



ClimBeR: Building Systemic Resilience Against Climate Variability and Extremes

INITIATIVE OVERVIEW



Without adaptation solutions now, millions of smallholder farmers will be unprepared for the severe consequences of increased temperature, drought, flooding, and other climate extremes. **Building Systemic Resilience Against Climate Variability and Extremes**, or **ClimBeR**, will address this challenge as part of CGIAR's new research portfolio that will deliver science and innovation to transform food, land, and water systems in a climate crisis.

ClimBeR aims to transform the climate adaptation capacity of food, land, and water systems in six countries: Guatemala, Kenya, Morocco, the Philippines, Senegal, and Zambia, ultimately increasing the resilience of smallholder production systems to withstand severe climate change effects like drought, flooding, and high temperatures.

The Challenge

Climate variability and extremes are having significant, adverse impacts in low- and middle-income countries – and these impacts will only grow worse. Food and agricultural systems face particular risk, with threats of economic and employment losses and investment uncertainty. Smallholder farmers, and particularly women and youth, are vulnerable to setbacks in efforts to improve livelihoods, while poverty and social tensions grow.

The demand has shifted from understanding climate change impacts to designing innovations and directing financial flows to achieve ambitious climate and food systems targets. Adaptation solutions must go beyond technology and consider social, environmental, and economic consequences as well – isolated interventions are no longer enough. Working to ensure transformation at the system level will enhance resilience, productivity, and equity.

Achieving ClimBeR's Objectives

Working closely with partners at the local, national, regional, and global levels, ClimBeR's bold and unique approach tackles vulnerability to climate change at its roots using a transformative adaptation framework.

The work builds on CGIAR's unparalleled track record of agricultural research for development, including ten years of work on climate change and agriculture under the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), with activities focusing on the following areas:

- **Reducing risk for producers' livelihoods and in value chains**, employing agricultural risk management,

climate-smart innovations, and digital services to reduce the impact of variable weather and extreme events on smallholder farmers;

- **Understanding climate security risks and identifying paths to climate-resilient peace**, including equitable access to natural resources;
- **Ensuring policymakers have the evidence necessary to develop urgently-needed, holistic and context-specific policies**, as well as untangling complexities across natural and social sciences that hinder progress;
- **Building capacity for policies that bring together local needs and available tools to enable governance for resilience, working across levels**, scales, and sectors and drawing out "champions of change" who can advocate for local investment and empowerment and inclusion of all;
- **Scaling climate finance**, with innovative mechanisms that increase farmers' access to finance at the local level and help policymakers identify new opportunities at the national level; and
- **Ensuring gender and social equity**, because a climate-resilient, nutrition-secure future will require gender-sensitive policy, ensuring grassroots voices are heard and women, youth, and marginalized groups are included.

ClimBeR at a glance

PRIMARY CGIAR IMPACT AREA: Climate Adaptation and Mitigation

FOCUS COUNTRIES:



Guatemala



Kenya



Morocco



Philippines



Senegal



Zambia

WORKS TOWARD SUSTAINABLE DEVELOPMENT GOALS:



PARTNERS:

130



ADDRESSES UNFSS ACTION TRACKS: Nutritious Food, Nature-Positive Production, Resilience

Proposed Three-Year Outcomes

1

Bundled climate services developed by ClimBeR are being used by at least 300,000 vulnerable farmers, at least 30 percent of whom are women, in six focal countries.

2

International agencies and policymakers use products developed by ClimBeR researchers and partners to shape at least nine policies or investments to strengthen agricultural resilience, including at least three aimed at reducing agriculture-related climate security risk.

3

At least US\$30 million in new investments made through ClimBeR's partnerships, focusing on disadvantaged groups, women, youth, and vulnerable smallholder farmers, contributing to building systemic resilience.

De-RISK

FOCUS: Reducing risk for producers' livelihoods and in value chains

Agriculture, especially smallholder, rain-fed agriculture practiced by millions of farmers in ClimBeR's focus countries, has always been susceptible to climatic-induced risk in production and post-harvest value chains. The nature of this risk is imperfectly understood by decision makers, and as a result agriculture is simply seen as a "risky business" that gets riskier in the face of climate change.

