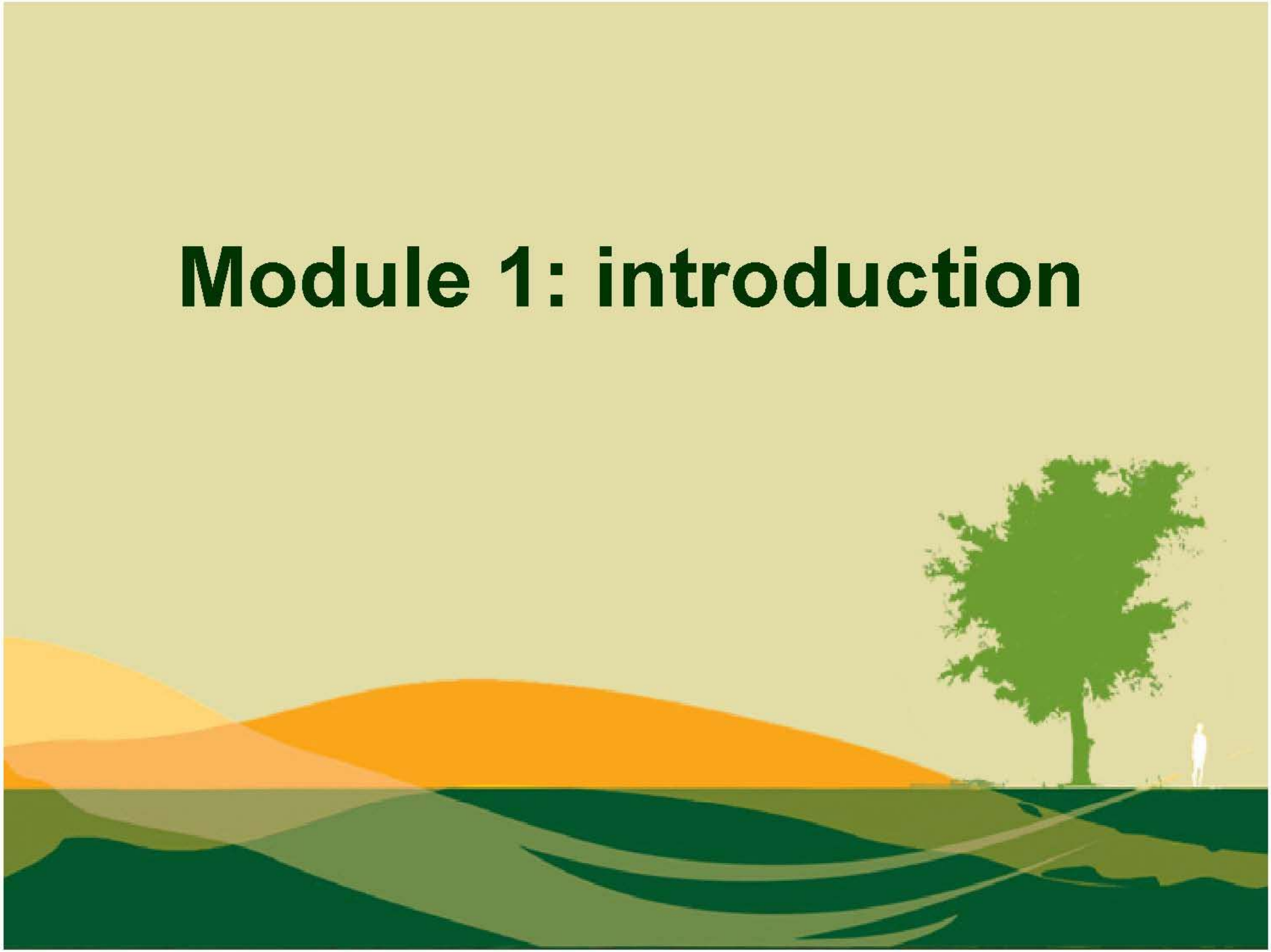
Module 1: introduction



Die FAO: mandate

Food and Agriculture Organization of the United Nations

for a world without hunger

FAO's mandate is to raise levels of **nutrition**, improve **agricultural productivity**, better the lives of **rural populations** and contribute to the **growth of the world economy**.

FAO offices: a worldwide network

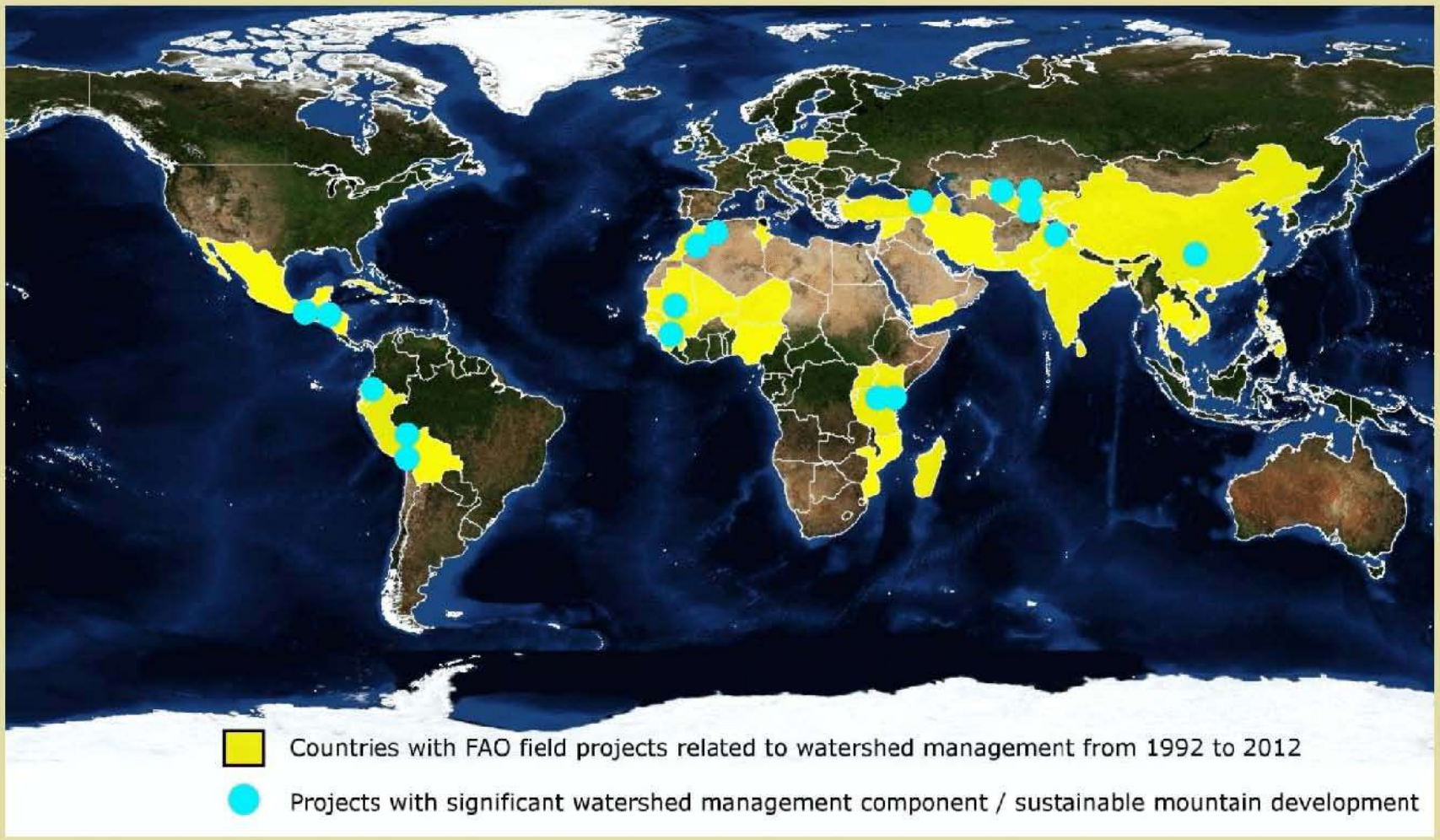
Watershed management and mountains team of FAO

Topics:	Types of work:
Watershed management	**Normative activities**
Mountain development	**Field projects**
Forests and water	International processes

Inter-departmental collaboration

Mountain Partnership

FAO's WM and SMD field projects, 1992-2012



Introduction to watershed management

Outline of the morning session

Module 1: introduction

Module 2: clarifying terminology

Coffee break

Module 3: the new generation of WM

Module 4: image interpretation

Module 5: scale issues in WM

Introduction to watershed management

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Module 6: disaster risk management and WM

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Reading a watershed landscape

Watershed / catchment (I)

- A **watershed** is the geographical are drained by a water course. The concept applies to units ranging from a farm crossed by a creek (a micro-watershed) to large river or lake basins.

- A **catchment** is the area drained by a river or body of water and is also called *catchment basin*.

Watershed / catchment (II)

River basin

- A **river basin** corresponds to the complex system of watersheds and sub-watersheds crossed by a major river and its tributaries while flowing from the source to the mouth.

Watershed management

- **Watershed management** is any human action aimed at ensuring a sustainable use of watershed resources;
- ..... promotes more efficient use of natural resources and improved livelihood situation;
- ..... applies by definition a landscape approach;
- ..... contributes to food security.

Characteristics of watersheds

- Mosaic of landuse systems;
- Altitudinal gradient, slopes;
- Upstream-downstream linkages;
- Different exposure;
- Nature-human interactions;
- Hierarchy of water courses;
- etc.

Watershed services

- Freshwater, flow regulation;
- Forests (timber, fuelwood);
- NR for local livelihoods;
- Energy;
- Biodiversity;
- Fertilization of lowlands;
- High quality products;
- Minerals, mining;
- Recreation;
- etc.

