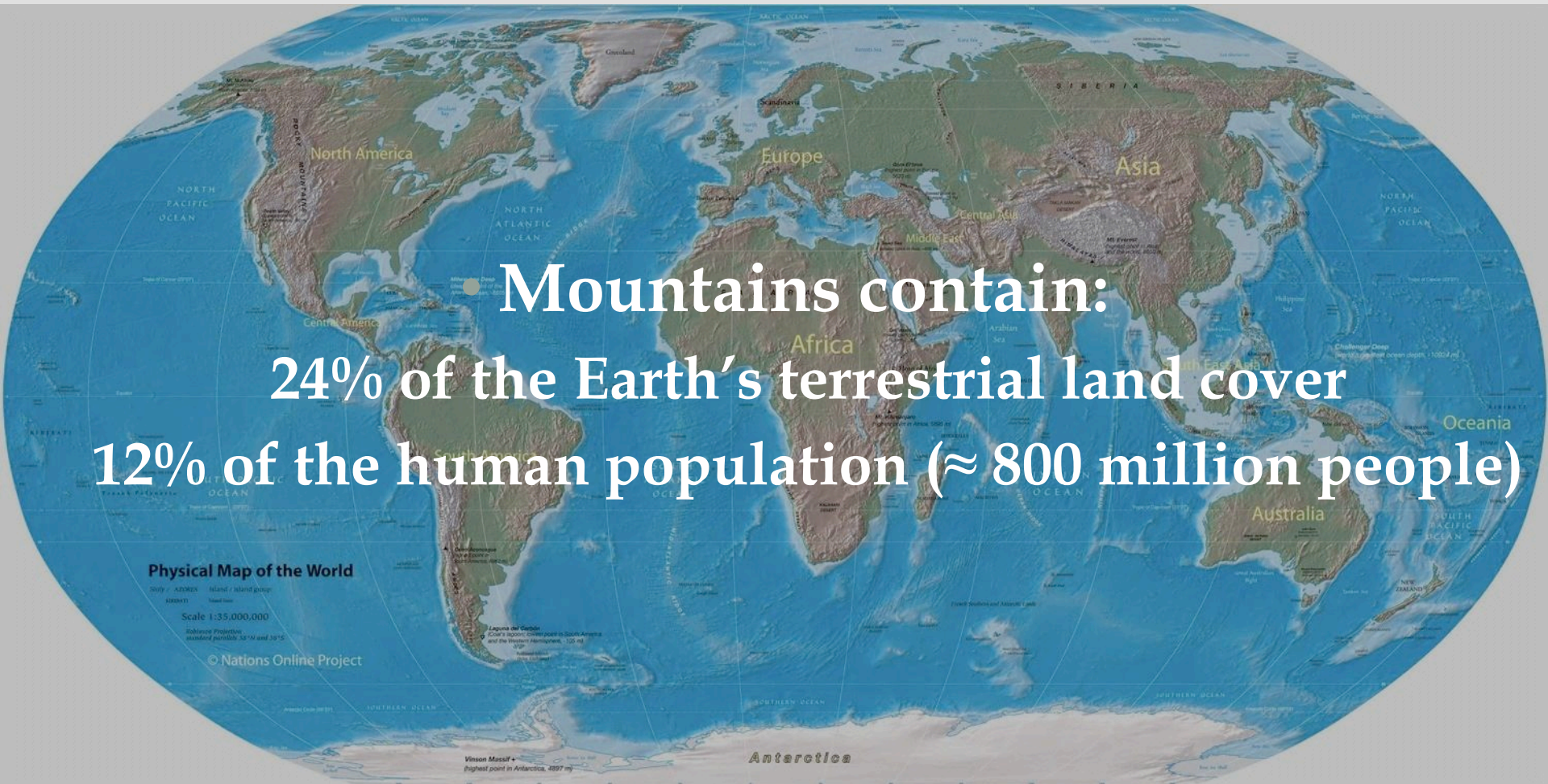
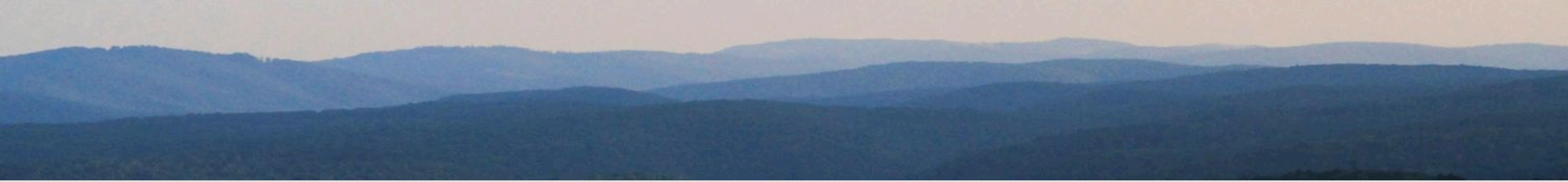




The Mountain Institute
Four Decades of Thinking Globally - Acting Locally
and the Legacy of Dr. Jane Pratt

Utah Valley University
International Mountain Day Celebration
December 2013 - Orem, Utah



Fresh Water – The Crown Jewel From Mountains



Half humanity depend on fresh water from mountains for consumption, irrigation and industry

Sources:

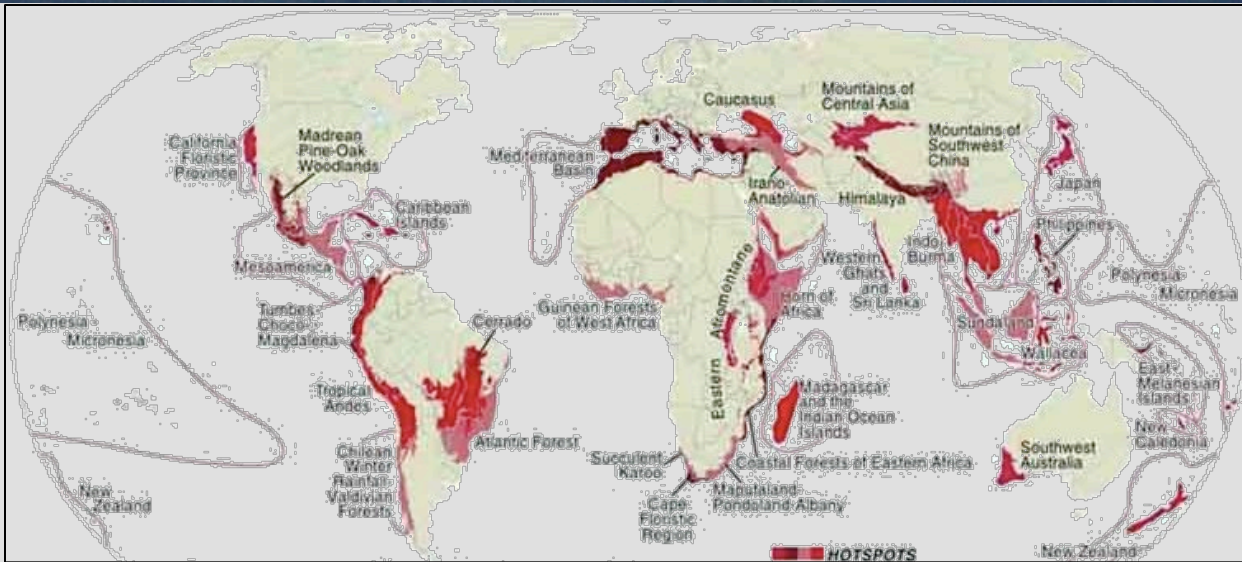
- Snowfield and glaciers
- “Green water” from forests, woodlands, grasslands and tundra

Other environmental services

- Carbon storage
- Climate regulation
- Pollinator services



Mountains - Bastions of Diversity



- Half of biodiversity hotspots
- Extraordinary and “iconic” species
- Mountain origin crops: maize, potatoes, barley, sorghum, apples, tomatoes, etc.

- 1000's of ethnic groups and languages

- Indigenous knowledge, practices and art



Heritage, Recreation, Health, and Spirituality



- UNESCO World Heritage Sites
- Mountain tourism (hiking, climbing, skiing, nature) generates \$70-90 billion/year
- Immeasurable benefits for physical and mental health
- **Mountains** – places for spiritual solace and pilgrimage

Threats to Mountain Systems



Climate Change is happening now!

- Glacial retreat, floods, drought
- Extinction
- Invasive species and pathogens
- 2-3 fold greater temperature increases than lowlands



Prevailing Threats:

- Unsustainable natural resource use
- Poorly planned roads and dams
- Habitat destruction and degradation
- Loss of ecological services

Security and Livelihoods

Mountains “Host”:

- Half the world’s wars and insurgencies
- Illicit crops
- Epicenters for conflict over natural resources, transportation corridors, etc.

“Ignore isolated mountain ranges at your peril”

Threats to mountain communities

- Isolation
- Poor governance
- Limited economic options = poverty, malnutrition, disease, **migration**
- Overpowering external cultures
- Flatlander education





Global Response to Date

- 1992 – United Nations Conference on Environment and Development
 - Agenda 21, Chapter 13 – “The Mountain Agenda”
- 2002 - World Summit on Sustainable Development
 - Plan of Implementation, Paragraph 42
- 2002 - UN International Year of the Mountain
- 2002 - Mountain Partnership
- 2012 – United Nations Conference on Sustainable Development, Rio+20
 - Mountain language in “The Future We Want” outcome document
 - Mountain Initiative / Alliance of Mountain Nations (2009)
- December 11th – UN International Mountain Day
- Talk of a “United Nations Convention on Mountains”

