

GEOSS Related Activities at ICIMOD

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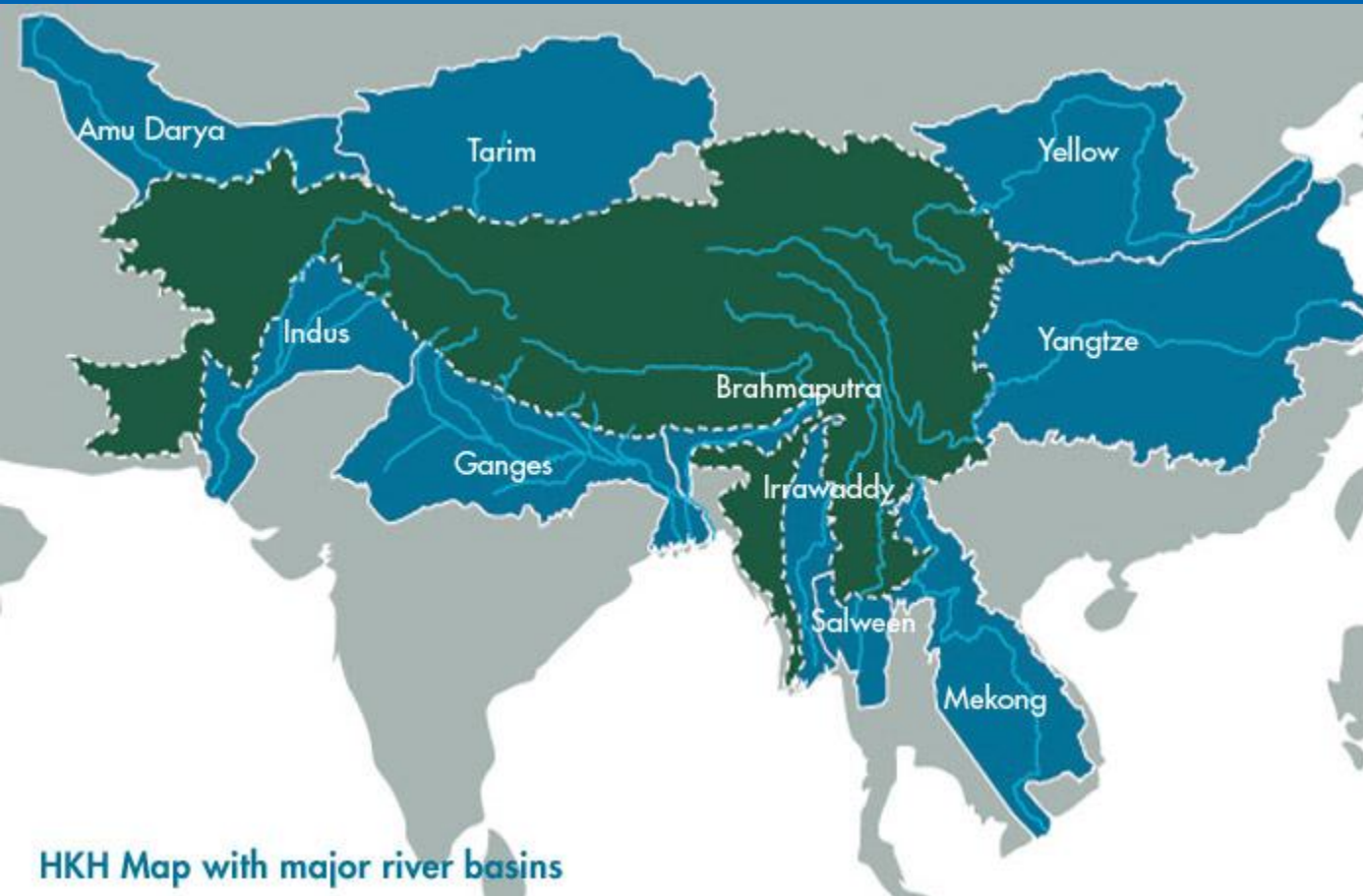
Kathmandu, Nepal

5th GEOSS Asia-Pacific Symposium, Tokyo, April 2012

International Centre for Integrated Mountain Development (ICIMOD)

ICIMOD

FOR MOUNTAINS AND PEOPLE



- Regional knowledge, learning and enabling centre devoted to sustainable mountain development
- Intergovernmental and independent organisation
- Information and knowledge are chief commodities of the centre



Climate Change in the Himalaya - an Overarching Issue in the Region



Most Vulnerable

- Bangladesh (1)
- India (2)
- Nepal (4)
- Afghanistan (8)
- Myanmar (10)
- Pakistan (16)

Pressures on Mountain Systems

- **Climate Change**
- Population Dynamics
- Globalization
- Natural Resources Use
- Land Use Change



Water
Biodiversity
Agriculture
Forest
Cultural/natural
heritage

...

Information needs

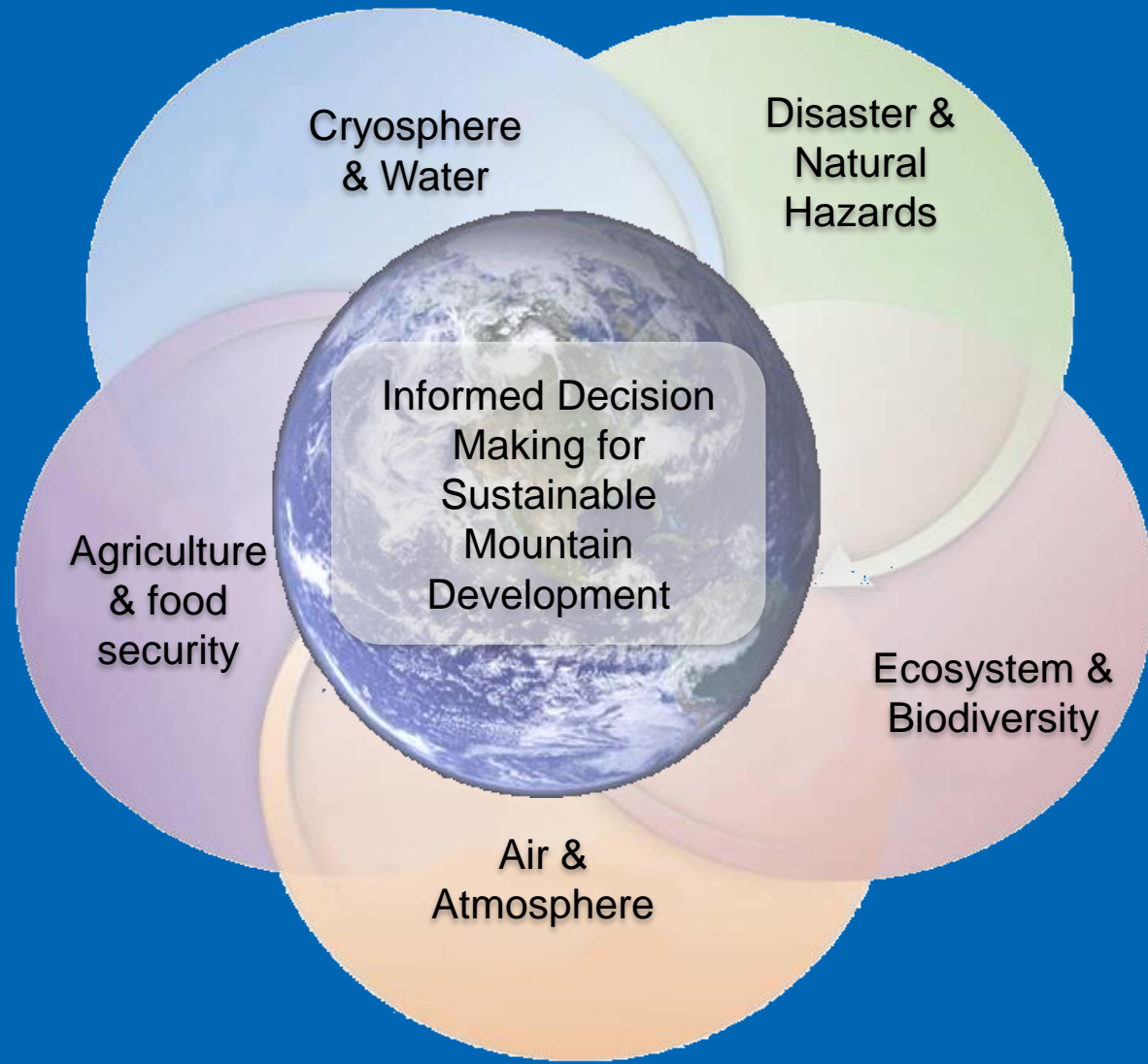
- Spatial and temporal data requirements
- Integration of social, economic & environmental components
- Translation of data from scientific domain to policy decision making