Risks and threats (I): population growth, abandonment

Risks and threats (II): pressure on NR, degradation, desertification

Risks and threats (III): increasing hazards

Risks and threats (IV): infrastructure

Risks and threats (V): reforestation with non-native species

Risks and threats (VI): climate change

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History of WM (I)

- Prior to 1950: recognition of the problem
- 1950-1980: enthusiasm phase
- 1980-1995: expansion phase (1985: expert consultation at ICIMOD)
- 1995-2000: controversial phase
- **2001- reflection and consolidation phase**

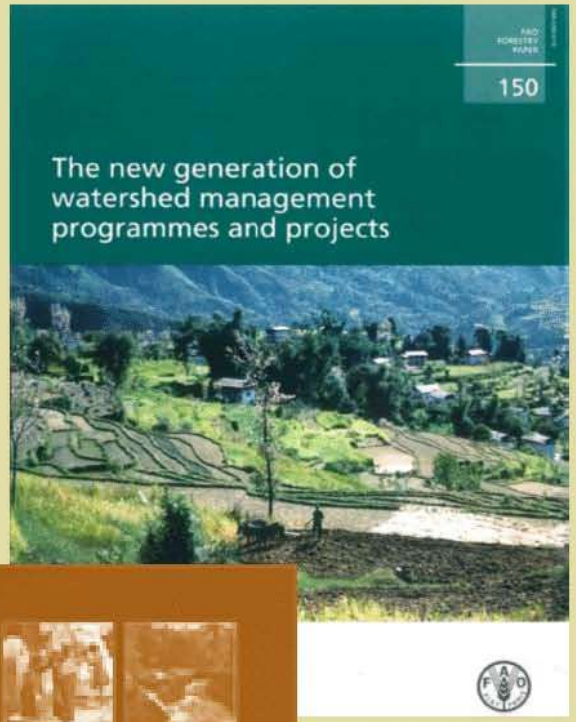
History of WM (II)

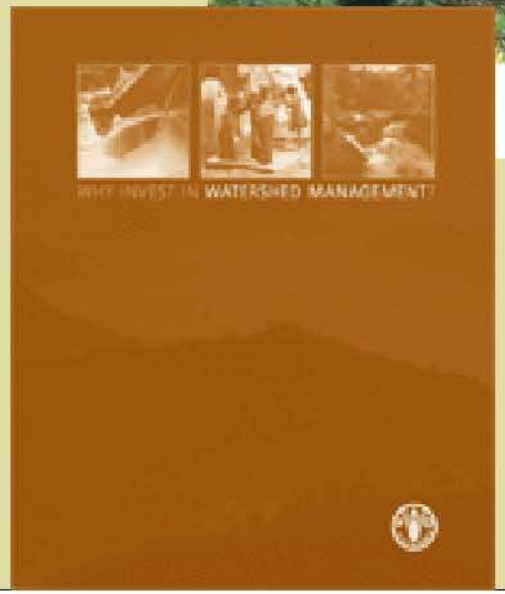
Watershed management in chapter 13 of Agenda 21:

- Programme area A: generating and strengthening knowledge about the ecology and sustainable development of mountain ecosystems;
- **Programme area B: promoting integrated watershed development and alternative livelihood opportunities.**

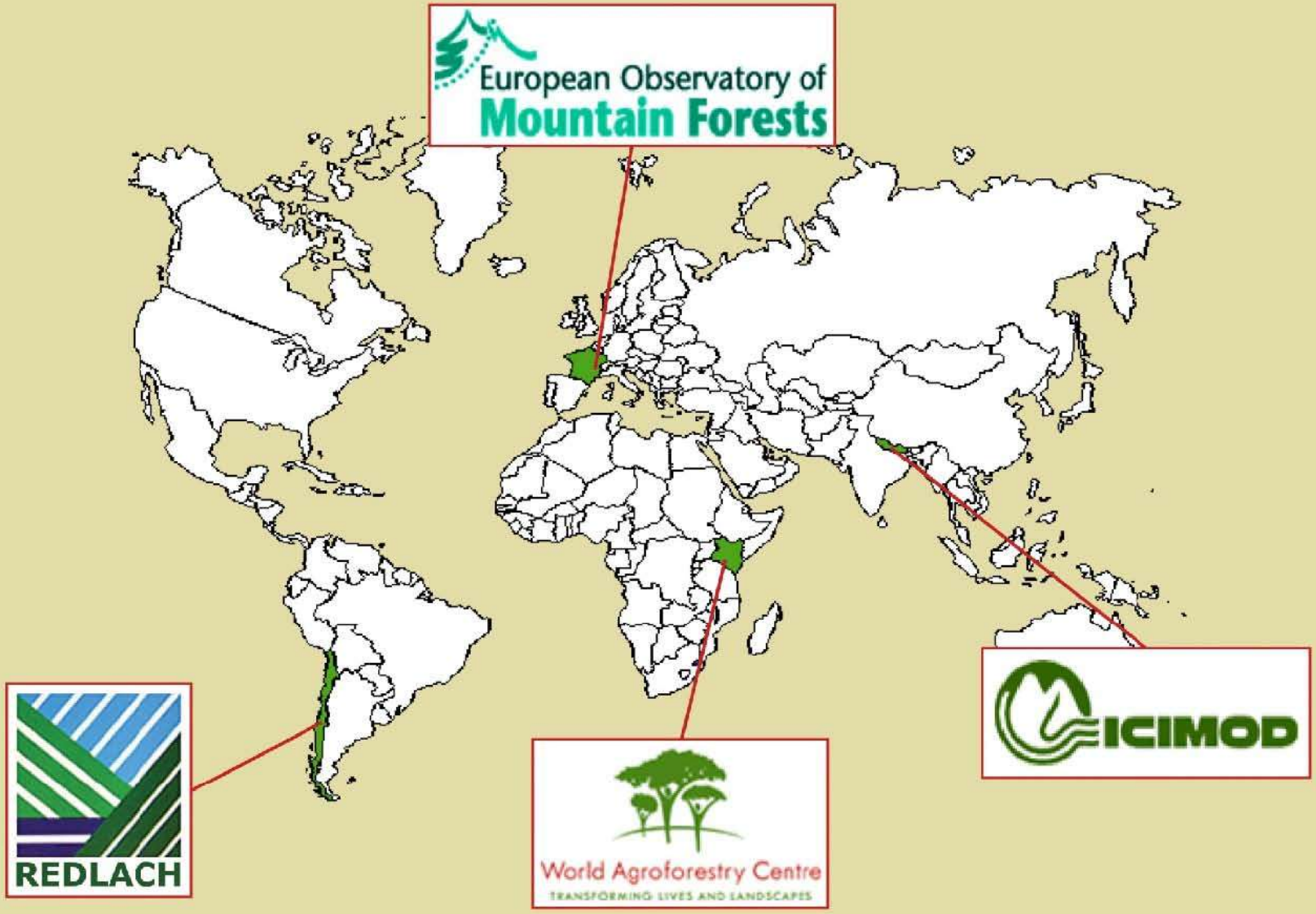
FAO-promoted WM review (I): steps

- Stock-taking;
- Review of FAO projects;
- Regional workshops (Aleppo, Megève, Arequipa, Kathmandu, Nairobi);
- Global conference (Sardinia);
- Proceedings and case studies;
- Analysis and synthesis.





FAO-promoted WM review (II): key partners



FAO-promoted WM review (III): key actors (selection)

UN Organizations	Other Organizations and Networks
FAO	EU
IFAD	IUCN
UNESCO	CGIAR
UNDP	OAS
UNEP	GEF
UNU	IUFRO
	CONDESAN

FAO-promoted WM review (IV): key actors (selection)

