South Africa's 2,798 km coastline faces escalating risks from climate change and environmental degradation. Coastal erosion is a persistent challenge, arising from natural forces like wave energy and climate change-induced sea level rise, compounded by human activities such as urbanization and sand mining. Coastal areas are increasingly vulnerable to erosion, with far-reaching environmental, health and socioeconomic impacts.

Satellite Earth observations offer critical solutions for monitoring and managing these risks. Cloud-based platforms such as Digital Earth Africa provide continuous data on coastal dynamics, enabling informed decision-making for sustainable management. The South African Environmental Observation Network emphasizes the value of these tools in addressing coastal risks in South Africa (https://sarva.saeon.ac.za/coastal-vulnerability).

Digital Earth Africa's Coastline Monitoring Service documents annual changes since 2000, indicating that the coastline near the Tugela River mouth has retreated inland by 14 m (approximately 1.5 m per year) since 2000. This shoreline was the most seaward in 2003 and the most landward in 2020. Since 2000, the median annual position of the shoreline has moved approximately 257 m and demonstrates a clear long-term pattern of coastal erosion, which, without proactive measures being implemented will devastate the local community and tourism in the area.

Source: https://digitalearthafrica.org



Digital Earth Africa Coastlines Monitoring Service shows that the coastline near the Tugela River mouth in South Africa has retreated inland by 14 m since 2000

Source: https://maps.digitalearth.africa/#share=s-sCTUTXQmMIPjqznIW1mDa70P8m5

Box E: Eastern Africa Crop Monitor

In this example, the East African Crop Monitor (EACM) makes use of EO and ground data to monitor crop conditions in the region. Agricultural monitoring is vital in detecting short-term deficits in crop productivity in response to a range of drivers, especially in areas frequently impacted by high cases of food insecurity.

This bulletin provides timely monthly warnings of agricultural production deficits (hotspots) in rain-fed systems. The example here is from the month of August 2022, a particularly challenging time due to extended drought in the region. This report is part of an operational EWS for food security crises prevention and response planning anticipation in Eastern Africa region.

Lead agency: IGAD Climate Prediction and Applications Center (ICPAC)

Partners: Eastern Africa Grain Council (EAGC). The EAGC is a grain trade, not for profit, organization focused on market constraints to trade.

Product: Eastern Africa Regional Food Security Bulletin

Systems utilized: ICPAC Crop Monitor System, GLAM, EWX, ASAP

Co-development partner: GEOGLAM - African Union Commission, Global Monitoring for Environment and Security (GMES) & Africa, NASA (National Aeronautics and Space Administration) Harvest/University of Maryland, SERVIR E&SA/RCMRD, JRC

Inputs from: The Greater Horn of Africa Climate Outlook Forums (GHACOF). The GHACOF brings together climate scientists, meteorologists, and experts from multiple sectors to evaluate potential impacts of the seasonal forecast and co-produce mitigation measures.

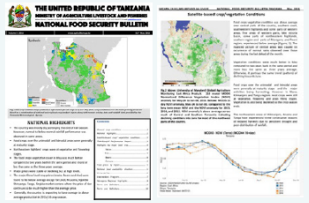
Contributions from National Representatives from ICPAC member countries: Kenya, Sudan, Uganda, Rwanda, Burundi, Ethiopia, Somalia, Djibouti, Eritrea, South Sudan and Tanzania.

Figure 6 - Example of Bulletin prepared by ICPAC for Eastern Africa

Box D: The Tanzania Crop Monitor Set-up and Operation

The first GEOGLAM National Crop Monitor was developed with the Tanzania Ministry of Agriculture (MoA) National Food Security Division (NFSD). NFSD is mandated to monitor and report on the country's food security status. The Crop Monitors are custom-built web-GIS-based interfaces that allow analysts to access and input crop conditions assessments based on EO data and field reports that are later summarized into easily interpretable map reports. Through joint needs assessments and training events, NFSD opted to include remote sensing-based inputs to enhance their national food security bulletin, capitalizing on the fact that EO data were readily accessible from the customized version of the GLAM system for every region in the country, and combined with field observations, simple reports could be compiled using the newly developed Tanzania Crop Monitor system. The team trained on the use of remote sensing information from GLAM that complemented the ministry's existing data collection systems and, since 2015, has integrated this into regular reports from NFSD. In 2019 the NFSD team was introduced to the Early Warning eXplorer (EWX), which became a core source of data for agrometeorological indicators. EWX is a web-based single-page application for geo-spatial data mainly related to monitoring agricultural drought and providing early warning information. The EWX provides easy and routine access to critical EO with the primary goal of enhancing its application for disaster mitigation and supporting long-term adaptation and resilience. NFSD sources additional data from Tanzania's Meteorological Authority and the Ministry of Trade.

