Restoring Rangelands

Unlocking Local Collective Action for Global Land Restoration

Photo Credit: María Isabel Dabrowski for Rare

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Editing and Design

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Foreword

In Mongolia's Eastern Steppe, a nomadic herder guides his cattle as cinereous vultures ride thermals overhead and argali sheep munch on sedges. In the southern Kenyan grasslands, a Maasai woman's goats graze nearby while she sells native grass seeds to local community members. In Ecuador's Andean páramo, a coalition of Indigenous leaders, scientists, and landowners meet to determine a sustainable grazing management scheme.

Across the world, grassland ecosystems are hotspots for wildlife, traditional herding, and modern land management. These ecosystems play a vital role in supporting biodiversity, regulating climate, and combating desertification. Though their biomes and related livelihoods vary across continents, all grasslands have one thing in common: they are endangered ecosystems. Climate change and human activity account for 84.72% of grassland degradation, making them the driving factors.[1]

Photo Credit: Mauricio Muñoz, Unsplash

From land privatisation and overgrazing to land clearing and mismanagement, there's another similarity found across these ecosystems: their biggest threats result from unsustainable human behaviours. Historically, regulations, financial incentives, and information campaigns have tried to encourage lasting behaviour change and failed to do so consistently. Pastoralists are struggling to make a living. Rangeland soil is degrading. Biodiversity is plummeting. Extreme weather events keep coming. Something needs to change.

And change is coming. 2026 has been declared the International Year of Rangelands and Pastoralists, placing a global spotlight on the herders, ranchers, and communities who steward nearly half the world's land surface. This momentum will carry into COP17, hosted in Mongolia — fittingly, a nation whose nomadic herding traditions stretch back millennia and whose steppe exemplifies both the promise and the fragility of these landscapes. It is a moment for the world to recognize rangelands not as marginal land, but as frontline ecosystems in the fight against desertification and biodiversity loss.

At the UNCCD, we are especially energised by the Rangelands Flagship Initiative, which is building the evidence, partnerships, and tools needed to turn recognition into action. Simply put, the interventions to address the myriad threats facing grasslands must include community-led solutions that emphasize communal and individual behaviour change. While simple in theory, this is challenging in practice.

We believe that to stop land degradation, a collective change in behaviour is needed. Understanding the various barriers and motivations pastoralists face, the decisions they must make, and the systems with which they interact are the first steps to designing lasting solutions. That is why we so warmly welcome this guide. Across grasslands, initiatives that center on community leadership, values, and collaboration have seen success. As we look ahead to COP17 and beyond, rangeland and grassland revitalization demands innovative solutions, and behavioural science gives us the tools to bring those solutions to life.

Louise Baker

Managing Director, Global Mechanism at the United Nations Convention to Combat Desertification


Photo Credit: Rare

Executive summary

Rangeland ecosystems, including grasslands, savannahs, deserts, or shrublands, cover over half of the world's terrestrial surface and support the lives and livelihoods of 500 million people and one billion animals.[2] Despite their importance, rangelands have received little attention from the public and media, and the few published articles and reports likely contain misperceptions. Moreover, these ecosystems are at risk of increasing degradation due to climate change, land privatization, resource extraction, changes to social and cultural institutions, and land-use conversion. Those challenges — and their accompanying solutions — often center on human behavior. Many actors, including pastoralists, farmers, foreign businesses, international organizations, and local governments and institutions, interact with these ecosystems, and their behaviors operate within a complex system of economic, social, cultural, and political factors. By better understanding each actor's behaviors, underlying motivations, and barriers within this system, we can design more effective solutions for rangeland management that protect both biodiversity and the livelihoods of those who depend on these vital ecosystems.

Using the step-by-step framework of Behavior-Centered Design, we analyzed the key actors, behaviors, goals, and context of rangelands, diagnosed the factors driving human behavior, and developed solution pathways for action. Past efforts to conserve rangelands tend to mismatch problems with solutions: for example, a lack of proper peer support or the strengthening of sustainable habits has been met with solutions, such as providing more information about technical solutions and financial incentives. In these cases, there is a missed opportunity to propose solutions based on data about people's needs rather than assumptions about what works.

Based on the research and case studies on rangeland conservation, we have found three key diagnostic factors that influence human behavior:

- **Feasibility:** People act based on their local conditions and context, including land tenure, mobility, local policies, and market access.
- **Legitimacy and coordination:** People are affected by socially determined norms and expectations, including opportunities to work together.
- **Identity and habits:** People make decisions based on their values, sense of identity, and the practices that reinforce those values and identity.

These factors helped reveal behavior-centered theories of change and associated case studies in which rangeland management has been successful in various countries. The report highlights three solution pathways that could be applied in similar contexts:

1 | Time resources to the moment of action

When resources are unavailable at a critical moment, people are unable to respond or adapt effectively to meet those needs. Cases from Kenya and Mongolia show that providing price subsidies and resources at the precise moment they are needed most leads to better conservation outcomes than offering those same resources at other times when it's harder to act.

2 | Revive customary institutions through state recognition and community coordination

Over the years, some state and foreign actors have eroded the legitimacy and governing powers of local institutions that once successfully managed rangelands, as pressure to modernize and convert land for profit has increased. Yet communities still trust these customary rules and remain familiar with them, so state recognition can help restore their former legitimacy and authority. An example from Jordan shows how the Hima system of rangeland management reemerged as a powerful governing force once the government publicly supported and funded it.

3 | Use peer learning to make change feel normal, doable, and legitimate

People often continue the behaviors they know, but seeing trusted peers having success with other behaviors can help shift what feels possible and normal. When people learn from and exchange ideas with their peers, everyone benefits by feeling permission to try something new. Examples from Kenya, Sudan, Tanzania, and Vietnam show how these learning opportunities led to the adoption of more sustainable practices. The same is true for institutions where positive peer pressure can lead to new norms around important issues such as land tenure.

Behavior-Centered Design offers an approach and set of tools for applying these theories of change to rangeland ecosystems. This report is a guide for bringing these insights into your work supporting people and nature.

Definition of terms

Activity result: The outcome or change in situation, options, or experience based on the behavioral strategy or lever used.

Behavior-Centered Design (BCD): A methodology that blends design thinking and behavioral science insights to create interventions that effectively influence human behavior by understanding individual or community motivations, barriers, and behavioral contexts.

Behavior change: The result when a person changes their behavior or the act of changing someone's behavior from one to another.

Behavioral lever: A specific category of evidence-based strategies from behavioral and social science (e.g., material incentives, social norms, default options) that can be adjusted to influence behavior in a predictable way.

Cognitive bias: A systematic pattern of deviation from rational judgment [see Rationality], where individuals rely on mental shortcuts that can lead to errors in decision-making.

Constraining factor: The element that prohibits or limits effective behavior change.

Cooperative action: Coordinated behavior among individuals or groups working together toward a shared goal or collective outcome.

Habit: A behavior repeated in a stable context so that familiar cues trigger it with little active thinking.

Human behavior: The range of actions and reactions of individuals in response to internal states and external environmental stimuli.

Incentives mismatch: Using financial, material, or other incentives to encourage behavior change, even though the main barrier to change is unrelated to or independent of those incentives.

Intention-action gap: The disconnect between our intentions, or what we plan to achieve, and our actual actions, or what we ultimately do.

Pastoralism: A livelihood system based on raising and herding livestock, often involving seasonal movement to access grazing resources.

Present bias: The tendency to give more weight to the present rather than the future and any long-term payoffs.

Psychosocial state: An individual's combined psychological and social condition, including emotions, beliefs, social identity, and perceived norms.

Rationality: The quality of making decisions based on logical reasoning, consistent preferences, and available evidence.

Routinized practice: The familiar and repeated way of working that has become embedded in daily routines, roles, tools, and expectations.

Rules and regulation mismatch: Using policies and procedures to force behavior change without an understanding of how those policies may affect people or the environment.