Mountain Environment and Natural Resources Information System (MENRIS)

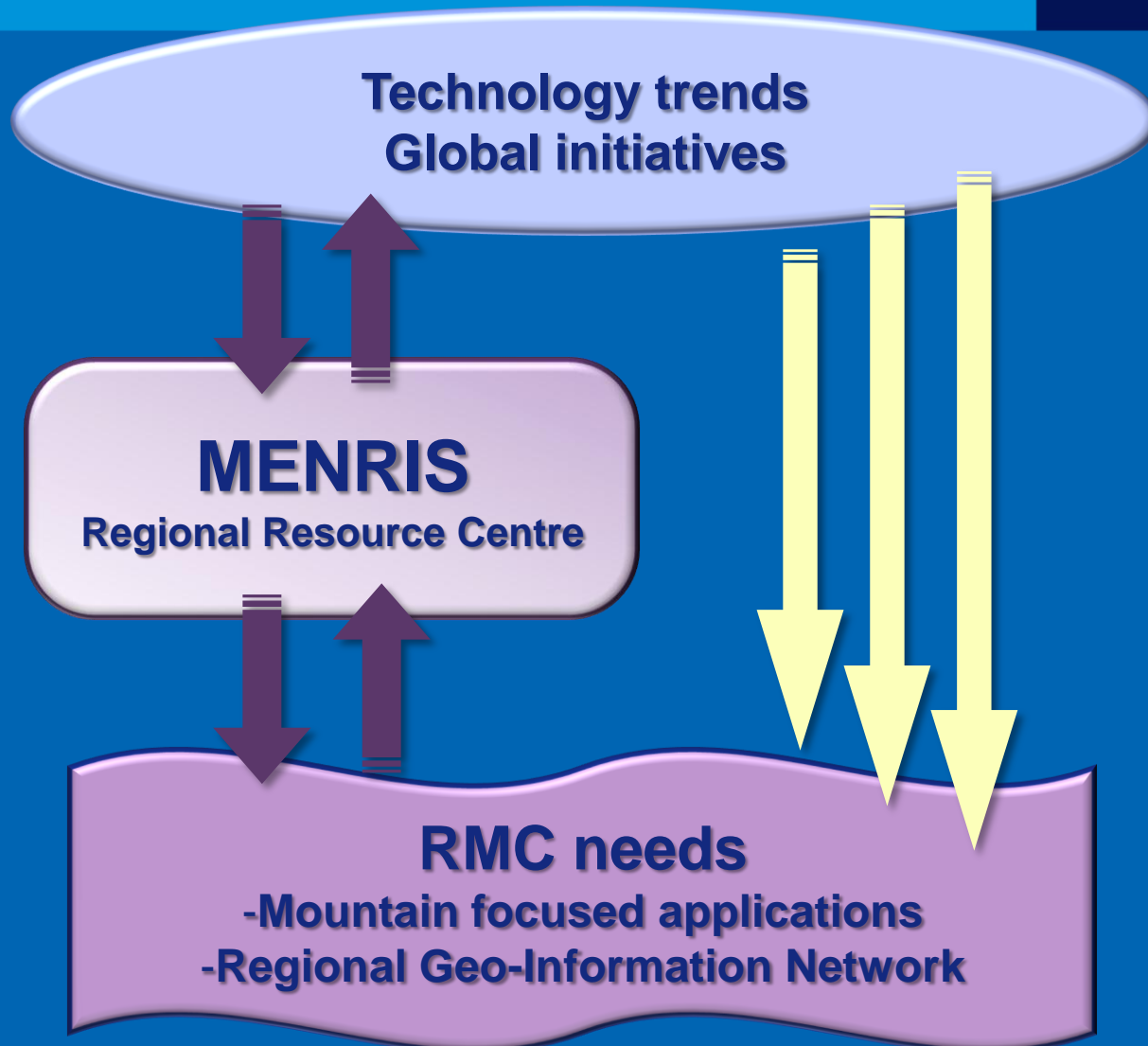
ICIMOD

FOR MOUNTAINS AND PEOPLE

- Build information and knowledge
- Scientific tools and methods, Innovation and technology transfer
- Integrated approaches, Harmonisation and standardisation
- Regional Networking and Platform



MENRIS - Regional Geospatial Resource Centre



SERVIR
Facility at NASA

SERVIR-Mesoamerica

SERVIR-Africa

SERVIR-Himalaya



SERVIR

Improving environmental decision-making
in the Hindu Kush Himalayan region
through dissemination and analyses of earth
observation information