Bilateral Donors

CDE

DFID

DANIDA

EPA

GTZ

IDRC

IRD

SIDA

Banks

ADB

AfDB

IADB

WB

NGO's

ICIMOD

IIED

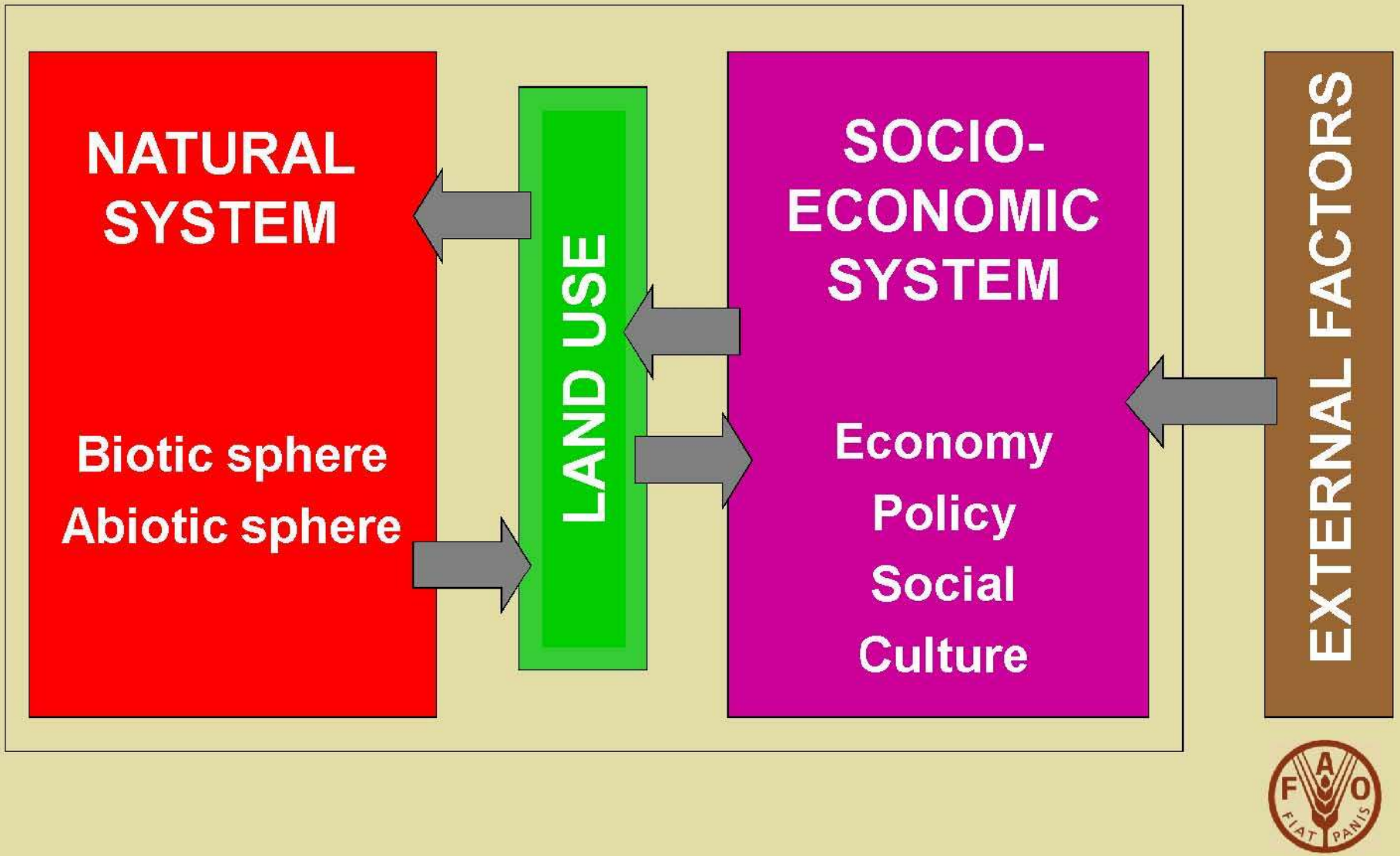
TMI

WWF

1. Treating symptoms → treating underlying causes

2. Common myths → scientific evidence

3. Sectoral→ integrated approach



4. Fragmented → holistic planning and implementation

5. High investment → low cost
Donation → co-financing

6. Institutional arrangements

7. Bottom up or top down → bottom up and top down

8. Women involvement → balance in decision making

9. Payment for ecosystem services (PES)

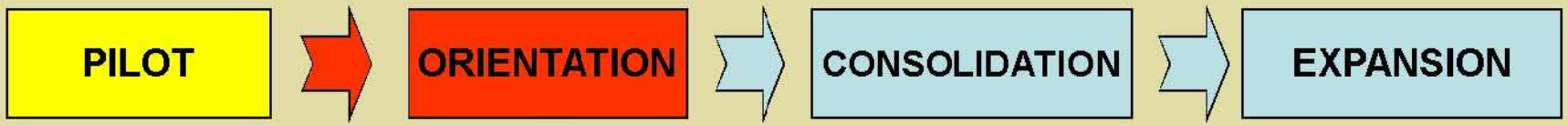
10. Capacity development

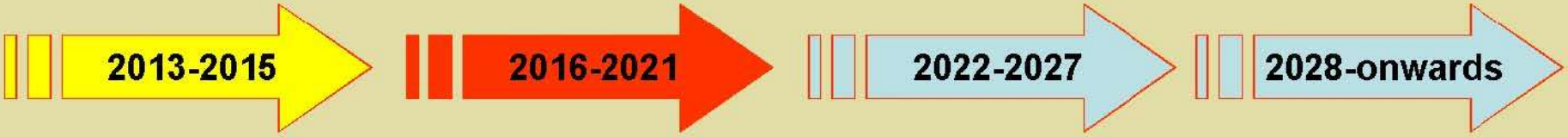
11. Monitoring & evaluation

Current practice	Desirable practice
Focus on on-site and short term effects	Also consider off-site effects
“Quick and dirty” assessments	Continuing action-research
Project performance	Problem solving

12. Project design

WM project format	WM service format
Rigid	Open, flexible, adaptive
Short-term (5-10 years)	Long-term (open-ended)





Introduction to watershed management
13.7.2013

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Project question

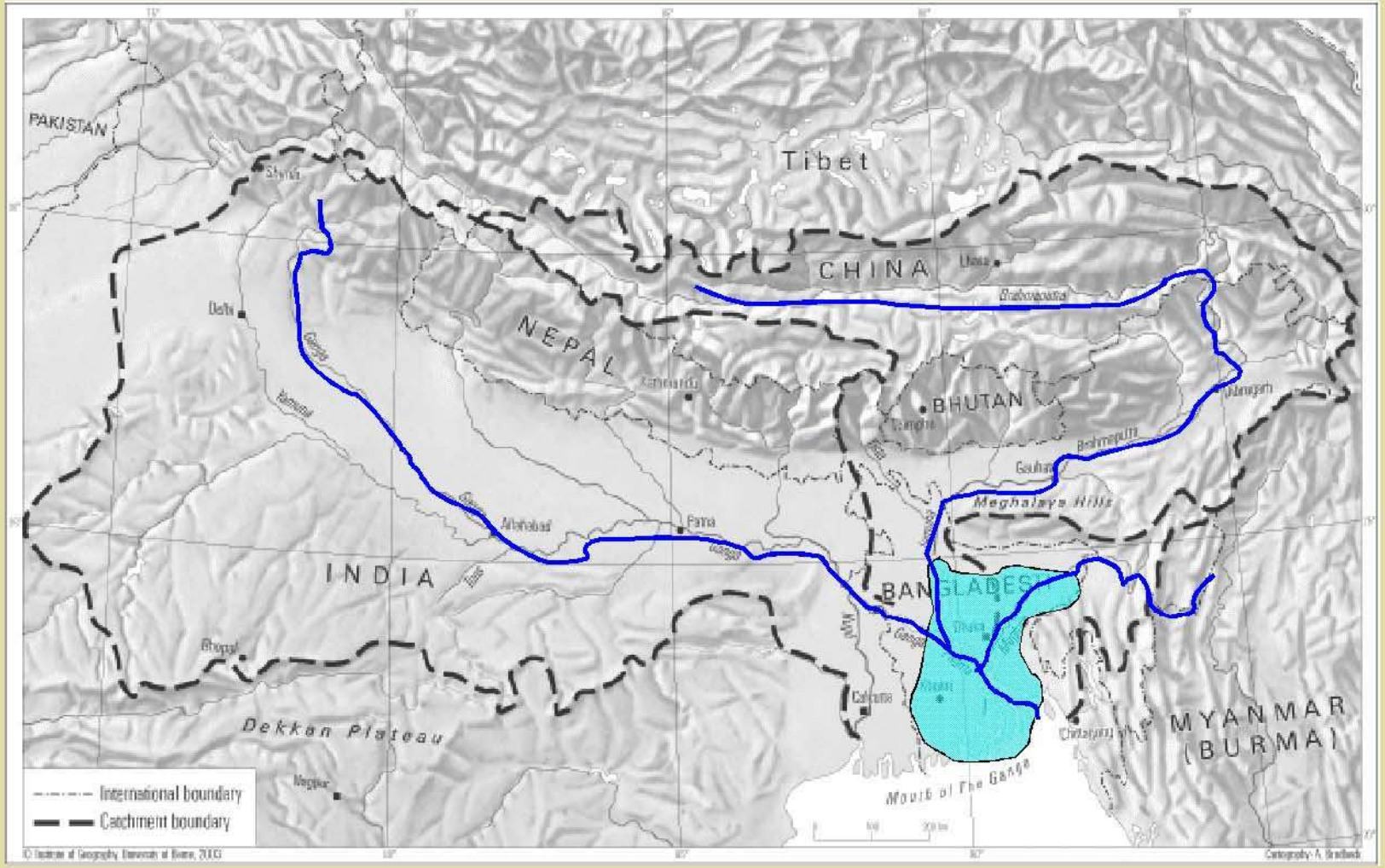
Overall question:

Is deforestation in the Himalayas responsible for the floods in Bangladesh?

Specific question:

What is the hydrological contribution from the Himalayas to the floods in Bangladesh?

Study area


PAKISTAN
Tibet
CHINA
NEPAL
BHUTAN
INDIA
BANGLADESH
MYANMAR
(BURMA)
Delhi
Patna
Bhopal
Dekkan Plateau
Meghalaya Hills
Mouth of the Ganga
International boundary
Catchment boundary

Data situation

Political sensitivity;

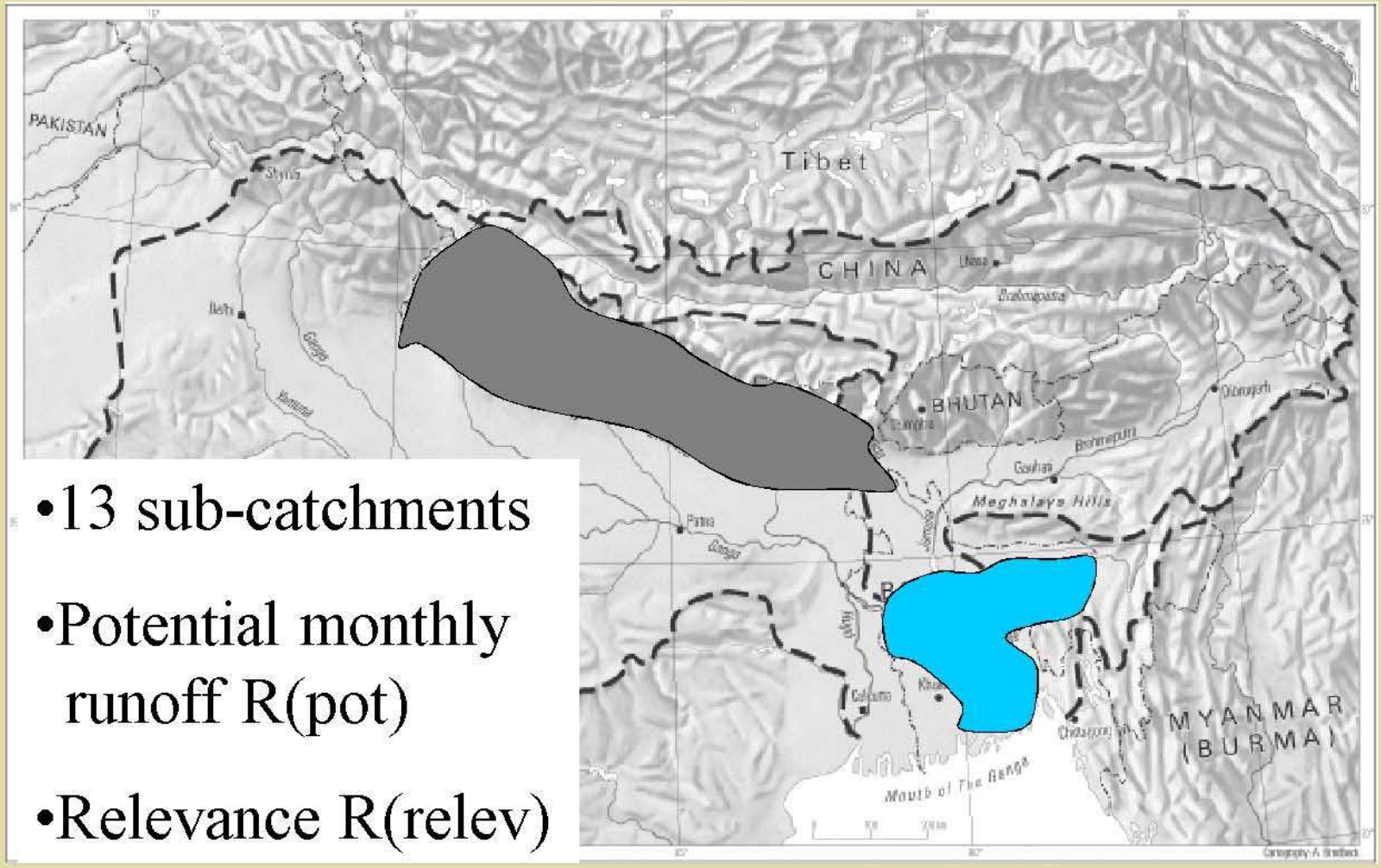
Classification of hydrological information;

Low density of stations;

Low temporal resolution of data;

Need to develop a particular methodology.

