

## Supplemental material for

“Challenges for Governing Mountains Sustainably: Insights From a Global Survey”, by Catherine M. Tucker, Irasema Alcántara-Ayala, Alexey Gunya, Elizabeth Jimenez, Julia A. Klein, Jun Xu, and Sophie Lena Bigler, published in *Mountain Research and Development* 41(2), 2021. (See <https://bioone.org/toc/mred/41/2>)

### APPENDIX S1 Survey protocol.

#### MRI Mountain Governance Survey [Protocol copied into JotSurvey]

This survey seeks to increase understanding of the challenges for governance in mountain regions, as well as efforts and projects that appear to be improving governance in ways that address major problems or foster sustainability. It is particularly interested in case studies that have considered governance. Governance is increasingly recognized as a critical dimension for bettering people’s lives, yet governance shortcomings can perpetuate problems or unsustainable processes. We value your willingness to share your expert knowledge and experiences regarding governance in the specific mountain site or region in which you work.

**Governance** is the process by which rules, norms, traditions and strategies interact to guide behavior, and how these are formed, applied, interpreted, and revised (adapted from M. McGinnis 2011).

**Sustainability** is the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability encompasses environmental, social and economic dimensions (Brundtland Commission 1987).

#### Instructions:

Please complete this survey for the research site that you know best. If you would like to complete a survey for more than one research site, you are welcome to complete another survey for an additional site. The survey will take 20 to 30 min. It can be completed in several visits if you want to save answers and return later to finish, by registering for a personal survey ID [here](#). The survey will be open until Monday 15 April 2019 (23:00 CET) [Extended to May 6, 2019]. Please, make sure to finish your survey by this date. [No limits placed on length of text in boxes]

#### Basic Site Information

- 1.1. Research Site Name/Brief Description: \_\_\_\_\_
- 1.2. Mountain Range: \_\_\_\_\_
- 1.3. Country: \_\_\_\_\_
- 1.4. Name of the local political unit(s) included in the study site (name of the county, province, state, or district or other subnational political unit/s):  
\_\_\_\_\_
- 1.5. Main town where inhabitants go to markets or government offices: \_\_\_\_\_
- 1.6. Latitude (provide if feasible -choose a central point): \_\_\_\_\_
- 1.7. Longitude (provide if feasible -choose a central point) \_\_\_\_\_
- 1.8. (Google earth link: ) \_\_\_\_\_
- 1.9. Optional: Other key identifier for the site (name of main river, watershed, main mountain)

**1.10.** What economic activities best characterize the research site (Choose up to three)?

- Agropastoral – mixed agricultural crops and livestock grazing
- Crops
- Pastoral
- Logging
- Mining
- Non-timber Forest Product Harvesting
- Residential uses and services (commuters, suburban, ex-urban, second homes, rentals)
- Residential-Tourism combined
- Tourism
- Other (Explain): \_\_\_\_\_

**2. Political Structural Conditions that Impede Governance for Sustainability**

**2.1a.** Examine the problems below. If they are not an issue, answer “N/A for Not Applicable.” If the problem is an issue in your research site, please check each level of government that is part of the problem by marking the appropriate box(es).

	N/A	Local Govt	Regional Govt	National Govt	Inter-natl	Don't Know
Corruption	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legal/judicial systems that apply the law inconsistently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decisions implemented without due process or input from citizens/communities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contradictions between government policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weak or absent democratic representation in government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Certain powerful individuals or groups are above the law (they have impunity).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Policies and/or programs that exacerbate societal inequities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Political arrangements, policies and/or programs that allow unsustainable use of natural resources (ex. Mining concessions)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of enforcement for environmental regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inadequate protections for workers' rights & safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of transparency in government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of support for human rights principles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Authority structures and leadership dominated by one individual, class, caste, or family to the exclusion of others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laws and policies that prevent women from owning land or other resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Political /structural challenges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**2.1.b.** If you chose 'Other Political/Structural Challenges', explain:

**2.2.** Briefly explain the most critical political challenge(s) for governance at your site:

**2.3.** Is anything being done to address (solve) the critical challenge(s)? If yes, explain:

**3. Governance Challenges that Impede Social and Economic Sustainability**

**3.1a.** Indicate the degree to which the following kinds of social and economic problems affect the research site. Indicate N/A (Not Applicable) if they are not an issue in the site. If you are not sure, choose “Don’t Know.”

	N/A	Low	Some- what Low	Some- what High	High	Don’t Know
Poverty	0	1	2	3	4	<input type="checkbox"/>
Large gaps between the wealthy and poor	0	1	2	3	4	<input type="checkbox"/>
Gender based differences in access to services, employment or rights that limit women’s opportunities	0	1	2	3	4	<input type="checkbox"/>
Tensions or conflicts between different groups (ethnicities, religions, castes, social classes, etc)	0	1	2	3	4	<input type="checkbox"/>
National government dominated by one group/class/family to the exclusion of others	0	1	2	3	4	<input type="checkbox"/>
Patron-client relationships that foster inequities	0	1	2	3	4	<input type="checkbox"/>
High rates of in-migration (outsiders moving in or visiting temporarily)	0	1	2	3	4	<input type="checkbox"/>
High rates of outmigration	0	1	2	3	4	<input type="checkbox"/>
Presence of highly valuable nonrenewable natural resources	0	1	2	3	4	<input type="checkbox"/>
External control over natural resources and/or their extraction	0	1	2	3	4	<input type="checkbox"/>
Other Challenges	0	1	2	3	4	<input type="checkbox"/>