Under De-Risk, ClimBeR researchers and partners seek to reduce risk in farmers' livelihoods and value chains at scale, by managing and reducing the impact of variable weather and extreme events, particularly through enhanced digital services and innovative financial products.

De-Risk work involves:

- Developing an **agricultural risk management strategy** with public and private sector partners that prioritizes insurable climatic risks, as well as bundled financial products, such as gender-appropriate risk-contingent credit, and constructing a remote sensing-based index for assessing weather-related damage;
- Developing tools with innovation partners to provide **digitally enabled agricultural climate services**, designing climate-informed investments, especially for women and marginalized groups;
- Generating a **climate risk profiling system** that combines data sources and analytical approaches to identify key agricultural risks and risk mitigation solutions tailored to value chain, geographical, and agro-ecological contexts; and
- Developing a **production system typology** based on the nutritional impact of climatic risks and interactions among farming system, climate, and nutritional outcomes to better prioritize and target investments.

Key Innovations:

1. **Risk-contingent credit**, focused in Kenya and Zambia;
2. Tools to provide **agro-climate information services**, focused in Guatemala and Kenya;
3. A **climate risk profiling system**, focused in Morocco, the Philippines, and Senegal; and
4. A **production system typology** with a nutrition lens, focused in Kenya, Morocco, Senegal, and Zambia.

Outcomes:

Bundled ClimBeR climate services being used by at least 300,000 vulnerable farmers, at least 30 percent of whom are women, in ClimBeR's six focal countries by 2024.

Climate Security

FOCUS: Identifying paths to climate-resilient peace and addressing inequitable access to natural resources.

Climate is linked to conflict, acting as a multiplier, and worsening the threat of crises and instability. Yet there exists a lack of robust, localized, and policy-relevant evidence, particularly at the nexus of climate security and agriculture, on how exactly risks may emerge across different geographic contexts.

Under Climate Security (CS), ClimBeR researchers and partners respond to this challenge, the United Nations Framework Convention on Climate Change's call for transformative climate action, and CS-sensitive agriculture needs.

Climate Security work involves:

- **Evidence:** To understand the complexity of climate and security for informed decision-making, researchers will work with demand and scaling partners, especially World Food Programme (WFP), and innovation partners to co-produce rigorous evidence on impact pathways linking climate, agriculture, gender, and security in different geographies. Tailored tools will help partners design, monitor, and implement transformative, climate-resilient agricultural interventions, targeted at climatically vulnerable, conflict-affected areas, and vulnerable groups, including women and youth.
- **Programming:** Working with partners, researchers will develop and help institutionalize climate security-sensitive operations, with a systematic approach to integrating CS analyses into agricultural and environmental programming.
- **Policy:** Communities, governing bodies, and other stakeholders need support in articulating the role of food systems in a climate crisis for policies and frameworks. Researchers will collaborate with partners to improve the coherence, integration, and performance of climate-related security and agricultural policies and co-develop methods to identify and address gaps.
- **Finance:** Researchers will work with international and local financial institutions to develop tools to help investors make agricultural investments that are conflict-sensitive and integrate CS risks assessments,

leveraging finance by aligning objectives along the humanitarian-development-peace nexus.

Key Innovations:

1. **Climate Security Proofing Guidelines** to help CGIAR and partners conduct localized climate security assessments, integrate them into programmatic planning, and enhance conflict sensitivity of climate adaptation and agricultural policies;
2. **Climate Security Policy Toolkit**, a step-by-step guide for national and local policymakers for increasing coherence across climate, agriculture, and peace programming to enhance climate adaptation strategy effectiveness;
3. **Climate Security Index**, a tool to monitor climate security risks; and
4. **Climate Security Observatory**, a decision-support tool to qualify and quantify the climate security nexus at regional, national, and sub-national levels.

This work will be developed in Kenya and Senegal in 2022, and in Zambia, Guatemala, and the Philippines in 2023.

Outcomes:

By 2024, international agencies and policymakers use ClimBeR products to shape at least nine policies or investments to strengthen agricultural resilience, including at least three aimed at reducing agriculture-related climate security risk.

Policy Pathways

FOCUS: Ensuring policymakers have the necessary evidence to develop urgently needed, holistic and context-specific policies for adaptation challenges facing food systems and farmers alike.