Indexing Scientific and Donor Attention

Google Scholar "Hits": 2007-2012

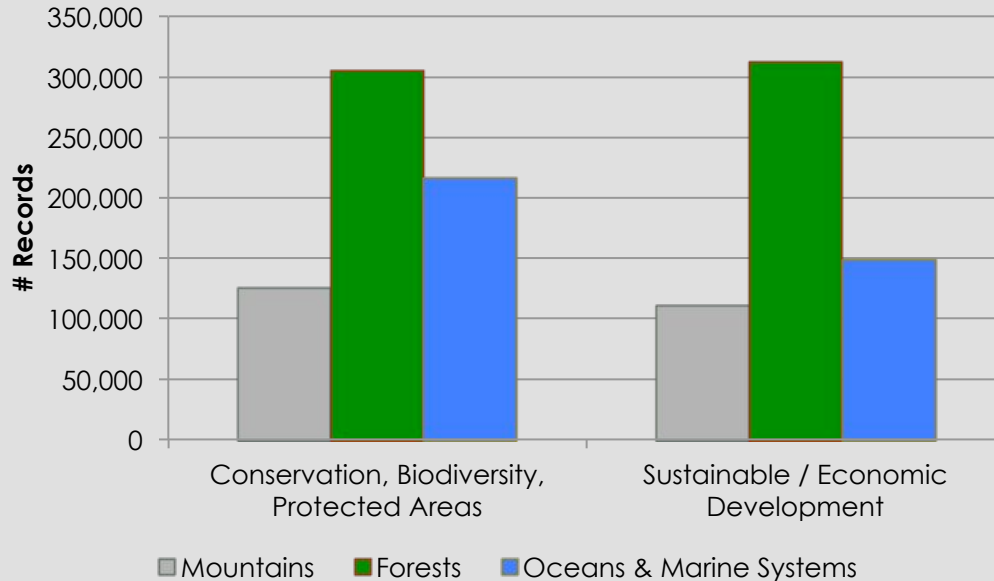
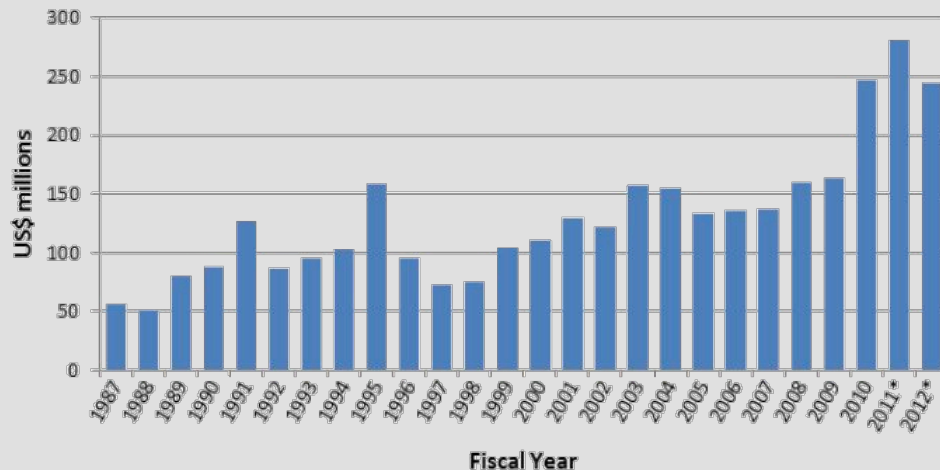


Figure 1. US Funding for International Forests



CGIAR Research Program 6

Forests, Trees and Agroforestry: Livelihoods, Landscapes and Governance

Proposal

February 2011



Smuggling to neighboring country ↘

Climate change looming

Isolated farms,
male out-
migration

National Park - "on paper"

Unstable glacial
lake

100's of
endemic
species at risk

Endangered
species
harvesting

Degraded
rangelands,
human-wildlife
conflict

Deteriorating ancient pilgrim's route

Illicit
Crops

Impoverished
Indigenous
community -
unclear land tenure

Deforestation,
erosion, landslides

Placer miners - toxic chemicals

Unsustainable
firewood harvesting

Season water flow variability and
pollution affecting millions
downstream ↘

Typical "challenged" mountain landscape today



Mountains Today

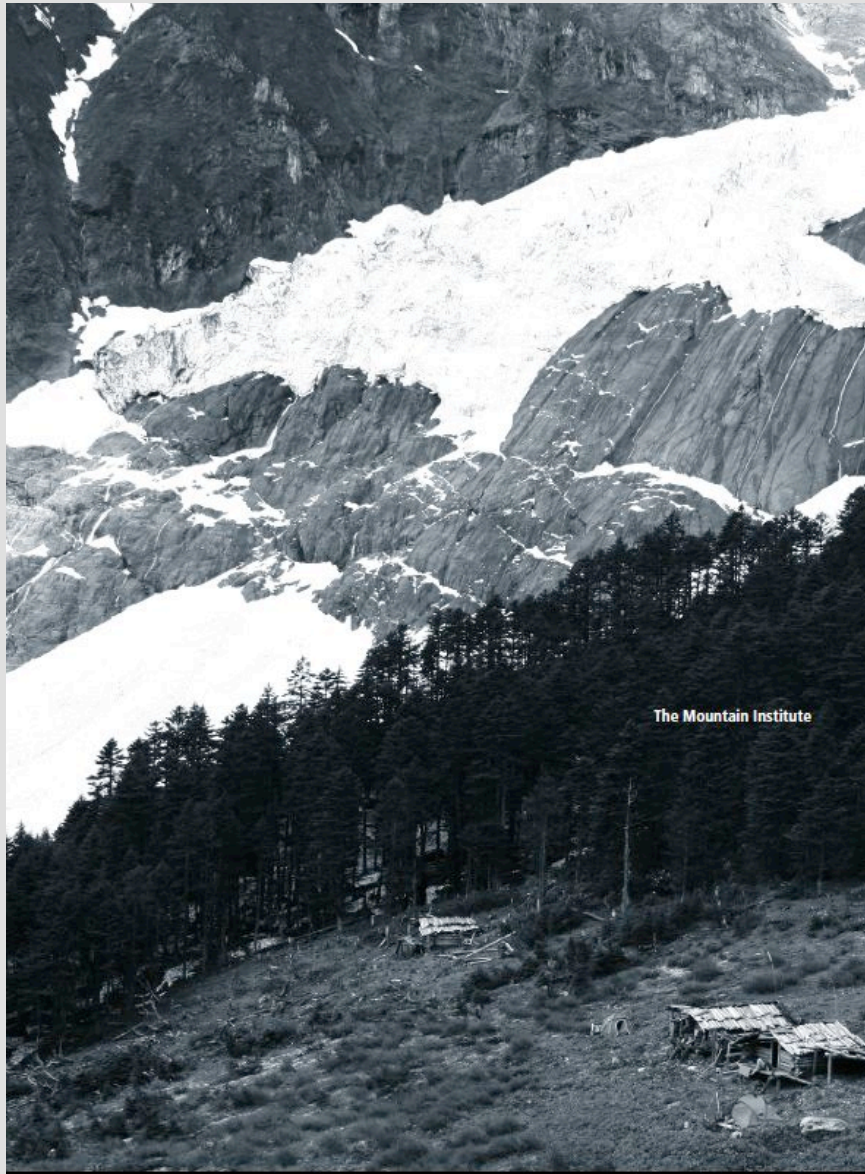
- Mountain environments, ecological services, and people are more at risk than ever
- Pace of change challenges ability of mountain societies and ecosystems to adapt
- Deficient support for research, development, conservation, and education
- A global mountain agenda has yet to truly take off





