

Table S1. List of social and ecological indicators.

Component	Indicator	Unit	Source
Ecological	Volumes of harvested production	ton year ⁻¹	Peng et al., 2023
		ton year ⁻¹ per capita	
	Harvested production of energy crops	ton year ⁻¹ per capita	Peng et al., 2023
	Harvest energy content	ton year ⁻¹	
	Total groundwater recharge	mm year ⁻¹	Peng et al., 2023
	Groundwater quality	Index	Peng et al., 2023
	Proportion of renewable water withdrawn for public use	%	Peng et al., 2023
	Use of raw water	m ³	Peng et al., 2023
	Total water abstraction for public use	m ³ or m ³ per capita	Peng et al., 2023
	Total water abstraction for industrial use	m ³	Peng et al., 2023
	Total water abstraction for agriculture and industry use	m ³ per capita	Peng et al., 2023
	Proportion of renewable water withdrawn for industrial use	%	Peng et al., 2023
	Total water abstraction for agricultural use	m ³	Peng et al., 2023
	Proportion of renewable water withdrawn for agricultural use	%	Peng et al., 2023
	Quality of water on rangelands	Likert scale (interview) or official microbiological analysis	Alary et al., 2022
	Expenses for water access on rangelands	Amount year ⁻¹	Alary et al., 2022
	Primary production	-	Peng et al., 2023
	Surface area of crops	ha	Peng et al., 2023
	Months of feedstock over the duration of the season	Ratio	Alary et al., 2022
	Counts of animal per species received from or given to...	Animal heads	Alary et al., 2022
	Milk production	liter day ⁻¹	Alary et al., 2022
	Wool production	kg	Alary et al., 2022
	Other animal services (animal traction, transportation, touristic riding, etc.)	hour	Alary et al., 2022
	Cash flow from animal products during the season	Amount	Alary et al., 2022
	Animal seasonal cash flow compared to family food and health expenses	Ratio	Alary et al., 2022
	Genetic improvement	Counts of animals per breed	Alary et al., 2022

Available selection pressure	% of the dominant breed	Alary et al., 2022
Proportion of fodder crop area in the cultivated area	Ratio	Alary et al., 2022
Manure production	Tons of Nitrogen	Alary et al., 2022
Proportion of cropping encroachment	ha	Alary et al., 2022
Animal products	kg	Peng et al., 2023
Distance	in km or hours	Alary et al., 2022
Seasonal fees to access pastureland	Amount Eq. Kg grain day ⁻¹	Alary et al., 2022
Supplementation during the mobility	Animal ⁻¹	Alary et al., 2022
Access to water supply on rangelands	Yes/no	Alary et al., 2022
Biomass production	per year	Alary et al., 2022
Pasture quality	Likert scale (interview)	Alary et al., 2022
Species richness and diversity	Count of plant species	Alary et al., 2022
Soil nutrients	Soil organic matter content, soil pH, Olsen P	Alary et al., 2022
Dry matter availability from pastoral and crop areas	tons	Alary et al., 2022
Dry matter requirement of the community herd	tons	Alary et al., 2022
Length of growing period per plant species	In months	Alary et al., 2022
Soil and water quality and availability	Likert scale/analysis	Alary et al., 2022
Total timber removal	m ³ year ⁻¹	Peng et al., 2023
Timber growing stock	m ³	Peng et al., 2023
Aggregated index of nutrient recycling potential	Index	Peng et al., 2023
Nitrogen fixation rate	kg ha ⁻¹ year ⁻¹	Peng et al., 2023
Soil retention	ton ha ⁻¹ year ⁻¹	Peng et al., 2023
Increased harvest	ha	Peng et al., 2023
Gross nitrogen balance	ton year ⁻¹	Peng et al., 2023
Improved water and soil quality	Qualitative scale	Peng et al., 2023
Pollination potential	Index	Peng et al., 2023
Increase in yield	kg ha ⁻¹	Peng et al., 2023
Biodiversity Intactness Index	Index	Peng et al., 2023
Percentage of protected area	%	Peng et al., 2023
Removal of NO ₂ by urban vegetation	ton ha ⁻¹ year ⁻¹	Peng et al., 2023

Proportion of green areas in the high-density area of cities	%	Peng et al., 2023
PM ₁₀ annual mean concentration	µg m ⁻³	Peng et al., 2023
NO ₂ annual mean concentration	µg m ⁻³	Peng et al., 2023
The highest O ₃ value based on daily max 8 h averages	µg m ⁻³	Peng et al., 2023
Water quality	Index	Peng et al., 2023
Water Retention Index	Index	Peng et al., 2023
Water purification	-	Peng et al., 2023
Groundwater production	Recharge rate, mm ha ⁻¹ year ⁻¹	Peng et al., 2023
Rates of surface water drainage	m ³ /s	Peng et al., 2023
Water Retention Index	(dimensionless between 0 and 10) Index	Peng et al., 2023
Capacity of ecosystems to avoid soil erosion	(dimensionless between 0 and 10)	Peng et al., 2023
Surface area of forest with a protective function	ha	Peng et al., 2023
Crop production deficit	%	Peng et al., 2023
Species richness	Index	Peng et al., 2023
Habitat quality based on common birds	(dimensionless ratio)	Peng et al., 2023
Interpolated biodiversity status	Index	Peng et al., 2023
Net ecosystem productivity	normalized index between 0 and 1	Peng et al., 2023
Forest carbon potential	Percent change, %	Peng et al., 2023
Annual CO ₂ -eq emissions per ha	t ha ⁻¹ year ⁻¹	Peng et al., 2023
Annual CO ₂ -eq emissions per capita	t capita ⁻¹ year ⁻¹	Peng et al., 2023
Carbon-storing habitats	ha or ha per capita	Peng et al., 2023
Overall coverage of forest	%	Peng et al., 2023
Potential increase in agricultural production to compensate the reduction due to the climate change	%	Peng et al., 2023
Standard deviation of annual rainfall	mm per year	Alary et al., 2022
Biodiversity of landscapes	-	Alary et al., 2022
Magnitude of change of the natural biomass after a disturbance	Variation of plant cover	Alary et al., 2022
Percentage of windbreaks	%	Peng et al., 2023
Aggregated index generated through recreation and tourism statistics	Index	Peng et al., 2023
Percentage of tourism to GDP	%	Peng et al., 2023

