Piloting the Climate Security Sensitiveness Scoring Tool (CSST)

A case study assessing the climate security sensitiveness of Participatory Rangeland Management (PRM) in Baringo, Kenya

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1. Introduction

Climate adaptation interventions, such as programs promoting climate-smart agricultural innovations, are proving effective in increasing farmer resilience as well as food and nutrition security (Mizik, 2021; Thornton et al., 2022). However, there is often little understanding of the potential positive and negative externalities that these programs can have (Smith et al., 2021), particularly in terms of peace and security. Maladaptation is the process whereby improperly built adaptation strategies can result in more vulnerability of other systems, sectors or social groups (Schipper, 2020; Barnett & O'Neill, 2010). It can create and sustain lock-ins, magnify inequity, marginalize people, and places vulnerable to climate-related risks, such as low-income households, people who reside in informal settlements, ethnic minorities, Indigenous Peoples among others (IPCC, 2022). These are commonly recognized drivers of conflict which must be accounted for while designing programs to avoid creating or exacerbating conflicts. Acknowledging the interlinkages between climate action, natural resource use and peace and security is fundamental to integrate climate and conflict sensitive programming interventions. Maladaptive climate initiatives neglecting those associations can foster power asymmetries, grievances, and competition for resources, especially in conflict-affected and fragile contexts (Moran et al., 2018; Krampe et al., 2021).

The CGIAR Focus Climate Security has been contributing to bridge this gap through the development of a climate security sensitiveness tool (CSST), a programming assessment tool for conflict-sensitive and peace-responsive climate action in agricultural interventions. Conflict-sensitivity is an approach to interventions that seeks to avoid causing harm while also contributing to peace, while peace-responsiveness seeks to reduce key drivers of violent conflict and to contribute to broader societal-level peace (Tänzler and Scherer, 2019; van Brabant, 2010). The CSST is a means for change agents from governmental and non-governmental organizations to support rural communities to adapt to climate change while reducing the potential for conflict of their programs and maximize social cohesion and integration.

The CSST is meant to be adopted at the designing phase of a project. It aims to improve the suitability of agricultural climate adaptation program designs in relation to these pre-existing drivers of conflict and insecurity, and to make recommendations on how they can be more effectively implemented. It does so by prioritizing climate-peace mechanisms based on the contextual drivers of conflict and insecurity.

This tool targets practitioners, decision makers and multilateral institutes interested in diagnostic research for peace responsive climate action in the context of rural development. The CSST is useful for stakeholders investing in and designing an agricultural climate action program with the goal to prevent maladaptation and related unintended consequences, avoid conflict relapses and contribute to peacebuilding.

This report aims to pilot the CSST on an existing climate adaptation intervention package: the Participatory Rangeland Management (PRM) approach implemented in Baringo, Kenya. Firstly, this report provides the theoretical and conceptual background underlying the CSST, it then provides introductory information on the case study through describing the characteristics of Baringo and of the PRM approach. Lastly, it proceeds on testing the CSST on this case study with the goal of providing

recommendations for improving the conflict-sensitiveness and peace responsiveness of this climate action program.

2. Background on the CSST

The CSST is employed on the premise that any fragile context is characterized by a unique set of risk factors for crises that can lead to insecurity and conflict, including natural hazards, human hazards, socioeconomic vulnerabilities, vulnerable groups, low institutional capacity to cope with shocks, and infrastructural coping capacity. These risk factors are retrieved from the crisis risk model developed by the Joint Research Center of the European Commission, the INFORM Risk model (Marin-Ferrer et al., 2017). Crisis risk models are particularly relevant for characterizing the contextual drivers of conflict and insecurity of different geographies as they assess threats to humans' wellbeing from a systemic approach while considering the complexity of the interlinkages between natural and socio-political vulnerability factors, leading to fragility and in some cases to conflict (Borodzicz, 2005; Simpson et al., 2021; Stein & Walch, 2017). For instance, exposure to droughts, floods and other natural hazards indicators, can indicate the predisposition to natural resource scarcity, reduced agricultural outputs and food insecurity, which are commonly recognized drivers of conflict as they can lead to competition and disputes over resources (Liebig et al., 2022; Bora et al., 2011). Socioeconomic vulnerabilities inform on the extent to which poverty and inequalities are pressuring in a given locality, therefore capturing grievance-related drivers of conflict (Kett & Rowson, 2007). The vulnerable groups risk category appraises levels of domestic food price levels and volatility, food insecurity, the prevalence of undernourishment and the number of refugees and displaced people, being factors indicating levels of exclusion and marginalization, as well as insurrection, which all can lead to insecurity (Stein & Walch, 2017; Walch, 2018; Bora et al., 2011; Thalheimer & Webersik, 2020). The model's risk category on the lack of institutional coping capacity is composed of indicators defining governments' effectiveness and corruption as well as their capacity to cope with disasters and shocks. Poor institutional capacity to cope with shocks is widely recognized as a conflict and insecurity driver, as institutional and political landscapes determine whether economic, agricultural and climate-driven shocks lead to conflict (Liebig et al., 2022; Koubi, 2018; Forsyth & Schomerus, 2013). The risk category on the lack of infrastructural coping capacity provides an overview of communities' capacity to access public services, therefore indicating the infrastructural and economic viability of the localities they pertain (Marin-Ferrer et al., 2017). Low economic and infrastructural capacity to cope with shocks, and more broadly economic hardship, provide indications on poverty levels which are often ingrained with other factors interconnected with conflict (Liebig et al., 2022). Lastly, the human hazards risk category informs on the projected risk of conflict as well as its intensity, therefore evaluating the actual risk of conflict and the potential tensions there may be in given locations.