TMI - an international non-governmental organization exclusively devoted to sustaining mountain communities and conserving mountain environments around the world

The Mountain Institute: A catalyst for change



- 40 years focused on mountains globally

Some Signature Accomplishments

- Trans-boundary / co-managed protected areas
 - Makalu-Barun (Nepal) + Qomolangma (Tibet)
 - Khangchendzonga, 3-countries, 31,000 km², 90,000 beneficiaries
- Globally utilized methodologies
 - Appreciative Participatory Planning and Action (APPA)
 - Community-based ecotourism: > 15 countries
- Scientific leadership
 - Repeat photography to monitor landscape change and glacial retreat
- Education and knowledge sharing
 - > 40,000 students and teachers trained in Appalachia
- Cultural heritage restoration
 - >155 sacred sites: monasteries, temples, pilgrimage routes, meditation caves
- Sustaining progress in conflict zones
 - Peru and Nepal

Three Generations of Senior Leadership





Andes Program

- Director: Dr. Jorge Recharte
- 3 geographies:
 - Piura/Paramos
 - Cordilleras Blanca y Negra
 - Nor-Yauyos
- Themes:
 - Ecosystem based adaptation
 - Natural hazard risk mitigation
 - Governance – watersheds and commonwealths
 - Hybrid science – linking universities and communities

Nepal Program

- Dr. Meeta Pradhan – Brian Peniston
- Three geographies:
 - Kanchenjunga – Makalu
 - Everest/Khumbu
 - Far west
- Principal initiatives
 - Mountain Carbon: REDD+, WWC
 - Livelihoods and Conservation: Medicinal and Aromatic Plants
 - Cultural Heritage Preservation
 - Local Adaptation Planning – risk mitigation Khumbu: CCRD/Engility, BMU
 - Food for Enterprise: WFP