**3.1.b.** If you chose “Other Challenges,” explain:

**3.2.** Briefly explain the most critical social and economic governance challenge(s) for this site:

**3.3.** Is anything being done to address (solve) the critical challenge(s)? If yes, explain:

**4. Governance Challenges that Impede Environmental Sustainability**

**4.1.** Indicate the degree to which the following issues pose a challenge in the research site. If they are not present (absent) , indicate N/A (Not Applicable). If you are not sure, choose “Don’t Know.”

	N/A	Low	Some- what Low	Some- what High	High	Don't Know
Tensions or conflict over land rights	0	1	2	3	4	<input type="checkbox"/>
Tensions or conflict over water or other natural resources (ex: timber, fuelwood, non-timber products, wild foods)	0	1	2	3	4	<input type="checkbox"/>
Land scarcity	0	1	2	3	4	<input type="checkbox"/>
Climate change	0	1	2	3	4	<input type="checkbox"/>
Deforestation	0	1	2	3	4	<input type="checkbox"/>
Desertification	0	1	2	3	4	<input type="checkbox"/>
Melting glaciers	0	1	2	3	4	<input type="checkbox"/>
Changes in water quality	0	1	2	3	4	<input type="checkbox"/>
Changes in water availability (such as scarcity)	0	1	2	3	4	<input type="checkbox"/>
Increasing impacts of natural hazards on livelihoods	0	1	2	3	4	<input type="checkbox"/>
Customs, traditions, religions and practices that undermine women’s rights to land and natural resources	0	1	2	3	4	<input type="checkbox"/>
Other challenges:	0	1	2	3	4	<input type="checkbox"/>

**4.1.b.** If you chose “Other Challenges,” explain:

**4.2.** Briefly explain the most critical social-environmental challenge(s) for this site:

**4.3.** Is anything being done to address (solve) the critical challenge(s)? If yes, explain:

**5. Researcher Assessment of Local Governance Arrangements**

**5.1a.** Indicate the extent to which the following characteristics are present in the research site. If they are not present (absent), indicate N/A (Not Applicable). If you are not sure, choose “Don’t Know”:

	N/A	Low	Some- what Low	Some- what High	High	Don't Know
Clear property rights (private &/or communal)	0	1	2	3	4	<input type="checkbox"/>
Participation of a majority of stakeholders in local rule creation, rule modification, and other local governance processes	0	1	2	3	4	<input type="checkbox"/>
Decision-making involves consensus-building across actors	0	1	2	3	4	<input type="checkbox"/>
Easy access to conflict mediation for all actors	0	1	2	3	4	<input type="checkbox"/>
Transparency in government decisions and finances	0	1	2	3	4	<input type="checkbox"/>
Efficiency in government processes and services	0	1	2	3	4	<input type="checkbox"/>
Accountability of government authorities to the population	0	1	2	3	4	<input type="checkbox"/>
Local laws and regulations are generally perceived as reasonable	0	1	2	3	4	<input type="checkbox"/>
Most people perceive the local government responds to their needs	0	1	2	3	4	<input type="checkbox"/>
Most people perceive the regional government responds to their needs	0	1	2	3	4	<input type="checkbox"/>
Most people perceive the national government responds to their needs	0	1	2	3	4	<input type="checkbox"/>
Rules are enforced fairly and equitably	0	1	2	3	4	<input type="checkbox"/>
Guards, police, and/or monitors are accountable to local residents	0	1	2	3	4	<input type="checkbox"/>
Repeat rule breakers face increasingly severe consequences (ex. A first violation is a verbal warning, additional offenses lead to more serious consequences such as fines)	0	1	2	3	4	<input type="checkbox"/>
Higher level government entities allow at least some local autonomy for self-organization and decision-making	0	1	2	3	4	<input type="checkbox"/>
Governance arrangements and activities are coordinated across levels of government (local, regional, national)	0	1	2	3	4	<input type="checkbox"/>
Climate change adaptation efforts are taking place	0	1	2	3	4	<input type="checkbox"/>

Disaster risk reduction efforts are taking place	0	1	2	3	4	<input type="checkbox"/>
Participatory / co-management governance arrangements exist across levels of governance	0	1	2	3	4	<input type="checkbox"/>
Women's participation and leadership in local decision making	0	1	2	3	4	<input type="checkbox"/>
Other (additional local characteristics) Explain: _____	0	1	2	3	4	<input type="checkbox"/>

**6. Human-Environmental Hazards that may exacerbate or pose governance challenges:**

**6.1.** What level of risk exists in the research site for natural hazards? If they are not present, (absent) indicate N/A (Not Applicable). If you are not sure, choose "Don't Know".

