

ATREE

Ashoka Trust for Research in Ecology and the Environment

Mission:

To promote *socially just* environmental conservation and *sustainable development* by generating rigorous *interdisciplinary knowledge* that *engages actively* with academia, policy makers, practitioners, students and *wider public audiences*



Where we work

- 19 Faculty
- 2 visiting Fellows
- 40 research staff
- 6 field coordinators
- 30 support staff
- 35 PhD students
- 25 field staff





Focal areas:

- **Sikkim state** (esp. N. Sikkim district), and
- **Darjeeling district** of W. Bengal (esp. Singalila NP & Senchel WS)
- **Eastern Nepal** (Ilam)

Kanchenjunga Conservation Area

ATREE-Eastern Himalaya Programme

- Monitoring and mapping biodiversity and ecosystem services in the context of global change
- Field implementation and demonstration for sustainable livelihoods
- **Climate change: monitoring and adaptation**
- Policy and governance related to natural resources
- Capacity building of a diverse range of stakeholders



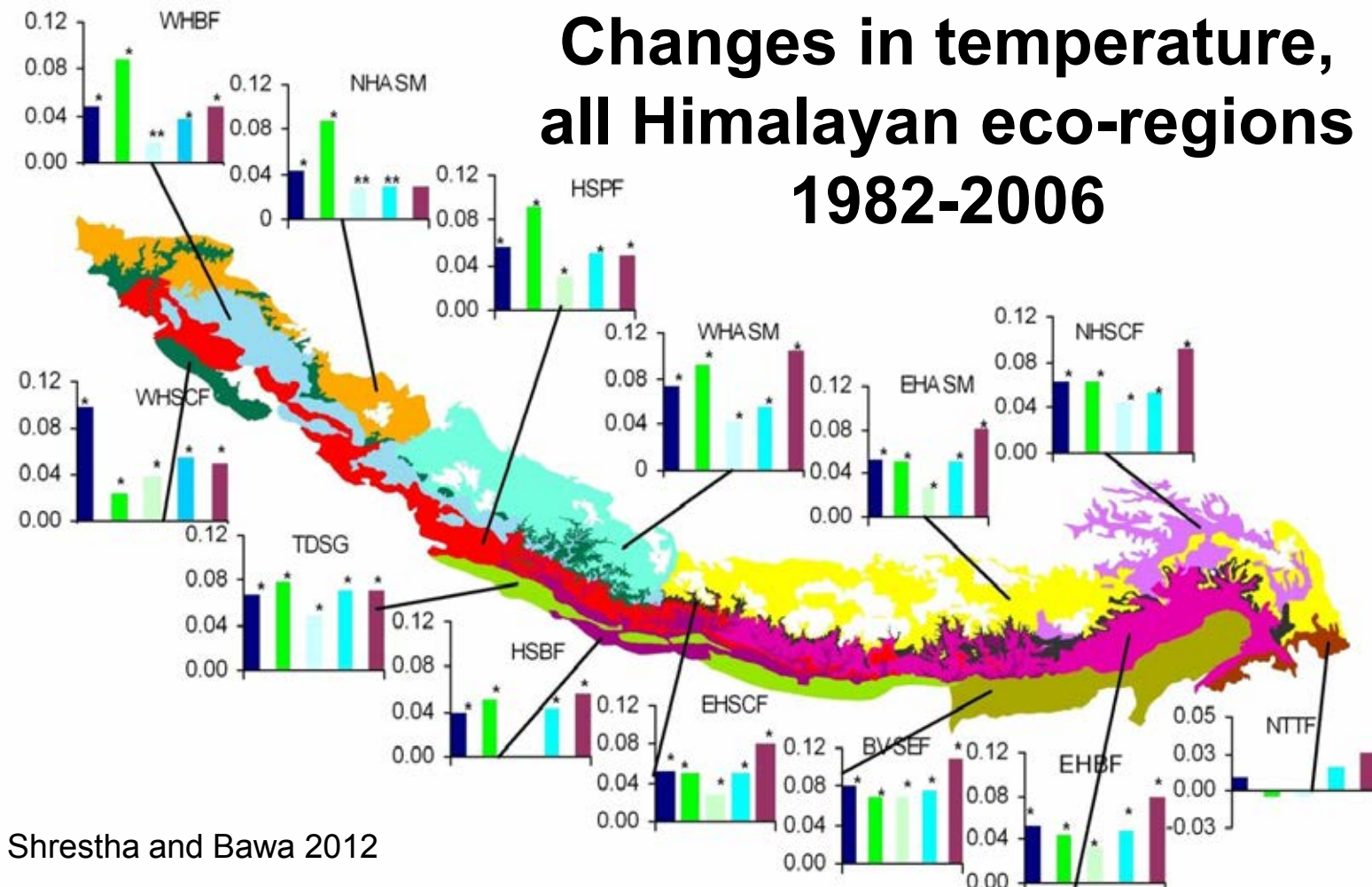
Climate change foci

1. Downscaling **global models** of climate change to regional scale
2. Developing actionable **climate scenarios** (with participation of local communities)
3. Promoting interventions for **adaptation and mitigation**
4. **Building capacity** of local communities and government agencies to cope with change



Changes in temperature, all Himalayan eco-regions 1982-2006

Observed an increase in mean temps of **1.7°C** (approx 3x the global change over same time period)

