7

The Climate–Security Nexus

Securing Resilient Livelihoods through Early Warning Systems and Adaptive Safety Nets

PETER LÄDERACH, FRANS SCHAPENDONK, PARESH SHIRSATH, GIRIRAJ AMARNATH, STEVEN D. PRAGER, SRIDHAR GUMMADI, BERBER KRAMER, AJIT GOVIND, AND GRAZIA PACILLO

Highlights

- Understanding the climate–security nexus requires framing risks and resilience, which often reflects a negative cycle of fragility, climate vulnerability, and human insecurity.
- Climate actions can enhance a society's climate resilience and generate pathways towards improved peace and security.
- These actions include early warnings for food security planning, building local capacity to translate early warnings and climate-informed advisories, climate-smart mapping and adaptation planning, safety-net programmes, and risk finance.
- Other changes and interventions are also needed to break the cycle between climate and conflict, align climate actions to peace objectives, and thereby contribute to a climate-resilient peace.

7.1 From Climate Resilience to Climate Security

Ambitions to increase resilience, transform food systems, and ensure an end to hunger and malnutrition are intrinsically linked with actions to keep countries, regions, and communities safe. To end dependence on humanitarian assistance for 40 million rural dwellers by 2030 and realign US$5 billion per year for adaptive safety nets, it is critical to embrace a climate-security lens, and in so doing ensure that climate action is aligned with conflict-prevention and peacebuilding objectives (Steiner et al., 2020).

Conceptualising the climate–security nexus requires framing risks and resilience. Such framing reflects a negative cycle of fragility, climate vulnerability, and human insecurity, all of which may worsen the risk of violent conflict. In this context, climate change is conventionally framed as a risk multiplier, exacerbating

https://doi.org/10.1017/9781009227216.007 Published online by Cambridge University Press

pre-existing risks and insecurities that ultimately form the root causes of conflict (Gilmore, 2017). Better resilience can be attained, however, by operationalising a virtuous cycle in which enhancing a society's climate resilience can also generate pathways to improved human security, stable and inclusive institutions, and stronger equity and peace. To realise and operationalise the double dividend of resilience-building for climate adaptation and peace, interventions must – where possible – consciously deploy a transformational lens and maximise the transformative potential of climate adaptation for other system dimensions. Climate action thereby offers an opportunity to build a 'climate-resilient peace', which involves leveraging climate adaptation for the renegotiation and reconstitution of key socio-economic, political, and institutional relationships and power asymmetries. These problematic dynamics both underpin the disproportionate exposure and vulnerability of certain societal groups *and* often form the root drivers of conflict (Nicoson, 2021).

The literature establishes key actions and targets to transform food systems in a climate crisis (Steiner et al., 2020). The main pathways to secure resilient livelihoods and value chains involve early warning systems and adaptive safety nets and are linked to the climate–security nexus. These pathways include (1) constructing a tighter continuum from humanitarian assistance to development processes, (2) developing and improving early warning systems in climate-risk hotspots, (3) aligning best-practice safety-net programmes in climate-risk hotspots, and (4) supporting early action with risk finance. These pathways follow analyses of the shortcomings of food systems for peace and security in a climate crisis, and of the connections between climate finance and peace in tackling climate and humanitarian crises (Läderach et al. 2021a; 2021b).

7.2 Pathways to Peace

Climate-security risks include competition over scarce resources, food insecurity and price shocks, livelihood insecurity and migration, unintended consequences of climate policies, and a lack of effective governance and legitimacy (Figure 7.1). The proposed pathways might feed into key climate-peace principles. Several examples of climate action in the agricultural research for development (AR4D) space tackle these four pathways with potential to contribute to a climate-resilient peace. The actions these examples showcase cover early warnings for food security planning, building local capacity to translate early warnings and climate-informed advisories, climate-smart mapping and adaptation planning, safety-net programmes, and risk finance. Each action might involve specific technologies, tools, and innovations.