Climate change will put millions more people at risk of food and nutrition insecurity by 2050. Moreover, many low- and middle-income countries are climate hotspots, highly exposed to climate change, and farming communities face growing water scarcity and climate extreme events, already now and more so in the future.

Under Policy Pathways, ClimBeR researchers and partners will work with policymakers and other stakeholders to untangle the natural and social science complexities that underpin the development of holistic agriculture, nutrition, and trade policies to generate policy pathways that support sustainable, climate-resilient food systems. They will also provide evidence for policymaking that addresses development challenges facing farming communities.

Policy Pathways work includes:

- In Kenya and Zambia, developing the integrated Future Estimator for Emissions and Diets (iFEED), an extensive, evidence-based framework designed to help decision makers identify policy pathways, risks, tradeoffs, and opportunities for a climate-smart, food- and nutrition-secure future for Africa. iFEED co-develops and uses future scenarios of policy outcomes and climate risks, including projected average changes and extreme events, to assess crop management and yields, land and water use, and interactions between trade and national-level nutrition security. iFEED will enable policymakers to make decisions that deliver nutrition security and enhance farmers' climate resilience.
- In Guatemala, designing policy pathways to mainstream initiatives or practices that disrupt the current unsustainable structures and have the potential to transform food systems. This includes identifying innovative grassroots initiatives or practices that actively challenge dominant structures in food production; envisioning climate-resilient futures with women, youth, and marginalized groups where niche initiatives are mainstream; understanding the role of power in achieving these futures; and identifying investment opportunities to scale up niche initiatives.
- In Morocco and Senegal, the Climate-Smart Systems Solutions and Scaling (C4S) innovation will be coordinated by ICARDA in partnership with the BRIDGE consortiumⁱ and other regional and local

partners. Under C4S, researchers will identify the context-specific climate adaptation options that have a systemic impact in these climate change hotspots. Adaptation interventions include:

- » Managing water resources effectively based on biophysical modeling at a variety of scales,
- » Identifying context-specific crop diversification through a target population of environments approach to crop improvement and management, and
- » Enabling strategic decision-making based on co-constructed climate- and water-smart decision tools and integrated bioeconomic modeling.

These actions will be implemented in a multiscale and multidisciplinary manner involving stakeholders to facilitate systemic transformation at the national scale.

Key Innovations:

1. iFEED – Integrated assessment framework to identify policy pathways to climate-resilient, food- and nutrition-secure future for Africa, and
2. Climate Smart Systemic Solutions and Scaling (C4S).

Outcomes:

International agencies and policymakers use ClimBeR products to shape at least nine policies or investments to strengthen agricultural resilience, including at least three aimed at reducing agriculture-related climate security risk.

ⁱ The BRIDGE consortium is a partnership led by Institut de recherche pour le développement (IRD) with institutions in France, Morocco, Senegal, and Tunisia, with the objective of co-Building Resilient climate and water smart farming systems with Interdisciplinary and Integrated models and multi-actor Decision and chanGE platforms in water-scarce Middle East and North Africa and Sahel regions.

Governance 4 Resilience

FOCUS: Promoting multiscale polycentric governance and innovative tools to build the adaptive capacity of local communities, increasing their resilience against climate-related shocks.

Building resilience and the capacity to adapt to climate shocks requires work and dialogue across scales, levels, and sectors. Yet siloed government institutions struggle to identify needs and scale adaptations that can be transformative for communities threatened by climate change. These challenges are compounded by a lack of timely data to inform risk-reducing strategies for smallholder farmers through early warning systems. Moreover, when data are available, they are not always used to inform action or finance.

Under Governance 4 Resilience, ClimBeR researchers and partners will build and strengthen networks to break down silos and enable the co-designing, co-developing, and co-implementing of adaptation interventions and coherent policies. This will ensure a bottom-up process that reflects community needs and priorities and draws on best practices and lessons learned across countries and contexts.