Socioecological system: A system of social and ecological factors at different scales that interact with one another to affect human behavior.

Solution pathway: Similar to a theory of change and shows the connection between a program activity, activity result, change in a person's psychosocial state, and change in behavior.

Status quo bias: A preference for the current behaviors and practices, resulting in resistance to change.

Target behavior: The specific behavior that the behavior-centered strategy sought to achieve.

Theory of Cooperative Behavior Adoption: A framework to solve environmental dilemmas that require cooperative action [see Cooperative Action] by generating collective demand, coordinating a behavior shift, and strengthening a new norm.

Introduction

Introduction

Protecting our global lands is an increasingly urgent conservation priority. UNESCO has warned that 90% of the planet's land surface could be degraded by 2050, posing severe risks to biodiversity and human well-being.[3] Rangelands, which cover more than 54% of the Earth's terrestrial surface and support more than 500 million people and one billion animals, are central to this challenge.[4] However, a significant share of these ecosystems has already been converted to other land uses or is under threat.[5] Estimates suggest that up to 50% of global rangelands are already degraded.[6] The drivers and definitions of degradation vary but are often linked to the erosion of traditional pastoralist systems, land privatization, natural resource extraction (e.g., mineral mining), and the expansion of industrial agriculture. Rangelands include a diverse set of landscapes and human populations. Many of these communities are also uniquely located in vast and/or remote areas, which can create greater social and economic vulnerability.[7] These factors underscore the urgency and complexity of spotlighting solutions for rangelands.

The language of good land stewardship is universal: (left to right) Local forestry veteran Isrophil Goipov and Silk Road Caravan participant Harouna Abarchi (a pastoralist from Niger, president of the A2N herders' association and IYRP focal point for West and Central Africa) in conversation during Caravan's field trip to the Urgut Specialized State Forestry Enterprise in the Amankutan area of Urgut District, Samarkand Region. Photo Credit: UNCCD.

Threats to rangeland ecosystems share a common throughline: human behavior. The choices people make can either increase desertification or mitigate it. For example, intensive agricultural methods can lead to soil erosion, but sustainable grazing practices can allow grasses to regenerate.

However, shifting behavior is not easy. Awareness and education campaigns alone rarely lead to durable behavior shifts.[8] There is also an "intention-action" gap: people may want and plan to change their behavior but will fail to do so when other key barriers and/or motivations are not addressed.[9] Rules and regulations are also challenging to enforce, and when material incentives end, pro-environmental behaviors often do, too. The persistence of "paper parks" — protected areas that exist in policy but lack effective enforcement or local support — highlights the limits of top-down conservation approaches that do not align with local realities.[10]

Moreover, decisions about land use do not occur in a vacuum. A complex socioecological system including economic pressures, local norms, cultural traditions, government policies, foreign interests and values, and climate change, shapes people's choices. Changing established practices becomes even more difficult, as individuals face structural constraints and competing priorities even when a choice could yield beneficial results.

One way to foster real change is to apply relevant behavioral strategies that consider individual and community barriers and motivations for conserving these important ecosystems. Our barriers and motivations to act in pro-environmental ways depend on our goals and values, our emotions, how decisions are framed, our identities, and the actions and perceptions of those surrounding us.[11] As social beings, we are guided by what our communities deem good, non-harmful choices.[12] Our emotions help us act in ways that align with our goals and overcome our challenges.[13] Our and others' beliefs further influence how we choose to behave both personally and in social settings.[14]

With all of this in mind, we have developed a diagnostic framework based on evidence from rangeland management that outlines three main factors for successful solutions. Each part presents distinct behavioral barriers and opportunities, underscoring the need for tailored rather than one-size-fits-all solutions.

1. Is the solution **feasible** based on people's local conditions and context (e.g., rights, land tenure, mobility, water, market access, and risk perceptions)?
2. Is the solution seen as **legitimate** by local communities, and is there **coordination** among people in terms of their norms and expectations for working together?
3. Does this project align with local **identities** and promote sustainable **routines** or **habits**?

Based on this framework, we have identified three solution pathways with case study examples for practitioners to apply in their rangeland conservation work.

This report is structured using the Behavior-Centered Design (BCD) approach, which blends behavioral insights with design thinking methods to develop behaviorally-informed solutions to environmental problems. BCD includes eight steps that guide practitioners from defining the behavioral and environmental issues and deeply understanding target actors through a behavioral lens to prototyping, implementation, evaluation, and scaling. It is critical to note that successfully implementing the BCD approach hinges on co-development with key actors and stakeholders throughout the process. Not only is this the ethical way to ensure that practitioners are aware of their biases, power dynamics, and values, but this approach also grounds solutions in community goals, interests, and needs for durability.

Following the BCD approach, the report has the following sections:

PART 1 — Framing the problem of rangeland conservation

PART 2 — Behavioral insights for protecting rangelands

PART 3 — Creating behavior-centered theories of change for rangelands

PART 4 — Behavior-Centered Design resources for UNCCD parties

PART 1

Framing the problem of rangeland conservation

Framing the problem of rangeland conservation

Protecting rangeland ecosystems requires understanding the larger system to create behaviorally-informed solutions. In Behavior-Centered Design (BCD), this is the Frame step, where we define the key actors, behaviors, and context that give shape to the environmental challenge we face. Some tools for this step include problem-behavior-actor mapping, stakeholder/actor mapping, and learning about the people and places involved. More information on these tools and all steps of BCD can be found in Part 4 and the References.

For rangeland ecosystems our goals are to:

- **Protect and preserve biodiversity**
- **Restore soils and degraded lands**
- **Ensure sustainable food systems**
- **Support livelihoods and well-being of rangeland communities**

Defining these goals helps us stay focused on the behaviors and actors that will help us achieve them.

Actors

Numerous actors influence rangeland ecosystems. The following is not an exhaustive list, but features actors that often have the biggest impact on rangeland outcomes:

Farmers	Individuals who cultivate land for crops, food, and livestock.
Pastoralists and herders	Individuals whose lives are defined by seasonal herd movements (e.g., cattle, sheep). They may participate in other activities such as trade and farming. Pastoralists are diverse and may have unique practices and traditions in each community.
Local institutions	In some rangeland communities, decision-making bodies led and represented by pastoralists and farmers determine rights and access in their areas.
National, state, and local governments	Government actors are often responsible for setting policies around land rights and access, including privatizing land for state interests.
Extension agents	Experts in a certain field or trade who offer support to farmers and pastoralists, connecting them to technology, resources, or markets.
Non-governmental organizations (NGOs)	Foreign and national development- and conservation-focused organizations that want to increase environmental and/or social outcomes in rangeland communities. Some of these organizations have closer relationships with communities than others.
Foreign businesses and governments	The rising global demand for meat and natural resources, such as oil and minerals, has caused foreign governments and businesses to become active in rangeland communities, often by claiming land and diminishing local resources.

Behaviors

Based on the actors above, there are different target behaviors for each that would support rangeland ecosystems. These behaviors belong to two main categories: individual and collective.

Individual behaviors are those in which actors make decisions that they believe will benefit themselves. Other behaviors are **collective**, meaning that they require groups of people with shared interests to work together to achieve an outcome. Collective action is often required in common pool resource problems, where many individuals use a natural resource such as water, air, or land.[15] In such cases, there may be a need for **cooperative behaviors**, in which individuals act to benefit the overall group, even if that results in some personal cost.[16] In the case of rangelands, an example of an individual behavior would be selecting native seeds to plant, and a collective behavior would be honoring seasonal closures (a community-agreed rest period for the land held by social agreement) for grazing. This distinction between behavior types is important because addressing individual and collective behaviors requires different types of solutions.

The following list shows **examples of rangeland conservation behaviors for each actor**. Behaviors with an I are individual and a C are collective.