Demand:
cultivate use of
better information

Users engaged to define
needs and opportunities

Capacity building and
training delivered

Outreach and
communications conducted



Supply:
Access to high quality, user-
tailored tools and information
services

Improved access through a
functioning One-Stop
platform

Data quality and coverage
improved

Tools, models, and
applications co-developed

- Formal launching
- Inception workshop
- Needs assessment



Mountain GeoPortal

ICIMOD
FOR MOUNTAINS AND PEOPLE

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Science Applications

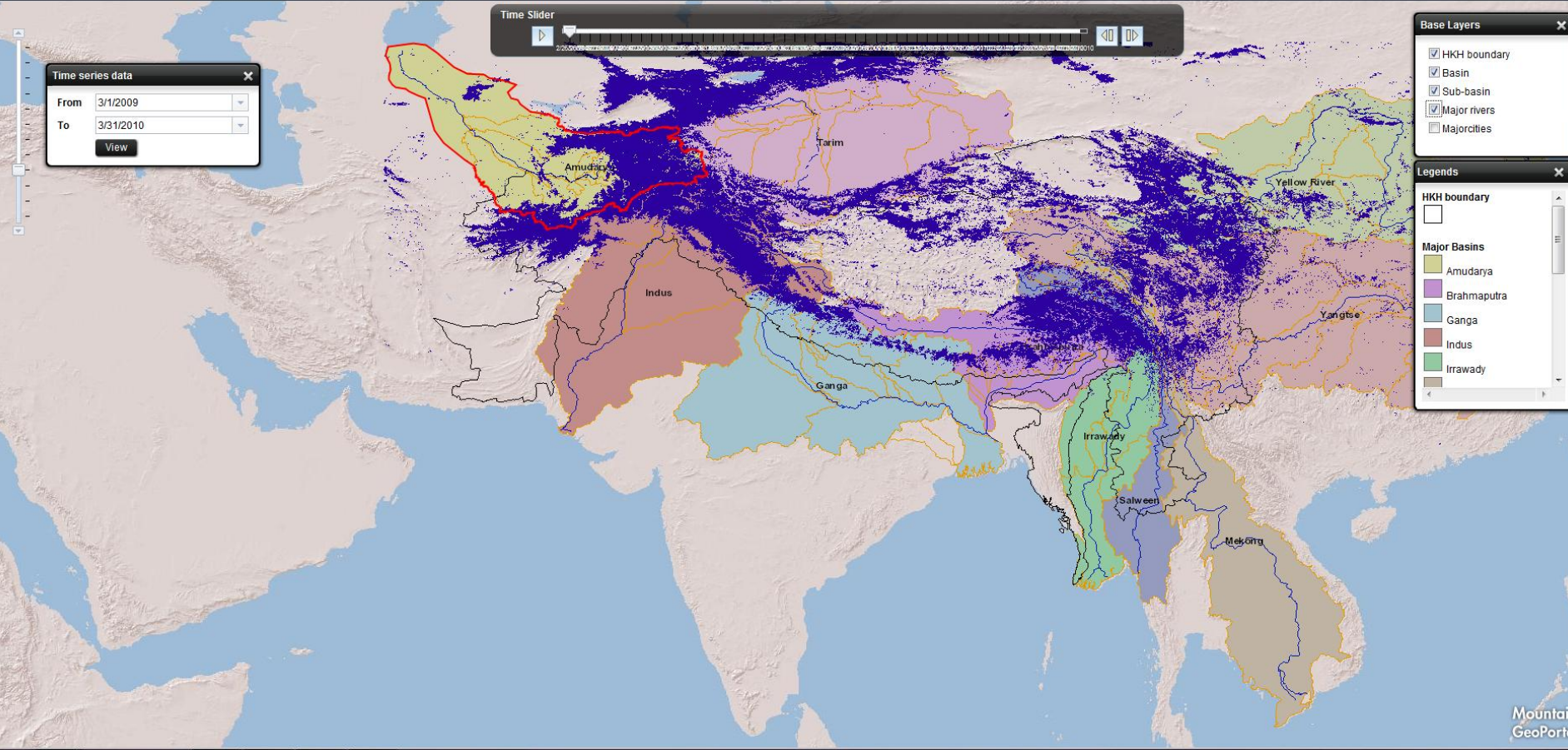
The science application is a collection of innovative and integrated geo-based solutions to support informed decision-making for mountain development policies and practices. The applications are being developed largely within the framework of SERVIR-Himalaya, which features web-based access to GIS data and satellite imagery, decision-support tools, interactive mapping and visualization, with the aim of providing scientists, environmental managers, and decision-makers with easy access to information. Following are the six broad themes of science applications:

<p>CRYOSPHERE & WATER</p> <ul style="list-style-type: none"> Status of Glacier in the HKH Region Historic Changes in Snow Cover in the HKH Region HKH glacial lake inventory of the HKH region Decadal Glacier Changes in Bhutan Himalaya Climate Change Impact on Hydrologic Flows in Wangchu Basin 	<p>ECOSYSTEMS & BIODIVERSITY</p> <ul style="list-style-type: none"> Land Cover Dynamics in the Bhutan Phobjikha Valley Resource Inventory HKH Conservation Portal
<p>DISASTER & EMERGENCY RESPONSE</p> <ul style="list-style-type: none"> Forest Fire Detection & Monitoring in Nepal Kathmandu Valley Earthquake Emergency & Response Management System 	<p>TRANSBOUNDARY AIR QUALITY & BLACK CARBON</p> <ul style="list-style-type: none"> Atmospheric Haze Monitoring in the HKH
<p>AGRICULTURE & FOOD SECURITY</p> <ul style="list-style-type: none"> Agricultural Monitoring to Support Food Ssecurity in Nepal 	<p>SOCIO-ECONOMY & LIVELIHOOD</p> <ul style="list-style-type: none"> Bhutan Gross National Hapiness (GNH) Index 2010 Cadastral Mapping in Bhutan Nepal Census Indicators & Trends

