

# Tibetan Alpine Ethnobotany and Climate Change

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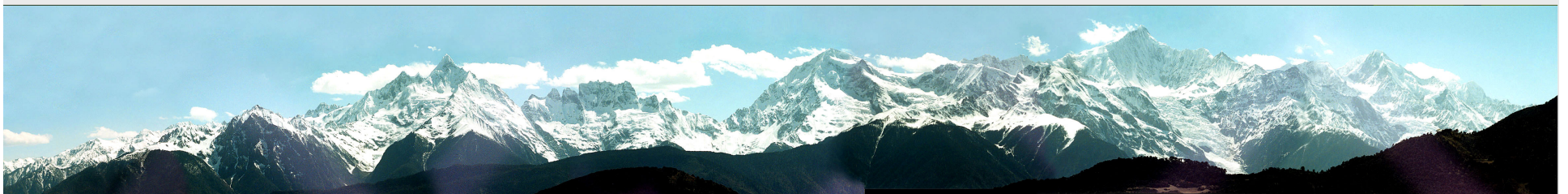
# Research Site: Eastern Himalayas





Tibetan Culture



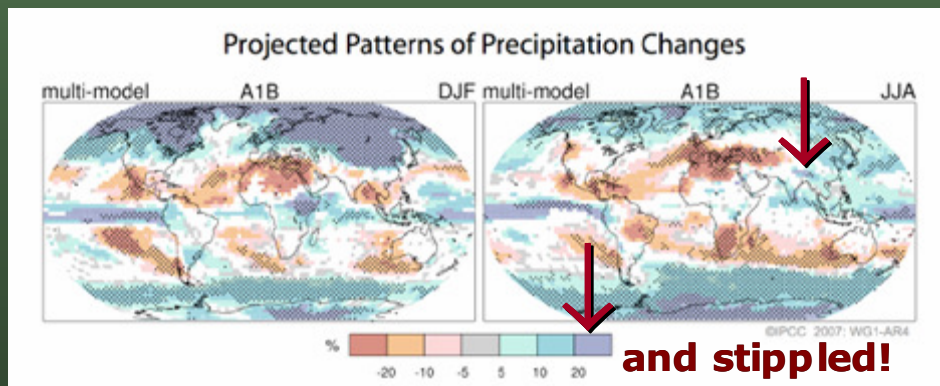
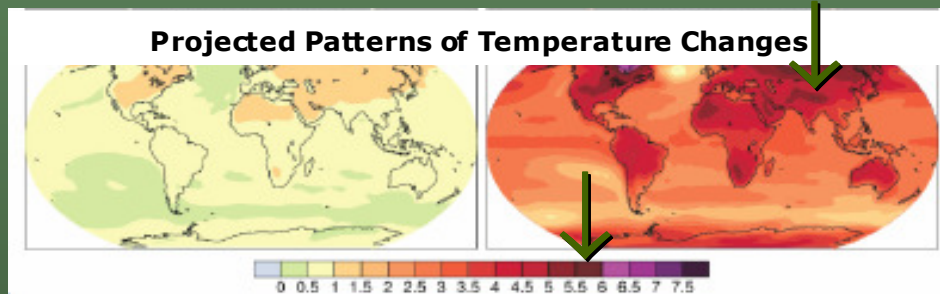


# Climate Change near Khawa Karpo: five lines of evidence

1. IPCC -- impacts
2. Repeat photographs -- impacts
3. Gradient analyses -- impacts
4. GLORIA plots -- impacts
5. Tibetan perspectives -- vulnerability