Farmers

- I Plant native seeds
- I Use organic fertilizer
- C Report violations to local laws

Pastoralists and herders

- C Respect seasonal closures for grazing
- C Rotationally graze within a communal pasture
- C Coordinate seasonal herd movements with other herders

Local institutions

- C Enforce sustainable grazing practices
- C Advocate for pastoralists' right to mobility and land tenure

National, state, and local governments

- C Invest in local institutions and support greater market access
- I Respect pastoralists', herders', and farmers' knowledge
- C Recognize and grant land tenure to pastoralists
- C Partner with communities on resource management
- C Advocate for policies that support sustainable rangeland management

Extension agents

- I Provide support (knowledge, training) on sustainable practices when it is most useful for pastoralists and farmers

Non-governmental organizations (NGOs)

- C Partner with communities on resource management
- I Respect pastoralists', herders', and farmers' knowledge
- C Invest in local institutions and support greater market access

Foreign businesses and governments

- C Partner with communities on resource management
- C Invest in local institutions and support greater market access
- I Respect pastoralists', herders', and farmers' knowledge
- C Stop overextraction of natural resources

Context

All actors and behaviors operate within a larger context. People living in rangeland ecosystems experience a unique set of ecological, economic, political, and social vulnerabilities that determine opportunities for change. Climate change and land use worsen these conditions and contribute to rangeland degradation.[17] The following factors are some of the most prominent for rangeland communities.

Economic inequality, education, and market access

Rangeland communities are often located in remote areas with high rates of poverty due to limited access to markets, education, technology, and services, including a lack of alternative income options.[18] Even so, they are navigating population growth and a rising global demand for meat and agricultural goods.[19] Wealthier pastoralists may be able to capitalize on rising product demand due to their connections, yet poorer pastoralists may be forced to move to cities if their livelihoods become unsustainable.[20] Pastoralists may need to clear or overgraze land to support their livelihoods, yet in some cases these practices still cannot provide entirely for a family's needs.[21] Even while traditional land practices remain effective, there are pressures to modernize and explore technological advancements like satellite-based rangeland monitoring (remote sensing) or integrated crop livestock systems. Accessing or applying these technologies requires higher education, upfront investments, and support, which are also less available in many rangeland regions.[22]

Government privatization, land tenure, and mobility

Government policies have greatly affected the landscape of rangelands and grasslands, primarily through land privatization.[23] Insecure land tenure and restricted access to resources, including water and grazing lands, have had detrimental effects on pastoral livelihoods.[24] Mobility is key for pastoralists, and there are clear links between land degradation, deforestation, and decreased land ownership. Traditional pastoral societies create their own rules and rights-based systems for communal property and livestock management. However, they now must navigate a patchwork of more privately owned land to survive. The individualization of land and herds has further reduced overall coordination, which is core to sustainable grazing.[25] Government and foreign interests have also added pressure to intensify crop production and conservation goals, such as afforestation, that may be at odds with local communities' needs.[26]

Conflict, power, and violence

Gender, ethnic, and indigenous violence are pervasive in rangeland communities, which restricts community members' participation in grazing and farming management practices. A study on pastoralism and conflict in West and Central Africa reveals a complex landscape of factors driving conflict that include external development policies, land privatization and tenure shifts, and changing economic conditions.[27] Some pastoral communities have local dispute resolution systems that have been undermined by more powerful actors or cannot manage the existing scale of conflict. In the face of instability and uncertainty, it is easier for corrupt or violent groups to form, even if they are fighting in self-defense for survival.[28] The remote and vast nature of pastoral lands and the lack of clear land ownership make it easier for conflict to endure since there is less oversight.[29]

Additionally, domestic violence against women and women's unequal access to education and resources, such as extension services, impact their ability to contribute to farming and livestock management.[30] In other cases, social, tribal, or ethnic hierarchies, such as caste dynamics in India, shape perceptions of power and access to land rights.[31] Pastoralists also typically have less political power and representation than other groups and face negative stereotypes about their lifestyles, deepening existing inequalities.[32]

Maintaining and eroding cultural traditions

Historically, there have been strong social practices around grassland, rangeland, and farmland management. Many cultures, including those in pastoral societies, have worldviews around the deep connections between people and nature and communal resource management.[33] For example, Balinese rice farmers used temples, and Namibian farmers used cattle-posts for generations to coordinate their activities with community members.[34] The strength of such cultural institutions and traditions has been key to avoiding soil erosion and desertification, yet these practices are under threat.[35]

Government and foreign business actors have undermined some of these traditions and norms through new policies that change land access, restrict mobility, and favor "modern" forms of agriculture and land management.[36] Research from Ghana and Algeria shows how negative stereotypes about pastoral livelihoods have led to the eviction and denials of land access for pastoralists.[37] The presence of conflict and violence has only reinforced foreign actors' existing biases and misconceptions about pastoralists' ability to manage their lands.[38]

To get started framing your challenge, visit **Part 4: Behavior-Centered Design resources** in this guide and check out the mapping tools.

PART 2

Behavioral insights for protecting rangelands

Behavioral insights for protecting rangelands

Once we have framed the behavioral challenge, the next step is to specifically define the psychological, emotional, social, material, and political motivators and barriers for change. In Behavior-Centered Design, the Empathize and Map steps do this work.

During the Empathize step, we collect data from actors about their motivations, barriers, and context for the target behaviors. Methods of data collection may include interviews, surveys, behavioral journeys, focus groups, and participant observation. The output of this step is a data-grounded understanding of how people currently behave and what drives or blocks change toward the target behavior.

The Map step takes this data and organizes it through a behavioral lens. This step involves analyzing the data for motivations and barriers, identifying root causes, and writing testable hypotheses (if-then statements) about behavior change. Within the rangeland behavioral system, the output of this step is a hypothesis about which factor(s) is the constraint a program designer must tackle first.

The mismatch between the problem and the solution

Programs that skip these early BCD steps often misread the problem and reach for the easiest solution to deliver. Historically, conservation programs have defaulted into the same three types of solutions: more information, more incentives, or more rules. While these strategies have legitimate uses, they fail when applied to the wrong constraint. The examples below show what that mismatch may look like in practice.

Information mismatch

In central Mozambique's Zambezi Valley, a field experiment tested whether strengthening an extension model would spread sustainable land management practices beyond the farmers who were directly trained. The practices were soil and water management behaviors, including pit planting, strip tillage, and crop rotation. Across 200 communities, all had contact farmers (or messengers), trained extension agents, and offered demonstration kits; yet in 150 randomly assigned treatment communities, contact farmers also received additional centralized training on sustainable land management. The training increased adoption among contact farmers, with the clearest effects for pit planting, strip tillage, and contour farming. However, it did not increase other farmers' access to contact farmers, knowledge of sustainable land management, or adoption. While training worked for the direct recipients, the hypothesis that information would move from contact farmers to the wider community was not proven. The study suggests that more information at the top of the extension chain did not continue to become community-wide behavior change.[39]

Incentives mismatch

In Cambodia's Cardamom Forests, a payments for environmental services (PES) program showed how incentives can change the meaning of conservation. A household survey of 205 participants and 120 matched control participants found that the PES program shifted how villagers valued the forest, from subsistence-related reasons to money-related ones. Participants who held money-related values reported significantly more often that they would break conservation rules if payments ended. The study showed how incentives can make stewardship feel more transactional and raise uncertainty for long-term compliance.[40]

Rules and regulations mismatch

In India's Khangchendzonga National Park, a grazing ban starting in 1998 forced the removal of herders across the state between 2002 and 2004. Based on interviews and key informants, 103 herders were evicted from the West Sikkim area. Herders believed the ban stemmed from assumptions of overgrazing and the negative effects on vegetation and wild herbivores, yet no research had been conducted before the ban to assess or quantify those effects. After the ban, respondents perceived declines in vegetation diversity in the high-altitude summer pastures and shifts in winter pasture composition, including reduced preferred forage species and greater dominance of less-preferred species. The study argues that pastoralists were not meaningfully consulted before the ban, and that their knowledge was included only later, after they had lost access and livelihoods.[41]

Past interventions failed because program designers assumed more information, incentives, or bans would shift behavior and improve conservation outcomes; yet program designers rarely consulted community members about local conditions and challenges or saw program benefits. There was no connection between the proposed problem and solution, and so the problem was not solved. Instead, when we take the time to Empathize and Map, we develop custom and responsive solutions that are more likely to work.