	N/A	Low Risk	Some-what Low Risk	Some-what High Risk	High Risk	Don't Know
Earthquakes	0	1	2	3	4	<input type="checkbox"/>
Landslides	0	1	2	3	4	<input type="checkbox"/>
Avalanches	0	1	2	3	4	<input type="checkbox"/>
Drought	0	1	2	3	4	<input type="checkbox"/>
Torrential rains +/-or flooding	0	1	2	3	4	<input type="checkbox"/>
Extreme wind events, tornadoes	0	1	2	3	4	<input type="checkbox"/>
Volcanoes	0	1	2	3	4	<input type="checkbox"/>
Tropical storms/Hurricanes/Typhoons	0	1	2	3	4	<input type="checkbox"/>
Wildfires/forest fires	0	1	2	3	4	<input type="checkbox"/>
Other hazard (explain): _____	0	1	2	3	4	<input type="checkbox"/>

**7. Current Effectiveness of Governance for Sustainability in the Research Site:**

**7.1.** How is the system of governance working overall to support **environmental** sustainability in the research site?

- Very poorly (Little interest & severe problems)
- Poorly ( some interest, minimal effort)
- Mixed (some failures and some successes)
- Fairly well (many steps forward)
- Very well (broadly effective)

**7.2.** How is the system of governance working overall to support **social and economic** sustainability in the research site?

- Very poorly
- Poorly
- Mixed
- Fairly well
- Very well

**7.3.** Which actors have had the most influence on how the system of governance is working for **environmental** sustainability (as indicated above)? (Choose the top three)

- Local organization(s) or group(s)
- Local government(s)
- Local businesses/entrepreneurs
- Regional government(s)

- Regional non-governmental (non-profit) organization(s) or group(s)
- National government
- National non-governmental (non-profit) organization(s)
- National corporation(s) /private business
- International government organization(s)
- International non-governmental (non-profit) organization(s)
- International corporation(s)/private business
- Scientific researchers
- Independent or informally organized environmental activists
- Independent or informally organized social justice activists
- Other (Explain): \_\_\_\_\_

**7.4.** Which actors have had the most influence on how the system of governance is working for **social and economic** sustainability (as indicated above)? (Choose the top three)

- Local organization(s) or group(s)
- Local government(s)
- Local businesses/entrepreneurs
- Regional/provincial government(s)
- Regional/provincial non-governmental (non-profit) organization(s) or group(s)
- National government
- National non-governmental (non-profit) organization(s)
- National corporation(s) /private business
- International government organization(s)
- International non-governmental (non-profit) organization(s)
- International corporation(s)/private business
- Scientific researchers
- Independent or informally organized environmental activists
- Independent or informally organized social justice activists
- Other (Explain): \_\_\_\_\_

**8. Local Concerns Relevant for Governance**

**8.1a.** How prevalent are the following concerns among local people? If not relevant to the site, answer “No concern”. If you are not sure, answer “Don’t Know”

	No Concern	Minor	Some-what Minor	Some-what Major	Major	Don’t Know
Climate change	0	1	2	3	4	<input type="checkbox"/>
Environmental degradation	0	1	2	3	4	<input type="checkbox"/>
Impact of natural hazards (such as earthquakes)	0	1	2	3	4	<input type="checkbox"/>
Increasing exposure/vulnerability to natural hazards	0	1	2	3	4	<input type="checkbox"/>
Market fluctuations and price variability	0	1	2	3	4	<input type="checkbox"/>
Crop losses due to infestation or diseases	0	1	2	3	4	<input type="checkbox"/>
Cost of agricultural inputs	0	1	2	3	4	<input type="checkbox"/>
Biodiversity loss	0	1	2	3	4	<input type="checkbox"/>
Economic recession /downturns	0	1	2	3	4	<input type="checkbox"/>
Political instability	0	1	2	3	4	<input type="checkbox"/>

Problems with local government	0	1	2	3	4	<input type="checkbox"/>
Problems with higher level (non-local) government	0	1	2	3	4	<input type="checkbox"/>
Change in access to land and/or natural resources	0	1	2	3	4	<input type="checkbox"/>
Lack of employment	0	1	2	3	4	<input type="checkbox"/>
Low income (not adequate to cover basic needs)	0	1	2	3	4	<input type="checkbox"/>
Inadequate or inaccessible educational opportunities	0	1	2	3	4	<input type="checkbox"/>
Inadequate or inaccessible health care	0	1	2	3	4	<input type="checkbox"/>
Hunger/cost of food/malnutrition	0	1	2	3	4	<input type="checkbox"/>
Lack of credit for business or agriculture	0	1	2	3	4	<input type="checkbox"/>
Soil infertility	0	1	2	3	4	<input type="checkbox"/>
Sociocultural transformations/changes	0	1	2	3	4	<input type="checkbox"/>
Transportation shortage/poor transportation infrastructure	0	1	2	3	4	<input type="checkbox"/>
Communications (phone, internet, etc.) problems	0	1	2	3	4	<input type="checkbox"/>
Water scarcity	0	1	2	3	4	<input type="checkbox"/>
Land scarcity	0	1	2	3	4	<input type="checkbox"/>
Other (explain): _____	0	1	2	3	4	<input type="checkbox"/>

**8.2.** What types of actors are working to address one or more of the **major, most critical** concerns identified above as local concerns relevant for governance? (Check all that apply):

