



# ClimBeR

## Building Systemic Resilience Against Climate Variability and Extremes

**Lead:** Ana María Loboguerrero ([a.m.loboguerrero@cgiar.org](mailto:a.m.loboguerrero@cgiar.org))  
**Co-lead:** Jon Hellin ([j.hellin@irri.org](mailto:j.hellin@irri.org))

### Proposal

September 28, 2021

**Note to readers:** please use the hyperlinks throughout the proposal for definitions, abbreviations, partners, references, etc.

## Contents

Summary table .....	4
1. General information .....	4
2. Context .....	5
2.1 Challenge statement.....	5
2.2 Measurable 3-year (end-of-Initiative) outcomes .....	6
2.3 Learning from prior evaluations and impact assessments (IA) .....	6
2.4 Priority-setting.....	7
2.5 Comparative advantage.....	7
2.6 Participatory design process .....	8
2.7 Projection of benefits .....	9
3. Research plans and associated theories of change (TOC).....	13
3.1 Full Initiative TOC.....	13
3.1.1 ClimBeR Initiative TOC diagram .....	13
3.1.2 ClimBeR Initiative TOC narrative .....	14
3.2 Work Packages TOCs.....	15
3.2.1 Work Package 1 TOC diagram.....	15
3.2.2 Work Package 1 research plan and TOC .....	16
3.2.3 Work Package 2 TOC diagram.....	19
3.2.4 Work Package 2 research plan and TOC .....	20
3.2.5 Work Package 3 TOC diagram.....	23
3.2.6 Work Package 3 research plan and TOC .....	24
3.2.7 Work Package 4 TOC diagram.....	27
3.2.8 Work Package 4 research plan and TOC .....	28
4. Innovation Packages and Scaling Readiness Plan.....	31
4.1 Innovation Packages and Scaling Readiness Plan.....	31
5. Impact statements .....	32
5.1 Nutrition, health & food security .....	32
5.2 Poverty reduction, livelihoods & jobs.....	34
5.3 Gender equality, youth & social inclusion .....	35
5.4 Climate adaptation & mitigation.....	36
5.5 Environmental health & biodiversity.....	37
6. Monitoring, evaluation, learning and impact assessment (MELIA).....	38
6.1 Result framework .....	38

6.2 MELIA plan.....	46
6.3 Planned MELIA studies and activities.....	47
7. Management plan and risk assessment .....	48
7.1 Management plan .....	48
7.2 Summary management plan Gantt table .....	49
7.3 Risk assessment.....	50
8. Policy compliance, and oversight .....	51
8.1 Research governance .....	51
8.2 Open and FAIR data assets.....	51
9. Human resources .....	52
9.1 ClimBeR Initiative team.....	52
9.2 Gender, diversity and inclusion in the workplace.....	53
9.3 Capacity development.....	53
10. Financial resources.....	54
10.1 Budget .....	54
References.....	55

## Summary table

<b>Initiative name</b>	Building Systemic Resilience against Climate Variability and Extremes (ClimBeR) <sup>1</sup>
<b>Primary Action Area</b>	Systems Transformation
<b>Geographic scope</b>	Western and Central Africa (WCA) ( <i>Senegal</i> ) Central and West Asia and North Africa (CWANA) ( <i>Morocco</i> ) Eastern and Southern Africa (ESA) ( <i>Kenya and Zambia</i> ) Southeastern Asia and the Pacific (SEA) ( <i>Philippines</i> ) Latin America & the Caribbean (LAC) ( <i>Guatemala</i> )
<b>Budget</b>	US\$ 45,000,000

## 1. General information

### Building Systemic Resilience against Climate Variability and Extremes (ClimBeR)

**Proposal Lead:** Ana María Loboguerrero ([a.m.loboguerrero@cgiar.org](mailto:a.m.loboguerrero@cgiar.org))

**Proposal Deputy:** Jon Hellin ([j.hellin@irri.org](mailto:j.hellin@irri.org))

#### Initiative Design Team

Name	Organization
Ana María Loboguerrero	CGIAR
Jon Hellin	CGIAR
Grazia Pacillo	CGIAR
Liangzhi You	CGIAR
Giriraj Amarnath	CGIAR
Ajit Govind	CGIAR
Howard Standen	United Kingdom Foreign Commonwealth and Development Office (FCDO)
Eleanor Fisher	Nordic Africa Institute (NAI)
Andy Challinor	University of Leeds, United Kingdom
Rikin Gandhi	Digital Green
Kira Topik	Digital Green
Vincent Vadez	Institut national de la recherche pour le développement (IRD)
Evan Girvetz	CGIAR
Raphael Nawrotzki	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GiZ)
Veronica Doerr	Australian Center for International Agricultural Research (ACIAR)

<sup>1</sup> A complete list of abbreviations and acronyms can be found [here](#).