# 1. Intergovernmental Panel on Climate Change

## IPCC Fourth Assessment Report



5-6°C temperature increase  
20-30% precipitation increase  
Glacial retreat



## 2. Repeat Photographs

Joseph Rock 1923

Robert Moseley 2003

Shrub-Line

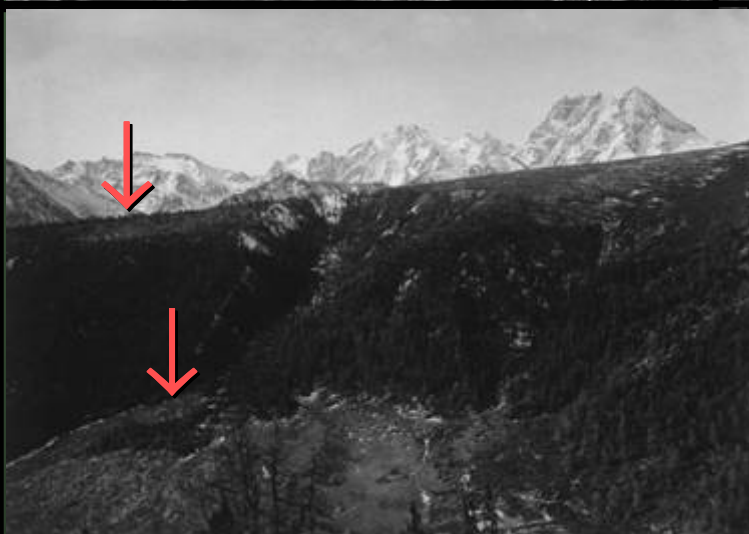
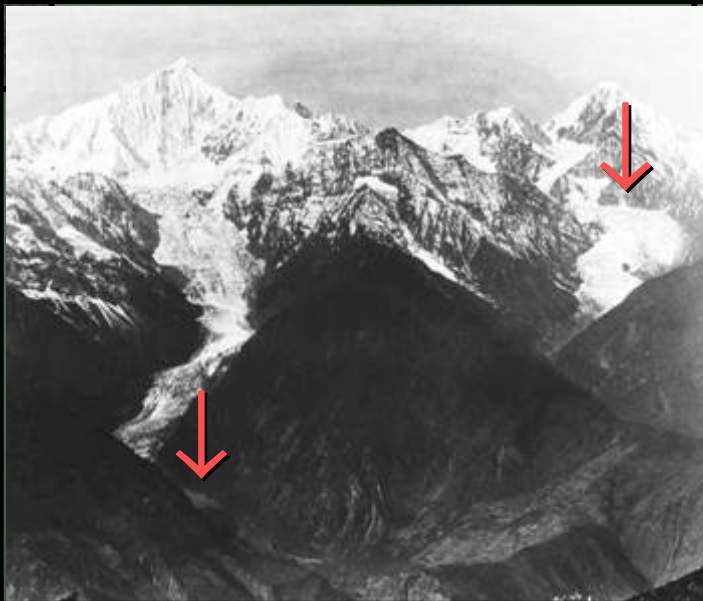
Glaciers of Mt. Khawa Karpo