Science Applications: Assessment of Snow

Monitoring & Assessment of Snow Cover in the HKH

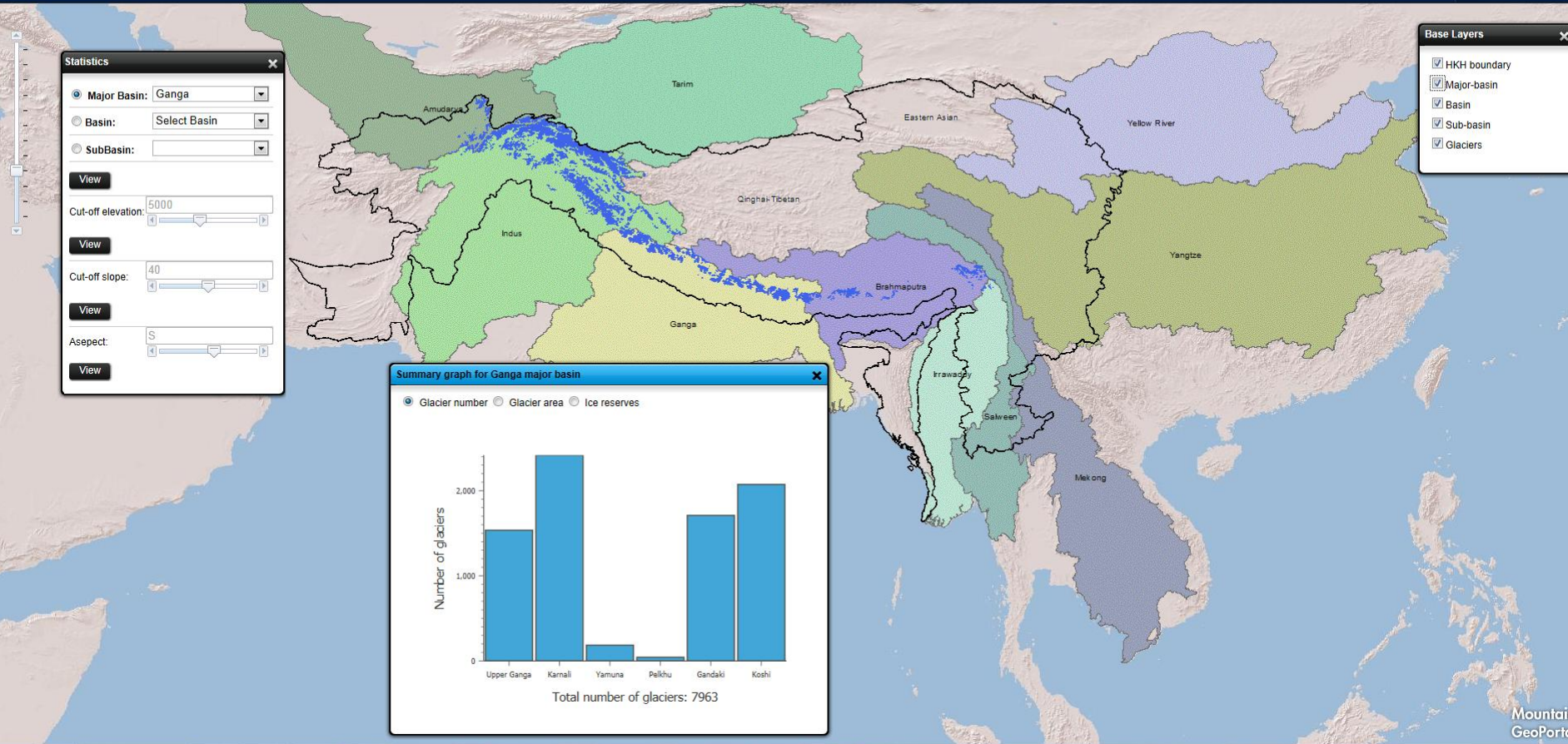
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Science Applications: Status of Glaciers

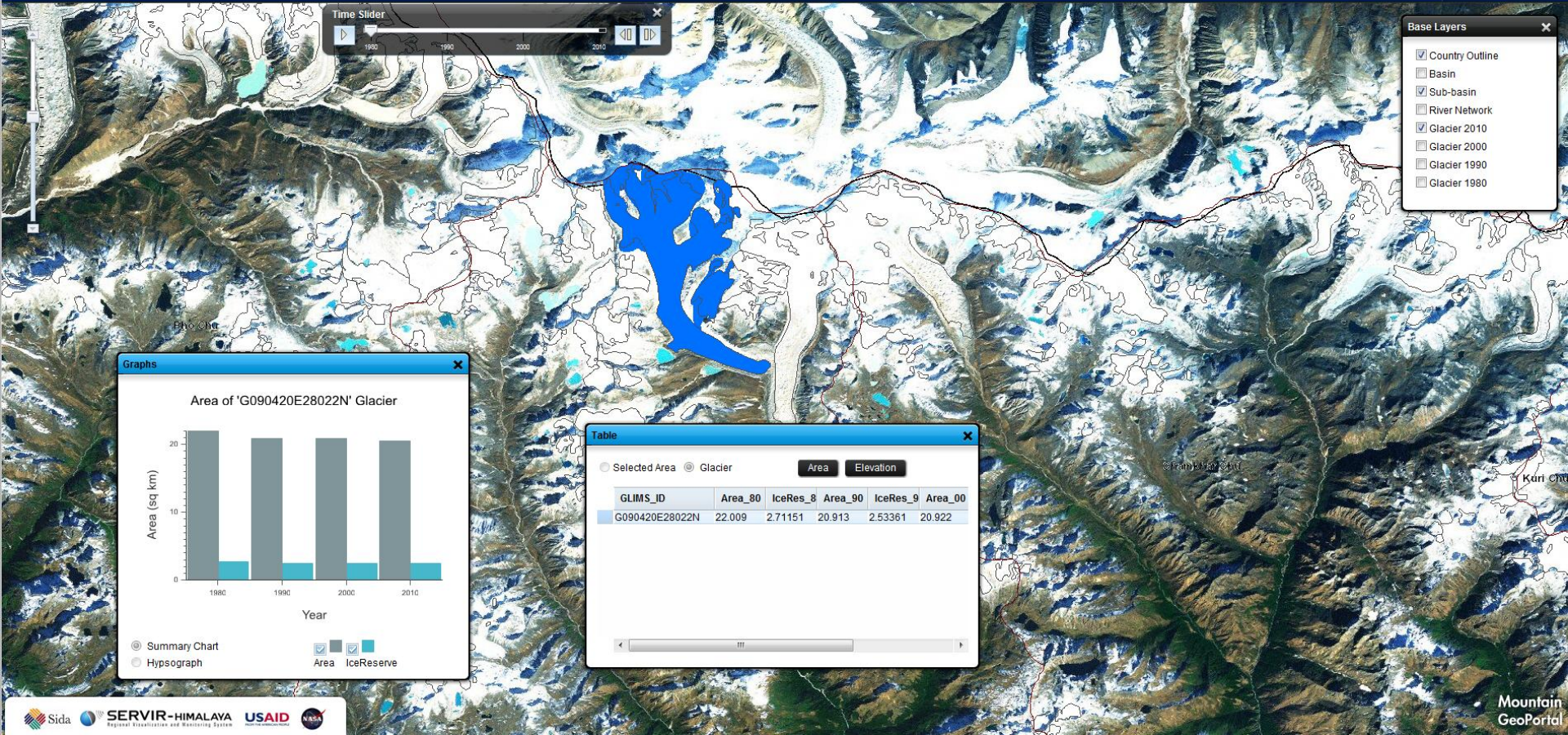
Status of Glaciers in the HKH Region

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Science Applications: Decadal Changes in Glaciers

