Global Change in Mountain Regions – Strategies for Biosphere Reserves

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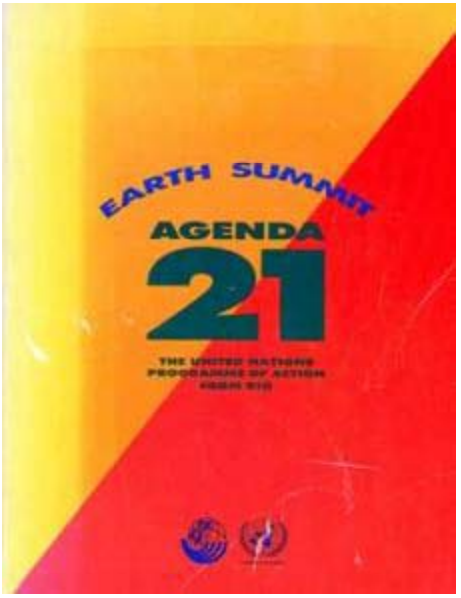


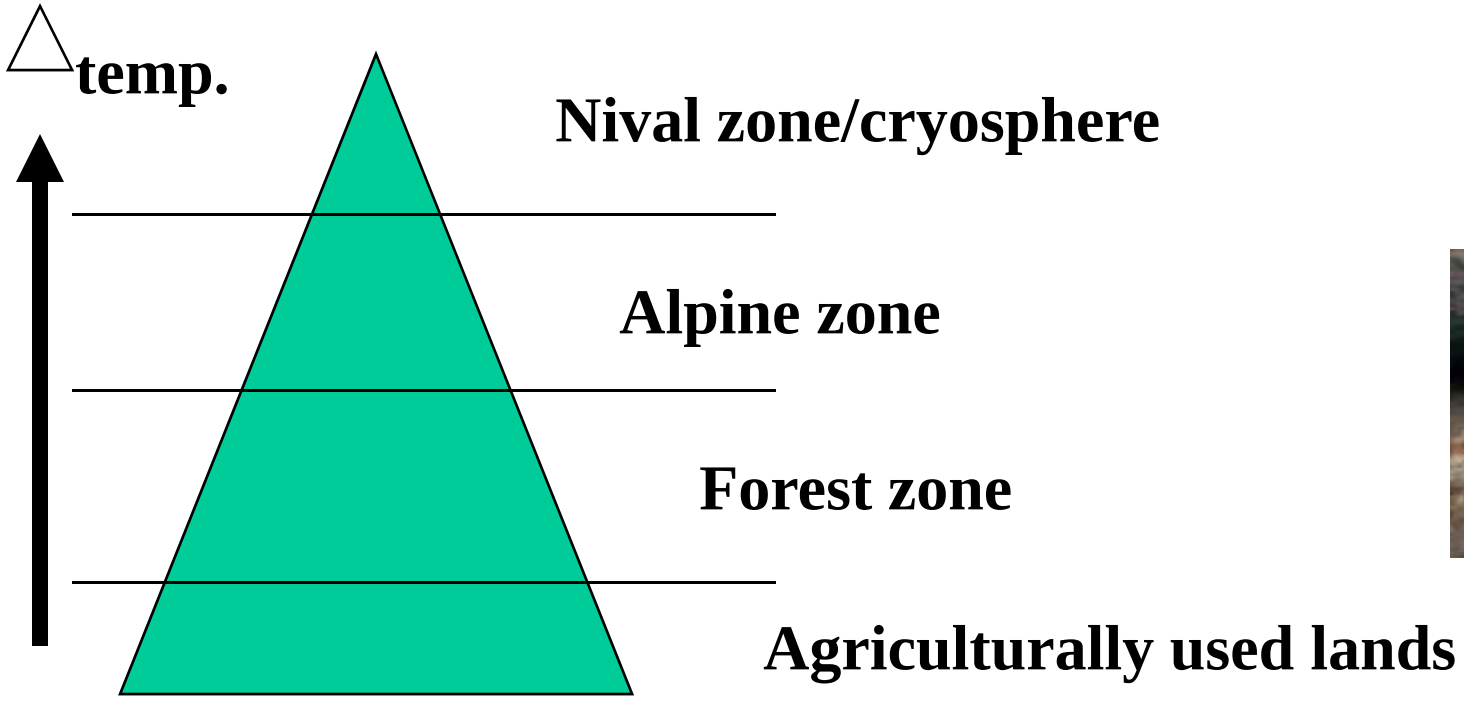
UNCED *Agenda 21*, Chapter 13: Mountains are fragile environments – susceptible to soil erosion, landslides, and rapid loss of habitats