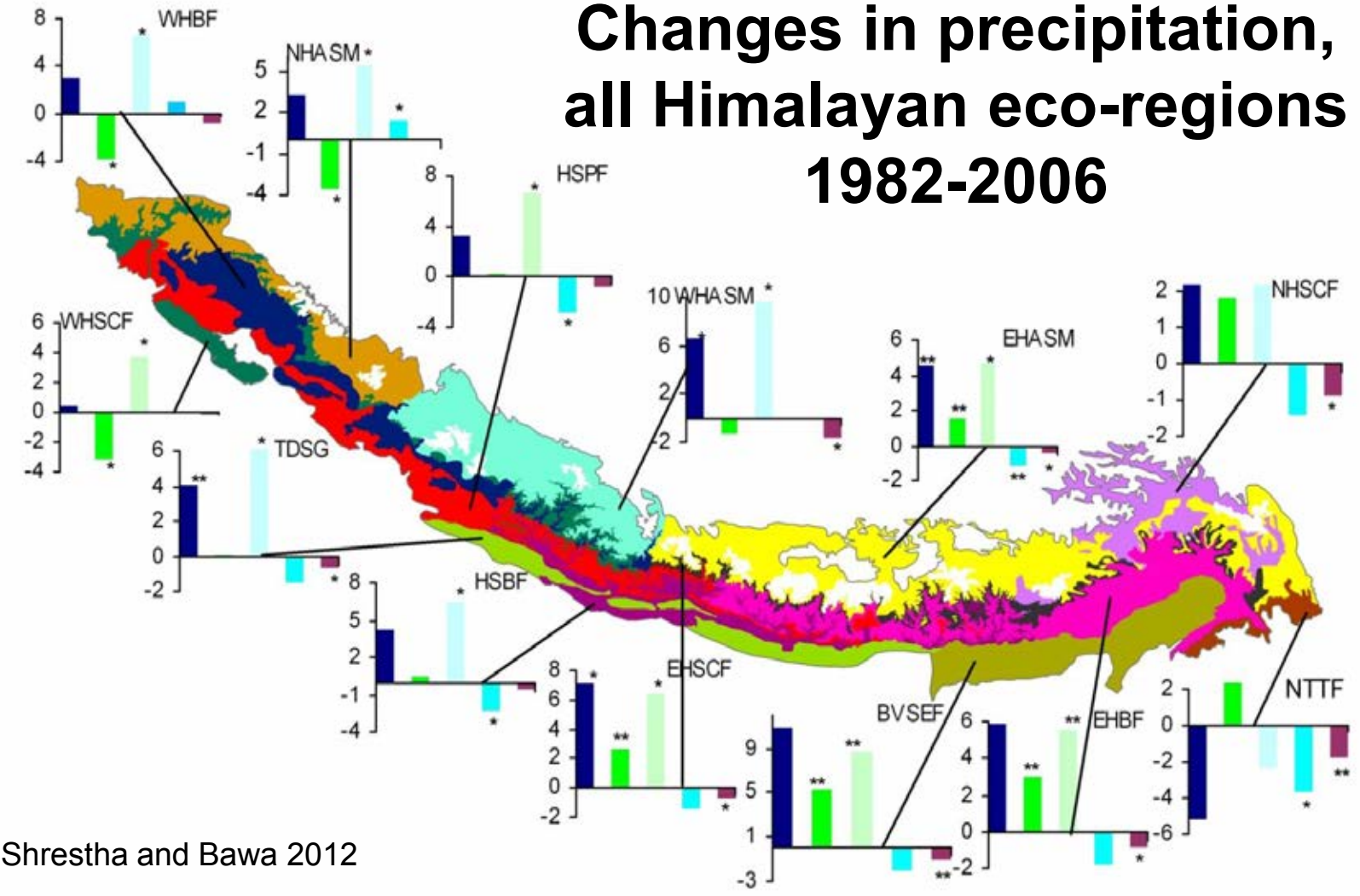


Shrestha and Bawa 2012

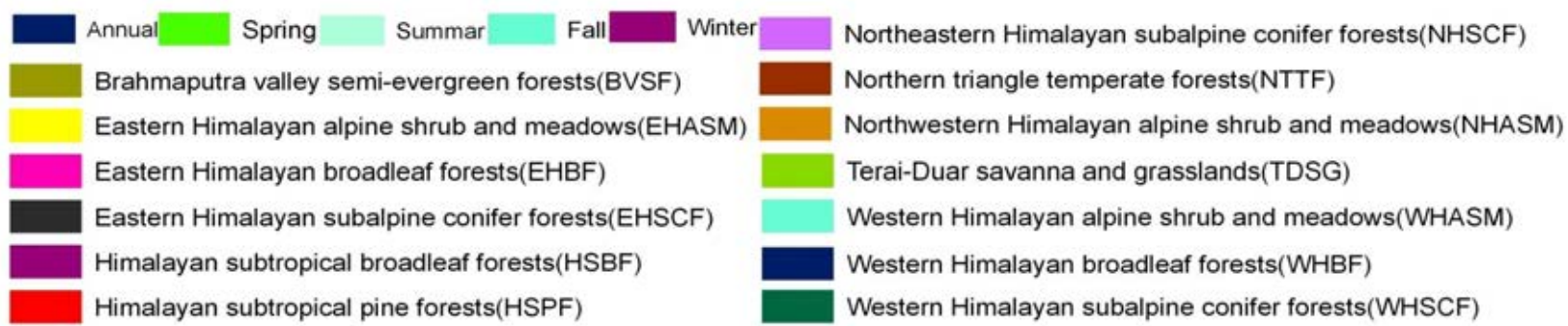


Changes in precipitation, all Himalayan eco-regions 1982-2006