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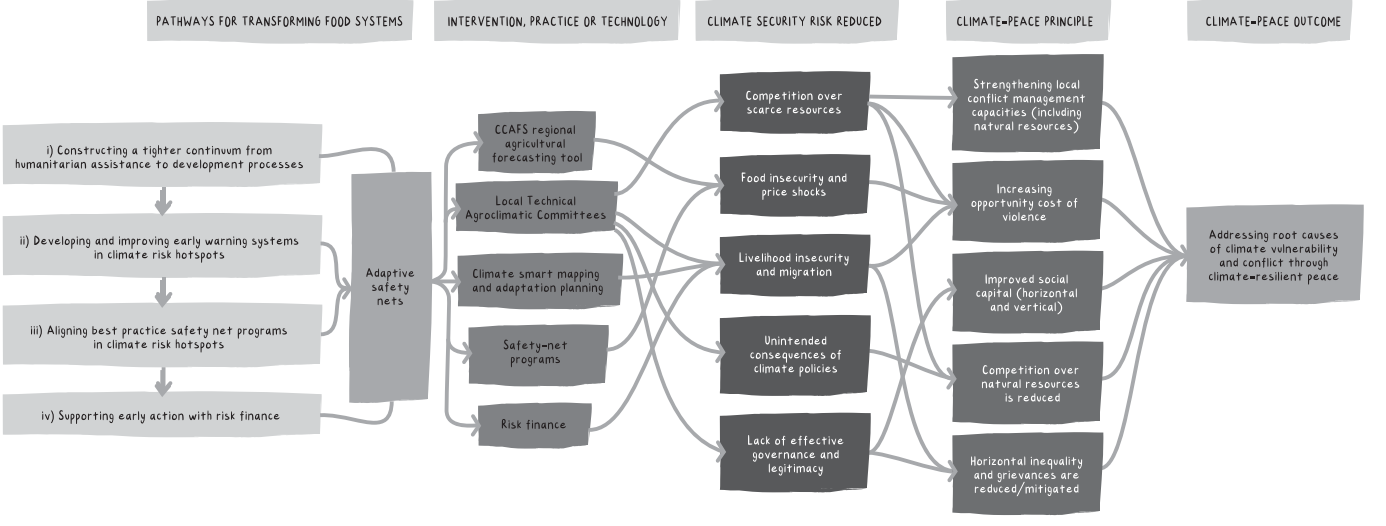

Figure 7.1 Pathways for transforming food systems and securing resilient livelihoods and their linkages with peace and security outcomes

These technologies, tools, and innovations can reduce several key climate-security risks (Figure 7.1), and in so doing, offer pathways from climate action to better peace and security. The different case studies in this chapter contribute to various aspects of the humanitarian–development–peace nexus by strengthening local conflict management capacities, increasing the opportunity cost of engaging in violence, lessening competition over scarce natural resources, improving social capital, and shrinking horizontal inequality. These pathways are also inevitably linked to each other in their potential contribution to peace and security because improving early warning systems, developing safety-net programmes, and risk financing are key building blocks in the creation of adaptive safety nets. When coupled with effective governance systems, these pathways help bridge the humanitarian–development–peace nexus, thereby ameliorating acute food insecurity, generating secure livelihoods, and addressing important conflict drivers. We conclude with some recommendations about how to build a climate action research agenda that responds to and accounts for climate-security risks.

7.3 Constructing a Tighter Continuum from Humanitarian Assistance to Development Processes

To reduce dependence on humanitarian assistance, a programmatic approach can strengthen climate resilience and risk mitigation. This objective can be achieved with new tools and risk reduction technologies together with stronger partnerships among governments, finance, humanitarian, and scientific and technological institutions. A case study from Nepal illustrates this pathway, wherein the Climate Change, Agriculture and Food Security Regional Agricultural Forecasting Tool (CRAFT) was used by the World Food Programme (WFP), the government of Nepal, and other stakeholders to support food security planning (Shelia et al., 2019).