Governance 4 Resilience work involves:

- **Improving coordination:** By developing a multiscale polycentric governance framework that looks across levels, scales, and sectors, researchers and partners will gain a complete picture of existing tools, technologies, and data, identify gaps, and improve coordination to trigger timely action and finance in response to extreme events.
- **Enabling responsiveness:** In Guatemala, Kenya, Senegal, and Zambia, the development of an early warning, early action, and early finance (AWARE) Platform will facilitate coordination across ministries to trigger action and investment ahead of an extreme climate event, providing a better response to the needs of those affected. The anticipatory action promotes and implements good governance practices that meaningfully involve local communities, and designs and develops systems and processes which include and work for everyone, including marginalized groups.
- **Facilitating planning:** In Morocco, the Philippines, Senegal, and Zambia, creating and launching a ClimaAdapt-Gov dashboard will empower farmers, communities, and policy planners to plan and implement bottom-up, integrated climate and water risk management interventions, matching global-level data with community-level needs.
- **Identifying champions:** Co-developing and supporting “champions of change” will build a network of advocates for polycentric multiscale

governance which draws on experiences across sectors and at different levels, to bring all voices to the table and target local investments for empowering farmers, including women.

Key Innovations:

1. **Multi-scale polycentric governance model** to help organize decision-making that links local-level adaptation with national-level policy processes;
2. **“Leave No One Behind” Indicators** incorporating gender and social equity to ensure recommendations consider the needs of all groups;
3. **ClimaAdapt-Gov Dashboard** that brings together multiscale data on environmental, economic, and social perspectives that identify needs at the community level to provide policymakers with informed options; and
4. **AWARE Platform** to facilitate coordination for early warning, early action, and early finance in the face of extreme climate events, ensuring disaster risk reduction, management and response effectively build resilience for everyone.

Outcomes:

At least US\$30 million in new investments made through ClimBeR’s partnerships, focusing on disadvantaged groups, women, youth, and vulnerable smallholder farmers that are contributing to building systemic resilience.

Climate Finance

Finance is a major constraint for transformative adaptation, particularly in the agriculture sector. Unlocking climate finance and creating and scaling evidence-based pipelines of investment opportunities are vital to achieve food system transformation goals. ClimBeR researchers and partners will develop innovative mechanisms to increase farmers' access to finance at the local level, while helping policymakers identify new opportunities at the national level, aiming to mobilize US\$30 million in new investments by 2024 that support building smallholder farmer resilience.

ClimBeR will work at the national level to support climate-smart agriculture investment planning and leverage finance mechanisms that draw on the public and private sectors for scaling resilience-building interventions. This includes influencing climate finance flows and attracting impact investors who seek environmental and social returns in addition to financial returns. It also includes supporting the use of "blended finance," where public or philanthropic funding can lower risks for private finance, through first-loss guarantees or other financial mechanisms. ClimBeR will also work with international and local finance institutions to unlock finance for agriculture that addresses peace building in conflict-prone areas. This includes tools and approaches to identify humanitarian and resilience-building investments, and to identify opportunities to design innovative finance mechanisms such as "peace bonds" that incorporate the value of increased security.

While there is a growing supply of finance from sustainability funds and climate finance at the global level, there is often a lack of bankable investments for that money. ClimBeR will work to create gender-sensitive, innovative financial mechanisms incorporating CGIAR science that combine climate information, credit, and insurance to build resilience. However, the investment size investors are looking for and the size of finance needed by farmers and agribusinesses often do not match. ClimBeR researchers and partners will look at how financial intermediaries, such as micro-finance institutions or cooperatives, can facilitate and mediate the disbursement of large funds in smaller amounts to end users. Through these approaches, ClimBeR will work across levels to help ensure financial flows from the global level support investments that foster transformational adaptation at the local level.

ClimBeR is working to create gender-sensitive, innovative financial mechanisms incorporating CGIAR science that combine climate information, credit, and insurance to build resilience.

Gender and Social Equity

Climate risks are distributed unevenly not only because of ecological drivers, but also due to socio-economic inequalities. There is growing evidence of a danger that, in many climate responses, socio-economic inequality is actually exacerbated. In these situations, those who are more economically powerful, who are often men, benefit more than those who are already marginalized and vulnerable. Moreover, vulnerable and marginalized groups are at greater risk of maladaptation, when climate adaptation efforts have unintended, negative consequences.

Transformative adaptation is not possible without special attention to gender and social equity. Despite the growing evidence of these challenges, climate adaptation strategies do not inherently focus on social equity. The design and implementation of adaptation policies and strategies must deliberately address this critical issue if root causes of climate vulnerability are to be tackled.