Figure 5 - Example of National Food Security Bulletin for Tanzania produced by the Ministry of Agriculture, Livestock and Fisheries



Lead agency: Ministry of Agriculture, Tanzania

Supporting University: Sokoine University of Agriculture

Product: National Food Security Bulletin

Systems utilized: GLAM, Tanzania Crop Monitor, Early Warning Explorer

Co-development partner: GEOGLAM-University of Maryland/ NASA Harvest

Case studies and Practical Examples

Possible roles of case studies in this supplement

Case studies could help illustrate:

- ❑ How mountain risks are identified and monitored
- ❑ How EO and in-situ observations support adaptation decisions
- ❑ Institutional arrangements for monitoring and adaptation planning
- ❑ Integration of different knowledge systems
- ❑ Practical examples of mountain adaptation initiatives
- ❑ ….

Q → Where in the document would **case studies be most useful to support NAP practitioners?**

- ❑ Risk assessment and monitoring
  - ❑ X, Y, Z
- ❑ Sector-specific adaptation challenges
- ❑ Institutional coordination
- ❑ Indigenous Knowledge as EO
- ❑ Monitoring, evaluation and learning

Case studies and Practical Examples

Proposed Case Study Format (200-300 words)

Title
Short descriptive title of the example

Context
Country / region and adaptation challenge being addressed

Lead institutions
Key agencies or partners involved

Approach
How EO, monitoring, or other knowledge systems were used

Relevance for NAPs
How this supports adaptation planning, monitoring, or decision-making

Key lesson
One or two takeaways for NAP practitioners

Q → Who can contribute case studies**?**

Case studies and Practical Examples

Possible Case Studies (200-300 words)

1. Mountain Hazard Monitoring and Early Warning
Illustrates:
- ❑ EO and in-situ observations for landslides, floods, glacier hazards
- ❑ Integration into early warning systems

2. Monitoring Cryosphere Change for Water Planning
Illustrates:
- ❑ Snowpack, glacier, and seasonal water monitoring
- ❑ EO + hydrological modelling for water resource planning

3. Ecosystem and Land-Use Change Monitoring
Illustrates:
- ❑ EO-supported monitoring of forests, rangelands, alpine ecosystems
- ❑ Links to biodiversity and ecosystem-based adaptation

4. EO-Supported Mountain Agriculture Monitoring
Illustrates:
- ❑ Monitoring climate impacts on high-altitude farming systems
- ❑ Early warning for drought or crop stress

5. National EO Monitoring Systems Supporting NAPs
Illustrates:
- ❑ Institutional arrangements for national adaptation monitoring
- ❑ Integration of EO platforms with national agencies

6. Integrating EO with Indigenous and Local Knowledge
Illustrates:
- ❑ Complementarity between satellite data and local observations
- ❑ Co-production of knowledge for adaptation decisions

Agenda Item 7 – Contributors and Drafting Process

Approach to developing the supplement

- ❑ The supplement will be developed through a collaborative drafting process, coordinated by GEO Mountains and led by a small coordination group.
- ❑ Contributions from TG3 members and identified partner organisations will help ensure the guidance reflects diverse mountain contexts and technical expertise.

Possible Contribution Types

Participants could contribute through:

- ❑ Drafting or co-authoring specific sections
- ❑ Providing technical input or review
- ❑ Contributing short case studies (200–300 words)
- ❑ Sharing relevant tools, data sources, or platforms

Coordination and Contributions

Small coordination group

❑ To help move the process forward between meetings, we could establish a small coordination **group of institutions** working on mountain adaptation and monitoring.

Possible role

- ❑ Help guide the overall drafting process
- ❑ Coordinate inputs to key sections
- ❑ Identify case studies and examples
- ❑ Provide technical review
- ❑ Support engagement with relevant networks