Reliable, timely, and accurate crop yield forecasts can provide crucial information for food and livelihood security planning, particularly in the context of climate variability, change, and extremes. The crop yield estimation in Nepal has been based on traditional crop cuts, surveys, and reports from the District Agricultural Development Offices. These crop situation updates rely on sample crop cutting, which is used to verify the yields of key cereal crops. Though this process has its advantages, it is a time-consuming and costly exercise, and there can be delays in processing the results. Indeed, crop-cutting results can take six months to over a year to indicate a basis for area and production estimates, and results only become available after the crops are harvested. CRAFT was used by the WFP and the government of Nepal to estimate pre-harvest wheat and paddy production during 2015–20 for Nepal's Food Security Monitoring System (NeKSAP).

The CRAFT tool furnishes a systematic yield forecasting model based on real-time climate information, providing accurate, precise, and scientific estimates of crop yields for food security and early warning purposes. CRAFT also produces spatial in-season crop yield forecasts and includes a client application with a user-friendly interface and database implementation. It integrates two different external engines: a crop simulation model for spatial crop simulations and another for seasonal climate forecasts. CRAFT supports spatial input data, spatial simulations, the integration of seasonal climate forecasts, aggregation and calibration of model predictions from historical agricultural statistics, analysis, and visualisation.

To support food security planning, the WFP and NeKSAP successfully used CRAFT to forecast the crop production of rice and wheat, and estimates were disseminated within the government and to all concerned stakeholders as well as to the general public using the NeKSAP's website.[1] This tool also supported food security monitoring when field operations were hampered because of the calamitous earthquake in 2015, by COVID-19 in 2020, and during the 2017 federal restructuring of Nepal's government.

By enabling humanitarian and government actors to design more effective, locally relevant food security interventions and remain responsive to their operating environment, spatial in-season crop yield forecasts produced by CRAFT can address immediate food insecurity. First, CRAFT may reduce the urgent scarcity of resources and thereby prevent or lessen competition over access to natural resources and agricultural inputs between communities (Figure 7.1). Second, by indirectly keeping food costs from spiralling and contributing to the preservation of stable markets, CRAFT may increase the opportunity cost of engaging in violence (Figure 7.1). Food price shocks and food insecurity are well-recorded triggers of violence and conflict, particularly in environments characterised by pre-existing social, political, and institutional fragility (Winne & Peersman, 2021). The provision of a staple may, therefore, shrink the incentives for engaging in criminal activity or violent protest.

Timely assistance to those hit by an extreme event, also known as 'early action', helps build resilience. In the absence of assistance, households will in extreme cases sell productive assets to survive a crisis, pushing them further into poverty, exacerbating their marginalisation, and undermining their resilience to future shocks.

7.4 Developing and Improving Early Warning Systems in Climate-Risk Hotspots

Improved early warning systems that utilise climate forecasting and science-based solutions can trigger early action that builds pathways to climate resilience. Together with meteorological, humanitarian institutions, and innovative

https://doi.org/10.1017/9781009227216.007 Published online by Cambridge University Press

communication, the benefits of improved early warning systems can reach women, youth, and marginalised stakeholders and mitigate climate-induced tensions and conflicts. One approach successfully used to confront climate-change challenges in agriculture systems is known as the Local Technical Agroclimatic Committee or LTAC (Loboguerrero et al., 2018). LTACs are a systemic means to bring together the who, that is, agricultural value chain actors; the what, that is, extreme climate variability and a changing climate, and the context, that is, the agricultural landscape. Bringing together the who, what, and how can facilitate the co-development of consensus and recommendations around best practices to improve agricultural outcomes, ultimately bolstering community resilience.