The tool draws on the growing body of research on environmental peacebuilding, which is the practice of using environmental challenges and resource-based disputes as opportunities to build intra- and inter-communal cooperation, social integration, and peace through the transformation of natural resource management strategies (Krampe, Hegazi & VanDeveer, 2021). It employs environmental peacebuilding theories, developed by Dresse et al. (2019) and Johnson et al. (2021), to express how climate adaptation can contribute to peacebuilding through a climate-peace framework. This framework incorporates principles of resilience thinking (Folke, 2016; Jeans et al., 2016), social ecology (McGinnis et al., 2014), intergroup contact theory (Everett & Onu, 2013; Christ & Kauff, 2019), and

resource securitization (Zikos et al., 2015). It lays the theoretical groundwork for connecting climate adaptation elements to peace-contributing outcomes in order to attain climate-resilient peace. Climate-resilient peace is defined as is the process of addressing imbalances in access and distribution of power and resources in response to the structures that drive climate change and influence experience of its impacts (Nicoson, 2021). Figure 1 illustrates the architecture of the climate-peace framework.

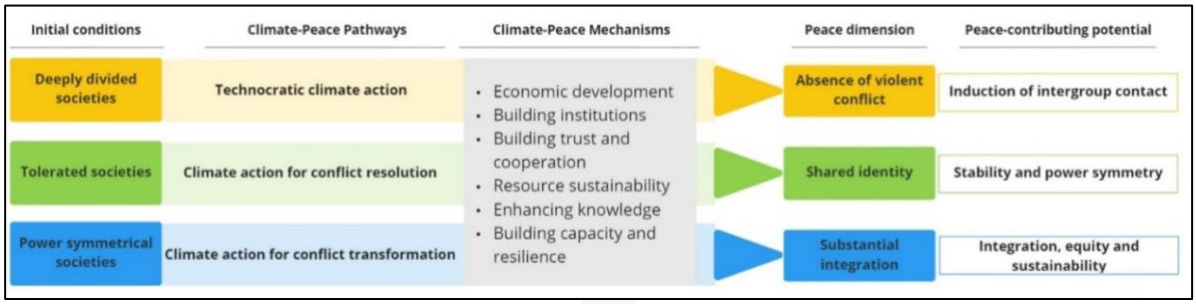

Figure 1: Diagram illustrating the climate-peace framework adapted from environmental peacebuilding literature

The framework introduces six climate-peace mechanisms: economic development, building institutions, building trust and cooperation, resource sustainability, enhancing knowledge and building capacity and resilience. These climate-peace mechanisms are the ways through which climate adaptation can unify conflicting communities against shared insecurities and work towards climate resilient peace. The climate-peace mechanisms translate how different characteristics of climate action interventions can mitigate conflict drivers, such as by strengthening livelihoods, improving resource governance, and addressing inequality and environmental degradation. Table 1 provides an overview of the climate-peace mechanisms and their components. Sub-mechanisms represent concrete activities and goals which can contribute to the main mechanism, and therefore to peacebuilding when integrated within climate adaptation interventions.

Table 1: Overview of climate-peace mechanisms, sub-mechanisms and examples of related climate action program activities

Climate-Peace Mechanisms	Climate-Peace Sub-Mechanism
Economic development	Create livelihoods and sustain existing ones
	Develop bi-communal spaces and infrastructures
	Foster the provision of public goods and services
Building institutions	Enhance institutional capacities for good environmental governance
	Facilitate legal pluralism and resource rights
	Foster equitable distribution of resources and benefits
Building trust and cooperation	Involve both high and grass-root levels while minimizing transboundary contacts in violent contexts
	Foster intercommunal trust and create shared identities
	Enhance social cohesion and empower vulnerable groups
Resource Sustainability	Restore degraded ecosystems
	Foster adoption of practices for sustainable use of resources
	Community-based conservation of ecosystems and common-pool resources
Enhancing knowledge	Raise public awareness and increase learning opportunities

	Establish the recognition of diverse ontologies in climate adaptation through grassroots approaches
Building capacity and resilience	Increase livelihood climate coping capacity
	Increase livelihood climate adaptation capacity
	Increase livelihood climate transformative capacity

Through literature reviews, climate-peace mechanisms have been linked to conflict and insecurity drivers based on their relevance in addressing them. Table 2 summarizes the linkages between mechanisms and drivers stemming from this review and shows which mechanisms are critical to counteract the drivers identified.

Table 2: Theoretical relationships between climate-peace mechanisms and drivers of conflict and insecurity. Tick marks show which mechanisms must be implemented to tackle each conflict and insecurity driver

DRIVERS OF CONFLICT & INSECURITY	**CLIMATE-PEACE MECHANISMS**					
	Economic Development	Building Institutions	Building trust and cooperation	Resource sustainability	Enhancing knowledge	Building capacity and resilience
Lack of infrastructural coping capacity	✓	✓				
Lack of institutional coping capacity		✓	✓		✓	✓
Human hazards	✓	✓	✓			✓
Natural hazards	✓	✓		✓		✓
Vulnerable groups	✓	✓	✓	✓	✓	
Socioeconomic vulnerabilities	✓	✓	✓	✓		✓

3. Participatory Rangeland Management in Baringo, Kenya

Contextualizing Baringo, Kenya

Baringo is one of 47 counties in Kenya. Located in the Rift Valley Region, the county contains arid and semi-arid land (Republic of Kenya, 2021). The Baringo district comprises the Western Agropastoral livelihood zone, where the main livelihood strategy and economic activity is livestock keeping and selling, followed by crop production (FEWS NET, 2011). Rangelands make up more than 80% of the Kenyan landmass and they provide livelihoods for pastoralists and agropastoral communities (ILRI, 2020). Livestock and crop farming provide income and employment for 80% of the county's population of nearly 667 thousand (Kipruto et al. 2017). Maize, beans and Irish potatoes are the county's main crops. In 2016, livestock in the county namely consisted of dairy cows, beef cattle, sheep, camels, goats, donkeys and beehives. Goats comprised the most significant portion of this. Fishing activities in Lake Baringo and fishponds provide 20% of income to male-headed households (Kipruto et al. 2017). Communities in this livelihood zone are mostly semi-nomadic, although 20% are fully nomadic, and meet food needs through both the purchase of food commodities from the market, such as beans, maize, rice and wheat which are bought from traders, and the consumption of household production

of meat and milk (FEWS NET, 2011). During the hunger-gap when stocks are low, households rely on wild foods (FEWS NET, 2011).