## 2. Context

### 2.1 Challenge statement

Climate change is affecting planetary systems at a higher and faster rate than previously estimated,<sup>1,2</sup> with the 1.5°C global warming level now expected to be reached by the early 2030s,<sup>3</sup> a trajectory United Nations Secretary-General Antonio Guterres has called “catastrophic.” If the United Nations Framework Convention on Climate Change (UNFCCC) and Paris Agreement targets (temperature increases held to 1.5°C by 2030, carbon neutrality by 2055) are to be met, urgent – and early – action on the twin goals of **climate mitigation** (reducing emissions, creating carbon sinks) and **climate adaptation** (boosting countries’ resilience to climate change) is required. ClimBeR is aimed squarely at **climate adaptation**.

The principal challenge addressed by ClimBeR is the poor climate adaptation preparedness of the food and agricultural systems in low- and middle-income countries (LMICs). The adverse impacts of climate variability and extremes in the Global South are well documented.<sup>4</sup> The loss of productive assets and human capital, coupled with the effect of uncertainty on agricultural investments, stymie smallholders' efforts to improve livelihoods, exacerbating poverty and social tensions. The central objective of ClimBeR is, therefore, to transform the climate adaptation capacity of food, land, and water systems in six LMICs, ultimately increasing the resilience of smallholder production systems to withstand severe climate change effects like drought, flooding, and high temperatures.

Demand has shifted from understanding climate change impacts to designing innovations and directing financial flows to achieve ambitious climate and food systems targets.<sup>5</sup> Isolated CGIAR interventions to increase crop yields or strengthen markets no longer suffice; it is critical to transform systems to simultaneously enhance resilience, productivity, and equity. ClimBeR will design and scale social-ecological-technological (SET) bundles that empower approximately 30 million people in the Global South to build climate resilience to a tipping point capable of triggering system-wide transformation. ClimBeR's co-designed climate adaptation innovations will be focused on supporting women and youth; they will improve the lives of 5 million women and bring nearly 22 million hectares of degraded land under more sustainable management. ClimBeR will exploit emerging opportunities, such as the growing global impetus to meet urgent climate adaptation and mitigation targets, and increasing momentum among climate financiers, development banks, and international donors to invest in climate change adaptation.

ClimBeR partners with six LMICs that demonstrate (a) a long history of engagement with CGIAR and the broader agricultural research for development (AR4D) community, (b) proven commitment to addressing the climate crisis and Paris Agreement targets via updated, ambitious Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs), and (c) financial flows being redirected (as per Article 2.1 of the Paris Agreement), towards low greenhouse gas (GHG) emissions and *climate-resilient development*. ClimBeR's partner countries face serious climate vulnerabilities including droughts, floods, and high temperatures in Kenya, Senegal, and Zambia; droughts and high temperatures in Morocco and Guatemala; and floods and rising temperatures in the Philippines. All six countries recognize the challenge, are committed to boosting their climate resilience, and have enabling policies and investment plans in place. They need support on capacity strengthening and mainstreaming truly innovative climate adaptation solutions.

## **2.2 Measurable 3-year (end-of-Initiative) outcomes**

ClimBeR aims to achieve three outcomes by 2024. Indicators to measure how we achieve these outcomes are included in the Monitoring, Evaluation, Learning and Impact Assessment (MELIA) Plan.

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

We assume a baseline of zero. Some of our products are ready to roll out, therefore, we believe 300,000 is a reasonable target. We expect these services to measurably reduce vulnerability to floods, droughts, and high temperatures.

2. 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 (CS) risk.

We estimate that six new policies or investments will be in our six focal countries, and three will be regional institutions' policies.

3. 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.

Our focus will not be on the total amount of new investment, rather it is targeting women and other very vulnerable people.

Together, these three outcomes will provide a foundation for rapid scaling out of CGIAR climate-resilient agricultural innovations and guidance for transforming agroecological productive systems to be more productive, resilient, and equitable.

## **2.3 Learning from prior evaluations and impact assessments (IA)**

ClimBeR responds to the findings and recommendations of the [CGIAR Research Program 2020 Reviews](#), [2021 Synthesis of Evaluative Evidence: Toward One CGIAR](#), and the [2020 external review of CCAFS](#):