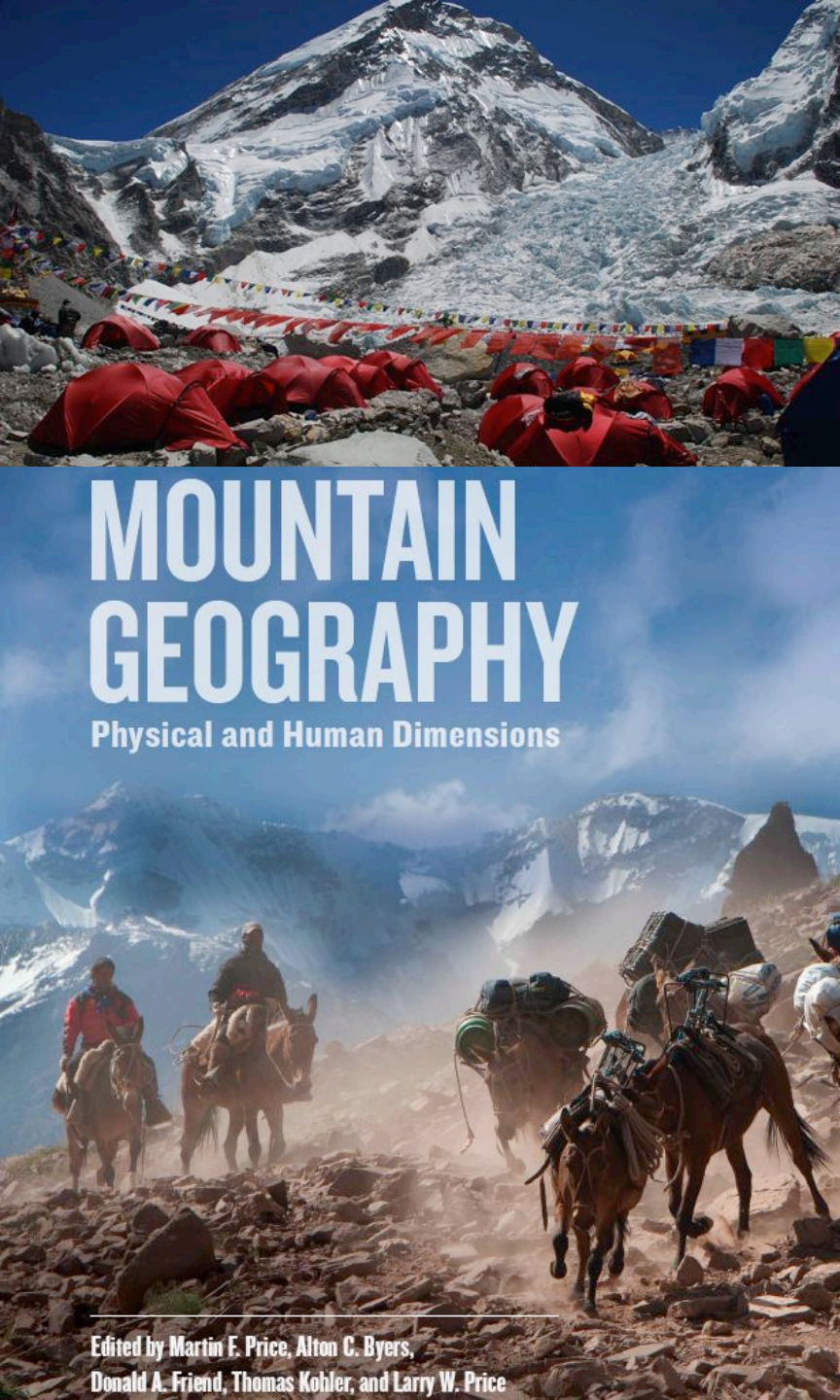
North America

- Appalachian Education:
 - Watershed education, monitoring and teacher training
 - Sustainable energy
 - SK summer camp and facilities rental
 - Funding: W VA legislature, State and Federal Agencies, Foundations, “Friends of Spruce Knob”
- Appalachian Energy: solar in coal country.
 - Funding: litigation settlement
- Native Americans and public lands in the western US – mediation and interpretation
 - Funding: federal agencies

Science and Exploration

“2014 the year of Everest?”

- Geographies:
 - Cordillera Blanca, Peru
 - Khumbu region, Nepal
- Primary program: High Mountain Glacial Watershed Program
 - GLOF Risk Mitigation (w/UNDP)
 - CC Adaptation Planning
 - Community of Practice (17 countries)
 - Climber-scientist small grant program
 - Everest Alliance
 - Mountain Geography textbook



MOUNTAIN GEOGRAPHY

Physical and Human Dimensions

Edited by Martin F. Price, Alton C. Byers,
Donald A. Friend, Thomas Kohler, and Larry W. Price

The Mountain Institute in Action



Large Protected Areas - Community Engagement



Sustaining Environmental Services in Multi-Use Landscapes

The Case of the Andean Paramos



Proposed Provincial Paramo Reserve: 400,000 acres

El agua para el valle de San Lorenzo viene del páramo

¿Qué son los páramos?

- Páramos altoandinos muy húmedos
- Lugares de vida y cultura
- Lugares sagrados

También son:

Lugares con cientos de turquesas y muchos más durante las neblinas, con neblinas y lluvia permanente que forman lagunas, pantanos o humedales, donde nacen los ríos que proporcionan agua a los valles de la región Piura.

En los páramos, las plantas y los animales, vive el uso de animales, el lagarto, las aves e insectos que se relacionan unos con otros y todos trabajan para el mantenimiento de la vida en los páramos.

El páramo salvó por qué:

- Captar el agua de la lluvia y la neblina para luego filtrar en el suelo.
- Almacenar el agua en pantanos y lagunas para luego soltarla lentamente.
- Es el hogar de plantas y animales endémicos, en decir que solamente viven en el páramo.
- Filtra el agua para el riego de cultivos, para el consumo humano y otros beneficios.

¿El clima está cambiando?

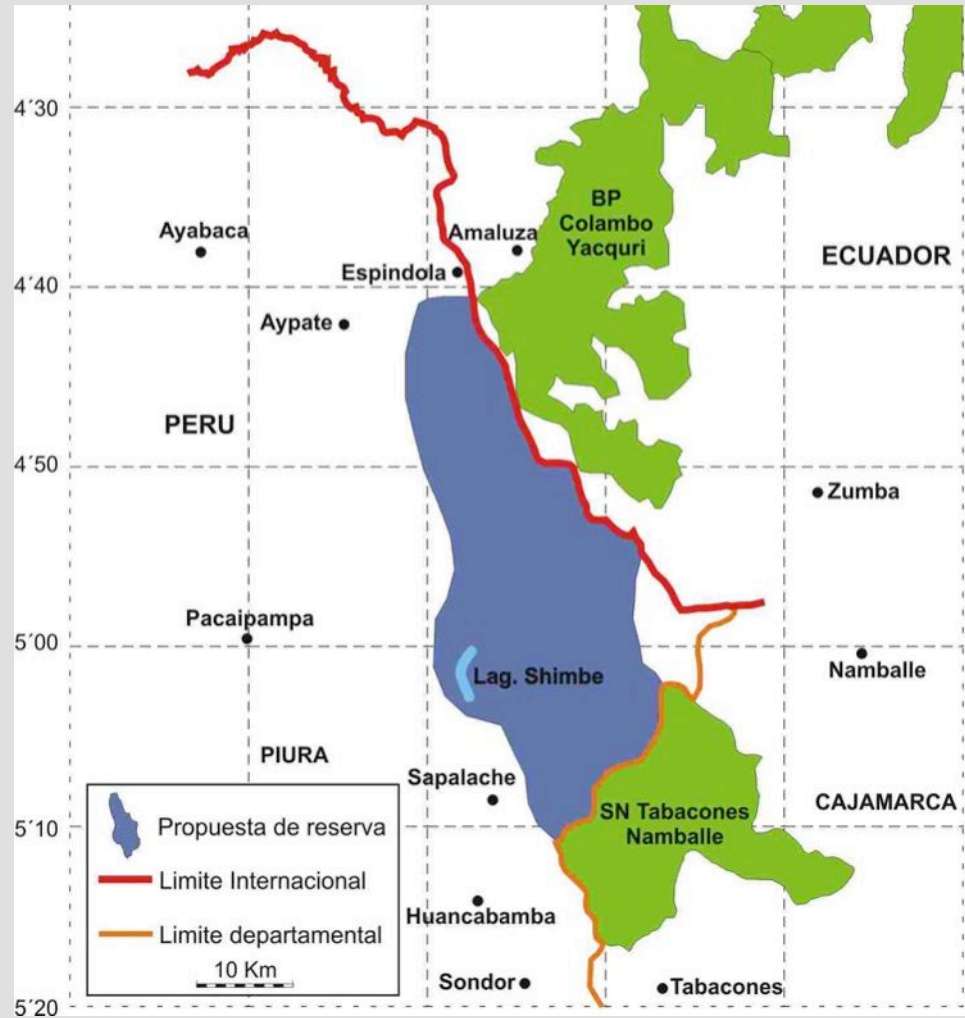
Si: El clima de la tierra está cambiando rápidamente por la acción del ser humano. Ahora se sienten más calor el agua de los ríos cada vez se menor y han aumentado las plagas y enfermedades. Entonces, el cambio climático está con nosotros, es tiempo de estar preparados, reducir los riesgos y ser capaces de responder organizadamente y tomar medidas de adaptación.