Tree-Line

Shrub-Line

Glaciers of Mt. Khawa Karpo

Tree-Line





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## Elevational gradient

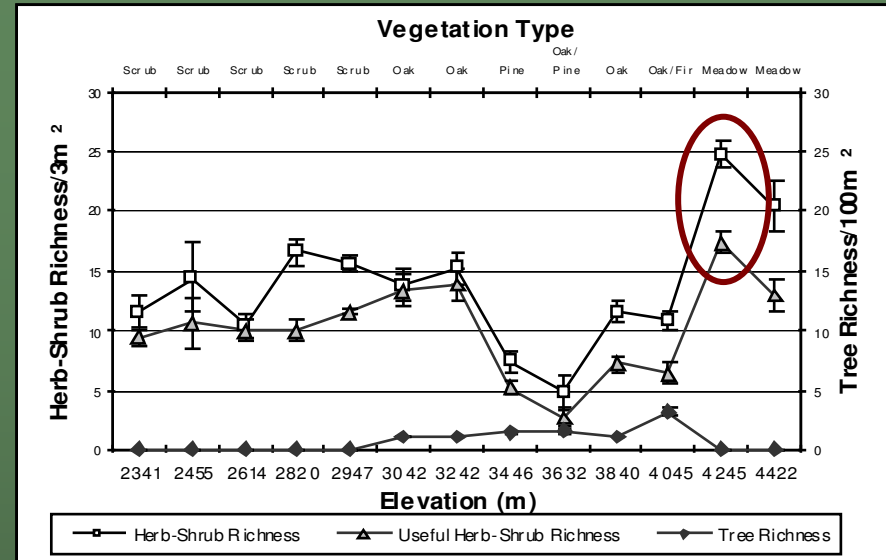
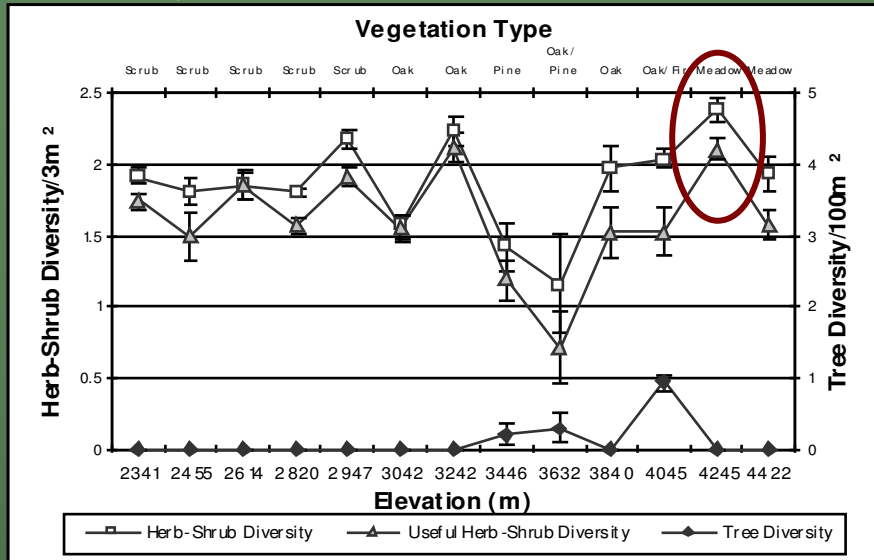
1. scree
2. alpine meadow
3. rhododendron
4. conifer
5. mixed
6. oak
7. scrub



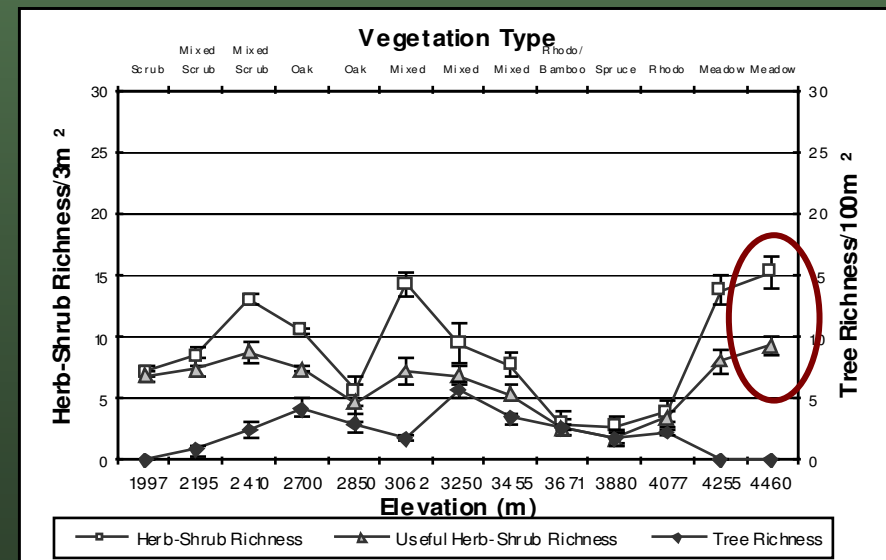
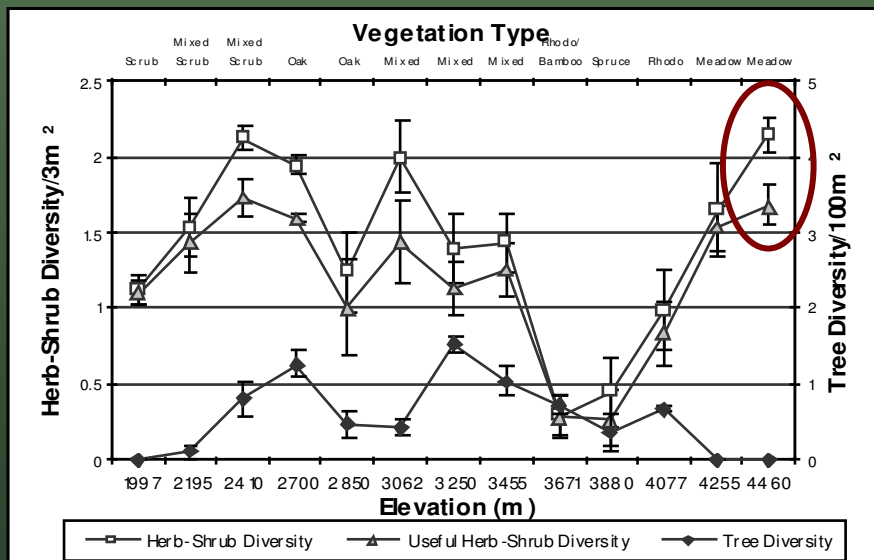
## Diversity