Methodology (I)



- 13 sub-catchments
- Potential monthly runoff R(pot)
- Relevance R(relev)

Methodology (II)

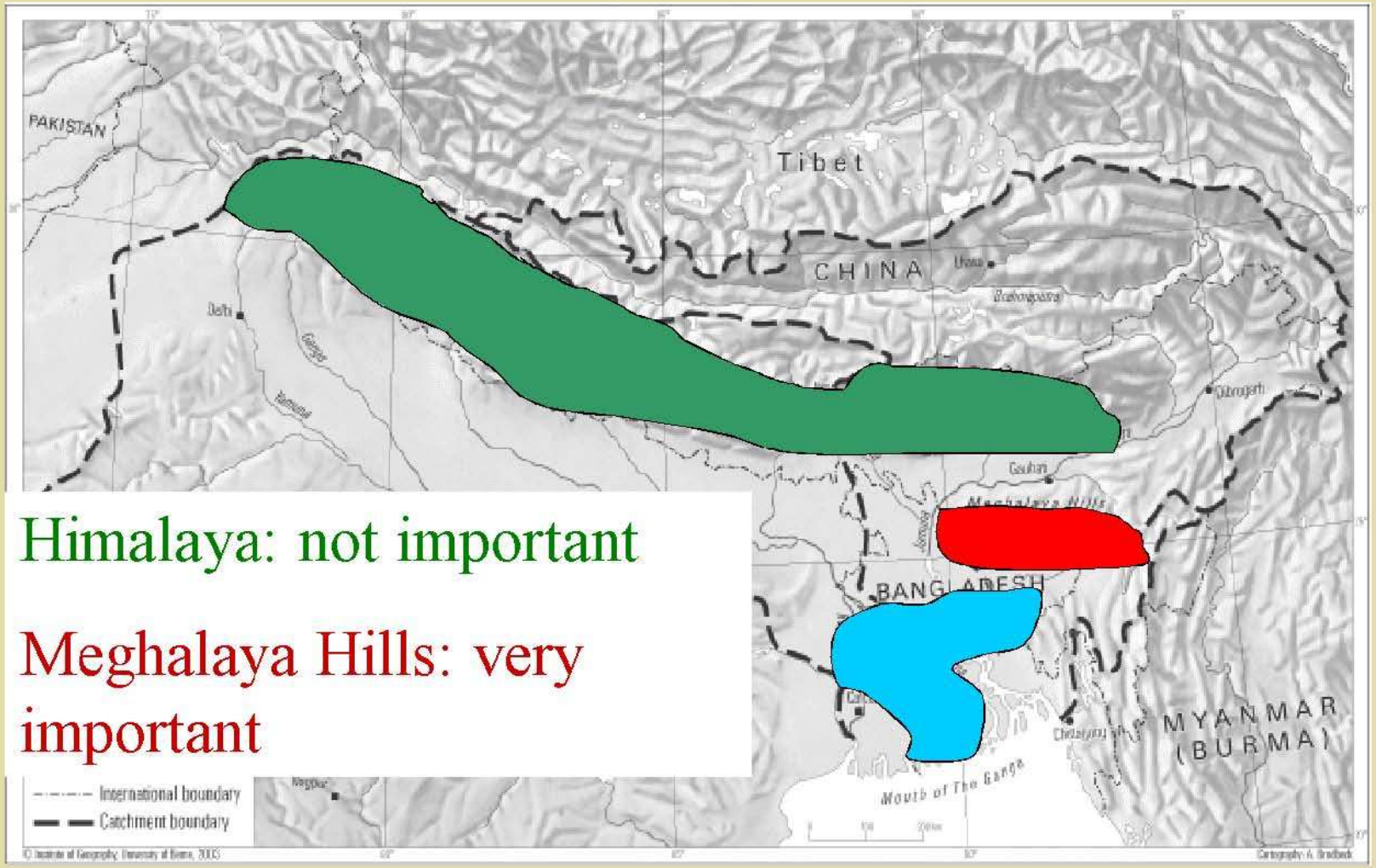
1) Calculation of monthly R(pot) and R(relev):

- 13 sub catchments;
- 90 years;
- 4 monsoon months;

2) Analysis of 11 selected, mainly flood years:

- Entire study area: anomalies of R(pot) and R(relev);
- Bangladesh: detailed process analysis.

Results (I)

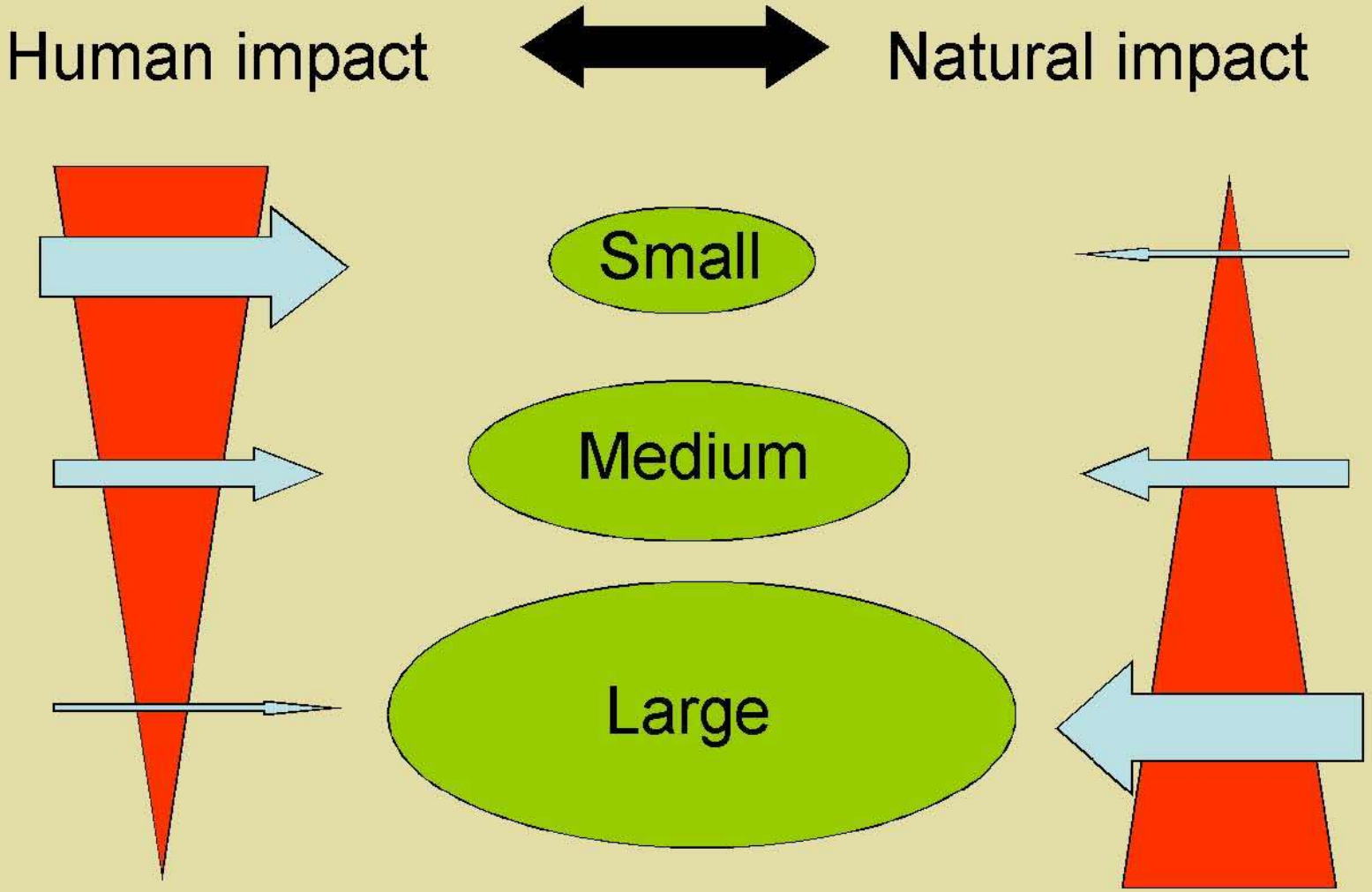

PAKISTAN
Tibet
CHINA
Lhasa
Brahmaputra
Delhi
Ganga
Yamuna
Dibrugarh
Guwahan
Meghalaya Hills
BANGLADESH
MYANMAR
(BURMA)
Chittagong
Mouth of The Ganga
Nagpur
International boundary
Catchment boundary
Himalaya: not important
Meghalaya Hills: very important

Results (II)

Other important factors for the generation of floods in Bangladesh:

- Synchronization of high flows (Ganges, Brahmaputra, Meghna) within Bangladesh;
- Heavy rainfall in Bangladesh;
- High groundwater table in Bangladesh;
- Spring tides in the Bay of Bengal.