Intensity of natural and cultural heritage protection based on the number of protected areas overlapping	km ²	Peng et al., 2023
Ecosystem exposed to flooding	%	Peng et al., 2023
Seasonal rainfall	mm/month	Alary et al., 2022
Counts of animals per species	Number	Alary et al., 2022
Area of fodder and grain crops for animals/total cultivated land	Ratio	Alary et al., 2022
Animal protein intake in the daily ration	gr/day	Alary et al., 2022
Species composition (intra-herd diversity)	Counts of species in a herd	Alary et al., 2022
Species composition (intra-herd diversity)	Counts of animal breed	Alary et al., 2022
Percentage of vegetation loss	%	Peng et al., 2023
Percentage of deforested area	%	Peng et al., 2023 I
Percentage of area covered by "problem soils"	%	Peng et al., 2023
Increased use of chemicals and fertilizers	(qualitative/quantitative)	Peng et al., 2023
Water clarity	Turbidity, Secchi depth	Peng et al., 2023
Normalized Difference Vegetation Index	NDVI	Peng et al., 2023
Land reclamation rate	km ² /year	Peng et al., 2023
Degree of pollution in sediments	(Heavy metals, etc.) (proxy – concentration of heavy metals in sediments)	Peng et al., 2023
Forest connectivity	Index	Peng et al., 2023
River connectivity	Index	Peng et al., 2023
River net density (defined as river length divided by land area)	Index	Peng et al., 2023
Ecosystem Functionality Index (EFI)	Index	Peng et al., 2023
Mean species abundance	MSA	Peng et al., 2023
Percentage of change in land use (agriculture, vegetation, fishery, settlement)	%	Peng et al., 2023
Number of aquatic environmental reservoirs	n	Peng et al., 2023
Policies supporting biodiversity conservation	Yes/no	Peng et al., 2023
Percentage of government expenditure on environmental protection	%	Peng et al., 2023
Percentage of area covered by Wetlands of International Importance (Ramsar Sites)	%	Peng et al., 2023
Participation in treaties, such as Convention on Biological Diversity	Yes/no	Peng et al., 2023

	Percentage of nature reserves and wetlands	%	Peng et al., 2023
	Percentage of forest area restored	%	Peng et al., 2023
	Rate of afforestation area	ha	Peng et al., 2023
	Proportion of drought tolerant crops	% of crop production	Peng et al., 2023
	Percent of area with intensive/extensive agriculture in floodplain	% of agriculture land	Peng et al., 2023
	Time needed for the natural vegetation to return to a certain percentage of plant cover	-	Alary et al., 2022
	Restoration period of the natural vegetation after a disturbance	Counts of months	Alary et al., 2022
	Average of monthly precipitation		Peng et al., 2023
	Water level	cm	Peng et al., 2023
	Hazard duration/days	Days	Peng et al., 2023
	Probability of occurrence		Peng et al., 2023
	Ecosystem exposed to storm surge	%	Peng et al., 2023
	Ecosystem exposed to drought	%	Peng et al., 2023
Social	Aggregated index generated through recreation and tourism statistics	Index	Peng et al., 2023
	Experience: participation in recreational activities	n, %	Peng et al., 2023
		or outdoor activities (n)	
	Share of high-provision, easily accessible land in the recreation opportunity spectrum	%	Peng et al., 2023
	Surface area of special protection area	ha	Peng et al., 2023
	Surface area of sites of community importance	ha	Peng et al., 2023
	Employment (n); tourism revenue	#	Peng et al., 2023
	Employment in tourism and other aesthetic activities	%	
	Characteristics of living systems that are resonant in terms of culture or heritage	km ²	Peng et al., 2023
	Percentage of population exposed to flooding	%	Peng et al., 2023
	Proportion of GDP in primary sector	%	Peng et al., 2023
	Livestock net income	Amount	Alary et al., 2022
	Livestock annual net income/basic annual family expenses	Ratio	Alary et al., 2022
	List of livestock assets and income owned or/and managed by women	Counts of tasks	Alary et al., 2022
	Crop income compared to total annual family income	Ratio	Alary et al., 2022

Out-of-farm income compared to total annual family income	Ratio	Alary et al., 2022
Proportion of houses with poor facilities that are more fragile to climate change and hazards	%	Peng et al., 2023
Number of conflicts on land	Number	Alary et al., 2022
Carrying capacity on rangelands	TLU*per km ² Tons of dry matter per ha	Alary et al., 2022
Proportion of critical transportation sector	%	Peng et al., 2023
Proportion of critical transportation sector: main road, main tunnel, subway, port, airport; water sector; energy sector; information and communication sector; civil administration buildings sector		
Percentage of population exposed to drought	%	Peng et al., 2023
Distance to market for animal transaction	km	Alary et al., 2022
Pastoral institutions and organizations	Count	Alary et al., 2022
Remittance from migrants	Amount	Alary et al., 2022
Emigration rate	Ratio	Alary et al., 2022
Percentage of population without access to electricity	%	Peng et al., 2023
Percentage of households without access to irrigation	%	Peng et al., 2023
Percentage of population without access to (improved) sanitation	%	Peng et al., 2023
Percentage of population without access to clean water	%	Peng et al., 2023
Percentage of population living in informal settlements	%	Peng et al., 2023
Percentage of households that live in rented houses	%	Peng et al., 2023
The household proportion with person aged 65 and older	%	Peng et al., 2023
Percentage of reinforced/elevated houses	%	Peng et al., 2023
Percentage of households without official land title	%	Peng et al., 2023
Percentage of houses with more than one floor	%	Peng et al., 2023
Credit access for livestock activity	Yes/no	Alary et al., 2022
Fodder seed supply	Yes/no	Alary et al., 2022
Proportion of vaccinated animals	% of the herds	Alary et al., 2022
Animal value stock (animal asset valued at selling price) per family member (compared to the poverty line)	Ratio	Alary et al., 2022
Percentage of population living in poorly constructed houses	%	Peng et al., 2023
Percentage of illiterate population	%	Peng et al., 2023