- Individual resident(s) (not part of an organized group)
- Local organization(s) or group(s)
- Local government(s)
- Regional/provincial government(s)
- Regional/provincial organization(s) or group(s)
- National government
- National non-governmental organization(s)
- International government organization(s)
- International non-governmental organization(s)
- Scientific researchers
- Independent or informally organized environmental activists
- Independent or informally organized social justice activists
- Other (Explain): \_\_\_\_\_
- No actor is addressing any of the concerns

**8.3.** Which major concerns are being addressed by the actors? (If more than one concern is being addressed, list all from the list of local concerns above (Example: water scarcity, hunger, poverty and deforestation)

**8.4.** If more than type of actor was checked above, are any of these actors working together?

- Yes
- No
- Don't Know



**8.5.** If Yes, briefly describe the actors who are working together /collaborating in partnerships, and what they are doing: (Examples: A local group, “Neighbors for Clean Water” is working with “ABC”, a national non-governmental organization to address water shortages by building a new water supply system; a UN team and Swedish aid organization are working with the community government on conflict mediation and participatory discussion groups to build understanding among different groups in a land conflict, ... ):

**8.6.** Is there any progress being made toward improving governance in the site? If Yes, explain briefly, or answer No if there is no progress.

**8.7.** Other comments on governance in the research site (feel free to expand here on any of your answers above):

### **9. Resource Base/Ecosystem Characteristics of the Research Site**

**9.1.** Minimum Elevation (m): \_\_\_\_\_

**9.2.** Maximum Elevation (m): \_\_\_\_\_

**9.3.** Biome(s) / ecological characteristics (choose from suggested list below, or describe in your own words):

- Snow, ice, scarce vegetation or upper alpine patches of mats
- Alpine mats, lower alpine shrubs
- Subalpine meadows, lower coniferous forests
- Alto-tropical (paramos, etc.)
- Alto-oro-desertic (high mountain deserts)
- Montane mixed coniferous and deciduous forests
- Montane mediterranean mesophyllous and sclerophyllous forests
- Montane laurel evergreen forests
- Montane tropical forests
- Low mountain winter – deciduous forests
- Low mountain steppes
- Other description:

Biome description in your own words:

**9.4.** Approximate Length of growing season: \_\_\_\_ months (enter number of months from 1 to 12) [Ex: 6 months] (at focal or central area of research site)

**9.5.** Mean Annual Precipitation: \_\_\_\_\_ (at focal or central area of research site)

**9.6.** Typical Daily Low Temperature in growing season: \_\_\_\_ C°

**9.7.** Typical Daily High Temperature in growing season: \_\_\_\_ C°

**9.8.** Add any other key data that you feel is critical for site: e.g., aridity, seasonal water scarcity, etc):

**10. Demographic Characteristics:**

**10.1.** Total Population estimate for the research site: \_\_\_\_\_

**10.2.** Population density estimate per km<sup>2</sup>: \_\_\_\_\_

**10.3.** How is population size changing?:

\_\_\_ Growing

\_\_\_ Staying approximately stable

\_\_\_ Declining

**10.4** Any other key information about the population that is important for understanding the site?

\_\_\_\_\_

**10.5.** Would you recommend one or two publications or reports that discuss this research site (indicate author and title, and/or URL if available)?:

\_\_\_\_\_

*Optional:*

Affiliation (university, research center, organization, group):

Email (if you wish to receive a copy of results):

**Thank you!**

**APPENDIX S2 List of sites by key descriptors and respondent affiliation.**

<b>Mountain Range by Continental Area</b>	<b>#</b>	<b>Country</b>	<b>Site<sup>1</sup></b>	<b>Major Town(s)<sup>2</sup></b>	<b>Governance Cluster</b>	<b>Respondent Affiliation<sup>3</sup></b>
<b>Africa</b>						
Bamenda Highlands	1	Cameroon	Donga Mantung Division	Mbot or Binka	Local Autonomy + Fit of Rules	Northern Virginia Community College
Ethiopian Highlands	1	Ethiopia	Mount Abuna Yosef	Lalibela	Somewhat Strong Local Governance	Addis Ababa University
Maloti-Dra Kensberg	1	South Africa - Lesotho	Rooiberge	Bethlehem	Mixed Experience of Local Governance	Family Connection to site
	2		Witsieshoek & Golden Gate Highlands	Phuthaditjhaba	Weak Local Governance	University of the Free State
Mount Elgon	1	Kenya	Mount Elgon	Kitale	Somewhat Strong Local Governance	---
	2	Uganda		Bududa	Weak Local Governance	Makerere University
Mount Gangan	1	Guinea	Kindia	Kindia	Weak Local Governance	Ministry of Environment, Water & Forest
Uluguru	2	Tanzania	Uluguru	Morogoro	Somewhat Weak Local Governance	University of York
<b>Asia</b>						
Altai	1	Russia	Altai Republic	Kosh-Agach	Mixed Experience of Local Governance	---
	2			Gorno-Altaiisk; Ust-Koks; Ulagan; Kosh-Agach	Somewhat Strong Local Governance	Russian Academy of Sciences
South Caucasus	1	Georgia	Mtskheta-Mtianeti	Mtskheta	Weak Local Governance	Tbilisi State University
Chukchi Highlands (Pekulnei Mountains)	1	Russia	Chukotka	Anadyr	Somewhat Weak Local Governance	Russian Academy of Sciences
Himalayas	1	Bhutan	Bhutan	Thimphu	Mixed Experience of Local Governance	Royal University of Bhutan