Mountains & global change

- **Vulnerable and sensitive ecosystems**
- **Diverse ecosystems and habitats at all latitudes**
- **Important for livelihoods & ecosystem services**

→ excellent sites to study and monitor global change and its impacts; and future options

1993



2000

Global Change in Mountain Regions (GLOCHAMORE)

Aims:

- Establish a world-wide network of mountain biosphere reserves to study global change
- Bring together global change researchers and biosphere reserve managers

Funded by: European Commission (6th FP, 2003-5)

GLOCHAMORE

Sponsored by:

- Mountain Research Initiative (MRI)
- University of Vienna
- UNESCO's Man and the Biosphere (MAB) Programme

Implemented by:

consortium of 14 universities & research institutions

Mountain biosphere reserves as study/monitoring sites for global change:

Biosphere Reserves (BRs):

- **should be:**
  - ‘Sites of excellence to reconcile conservation & sustainable development at a regional scale’
- **include:**
  - protected areas (natural or near-natural environments)
  - areas inhabited by human beings and used for economic activities
  - research infrastructure

Mountain biosphere reserves as monitoring sites for global change:

Most BRs have

- long-term climatic data
- species lists

BRs involve people

- ➢ impacts of global change on human societies
- ➢ partnerships of biosphere reserve managers, scientists, local stakeholders

Mountain BRs include significant gradients

- ➢ diverse ecosystems & land uses

What are biosphere reserves?

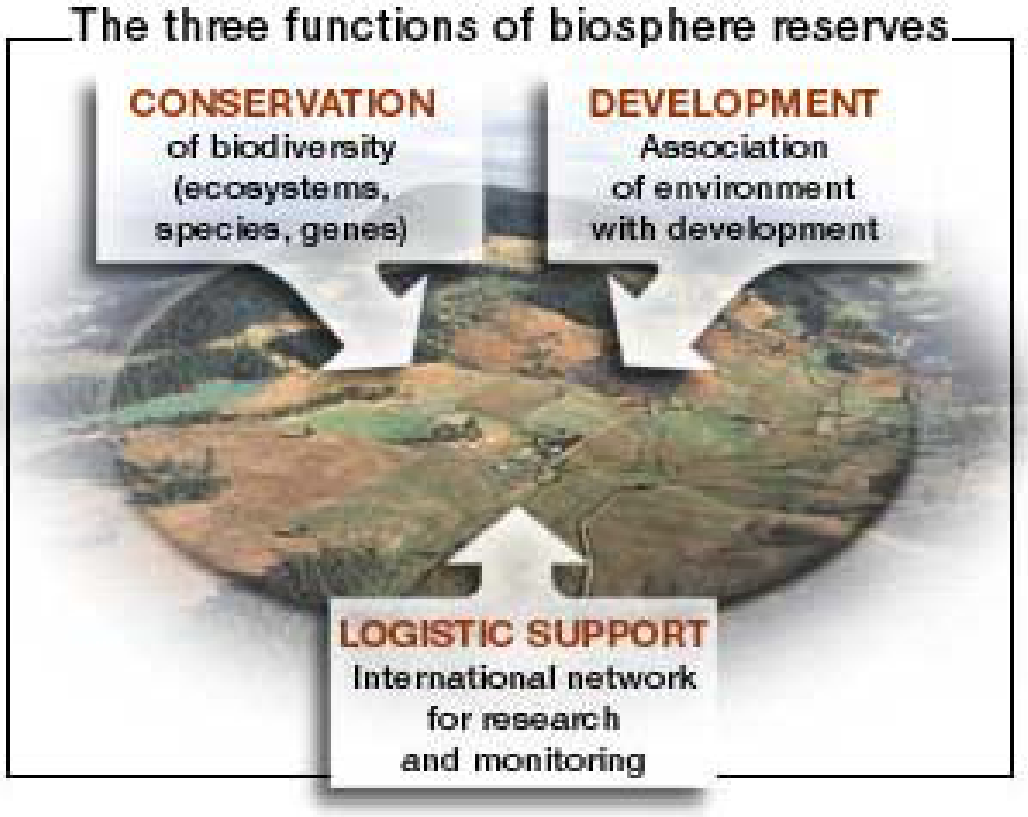
Definition:

- **Biosphere reserves are areas which are internationally recognised for promoting and demonstrating a balanced relationship between people and nature (combining conservation and sustainable development)**

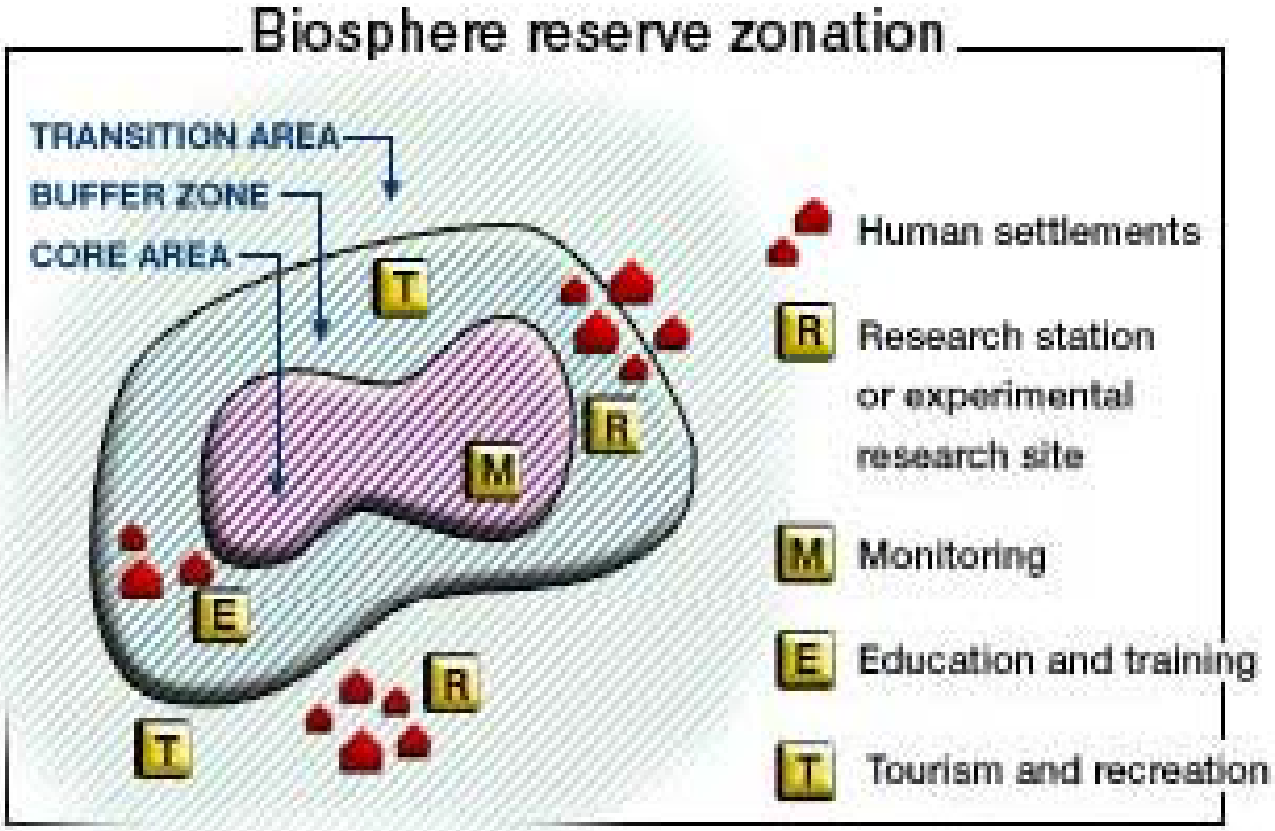
- **Sites for international environmental research and monitoring.**

3 Functions of biosphere reserves

Each biosphere reserve has three basic functions, which are complementary and mutually reinforcing. It is the synergy of these functions which makes a site a biosphere reserve