Percentage of primary industry to GDP	%	Peng et al., 2023
Population density	Population per km ²	Peng et al., 2023
Percentage of female-headed households	%	Peng et al., 2023
Travel time to closest city	mins	Peng et al., 2023
Percentage of the population with disabilities	%	Peng et al., 2023
Percentage malnourished population	%	Peng et al., 2023
Percentage of population with chronic illnesses	%	Peng et al., 2023
Proportion of families below poverty line in total households		Peng et al., 2023
Dependency ratio	%	Peng et al., 2023
GINI index	0-100	Peng et al., 2023
Dependency on agriculture /forestry /fisheries for livelihood	%	Peng et al., 2023
Ratio of afforestation coverage areas in the city		Peng et al., 2023
Prevalence of population who experience violence	%	Peng et al., 2023
Prevalence of population affected by armed conflict	%	Peng et al., 2023
Number of fatalities caused by terrorists per 10,000 per year		Peng et al., 2023
Per capita income		Peng et al., 2023
Per capita GDP per unit area		Peng et al., 2023
Average years of education	year	Peng et al., 2023
Ratio of the population with college/university degree or higher	%	Peng et al., 2023
Percentage of households without individual means of transportation	%	Peng et al., 2023
Percentage of households without gross savings	%	Peng et al., 2023
Percentage of households without access to bank loans/(micro-)credits	%	Peng et al., 2023
Percentage of households without any insurance—excl. health insurance	%	Peng et al., 2023
Animal stock per veterinarian in the community	Number of animals /vet	Alary et al., 2022
Distance of veterinary services from family house	km	Alary et al., 2022
Distance of veterinary service from rangeland in the territory of attachment	km	Alary et al., 2022
Distance of veterinary pharmacy from family house	km	Alary et al., 2022
The average cost of veterinary medicine	amount animal ⁻¹	Alary et al., 2022
Percentage of population without a health insurance	%	Peng et al., 2023
Net income per person in working age (compared to the minimum wage)	Ratio	Alary et al., 2022

Density of strong ties within the local social network	Contacts par category of stakeholders	Alary et al., 2022
Density of links within the extended networks (administration, traders, etc.)	Contacts par category of stakeholders	Alary et al., 2022
Equipment: telephone, internet, road, electricity, etc.	Counts of equipment	Alary et al., 2022
Proximity	km	Alary et al., 2022
Number of visits/year	Number	Alary et al., 2022
Elasticity of animal product demand	Ratio	Alary et al., 2022
Animal supply dynamic	% variation	Alary et al., 2022
Household size	Number	Alary et al., 2022
Working-age persons in the household	Number	Alary et al., 2022
Household dependency ratio	Ratio	Alary et al., 2022
Number of people with higher education	Number	Alary et al., 2022
Value of animal stock (valued at the selling price) per children (transmissibility)		Alary et al., 2022
Existence of early warning systems	Yes/no	Peng et al., 2023
Volume of water storage in a safe reservoir/container	m ³	Peng et al., 2023
Number of hospital beds per 1000 inhabitants	#	Peng et al., 2023
Access to shelter places (density of schools)	Index	Peng et al., 2023
Percentage of households without access to waste/water treatment	%	Peng et al., 2023
Drainage system: average length of drainage network	%	Peng et al., 2023
Access to emergency places (density of hospitals, fire bridges, police stations)		Peng et al., 2023
Density of transportation network: combined measure of distance to nearest station, density of road and rail networks, density of bus stations and ports for transportation service	Index	Peng et al., 2023
Public health expenditure	% of GDP	Peng et al., 2023
Private health expenditure	% of GDP	Peng et al., 2023
Density of aid projects	Index	Peng et al., 2023
Percentage of population who has experienced hazard(s) in the past 10 years	%	Peng et al., 2023
Foreign direct investment	% of GDP	Peng et al., 2023
Percentage of farmers who use different crop varieties	%	Peng et al., 2023
Number of income-generating activities per household	Number	Peng et al., 2023

Existence of hazard/vulnerability/risk map	Yes/no	Peng et al., 2023
Existence of integrated development plans: conservation, protection, land use planning	Yes/no	Peng et al., 2023
Existence of adaptation policies/strategies	Yes/no	Peng et al., 2023
Percentage of GDP spent on innovation and research	%	Peng et al., 2023
Amount of subsidies par animal at the territorial level	amount animal ¹	Alary et al., 2022
Percentage of reproductive females in the herd per animal species	Ratio	Alary et al., 2022

Table S2. Selection of indicators by selection criteria.

Component	General indicators	Geographical contexts				Alignment with vulnerability dimensions						
		Paso del Norte (urban)	Nuevas Delicias (peri-urban)	La Regina (rural)	Basaseachi (forestry)	CC	Rop	LB	GA	UH	SM	Total dimensions
Ecological	Volumes of harvested production	0	1	1	1	1	1	1	0	0	0	3
	Harvested production of energy crops	0	1	1	1	1	1	1	0	0	0	3
	Total groundwater recharge	1	1	1	1	1	1	0	0	0	0	2
	Groundwater quality	1	1	1	1	1	1	0	0	0	0	2
	Proportion of renewable water withdrawn for public use	1	1	1	1	1	1	0	0	0	0	2
	Use of raw water	1	1	1	1	1	1	0	0	0	0	2
	Total water abstraction for public use	1	1	1	1	1	1	0	0	0	0	2
	Total water abstraction for industrial use	1	1	1	1	1	1	0	0	0	0	2
	Proportion of renewable water withdrawn for industrial use	0	1	1	1	1	1	0	0	0	0	2
	Total water abstraction for agricultural use	0	1	1	1	1	1	0	0	0	0	2