- Our unique approach to gender and social equity addresses the recommendation to make greater use of social science, including gender analysis, and to engage more effectively on equity and affirmative measures, as part of transformative change thinking.
- ClimBeR will examine the root causes of climate impact challenges by addressing questions related to political economy, society, nutrition, agroecology, and CS.
- ClimBeR will use transdisciplinary research to mainstream climate change adaptation as a strategy to transform food systems.
- We adopt a SET bundle approach to support researchers and practitioners to integrate the three domains of gender and social equity issues, environmental quality and protection, and technological innovations. Specifically, ClimBeR will bundle climate information services within a framework of socially inclusive policies and institutions rather than adopting piecemeal or technology-focused innovations.
- Our work tackles climate change in the context of natural resources, including water management, nutrition, employment, and health; using a transdisciplinary research lens to inform, engage, and steer a nexus of science, policy, and finance towards system transformation.
- Our work is aligned with and supports our six partner countries' strategic development priorities, and the capacity development needs of our partners and stakeholders.
- All activities are developed and implemented in collaboration with our partners (research institutions, governments, civil society, financial institutions, and private sector organizations) and are informed by continuous stakeholder consultation and outreach.

## 2.4 Priority-setting

Strengthening the capacity of smallholder farmers, both women and men, in the Global South to adapt to climate change is a major CGIAR priority. Climate change is reducing global agricultural growth and undermining food security and livelihoods.<sup>6</sup> Without transforming entire food, land, and water systems, many rural people face a dismal future.<sup>7</sup>

ClimBeR builds on over a decade of AR4D and scaling implemented by CGIAR and others, especially CCAFS. For example, CCAFS documented the [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. The Philippines [government adopted CCAFS outputs in its climate-smart agriculture \(CSA\) programs](#). The government recently acknowledged the importance of building climate resilience, establishing a Climate-Resilient Agriculture Office within the Department of Agriculture, part of whose mandate is to build climate resilience throughout the country.

ClimBeR's four Work Packages (WPs) were developed based on past research and key messages from multiple national, regional, and global fora aimed at setting future research and development priorities. These included the [Two Degree Initiative \(2DI\)](#) regional challenge listening sessions, consultations held by CCAFS when designing the World Bank-financed Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA), participation in consultations organized by other agencies, and consultations in ClimBeR's six focal countries (see also Section 2.6).

These fora confirmed ClimBeR's relevance in the dry corridor of Central America, southern Africa, the Sahel, the Horn of Africa, and the Middle East and North Africa (MENA). These regions are arid and face growing food security challenges, which are related directly to peace and security.<sup>8,9</sup> Our partners in the Philippines have also demonstrated a strong interest in ClimBeR, as it is one of the countries most affected by natural disasters.

The limited time and financial resources available make it imperative that we identify just one country within each region with the highest potential for generating significant outcomes. The chosen countries – Guatemala, Zambia, Senegal, Kenya, Morocco, and the Philippines – share the following advantages: they have committed to strengthening their smallholder farmers' resilience to prosper in the face of climate change; they offer strong partnerships with a proven track record of collaboration; and they have expressed a strong interest in collaborating with ClimBeR (see Section 2.6).

The WPs, Innovations, and regions were chosen based on diagnostic documents and stakeholder consultations and the need to respond to the intersection among key stakeholders' needs (demand), what CGIAR can offer (supply), and donors' interests. The WPs and Innovations build on more than a decade of CGIAR's lessons learned,<sup>10</sup> as well as an internal ClimBeR workshop on synergies, and the numerous meetings within the Initiative Design Team (IDT).

## 2.5 Comparative advantage

ClimBeR builds on the foundation created by CCAFS. The recent synthesis evaluation of CGIAR confirms its highly competent researchers, innovative partnerships, and strong policy engagement and influence.<sup>11</sup> CCAFS epitomized this unique combination.<sup>12</sup> Over ten years, CCAFS established an exceptional set of partnerships among CGIAR centers and other centers of excellence and advanced research institutes and has been actively engaged in global climate change and environmental and food security processes such as UNFCCC. Our strength goes beyond unparalleled scientific excellence: our partners include numerous global and regional demand and scaling partners. In the six partner countries, we have a track record of collaboration with government institutions, universities and research institutions, Non-

Governmental Organizations (NGOs), private firms, and farmers' organizations including cooperatives and women's groups. No single institution has the wide range of cutting-edge scientific capacity that our partners bring to the table.

With other CGIAR Initiatives, ClimBeR addresses the enormous challenge of building systemic resilience against climate variability and extremes and vulnerability in "structural, systemic and enabling"<sup>13</sup> ways. ClimBeR focuses on *transformative adaptation* (tackling root causes of vulnerability) rather than the immediate causes of vulnerability.<sup>14</sup> ClimBeR's integrated SET bundle approach<sup>15</sup> and its Gender and Social Equity Framework (GSEF)<sup>16</sup> addresses underlying power imbalances and socio-economic and cultural factors.<sup>17,18</sup> ClimBeR represents a bold and radical approach. We are not aware of any other institution or partnership having a similar science track record combined with a commitment to impact. ClimBeR is poised to begin demonstrating positive outcomes from the beginning.