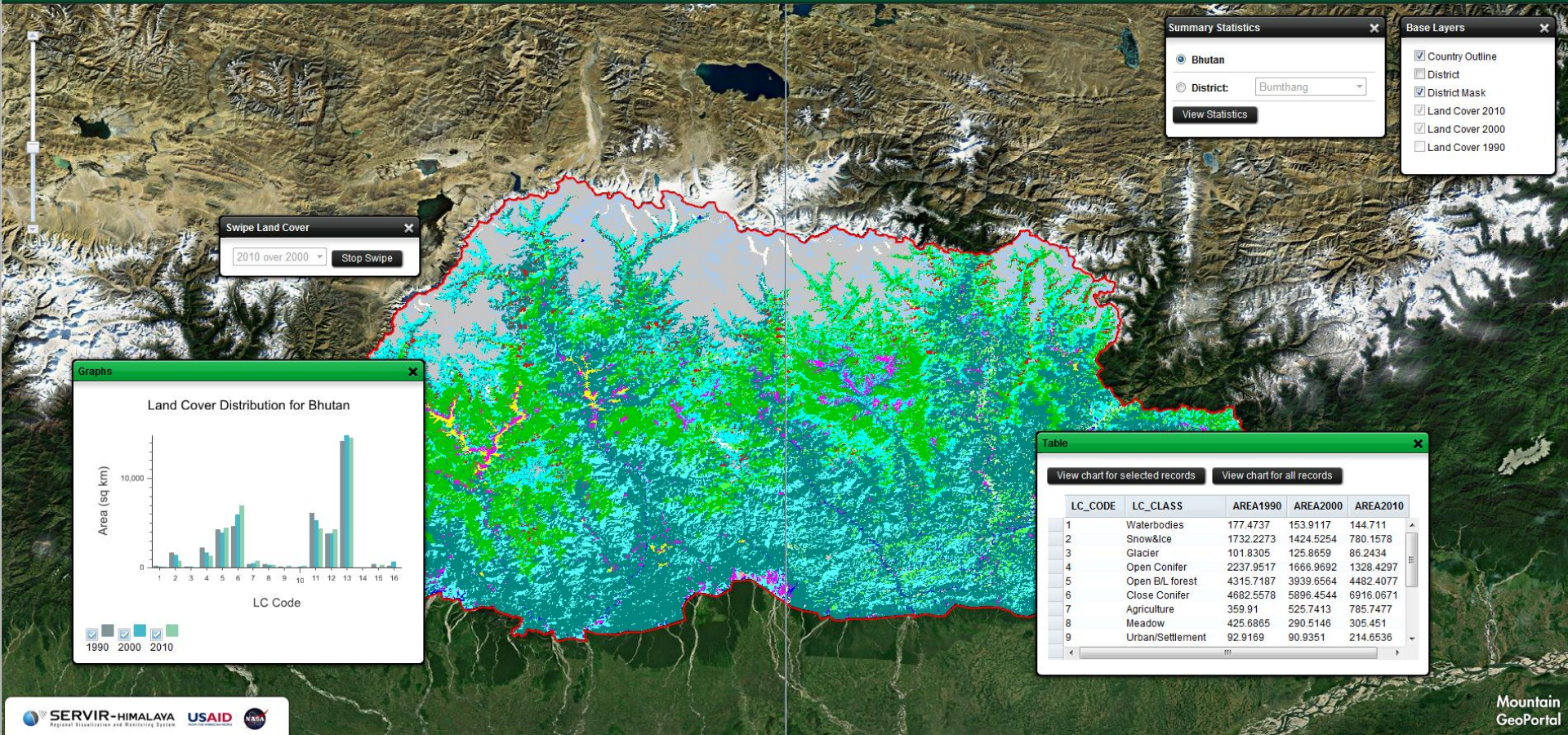
Decadal Glacier Changes in Bhutan Himalaya



Science Applications: Land Cover Change Assessment

Land Cover Dynamics in Bhutan

Imagery
ICIMOD



Swipe Land Cover

2010 over 2000

Stop Swipe

Summary Statistics

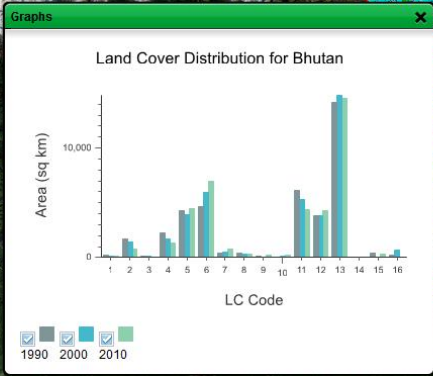
Bhutan

District: Bumthang

View Statistics

Base Layers

- Country Outline
- District
- District Mask
- Land Cover 2010
- Land Cover 2000
- Land Cover 1990



Table

View chart for selected records | View chart for all records

LC_CODE	LC_CLASS	AREA1990	AREA2000	AREA2010
1	Waterbodies	177.4737	153.9117	144.711
2	Snow&Ice	1732.2273	1424.5254	780.1578
3	Glacier	101.8305	125.8659	86.2434
4	Open Conifer	2237.9517	1666.9692	1328.4297
5	Open BL forest	4315.7187	3939.6564	4482.4077
6	Close Conifer	4682.5578	5896.4544	6916.0671
7	Agriculture	359.91	525.7413	785.7477
8	Meadow	425.6865	290.5146	305.451
9	Urban/Settlement	92.9169	90.9351	214.6536

Science Applications: Emergency Management and Response

Earthquake Emergency Management & Response System for Kathmandu Valley



Route Finder

Add Stops Clear

Add Barriers Clear

Show Route Clear

Closest Facility

Hospital

Hover over the route to view directions

Gallery

Photos Video Before/After

3 person injured at Laichowr

2011-09-18 01:45:00
It has been reported that three persons have been injured as the wall of the British embassy to Nepal crumbled in Laichaur. - TheHimalayanTimes

Base Layers

- Images
- Municipality
- VDC
- Ward
- Water area
- Water lines
- Roads
- Road edge
- Bridge
- Hospitals
- Health Post
- Transformers
- Gas Station
- Schools

Incidents

- Building Collapse
- Injuries
- Deaths
- Safe Places
- Road Blockade
- NONE
- Rescue Request
- Medical
- Stores and Facilities
- Fire
- Evacuation Centers
- Trusted Reports

Submit incident:

1. SMS to 5555
2. KtmEqk@gmail.com
3. Tweet with #ktmeqk
4. [Fill Form](#)

Useful Links

- [Air Traffic Controll \(ATC\)](#)
- [All Hands Volunteers](#)
- [Asia Disaster Preparedness Centre \(ADPC\)](#)
- [Asia Emergency Response Facility \(AERF\)](#)
- [Bhaktapur Municipality](#)
- [Civil Aviation Authority of Nepal \(CAAN\)](#)
- [Dept. of Mines and Geology \(DMG\)](#)
- [Disaster Inventory System - US](#)
- [Disaster Mgmt. Sentinel](#)

Legends

Hospitals

Police Stations

Crematory

Factories

Fire Brigade



Science Applications: Forest Fire Detection and Monitoring

Forest Fire Detection and Monitoring in Nepal

Tools: Mar 12, 2012

Base Layers:
 Country Outline
 District
 Airport
 Settlement
 Road
 Protected Area
 Active Fire
 MODIS RGB
 Land Cover 2000
 HKH Globe Cover

