

Policy Brief

Preparing for El Niño in the Sahel: Policy Actions for Climate-Resilient Agriculture, Healthy Soils and Sustainable Landscapes



Kingdom of the Netherlands



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Preparing for El Niño in the Sahel: Policy Actions for Climate-Resilient Agriculture, Healthy Soils and Sustainable Landscapes

Prepared by

Soil Values Program

and

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(WASCAL)

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Key Messages

- El Niño is a recurring climate phenomenon, but crisis is not inevitable. It acts as a risk multiplier when existing vulnerabilities are exposed to climate shocks.
- Long-term resilience depends on healthy soils and landscapes, reliable water, integrated crop-livestock-tree systems, empowered farmers and pastoralists, capable institutions, and sustained investment.
- Compounding stressors can magnify shocks, while cascading impacts transmit losses across land, water, food, and human systems.
- Resilience requires multiple complementary buffers. No single technology, variety, water intervention, or forecast is sufficient on its own.
- Preparedness is more cost-effective than disaster response.
- Climate information creates value when it is translated into locally relevant decisions, agreed triggers, contingency plans, finance, and action before losses escalate.
- Collaboration among governments, researchers, universities, the private sector, development partners, and farmer organizations is essential to safeguard food security and livelihoods in the Sahel.

1. Why El Niño Is a Concern for the Sahel

The economies of countries in the Sahelian region of West Africa, including Burkina Faso, Mali, Niger, and Northern Nigeria, depend heavily on rainfed agriculture and climate-sensitive livestock production. Climate variability thus has immediate consequences on food production, rural incomes, pastoral livelihoods, water availability, and national economies.

Scientific evidence has shown that El Niño can influence regional rainfall and temperature patterns, including the timing and distribution of rainfall and the likelihood of climate extremes. El Niño episodes are formally tracked using the Oceanic Niño Index (ONI), a three-month running-mean sea-surface-temperature anomaly in the Niño 3.4 region of the equatorial Pacific (5°N–5°S, 170°W–120°W). An episode is declared as “El Niño” when the ONI reaches or exceeds +0.5°C for at least five consecutive overlapping three-month periods. These changes create substantial uncertainty for farmers and livestock keepers and complicate decisions on planting, grazing, water management, and agricultural investment. However, the impacts of El Niño are not uniform across the Sahel, and their magnitude and direction vary geographically and between seasons. El Niño information should accordingly be interpreted together with regional and national seasonal forecasts.

For smallholder farming systems, relevant seasonal hazards include late or false onset of rainfall, early cessation of rainfall, prolonged dry spells, heavy rainfall (and associated strong winds), high temperatures, floods and droughts, off-season rainfall, and persistent soil-moisture deficits. These hazards can interact with degraded land, limited water storage, poor pasture availability, and constrained livelihood options, generating compounding and cascading impacts – from reduced crop and livestock productivity to food insecurity, income losses, resource competition, and wider economic stress.

2. El Niño as a Risk Multiplier: Compounding Stressors and Cascading Impacts

El Niño-related shocks rarely occur in isolation. Rainfall deficits, disrupted seasonality, and higher evaporative demand can interact with preexisting stressors, such as degraded soils and rangelands, water over-abstraction, weak allocation systems, poverty, insecurity, limited institutional capacity,