A diagnostic framework of three key factors shaping rangeland behavior

Rangeland management behaviors are often collective, rather than individual, choices and shaped by a large system of actors. Behaviors like rotational grazing, respecting seasonal closures, and shared monitoring depend on what a group of people can do together; for example, an individual herder cannot regenerate a pasture or sustain a seasonal closure on their own. Even for individual behaviors, there are strong forces that may inhibit or limit action. The behavioral science evidence on what shapes these decisions includes one precondition factor: **feasibility**, and two interacting pairs of other factors: **legitimacy and coordination**, and **identity and habit**.

Feasibility

Feasibility describes whether the target behavior is possible. Feasibility has two dimensions. The first is material feasibility: access to rights, tenure, mobility, water, capital, and market access. The second dimension is risk and uncertainty, meaning whether people can absorb the downside of an option whose payoff is delayed or unproven. If the conditions are not in place for behavior change, no solution will work.

A farmer who is not confident they will still have access to their land in the future has little reason to invest in practices whose benefits accrue over time. Evidence from Malawi smallholders illustrates this point. The probability of investing in soil conservation was about 18% lower on plots held under informal short-term tenancy than on more securely held plots.[42] A second source of insecurity, customary inheritance and marriage practices, produces a similar gap: decision-makers whose future land access was insecure under the village's prevailing inheritance system were less likely to invest in soil conservation. Tenure insecurity can weaken long-horizon conservation behavior, so information or technical knowledge alone may not be enough.

Access to wealth or capital is another common constraint, especially for upfront investments that lead to future payoffs. Some examples come from silvopastoral systems, grazing lands where pastoralists integrate trees and shrubs with pasture for shade, fodder, and soil benefits. Across Latin American studies, pastoralists recover their upfront investment within three to five years, once the trees mature. Therefore, pastoralists must be able to absorb the planting and maintenance costs during the years before the financial benefit arrives. Adoption stalls when they cannot bridge that gap without external support such as credit, cost-sharing, or bridge financing.[43]

Risk and uncertainty form the second dimension of feasibility. Even when the material conditions are met, a household may be unable to take on an option it cannot afford to see fail. Because agrarian livelihoods are already precarious, farmers are often hesitant to adopt innovations they have not yet seen tested in a similar context. The possibility of loss shapes their decisions more heavily than the equivalent possibility of gain. Uncertainty aversion and loss aversion mean that farmers who cannot afford a bad outcome prefer to wait for evidence that the practice will work among people they know. The Latin American silvopastoral review finds that peer networks and technical demonstrations from trusted local organizations are among the strongest enablers of adoption.[44]

Finally, pastoral mobility is key to successful herding. A herder cannot graze their herds effectively if fences, land-use change, or government policies have closed off the routes. Land fragmentation and enclosures crowd herds and undermine the reciprocity between neighboring herders that makes coordinated grazing possible, regardless of what extension or incentive programs offer.

Legitimacy and coordination

Many land-management behaviors are cooperation problems. A seasonal closure benefits the whole community, but each herder is tempted to graze the rested pasture. The closure holds only when people expect others to respect it and expect deviations to carry social costs. People follow norms conditionally, based on what they anticipate others will do and what they believe others expect of them.[45] Legitimacy is what makes that shared expectation possible. When people accept a rule or authority as legitimate, and know their neighbors do too, the group can move from open use to shared restraint. A legitimate authority can sustain that shift through fair enforcement. Ostrom's work on the commons[46] shows that these rules endure when resource users help shape and enforce them. Coordination that succeeds in this way deepens trust in the institution, reinforcing its legitimacy.

Community-based rangeland management (CBRM) in Mongolia is an example of this factor at work. Ulambayar and Fernández-Giménez[47] surveyed 706 Mongolian herder households across 142 traditional and formally organized CBRM groups. CBRM groups had more access to information, stronger leadership, more knowledge exchange, and more rules for resource use, which together were associated with greater adoption of rangeland practices and stronger social networks. The study also shows that rules are not automatically beneficial. Within some CBRM groups, rules borrowed from elsewhere without local discussion were linked to lower trust and weaker reciprocity. The authors believe the cause is the absence of "real buy-in and ownership of the rules by group members".[48] Imposing rules without local participation can actively undermine the social capital on which coordination depends.

Customary rangeland systems like the Hima in Jordan, the Agdal in Morocco, and the communally governed pastures of the Swiss Alps[49] are older examples of legitimate coordination institutions. In these areas, pastures are closed seasonally under tribal or customary authority with peer pressure rather than external policing maintaining coordination. Reinforcing an existing legitimate institution is often more effective than building a new rule alongside it.

Finally, the design of the participatory process predicts success more reliably than local context does.[50] Process design includes how a program convenes community members, listens to them, and gives them real decision-making authority. Programs that skip this step and rely on subsidies or government-imposed bans tend to produce evasion rather than compliance. When governments or foreign actors take ownership of rangeland areas, they may promote norms and values that undermine traditional institutions and beliefs about the effectiveness of pastoralist lifestyles and communal management, which undermines their legitimacy within the community.[51]

Identity and habit

A person's identity is the role they see themselves having in the context of their place and community: a good farmer, a respected herder, a skilled custodian of family pastures. It shapes what practices a person sees as right and expected for someone like them. A conservation practice that fits within that identity is more likely to feel right and worth sustaining than a conflicting one, even if it is technically sound.

Identity can also reinforce routinized practice, the repeated ways people organize daily or seasonal work. While some routinized practices may become habits, a habit is a narrower term for a behavior repeated in a stable context, so that eventually familiar cues trigger it with little active thinking.[52] Many existing practices are better understood as routines, traditions, defaults, or status quo behaviors rather than true habits. People may maintain current practices because they are familiar, expected, or perceived as less risky than change, even when alternatives are available.[53] This distinction matters because practices such as overgrazing, overusing chemical fertilizer, or clearing tree cover may persist for many reasons: feasibility constraints, social expectations, identity, routines, or status quo bias.

Repeated practices are harder to change when life is stable because the same work patterns, cues, and expectations keep reproducing the same behavior. They can become more open to change when life disrupts those patterns. A drought or extreme winter, a generational transfer of wealth, a move to a new land, the start of a new agricultural cycle, or a new program can unsettle routines and create a moment of decision where new practices can take hold, especially when they fit a valued identity and can be repeated as part of normal work.

For example, in northern Vietnam's tea-farming region, peer-led messaging amplified adoption of organic fertilizer, especially among farmers who belonged to VietGAP, Vietnam's domestic certification program for clean and safe agricultural production.[54] Farmers who already saw themselves as part of an identity-shaping group viewed the peer messaging as confirmation of what skilled farmers like them do. This case illustrates the identity side of the framework. Whether organic fertilizer use would later become routine, or eventually habitual, would depend on repeated use over time, which the study did not measure.