## 2.6 Participatory design process

ClimBeR held [meetings and consultations](#) directly with over 150 organizations in the six partner countries and through partners with an additional 100. We used the results of 2DI virtual listening sessions and other regional and international conferences to design ClimBeR. The project proponents were directly involved in most of the 2DI regional challenge listening sessions.<sup>19</sup> ClimBeR addresses priorities articulated at six 2DI listening sessions. Furthermore, the three sub-Saharan African regions and chosen countries (Kenya, Senegal, Zambia) are active participants in AICCRA, which involved an extensive [design participatory process](#).<sup>20</sup> ClimBeR activities in these countries will add value to AICCRA. Furthermore, ClimBeR scientists have participated in discussions organized by the CGIAR Systems Transformation Director where a variety of donors have expressed their alignment with the work proposed by ClimBeR.

ClimBeR's partner countries present important opportunities to generate impact on the ground. The following are examples demonstrating the alignment and consistency between ClimBeR's proposed work and country priorities:

The [Kenya Climate-Smart Agriculture Implementation Framework 2018-2026](#)<sup>21</sup> guides mainstreaming of CSA and the [Kenya Climate-Smart Agriculture Project](#) has four components which are directly supported by ClimBeR WPs.

Senegal was an active participant in the 2DI and Food System Resilience Program consultations in West Africa.<sup>22</sup> 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. Senegal is actively promoting CSA, index insurance, and agro-advisories.<sup>23</sup> Senegal's [Stratégie nationale de sécurité alimentaire et de résilience](#) 2015-2035 is supported by ClimBeR WPs and Innovations.

The Zambian Government is integrating climate change concerns into its agriculture policy agenda. Under its CSA strategy framework, it is promoting CSA practices to sustainably increase productivity, enhance resilience, and reduce GHG emissions<sup>24</sup>. Its implementation framework has nine components which are supported by ClimBeR WPs and Innovations.

A ClimBeR leader was a key organizer of the 2DI MENA grand challenge.<sup>25</sup> The King of Morocco personally led the preparation of "The New Development Model" which includes a strong push for a sustainable and green agricultural sector and more support for entrepreneurship and women's participation in economic activities.<sup>26</sup> In 2020, Morocco launched its 2020-2030 agricultural development program, "[The Generation Green Strategy](#)." It focuses on transitioning toward a climate-resilient agricultural sector. Morocco's strategies are very well aligned with ClimBeR.

Guatemala participates in the Central American Integration System, which adopted a *Climate-Smart Agricultural Strategy*.<sup>27</sup> Large areas of these countries are in a “Dry Corridor” that is very vulnerable to climate change. The Strategy has four pillars or axes, each with several activity areas, which ClimBeR will support.

ClimBeR aligns very well with the *Philippines National Climate Change Action Plan2011-2028*.<sup>28</sup> Among others, 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.

Letters of support from partner organizations secured to date can be found [here](#).

## 2.7 Projection of benefits

The projections below transparently estimate reasonable orders of magnitude for impacts which could arise as a result of the impact pathways set out in the Initiative’s theories of change. Initiatives contribute to these impact pathways, along with other partners and stakeholders.

For each Impact Area, projections consider breadth (numbers reached), depth (expected intensity of effect per unit) and probability (a qualitative judgement reflecting the overall degree of certainty or uncertainty that the impact pathway will lead to the projected order of magnitude of impact).

Projections will be updated during delivery to help inform iterative, evidence-driven, dynamic management by Initiatives as they maximize their potential contribution to impact. Projected benefits are not delivery targets, as impact lies beyond CGIAR’s sphere of control or influence.

ClimBeR’s projected benefits exercise covers the number of people benefiting from CGIAR innovations expected by 2030 (Table 1). The methodology, fully described [here](#), is conservative and assumes bringing the SET bundle approach to scale during 2024-2030. Conservatively, ClimBeR expects to achieve the following benefits by 2030: three million people benefiting from food security innovations; 13 million benefiting from improved livelihoods; 21 million hectares brought under sustainable management; and 30 million people benefiting overall. Using GSEF,<sup>29</sup> we anticipate that five million+ women will benefit from CGIAR science.

We anticipate synergies with other Initiatives as per our theory of change (TOC). We have not assumed additional impact from these synergies in these projections, to ensure projections are conservative with no double counting. We will further develop the synergies and factor these into future projections during the inception period.