	2	India	Garhwal	Joshimath	Somewhat Weak Local Governance	Nature-Link Institute
	3		Darjeeling District, North Bengal	Darjeeling or Rimbick	Somewhat Weak Local Governance	University of Massachusetts Boston
	4		Jammu and Kashmir, Uttarkhand, Himachal, Sikkim, Arunachal Pradesh	Kullu	Strong Local Governance	University of Delhi
	5		Darjeeling and Sikkim	Darjeeling	Mixed Experience of Local Governance	---
	6	Nepal	Kyanjin, Langtang National Park	Dhunche	Mixed Experience of Local Governance	---
	7	Nepal	Trans-Himalaya Nepal	Jomson	Mixed Experience of Local Governance	Tribhuvan University
	8	Tibet, China	Nagchu, Tibet	Nagchu	Somewhat Strong Local Governance	---
	Hindu Kush	2	Afghanistan	Kabul	Kabul	Somewhat Strong Local Governance
1		Pakistan	Chitral	Chitral	Somewhat Weak Local Governance	University of Peshawar
Karakoram	1	Pakistan	Gilgit-Baltistan & Chitral	Gilgit-Baltistan or Chitral	Mixed Experience of Local Governance	Hashoo Foundation
	2		Qurambar National Park	Ghakuch, Ghizar District	Somewhat Weak Local Governance	Ministry of Climate Change, Pakistan
	3		Khyber Pakhtunkhwa Province	Mingora	Local Autonomy + Fit of Rules	---
	4		Shimshal Valley, Gilgit, Baltistan	Gilgit	Local Autonomy + Fit of Rules	ICIMOD
Longmen Mountains	1	China	Jiufeng Village, Longmen Shan Mountain	Longmen Town	Weak Local Governance	Colorado University, Boulder

Pamirs	1	Tajikistan	Bartang Valley	Khorog	Somewhat Strong Local Governance	University of Neuchâtel, Switz.
Quinling Mountains	1	China	Sunan Uigur Autonomous County, Gansu Province	Zhangye City	Mixed Experience of Local Governance	Yunnan University
Tien Shan	1	Kyrgyz Republic	Naryn Oblast Province	Naryn	Local Autonomy + Fit of Rules	MSRC/UCA <sup>4</sup>
Xuebaoding	1	China	Dazhai Township	Dazhai, Songpan County	Somewhat Weak Local Governance	Sun Yat-sen University
<b>Europe</b>						
Alps	1	Austria	Murau District	Murau	Strong Local Governance	Federal Institute of Agricultural Economics, Rural & Mountain Research
	2	Italy	Friuli Venezia Giulia	Udine; Trieste; Gorizia	Weak Local Governance	---
	3		Trentino	Trento	Strong Local Governance	Fondazione Edmund Mach
	4		Municipality of Badia, Autonomous Province of Bolzano	Bolzano	Strong Local Governance	Eurac Research
	5	Slovenia	Solčava area (Solčavsko)	Solčava	Somewhat Strong Local Governance	Slovenian Institute for Adult Education
Carpathian Mountains	1	Romania	Tara Hategula	Hateg	Somewhat Weak Local Governance	BUAS Timisoara
	2	Slovakia	Tatry National Park	Poprad	Somewhat Strong Local Governance	ILE SAS
North Caucasus	1	Russia	Republic of Dagestan	Makhachkala	Weak Local Governance	Dagestan State University
	2		Churtakh village, Republic of Dagestan	Makhachkala	Weak Local Governance	Dagestan State University
	3		Kezenoy-Am area, Chechen Republic	Grozny	Somewhat Weak Local Governance	Chechen State University
	4		Khoy Village, Vedenskey District, Chechen Republic	Grozny	Mixed Experience of Local Governance	---
	5		Upper Balkaria, Kabardino-Balkaria Republic	Nalchik	Somewhat Weak Local Governance	Kabardino-Balkarian State University