Baringo contains both highlands and lowlands, which impact the climatology. Mean annual temperatures vary, ranging from below 21°C in the county's south, southeast, and southwest, and rising to over 25°C in the central region (Ministry of Agriculture, 2018). The county experiences a precipitation gradient, increasing from the northeast to the south. Rainfall ranges from 350mm to 600mm per year in the warmer lowlands and 1000mm to 1500mm per year in the cooler highlands (Ministry of Agriculture, 2018; Republic of Kenya, 2021). The highlands are in modified tropical zones and have well-drained and fertile soils. The lowlands are mainly semi-arid and considered to be predominantly rangeland.

In addition to high temperatures, Baringo experiences variable, and unreliable rains, resulting in floods, droughts, and uncertainty over the timing of the long rainy season (March-May) (Ochieng et al., 2017). Floods have become more frequent during the short rainy season (October-December), and droughts are more frequent during the long rainy season. Moreover, this has contributed to the drying of wells and rivers, a fall in the depth of Lake Baringo, soil degradation, landslides, the emergence of pests, and changes in the prevalence of diseases (Kipruto et al. 2017).

The county's dependence on agriculture, a climate-sensitive sector, leaves it acutely vulnerable to the impacts of climate change. The floods and droughts hamper crop production impacting household income and food security. Income is also undermined by the impact of elevated temperatures on livestock production, which contributes to poor body condition and the death of livestock. Drought in 2017 resulted in the death of 1500 livestock (National Drought Management Authority Baringo County, 2017). Decreases in water levels in Lake Baringo undermine fish stocks which jeopardizes fishing (Walumona et al. 2021). Droughts and dry season hardship affect food availability and access in this zone, while high poverty and illiteracy levels undermine adaptive capacity and amplify the socioeconomic burdens imposed by climate hazards (FEWS NET, 2011). Overall constraints posed to households in this zone include poverty, poor access to capital, shortage of expertise, poor access to markets, shortage of pasture, browse and water, livestock pests and diseases and insecurity, such as livestock raids (FEWS NET, 2011).

Historically, droughts have been a cause of inter-communal conflicts over pasture and water (Anderson and Bollig, 2016). Indeed, both the frequency and the severity of conflicts over resources has increased. In 2014, at least 46 people were killed, and many were injured in a raid on a village in the county (Anderson and Bollig, 2016). In 2021, there were 16 deaths from 19 livestock raid, and by the end of April in 2022 there had been 24 violent clashes with 39 fatalities (Ministry of Agriculture 2018). Half of these were the result of livestock raids. Moreover, the climate hazards and resultant deterioration of agricultural livelihoods pressurizes communities to migrate, increasing pressure on grazing resources. Insecurity in neighboring counties which are experiencing their own stresses only deepens the precarity in Baringo (Kaimba et al. 2011).

The Participatory Rangeland Management approach

Participatory rangeland management (PRM) is a process of planning and management of rangelands that is led by communities and can be supported by external actors such as governmental and non-governmental organizations, development agents and/or rangeland experts (Waweru et al., 2021).

The aim is to enhance governance institutions and ensure the effective management of pastures and other rangeland resources (Flintan & Cullis, 2010). While the PMR process prioritizes community organization, planning and decision-making occur at different levels (ILRI, 2020).

The major phases of the PRM process include 1) Investigating, 2) Negotiating, and 3) Implementing. This implies that "the owners and users of pastoral rangelands investigate the social and ecological situation, plan and negotiate how best to manage rangeland resources, and implement actions that they have agreed upon" (ILRI, 2020).

The rangeland management institution represents the community and manages the resources within the entire rangeland unit (ILRI, 2020). PRM involves applying different participatory tools depending on the context and local needs. For instance, the Four Legs concept is used to assist members of the rangeland management institution in acknowledging the various dimension of their role (ILRI, 2020). The four key aspects of this concept include the establishment and governance of the rangeland unit, the management of the rangeland unit, the application of a landscape approach, and the establishment of relations with government and traditional institutions (ILRI, 2020).

4. Application of the CSST

Central to this tool is the idea that context-specific drivers of conflict and insecurity can be addressed by a specific set of climate-peace mechanisms. The CSST is composed of two main steps: the context definition and the climate action scoring system. Implementing the first component results in the projection of the ideal set of climate-peace mechanisms for the selected context, while the second component provides the set of mechanisms currently delivered by the proposed program design. Visually aligning these two sets allows practitioners to re-define their intervention to match the ideal mechanisms.

Step 1: Conflict drivers scores in Baringo

Step 1 of the tool defines the context by identifying the locally relevant potential drivers of conflict and insecurity. For this case study, the drivers of conflict and insecurity identified in step 1 score high for low infrastructural and institutional capacities, natural hazards, vulnerable groups, and socio-economic vulnerabilities in Baringo County. The human hazards driver received a medium-risk score.

In Baringo, weak infrastructure and undeveloped markets limit farmers' ability to develop sustainable and productive livelihood strategies. As a result, adaptation efforts are stymied by human, technical, and financial resources. The county's fragile communal land tenure system, low technology input prices, poor infrastructure, undeveloped markets, and high input prices increase its vulnerability to external shocks are some of the factors underpinning the high score for failing institutions (Ministry of Agriculture 2018). Despite the medium score for human hazards, the high figures for the other risk indicators can lead to increased tensions, especially when combined with other drivers of conflict, such as weak institutional capacity, climate hazards and resource scarcity, which heighten the risk of livestock raids. Similarly, the proliferation of illegal firearms in the country can increase the severity of conflicts (National Cohesion and Integration Commission and Interpeace, 2021).

Table 3: Insecurity and conflict driver scores for Baringo

STEP 1: CONTEXT DEFINITION	
Drivers	**Score**
Low infrastructural capacities	0.65964
Low institutional capacities	0.74055
Human hazards	0.669127
Natural hazards	0.578526
Vulnerable groups	0.626406
Socio-economic vulnerabilities	0.580753

The score for natural hazards correlates with the high vulnerability of Baringo to extreme climatic events, such as high temperatures, rainfall variability, floods, and drought. The impacts of climate hazards can fuel conflicts between pastoralists, induce the risk of inter-tribal tensions, and exacerbate stresses and clashes. Vulnerable groups, such as women and children, are the most vulnerable to the impacts of climate hazards and conflicts. The increased household burden for women, a lack of alternative sources of income, and greater food insecurity for children illustrate the high scores for this category. Finally, the prevalence of poverty and illiteracy levels in Baringo undermine households' adaptive capacity, amplifying socioeconomic vulnerabilities and exposing families to external risks.