Table 1: Summary of ClimBeR's Project Benefits 2022-2030

Impact Area	Breadth	Number	Depth	Probability
<b>Nutrition, health &amp; food security</b>	# people benefiting from relevant CGIAR innovations	3+ million	Substantial: 500% of annual income or 50% permanent impact on income OR if health benefit: one disability-adjusted life year averted	Medium
<b>Poverty reduction, livelihoods &amp; jobs</b>	# people benefiting from relevant CGIAR innovations	13 million	Substantial: 500% of annual income or 50% permanent impact on income	Medium
<b>Gender equality, youth &amp; social inclusion</b>	# women benefiting from relevant CGIAR innovations	5+ million (Transformative - ~40%; Substantial - ~60%)	Transformative: Constraining gender norms and dynamics are shifted and reduced, and norms and dynamics which support gender equality are strengthened, leading to greater gender equality  Substantial: The different needs of men and women are identified and differentially met (but the underlying process by which these differing needs are generated are not affected)	Medium
<b>Climate adaptation &amp; mitigation</b>	# people benefiting from climate-adapted innovations	30 million	Substantial: 500% of annual income or 50% permanent impact on income OR if health benefit: one disability-adjusted life year averted.	Medium
<b>Environmental health &amp; biodiversity</b>	# ha under improved management	21 million ha	Significant: Where improved management delivers one of the following three benefits: improves soil health and fertility, delivers biodiversity gains, and provides additional ecosystem service improvements.	Medium

## Nutrition, health & food security | Poverty reduction, livelihoods & jobs | Climate adaptation & mitigation

### Assessing breadth

We used [Steiner et al.'s<sup>30</sup>](#) pathways classification for transforming food systems. Large-scale commercial farmers' pathways are through improving environmental outcomes. Conventional small-scale farmers' pathways involve increasing market integration, enabling farmers to "step up".<sup>31</sup> Pathways for farmers practicing extensive agriculture in riskier environments involve building assets and safety nets to "step up." Revitalizing rural economies and fostering non-agricultural livelihood opportunities will enable lower-endowment smallholders to 'step out'.

This classification aligns with ClimBeR's tailoring of SET bundles to different farm typologies. We used this classification to calculate the target population in each partner country. For food security, we targeted farmers engaged in extensive agriculture in riskier environments; for livelihoods, lower-endowment small-scale farmers; and for beneficiaries of climate-adapted innovations, we used all five types. The total number benefiting from ClimBeR innovations (30+ million) includes those benefiting from food security, livelihood improvement, and gender-responsive and gender-transformative approaches. For ClimBeR's Innovation Package adoption rates, we used the [ND-GAIN readiness index](#) and Thornton and Herrero<sup>32</sup> to assume 40% for Morocco and 20% for the other five countries.

### Assessing depth

For the six countries, we calculated the maize yield probability distribution for 2000-2019 (FAOSTAT) assuming a normal distribution. Based on ClimBeR's integrated approach, we combined using climate services (reducing yield variability, thereby reducing the standard deviation) and growing drought- and heat-tolerant seeds (increasing yields, thus increasing the distribution mean). We use a 25% increase in yields as a benchmark,<sup>33</sup> combined with a 50% reduction in the standard deviation, to estimate changes in permanent income.

Results show that farmers benefiting from ClimBeR innovations will increase permanent income by 68%. A sensitivity analysis using a 15% increase in maize yields combined with a 50% reduction in variability obtains a 51% (substantial) increase in permanent income. We believe that synergies among ClimBeR and other Initiatives will increase permanent income from 51-68% to 100% (transformative). Based on Pradhan et al.'s<sup>34</sup> correlation matrix, if ClimBeR advances the climate action agenda (SDG13) (Sustainable Development Goal), 91% of the time this will contribute to ending poverty (SDG1) and 86% of the time to promoting peaceful, inclusive societies for sustainable development (SDG16), in turn contributing to ending poverty 47% of the time.

### Gender equality, youth & social inclusion

#### Assessing breadth

ClimBeR's TOC assumes that stakeholders embrace achieving gender and social equity and the disruption to power balances inherent in transformation, and that the SDGs will be reached via societal transformation for which guidelines are sparse. ClimBeR's GSEF,<sup>35</sup> co-authored by two ClimBeR IDT members, addresses gender and social equity at four levels: access, procedures, representation and distribution, and avoiding maladaptation.

The number of women benefiting from ClimBeR innovations will be recorded using the project-level [Women's Empowerment in Agriculture Index \(pro-WEAI\)](#) and the [Global Gender Gap Index](#). The challenge is daunting: even after explicit efforts to enhance gender equality in climate-smart villages,<sup>36</sup> in some cases, the result was greater inequality as powerful males benefited more. ClimBeR calculates that 13 million people will benefit from ClimBeR innovations under *Poverty reduction, livelihoods & jobs*. Despite GSEF's comprehensiveness, entrenched norms mean that we estimate **very conservatively** 42% of 13 million (i.e., 5+ million) will be women.