Proportion of renewable water withdrawn for agricultural use	0	1	1	1	1	1	0	0	0	0	2
Quality of water on rangelands	0	1	1	1	1	1	0	0	0	0	2
Expenses for water access on rangelands	0	1	1	1	1	1	0	0	0	0	2
Primary production	0	1	1	1	0	1	1	0	0	0	2
Surface area of crops	0	1	1	1	0	1	1	0	0	0	2
Months of feedstock over the duration of the season	1	1	1	1	0	1	1	0	0	0	2
Counts of animal per species received from or given to or	0	1	1	1	1	1	1	0	0	0	3
Counts of animals per species											
Milk production	0	1	1	1	0	1	1	0	0	0	2
Wool production	0	1	1	1	0	1	1	0	0	0	2
Other animal services (animal traction, transportation, touristic riding, etc.)	1	1	1	1	0	1	1	0	0	0	2
Cash flow from animal products during the season	1	1	1	1	0	1	1	0	0	0	2
Animal seasonal cash flow compared to family food and health expenses.	1	1	1	1	0	1	1	0	0	0	2
Genetic improvement	0	1	1	1	0	1	1	0	0	0	2
Available selection pressure	0	1	1	1	0	1	1	0	0	0	2
Proportion of fodder crop area in the cultivated area	0	1	1	1	0	1	1	0	0	0	2
Manure production	1	1	1	1	1	1	1	0	0	0	3
Proportion of cropping encroachment	0	1	1	1	0	1	1	0	0	0	2
Animal products	1	1	1	1	0	1	1	0	0	0	2
Distance	1	1	1	1	0	0	0	0	0	1	1
Seasonal fees to access pastureland	1	1	1	1	0	1	1	0	0	0	2
Supplementation during the mobility	1	1	1	1	0	1	1	0	0	0	2
Access to water supply on rangelands	1	1	1	1	1	1	1	0	0	0	3
Biomass production	1	1	1	1	0	1	1	0	0	0	2
Pasture quality	1	1	1	1	1	1	1	0	0	0	3

Species richness and diversity	1	1	1	1	1	1	0	0	0	0	2
Soil nutrients	0	1	1	1	1	1	1	0	0	0	3
Dry matter availability from pastoral and crop areas	0	1	1	1	0	1	1	0	0	0	2
Dry matter requirement of the community herd	0	1	1	1	1	1	1	0	0	0	3
Length of growing period per plant species	0	1	1	1	1	1	1	0	0	0	3
Improved water and soil quality	1	1	1	1	1	1	1	0	0	0	3
Total timber removal	0	1	1	1	1	1	1	0	0	0	3
Timber growing stock	0	1	1	1	1	1	1	0	0	0	3
Aggregated index of nutrient recycling potential as function of substrate type	0	1	1	1	1	1	1	0	0	0	3
Nitrogen fixation rate	0	1	1	1	1	1	1	0	0	0	3
Soil retention	0	1	1	1	1	1	1	0	0	0	3
Increased harvest	0	1	1	1	1	1	1	0	0	0	3
Gross nitrogen balance	0	1	1	1	1	1	1	0	0	0	3
Pollination potential	1	1	1	1	1	1	1	0	0	0	3
Increase in yield	1	1	1	1	1	1	1	0	0	0	3
Biodiversity Intactness Index	1	1	1	1	1	0	0	0	0	0	1
Percentage of protected area	1	1	1	1	1	0	0	0	0	0	1
Removal of NO ₂ by urban vegetation	1	1	1	1	1	0	0	1	1	0	3
Proportion of green areas in the high-density area of cities	1	1	1	1	1	0	0	1	1	0	3
PM ₁₀ annual mean concentration	1	1	1	1	1	0	0	1	1	0	3
NO ₂ annual mean concentration	1	1	1	1	1	0	0	1	1	0	3
The highest O ₃ value based on daily max 8 h averages	1	1	1	1	1	0	0	1	1	0	3
Water quality	1	1	1	1	1	1	0	0	0	0	2
Water Retention Index	1	1	1	1	1	1	0	1	1	0	4
Water purification	1	1	1	1	1	1	0	1	1	0	4
Groundwater production	1	1	1	1	1	1	0	0	0	0	2

Rates of surface water drainage	1	1	1	1	1	1	0	1	1	0	4
Capacity of ecosystems to avoid soil erosion	1	1	1	1	1	1	0	0	0	0	2
Surface area of forest with a protective function	1	1	1	1	1	1	0	0	0	0	2
Crop production deficit	0	1	1	1	0	1	1	0	0	0	2
Habitat quality based on common birds	1	1	1	1	1	1	0	0	0	0	2
Interpolated biodiversity status	1	1	1	1	1	1	0	0	0	0	2
Net ecosystem productivity	1	1	1	1	1	1	1	0	0	0	3
Forest carbon potential	0	1	1	1	1	1	1	0	0	0	3
Annual CO ₂ -eq emissions per ha	1	1	1	1	1	1	1	0	0	0	3
Annual CO ₂ -eq emissions per capita	1	1	1	1	1	1	1	0	0	0	3
Carbon-storing habitats	1	1	1	1	1	1	1	0	0	0	3
Overall coverage of forest	0	1	1	1	1	1	1	0	0	0	3
Potential increase in agricultural production to compensate the reduction due to the climate change	0	1	1	0	1	1	1	0	0	0	3
Standard deviation of annual rainfall	1	1	1	1	1	1	0	0	0	0	2
Biodiversity of landscapes	1	1	1	1	1	1	0	0	0	0	2
Magnitude of change of the natural biomass after a disturbance	1	1	1	1	1	1	0	0	0	0	2
Percentage of windbreaks	1	1	1	1	1	1	0	0	0	0	2
Percentage of tourism to GDP	0	0	1	1	0	0	1	0	0	0	1
Intensity of natural and cultural heritage protection based on the number of protected areas overlapping	1	1	1	1	1	1	0	0	0	0	2
Ecosystem exposed to flooding	1	1	1	1	1	1	0	1	1	0	4
Seasonal rainfall	1	1	1	1	1	1	0	0	0	0	2
Area of fodder and grain crops for animals/total cultivated land	0	1	1	1	1	1	1	0	0	0	3
Animal protein intake in the daily ration	1	1	1	1	0	0	0	1	1	0	2