Conclusions (I)



Conclusions (II)

- Need to rethink the old paradigm;
- Himalayan people can not be blamed for Bangladesh floods;
- Processes in small watersheds can not be extrapolated;
- Good WM is crucial for the Himalayas;
- Good WM in the Himalayas will not prevent floods in the lowlands;
- Many questions remain unanswered related to scales in watershed management.

Pakistan floods 2010

Introduction to watershed management

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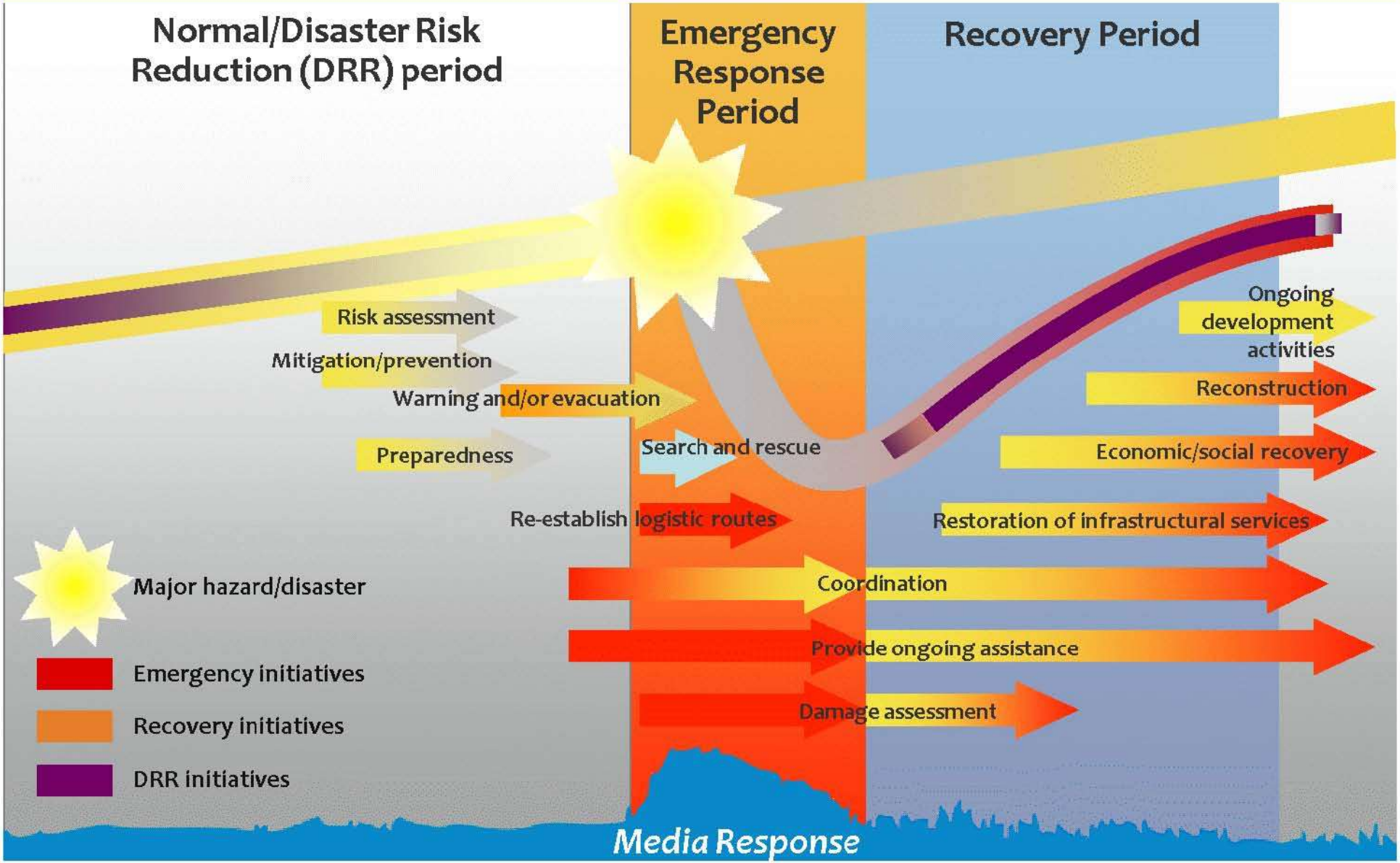
Exercise

Watershed management is a very appropriate and promising approach in the context of disaster risk management

Disaster Risk Management Framework



Source: Disaster Risk Management Cycle (DRMC) Diagram (modified from TorqAid; http://www.torqaid.com/default.asp).

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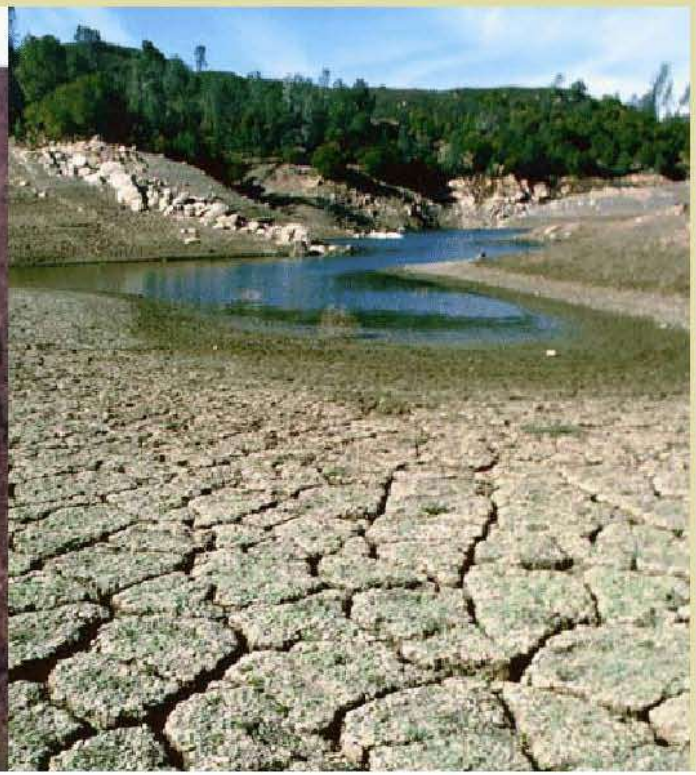
Structure of the module

1. Climate change **impacts** on watersheds;
2. Watershed management's role / approach in cc **adaptation;**
3. Watershed management's role / approach in cc **mitigation;**
4. Conclusions.

Climate change impacts (I)

- Precipitation and runoff patterns:
  - →floods and water shortages;
  - →soil erosion and landslide;
  - →crop, pasture and forest productivity.





Climate change impacts (II)

- Raising temperatures → melting of glaciers and movement of permafrost;
- Increase in extreme weather events;
- Deforestation of higher lands, steeper slopes and riverbanks.

Watershed management and cc adaptation (I)

Examples of **adaptation activities** in the framework of watershed management:

- Adaptive land use planning and management;
- Soil and water conservation;
- Strengthening adaptive capacity of forests and trees;
- Enhancing forests' buffering functions;
- Promote sustainable forest management and utilization;
- Adaptive agriculture practices;
- Conservation agriculture;
- Diversification of livelihoods.

Watershed management and cc adaptation (II)

The concept of integrated watershed management has a strong influence on the adaptive potential of communities.

Watershed management and cc adaptation (III)

To be successful and sustainable, cc adaptation strategies must be:

- comprehensive/integrated;
- built on intersectoral cooperation;
- collaborative;
- be consistent from national to local levels;
- continuously guided by experiences, knowledge and technology transfer, action-research;
- based on relevant decision making, closer to actors

The **new generation of watershed management programmes** provides a good framework to address these issues.

Watershed management and cc mitigation (I)

Examples of **mitigation activities** in the framework of watershed management:

- Increasing carbon storage and sequestration by forests and trees:

Forest conservation

Preventing degradation

Afforestation/ reforestation

Agroforestry

- Promotion of wood products, substituting steel, concrete, plastics, …
- Improving agriculture practices and seeds
- Promotion of conservation agriculture.

Watershed management and cc mitigation (II)
Example of potential for REDD+

INTERSECTORAL APPROACH	**Cancun decisions:** *"REDD+ activities should be implemented in the context of sustainable development and reducing poverty, while responding to CC"* *"REDD+ activities should be consistent with the objective of environmental integrity and take into account the multiple functions of forests and other ecosystems".*
LANDSCAPE APPROACH	*REDD+ safeguard n. 7, "Promote and support actions to reduce displacement of emissions".*

Watershed management and cc mitigation (III)
Example of potential for REDD+

COLLABORATIVE MANAGEMENT	*REDD+ safeguard n. 4: "Full and effective participation of relevant stakeholders, in particular indigenous peoples and local communities, must be ensured".* *REDD+ safeguard n. 3: "Respect the knowledge and rights of indigenous peoples and members of local communities [..]."*