Legends:
Country Outline
District
Airport
Settlement
Road
Highway

District	Count
Bhojpur	2
Dhankuta	2
Dolakha	3
Ilam	1
Jajarkot	2
Kanchanpur	4

SERVIR-HIMALAYA
Regional Visualization and Monitoring System

USAID

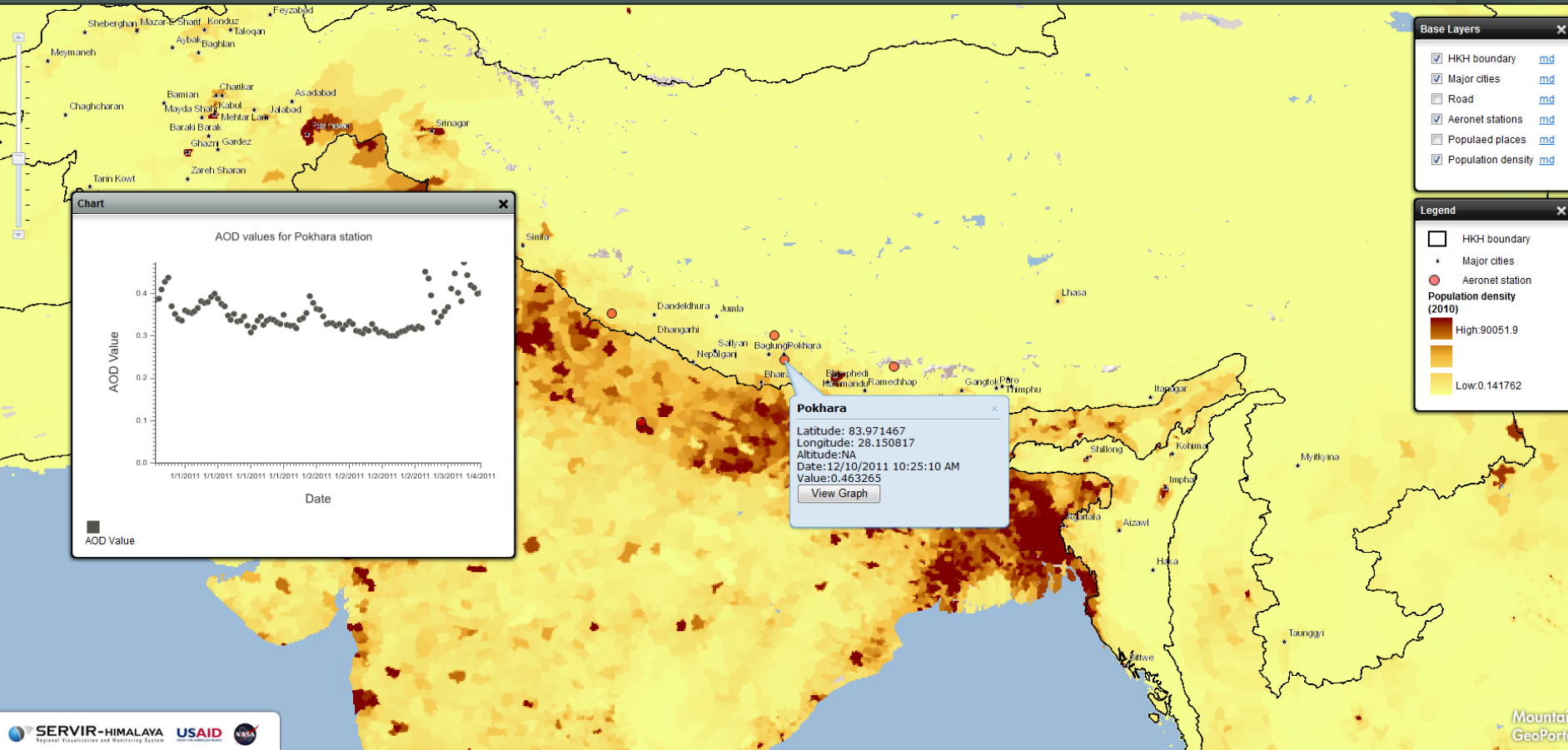
NASA

Mountain GeoPortal

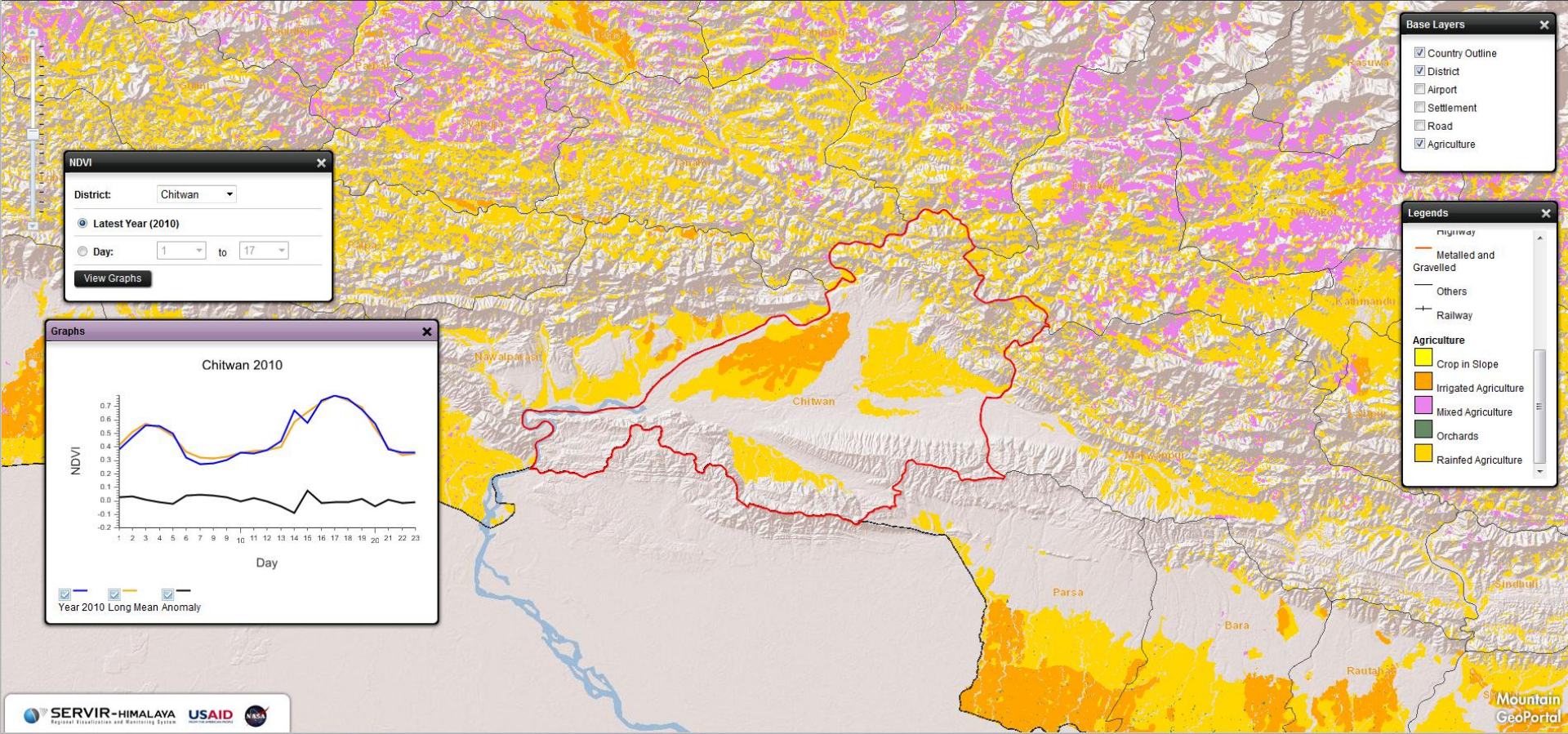
Science Applications: Haze Monitoring

Atmospheric Haze Monitoring in the HKH

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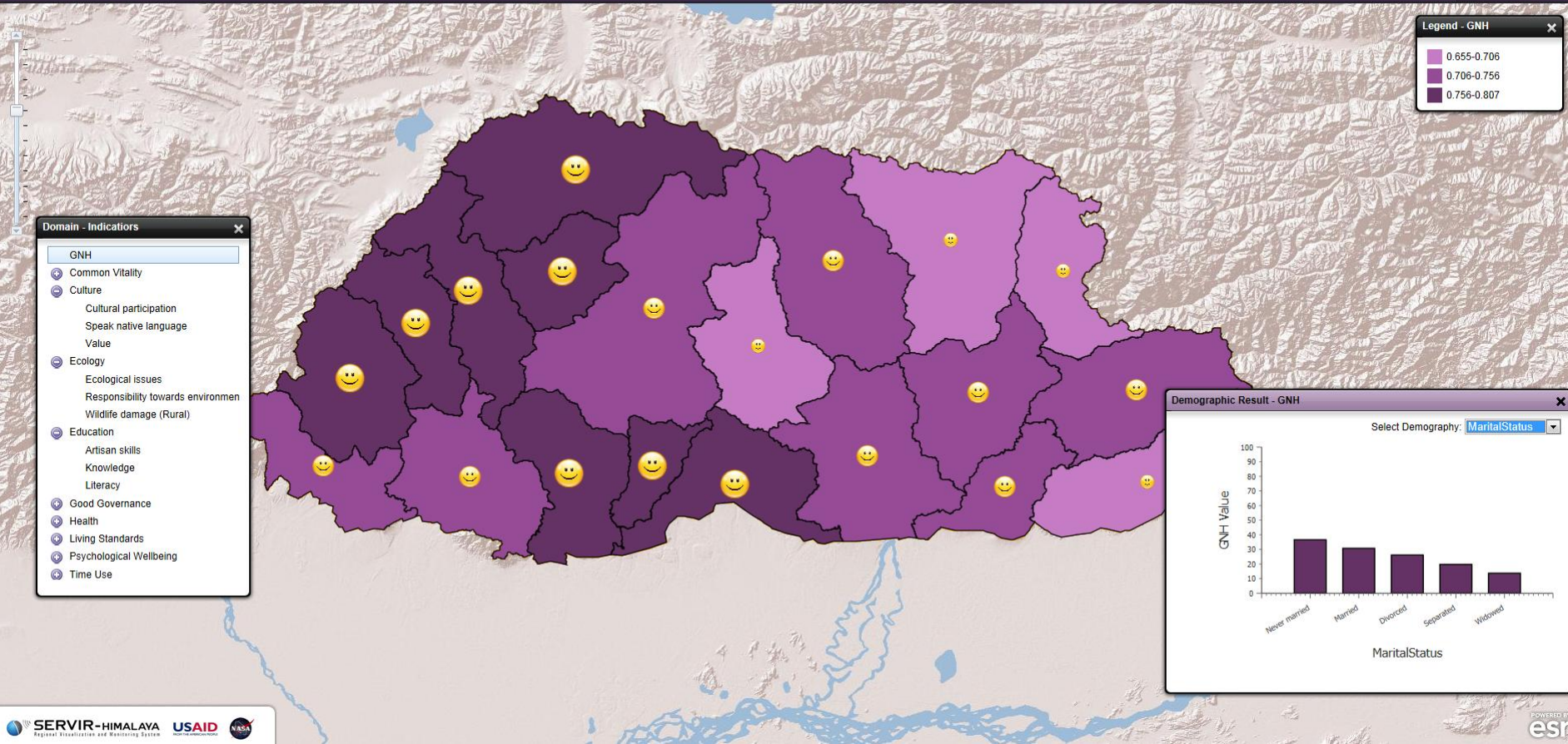
Science Applications: Agriculture Monitoring



Gross National Happiness

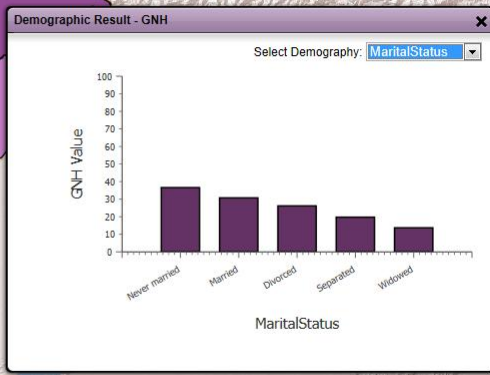
Bhutan Gross National Happiness (GNH)

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Domain - Indicators

- GNH
 - Common Vitality
 - Culture
 - Cultural participation
 - Speak native language
 - Value
 - Ecology
 - Ecological issues
 - Responsibility towards environmen
 - Wildlife damage (Rural)
 - Education
 - Artisan skills
 - Knowledge
 - Literacy
 - Good Governance
 - Health
 - Living Standards
 - Psychological Wellbeing
 - Time Use



- Collaboration with Sentinel Asia, JAXA, UN-Spider and national institutions
- Regional coordination
- Capacity building



NEWS OF THE WEEK

REMOTE SENSING

Earth-Observation Summit Endorses Global Data Sharing

BEIJING—Last August, heavy monsoon rains submerged nearly one-fifth of Pakistan, inflicting \$43 billion worth of damage. The floodwaters destroyed homes and businesses, washed away bridges and roads, ruined crops, and claimed about 1800 lives. As bad as it was, the toll could have grown in the weeks that followed if not for a novel Earth-observation system featured at a meeting here last week.