The involvement of a broad array of actors that span farmers, local technical experts, and key institutional actors among others is key to a successful LTAC (Giraldo Mendez et al., 2019). This not only assures that consideration of local farmers and expert knowledge feeds into the consensus process but also aids wide diffusion of the committee recommendations, through the extensive networks associated with each participant type. In bridging across individuals and institutions, LTACs also foster the further development of social capital in the agriculture system, which ostensibly also has the potential to improve resilience and long-term outcomes (Martínez-Barón et al., 2018). We would argue that the highly networked, adaptive LTACs implemented throughout Latin America have contributed significantly to the resilience of the region's socio-ecological fabric. Their evolutionary nature allows LTACs to respond to regional needs, while their participant-driven approach assures that local context and perspectives are adequately considered. Whether or not LTACs can also specifically serve as a catalyst for peace has not been examined; however, lack of climate-change resilience has been shown to undermine negative peace (Sharifi et al., 2021).

LTACs also form a platform where conflicting or competing interests and concerns can be resolved, and synergistic objectives better detected and implemented. LTACs, therefore, are a potentially useful component in the development of context-specific conflict-prevention mechanisms. Additionally, by linking individuals and communities with institutions in a participatory manner, LTACs help empower local stakeholders, allowing perhaps conventionally unheard voices to be brought to the forefront. As such, LTACs can form a mechanism by which governance in agricultural systems can become more responsive to local political economies, unintended consequences of climate policies can be avoided, and local actors can have more power to inform governing higher-level structures (Figure 7.1: Climate-security risks 4 and 5; Climate-peace principles 3 and 5).

Another example of early warning systems development in climate-risk hotspots is Climate-Smart Mapping and Adaptation Planning in Vietnam. The process of

preparing Climate-Smart Maps and Adaptation Plans (CS-MAP) engages experts from the national and local levels to identify climate-related risks; determine potentially affected areas and their risk levels using technical, infrastructure and topographic data, and local knowledge; assess and improve proposed adaptive measures, and develop integrated adaptation plans for rice production from regional to provincial levels.

Implemented during 2018–19 and 2019–20, the CS-MAP interventions were a valuable way to determine climate-risk-related areas. They facilitated decision-makers and agricultural planners in deploying suitable crop-adaptation measures to mitigate adverse climate conditions. Such conditions include salinity intrusion in the coastal provinces of the Mekong River Delta region over areas of more than 500 000 ha. This exercise demonstrated that real-world risk maps along with suitable location-specific adaptation options can be rapidly, economically, and efficiently developed and implemented. By helping the most climate-vulnerable households and communities to weather climate shocks – and thereby protect financial and social capital – the CS-MAP interventions arguably help mitigate the impact of climate on existing inequalities apparent at the household, community, and national scales.

Climate impacts and pre-existing inequalities are likely to feed back into one another, locking certain groups and their members into cycles of insecurity and vulnerability (Islam & Winkel, 2017). By building the absorptive and adaptive resilience capacities of individuals, households, and communities – thereby reducing livelihood insecurities – this cycle can be broken, and beneficiaries enabled to better accumulate social, financial, and political capital in the face of increasing climatic pressures (Figure 7.1: Climate-security risk 3). In turn, this is likely to either mitigate existing inequalities or prevent their further downward spiral (Figure 7.1: Climate-peace principle 5), particularly for rural communities, thereby helping lay the foundations for positive peace. This is particularly relevant for contexts without existing conflict or fragility and with no immediate risk of escalation, but where continued marginalisation and inequality may eventually lead to greater degrees of human insecurity, as in Vietnam.

7.5 Aligning Best-Practice Safety-Net Programmes in Climate-Risk Hotspots

Developing safety-net programmes is critical to foster food-system transformation and secure resilient livelihoods, particularly in highly fragile and conflict-affected countries. However, designing *adaptive* safety-net interventions requires a holistic approach that looks at agriculture as an integrated component of rural poverty reduction, urban food security, and inclusive economic growth under natural-resource scarcity. CGIAR has been working in several fragile countries in the Middle East and North Africa (MENA) experiencing conflicts, such as Syria, Iraq,

Afghanistan, Yemen, and Palestine. In post-conflict countries, socio-economic restoration in agriculture is often an avenue for resilient job creation and economic revitalisation, one of the six main priority areas of peacebuilding as defined by the UN Peacebuilding Support Office (PBSO) (Al Maleh et al., 2020). Therefore, crops and food security may become one of the highest priorities when operating in post-conflict locations. In the MENA region, 50 percent of all food consumed is imported. The region is highly dependent on external drivers to ensure its food security, particularly for cereals, pulses, and forages/feed.