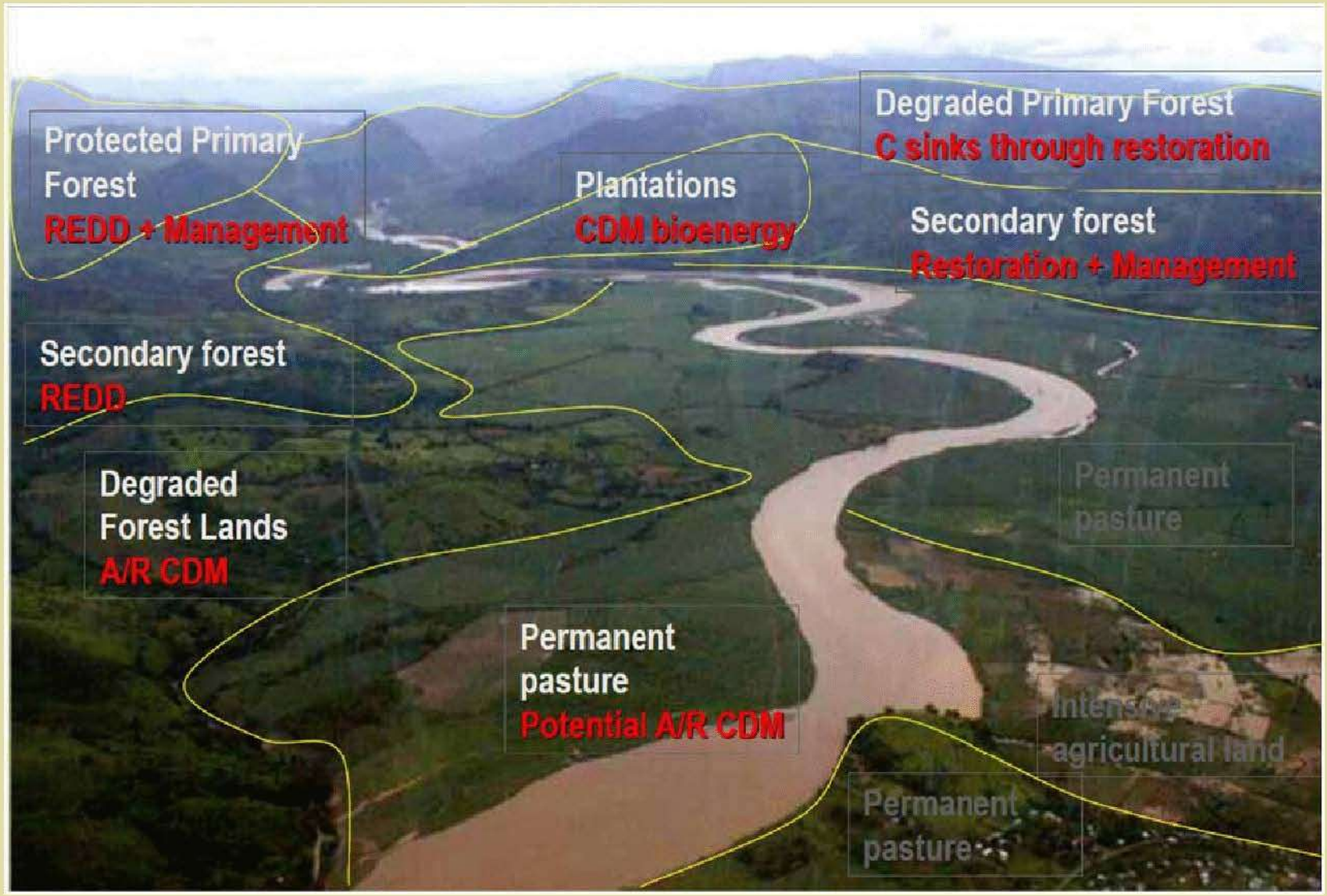
Watershed management and cc mitigation (IV)

Example of potential for REDD+

FOCUS ON SCIENTIFIC MONITORING & EVALUATION	**COP decisions related to REDD+/MRV:** ***"Countries are requested to develop a robust and transparent national forest monitoring system [...], and a system for providing information on how the safe guards are being addressed and respected".***
EMPHASIS ON ACTION RESEARCH	**Knowledge gaps and information needs needed for climate change mitigation and adaptation, as well as for influencing international negotiations**

Watershed management and cc mitigation (V)

Landscape approach: multiple contributions to mitigation



Watershed management and cc mitigation (VI)

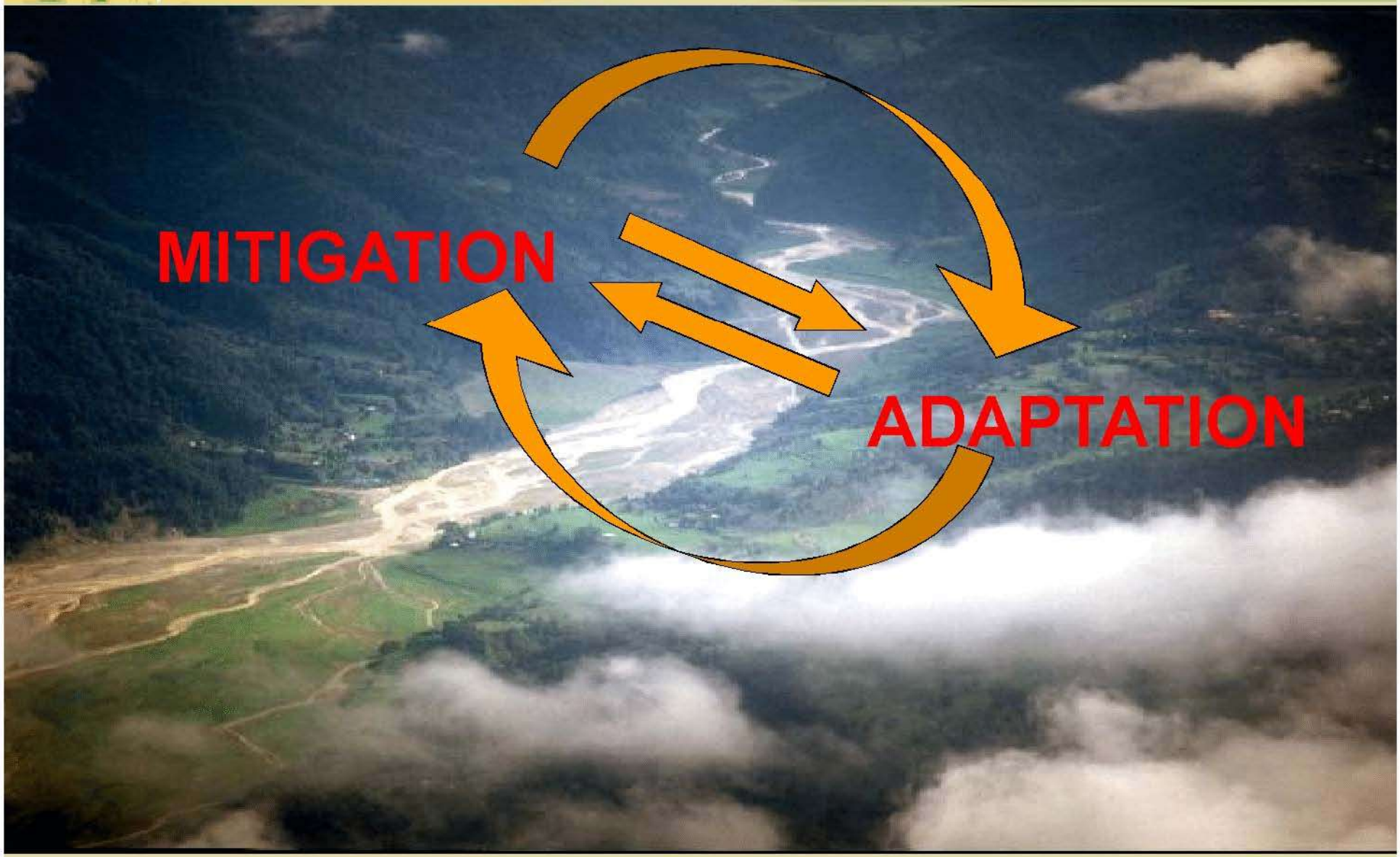
Mitigation potential vs water consumption

Mitigation/REDD+ potential → Higher in forested watersheds and with afforestation/reforestation potential.

However, forests can only take up carbon if they take up water at the same time

→negative impacts of reduced runoff in **arid zones**

→trade-offs


MITIGATION
ADAPTATION

Conclusions

- Watersheds are an **appropriate geographic unit for addressing both, climate change mitigation and adaptation** in a comprehensive and participatory manner;
- The paradigms identified in the new generation of watershed management programmes are **closely related to the requirements and safeguards of climate change initiatives**;
- There is potential for **advocating watershed management in international CC negotiations and the design of financial mechanisms;**
- WM projects and programmes have a strong potential to **contribute to climate change mitigation and adaptation efforts** and to benefit from CC related **funding**. Therefore, cc aspects need to be mainstreamed in WM projects