## Southern Aspect

## Richness



## Northern Aspect



**Useful plants, plant diversity and richness are all greatest in Alpine**  
**ANOVAs p=0.0001 (Salick et al. 2004)**

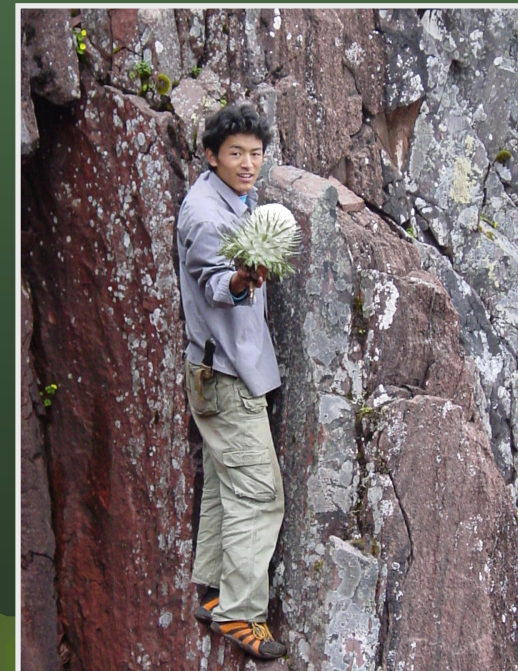
# Tibetan Doctors



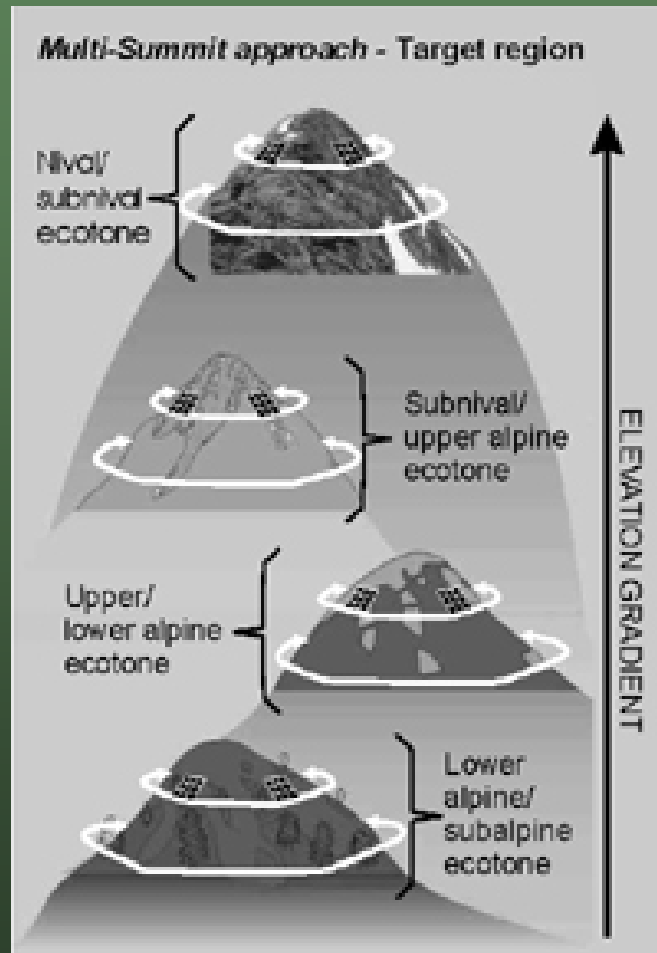
**collect medicinal plants in mountains**