Step 2: Climate-peace mechanisms for the proposed intervention

In Step 2, the proposed climate intervention program is scored according to its relevance to various climate-peace mechanisms, which are partitioned in sub-mechanisms. In this step, scores are given to each sub-mechanism indicating whether they are fulfilled (score of 1), somehow fulfilled (score of 0.5) or not fulfilled (score of 0). Overall climate-peace mechanisms scores are generated by averaging sub-mechanism scores. Table 4 displays the scores assigned to each sub-mechanism for the case of the PRM interventions in Baringo, with related justifications and references. See the results and recommendation sub-section for overall climate-peace mechanism scores delivered by the PRM approach and their comparison with ideal conditions.

Table 4: Scoring system applied to the Participatory Rangeland Management approach implemented in Baringo

Climate Peace mechanisms	Sub-mechanisms	Indicators & examples/practices	Score	Notes	Ref
1. Economic development	Create livelihoods and sustain existing ones	**Secure food production:** provision of necessary inputs, irrigation sources, climate information **Diversify income and livelihood:** spread farm operations, mixed-systems approach, analyze market value chains to address bottlenecks and identify opportunities for added value **Restore degraded infrastructures**: sustain/introduce irrigation systems, mechanization technologies	1	The program impacts on livelihoods, food and nutrition security and incomes, as well as enhances capacities to cope with drought and other crises. The ownerships of production units such as beehives is also encouraged. Specifically, women are allowed to make sales and own their businesses, which positively impacts their income. Intensifies livelihoods activities.	Waweru et al., 2021

	Develop bi-communal spaces and infrastructures	**Introduce intercommunal infrastructures**: develop shared collecting/ storing/ processing/ transporting facilities for produce **Facilitate access to intercommunal resources**: extend fallow areas/pastures	0.5	Focus is needed on supporting functions in the rangeland management as drivers of scaling. Supporting functions include infrastructure, financial services, leadership and coordination, research and development, extension and (market) information services and skills and capacity development.	Waweru et al., 2021
	Foster the provision of public goods and services	**Bolster equitable and efficient delivery of public services:** monitor funds allocation, increase availability of extension services **Increase government revenues from natural resource management:** increase available resources for the provision of public goods and services, foster foreign investment	0.5	Good business enabling environment. The enabling environment for business with and by communities can be strengthened by improving the institutional arrangements and supporting policy implementation, facilitating public-private collaboration and consultations and improving the capacities of both public and private livestock actors.	Waweru et al., 2021
2. Building institutions	Enhance institutional capacities for good environmental governance	**Address the illicit use of natural resources:** monitor protected areas/resources **Address the conflict economy:** reduce corruption, promote transparency **Build natural resource management governance, institutions, and capacities**: fortify subnational institutions, involve authorities in administration of program	1	Setting up rangeland management institutions (and its rangeland work plan). Strategic engagement with the government and policy makers. PRM engages with government at village, ward and district/sub-county and regional/ county levels. The formation of Technical Working Groups (TWG) at the onset of the project was a major boost for performance and sustainability. This enables the identification of project sites, beneficiaries, sharing approaches, information, data and solutions to community challenges. This promotes sustainability of community projects as government agencies can take over the activities of the project once it comes to an end.	Flintan et al., 2019; Waweru et al., 2021
	Facilitate legal pluralism and resource rights	**Secure property rights:** map properties, address legal ambiguities on natural resource tenure and rights, certify resource rights **Deploy effective conflict management and resolution processes:** facilitate communication and negotiation around resources	1	Promotes activities implemented in the rangeland management units (RMUs) through rangeland management plans (RMPs) such as bush clearing, seeding pastures, improvement of grasses, tree planting and conservation and water conservation measures to improve rangelands. Similarly, security of rights to land and resources is tackled. Improved participation of the community in governance and management of rangelands through the PRM process fosters improved access to rangeland resources for the whole community and an increased feeling that the rangelands belong to them as a community.	Waweru et al., 2021
	Foster equitable distribution of resources and benefits	**Regulate the use of and rights to resources more effectively and equitably:** make tenure governance policies more inclusive, transparent, and fair, strengthen the links between formal and informal natural resource management systems, reform natural resource management policies **Ensure program benefits are evenly distributed across groups:** all relevant actors concerned are made aware of the project and its benefits	1	Rangeland management agreements are established and contribute to strengthen the links between formal and informal natural resource management systems. Also, during implementation phase, participatory monitoring and evaluation is carried out.	Flintan et al., 2019