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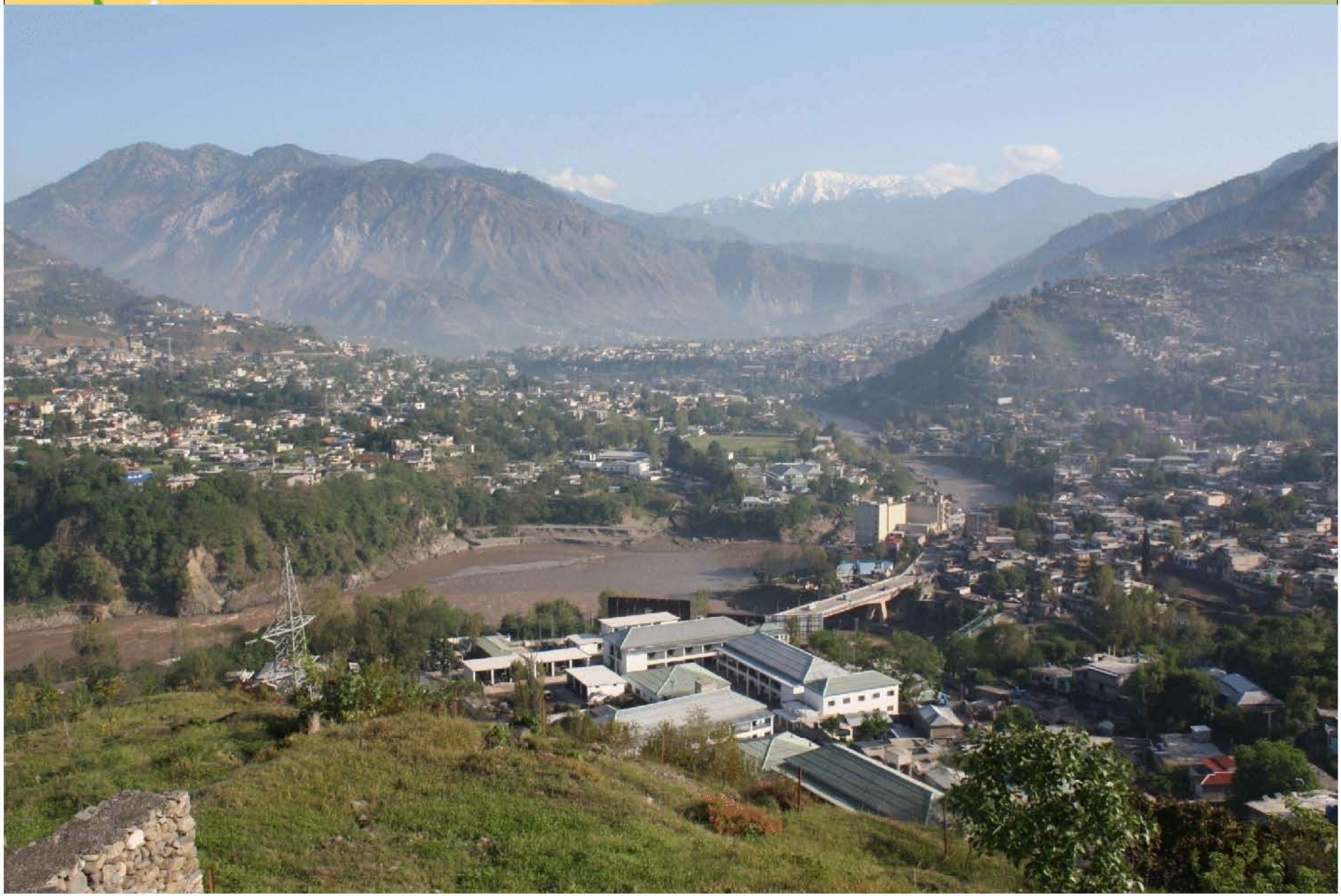
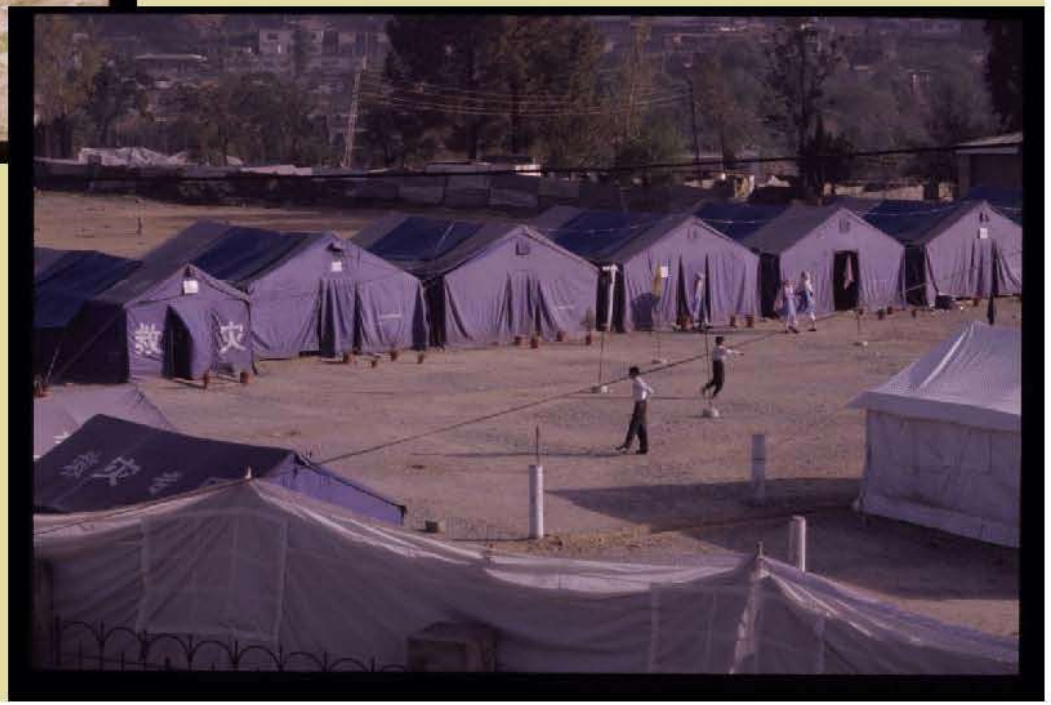
The earthquake of 8.10.2005 (I)



The earthquake of 8.10.2005 (II)

3 to 4 million people were affected



The estimated death toll exceeds 80,000

The earthquake of 8.10.2005 (III)

Landslides and thousands of landslips affected 10 percent of ……

…… the arable land, forests and rangelands

FAO-SIDA Project

Objective: to support the Earthquake Reconstruction and Rehabilitation Authority (ERRA) to implement the livelihood rehabilitation strategy in 9 earthquake affected districts in two regions (KPK and PAK)

Slogan: "building back better"
Budget: USD 6,570,000
Duration: Jan 2007 – Jun 2011

Output 3: NRM and livelihood improvement through integrated watershed management in 17 sites (landslide stabilisation!)

Institutional setup

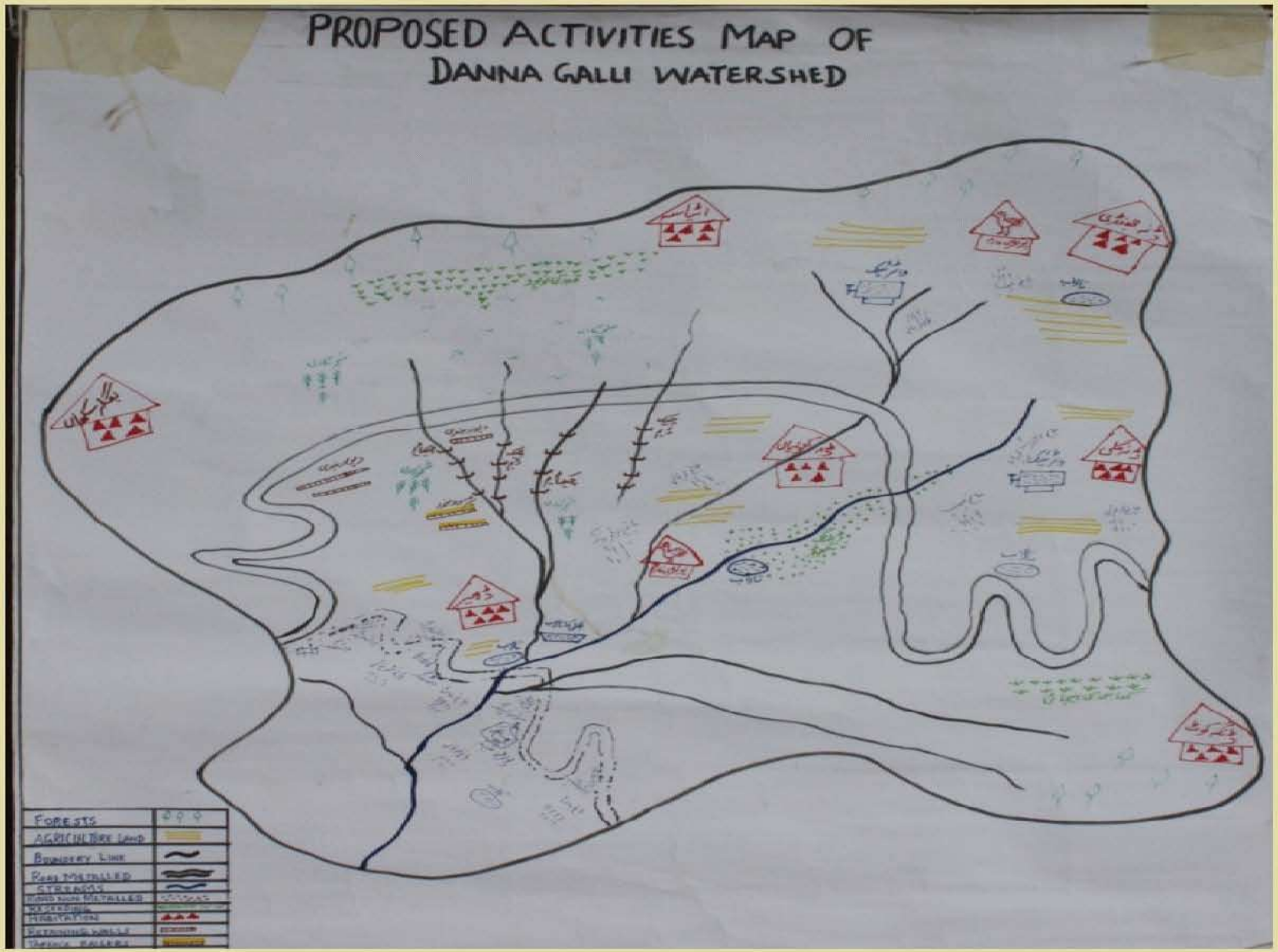
- ERRA;
- PERRA and SERRA;
- DRUs;
- DFOs and other Line Agencies;
- ICIMOD;
- FAO (FOM, AGA, TCE, SO-I, FAOR).