# Tibetan Sacred Space

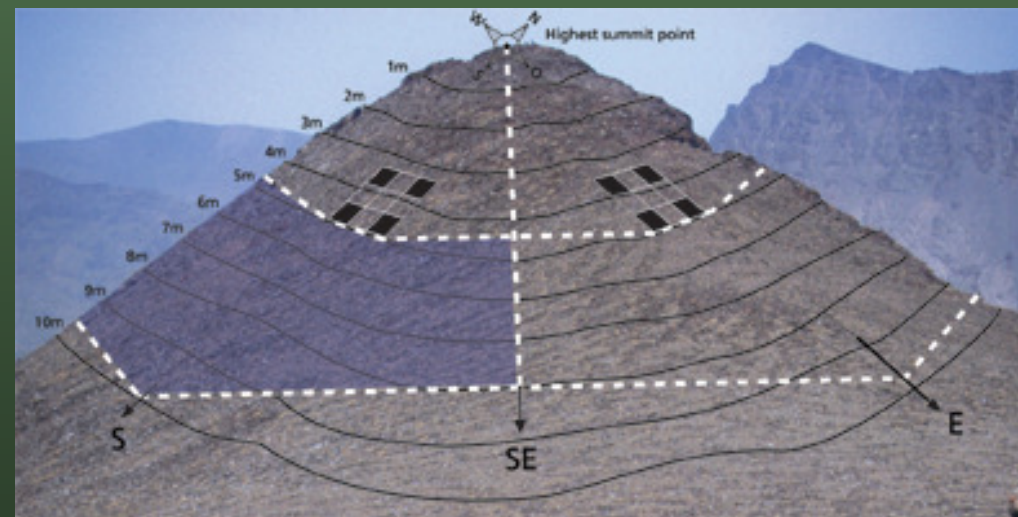
- More biodiversity
- Greater endemism
- Old-growth trees
- Useful plants



# 4. GLORIA methodology



Global  
Observation  
Research  
Initiative in  
Alpine  
Environments



# GLORIA Team, NW Yunnan



# Alpine Vegetation in Eastern Himalayas





# Vegetation trends

- ◆ Biogeography defines vegetation,
- ◆ as does precipitation & elevation.
- ◆ Highest elevations have similar vegetation types (“Arctic-Alpine”).
- ◆ **Alpine vegetation has the most diversity and most useful plants (Tibetan medicines) and is most threatened by climate change!**



# Climate Change near Khawa Karpo: five lines of evidence

1. Intergovernmental Panel on Climate Change
  - ◆ Great increases in temperature and precipitation
2. Repeat photographs
  - ◆ Glacial retreat, shrub & treeline advance
3. Gradient analyses
  - ◆ Alpine is most diverse and useful (Tibetan medicines)
4. GLORIA plots
  - ◆ Alpine is *threatened by climate change!*
5. Tibetan perspectives



# 5. Tibetan perspectives on Climate Change

Questions, discussions & repeat photos



(There had been no information on climate change from government or in media)

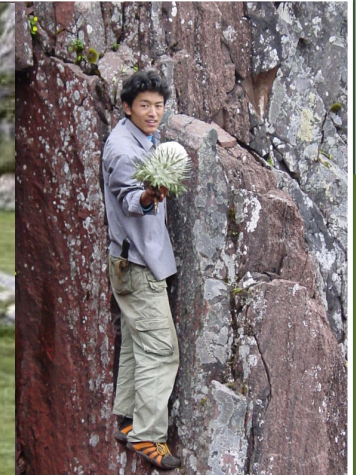
# What climate changes do Tibetans experience?