3. Building trust and cooperation	Involve both high and grass-root levels while minimizing transboundary contacts	**Involve all community stakeholders in planning process:** meaningfully involve relevant community stakeholders (climate vulnerable and conflict-affected households) in the program's planning and administration processes, engage informal sector in program development **Decrease opportunity cost for conflict:** address needs of both high and grass-root level figures in all groups targeted by the program, identify root causes of intercommunal conflict through participatory rural appraisal strategies **Participatory approach through minimized transboundary dialogue**: ensure participatory approaches do not gather program beneficiaries involved in active (violent) conflict together	1	Communities undertake participatory mapping of the area and use other participatory tools to understand the rangelands resources. Actors: pastoral and communities, CBOs and Pastoral Development advisors, rangeland management cooperatives. Community participation in rangelands governance and management is promoted.	Flintan et al., 2019; Waweru et al., 2021
	Foster intercommunal trust and create shared identities	**Address intercommunal power imbalances**: address disparities in wealth and negotiating capacity, support beneficiary communities through equity-based approaches rather than egalitarian ones **Create neutral spaces for dialogue:** gather program beneficiaries to analyze, collaborate, and find creative solutions for climate challenges, involve moderators in project plans	0.5	While PRM create a sense of ownership and trust in the PRM process (community ownership and responsibility is conceived as a basic prerequisite for sustainable development), more neutral spaced for dialogue and mediator actors should be promoted.	Waweru et al., 2021
	Enhance social cohesion and empower vulnerable groups	**Foster cooperative behaviour:** enable communities to produce collective benefits, strengthen cooperatives, create opportunities for shared outputs, increase social capital in cooperative arrangements and networks **Involve on vulnerable groups in decision making processes:** include women, youth, marginalized, and disabled in program design and administration **Address gender-based discrimination:** include protocols to address gender-based violence, provide guidelines for reporting and confidentiality	1	Sensitization and capacity-building on the need for gender parity is carried out, including gender issues, women's empowerment and other social equity aspects. The intervention aims at increasing the number of women in leadership positions in the community and improve women's participation in rangeland management.	Waweru et al., 2021
4. Resource sustainability	Restore degraded ecosystems	**Avoid future conflicts over scarce natural resources:** employ restoration frameworks for degraded landscapes and ecosystems, increase access to, availability and quality of water and land resources	1	Reduced number of conflicts was also an impact contributed to by the PRM process. In Kenya, the project is aligned to the objectives of the Vision 2030 as well as the Baringo County integrated Development Plan (CIDP). Activities include environmental management, reduction of resource-based conflicts, land access and use as well as livelihoods improvement. It is also aligned to other key policy documents including the policy on Disaster Risk Reduction Management; County Climate Change policy -which is pending ratification; and the County Rangelands Policy that is currently under development.	Waweru et al., 2021

	Foster adoption of practices for sustainable use of resources	**Increase natural capital:** recycle resources, regenerative agricultural practices **Promote diversity in production systems:** increase land-use diversity or diversity at the landscape scale, Sustainable shifting cultivation, management of heterogeneous landscape, promote spatially diversified production systems through polycropping, promote rotational and regenerative grazing to improve soil quality and forage yield **Create bicommunal spaces for landscape restoration:** meaningfully involve communities in the planning of bi-communal NRM projects (dams, forest conservation…)	0.5	The livelihood activities should be integrated with rangeland conservation interventions such as water conservation, control of invasive plant species and increasing vegetation cover.	Waweru et al., 2021
	Community-based conservation of ecosystems and common-pool resources	**Protect ecosystems and biodiversity:** identify local resources at risk (endangered/ vulnerable species), identify ecosystem services of valuable resources (cultural, provisioning, regulating, supporting services), plan conservation efforts for such resources **Establish conservation committees:** meaningfully involve the community in the definition and development of protected areas, and NRM projects more broadly, to address the needs of all resource users and prevent the exclusion of marginalized groups	0.5	Recognition of women and youth in rangeland management.	Waweru et al., 2021
5. Enhancing knowledge					
	Raise public awareness and increase learning opportunities	**Provide technical knowledge on natural resource management:** tools, workshops and learning opportunities to help communities preserve dwindling or scarce resources **Provide learning opportunities and tools** to comprehend the risks posed by climate change, especially regarding slow onset processes **Increase public awareness to address violent conflict:** environmental educational activities to develop sustainable and diversified livelihoods on environmental issues and environment-conflict linkages	1	Capacity-building activities to communities have increased their capacity to manage project. Project-specific technical working group are created. TWG incorporates members from departments of lands, environment, water, and livestock, reflecting the various project components. It also incorporates the County warden for the Lake Bogoria National Reserve. The TWG members are involved in planning activities (work plans), capacity-building, and offering technical advice during, procurement, budgeting and implementation.	Waweru et al., 2021
	Establish the recognition of diverse ontologies in climate adaptation through grassroots approaches	**Co-design programs to integrate local knowledges:** meaningfully involve representatives from local groups in the planning of the projects to include existing local climate adaptation and natural resource management strategies, ensure diverse knowledge holders have equal voice and that their strategic interests are addressed **Value traditional and indigenous knowledge:** seek to include traditional practices and customs in program development and recognize the legitimacy and value of indigenous and local knowledge **Provide knowledge sharing opportunities:** plan workshops and other community-engaging activities for different groups to share their traditional practices and beliefs in place to manage natural resources and adapt to climate changes	1	Community participation in rangelands governance and management is promoted through training on PRM given to government and communities, the establishment of functioning PRM coordination platforms, holding multi-stakeholder dialogues and establishing effective partnerships. Engagement with traditional leaders: Local leaders, including elders and village councils, are a key source of information to which the community refers. There is active participation of traditional leaders in educating people on adoption of new innovations.	Waweru et al., 2021

6. Building capacity and resilience	Increase livelihood climate coping capacity	**Identify local assets and needs:** understand impact of conflict and climate on livelihoods and production systems, provide social protection schemes to strengthen post-conflict human capital (health, nutrition, education, employment) **Decrease sensitivity of risk exposed areas:** include sensitivity analyses, identify maladaptive livelihood strategies based on sensitivity, provide early warning systems **Strengthen production systems coping capacity to shocks:** spread farm operations and diversify produce, adjust cropping/harvesting times, develop storage capacities, facilitate adoption of insurance-based schemes	1	Considering unique needs of the communities, there is a need to consider the educational level of the members when developing Rangeland Management Plans and PRM guidelines and toolkits. Some of these and other policy documents should be translated into local languages foe ease of understanding and adoption.	Waweru et al., 2021
	Increase livelihood climate adaptation capacity	**Increase adaptation capacity of social systems**: strengthen social capital (networks and connections) and financial capital to expand capacities to grow production systems (e.g.: financial services, credits), increase land-tenure security, address instrumental needs of communities	0.5	Establish RMUs that are fully responsible for their own activities is a key success factor.	Waweru et al., 2021
		Increase adaptation capacity of production systems: facilitate the adoption of adapted crops/ cultivars & animal types/ breeds, improve crop residue management, integrated nutrient management, provision of post-harvest storage and water harvesting structures, mixed production systems, increase access to collection, refrigeration, processing and transportation infrastructures	1	Impact on livestock production. Improved management of and access to rangeland resources through PRM contribute to an increase in livestock numbers and improved livestock body conditions. Promotes the adoption of new breeds	Waweru et al., 2021
	Increase livelihood climate transformative capacity	**Address root causes of poverty and inequality:** strengthen sense of agency of vulnerable and marginalized groups, engage women and youth in long-term change processes that shift power, beliefs, values and ways of thinking and behaving to support greater levels of justice and equity **Equity, dignity, inclusion:** support fair, dignified and inclusive livelihoods for all actors engaged in food systems, especially small-scale food producers **Promote food sovereignty:** developing and informing policies and approaches that allow communities to decide the way food is produced, traded and consumed	0.5	Strengthens sense of agency of vulnerable groups.	Waweru et al., 2021