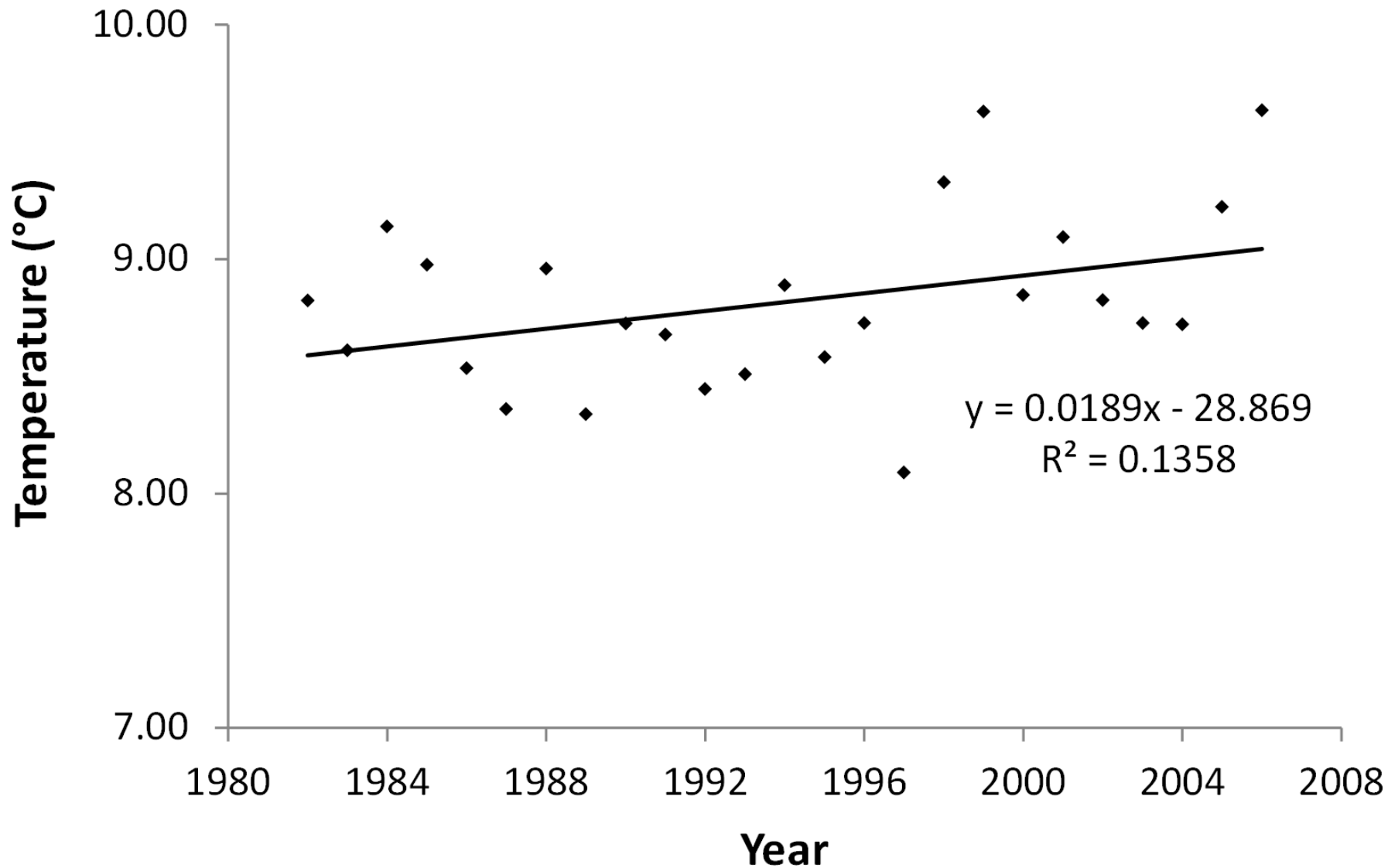
Observed a significant increase in mean annual precip, with increased seasonality of rainfall