- ◆ Glacial retreat, higher temperatures & treeline advance
- ◆ Valleys (negatives)
  - Rainfall
  - **Agricultural problems**
  - Health problems
- ◆ Mountains (positives)
  - less firewood is needed
  - spend more time outside
  - bath more often, increasing hygiene
- ◆ Cosmology



# Agricultural vulnerability to climate

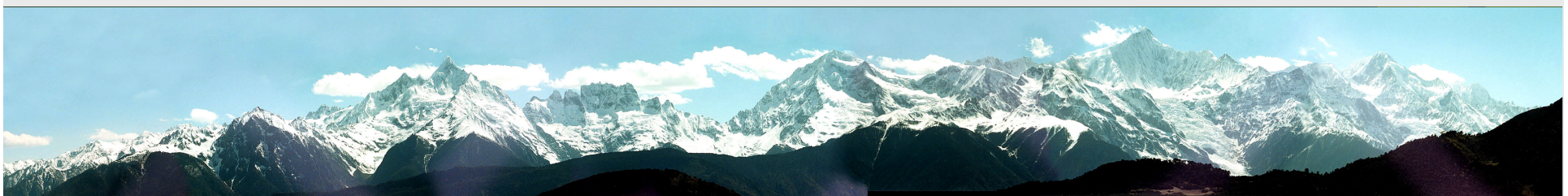
- ◆ Floods, erosion & drought – change in variability (change)
- ◆ Seasons & variability
- ◆ Animals, crops & varieties
- ◆ Rats, insects & diseases
- ◆ OM break down
- ◆ Food spoilage
- ◆ Threatened NTFP



# What causes climate change?



- ◆ Khawa Karpo is withdrawing
- ◆ Tibetans have not prayed enough
- ◆ Irreverent tourists defile the mountain (especially Japanese climbers and Chinese bathing feet)



## Tibetan perceptions

Climate change is a moral & religious issue that reveals people's feeling of powerlessness:

- *The mountains are not as beautiful any more, and they do not protect people as they used to* (man, 29 years)
- *I am worried that the earth will be destroyed if the snow disappears completely* (woman, 85 years)
- *If the snow disappears, people will disappear from the earth* (man, 57 years)



# Tibetan perceptions

## Cosmology of climate change:

- Climate Change is basic to Tibetan cosmology: 1. massive earthquakes 2. a great flood 3. fire will consume Mt. Shumi 4. a colossal wind storm will extinguish the universe.
- Offerings and prayers are ceremonially presented to Lu in order to control weather and disease.
- The Tibetan Calendar predicts weather and agricultural cycles based on Tibetan astrology and pragmatic consultations with experienced farmers subscribing to traditional knowledge.