La Junta de Usuarios de San Lorenzo frente al cambio climático propone:

- Fortalecer la capacidad técnica y organizativa de la JUSAL para la gestión adecuada del agua.
- Mejorar el sistema de captación, reserva, distribución y uso del agua de los ríos Querey y Chigüillo.
- Colaborar en la conservación y uso sostenible de los ecosistemas naturales de agua, páramo y bosques de neblina.
- Implementar acciones de prevención y respuesta a riesgos y desastres naturales producto del cambio climático.
- Incentivar el uso de tecnologías alternativas para la conservación y uso sostenible de los suelos.
- Colaborar en el manejo de los residuos orgánicos e inorgánicos.
- Convencionar sobre el uso del agua para riego y el consumo humano.



¡Cuidando el PÁRAMO, nos preparamos para el CAMBIO CLIMÁTICO!



Bolstering Livelihoods – Conserving Forests: Medicinal and Aromatic Plant Cultivation in Nepal



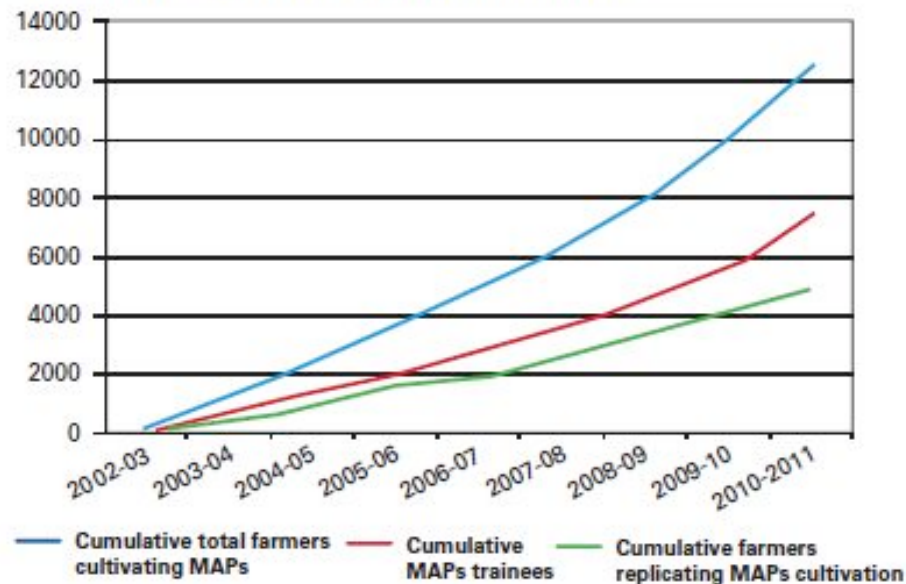


Results:

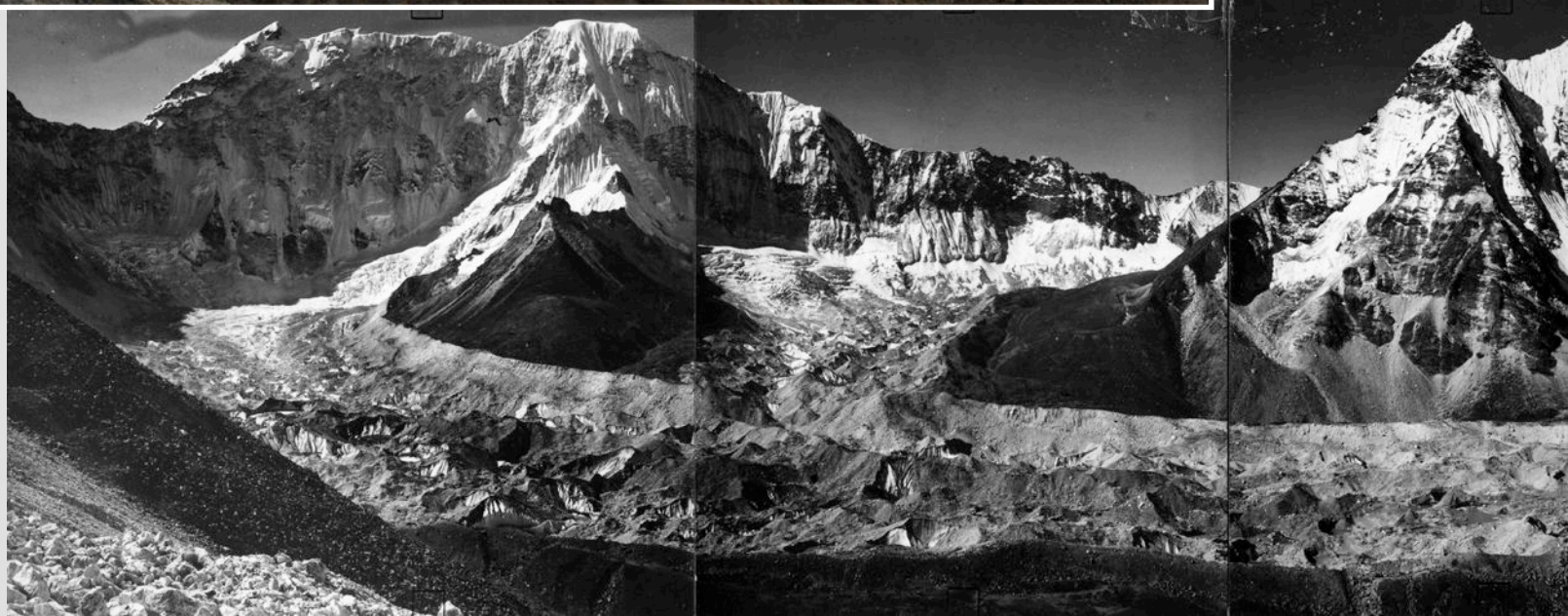
- In 2012:
 - >13,000 farming families earned a combined income from MAPS of \$1,200,000
 - Typical household doubled annual cash income
- 1 million seedlings of native trees and fodder species planted
- Ecological restoration of upland habitats
- Target: 50,000 farmers in 10 years
- Ripe for expansion in Asia and to Latin America (Peru pilot)



Cumulative farmers cultivating MAPs



Mitigating Risks from Glacial Lake Outburst Floods

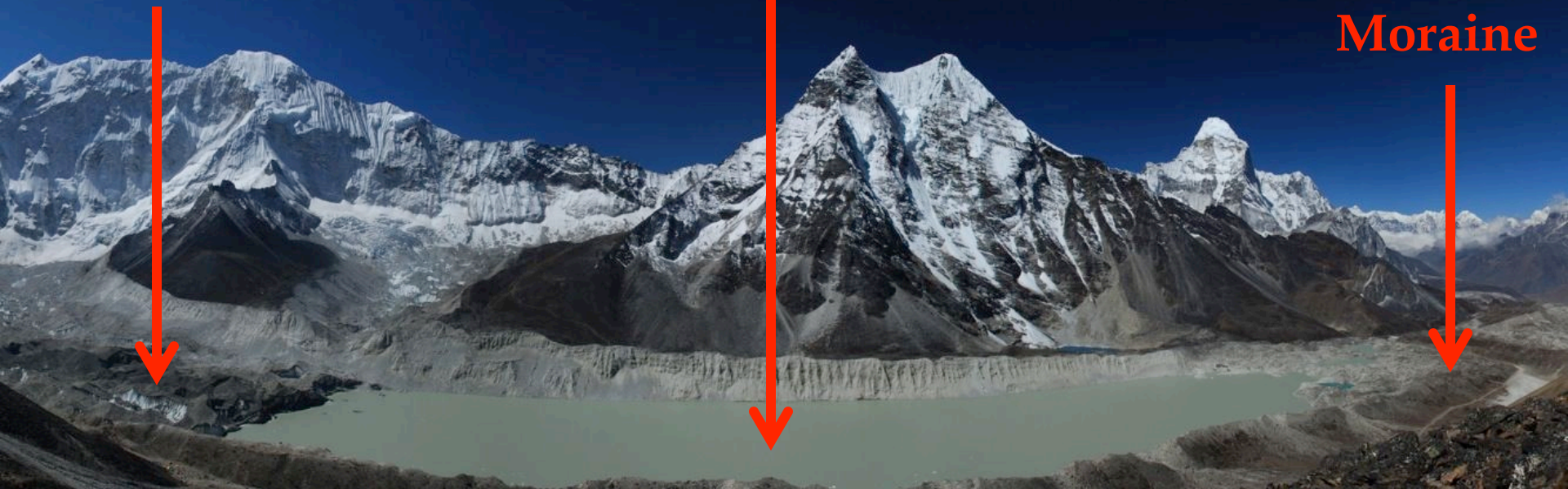


The Case of Imja Lake

Glacier

Lake

Terminal
Moraine



	Area (km ²)	Average Depth (m)	Volume (10 ⁶ m ³)	Maximum Depth (m)
1992 ¹	0.60	47.0	28.0	98.5
2002 ²	0.86	41.6	35.8	90.5
2009 ³	1.01	35.1	35.5	96.5
2012⁴	1.45	48.0	66.2	116