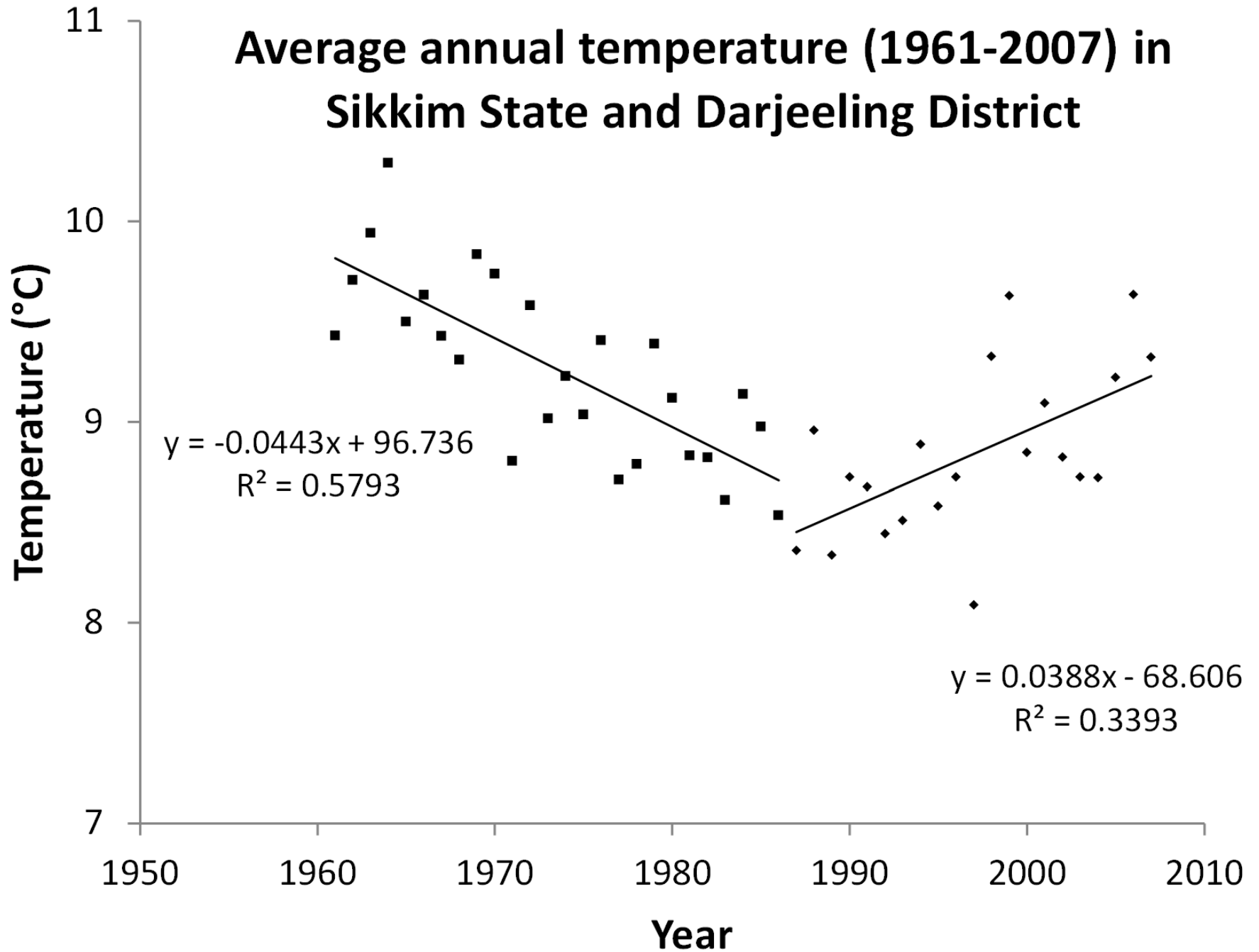
Shrestha and Bawa 2012



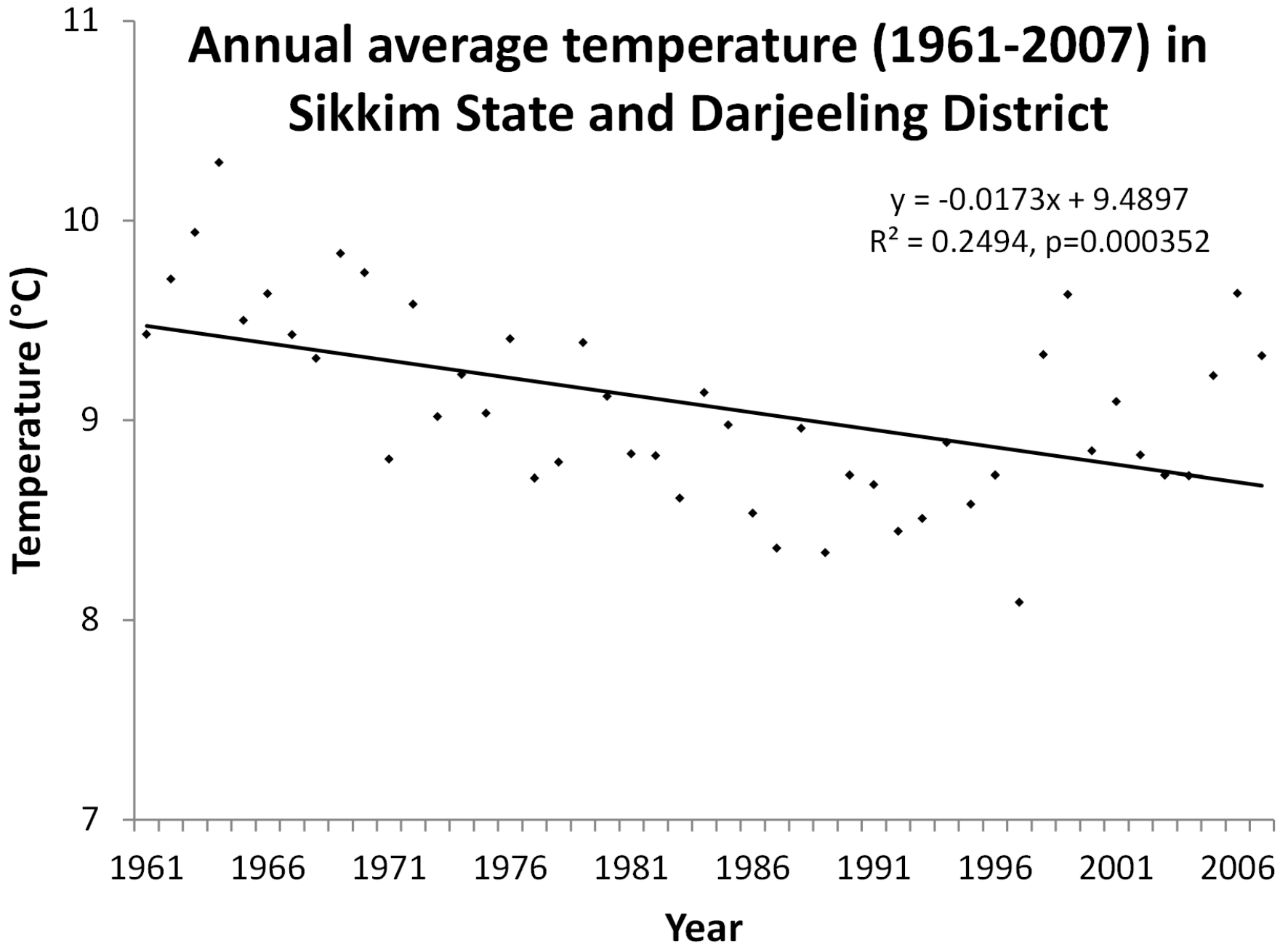
Average annual temperature (1982-2006) in Sikkim State and Darjeeling district