Species composition (intra-herd diversity)	0	1	1	1	0	1	1	0	0	0	2
Percentage of vegetation loss	1	1	1	1	1	1	0	0	0	0	2
Percentage of deforested area	1	1	1	1	1	1	1	0	0	0	3
Percentage of area covered by "problem soils"	1	1	1	1	1	1	1	0	0	0	3
Increased use of chemicals and fertilizers	0	1	1	1	1	1	1	1	1	0	5
Water clarity	1	1	1	1	1	1	1	1	1	0	5
Normalized Difference Vegetation Index	1	1	1	1	1	1	0	0	0	0	2
Land reclamation rate	1	1	1	1	1	1	0	1	1	0	4
Degree of pollution in sediments	1	1	1	1	1	1	0	1	1	0	4
Forest connectivity	0	1	1	1	1	1	1	0	0	0	3
River connectivity	1	1	1	1	1	1	1	1	1	0	5
River net density (defined as river length divided by land area)	1	1	1	1	1	1	1	1	1	0	5
Ecosystem Functionality Index (EFI)	1	1	1	1	1	1	1	1	1	0	5
Mean species abundance	1	1	1	1	1	1	0	0	0	0	2
Percentage of change in land use (agriculture, vegetation, settlement)	1	1	1	1	1	1	1	0	0	0	3
Number of aquatic environmental reservoirs	1	1	1	1	1	1	1	0	0	0	3
Policies supporting biodiversity conservation	1	1	1	1	1	1	0	0	0	0	2
Percentage of government expenditure on environmental protection	1	1	1	1	1	1	0	0	0	0	2
Percentage of area covered by Wetlands of International Importance (Ramsar Sites)	1	1	1	1	1	1	0	0	0	0	2
Participation in treaties, such as Convention on Biological Diversity	1	1	1	1	1	1	0	0	0	0	2
Percentage of nature reserves and wetlands	1	1	1	1	1	1	0	0	0	0	2

	Percentage of forest area restored	1	1	1	1	1	1	0	0	0	0	2
	Rate of afforestation area	1	1	1	1	1	1	0	0	0	0	2
	Proportion of drought tolerant crops	1	1	1	1	1	1	1	0	0	0	3
	Percent of area with intensive/extensive agriculture	0	1	1	1	1	1	1	0	0	0	3
	Time needed for the natural vegetation to return to a certain percentage of plant cover	0	1	1	1	1	1	0	0	0	0	2
	Restoration period of the natural vegetation after a disturbance	1	1	1	1	1	1	0	0	0	0	2
	Average of monthly precipitation	1	1	1	1	1	1	0	0	0	0	2
	Water level	1	1	1	1	1	1	0	0	0	0	2
	Hazard duration	1	1	1	1	1	1	0	0	0	0	2
	Probability of occurrence	1	1	1	1	1	1	0	0	0	0	2
	Ecosystem exposed to storm	1	1	1	1	1	1	0	0	0	0	2
	Ecosystem exposed to drought	1	1	1	1	1	1	0	0	0	0	2
Social	Aggregated index generated through recreation and tourism statistics	1	1	1	1	0	0	1	1	1	0	3
	Experience: participation in recreational activities	1	1	1	1	0	0	1	1	1	0	3
	Share of high-provision, easily accessible land in the recreation opportunity spectrum	1	1	1	1	0	0	1	1	1	0	3
	Surface area of special protection area	1	1	1	1	1	1	0	1	1	0	4
	Surface area of sites of community importance	1	1	1	1	1	1	0	1	1	0	4
	Employment (n); tourism revenue	1	1	1	1	0	0	1	1	1	0	3
	Employment in tourism and other aesthetic activities	1	1	1	1	0	0	1	1	1	0	3
	Characteristics of living systems that are resonant in terms of culture or heritage	1	1	1	1	0	0	1	1	1	0	3

Percentage of population exposed to flooding	1	1	1	1	1	1	1	1	1	0	5
Proportion of GDP in primary sector	0	1	1	1	0	0	1	1	1	0	3
Livestock net income	1	1	1	1	0	1	1	1	1	0	4
Livestock annual net income/basic annual family expenses	1	1	1	1	0	1	1	1	1	0	4
List of livestock assets and income owned or/and managed by women	1	1	1	1	0	1	1	1	1	0	4
Crop income compared to total annual family income	1	1	1	1	0	1	1	1	1	0	4
Out-of-farm income compared to total annual family income	1	1	1	1	0	0	1	1	1	0	3
Proportion of houses with poor facilities that are more fragile to climate change and hazards	1	1	1	1	0	0	1	1	1	1	4
Number of conflicts on land	1	1	1	1	0	0	0	1	1	0	2
Carrying capacity on rangelands	1	1	1	1	0	1	1	1	1	0	4
Proportion of critical transportation sector											
Proportion of critical transportation sector: main road, main tunnel, subway, port, airport; water sector; energy sector; information and communication sector; civil administration buildings sector	1	1	1	1	0	0	1	1	0	1	3
Percentage of population exposed to drought	1	1	1	1	1	1	0	1	1	0	4
Distance to market for animal transaction	0	1	1	1	0	1	1	0	0	1	3
Pastoral institutions and organizations	1	1	1	1	0	0	0	1	1	0	2
Remittance from migrants	1	1	1	1	0	0	1	1	1	0	3
Emigration rate	1	1	1	1	0	0	1	1	1	0	3
Percentage of population without access to electricity	1	1	1	1	0	0	1	1	1	1	4

Percentage of households without access to irrigation	0	1	1	1	0	0	1	1	1	0	3
Percentage of population without access to (improved) sanitation	1	1	1	1	0	0	1	1	1	0	3
Percentage of population without access to clean water	1	1	1	1	0	0	1	1	1	0	3
Percentage of population living in informal settlements	1	1	1	1	1	0	1	1	1	1	5
Percentage of households that live in rented houses	1	1	1	1	1	0	1	1	1	0	4
The household proportion with person aged 65 and older	1	1	1	1	1	1	1	1	1	1	6
Percentage of reinforced/elevated houses	1	1	1	1	1	1	1	1	1	0	5
Percentage of households without official land title	1	1	1	1	0	1	0	1	1	1	4
Percentage of houses with more than one floor	1	1	1	1	0	1	0	1	1	1	4
Credit access for livestock activity	0	1	1	1	0	1	1	1	0	1	4
Fodder seed supply	0	1	1	1	0	1	1	0	0	0	2
Proportion of vaccinated animals	1	1	1	1	0	1	1	0	1	0	3
Animal value stock (animal asset valued at selling price) per family member (compared to the poverty line)	1	1	1	1	0	1	1	0	0	0	2
Percentage of population living in poorly constructed houses	1	1	1	1	0	1	0	1	1	1	4
Percentage of illiterate population	1	1	1	1	0	0	0	1	1	1	3
Percentage of primary industry to GDP	1	1	1	1	0	1	1	1	1	1	5
Population density	1	1	1	1	1	1	1	1	1	1	6
Percentage of female-headed households	1	1	1	1	0	1	1	1	1	1	5
Travel time to closest city	1	1	1	1	0	1	1	1	1	1	5
Percentage of the population with disabilities	1	1	1	1	0	1	1	1	1	1	5