	6		Elbrus Area, Kabardino- Balkaria Republic	Nalchik	Local Autonomy + Fit of Rules	Russian Academy of Sciences
	7		Uchkulan, Karachay- Cherkessia Republic	Karachayevsk	Weak Local Governance	North Caucasian Federal University, Stavropol
	8		Karachay- Cherkessia Republic	Cherkessk	Somewhat Strong Local Governance	---
	9		Republic of North Ossetia- Alania	Vladikavkaz	Mixed Experience of Local Governance	North Caucasus Mining and Metallurgical Institute
Cumbrian Mountains	1	UK	Lake District World Heritage Site	Kendal	Mixed Experience of Local Governance	University of Cumbria
Dolomites	1	Italy	Province of Belluno	Belluno	Mixed Experience of Local Governance	Centro Consorzi
Galician Massif	1	Spain	Lugo, Galicia	Lugo	Somewhat Strong Local Governance	University of Santiago de Compostela
Grampian Highlands	1	UK	Loch Lomond and Trossachs National Park	Glasgow	Strong Local Governance	---
Korab Mountains	1	Albania	Gjallica e Lumës Mountain	Kukesi; Gostili; Shtiqni; Pobregu; Shishtavec	Somewhat Strong Local Governance	Alba Forest Center
Krkonoše Mountains	1	Czech Republic	East Bohemian District, Krkonoše (Giant) Mtns	Vrchlabí	Weak Local Governance	Global Change Research Institute
Pyrenees	1	Andorra	Andorra	Andorra de Vella	Strong Local Governance	---
Sierra de Tramuntana	1	Spain	Serra de Tramuntana	Pollença	Somewhat Weak Local Governance	University of the Balearic Islands
Sudetes	1	Poland	Sudety, Sudeten	Wrocław, Opole	Strong Local Governance	Wrocław University of Environmental and Life Sciences
Trevinca Mountains	1	Spain	Trevinca Mountains	O Barco, Ponferrada; Puebla de Sanabria; Verín	Somewhat Weak Local Governance	University of Santiago de Compostela

<b>Latin America</b>						
Andes	1	Argentina	Jujuy, Laguna Pozuelos Natural Monument	Santa Catalina	Weak Local Governance	Vicunas, Camelids & Environment (VICAM)
	2	Brazil	Rupestrian Grasslands	Belo Horizonte	Somewhat Weak Local Governance	Federal University of Minas Gerais
	3	Bolivia	Sajama National Park	Curahuara de Carangas	Local Autonomy + Fit of Rules	Universidad Mayor de San Andrés - CIDES
	4		Yungas Region	La Paz	Local Autonomy + Fit of Rules	University of Bern
	5	Chile	Coyhaique National Reserve, Patagonia	Coyhaique	Local Autonomy + Fit of Rules	University for International Cooperation, San José, Costa Rica
	6	Colombia	Veredas del NoroOccidente de Popoyan	Popayan	Somewhat Strong Local Governance	Ecohabitats Foundation
	7	Ecuador	El Collay Protected Forest	Cuenca and Loja	Strong Local Governance	University of Georgia
	8		Andean Chocó	Quito	Weak Local Governance	CONDESAN <sup>7</sup>
	9		Imbabura, Pichincha, Tungurahua, Cotopaxi	Quito	Weak Local Governance	---
	10	Peru	Andean Foothills, Amaraeri Communal Reserve	Shintuya	Weak Local Governance	SIT Study Abroad - World Learning Inc.
	11		Huascaran National Park	Huaraz	Somewhat Weak Local Governance	Texas A&M University
Cordillera de Tlamanca	1	Costa Rica	National Park of Chirripo	San Isidro del General	Somewhat Weak Local Governance	UNIGE (Swiss)/ University of Costa Rica
Espinhaço Mountains	1	Brazil	Rupestrian Grasslands	Belo Horizonte	Somewhat Weak Local Governance	Federal University of Minas Gerais
Sierra Norte de Oaxaca	1	Mexico	District of Ixtlán, Oaxaca	Ixtlán	Somewhat Weak Local Governance	Rural Studies and Consultation, Oaxaca
Sierras de Managua	1	Nicaragua	Department of Managua	Managua	Somewhat Weak Local Governance	National Autonomous University of Nicaragua (UNAN)
<b>North America</b>						
Rocky Mountains	1	USA	Vail, Colorado	Town of Vail	Strong Local Governance	Walking Mountains Science Center

	2		Rocky Mountain Biological Laboratory	Crested Butte	Strong Local Governance	Rocky Mtn. Biological Lab, and Univ. of Maryland
Saint Elias Mountains	1	Canada	Kluane Region, SW Yukon	Haines Junction	Mixed Experience of Local Governance	Wilfrid Laurier University

<sup>1</sup> Research site or region as provided by respondent.

<sup>2</sup> Nearest major town(s) where local residents find major markets and governmental services (**possibly at a distance** from the research site).

<sup>3</sup> Based on professional affiliation reported by respondents, an optional question that some did not answer.

<sup>4</sup> Mountain Societies Research Institute, University of Central Asia.

<sup>5</sup> Sustainable Development Consortium of the Andean EcoRegion (CONDESAN).



**APPENDIX S3 Kruskal–Wallis *H* Test results by cluster for political structural challenges, socioeconomic governance challenges, and local governance concerns (significantly different pairs indicated by medians in bold font and matching superscript symbols).**