### *Accessing depth*

Using GSEF will achieve a 100% gender success rate, i.e., 100% of the 5+ million women accessing increased employment and nutrition via ClimBeR's innovations will benefit. In the absence of data for assessing the probability of gender transformation versus responsiveness, ClimBeR assumes, conservatively, 40% of women benefiting from transformative action and 60% from responsive action.

### **Environmental health & biodiversity: # ha under improved management**

#### *Accessing breadth*

Environmental health and biodiversity benefits hinge on adoption of technologies and practices. Farmers' adoption is often disappointing due to unrealistic expectations, over-emphasis on technologies, and insufficient attention to a supporting institutional environment. We assume ClimBeR's integrated approach improves land management if institutional support is in place. We estimate adoption rates of 20-35%. This assumption is reflected in the lower probability assessment for the number of hectares (Table 1). We have calculated breadth in detail for Guatemala and the Philippines. Details for the other countries will be added in the second stage of benefit projection.

The Philippines' [Climate Resilient Agriculture Office](#)'s focuses on building climate resilience in the country's 21 river basins. Based on Dikitanan et al.<sup>37</sup> and the government's commitment to climate resilience, we calculate 5+ million ha under improved management by 2030 (baseline will be established at project inception).

In Guatemala, building climate resilience and increasing the area under improved management has been problematic, but there are successes and a growing [US government commitment to strengthen land management improvement efforts](#) to reduce out-migration rates. ClimBeR will build on successful recent efforts to build climate resilience. We calculate 1.4+ million ha under improved land management by 2030.

#### *Assessing depth*

The Philippines government is focusing on improved water provision to urban areas and developing an equitable rewards scheme for water storage and livelihood improvement in the Manupali watershed. Hence, we calculated the benefits as significant. Efforts in Guatemala are to improve agricultural livelihoods via improved soil health and water management; the depth is, therefore, significant (Table 1). We cautiously calculate similar significant gains in the other countries based on these adoption rates.

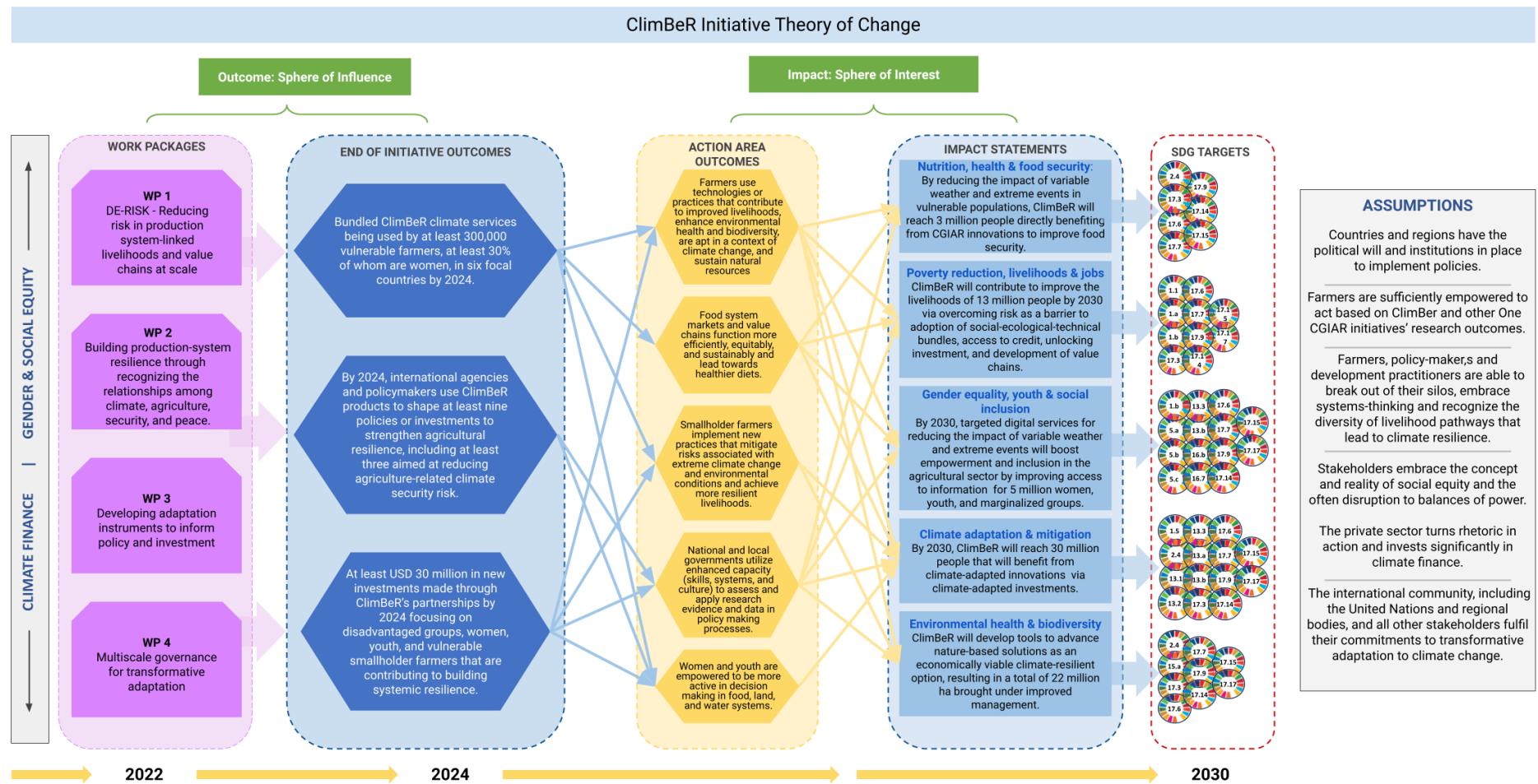
### **Assessing probability for all five indicators**