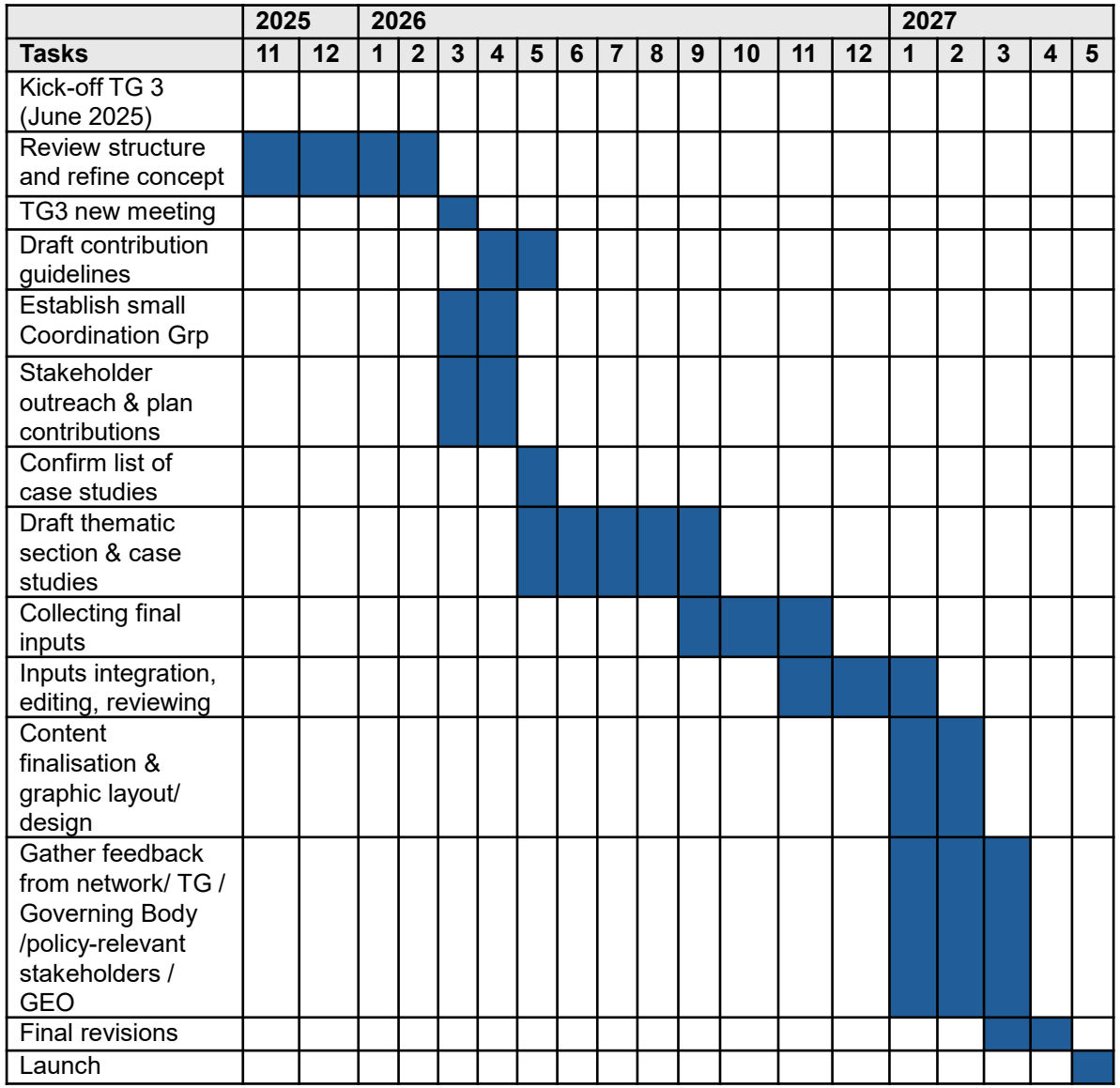
Shared contributions document

To facilitate collaboration, we have made a simple online document (Google Sheet) where participants can:

- ❑ Indicate sections they might contribute to
- ❑ Suggest case study examples
- ❑ Express interest in joining the coordination group

Shared document for contributions
https://docs.google.com/spreadsheets/d/1pqFGiNa0JX7IeXna4YsiqAUgmorh2A7MqCIt008zix0/edit?usp=sharing

Ageda Item 8 – Timeline and Next Steps



Indicative timeline

- **March–April 2026**

Refinement of document scope and structure
Identification of contributors and case studies

- **May–Sept 2026**

Preparation of **first draft contributions**

- **Late-2026**

Review by TG3 members and partner organisations

- **First half of 2027**

Revision and preparation of the **final supplement**

Immediate next steps

- Circulate **shared contributions document** (Google Sheet)
- Establish a **small coordination group**
- Confirm **section leads and case study contributions**
- Begin drafting initial sections

Wrap up and Closing

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Observing Mountain Environments

Key questions for the group

- ❑ Does the overall scope and positioning of the supplement make sense?
- ❑ Does the proposed structure work?
- ❑ Where would case studies be most useful?
- ❑ Who might be interested in contributing to sections or examples?

Some advice given the GEO Mountains

- Bearing in mind the intended readership, keep the document **as concise as possible**
- Supplements can both **raise topics / issues which may be currently underrepresented or overlooked in NAPs** *and/or* seek to support countries in **addressing priorities that have already been identified**
- Such supplements are ultimately intended to assist **NAP implementation**; consider what could be done to ensure that this product is not "just another document"! (e.g. provide supporting case studies / examples / data / code / notebooks to support replication / transfer?)
- Continue engagement with the **UNFCCC Secretariat / seek to have the product endorsed**
- Don't underestimate the amount of work involved / time requires (including consultation steps and final copy-editing / typesetting)