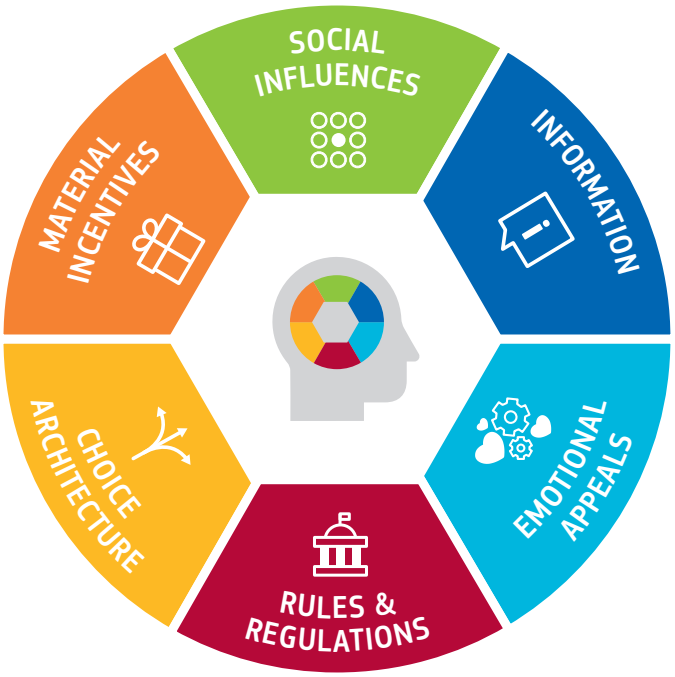
To learn more about the Ideate step and the use of social influences, visit **Part 4: Behavior-Centered Design resources** in this guide and check out the behavioral levers.

PART 3

Creating behavior-centered theories of change for rangelands

Creating behavior-centered theories of change for rangelands

Now that we have identified key behavioral insights for the target behaviors, we can turn to the Ideate and Prototype steps. In Ideate, we create a set of solutions for the target behavior based on our hypotheses that can be made into prototypes, or small-scale, testable versions of those solutions. **Rare's six Levers of Behavior Change** — Information, Material Incentives, Emotional Appeals, Rules and Regulations, Social Influences, and Choice Architecture — supply the strategies for behavioral solutions.[55]



MATERIAL INCENTIVES
Increasing or decreasing costs, time, or effort for doing a behavior.

CHOICE ARCHITECTURE
Changing the context in which choices are made.

RULES & REGULATIONS
Enacting rules that promote or restrict a behavior.

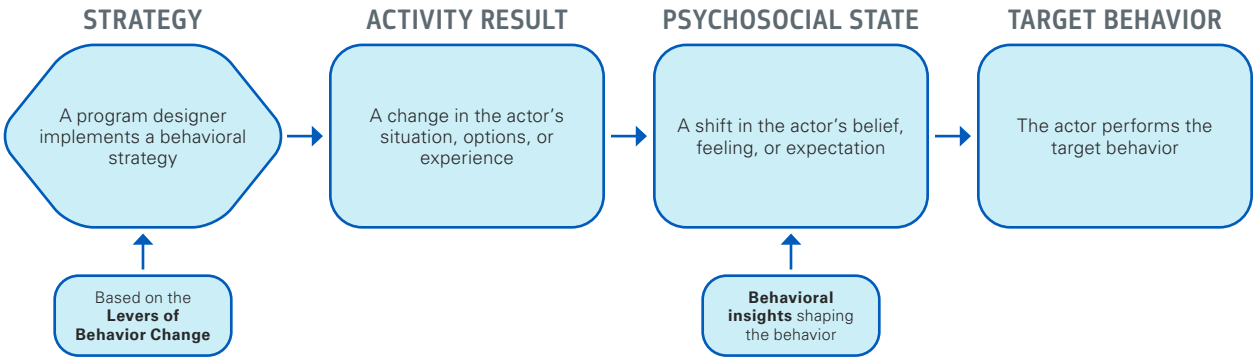
SOCIAL INFLUENCES
Leveraging the behavior, beliefs, and expectations of others.

INFORMATION
Providing information about what the target behavior is, why it matters, and how to do it.

EMOTIONAL APPEALS
Using emotional messages to drive behaviors.

We have developed three behavioral solution pathways below for rangeland ecosystem scenarios based on the framework of insights from Part 2. Each pathway is presented as a results chain, or a visual diagram of its theory of change. Typically, theories of change focus on how a strategy leads to an activity that may change a behavior and support positive long-term environmental and/or social outcomes. But what actually happens between the implemented activity and the outcome behavior that *drives* change? Behavioral science indicates that there is a shift in a person's **psychosocial state**, or the way they feel, believe, think, know, or perceive a certain behavior. With this in mind, we can create solution pathways as causal "if-then" relationships through four linked boxes:

1. A program designer implements a behavioral strategy (based on the Levers of Behavior Change).
2. The strategy produces an activity result (what changes after the strategy is implemented).
3. The result leads to a change in psychosocial state (what shifts in the actor's mind, like a belief, attitude, or expectation that was important in Part 2's framework of factors).
4. This state leads to the actor doing the target behavior.

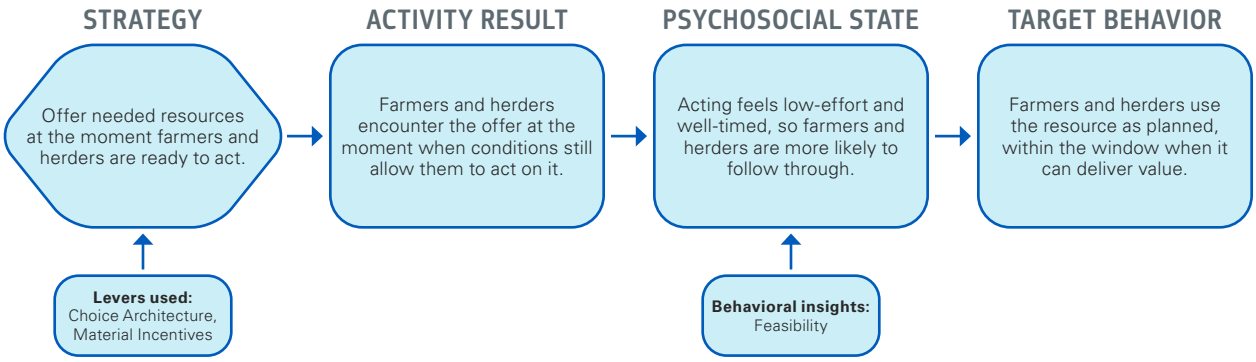


The solution pathways make a program's underlying assumptions explicit, and it becomes easier to identify where changes or adjustments need to be made when testing solutions. For example, if a behavioral strategy does not lead to the target behavior, we can examine whether the planned activity result or psychosocial state occurred. For each pathway we share its structure, why it works based on behavioral insights, including constraining factors identified in Part 2, and a case study showing where this pathway has succeeded in a relevant context for rangeland conservation.

Solution pathway 1: Time resources to the moment of action

Pathway

When someone has the intention to do a target behavior (e.g., apply fertilizer) but does not follow through with that behavior due to a lack of resources at the moment of action, harness the right timing for decision-making.



Why it works

The constraining factor here is feasibility, but the real problem is timing rather than affordability. Most programs assume that people cannot afford the resources and respond with price subsidies. The actual constraint is different, as the means come at one moment, but the action is needed at another. The window in between can be a regular cycle, like the months between harvest cash and planting fertilizer, or a forecast-triggered window, like the weeks between an extreme weather warning and the crisis itself. By the time the action is required, the funds have often been spent on other needs, or the moment has passed.

Behavioral science names this pattern of decision-making "present bias." Present bias occurs when people give more weight to the present than the future, procrastinate taking actions for the future, and then are not ready when action is finally required.[56] The result is a predictable intention-action gap. A small, well-timed offer delivered when need and willingness coincide can outperform a much larger subsidy delivered later.