Results and recommendations

The results of the CSST are expressed visually through displaying ideal climate-peace mechanisms scores for the selected context next the climate-peace mechanisms scores of the proposed intervention on spider charts. Ideal scores highlight which climate-peace mechanisms should be prioritized in an intervention package, and how well matched the design of an intervention is to address conflict drivers. The ideal mechanism scores from Step 1 are informed by contextual drivers of conflict and insecurity, and the scores of the intervention packages in Step 2 derive from the scoring system of the climate adaptation intervention (table 4).

Given the high-level of risk for most conflict and insecurity drivers identified in Step 1, ideal climate-peace mechanisms scores for Baringo result high. Nevertheless, the gap between the ideal and actual climate-peace mechanisms is low in Baringo (figure 2). The enhancing knowledge and building institutions' mechanisms are fully represented (100%), followed by building trust and cooperation (above 80%), building capacity and resilience (above 70%), resource sustainability, and economic development (roughly 70%).

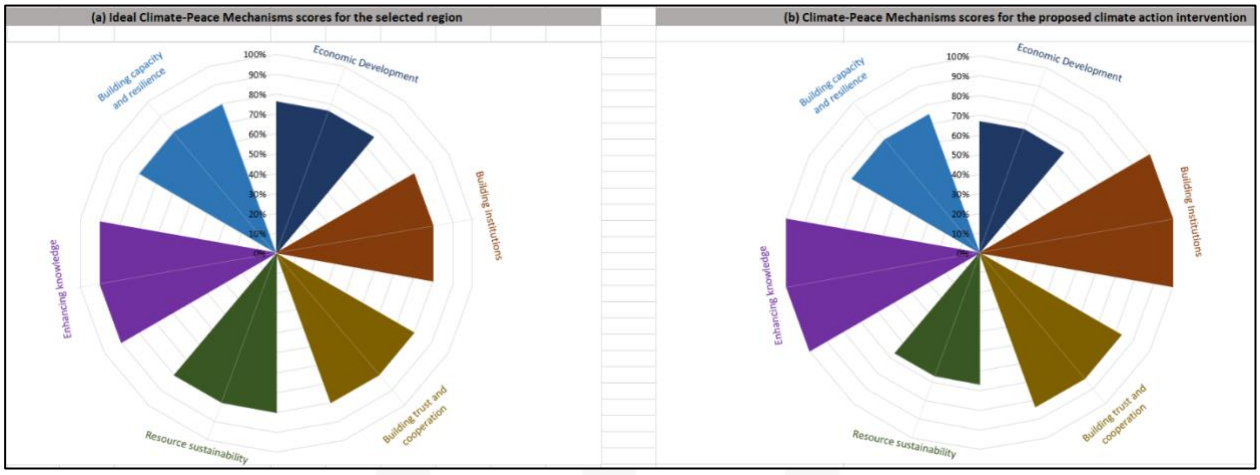

Figure 2: Spider charts displaying the CSST results - ideal climate-peace mechanisms scores in Baringo (left) and climate-peace mechanism scores for the PRM intervention (right)

The **enhancing knowledge** climate-peace mechanism score is fully delivered by PRM approaches. It scores 100% for the proposed climate intervention, outweighing the ideal score of 90%. The intervention integrates local knowledge by including traditional practices and rules adopted by the rangeland committees. It facilitates the engagement of traditional leaders, such as elders and village councils, which contributes to building legitimacy and ensuring the representation of diverse voices and knowledge systems. The engagement of traditional leaders is also meaningful for educating people about adopting innovations. As PRM is a multi-stakeholder process, bringing together multiple actors ensures horizontal information exchanges and dialogue. Technical working groups (TWG) are also established to deliver capacity-building and offer technical advice during planning activities. Therefore, PRM interventions are particularly suitable for the context of implementation as they support Baringo vulnerable communities affected by poverty, illiteracy, shortage of expertise and poor access to markets through empowering them with the inclusion of their traditional knowledge and through providing them with capacity building activities.

The **building institutions** climate-peace mechanism score is also widely delivered by PRM approaches. It scores 100% for the proposed climate intervention, outweighing the ideal score of 80%. The intervention promotes strategic engagement with government actors and policymakers, thus strengthening subnational institutions. Institutions such as rangeland management units (RMUs) and rangeland management plans (RMPs) ensure the effective use and management of resources and secure land and resource rights. This helps to promote accountability and transparency. Increased community involvement in the governance and management of rangelands fosters equitable access to rangeland resources and a stronger sense of collective ownership. The high institutional capacity provided by the PRM approach enables communities to cope with shocks, such as droughts and related

pasture and water scarcity, and reduces the risk of livestock death and livestock raids. In this sense, this climate adaptation intervention is extremely relevant for the context of implementation since it can be considered as conflict-sensitive by reducing the risk of conflict relapses due to natural resource scarcity.