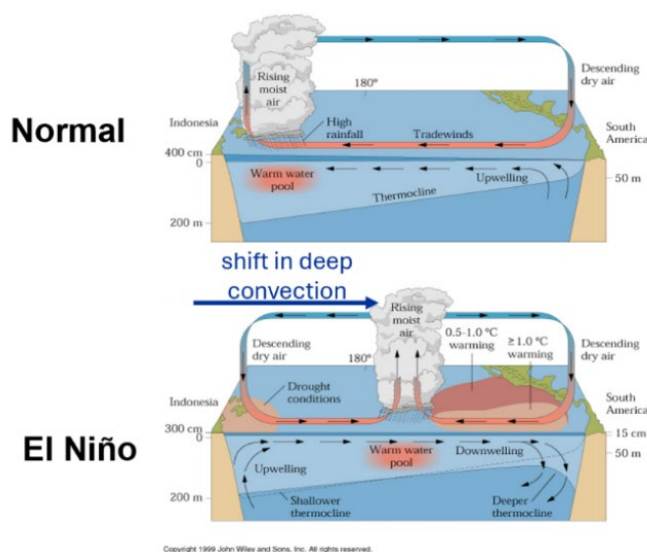


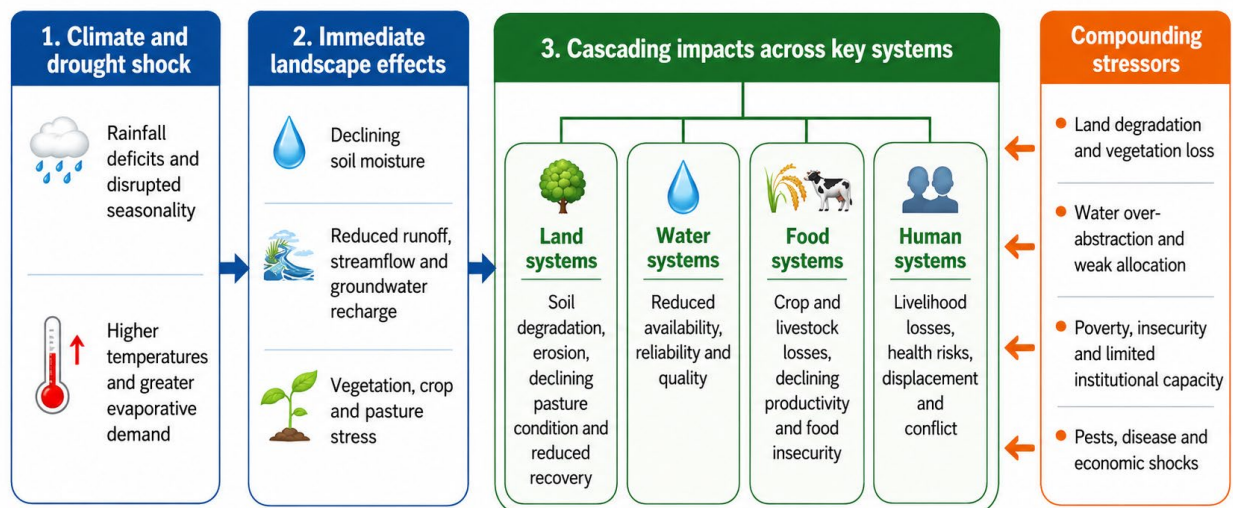
Figure 1. Schematic contrast between normal and El Niño conditions in the tropical Pacific atmosphere–ocean system, showing the eastward shift in deep convection, weakened trade winds, and shoaling thermocline that characterize El Niño.

pests, disease, and economic shocks. These compounding pressures magnify the initial climate shock.

Impacts then cascade across connected systems: Declining soil moisture and vegetation stress reduce land productivity and pasture condition; reduced runoff, streamflow, and groundwater recharge weaken water availability and reliability; crop and livestock losses affect food supply and incomes; and prolonged livelihood losses can intensify food insecurity, displacement, health risks, and conflict. Thus, the policy challenge is to strengthen the resilience and response capacity of agricultural and pastoral systems before El-Niño-induced shocks escalate into broader livelihood and food-system crises.

El Niño as a risk multiplier

Climate shock + existing vulnerabilities → cascading impacts across connected systems



Compounding stressors magnify the initial climate shock, while cascading impacts transmit losses across connected systems.

Figure 2. El Niño as a risk multiplier across connected land, water, food, and human systems.

3. From Climate Risk to Resilient Agricultural Systems

No single intervention is sufficient to mitigate the effects of climate shocks. Resilience comes from combining buffers that protect different parts of the system and operate at different scales.

- Soil and vegetation buffers store water, improve infiltration, reduce evaporation and erosion, and protect productive capacity.
- Water buffers improve reliability through infiltration, recharge, storage, sustainable allocation and, where appropriate, irrigation.
- Production and livelihood buffers diversify crops, livestock, trees, fodder, management options, and income sources.