Cluster by Strength of Governance Principles Type of Challenge	Cluster 1 Weak (N=14) Med(n) <sup>1</sup>	Cluster 2 Somewhat Weak (N=17) Med(n)	Cluster 3 Local Autonomy + Fit of Rules (N=9) Med(n)	Cluster 4 Mixed Experience (N=13) Med(n)	Cluster 5 Somewhat Strong (N=12) Med(n)	Cluster 6 Strong (N=10) Med(n)	Kruskal Wallis H Test Statistic (df =5)	Asymptotic Sig. (*Sig.) <sup>2</sup>
<b>Political Structural Challenges for Governance<sup>3</sup></b>								
Corruption	<b>3.00<sup>^</sup></b> (10)	2.00 (13)	<b>2.50<sup>†</sup></b> (8)	0.50 (8)	2.00(9)	<b>0.00<sup>^†</sup></b> (9)	18.704	.002*
Laws applied inconsistently	<b>3.00<sup>^g</sup></b> (12)	1.00 (15)	<b>3.00<sup>++</sup></b> (8)	<b>0.00<sup>+g</sup></b> (12)	2.00 (11)	<b>0.00<sup>^†</sup></b> (10)	21.161	.001*
Lack of due process /lack of participation in decision-making	3.00(13)	2.00(15)	2.00(9)	1.00 (12)	1.00(11)	1.00(9)	6.628	.250
Contradictory policies	2.00(12)	3.00(15)	2.00(7)	1.50(12)	1.50(12)	1.00(10)	5.312	.379
Weak or absent democratic representation	1.00(13)	1.00(15)	1.00(7)	1.00 (13)	2.00(11)	0.00(10)	10.924	.053
Impunity for powerful individuals	<b>2.00<sup>^†</sup></b> (13)	1.50 (16)	1.00 (9)	<b>0.00<sup>†</sup></b> (12)	1.00 (12)	<b>0.00<sup>^</sup></b> (10)	18.223	.003*
Policies + or/programs exacerbate social inequities	<b>2.00<sup>^</sup></b> (11)	1.50 (14)	1.00 (7)	1.00 (12)	1.00 (11)	<b>0.50<sup>^</sup></b> (10)	11.125	.049*
Political arrangements, policies +/-or programs allow unsustainable natural resource use	2.00(10)	1.00(15)	2.00(9)	0.50(12)	2.00(12)	1.00(10)	4.451	.486
Lack of enforcement of environmental regulations	1.00(11)	2.00(17)	2.00(9)	2.00(11)	2.00(12)	0.00(10)	8.381	.136
Inadequate protections for workers' safety	1.00(11)	1.00 (14)	1.00(7)	0.00 (12)	1.00(10)	0.00(9)	8.860	.118

Lack of transparency in government	<b>2.00<sup>^</sup></b> (13)	2.00 (15)	2.50 (8)	<b>3.00<sup>†</sup></b> (11)	1.00 (11)	<b>0.00<sup>^†</sup></b> (9)	16.059	.007*
Lack of human rights	2.00(13)	2.00(15)	1.00(8)	0.00(11)	1.00(8)	0.00(10)	7.520	.185
Authority concentrated in one or few individuals	1.00(12)	1.00(14)	1.00(8)	0.00(10)	1.00(10)	0.00(10)	6.769	.238
Laws and policies prevent women from owning land or other resources	0.50(8)	0.00 (14)	0.00 (8)	0.00(11)	0.00(10)	0.00(9)	9.346	.096
<b>Socioeconomic Challenges for Governance<sup>4</sup></b>								
Poverty is a Challenge for Governance	<b>3.50<sup>^</sup></b> (12)	3.00(17)	3.00(9)	2.00(13)	3.00(11)	<b>1.00<sup>^</sup></b> (9)	14.713	.012*
Large gaps between the wealthy and poor	4.00(11)	3.00(17)	3.00(8)	2.00(13)	2.00(12)	2.00(10)	9.018	.108
Gender based differences in access to services, employment or rights that limit women's opportunities	2.00(12)	3.00(15)	2.00(9)	1.00(13)	1.00(12)	1.00(9)	6.269	.281
Tensions or conflicts between different groups	2.00(13)	3.00(17)	3.00(9)	2.00(13)	1.50(12)	1.50(10)	10.673	.058
National government dominated by one group/ class/ family to the exclusion of others	2.00(13)	3.00(15)	3.00(9)	1.00(13)	1.00(11)	0.00(10)	9.230	.100
Patron-client relationships that foster inequities	4.00(11)	2.00(16)	2.50(8)	2.00(13)	1.00(11)	1.00(10)	8.879	.114
High rates of in-migration (outsiders moving in or visiting temporarily)	2.00(11)	1.00(17)	1.00(9)	1.00(13)	1.00(12)	1.00(10)	7.021	.219
High rates of outmigration	3.50(12)	2.00(17)	3.00(9)	2.00(13)	2.00(12)	1.50(10)	6.029	.303