Bottlenecks to uptake of SET bundles are many and country specific. We recognize the uncertainty in our project benefit calculations. However, we estimate a medium probability that ClimBeR's innovations will achieve the anticipated breadth and depth of impacts across all five areas by 2030. This uncertainty will be reduced as ClimBeR gets underway and generates evidence of progress. We anticipate that the risk-adjusted impact projections will increase with implementation, as uncertainty is reduced, synergies are established among the Initiatives, and transdisciplinary partnerships evolve.

### 3. Research plans and associated theories of change (TOC)

### **3.1 Full Initiative TOC**

### **3.1.1 ClimBeR Initiative TOC diagram**



### **3.1.2 ClimBeR Initiative TOC narrative**

Article 2.1 of the Paris Agreement urges *adaptation “to the adverse impacts of climate change and foster climate resilience … in a manner that does not threaten food production.”* [EAT-Lancet reports](#) argue that to overcome the climate crisis, food systems must be radically reshaped. They account for [21%-37% of global GHG](#), and a significant portion of deforestation, biodiversity loss, and declining water tables. Food is produced in complex social-ecological systems, often insufficiently resilient to adapt to climate change and failing to meet the needs of people or environments.

Our **theory of change** (TOC) is that *transformative adaptation* (tackling root causes of vulnerability) via a gender and social equity framework is required to make food systems truly resilient to climate change<sup>38,39</sup>. ClimBeR adopts a holistic, intertwined SET understanding and approach,<sup>40</sup> enabling researchers and food system practitioners to integrate social equity, environmental protection, and technology. ClimBeR will bundle climate information services and climate-resilient practices within a framework of supportive, socially inclusive policies and institutions rather than adopting piecemeal or technology-focused innovations.

Three assumptions underlay ClimBeR’s TOC: 1) the capacity to learn and innovate is the basis for resilience and system transformation; 2) our partners recognize that success requires strong commitment to promoting equitable transformation of smallholder food systems; and 3) our partners welcome collaboration through an integrated participatory implementation strategy (Section 2.6).