ClimBeR researchers and partners put theory into practice by embedding gender and social equity in approaches to reduce climate vulnerabilities and improve livelihoods. The Initiative's objectives are rooted in an understanding that intervention design must be tailored to farmers' diverse needs and that benefits must be distributed equitably among vulnerable populations while avoiding maladaptation. These efforts cut across the Initiative's work, as ClimBeR will operationalize a social equity framework that embeds gender and social equity principles in each of the Initiative's four research areas.

Focus Countries

ClimBeR will undertake activities focused in six countries: Guatemala, Kenya, Morocco, the Philippines, Senegal, and Zambia. This approach will enable researchers and partners to dive deeply into different possible impacts and context-specific adaptations.



Guatemala

As part of the Dry Corridor, Guatemala is highly vulnerable to climate impacts including drought and high temperatures, which threaten farmer livelihoods and agricultural production. CGIAR researchers under the Research Program on Climate Change, Agriculture, and Food Security (CCAFS) hold strong relations with relevant stakeholders in Central America through the implementation and scaling of 41 Local Technical Agroclimatic Committees (LTACs) in 10 Latin American countries including Guatemala, which successfully enhanced farmers' capacities to co-produce, translate, and use climate information. Guatemala participates in the Central American Integration System, which adopted a Climate-Smart Agriculture (CSA) Strategy to combat threats from these impacts. The Strategy has four pillars, or axes, each with several activity areas, which ClimBeR will support. Initiative efforts will focus on improving agricultural livelihoods via improved climate information, early warning systems, climate security analyses that consider drivers of migration, and policy pathways to mainstream practices that have the potential to transform food systems.



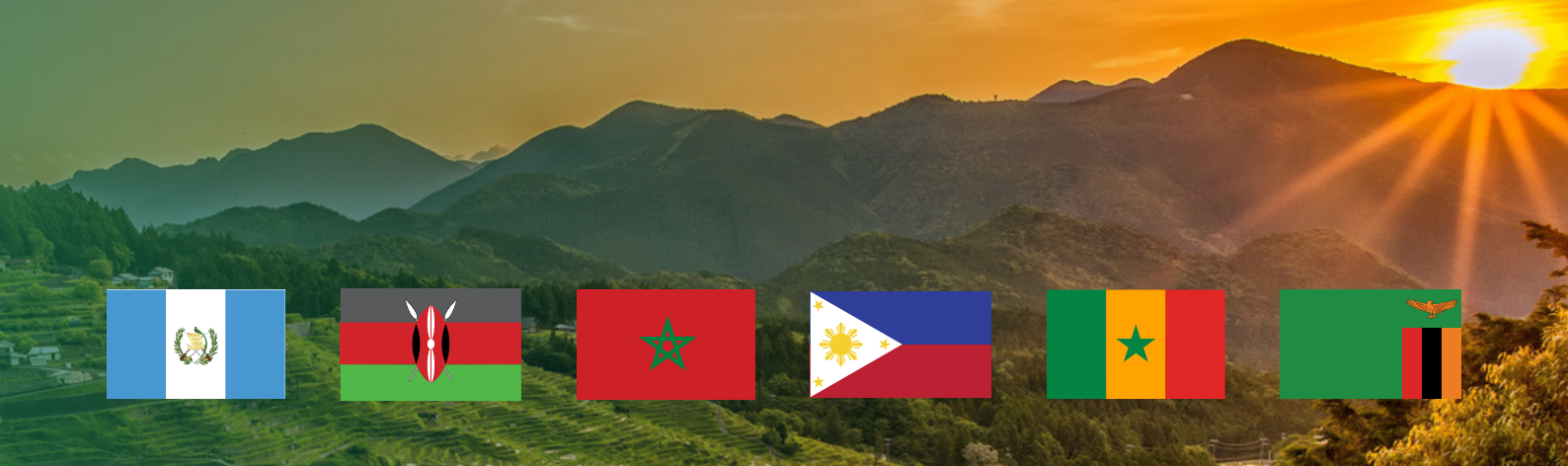
Kenya

In Kenya, the impacts of climate change are felt with an increase in the frequency of extreme weather events, ranging from flooding to droughts to high temperatures. The government is working to address these challenges, including through a National Climate Change Action Plan. ClimBeR researchers will partner with national stakeholders to assess crop management and yields, land and water use, greenhouse gas emissions, and nutrition outcomes to help develop an assessment of the risks associated with food system policy decisions. An early warning, early action, and early finance (AWARE) platform designed to be used across ministries will help trigger action and investment ahead of extreme climate events. Researchers and partners will also work together to develop bundled insurance products targeted toward ensuring gender and social equity outcomes.