Presence of highly valuable nonrenewable natural resources	3.00(13)	3.00(16)	3.00(9)	3.00(13)	3.00(10)	3.50(10)	1.686	.891
External control over natural resources and/or their extraction	2.00(13)	2.00(15)	3.00(9)	2.00(13)	3.00(12)	2.00(10)	4.058	.541
Tensions or conflict over land rights	3.00(13)	2.00(17)	3.00(9)	2.00(13)	2.00(12)	1.00(10)	7.673	.175
Tensions or conflict over water or other natural resources (ex: timber, fuelwood, non-timber products, wild foods)	3.00(13)	3.00(17)	3.00(9)	2.00(13)	2.00(12)	1.50(10)	8.191	.146
Land scarcity	2.00(13)	2.00(15)	2.00(9)	2.00(12)	2.50(12)	3.00(10)	.148	1.000
Customs, traditions, religions and practices undermine women's rights to land and natural resources	0.00(12)	1.00(15)	1.00(8)	1.00(13)	1.00(11)	0.50(10)	2.161	.826
<b>Local Concerns that Pose Challenges for Governance<sup>5</sup></b>								
Climate Change	1.00(13)	2.00(16)	3.00(9)	3.00(13)	2.00(11)	2.50(10)	2.575	.765
Environmental Degradation	2.00(12)	2.00(17)	2.00(9)	3.00(13)	2.00(11)	3.00(10)	1.218	.943
Impact of natural hazards	1.00(12)	2.00(17)	3.00(9)	2.00(13)	2.50(10)	1.50(10)	4.595	.467
Increasing vulnerability to natural hazards	2.00(12)	3.00(17)	3.00(9)	2.00(13)	2.00(11)	2.50(10)	2.682	.749
Market volatility	2.00(13)	3.00(16)	3.00(9)	2.50(12)	3.00(9)	2.00(9)	3.699	.593
Crop losses & diseases	2.00(12)	2.00(17)	2.00(9)	2.00(12)	2.50(10)	1.00(10)	2.793	.732
Cost of agricultural inputs	2.00(13)	3.00(17)	2.00(9)	2.00(12)	3.00(10)	1.00(9)	3.084	.687

Biodiversity Loss	2.00(13)	2.00(16)	1.00(9)	2.00(12)	3.00(10)	2.50(10)	7.252	.203
Economic recession	3.00(13)	3.00(17)	2.00(9)	3.00(12)	3.00(9)	3.00(10)	4.441	.488
Political instability	2.00(13)	2.00(17)	2.00(9)	2.00(13)	2.00(10)	1.00(10)	8.449	.133
Problems with local government	2.00(14)	<b>3.00<sup>^</sup>(17)</b>	2.00(9)	2.00(13)	2.00(10)	<b>1.00<sup>^</sup>(10)</b>	11.092	.050*
Problems with higher level government	2.00(14)	3.00(17)	2.50(8)	3.00(13)	3.00(10)	2.00(10)	2.730	.742
Change in access to land/resources	<b>3.00<sup>^</sup>(13)</b>	<b>3.00<sup>‡</sup>(17)</b>	<b>1.00<sup>‡</sup>(9)</b>	2.00(13)	2.00(11)	<b>1.00<sup>^</sup>(10)</b>	17.262	.004*
Lack of employment	<b>4.00<sup>‡</sup>(14)</b>	<b>4.00<sup>#</sup>(17)</b>	3.00(9)	3.00(13)	<b>4.00<sup>^</sup>(11)</b>	<b>2.00<sup>‡#^</sup>(10)</b>	17.671	.003*
Low income (below needs)	4.00(14)	3.00(17)	3.00(9)	3.00(13)	4.00(11)	2.00(10)	7.577	.181
Inadequate educational opportunities	<b>3.00<sup>^</sup>(14)</b>	<b>3.00<sup>‡</sup>(17)</b>	<b>3.00<sup>#</sup>(9)</b>	<b>3.00<sup>§</sup>(13)</b>	<b>3.00<sup>&amp;</sup>(10)</b>	<b>0.00<sup>^†##\$&amp;</sup>(10)</b>	18.030	.003*
Lack of health care	3.00(13)	3.00(17)	2.50(8)	2.00(13)	3.50(10)	1.00(10)	10.895	.054
Hunger /cost of food/malnutrition	.00(13)	200(17)	2.00(9)	2.00(13)	1.00(10)	0.50(10)	3.853	.571
Lack of credit for business or agriculture	2.00(13)	2.00(16)	1.00(7)	<b>3.00<sup>^</sup>(12)</b>	2.00(10)	<b>0.50<sup>^</sup>(10)</b>	13.176	.022*
Soil infertility	1.00(13)	3.00(17)	3.00(9)	2.00(12)	1.00(10)	0.00(10)	6.363	.272
Social transformations	1.00(13)	2.00(16)	3.00(9)	3.00(13)	2.50(10)	3.00(10)	3.243	.663
Inadequate transportation	3.00(14)	3.00(17)	2.00(9)	2.00(13)	3.00(10)	2.00(10)	4.105	.534
Communications problems	1.50(14)	2.00(16)	1.00(9)	2.00(13)	2.00(10)	1.00(10)	5.315	.379
Water scarcity	2.00(13)	2.00(17)	2.00(9)	2.00(13)	1.00(11)	1.00(10)	4.155	.527

Land scarcity	2.00(12)	2.00(15)	2.00(9)	2.00(13)	2.00(11)	3.00(10)	.702	.983
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1) Med(n) = Median value and n of observations.

2) [\*] = significant at .05 level or greater, with Bonferroni correction for ties.

3) Likert scale: Not an issue at any level of governance = 0, One level = 1, Two levels = 2, Three levels = 3, Four levels = 4 (local, regional, national and international levels of governance).

4) Likert Scale: Indicate the degree to which the following kinds of social and economic problems affect the site: Not an issue for the site = 0, Low = 1, Somewhat Low = 2, Somewhat high = 3, High = 4.

5) Likert Scale: How prevalent are the following concerns among local people? No concern = 0, Minor = 1, Somewhat minor = 2, Somewhat major = 3, Major = 4.

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