Percentage malnourished population	1	1	1	1	0	1	1	1	1	0	4
Percentage of population with chronic illnesses	1	1	1	1	0	1	1	1	1	0	4
Proportion of families below poverty line in total households	1	1	1	1	0	1	1	1	1	0	4
Dependency ratio	1	1	1	1	0	1	1	1	1	0	4
GINI index	1	1	1	1	0	1	1	1	1	0	4
Dependency on agriculture /forestry for livelihood	0	1	1	1	0	1	1	1	1	0	4
Ratio of afforestation coverage areas in the city	1	1	1	1	1	1	0	0	0	1	3
Prevalence of population who experience violence	1	1	1	1	0	0	0	1	1	0	2
Prevalence of population affected by armed conflict	1	1	1	1	0	0	0	1	1	0	2
Number of fatalities caused by terrorists per 10,000 per year	1	1	1	1	0	0	0	1	1	0	2
Per capita income	1	1	1	1	0	0	1	1	1	1	4
Per capita GDP per unit area	1	1	1	1	0	0	1	1	1	1	4
Average years of education	1	1	1	1	0	1	1	1	1	1	5
Ratio of the population with college/university degree or higher	1	1	1	1	0	1	1	1	1	1	5
Percentage of households without individual means of transportation	1	1	1	1	0	1	0	1	1	1	4
Percentage of households without gross savings	1	1	1	1	0	0	0	1	1	1	3
Percentage of households without access to bank loans/(micro-)credits	1	1	1	1	0	0	0	1	1	1	3
Percentage of households without any insurance—excl. health insurance	1	1	1	1	0	0	0	1	1	1	3
Animal stock per veterinarian in the community	0	1	1	1	0	1	1	0	1	0	3

Distance of veterinary services from family house	0	1	1	1	0	1	1	0	1	1	4
Distance of veterinary service from rangeland in the territory of attachment	0	1	1	1	0	1	1	0	1	1	4
Distance of veterinary pharmacy from family house	0	1	1	1	0	1	1	0	1	1	4
The average cost of veterinary medicine	0	1	1	1	0	1	1	0	1	1	4
Percentage of population without a health insurance	1	1	1	1	0	0	1	1	1	0	3
Net income per person in working age (compared to the minimum wage)	1	1	1	1	0	0	1	1	1	0	3
Density of strong ties within the local social network	1	1	1	1	0	0	1	1	1	0	3
Density of links within the extended networks (administration, traders, etc.)	1	1	1	1	0	0	1	1	1	0	3
Equipment: telephone, internet, road, electricity, etc.	1	1	1	1	0	1	1	1	1	0	4
Proximity	1	1	1	1	0	0	0	0	1	1	2
Number of visits/year	1	1	1	1	0	0	0	1	1	0	2
Elasticity of animal product demand	0	1	1	1	0	1	1	0	0	0	2
Animal supply dynamic	0	1	1	1	0	1	1	0	0	0	2
Household size	1	1	1	1	1	1	0	1	1	1	5
Working-age persons in the household	1	1	1	1	1	1	0	1	1	1	5
Household dependency ratio	1	1	1	1	1	1	0	1	1	1	5
Number of people with higher education	1	1	1	1	1	1	0	1	1	1	5
Value of animal stock (valued at the selling price) per children (transmissibility)	1	1	1	1	0	1	1	1	0	1	4
Existence of early warning systems	1	1	1	1	1	1	1	0	0	1	4
Volume of water storage in a safe reservoir/container	1	1	1	1	1	1	1	0	0	0	3

Number of hospital beds per 1000 inhabitants	1	1	1	1	1	1	0	1	1	1	5
Access to shelter places (density of schools)	1	1	1	1	1	1	0	1	1	1	5
Percentage of households without access to waste/water treatment	1	1	1	1	1	1	0	1	1	1	5
Drainage system: average length of drainage network	1	1	1	1	1	1	0	1	1	1	5
Access to emergency places (density of hospitals, fire bridges, police stations)	1	1	1	1	1	1	0	1	1	1	5
Density of transportation network: combined measure of distance to nearest station, density of road and rail networks, density of bus stations and ports for transportation service	1	1	1	1	1	1	0	1	1	1	5
Public health expenditure	1	1	1	1	0	0	0	0	1	1	2
Private health expenditure	1	1	1	1	0	0	0	0	1	1	2
Density of aid projects	1	1	1	1	0	0	1	1	1	1	4
Percentage of population who has experienced hazard(s) in the past 10 years	1	1	1	1	0	0	1	1	1	1	4
Foreign direct investment	1	1	1	1	0	0	1	1	1	1	4
Percentage of farmers who use different crop varieties	0	1	1	1	1	1	1	1	0	0	4
Number of income-generating activities per household	1	1	1	1	0	0	1	1	1	1	4
Existence of hazard/vulnerability/risk map	1	1	1	1	1	0	0	1	1	1	4
Existence of integrated development plans: conservation, protection, land use planning	1	1	1	1	1	0	0	1	1	1	4
Existence of adaptation policies/strategies	1	1	1	1	1	0	0	1	1	1	4

Percentage of GDP spent on innovation and research	1	1	1	1	0	1	1	1	1	0	4
Amount of subsidies par animal at the territorial level	0	1	1	1	0	1	1	1	0	0	3
Percentage of reproductive females in the herd per animal species	1	1	1	1	0	1	1	1	0	0	3

Climate change (CC); resources optimization (Rop); local businesses (LB); gender approach (GA); urban health (UH); sustainable mobility (SM).

Table S3. Expert weighting of indicators.