Zonation pattern of biosphere reserves

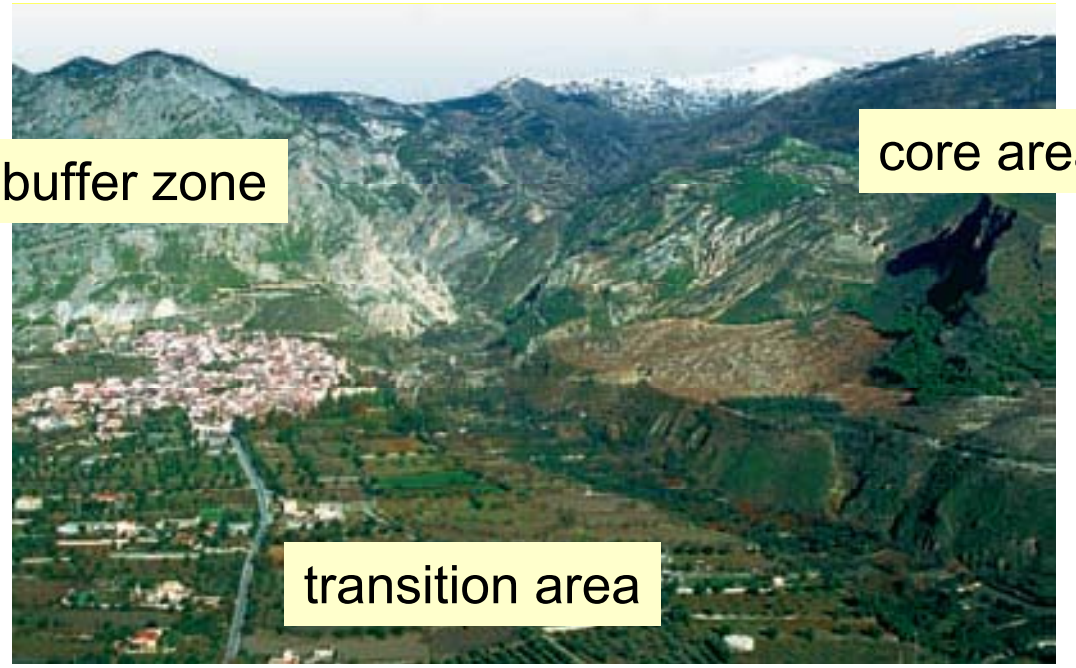


CORE AREA

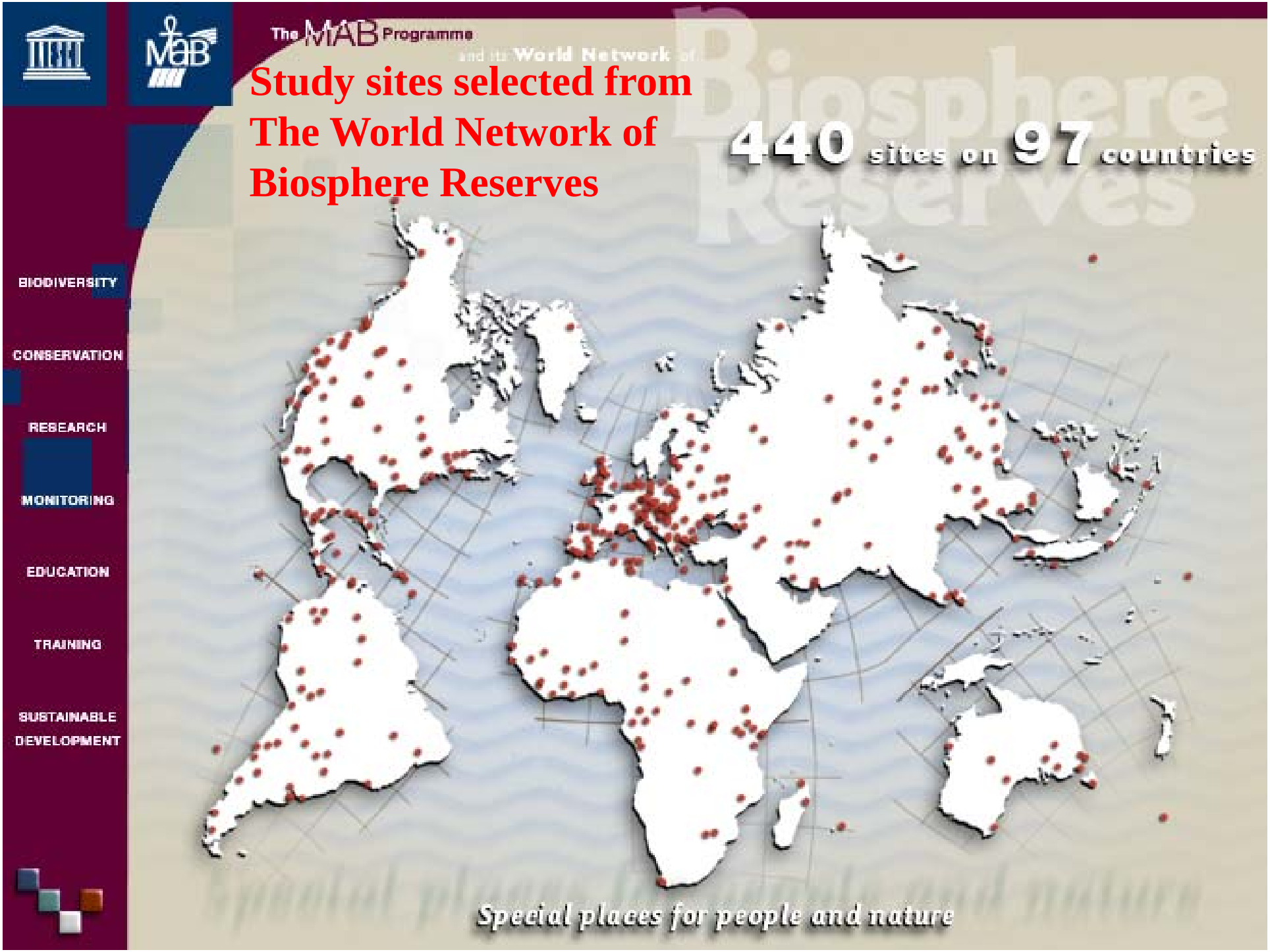
BUFFER ZONE

TRANSITION AREA

Biosphere Reserve El Hierro (Spain)

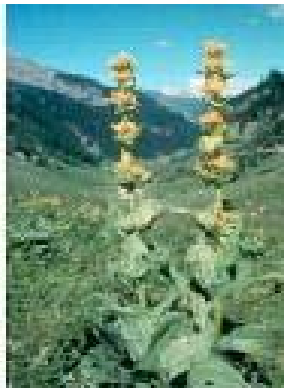


Sierra Nevada Biosphere Reserve (Spain)


The MAB Programme
and its World Network of
Biosphere Reserves
Study sites selected from
The World Network of
Biosphere Reserves
440 sites on 97 countries
BIODIVERSITY
CONSERVATION
RESEARCH
MONITORING
EDUCATION
TRAINING
SUSTAINABLE
DEVELOPMENT
Special places for people and nature

Final selection of biosphere reserves representing major mountain ranges around the world


MRI/UNESCO INTERNATIONAL WORKSHOP
GLOBAL CHANGE RESEARCH
in Mountain
Biosphere
Reserves
BIODIVERSITY
CONSERVATION
RESEARCH
MONITORING
EDUCATION
TRAINING
SUSTAINABLE
DEVELOPMENT
Mountain Biosphere Reserves for global change study



GLOCHAMORE Project objectives:

Study the impact of global change on the

- biophysical environment
- socio-economic conditions
  of mountain people

Strategic objectives:

(1) Understand the causes and impacts of *Global Change* in mountain regions

→ Focus on the consequences of global change for:

- the biophysical environment
- human societies

Strategic objectives (continued):

(2) Establish a framework / strategy for long-term research efforts in mountain biosphere reserves in Europe

(3) Implement the strategy in mountain biosphere reserves around the world

Main outputs and outcomes of the GLOCHAMORE project (2003-5)

Five international workshops:

- **Entlebuch (Switzerland, November 2003)**
- **Vienna (Austria, May 2004)**
- **L'Aquila (Italy, December 2004)**
- **Granada (Spain, March 2005)**
- **Samedan (Switzerland, July 2005)**

➢ **Workshop proceedings**

International Open Science Conference:

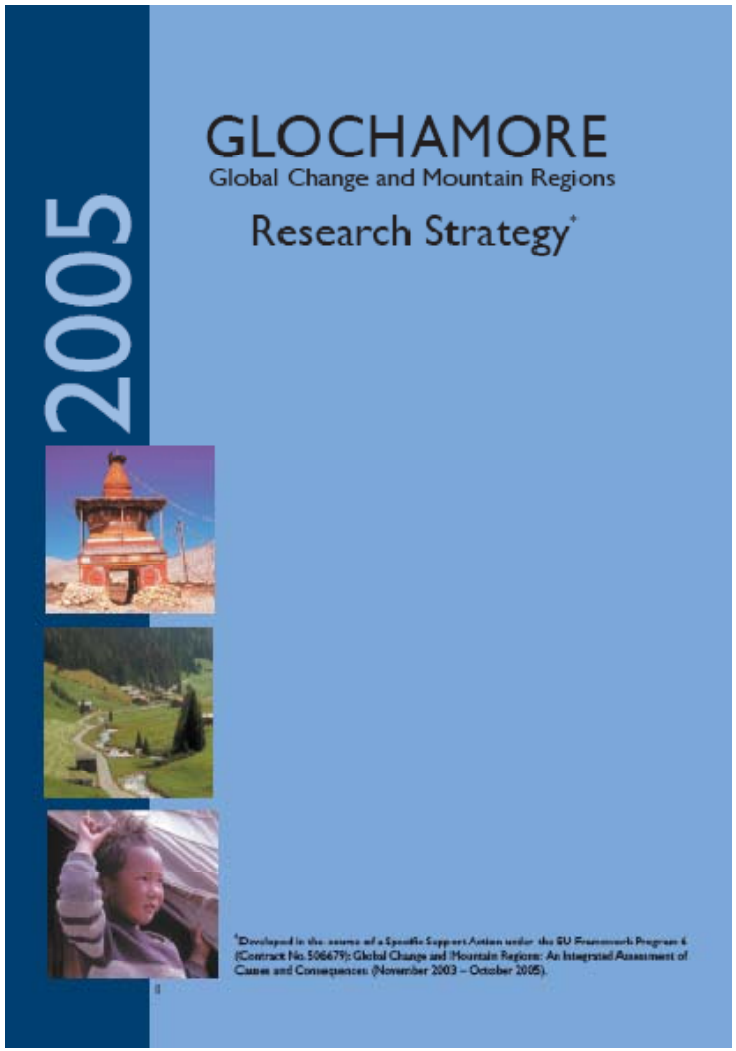
held in Perth, Scotland, October 2005,
Over 210 participants from 41 countries

- Proceedings: 197 extended abstracts
- ‘Perth Declaration’
- GLOCHAMORE Research Strategy

Perth Declaration

scientists and biosphere reserve managers

… express commitment to continue work initiated during the GLOCHAMORE project to study global change and its impacts in mountain biosphere reserves



Research Strategy

developed from inputs from c. 100 scientists and BR managers around the world

Research Strategy themes

- Climate
- Land use change
- Cryosphere
- Water systems
- Ecosystem function & services
- Biodiversity
- Hazards
- Human and animal health
- Mountain economies
- Society and global change

Recent activities

Implementation of GLOCHAMORE Research Strategy in specific sites in a regional context:

- All-American workshop
  (Argentina, March 2006)
- Central Asian workshop
  (Kazakhstan, November 2006)
- African workshop (Uganda, July 2007)

Future activities

Focus on 3 GLOCHAMORE Research Strategy themes:

- **Biodiversity: Key fauna and flora (item 6e of research strategy)**

Future activities

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- **Biodiversity: Key fauna and flora (item 6e of research strategy)**

- **Water: Water quantity (item 4a)**

Future activities

Focus on 3 GLOCHAMORE Research Strategy themes:

- **Biodiversity: Key fauna and flora (item 6e of research strategy)**
- **Water: Water quantity (item 4a)**
- **Mountain economies: employment and income (item 9a)**

Biodiversity: Key fauna and flora

Rationale:
Certain (rare/endangered) species constitute a key reason for the creation of a BR (conservation value). Their fate is often influenced by land use change and could be threatened by climate change.

Research goal:
To predict the probability of local persistence of key species under different climate change scenarios.

Actions:

- Identify key species at risk;
- Collect presence, and if possible, abundance data on key species along with environmental data;
- Simulate future distribution and, if possible, abundance under difference climate and land use scenarios;
- …. (→ visit workshop on 19 November 2008)

Water: Water quantity

Rationale:
Mountains are key sources of water (both within mountain and downstream lowlands). The main impact of climate change in mountains may well relate to the amount and timing of water released.