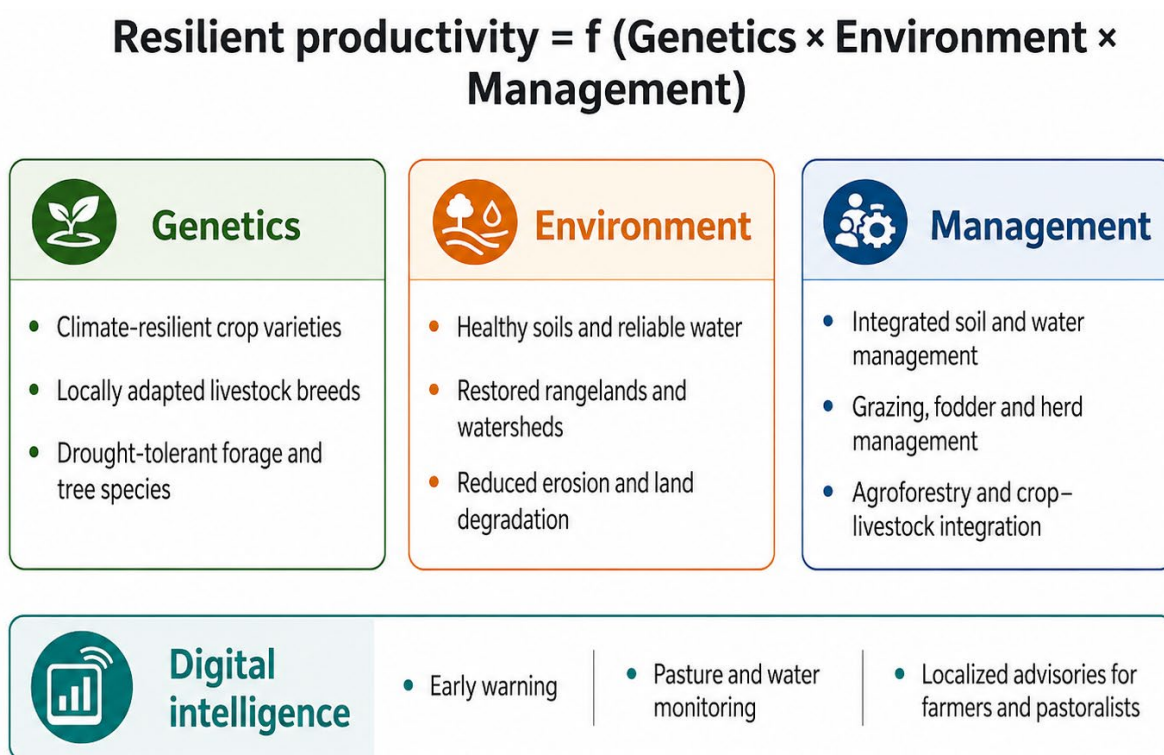
- Food system and economic buffers, including markets, insurance, social protection, finance, trade, and food stocks, can prevent local production losses from becoming prolonged livelihood crises.

The policy task is not to prescribe every option throughout the region, but to build locally adapted portfolios of complementary buffers that match rainfall, soils, water availability, production systems, livelihood strategies, and local institutions.

4. From Multiple Buffers to Integrated, Locally Adapted Solution Portfolios

Resilient productivity depends on matching genetics, environment, and management. Improved crop varieties and locally adapted livestock breeds are most effective when matched with healthy soils, reliable water, functioning rangelands and watersheds, and appropriate management. Digital intelligence helps farmers, pastoralists, extension services, and governments adjust decisions as conditions change.

The right variety will not deliver resilience unless it is matched with healthy soils, functioning landscapes, good management, and usable information.



Shift from isolated technologies to integrated, locally adapted solution portfolios.

Figure 3. Resilient productivity through the right combination of genetics, environment, management, and digital intelligence.