Downstream to Dingboche





Appalachia Program – Developing an Informed Mountain Citizenry



Conservation, Community, Culture



Wilderness Program



Teacher Professional Development Programs



Appalachian Watershed and Stream Monitors

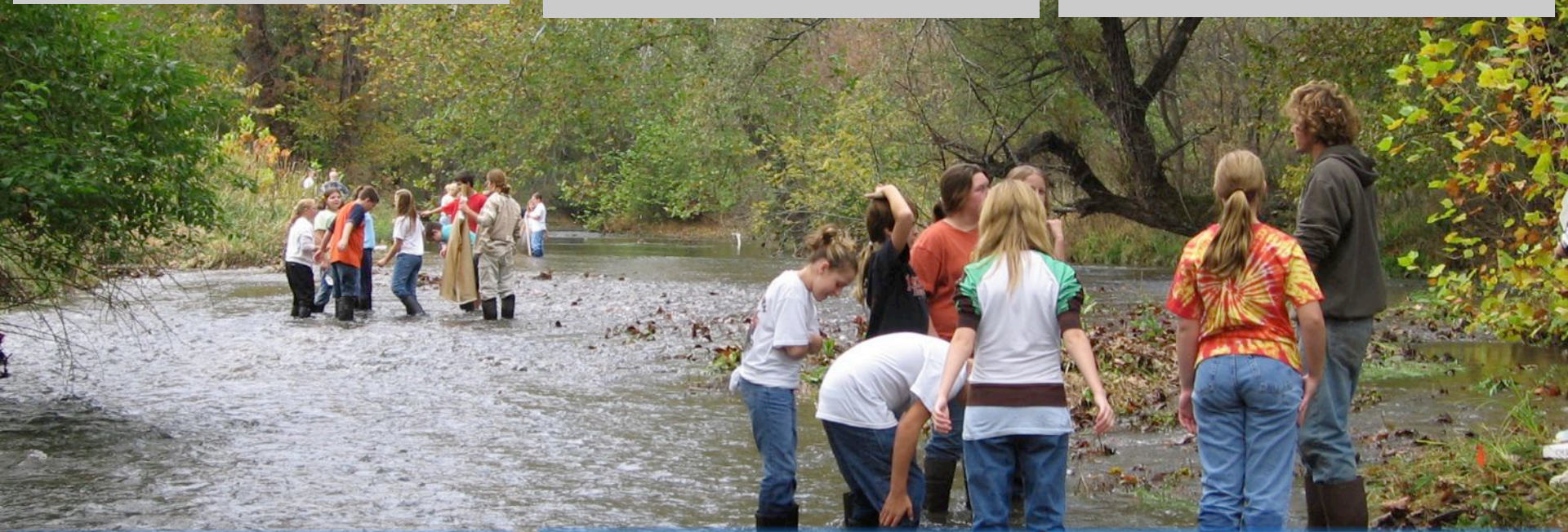


County-wide Outdoor Education Programs

Did you learn anything about the value of mountains that will change your actions at school or home?

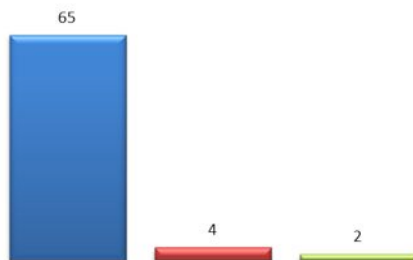
I feel responsible for conserving and recycling, and getting involved in restoration efforts.

I have a better understanding of how we are all connected through our watershed and forest communities.



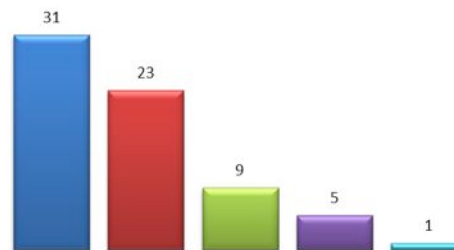
Question 8

■ Affirmative Response ■ Negative Response ■ No Response



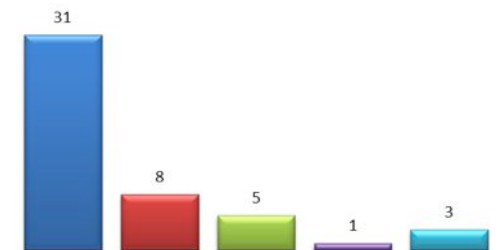
Question 13

■ Strongly Agree ■ Agree ■ Neutral ■ Disagree ■ Strongly Disagree



Question 18

■ Strongly Agree ■ Agree ■ Neutral ■ Disagree ■ Strongly Disagree





2,651
Informed
Mountain Citizens
in 2012

“My science fair project will be about headwater streams!”

“I can’t wait to bring my students to Spruce Knob Mountain!”

“One day I will come back and tell my kids - ‘I planted that forest’”

Legal international trade benefits local people ↘

Climate change adaptation capacity built

Medicinal plant cultivation triples farmer income – options for men and women

Co-managed Park, community income from trekkers

Glacial lake flood risk mitigated, micro-hydro

100's of endemic species thriving

Rangelands restored, livestock well managed

Stable wildlife populations

Trail and shrines restored
community-based cultural tourism

Alternative energy income options

Thriving Indigenous community - Inclusive governance

Hillsides reforested with PES funds

"Commonwealth" managed watershed

REDD+ funding conserving forests and grasslands

Clean year-round water flow benefits millions downstream ↘

Mountain landscape in 10 years



CONSERVATION. CULTURE. COMMUNITY.