Research goal:
To determine and predict water balance and its components, particularly runoff and water yield of mountain catchments (incl. glaciers and wetlands), under different global change scenarios.

Actions:

- Establish and maintain gauging stations on representative drainages within mountain biosphere reserves;

- Develop models to predict discharge from representative drainages at several different timescales (from monthly to hourly);

- …. (→ visit workshop on 19 November 2008)

Mountain Economies: Employment and Income

Rationale: Global change will change the capacity of landscapes to generate wealth and to provide livelihoods for resident populations (and for distant but nonetheless dependent populations). An understanding of these changes and local peoples' ability to respond is a prerequisite for successful adaptation to such impacts.

Research goal: To predict the impacts of global change scenarios on the economies of mountain regions (and economies dependent on mountain good & services), and hence, to asses the resilience of mountain societies to global change.

Actions:

- Compile data on incomes deriving from all economic sectors;

- Simulate possible future economies under different regional scenarios of climate, land use, human demography, and external forces;

- …. (→ visit workshop on 19 November 2008)

UNESCO-MAB – ICIMOD
International workshop

Research Strategy on Global Change in Mountain Biosphere Reserves

When? 19 November 2008
Where? Conference Hall (ICIMOD)
Time? 10 a.m. to 4.30 p.m.

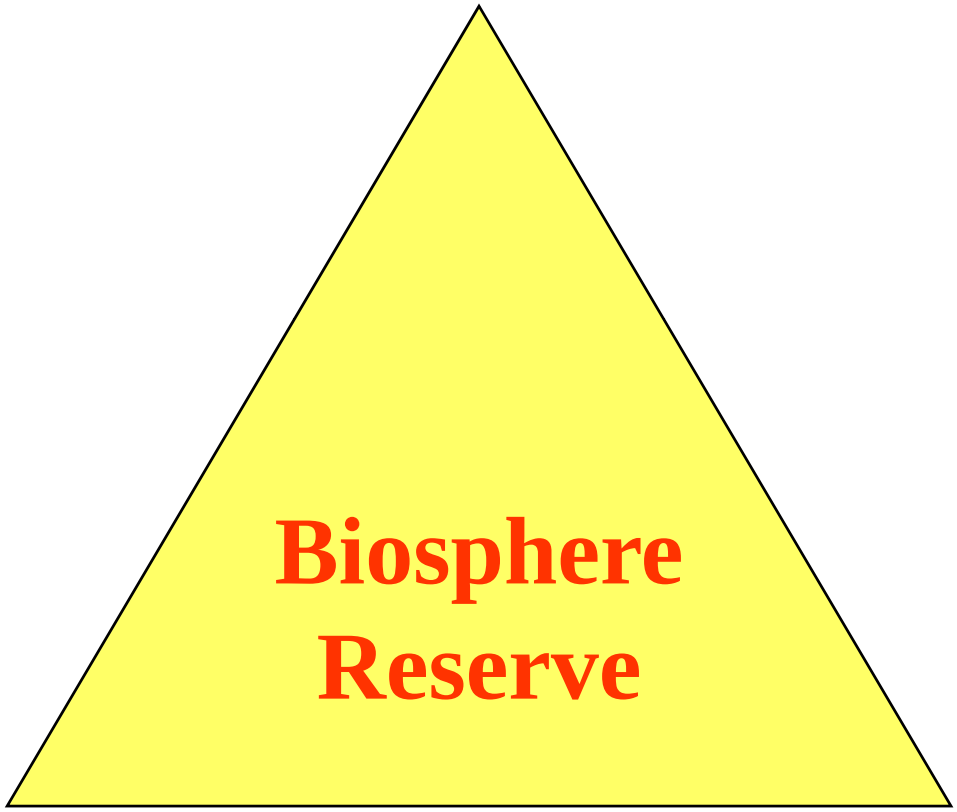
Key strengths:

- **existing network of sites around the world**
- **involvement of key organisations**
- **clearly defined strategy:**
  - forward-looking
  - ready on the ground
  - links global change with environmental conservation & sustainable development

Key needs:

- **resources to support work in 20? sites over 5? years**
  - ➢ harmonized, comparable data
  - ➢ global and local/regional relevance

Environmental research and monitoring



Biodiversity conservation

Sustainable development

Web-site:

www.unesco.org/mab

Thank you!