CASE STUDY:
The savings and fertilizer initiative in Kenya

In a low-soil-fertility area of Western Kenya, smallholder maize farmers had access to fertilizer at market stalls. Trials on their own farms showed fertilizer was a profitable investment, with annualized net returns of 52% to 85% after labor costs. Yet only 29% of farmers used fertilizers in the past growing season. When asked why, fewer than 2% said fertilizer was unprofitable; 79% said they did not have the money.[57]

Of the 139 farmers asked about their last three planting seasons; 96% to 98% of those who used fertilizer had bought it just before applying it, not months earlier when cash was actually available. And among farmers who had visited a demonstration plot, almost 98% said they planned to use fertilizer the following season. However, only about 36% followed through.[58]

To address this follow-through problem, Duflo and colleagues designed and tested the Savings and Fertilizer Initiative (SAFI). A field officer visited each farmer immediately after harvest, when cash was in hand, and offered a voucher for fertilizer at the regular retail price, with free delivery on a date the farmer chose. There was no discount on the fertilizer itself. The intervention was all about offering it at the right time.

The basic SAFI program increased fertilizer use by 47% to 70%. That effect was larger than offering free delivery combined with a 50% price subsidy delivered later in the season, when cash had already been spent. The implication for fertilizer programs in similar contexts is that small, well-designed timing interventions can do work that large discounts cannot.

The constraint described in this case is not specific to crop systems. Pastoralists face a similar challenge due to inconsistent cash flows, cycles of poverty, and unequal access to networks and alternative livelihoods. A herder may intend to destock before the dry season but lack a buyer or the cash at the moment when destocking would still avoid losses. The SAFI design works in any setting where the gap between intention and action is about timing rather than affordability.

Photo Credit: B. Das/CIMMYT.

CASE STUDY:
Forecast-based assistance before a Mongolian dzud

Mongolia's pastoralist economy is shaped by dzud, severe winters that follow dry summers and can kill large parts of a herd within weeks. In 2017, 80% of the country experienced drought-like conditions over the summer. On November 26 of that year, the National Agency for Meteorology and Environmental Monitoring released a dzud risk map placing 50% of the country at high risk for the coming winter. The forecast showed a window of several weeks before winter conditions became the most severe.

The Mongolian Red Cross Society used the forecast to trigger a forecast-based financing intervention. Approximately 2,000 vulnerable herder households across 40 high-risk pasturelands were enrolled. Each received a cash grant of MNT 240,000 (about USD 100) in December 2017, followed by an animal care kit of fish oil, hoof ointment, and mineral blocks in January 2018.

Gros and colleagues[59] evaluated the program by comparing 223 beneficiaries with 223 households who did not receive any support. Horse mortality among recipients was 7% versus 12% in the non-recipient group, a statistically significant difference. Sheep offspring survival was 82% versus 76% (statistically significant at the 10% level). Of recipients, 91.9% reported spending at least part of the cash on hay or feed.

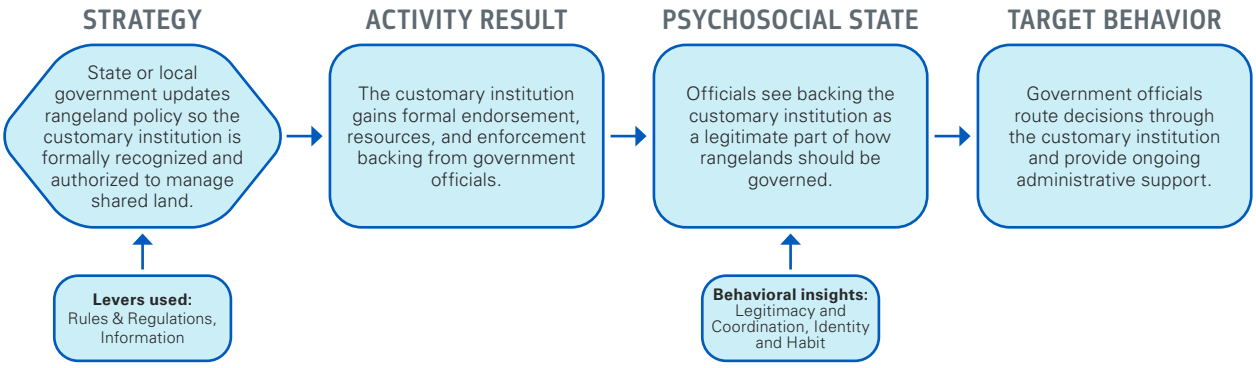
The authors further split recipient households by whether they reported receiving assistance before or after January 31, 2018, a point after which livestock mortality in Mongolia typically rises sharply. Horse mortality was 1.7% among earlier-receipt households and 8.3% among later-receipt ones. Therefore, the same modest support package was associated with very different outcomes depending on when households reported receiving it and whether they were able to use the resources. The forecast window between a dzud warning and the period when losses typically intensify presented a timely moment to support pastoralists when they needed it most and could take advantage of the benefits. The same forecast-based timing works in northern Australia, where a seasonal forecast of low rainfall can prompt grazers to destock early, before pastures fail and prices fall, protecting both herd value and land condition.[60]

Photo Credit: Alexander Popovkin, Unsplash.

Solution pathway 2: Revive customary institutions through state recognition and community coordination

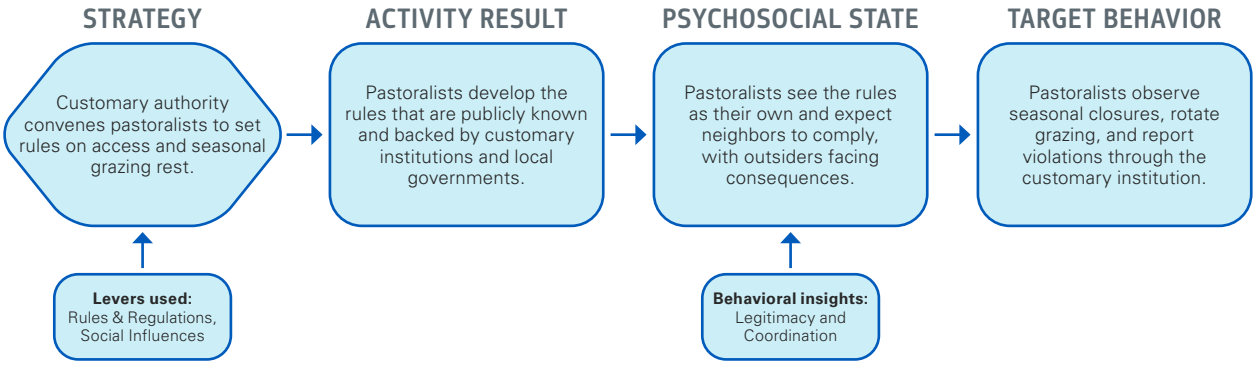
Pathway 2A

When past state policy has weakened a customary institution that still carries legitimacy in the community, formally recognize and repair the institution to govern shared land.



Pathway 2B

When a customary institution carries legitimacy over shared land, convene pastoralists through that authority to set rules they will own and enforce together.



Why it works

In many rangeland systems, communities know that rest periods regenerate vegetation and have regulated grazing through customary authority for centuries. However, after decades of government actors reducing pastoralists' mobility and implementing centralized rules, the local institutions once led by herders have been weakened. New rules imposed in their place tend to be ignored, even when they are scientifically sound.

The constraining factor here is legitimacy. Rules carry weight when they come from an authority the community already accepts. When a customary institution has less power but remains legitimate, the fastest route to coordinated grazing practices is often to restore its practical authority through state recognition and backing. Local knowledge and norms can then operate within an institution that the community already recognizes.[61]

This pathway combines two linked behavior changes that operate in sequence. The state chain often must happen first because in landscapes that have been state-owned or treated as open access for decades, community rules without formal backing may not have enough authority to deter outsiders or make sure everyone follows the rules.

CASE STUDY:
Reviving the Hima in Jordan

The Global Land Outlook identifies weak recognition of customary governance and land rights as a major challenge in the Middle East and North Africa region.[62] The Hima is a traditional Arab grazing-regulation system used across Syria, Jordan, and the Arabian Peninsula for centuries. It designates pastures that close seasonally under tribal authority, allowing vegetation to set seed and regenerate.