The **building trust and cooperation** climate-peace mechanism score is adequately represented, as it scores 83% for the proposed intervention compared to the ideal score of 80%. Community stakeholders are highly involved in planning and implementation processes, for instance, by undertaking participatory mapping and employing tools to manage rangeland resources. Some local actors braced by the intervention include CBOs, Pastoral Development advisors, and community rangeland management cooperatives. PRM also addresses gender discrimination through sensitization, delivers capacity-building to increase the number of women in leadership positions, and improve women's participation in rangeland management. Thus, the intervention has the potential to contribute to substantial integration, which is a critical factor for peace-responsiveness. While increasing the sense of ownership and trust is vital in the PRM process in Baringo, the intervention could enhance its conflict-sensitiveness through fostering trust and cooperation since the county is experiencing increasing rates of conflict and disputes. This could be done by intentionally creating neutral dialogue spaces and introducing moderators to address intercommunal power imbalances. Although this process must be participatory, it should account for ongoing conflict dynamics and ensure operations do not exacerbate tensions in groups involved in active violent conflict, and therefore reduce transboundary contacts between conflicting communities when the levels of tension and violence are elevated.

Similarly, the **building capacity and resilience** climate-peace mechanism is adequately represented in the adaptation program, since it scores 75% with ideal score amounting to 80%. Improved rangeland resource management helps increase the number and physical condition of livestock, as well as the adaptive and coping capacity of production systems. Local conditions, assets, and the educational level of community members are considered when developing rangeland management plans. Therefore, by building communal capacities and their increasing their adaptability to cope with shocks, PRMs can be considered as conflict sensitive. In fact, providing communities with adapted livestock breeds allows to reduce the risk for livestock diseases and mortality, therefore also reducing the risk of livestock raids and related conflicts. Nonetheless, given the risk of conflicts around natural resources in Baringo, the intervention could include the provision of social protection schemes to strengthen post-conflict human and financial capital. This would improve substantial integration, making the program more peace responsive.

While the ideal results indicate the great relevance of **resource sustainability** and **economic development** in Baringo, these climate-peace mechanisms are underrepresented in the intervention. The ideal mechanism score for the two components amounts to 80%, while the PRM scores 67% in both. Regarding resource sustainability, the program contributes to preventing conflicts over resources by being aligned with the objectives of Vision 2030 and the Baringo County Integrated Development Plan (CIDP). This framework includes environmental management, reduction of resource-based conflicts, land access and use, and livelihood improvement. Therefore, although underscoring, the PRM approach does contribute to conflict sensitivity. However, while the intervention recognizes women and youth in rangeland management activities and establishes

rangelands committees, conservation activities such as water conservation, control of invasive plant species, and increasing vegetation cover should be stimulated to increase natural capital. This would improve the conflict-sensitiveness since most conflicts in Baringo are due to natural resource scarcity and such conservation activities would help preventing losses and related conflicts. Regarding economic development, PRMs intensify incomes, encourage ownership of production units, and secures food production. For instance, they encourage women to own their businesses, positively impacting their income. However, emphasis is needed on supporting functions in rangeland management, which includes infrastructure, financial services, leadership and coordination, and extension services. Similarly, promoting collaboration between the public and private sectors can help to improve the enabling environment for income generation and business. Such activities would improve the peace-responsiveness of the program through enhancing substantial integration.

STEP 2: SCORING SYSTEM			
Mechanisms	Sub-mechanisms	Score	
Economic development	1.1. Create livelihoods and sustain existing ones	1	0.67
	1.2. Develop bi-communal spaces and infrastructures	0.5	
	1.3. Foster the provision of public goods and services	0.5	
Building institutions	2.1. Enhance institutional capacities for good environmental governance	1	1
	2.2. Facilitate legal pluralism and resource rights	1	
	2.3. Foster equitable distribution of resources and benefits	1	
Building trust and cooperation	3.1. Involve both high and grass-root levels while minimizing transboundary contacts	1	0.83
	3.2. Foster intercommunal trust and create shared identities	0.5	
	3.3. Enhance social cohesion and empower vulnerable groups	1	
Resource sustainability	4.1. Restore degraded ecosystems	1	0.67
	4.2. Foster adoption of practices for sustainable use of resources	0.5	
	4.3. Conserve ecosystems and common-pool resources	0.5	
Promotion of worldview and knowledge system plurality	5.1. Raise public awareness and increase learning opportunities	1	1
	5.2. Establish the recognition of diverse ontologies in climate adaptation through grassroots approaches	1	
Building capacity and resilience	6.1. Increase livelihood climate coping capacity	1	0.75
	6.2. Increase livelihood climate adaptation capacity	0.75	
	6.3. Increase livelihood climate transformative capacity	0.5	

Figure 3: Climate-Peace mechanisms and sub-mechanisms scores for the PRM intervention

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6. Annex: the CSST Methodology

Defining ideal climate-peace mechanism scores for a given context

The context definition step enables to identify the location where a climate adaptation intervention is expected to be implemented. In this step, the user fills the cells with location-specific information for risk indicator scores to appear. Indicators are assessed at the national, regional and local levels according to the set of pre-defined potential conflict drivers, sourced from the Joint Research Centre's INFORM risk index (Marin-Ferrer et al., 2017). Indicators are assessed on a scale from 0 and 10, with risk-level values varying between categories. Table 5 shows the risk threshold classes for each driver.

Table 5 Classes thresholds in INFORM (Marin Ferrer M., Vernaccini L., & Poljansek K., 2017)

Category	CLASS	MAX	MIN
NATURAL	very high	10.0	6.9
	high	6.8	4.7
	medium	4.6	2.8
	low	2.7	1.3
	very low	1.2	0.0
HUMAN	very high	10.0	9.0
	high	8	7
	medium	6.9	3.1
	low	3.0	1.0
	very low	0.9	0.0
SOCIO-ECONOMIC	very high	10.0	7.1
	high	7.0	5.4
	medium	5.3	3.5
	low	3.4	1.8
	very low	1.7	0.0
VULNERABLE GROUPS	very high	10.0	6.3
	high	6.2	4.4
	medium	4.3	2.9
	low	2.8	1.6
	very low	1.5	0.0
INSTITUTIONAL	very high	10.0	7.3
	high	7.2	6.0
	medium	5.9	4.9
	low	4.8	3.3
	very low	3.2	0.0
INFRASTRUCTURE	very high	10.0	7.4
	high	7.3	5.4
	medium	5.3	3.5
	low	3.4	2.1
	very low	2.0	0.0