The stabilisation and reconstruction in MENA's Rainfed Systems are a good example of how developing innovative technologies with longstanding national partners in agricultural policy and research, donors, and humanitarian agencies has resulted in adaptive safety nets, and policy and institutional reforms in two critical areas. The first is the mainstreaming of climate adaptation and resilience innovations towards the reconstruction and stabilisation of rainfed areas in the MENA. This focuses on the cereal-based production systems that are crucial to ensure food security and the resilience of livelihoods (Figure 7.1: Climate-security risk 2), and sustainability of natural resources (Figure 7.1: Climate-security risk 1). The second centres on institutional arrangements to achieve equity and sustainability in agricultural reconstruction. In particular, the focus has been on supporting frameworks for successful water and seed governance in the region (Figure 7.1: Climate-security risk 5). Both actions combine the provision of evidence with informing policy and institutional reforms for climate-smart reconstruction, resilience, and stabilisation investments. The goal is to mitigate the risks of further conflicts by strengthening institutions, natural-resource management (Figure 7.1: Climate-peace principle 1), and minimising climate-induced land degradation, therefore contributing to stable and resilient livelihoods. For this purpose, these initiatives support the development of value chains and improve livelihoods through new ways of generating income, with an increased focus on gender and social inclusion (Figure 7.1: Climate-peace principles 3 and 5). By considering gender and social inclusion and integrating participatory processes from the beginning of such interventions, they become an important platform from which to pursue transformative action agendas. Ensuring natural-resource management decision-making bodies are inclusive and gender-balanced, for instance, or by ensuring a greater degree of state–citizen interaction, can help address inequalities and improve the responsiveness and legitimacy of government.

7.6 Supporting Early Action with Risk Finance

Early action with risk finance can help countries build resilience and put in place finance and systems that ensure they are better prepared to respond to emergencies.

https://doi.org/10.1017/9781009227216.007 Published online by Cambridge University Press

Mobilising early action is not an easy task. It requires access to sufficient funds to finance early interventions, but such funds are often lacking, regardless of whether one focuses on governments, farming households, or meso-level institutions, allowing climate disasters to have enormous impact on the world's most vulnerable and the poor. Risk finance can help bridge this gap. For instance, by providing monetary compensation after a shock, insurance helps governments, farmers, and rural communities transfer the risk to global markets. Smart-risk finance contracts can provide governments with the funding for early interventions in anticipation of a disaster, and risk-financing instruments increase farmers' access to funds when otherwise they would resort to costly coping strategies that could lead them into poverty. The resulting reduction in risk exposure can also unlock credit and accelerate investments in high-risk yet productive agricultural and non-agricultural opportunities based on the predicted outcome in the absence of a shock, and stabilise rural economies.

Yet, risk finance has generally failed to reach smallholder farmers at scale, and where scale has been achieved, programmes were not necessarily designed to impact resilience and adaptation. Insights from AR4D can be leveraged to help address these challenges. Examples include the use of crowdsourced images for seasonal monitoring and claims settlement to improve product accuracy (Ceballos, Kramer & Robles, 2019); bundling risk finance with climate-smart practices and technologies (Boucher et al., 2021); using insurance to finance humanitarian response operations and scale up cash transfer programmes in the event of a severe drought (Kramer, Rusconi & Glauber, 2020), and the integration of insurance in social protection (Jensen, Ikegami & Mude, 2017).