Resilience does not just encompass biophysical or technical aspects. Governance shapes who can access land, water, grazing areas, mobility routes, finance, and information. Pastoral mobility, flexible grazing rights, local resource-sharing institutions, farmer and pastoralist organizations, extension services, and conflict-resolution mechanisms are themselves resilience assets. Policies should strengthen local agency and collective capacity rather than treat farmers and pastoralists as passive recipients of technologies. Each stakeholder group has its own responsibilities:

- **Governments:** Integrate anticipatory preparedness into agriculture, adaptation, land, water, and drought plans; clarify institutional roles; protect legitimate resource access and mobility; and establish contingency budgets and finance.
- **WASCAL and research institutions:** Connect climate information with soil, water, pasture, and livelihood vulnerability information; improve monitoring and prediction of agriculturally relevant seasonal characteristics; define fit-for-purpose indicators; and co-develop agreed thresholds that translate forecasts into anticipatory action. Universities: together with WASCAL and research institutions, expand climate-resilience curricula, promote interdisciplinary research, and train the next generation of climate-smart agriculture professionals.
- **Extension services and farmer and pastoralist organizations:** Translate forecasts into locally relevant choices on planting, grazing, fodder, water, soil management, markets, and risk reduction; and strengthen peer learning.
- **Private sector and financial institutions:** Ensure timely access to appropriate seeds, inputs, services, markets, insurance, and finance, while avoiding investments that shift water or land risks onto vulnerable users.



Working together for climate-resilient agriculture and food security in the Sahel
Figure 4. Actions for El Niño preparedness and resilience by stakeholder group.

5. From Forecast to Action: Anticipate, Prepare, Demonstrate, and Scale

Early warning alone does not create resilience. Climate information must be linked to agreed decisions, action thresholds, responsible institutions, contingency plans, and resources. Because El Niño is a risk modifier rather than a deterministic local forecast, decisions should combine El Niño-Southern Oscillation (ENSO) information with updated regional, national, and local forecasts and explicitly communicate uncertainty. Every forecast should answer four questions:

1. What decision changes?
2. Where?
3. By whom?
4. With what resources?

Resilience can be fostered by anticipating, preparing, and demonstrating and scaling:

- **Anticipate:** Understand climate risks and vulnerabilities; combine climate, soil, water, pasture, and livelihood information; and agree on locally meaningful triggers for action.
- **Prepare:** Integrate preparedness into implementation and contingency plans; train extension and local partners; and pre-position finance and feasible response options before losses escalate.
- **Demonstrate and scale:** Establish learning and demonstration sites; track results; adapt solution portfolios to context; and scale effective options through partnerships, institutions, and finance.



Forecasts create value only when they trigger preparation, locally relevant action, learning, and scaling.

Figure 4. A practical pathway from climate information to locally led resilience at scale.

6. The Soil Values Program Response

The Soil Values program can operationalize this resilience agenda through three complementary functions: Bundling, Integrating, and Brokering. These functions serve as mechanisms for building and scaling multiple buffers.

- **Bundling:** Combine complementary ecological, water, production, livelihood, and economic buffers, including suitable genetics, soil and water management, agroforestry, crop-livestock integration, grazing and fodder options, climate advisories, and finance, into locally adapted solution portfolios.
- **Integrating:** Connect farm and rangeland interventions to watershed and landscape processes, and align land, water, agriculture, rangeland, and climate planning so that gains in one place or sector do not shift risk elsewhere.
- **Brokering:** Connect climate science, local knowledge, extension, government, farmer and pastoralist organizations, private services, and finance so that evidence is translated into decisions, investment, and scaling.

Digital intelligence should cut across all three functions, linking early warning, localized advisories, pasture and water monitoring, and agreed decision triggers to institutions with the authority and resources to act.

7. Policy Priorities

Governments and partners should focus on five decisions that change how El Niño risk is managed:

1. Treat soil health, water regulation, rangelands, vegetation, and watershed function as climate adaptation infrastructure, and invest in them before shocks occur.
2. Shift from isolated technologies to locally adapted portfolios of multiple buffers, combining appropriate genetics, healthy environments, management, livelihood diversification, and digital intelligence.
3. Translate climate information into anticipatory action through agreed thresholds, locally relevant advisories and impact-based forecasts, contingency plans, responsible institutions, and pre-arranged financing, with particular attention to onset, dry spells, heavy rainfall, heat, and soil-moisture stress.
4. Enable farmer and pastoralist agency by strengthening extension, collective institutions, legitimate access to land and water, mobility where relevant, conflict-resolution mechanisms, markets, and risk finance.
5. Mainstream anticipatory resilience into existing agriculture, adaptation, land, water, and drought plans and budgets; demonstrate, track, and scale effective options through coordinated public, private, and community partnerships.

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