Component	General indicators	Average weight of experts	Category	Yes (1)/No (0)
Ecological	Volumes of harvested production	3	N.A	N.A
	Harvested production of energy	1	N.A	N.A
	Total groundwater recharge	4	Environment	0
	Groundwater quality	4	Environment	1
	Proportion of renewable water withdrawn for public use	1	N.A	N.A
	Use of raw water	3	N.A	N.A
	Total water abstraction for public use	3	N.A	N.A
	Total water abstraction for industrial use	3	N.A	N.A
	Proportion of renewable water withdrawn for industrial use	0	N.A	N.A
	Total water abstraction for agricultural use	3	N.A	N.A
	Proportion of renewable water withdrawn for agricultural use	0	N.A	N.A
	Quality of water on rangelands	4	Environment	0
	Expenses for water access on rangelands	1	N.A	N.A
	Primary production	2	N.A	N.A
	Surface area of crops	3	N.A	N.A
	Months of feedstock over the duration of the season	0	N.A	N.A
	Counts of animal per species received from or given to	3	N.A	N.A
	Milk production	3	N.A	N.A

Wood production	3	N.A	N.A
Other animal services (animal traction, transportation, touristic riding, etc.)	3	N.A	N.A
Cash flow from animal products during the season	3	N.A	N.A
Animal seasonal cash flow compared to family food and health expenses.	4	Social	1
Genetic improvement	1	N.A	N.A
Available selection pressure	1	N.A	N.A
Proportion of fodder crop area in the cultivated area	3	N.A	N.A
Manure production	2	N.A	N.A
Proportion of cropping encroachment	1	N.A	N.A
Animal products	2	N.A	N.A
Distance	4	Territory	1
Seasonal fees to access pastureland	1	N.A	N.A
Supplementation during the mobility	1	N.A	N.A
Access to water supply on rangelands	2	N.A	N.A
Biomass production	2	N.A	N.A
Pasture quality	3	N.A	N.A
Species richness and diversity	4	Environment	1
Soil nutrients	3	N.A	N.A
Dry matter availability from pastoral and crop areas	2	N.A	N.A
Dry matter requirement of the community herd	1	N.A	N.A
Length of growing period per plant species	0	N.A	N.A
Soil and water quality and availability	4	Environment	1
Improved water and soil quality	2	N.A	N.A
Total timber removal	3	N.A	N.A
Timber growing stock	4	Social	0
Aggregated index of nutrient recycling potential as function of substrate type	0	N.A	N.A
Nitrogen fixation rate	0	N.A	N.A
Soil retention	3	N.A	N.A
Increased harvest	1	N.A	N.A
Gross nitrogen balance	1	N.A	N.A

Pollination potential	2	N.A	N.A
Increase in yield	0	N.A	N.A
Biodiversity Intactness Index	4	Environment	0
Percentage of protected area	4	Territory	1
Removal of NO ₂ by urban vegetation	3	N.A	N.A
Proportion of green areas in the high-density area of cities	2	N.A	N.A
PM ₁₀ annual mean concentration	2	N.A	N.A
NO ₂ annual mean concentration	2	N.A	N.A
The highest O ₃ value based on daily max 8 h averages	2	N.A	N.A
Water quality	2	N.A	N.A
Water Retention Index	2	N.A	N.A
Water purification	2	N.A	N.A
Groundwater production	2	N.A	N.A
Rates of surface water drainage	3	N.A	N.A
Capacity of ecosystems to avoid soil erosion	3	N.A	N.A
Surface area of forest with a protective function	3	N.A	N.A
Crop production deficit	1	N.A	N.A
Habitat quality based on common birds	1	N.A	N.A
Interpolated biodiversity status	3	N.A	N.A
Net ecosystem productivity	1	N.A	N.A
Forest carbon potential	3	N.A	N.A
Annual CO ₂ -eq emissions per ha	2	N.A	N.A
Annual CO ₂ -eq emissions per capita	2	N.A	N.A
Carbon-storing habitats	2	N.A	N.A
Overall coverage of forest	3	N.A	N.A
Potential increase in agricultural production to compensate the reduction due to the climate change	2	N.A	N.A
Standard deviation of annual rainfall	4	Environment	1
Biodiversity of landscapes	4	Environment	1
Magnitude of change of the natural biomass after a disturbance	1	N.A	N.A
Percentage of windbreaks	0	N.A	N.A
Aggregated index generated through recreation and tourism statistics	3	N.A	N.A

Percentage of tourism to GDP	4	Social	0
Intensity of natural and cultural heritage protection based on the number of protected areas overlapping	3	N.A	N.A
Ecosystem exposed to flooding	4	Territory	1
Seasonal rainfall	3	N.A	N.A
Counts of animals per species	2	N.A	N.A
Area of fodder and grain crops for animals/total cultivated land	2	N.A	N.A
Animal protein intake in the daily ration	2	N.A	N.A
Species composition (intra-herd diversity)	1	N.A	N.A
Percentage of vegetation loss	4	Territory	1
Percentage of deforested area	4	Territory	1
Percentage of area covered by "problem soils"	4	Territory Social	1
Increased use of chemicals and fertilizers	4	Environment Social	1
Water clarity	1	N.A	N.A
Normalized Difference Vegetation Index	3	N.A	N.A
Land reclamation rate	2	N.A	N.A
Degree of pollution in sediments	2	N.A	N.A
Forest connectivity	4	Territory	1
River connectivity	4	Territory	1
River net density (defined as river length divided by land area)	2	N.A	N.A
Ecosystem Functionality Index (EFI)	1	N.A	N.A
Mean species abundance	3	N.A	N.A
Percentage of change in land use (agriculture, vegetation, settlement)	4	Territory	1
Number of aquatic environmental reservoirs	3	N.A	N.A
Policies supporting biodiversity conservation	4	Territory Environment	0
Percentage of government expenditure on environmental protection	3	N.A	N.A
Percentage of area covered by Wetlands of International Importance (Ramsar Sites)	3	N.A	N.A
Participation in treaties, such as Convention on Biological Diversity	2	N.A	N.A
Percentage of nature reserves and wetlands	3	N.A	N.A