These risk threshold classes enable to provide a weight of severeness of the drivers. Drivers featuring very high risk are assigned a weight of 5, high risk is assigned a weight of 4, medium risk is assigned a weight of 3, low risk is assigned a weight of 2, and very low risk is assigned a weight of 1. Drivers' risk severeness informs on the relevance of the mechanisms they are linked to. Mechanisms' relevance scores are then defined by summing the weights of drivers that each mechanism is crucial for addressing (see table 2 for mechanisms-drivers linkages). Thus, maximum and minimum relevance scores vary between mechanisms due to their differences in addressing each driver. In order to visually project mechanisms' relevance as a proportion of importance for a given context, these scores are thereafter standardized. For this, relevance scores are divided by the maximum score they can get and expressed as percentages. In this sense, the maximum score a mechanism can get is adopted as denominator. Being 5 the higher driver risk severeness weight, the maximum relevance score for economic development will be a fraction out of 25 since it is crucial for addressing five drivers, the one for building institutions will be a fraction out of 30 since it is critical for addressing all six drivers, the one for building trust and cooperation will be a fraction out of 20 since it links to four drivers, the one for resource sustainability will be a fraction out of 15 since it is critical for three drivers, the one for enhancing knowledge will be a fraction out of 10 since it only addresses two drivers, and the ones for building capacity and resilience will be a fraction out of 20 since it addresses four drivers. These fractions, which are visually represented as percentages, display the ideal scores for each mechanism for the local context identified on a spider chart.

Defining climate peace mechanism scores delivered by proposed climate action intervention

Through the building of the climate-peace framework, mechanisms were qualified into sub-mechanisms which characterize how climate adaptation efforts can contribute to fulfilling these mechanisms, and therefore contribute to peace (see table 1). A scoring system was developed upon these sub-mechanisms to assess the contribution towards each climate-peace mechanism of a climate action program design. In the climate action scoring system step, the user scores the proposed climate adaptation intervention across the different climate-peace sub-mechanisms. The user can only fill the scores with either a 1, a 0.5 or a 0. A score of 1 can be added when the sub-mechanism is fully fulfilled, a score of 0.5 when the sub-mechanisms is partly or indirectly fulfilled, and a score of 0 when the sub-

mechanism is not fulfilled. Sub-mechanism scores are then averaged to inform a score for each climate-peace mechanism. Mechanisms' overall scores are expressed as percentages and plotted on a spider chart.

Interpreting results

The results of the tool are displayed as a graphic representation of ideal combination of mechanisms scores for the selected region (left spider-chart in figure 4), and the mechanisms scores for the proposed climate action intervention (right spider-chart in figure 4). Based on the resulting ideal mechanisms (a), the user can assess whether the mechanisms scores featuring the proposed climate action program design (b) score high as well. If relevant context-specific mechanisms score low, the user can consider further integrating sub-mechanism features in the proposed program. Figure 4 shows the spider charts resulting from the tool. Based on the ideal set of climate-peace mechanism scores (a) displayed in figure 5, the user can see that the proposed climate adaptation intervention (b) adequately includes features for the climate-peace mechanisms 'enhancing knowledge' and 'building capacity and resilience', it sufficiently includes features for the mechanisms 'resource sustainability' and 'building trust and cooperation', whereas it insufficiently addresses the mechanisms 'economic development' and 'building institutions'.

Figure 4: Interface of the CSST results: spider chart of the ideal climate-peace mechanisms scores for the selected context (left) and spider chart of the climate-peace mechanism scores for the proposed intervention (right)

The data for the two charts results from different methodologies, since ideal mechanisms scores are defined through combining weights and risk score indicators while the ones for the proposed intervention come from the user filling the scoring systems. Therefore, the two spider charts are not numerically comparable, and the comparison between the two graphs should be made with caution. The left chart informs on the extent to which each mechanism is relevant for the selected context, whereas the right chart informs on the extent to which each mechanism is incorporated by the proposed intervention. The comparison between the two graphs should then be approximate.

The results provided by the tool can be useful to formulate recommendations on how climate adaptation programs can address contextual drivers of conflict and insecurity more effectively. When the user has identified the relevant mechanisms for addressing contextual drivers that are underrepresented in the proposed program, improvements can be made to the design by further

incorporating sub-mechanisms that led to a low score for those relevant mechanisms. Figure 5 shows an intervention's sub-mechanisms scores related to the results shown in figure 4. In this case, by having identified economic development and building institutions as relevant mechanisms that the proposed design did not sufficiently integrate, the user can then incorporate more sub-mechanisms pertaining those mechanisms (figure 5). For example, the user can improve the program design by integrating features to facilitate the development of bi-communal spaces and infrastructures, foster the provision of public good and services, and facilitate legal pluralism and resource rights.

STEP 2: SCORING SYSTEM			
Mechanisms	Sub-mechanisms	Score	
Economic development	1.1. Create livelihoods and sustain existing ones	1	0.33
	1.2. Develop bi-communal spaces and infrastructures	0	
	1.3. Foster the provision of public goods and services	0	
Building institutions	2.1. Enhance institutional capacities for good environmental governance	0.5	0.33
	2.2. Facilitate legal pluralism and resource rights	0	
	2.3. Foster equitable distribution of resources and benefits	0.5	
Building trust and cooperation	3.1. Involve both high and grass-root levels while minimizing transboundary contacts	1	0.67
	3.2. Foster intercommunal trust and create shared identities	0	
	3.3. Enhance social cohesion and empower vulnerable groups	1	
Resource sustainability	4.1. Restore degraded ecosystems	0.5	0.5
	4.2. Foster adoption of practices for sustainable use of resources	1	
	4.3. Conserve ecosystems and common-pool resources	0	
Enhancing knowledge	5.1. Raise public awareness and increase learning opportunities	1	1
	5.2. Establish the recognition of diverse ontologies in climate adaptation through grassroots approaches	1	
Building capacity and resilience	6.1. Increase livelihood climate coping capacity	0.5	0.75
	6.2. Increase livelihood climate adaptation capacity	0.75	
	6.3. Increase livelihood climate transformative capacity	1	

Figure 5: Interface of the CSST results: sub-mechanism scores useful to formulate recommendations to better address contextual drivers of conflict and insecurity