# Tibetan perspectives on Climate Change



## Tibetans

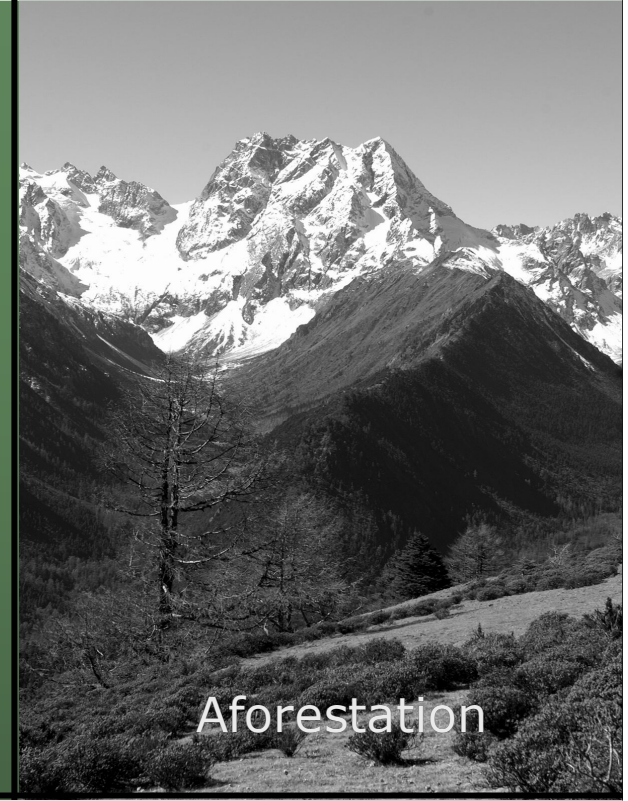
- ◆ Are affected by climate change
- ◆ Perceive
- ◆ **Adapt**
- ◆ **Mitigate**

# Tibetans *adapt* to Climate Change

2<sup>nd</sup>



# Tibetans *mitigate* Climate Change



# Tibetan perspectives on Climate Change



## Tibetans

- ◆ Are effected by climate change
- ◆ Perceive
- ◆ Adapt
- ◆ Mitigate

# Tibetan perspectives on Climate Change

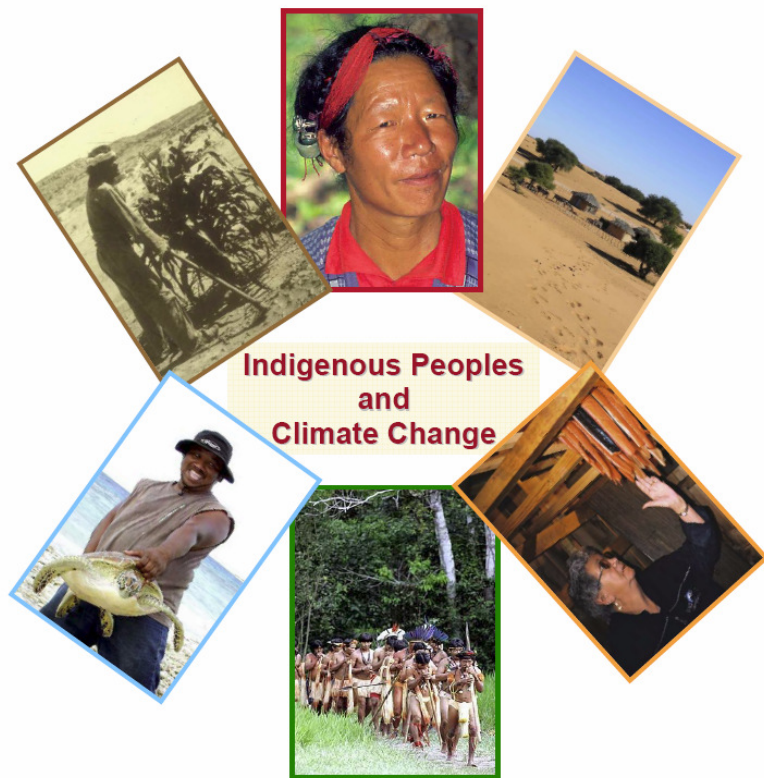


## Tibetans

- ◆ Are effected by climate change
- ◆ Perceive
- ◆ Adapt
- ◆ Mitigate

Indigenous peoples have a right to participate and a role to play in climate change discussions and policy

# Indigenous Peoples and Climate Change



## Indigenous Peoples and Climate Change

Jan Salick and Anja Byg  
University of Oxford and  
Missouri Botanical Garden  
May 2007

## Indigenous Peoples and Climate Change

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# Future initiatives



# Collaborating Institutions

- ◆ Missouri Botanical Garden
- ◆ Kunming Institute of Botany
- ◆ Shangri-la Alpine Botanical Garden
- ◆ GLORIA, Vienna
- ◆ Environmental Change Institute, University of Oxford

# Funding Agencies

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