Social	Percentage of forest area restored	4	Territory	1
	Rate of afforestation area	4	Territory	1
	Proportion of drought tolerant crops	3	N.A	N.A
	Percent of area with intensive/extensive agriculture	3	N.A	N.A
	Time needed for the natural vegetation to return to a certain percentage of plant cover	3	N.A	N.A
	Restoration period of the natural vegetation after a disturbance	2	N.A	N.A
	Average of monthly precipitation	3	N.A	N.A
	Water level	3	N.A	N.A
	Hazard duration	3	N.A	N.A
	Probability of occurrence	2	N.A	N.A
	Ecosystem exposed to storm	4	Social	0
	Ecosystem exposed to drought	4	Territory	1
	Aggregated index generated through recreation and tourism statistics	3	N.A	N.A
	Experience: participation in recreational activities	3	N.A	N.A
	Share of high-provision, easily accessible land in the recreation opportunity spectrum	0	N.A	N.A
	Surface area of special protection area	2	N.A	N.A
	Surface area of sites of community importance	4	Social	1
	Employment (n); tourism revenue	4	Territory	1
	Employment in tourism and other aesthetic activities	4	Territory	1
	Characteristics of living systems that are resonant in terms of culture or heritage	3	N.A	N.A
	Percentage of population exposed to flooding	2	N.A	N.A
	Proportion of GDP in primary sector	2	N.A	N.A
	Livestock net income	2	N.A	N.A
	Livestock annual net income/basic annual family expenses	2	N.A	N.A
	List of livestock assets and income owned or/and managed by women	2	N.A	N.A
	Crop income compared to total annual family income	2	N.A	N.A
	Out-of-farm income compared to total annual family income	2	N.A	N.A

Proportion of houses with poor facilities that are more fragile to climate change and hazards	4	Territory Environment	0
Number of conflicts on land	3	N.A	N.A
Carrying capacity on rangelands	3	N.A	N.A
Proportion of critical transportation sector			
Proportion of critical transportation sector: main road, main tunnel, subway, port, airport; water sector; energy sector; information and communication sector; civil administration buildings sector	2	N.A	N.A
Proportion of houses with poor facilities that are more fragile to climate change and hazards	4	Territory	1
Percentage of population exposed to drought or flooding	4	Territory	1
Distance to market for animal transaction	1	N.A	N.A
Pastoral institutions and organizations	3	N.A	N.A
Remittance from migrants	2	N.A	N.A
Emigration rate	4	Social	1
Percentage of population without access to electricity	4	Territory	1
Percentage of households without access to irrigation	4	Territory	1
Percentage of population without access to (improved) sanitation	4	Territory	0
Percentage of population without access to clean water	4	Territory Social	1
Percentage of population living in informal settlements	4	Territory	1
Percentage of households that live in rented houses	2	N.A	N.A
The household proportion with person aged 65 and older	4	Social	1
Percentage of reinforced/elevated houses	2	N.A	N.A
Percentage of households without official land title	4	Social	1
Percentage of houses with more than one floor	1	N.A	N.A
Credit access for livestock activity	2	N.A	N.A
Fodder seed supply	1	N.A	N.A
Proportion of vaccinated animals	1	N.A	N.A
Animal value stock (animal asset valued at selling price) per family member (compared to the poverty line)	1	N.A	N.A
Percentage of population living in poorly constructed houses	4	Territory	1

Percentage of illiterate population	4	Territory	1
Percentage of primary industry to GDP	4	Social	1
Population density	4	Social	0
Percentage of female-headed households	4	Social	1
Travel time to closest city	4	Territory	0
Percentage of the population with disabilities	4	Social	1
Percentage malnourished population	4	Social	1
Percentage of population with chronic illnesses	4	Social	0
Proportion of families below poverty line in total households	4	Social	1
Dependency ratio	3	N.A	N.A
GINI index	2	N.A	N.A
Dependency on agriculture/forestry for livelihood	2	N.A	N.A
Ratio of afforestation coverage areas in the city	1	N.A	N.A
Prevalence of population who experience violence	3	N.A	N.A
Prevalence of population affected by armed conflict	3	N.A	N.A
Number of fatalities caused by terrorists per 10,000 per year	1	N.A	N.A
Per capita income	4	Social	0
Per capita GDP per unit area	2	N.A	N.A
Average years of education	4	Social	0
Ratio of the population with college/university degree or higher	4	Social	0
Percentage of households without individual means of transportation	4	Territory	1
Percentage of households without gross savings	4	Social	1
Percentage of households without access to bank loans/(micro-) credits	4	Social	1
Percentage of households without any insurance—excl. health insurance	4	Social	1
Animal stock per veterinarian in the community	1	N.A	N.A
Distance of veterinary services from family house	1	N.A	N.A
Distance of veterinary service from rangeland in the territory of attachment	1	N.A	N.A
Distance of veterinary pharmacy from family house	1	N.A	N.A
The average cost of veterinary medicine	1	N.A	N.A

Percentage of population without a health insurance	2	N.A	N.A
Net income per person in working age (compared to the minimum wage)	2	N.A	N.A
Density of strong ties within the local social network	4	Social	0
Density of links within the extended networks (administration, traders, etc.)	4	Social	0
Equipment: telephone, internet, road, electricity, etc.	4	Territory	1
Proximity	3	N.A	N.A
Number of visits/year	3	N.A	N.A
Elasticity of animal product demand	1	N.A	N.A
Animal supply dynamic	1	N.A	N.A
Household size	2	N.A	N.A
Working-age persons in the household	4	Social	0
Household dependency ratio	4	Social	0
Number of people with higher education	4	Social	1
Value of animal stock (valued at the selling price) per children (transmissibility)	0	N.A	N.A
Existence of early warning systems	3	N.A	N.A
Volume of water storage in a safe reservoir/container	4	Territory	1
Number of hospital beds per 1000 inhabitants	2	N.A	N.A
Access to shelter places (density of schools)	3	N.A	N.A
Percentage of households without access to waste/water treatment	4	Territory	1
Drainage system: average length of drainage network	4	Territory	0
Access to emergency places (density of hospitals, fire bridges, police stations)	4	Territory Social	1
Density of transportation network: combined measure of distance to nearest station, density of road and rail networks, density of bus stations and ports for transportation service	4	Territory Social	1
Public health expenditure	3	N.A	N.A
Private health expenditure	3	N.A	N.A
Density of aid projects	3	N.A	N.A
Percentage of population who has experienced hazard(s) in the past 10 years	4	Social	1

Foreign direct investment	2	N.A	N.A
Percentage of farmers who use different crop varieties	2	N.A	N.A
Number of income-generating activities per household	4	Social	1
Existence of hazard/vulnerability/risk map	4	Territory	0
Existence of integrated development plans: conservation, protection, land use planning	4	Territory	0
Existence of adaptation policies/strategies	4	Territory	1
Percentage of GDP spent on innovation and research	3	N.A	N.A
Amount of subsidies par animal at the territorial level	0	N.A	N.A
Percentage of reproductive females in the herd per animal species	0	N.A	N.A