Roughly 80% of Jordan is rangeland, and about 75% of the country is the arid Badia, where annual rainfall is below 200 millimeters. Historically, Bedouin tribes have practiced pastoralism. In the 1960s, the government declared rangelands state-owned and began reducing the mobility of Bedouin herders due to industrialization and modernization pressures.[63] The Hima was weakened and open-access grazing replaced seasonal closure. Within decades, edible dry matter per hectare in the Badia had halved. Most livestock producers became dependent on purchased fodder.[64]

In the early 2010s, the state's approach began to shift. The Updated Rangeland Strategy acknowledged that the elimination of customary systems contributed to overgrazing, early grazing of range plants, and the spread of quarrying and mining into rangeland areas.[65] The new strategy identified the failure of the open-access regime and opened the window for Solution Pathway 2A by committing to community involvement, institutional empowerment, and a Hima approach. The International Union for Conservation of Nature (IUCN) and the Jordan Ministry of Agriculture piloted a Hima revival in the Bani Hashem community of the Zarqa River Basin. After negotiations with the Directorate of Rangelands and Badia Development and the prime minister's office, the community received approval to manage an initial 100 hectares, with possible scale-up to 1,500 if successful.[66]

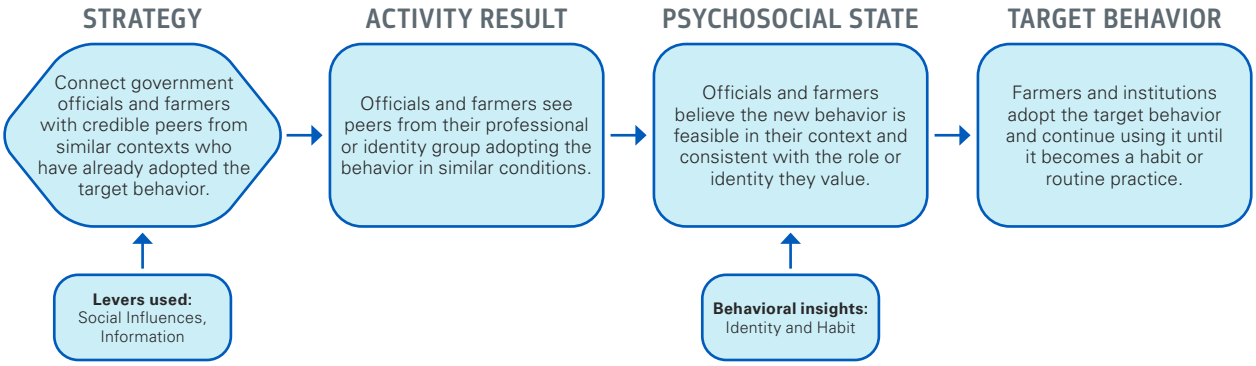
With state approval in place, residents developed a local tribal law, *Meathak Sharaf*, to restrict grazing in the Hima area. The Zarqa governor endorsed it, the Ministry of Agriculture established the Hima Bani Hashem Community Based Organization (CBO) to sustain management, and ministry employees handled significant violations by outsiders.[67] Grazing was excluded for the first two years and units opened rotationally in autumn for the third year. The vegetation response was rapid. Within two years of protection, the average dry biomass yield almost tripled.[68]

Photo Credit: Leon Hellegers, Pexels.

Solution pathway 3: Use peer learning to make change feel normal, doable, and legitimate

Pathway

When a target behavior is possible but not yet common, highlight peers from similar contexts to show that the change is doable and consistent with a valued identity or professional role.



Why it works

The constraining factors here are information, habits, and identity. People may continue with familiar behaviors because they are routine, available, and associated with expected returns. A more sustainable behavior can be economically rational and environmentally beneficial and still be rejected by the people who would gain most. The reason is often that the target behavior does not match how those people see themselves or their perception of community expectations. A generic message from an extension agent asks for trust in an outside recommendation. The same message from peers in the community reads as confirmation of what people like them already do.

Peer experience sharing is socially recognizable in a way that outside expertise is not. When the messenger has an identity that people already value, the target behavior can be interpreted as confirmation of what people like them already do. Over time, repeated use can turn the new behavior into a habit, and the action becomes part of who they are and what they routinely do.

The same mechanism applies inside institutions. Ministries and local governments respond to evidence, professional norms, and perceived legitimacy. When officials see comparable institutions in similar rangeland systems successfully managing shared resources and coordinating land-use planning, the practice becomes more professionally credible. Peer learning across institutions also creates relationships across agencies, which lowers the coordination costs that block institutional change.

CASE STUDY:
Peer learning among rangeland governance institutions in Sudan, Kenya, and Tanzania

In 2012, the United Nations Environment Programme (UNEP) supported a knowledge exchange for Darfur institutions working on land, natural resources, and rangeland governance. The September visit brought together 25 participants (18 from Sudan and 7 from East Africa). The Sudanese delegation drew from ministries, legislative councils, the Darfur Regional Authority, and pastoralist unions, with federal representation from the ministries responsible for environment and animal resources.

Participants visited four rangeland governance cases in Kenya and Tanzania. Across these sites, they observed committees governing group ranches and conservancies, customary Borana resource institutions, water resource user associations, village assemblies and land-use committees, and participatory mapping processes. The cases came from comparable dryland and pastoral contexts. Local actors were managing the same kinds of institutional problems that Darfur faced, like protecting mobility, defining access rights, recognizing customary systems and combating negative biases, coordinating land use, and setting legitimate rules for shared resources.

The behavioral strategy was "learning by seeing." Darfur participants observed local actors and institutions demonstrating workable governance arrangements in similar rangeland settings. The route also built an intensive peer community among the Darfur participants themselves. They spent two weeks together, reflected every two days on relevance for Darfur, and later met in Khartoum to draft shared priorities. UNEP reports that the process built relationships across states, ministries, and pastoralist unions, and helped participants craft a shared vision.[69] Follow-on actions were institutional. Participants hosted seven seminars across Darfur and Khartoum, and in several cases ministries that had not usually worked together presented jointly. The route also produced a joint draft statement of priorities for Darfur and two innovation plans. The West Darfur plan disseminated lessons locally to inform state-level policy. At the federal level, a separate plan addressed land-use planning and tenure security with community participation.

The case shows peer influence operating at the institutional level, helping officials see that institutions and communities like ours have made this work.

Photo Credit: Maasai Magic, Pexels.

CASE STUDY:
Peer experience-sharing among tea farmers in Vietnam

Northern Vietnam is a major green tea-producing region and home to many VietGAP (Vietnam's domestic certification program for clean and safe agricultural production)-certified tea-farmer groups.[70] Tea farmers have historically overapplied chemical fertilizers, contributing to water contamination, soil acidification, and soil fertility loss. Organic fertilizer is promoted as an alternative, but fewer than half of the farmers in this study's sample reported any experience using it. Among non-users, about 90% cited lack of information as the reason.

Vu et al.[71] ran a randomized controlled trial with 1,287 small-scale tea farmers. The study had three conditions: a control group, a 50% price subsidy for organic fertilizer, and a peer-experience consisting of a three-minute video in which three peer farmers described their own experience adopting organic fertilizer. The farmers featured in the video were deliberately selected to match the target audience on generation, gender, place of residence, tea farm size, and prior experience, so that they would share a group identity with the viewers.

Both the subsidy and the peer experience increased adoption. The strongest evidence for the identity-and-habit pathway comes from a subgroup result. Among farmers who already belonged to VietGAP, the same three-minute video raised purchase rates by 21.7 percentage points, about 2.5 times the full-sample effect. For these farmers, the peer message likely resonated more strongly because it aligned with an existing "clean and safe" production identity.

Sustainable land-management behaviors are more likely to stick when they are made visible through trusted peers and linked to an identity people already value. Programs aiming to shift rangeland practices should not rely only on technical explanations. They should identify the peer institutions and groups that already carry status, select messengers from within that group, show the desired practice in use, and time the message to when the behavior is performed.