Average annual temperature (1961-2007) in Sikkim State and Darjeeling District

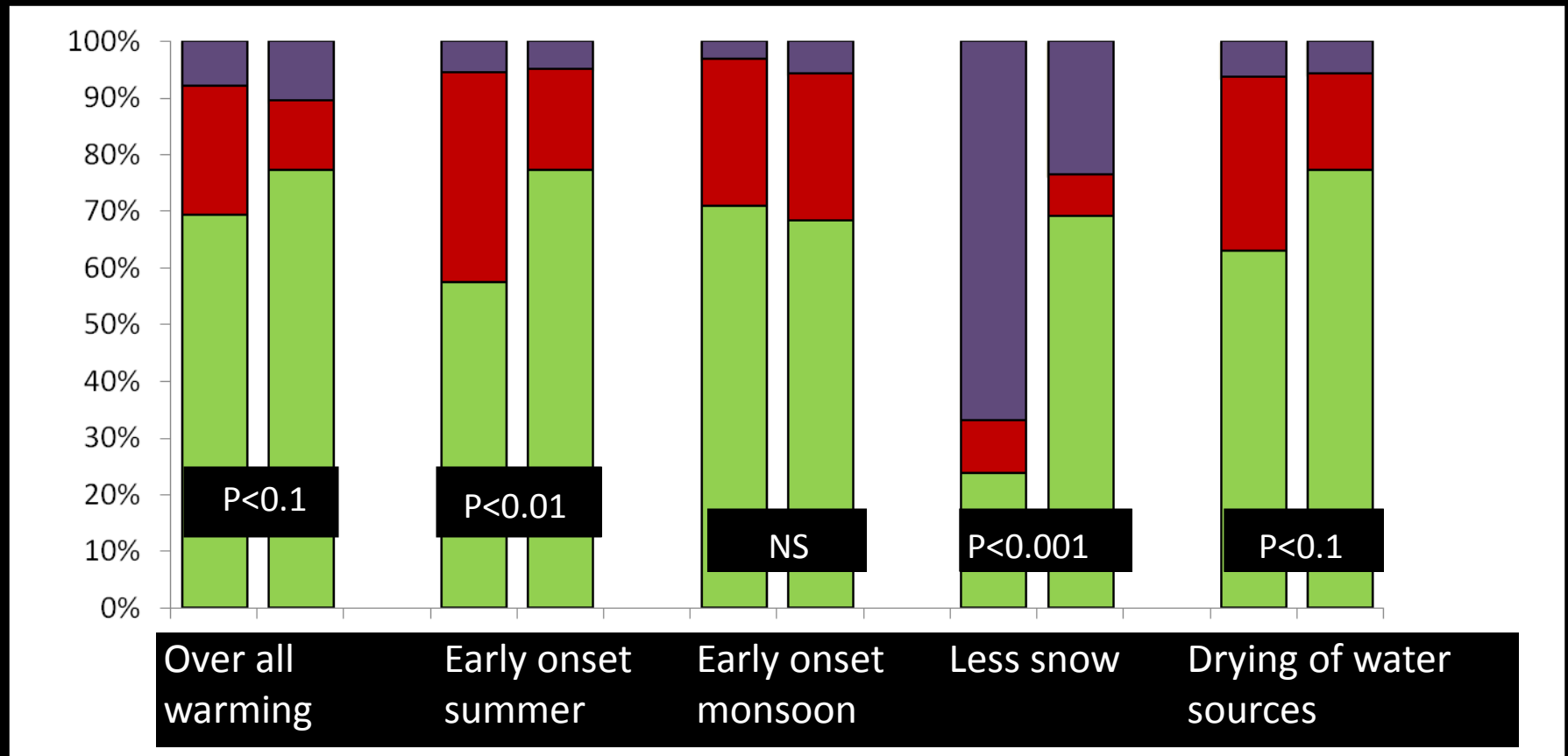


Annual average temperature (1961-2007) in Sikkim State and Darjeeling District



Local perceptions of climate change, Eastern Himalaya

Shifts in seasonal markers, by altitude

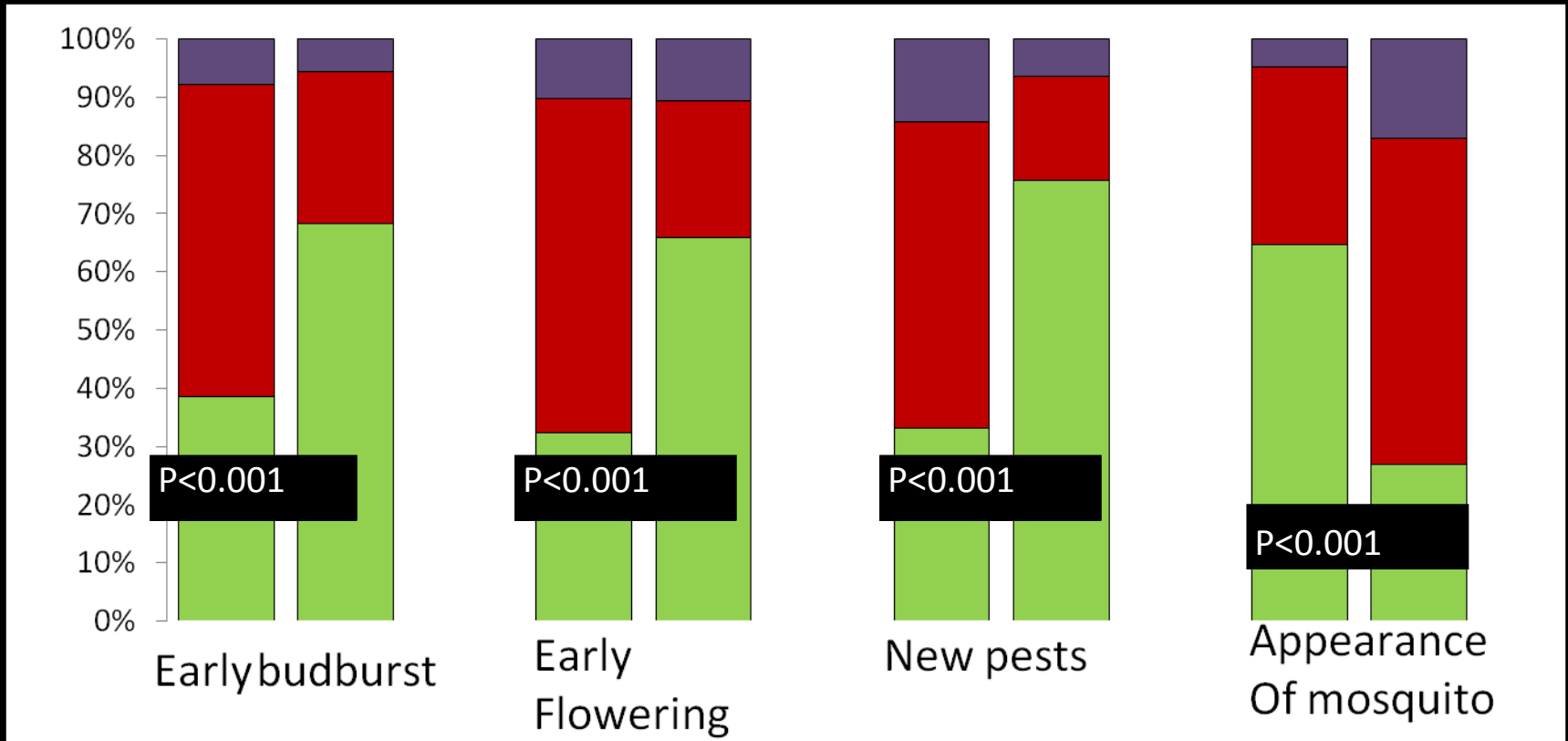


Experienced change No change Don't know

Left bars = Low altitude (~1500m, 127 HHs); Right bars = High altitude (>2100m, 123 HHs)

Local perceptions of climate change, Eastern Himalaya

Shifts in seasonal markers, by altitude



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Env. risk prioritization exercise among social affinity groups

Group	Risk priority 1	Risk priority 2	Risk priority 3
Forest villagers (SNP)	Crop failure: HWC, soil moisture	Livestock: grazing ban, loss of access to NTFP	Market access: transport costs, road connectivity
Forest villagers – women (SNP)	[Non-environ.: education, health, social security]	Crop failure: HWC, soil moisture	Livestock: grazing ban, loss of access to NTFP
Khasmal villagers (SNP)	Market access: transport costs, road connectivity	Crop failure: HWC, soil moisture	Livestock: grazing ban, loss of access to NTFP
Khasmal villagers – women (SNP)	[Non-environ.: education, health, social security]	Market access: transport costs, road connectivity	Crop failure: HWC, soil moisture
Dzumsa villagers (N Sikkim)	Road connectivity, maintenance	Army restrictions: loss of access to grazing pastures & NTFP	[Health issues: alcohol, TB, suicide, others]
Tourism industry, traders	Road connectivity, maintenance, communications & power supply	Army restrictions: red tape due to security concerns	Infrastructure, hygiene & sanitation facilities
Social activists (Darjeeling)	Politics of environmental governance: Unclear authorities of the GTA vis-a-vis FD, MoEF, District Admin.	Water: drought, regulation, urban/rural distributional justice	Infrastructure devel plans unclear; civil exclusion from decision-making
Social activists (Sikkim)	Dam construction: environmental impacts on biodiversity and livelihoods	Improper acquisition of tribal lands for hydro development	Governance issues: vast economic/ financial powers of hydro companies
Hydrocompanies	Landslides & infrastructure security	Legal issues & construction progress	Labour supply
Dam construction laborers	Health & environment: poor living conditions (sanitation etc), insecure workplace	Insurance coverage, on-site safety measures	??
Military	Road connectivity, maintenance; reliability of communications	??	??