The following example of index-based flood insurance (IBFI) is a relatively new approach to insurance provision that pays out benefits based on a predetermined index, for example flood level and duration, for loss of revenue in agricultural fields owing to floods. The IBFI product was created to reduce the impacts of floods on India's poorest farmers. The product combines 30 years of historical flooding data, hydrological modelling, and 10 m-resolution satellite images from the European Space Agency. In Bangladesh, the IBFI model works by calculating the proportion of land inundated in relation to the total geographical area in question, using satellite images. Between 2017 and 2021 more than 8 000 households were insured by the Agricultural Insurance Company of India Ltd, insurance companies HDFC ERGO and Green Delta Insurance Company Ltd, with Swiss Re as reinsurer. This was the first time satellite-based insurance had been employed in the country, resulting in compensation of US$170 000 being paid to farmers by insurers.

Such types of innovations in risk financing can minimise the long-term impacts of floods and other climate disasters faced by smallholder farmers. In doing so,

threats to livelihood insecurity (Figure 7.1: Climate-security risk 3) are mitigated and the potentially long-term devastation caused by climatic shocks is minimised, allowing farmers to restore their financial and social capital (Figure 7.1: Climate-peace principle 3) more rapidly, as opposed to being pushed into persistent cycles of poverty and inequality in the aftermath of an exogenous shock. In the absence of such safeguards, rural livelihoods may become persistently unsustainable in flood-prone areas and the relative weight of migration-based remittances is likely to become increasingly important at the household level. IBFI helps ensure that the pace of socio-economic recovery in the aftermath of a climate shock is sufficient for farmers, not hostage to the slow, drawn-out turnover of support funds otherwise in place.

7.7 Building a Climate-Security Sensitive Agenda

A truly transformative shift towards resilience and sustainable land, water, and food systems that reduces the need for humanitarian interventions is a key challenge of the next decade. Climate is increasingly becoming the accelerator of many socio-economic insecurities that can cause grievances and conflict. Early warning systems and early action can significantly mitigate climate impact and help humanitarian organisations and governments prevent the expansion of climate-induced conflict. This chapter shows that this can be achieved in some contexts. Much more, however, is needed to break the cycle between climate and conflict, align climate action to the peace objective, and thereby contribute to climate-resilient peace. The following are useful factors in building a climate-security sensitive agenda:

Strengthening Multi-Level Governance Frameworks that Help Bridge the Humanitarian–Development–Peace Nexus: It is important to connect key stakeholders and approaches both vertically and horizontally, co-develop standards of practice with affected communities and the relevant institutions, and facilitate cross-siloed knowledge sharing and learning. By doing so, we can strengthen links between early warning and early action and continue to improve the effectiveness of both of these important mechanisms for peace and security.

Finding Ways to Integrate Climate Security Evidence in Early Warning and Early Action Systems: Stakeholders working in the climate-action sphere should have access to clear and user-friendly metrics, measures, and evaluation frameworks that help articulate how, why, and where their interventions are likely to produce tangible impacts for peace and security. This includes both programmatic outcomes – such as building resilient livelihoods and value chains – but also programmatic processes, such as participatory and multi-stakeholder-approaches.

Designing Coherent and Conflict-Sensitive Adaptive Safety-Net Policies and Programmes: A well-designed adaptation nexus – backed by coherent and conflict-sensitive policies – can synergise solutions and catalyse progress towards building inclusive and transformative resilience to the impacts of climate change. Enacted through the action tracks on food security and rural livelihoods, resilient infrastructure, finance, and locally led action, such an adaptation nexus can accelerate resilience-building agendas.

Bridging Innovations and Social Capital: Innovations, practices, and technologies to fight the climate crisis are not enough if enacted in isolation. To effectively achieve what can be termed a 'climate-resilient peace', climate action should be leveraged to simultaneously build resilience to both climate and conflict risks. Actions to promote climate adaptation and mitigation can foster neutral spaces for dialogue, build interdependence, help improve government legitimacy and trust, and help reduce structural inequalities.

Notes

1 www.neksap.org.np/.

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