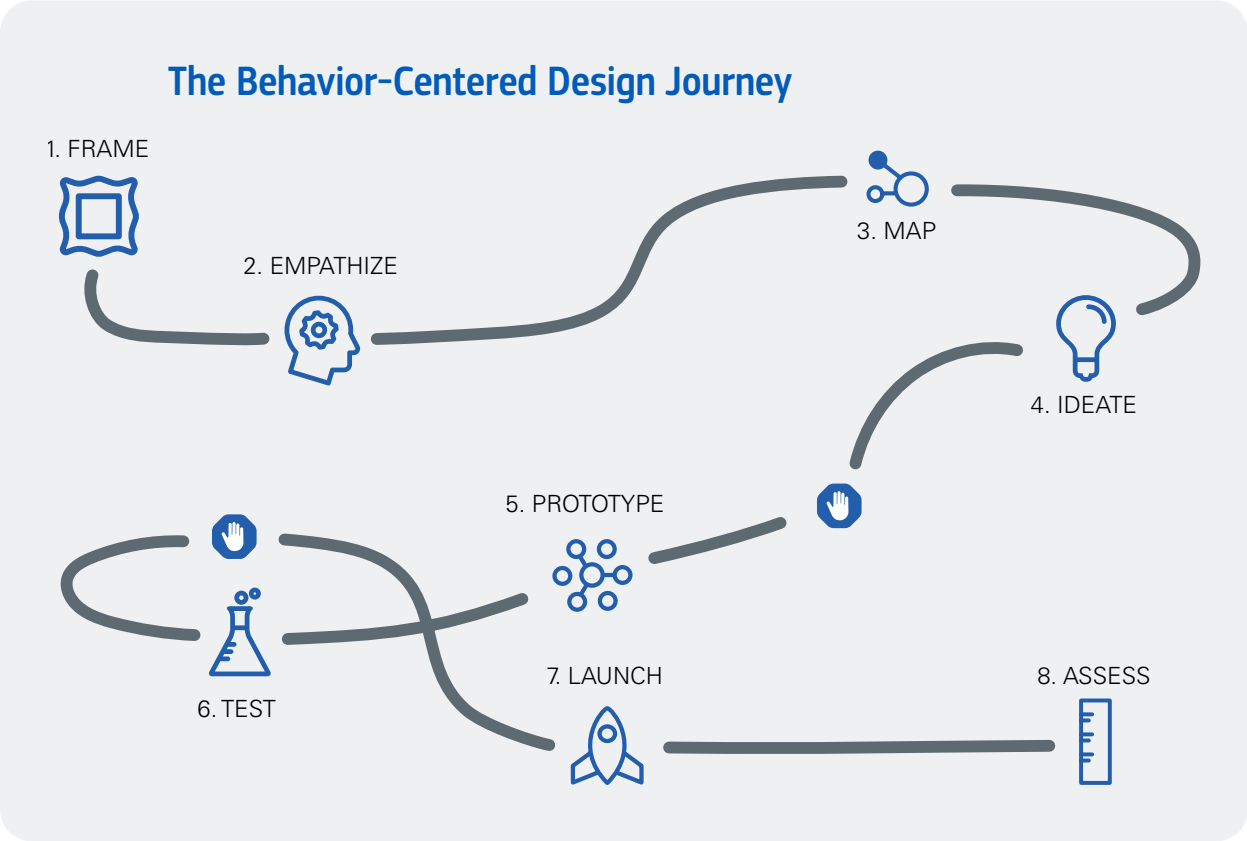
Photo Credit: Son Hoa Nguyen, Pexels.

PART 4

Behavior-Centered Design resources for UNCCD parties

Behavior-Centered Design resources for UNCCD parties

In this section, we will focus on how to use Rare's Behavior-Centered Design (BCD) framework to best position your project for success. Complete references for all tools mentioned in this section are provided in the References section. Note that the BCD process, while shown linearly, is meant to be iterative. In the co-creation process, you may need to take a step back to ensure that your solution is ethical, data-driven, and aligned with community values and needs. Importantly, remember that each step in the framework requires reflection on your *own* roles and responsibilities as a designer. Our Diversity, Equity, and Inclusion (DEI) checklist[72] will prompt you with considerations at each step of the BCD journey. UNDP also offers a guide to effective collaborative action, which is another excellent resource for community-based work with partners.[73]



Note: Various models and frameworks can guide behavior-centered work. Each model has its own strengths and weaknesses. When deciding which model to use, consider your project's context, your team's resources, and where you need additional expertise. Rare's Behavior Change in Practice report offers a table of various behavior change frameworks, and their pros and cons, to help determine which framework best fits your needs. If you are considering if Behavior-Centered Design is the right framework for you, we provide a separate series of questions to guide you to an answer.

Behavior-Centered Design tools and resources

1. FRAME

Once you've selected BCD as the right framework for you, decide where you need to start based on your project's status. Many practitioners start with Frame to define key behaviors and actors. To do this, try out the:

- Stakeholder/Actor mapping tool to identify and organize relevant stakeholders and actors that are involved in the system where the environmental challenge takes place.
- Problem-Behavior-Actor mapping tool to understand the broader context of your environmental problem and identify the target behavior(s) and actors(s) relevant for your behavior change solution.
- Positionality Wheel to reflect on your own positionality as a designer in a given context or system.

2. EMPATHIZE

Now that you've clearly defined a core behavior(s) and a core actor(s), you're ready for Empathize. Rare offers an in-depth Empathize course about the tools and resources designers can use to understand actor motivations and barriers. Check out the:

- Paseo protocol to reflect on the values, experiences, identity, and power you are bringing to your behavior change project.
- Survey guide to construct a questionnaire to better understand individuals' motivations, barriers, and context for a particular behavior.
- Interview guide to construct a series of questions that explore key actors' thoughts, feelings, and emotions to understand their current behavior, motivations, and barriers to the target behavior.
- Focus group guide to obtain deeper and nuanced qualitative data from an open-ended discussion with a small group of people.
- Participatory photography guide to engage and learn from a community about the target behavior and its real-world context through the lens of photography.
- 5 Whys guide to think about the root causes and reasons behind behaviors and beliefs.

3. MAP

You've collected data on your core actors' motivations, barriers, and context for the core behavior. Do you need to reframe the issue or gather additional data from the target actor(s)? If not, then it is time to Map your findings. Use the:

- Hypothesis generator to plot data from the Empathize step, organize them by types of motivations and barriers, and develop an if-then statement.

4. IDEATE

Before Ideating, make sure you've written at least one hypothesis about what motivates your target actors to do the target behavior. Explore:

- Our deep dive of the behavioral levers to learn more about what they are, how to use them in combination with one another, and their limitations.
- The principles of pride if your solutions involve emotional appeals, large community gatherings, and the power of mascots.
- Eight principles for effective climate communication when developing key messaging.

5. PROTOTYPE

When you have a list of prioritized solutions based on your target behaviors, feasibility, and potential impact, you can build a prototype of your solution. The prototype should have the essential features of your project but should *not* be a full-scale model.

6. TEST

Test your prototype and receive feedback. Make sure you obtain feedback from any community members who might be impacted by your solution to avoid unintentional harm. What worked? What did not? What changes do you have to make? You may have to create and test multiple prototypes before you scale — this is normal! Incorporate your feedback into a final prototype.

6. LAUNCH

Now you can Launch your solution on an appropriate scale. See how the solution performs "in the real world," and obtain feedback where possible.

7. ASSESS

Finally, once you can describe when, how, and where you launched your solution, you can Assess your impact. Ideally, you monitor the outcome over time to demonstrate durable behavior change. If you want to learn more about measuring and reporting the effectiveness of your impact over time, Rare offers an in-depth Assess course on creating behaviorally-informed theories of change, determining relevant indicator metrics, and more.

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Endnotes

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