Steps in project implementation

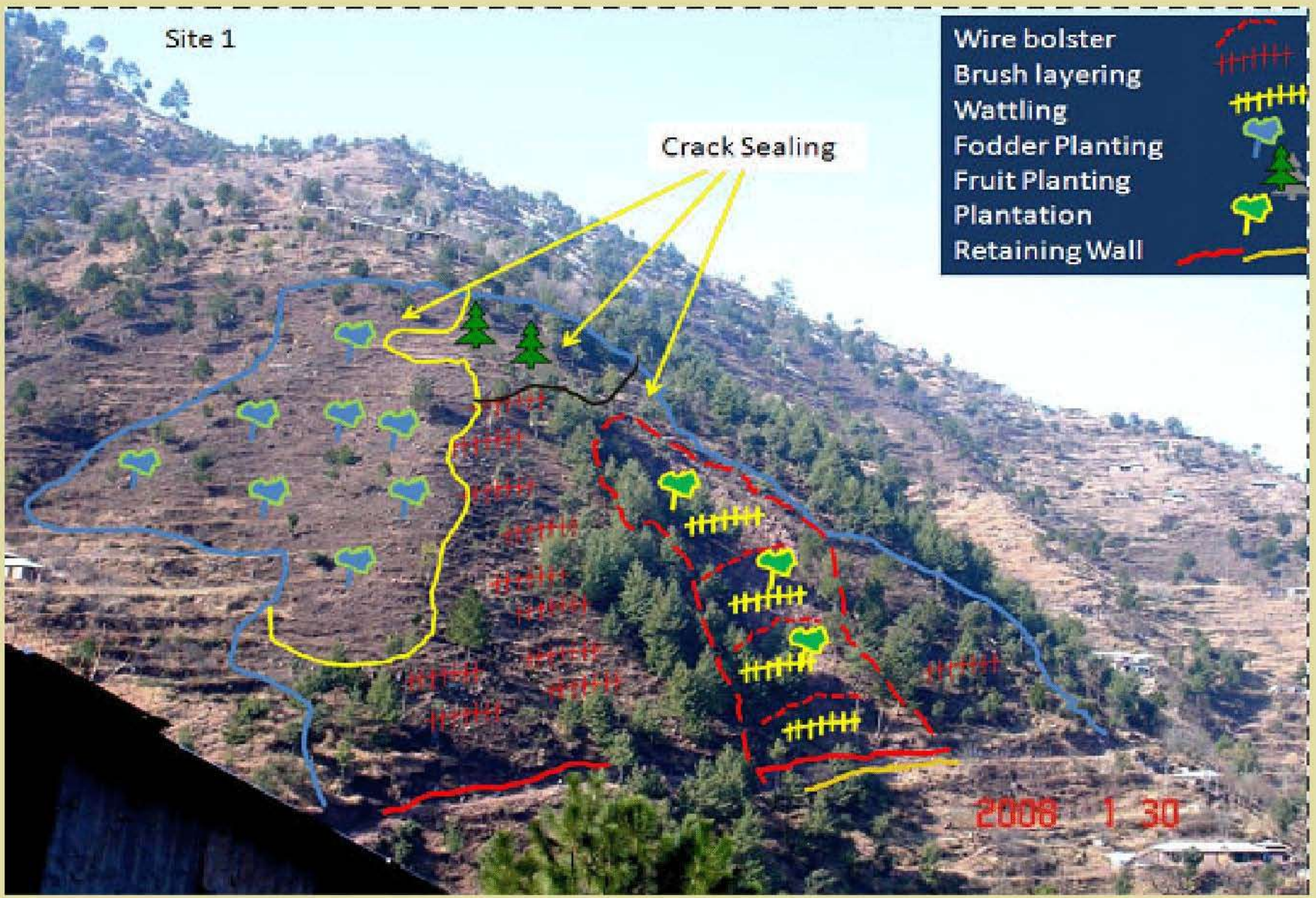
- Baseline, mapping, institutional situation;
- Watershed management committee;
- Watershed management plan;
- Implementation of pilot activities (nrm and livelihood improvement);
- Capacity building;
- Outcome and impact monitoring.

Watershed management committee

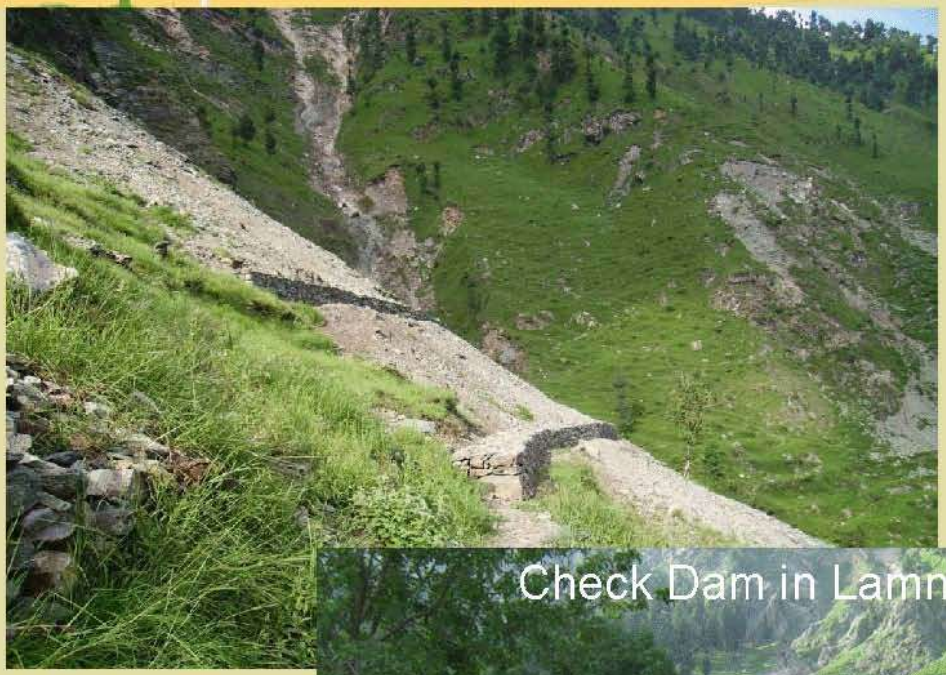
Watershed management plan



Landslide treatment plan



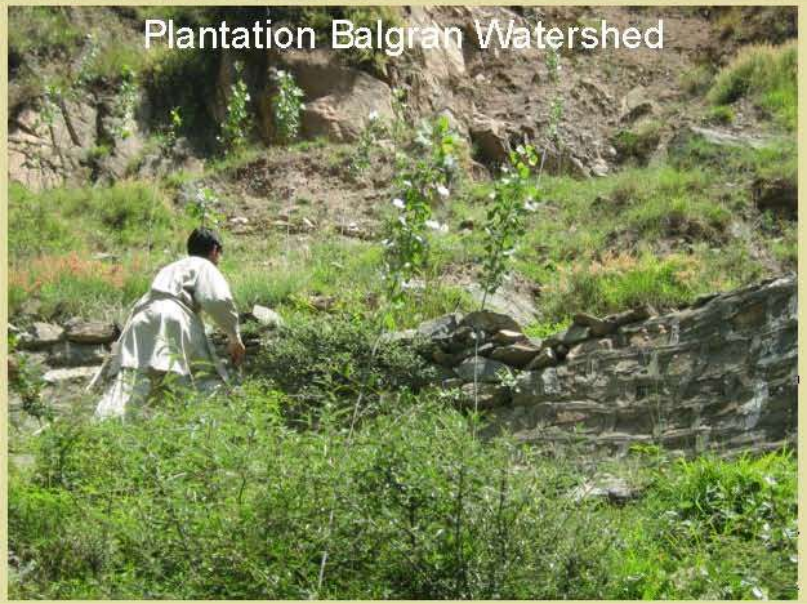
Landslide stabilisation (I)



Check Dam in Lamnian

Landslide stabilisation (II)


Wattling in Chinari Watershed


Plantation Balgran Watershed

Reforestation (I)

Reforestation (II)

Agricultural terraces

Livelihood improvement

Water management

Integration

Capacity development (I)

Capacity development (II)

Impacts (I): success in landslide stabilisation

Impacts (II): landscape approach

Impacts (III)

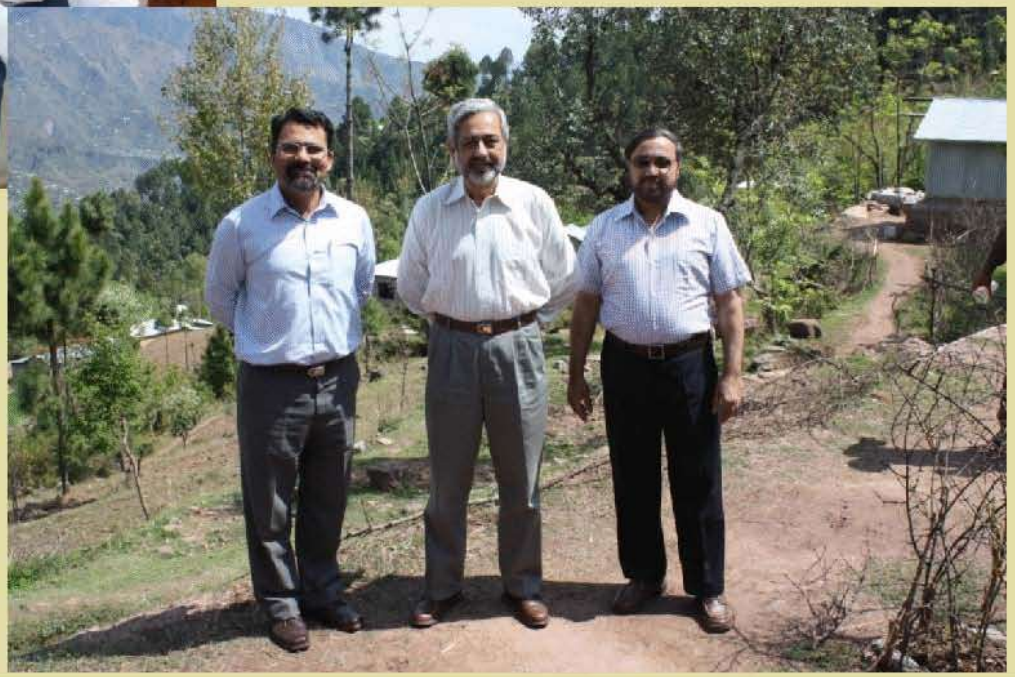
- Watershed management committees allowed for participatory planning;
- Communities gained confidence, voice;
- Resilience created: flood 2010;
- Livelihood, nutritional situation improved;
- Replication of pilot interventions, particularly bioengineering;
- Watershed management funds;
- Capacities built.

Impacts (IV): institutional innovation

Constraints

- ERRA as a difficult partner;
- Security situation;
- Accessibility;
- Co-financing from the Government;
- Sustainability, follow up funding.

A great national project team!



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Conclusions (I)

Watershed management offers solutions for addressing global challenges:

- water;
- biodiversity conservation;
- climate change;
- disaster risk management;
- food security and nutrition.

Conclusions (II)

Overarching themes and principles:

- landscape approach;
- scale issues;
- environment-human relationship;
- holistic planning;
- participatory approaches, partnerships, dialogue;
- institutional arrangements

Conclusions (III)

Sustainability of watershed management initiatives?


Thank you and good luck with the IPROMO course!