Morocco

In Morocco, the adverse impacts of climate variability and extremes are well documented. Adaptation solutions are needed to address threats from droughts and high temperatures, along with the loss of productive assets and human capital and the effects of uncertainty on agricultural investments, which combine to stymie smallholders' efforts to improve livelihoods, exacerbating poverty and social tensions. Following the achievements of the Green Morocco Plan, the Green Generation Strategy 2020-2030 aims to improve water use efficiency, strengthen agricultural insurance programs, and increase access to climate finance. The National Strategic Adaptation Plan 2020-2030 aims to improve climate information, adopt a strategic governance plan, and enhance resilience in the agriculture sector. ClimBeR researchers and partners will work to test adaptation options, focusing on improved agricultural water management strategies; reduce risk in production system-linked livelihoods and value chains at scale; design multiscale governance for transformative adaptation; mobilize finance to build systemic resilience among vulnerable smallholder farmers; and integrate gender and social equity into innovations to address the root causes of vulnerability.



Philippines

Like many countries in Southeast Asia, the Philippines faces climate change challenges stemming from sea level rise, flooding, and rising temperatures. The importance of building climate resilience is recognized by the government, which established the Climate Resilient Agriculture Office in the Department of Agriculture in February 2020. The government is also focused on building climate resilience in the country's 21 river basins, and on improving water provision to urban areas and developing an equitable rewards scheme for water storage and livelihood improvement in the Manupali watershed. ClimBeR aligns with the Philippines National Climate Change Action Plan 2011-2028. The Plan prioritizes food security, water sufficiency, ecological and environmental stability, human security, and mainstreaming climate adaptation into all national policies. ClimBeR will support implementation of the food security component of the plan by identifying context-specific climate risks to farmers, informing national policymakers of the nexus of climate security and agriculture, and empowering policymakers to plan and implement climate and water risk management interventions, matching global-level data with community-level needs.



Senegal

With a large agricultural sector, Senegal is threatened by a host of climate change impacts, including drought, floods, increased temperatures, and sea level rise. In the face of these increasing threats to agriculture and food security in the country, the government has developed a twenty-year strategy targeting food security and resilience, the Stratégie nationale de sécurité alimentaire et de résilience 2015-2035. Senegal is actively promoting climate-smart agriculture (CSA), index insurance, and agro-advisories. CGIAR, through CCAFS and others, has successfully collaborated with Senegalese national partners to disseminate CSA technologies, especially water management practices, and downscaled climate information services. ClimBeR researchers and partners will continue to build on this work, with particular attention to early warning and early finance, climate security, and crop production information and modeling to help farmers and policymakers alike make informed decisions.



Zambia

The variability in Zambia's climate means farmers are challenged by droughts and floods, high temperatures, and increased unpredictability. In response, the government is integrating climate change concerns into its agriculture policy agenda. Under its climate-smart agriculture (CSA) strategy framework, it is promoting CSA practices to sustainably increase productivity, enhance resilience, and reduce greenhouse gas emissions. Its implementation framework has nine components which are supported by ClimBeR researchers across the Initiative's different areas of work. Gender and social equity are recognized among areas that need to be prioritized to enhance systemic resilience. Researchers and partners will work on developing an agricultural risk management strategy that prioritizes gender-differentiated, insurable climatic risks and co-designing bundled insurance products, such as gender-appropriate risk-contingent credit. In addition, targeted financial education, randomized controlled trials, monitoring, and loan repayments will be managed by local partners, providing expertise to continue over the long term.



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CGIAR is a global research partnership for a food-secure future. CGIAR science is dedicated to transforming food, land and water systems in a climate crisis. Its research is carried out by 13 CGIAR Centers/Alliances in close collaboration with hundreds of partners, including national and regional research institutes, civil society organizations, academia, development organizations and the private sector. www.cgiar.org

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