In July, before the deluge, the International Centre for Integrated Mountain Development in Kathmandu—along with NASA and the U.S. Agency for International Development—had booted up SERVIR-Himalaya, a Web-based monitoring system that pulls together satellite imagery, forecast models, and ground observations. It “showed the progression of the floods in [near] real time,” says Sherburne Abbott, associate director for environment at the White House Office of Science and Technology Policy. As the disaster unfolded, analysts revealed that flooding had knocked nearly 200 tuberculosis clinics out of commission. Forewarned, aid agencies scrambled to steer patients to functioning health centers. “They knew they were going to have a real problem,” Abbott says.

SERVIR is one new instrument in a veritable orchestra of Earth-observation systems intended to make roams of data available and relevant to decision-makers. At the summit last week of the Group on Earth Observations (GEO)—the organization attempting to get this ensemble performing in synchrony—initiatives were unveiled to monitor land-cover changes and forest carbon stocks. And GEO delegates embraced plans to funnel data from platforms tracking everything from biodiversity to earthquake risks into a free and open database. “What’s happening is groundbreaking,” says David Hayes, deputy secretary of the U.S. Department of the Interior. “This data is incredibly valuable. If you share it, your incremental contribution can yield a super benefit.”

Established in 2005, GEO is an effort by 85 countries, the European Commission, and 58 international organizations to meld disparate remote-sensing tools and ground-based databases—300 databases and counting—into a seamless Global Earth Observation System of Systems (GEOSS), which is expected to come fully online in 2015. When GEO was conceived, “we understood that if you want to manage planetary problems, you have to have planetary information—which didn’t exist at that stage,” says Bob Scholes, a biodiversity expert at the Council for Scientific and Industrial Research in Pretoria.

GEO’s progress has been remarkably swift, Scholes adds, and the project has overcome the view that data should be hoarded, not shared. “When an earlier generation of scientists collected data on the public purse, they considered it their data. The norm now is that data will quickly enter the public domain,” he says. To reinforce such good behavior, “persistent identifier” tags are being developed that will note which scientists or teams contributed data to GEOSS. The U.S. Office of Management and Budget (OMB) is spurring agencies to release data via www.data.gov. “OMB is looking to measure our department’s productivity in part by how much we’re adding to the public’s access to data,” says Hayes.

NASA and the U.S. Geological Survey 2 years ago began allowing free access to their 4-decade Landsat archive, including images with a resolution of 30 meters that enable tracking of land-cover changes wrought by human activity. And riding new open-data legislation in the European Union, the European Space Agency plans to allow free access to data streams from its soon-to-be-launched Sentinel satellites, says Manuela Soares, director for environmental research at the European Commission’s Research Directorate. “There’s been delivery of data on a massive scale,” says Gary Richards of Australia’s Department of Climate Change and Energy Efficiency in Canberra.

Ground-truthing such data is a key element of SilvaCarbon, a U.S.-led scientific network announced here to help GEO improve access to Earth-observation data on forests. SilvaCarbon is expected to develop technologies to implement one of the few bright spots in international climate negotiations: REDD+, a program to reduce emissions from deforestation and enhance forest carbon stocks. Together with GEO’s Global Forest Observation Initiative, SilvaCarbon “shows that we are ready to take the next big step to a robust and transparent global monitoring system for forest carbon,” says Richards.

A second new effort, the Global Land-Cover Data Initiative, aims over the next 2 years to compile and publicly share a current snapshot of Earth’s land-cover conditions. Landsat data provide 80% coverage; GEO partners will fork over the rest.

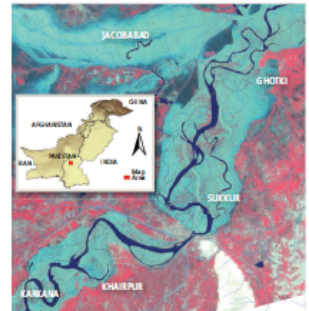
As GEOSS is woven from disparate data sets, there have been a few glitches in integrating the information. “We can’t get all data into the free and open database at this point,” says Abbott. And some resistance remains. “We still get pushback,” says Scholes. “Some countries worry about how data release will affect national security.” Nations fret, for instance, over satellite data they have no data to cover and others revealing info such as flows rates of transboundary rivers. Of course, all agree that some sensitive data, such as the precise location of the last few individuals of an endangered species, should not enter the public domain. “But these instances are now perceived as the exceptions to the rule,” Scholes says. And that, he says, testifies to the profound cultural change on data sharing that GEO is helping drive.

GEOSS’S TOP TARGETS

1. Precipitation
2. Soil moisture
3. Surface air temperature
4. Surface wind speed
5. Land cover
6. Surface humidity
7. Vegetation cover
8. Surface wind direction
9. NDVI*
10. Sea surface temperature

*Normalized difference vegetation index

Data fundamental. Of 146 critical Earth observations, GEO rates these 10 as the highest priority.



Waterlogged. This SERVIR-Himalaya analysis shows flooding along the Indus River in Pakistan’s Sindh Province last August.

International Symposium

Benefiting from Earth Observation

Bridging the Data Gap for Adaptation
to Climate Change in the Hindu Kush-Himalayan Region

4 - 6 October 2010, Hotel Soaltee Crowne Plaza, Kathmandu



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ICIMOD

Geo GROUP ON
EARTH OBSERVATIONS

GIS
Himalayas

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International Symposium

Connecting from Space to Village

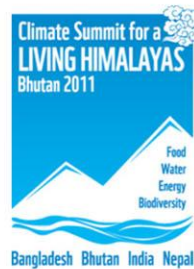
Enabling Climate Policy and Actions in the Himalayas

རྒྱལ་སྤྱིའི་མཁའ་རིག་གོས་འཛོམས

གནམ་སྟོང་ལས་མི་ཡུལ་གྱི་འབྲེལ་མཐུན་

ཉི་མ་ལ་ཡ་ནང་གནམ་གཤེས་ཀྱི་སྲིད་བྱས་དང་བྱ་བ་ཚུ་ ལྷོགས་གྲུབ་ཅན་བཟོ་བ།

November 17-18, 2011, Thimphu



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International Symposium

Connecting from Space to Village

Enabling Climate Policy and Actions in the Himalayas

ICIMOD

FOR MOUNTAINS AND PEOPLE

- International symposium
- Showcasing science applications



International Symposium

Connecting from Space to Village

Enabling Climate Policy and Actions in the Himalayas

ICIMOD

FOR MOUNTAINS AND PEOPLE

- Regional youth forum
 - 40 youth from Bangladesh, Bhutan, India and Nepal
- Special event for school children



- Collaboration with international initiatives in development of methods and tools
- Building synergy with ongoing initiatives at national levels
- Dissemination of methods and tools to the national governments and relevant stakeholders through capacity building programs
- Developing SERVIR platform as a mechanism to share data and applications to support decision making

Thank You!