Regional DRR & CCA priority: landslides

1. Underlying risk factors: seismic activity, steep slopes, sedimentary geology, monsoon seasonality
2. Exacerbating risk factors: climate change

BUT

3. Proximate risk drivers: road building, construction, hydropower development, land use changes (deforestation, agriculture, urbanization...)

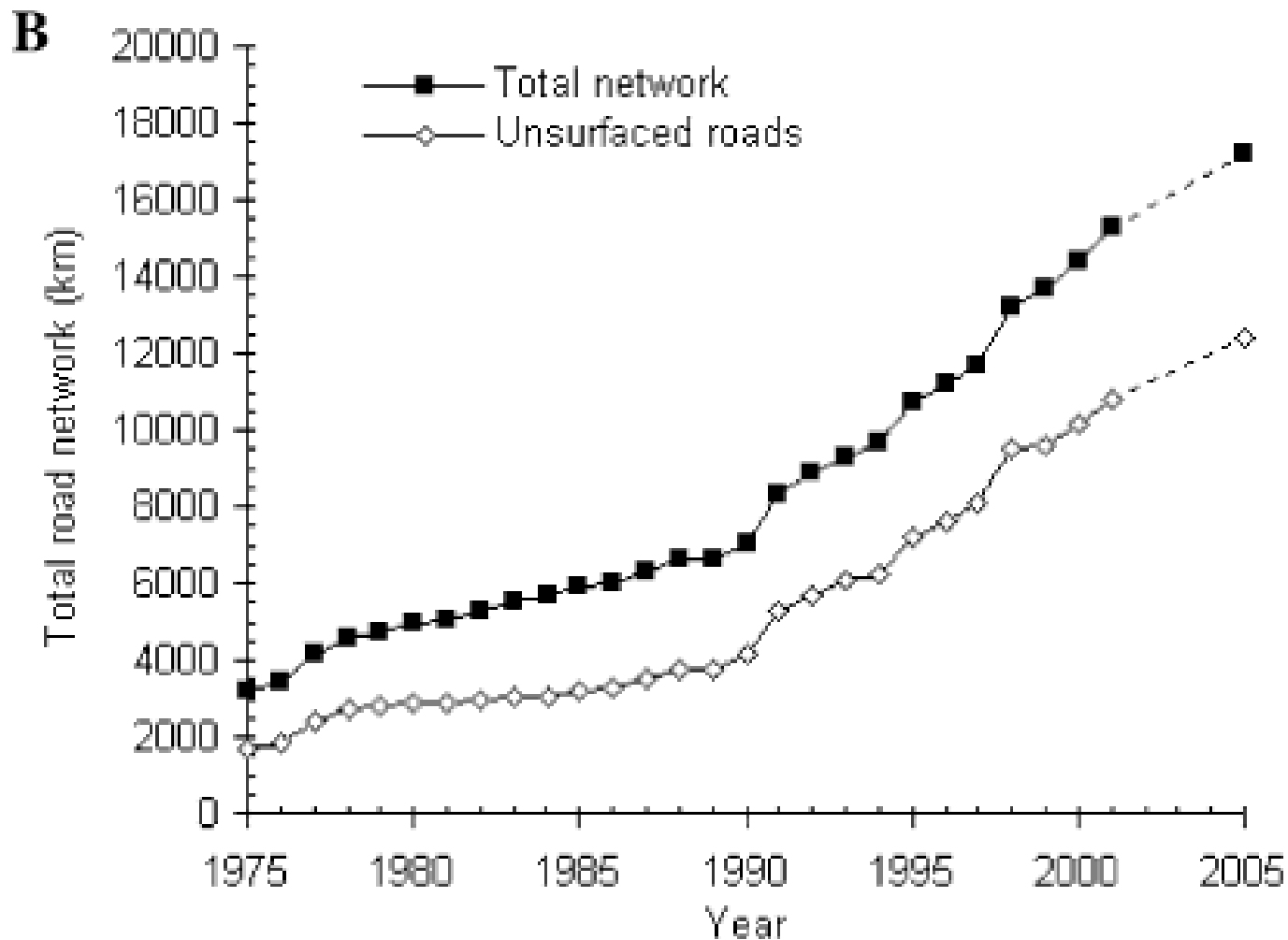




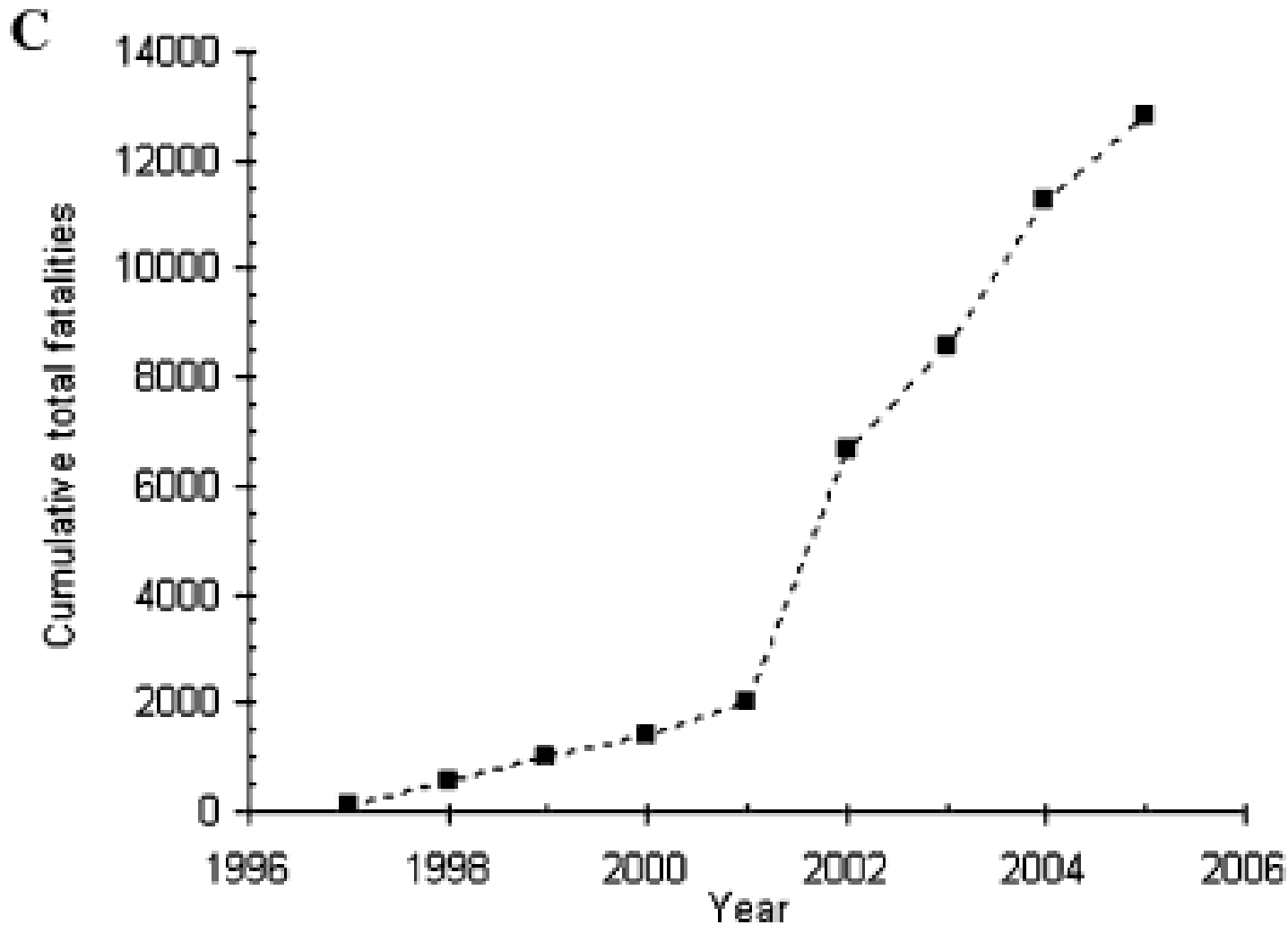
Figure 2.2. Landslide following road construction in Bhutan

Source: Patrick Durst

Expansion of the rural road network in Nepal, 1975-2005



Increase in total landslide fatalities in Nepal, 1997-2005



MGNREGA projects: Darjeeling 2013-14

Project type	In progress	Completed	Labour (Rs lakhs)	Material (Rs lakhs)
Rural connectivity	2454	10	913.91	1208.31
Flood control	721	1	144.09	413.01
Land development	718	4	168.78	228.62
Drought-proofing	315	0	59.44	11.37
Water harvesting	162	0	28.71	100.29
Irrigation	115	0	14.97	42.8
Trad. water bodies	18	0	0.9	19.53

MGNREGA projects: North Sikkim 2012-13

Project type	Projects	Labour (Rs lakhs)	Material (Rs lakhs)
Rural connectivity	92	336.17	71.41
Flood control	47	177.96	37.76
Land development	91	169.15	200.32
Drought-proofing	6	4.79	0
Water harvesting	0	0	0
Irrigation	6	21.02	8.49
Trad. water bodies	0	0	0

Institutional risk-exacerbating factors

Case studies of Aila (2009) & Sikkim quake (2011):

- Lack of coordination among agencies
- Insufficient institutional focus on underlying risk factors
- Confused lines of authority (communication gaps among central/state, state/regional, military/civilian, public/private spheres)

Next steps

1. Rural roads construction implications: CCA & DRR
 - Correlation w/ landslides?
 - MGNREGA/PGMSY connection?
2. Risk perceptions analysis: understanding social priorities
 - Importance of road connectivity
 - HWC as risk factor
3. KCA Climate Awareness Forum / Network
 - To promote dialogue among regional NGOs & gov't agencies
 - To align w/ UNISDR Post-2015 Framework, SAARC programmes, India NPDM, NAPCC & SAPCCs.

Next steps:

KCA Climate Awareness Forum / Network

Alignment w/ UNISDR Post-2015 Framework for DRR:

1. Integrate regional agendas for CC, environ protections, SD
2. Work toward consensus on integrating stakeholder knowledge into decisions on environmental investments
3. Work toward a common regional vision for risk mgmt governance
4. Discuss a regional approach to extending the Post-2015 Framework to incorporate technological & man-made hazards
5. Maintain focus on the full range of risk factors.