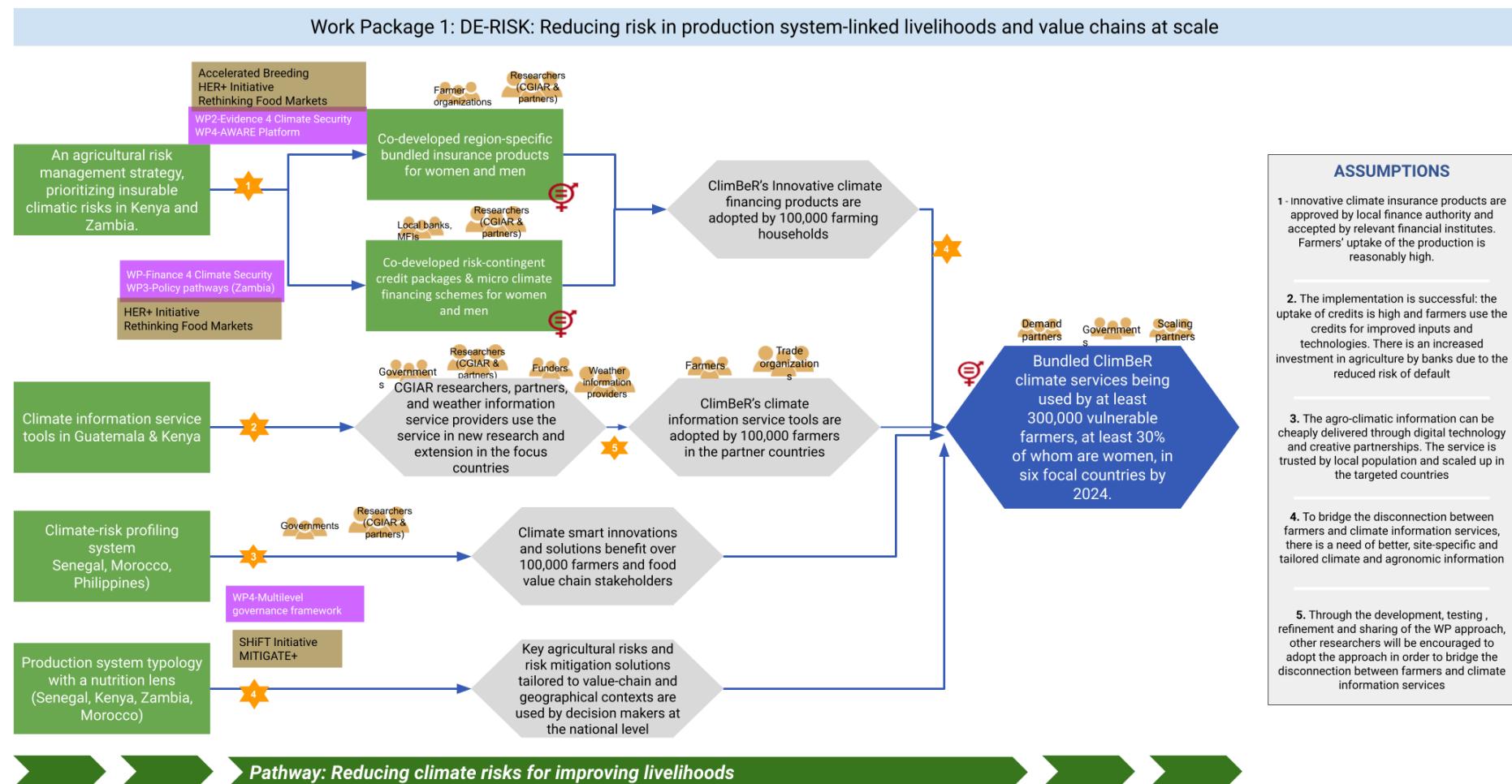
We will work with six highly vulnerable countries to identify evidence-based SET bundles linked to supportive policies and institutions that trigger transformative impacts. ClimBeR partners will co-test these bundles to demonstrate their contributions to food security, gender and social equity, farmers’ adaptive capacity, and improved welfare in the face of climate shocks (collaborating with other Initiatives, including HER+, Agroecology, MITIGATE+, Ukama Ustawi [UU], AgriLAC resiliente, Rethinking Food Markets and Value Chains for Inclusion and Sustainability, and Livestock Climate Resilience System [LCRS]). WP1 bundles these ‘best bet’ climate services, tools, and CSA practices. WP2 focuses on how to anticipate and minimize climate change impacts on security through agriculture. WP3 identifies policies to support uptake of WP1 and 2 outputs. WP4 targets the governance arrangements required at multiple scales to co-develop with women, youth and smallholders and implement effective climate resilience policies (WP3), maximize uptake of SET bundles (WP1), and address the climate-agriculture-peace nexus (WP2).

ClimBeR’s approach will generate significant change in the six countries. By 2024, 300,000+ farmers will have reduced their climate risk, while countries will have adopted climate adaptation measures that increase resilience, from gender and social equity mechanisms to climate risk systems and policy implementation. ClimBeR’s transdisciplinary and stakeholder engagement approach will generate US\$30 million+ in new investments by 2024. Longer term (2024-2030) scaling will enable 30 million+ vulnerable farmers to improve their food security, social equity, and income in a virtuous transformative adaptation cycle. Governments and other stakeholders will use ClimBeR tools to identify farmers for whom social protection is needed.<sup>41</sup>

ClimBeR directly contributes to two Systems Transformation Outcomes, two Systems Transformation/Resilient AgriFood Systems Outcomes, one Systems Transformation/Resilient AgriFood Systems/Genetic Innovation Outcome, 53 SDG targets, and five CGIAR Impact Areas, as detailed in Section 5.1.

## 3.2 Work Packages TOCs

### 3.2.1 Work Package 1 TOC diagram



### 3.2.2 Work Package 1 research plan and TOC

<b>Work Package 1 DE-RISK: Reducing risk in production system-linked livelihoods and value chains at scale</b>	
<b>Main focus and prioritization</b>	Research demand has shifted to designing innovations and directing investments to achieve climate and food system targets. This Work Package aims to reduce livelihood and value chain risks by reducing the impact of variable weather and extreme events on agriculture. It includes i) agricultural risk management, ii) digital agro-climate services, iii) climate-smart agricultural innovations, and iv) diversifying production systems and reducing nutritional impacts of climatic risks. We will apply a gender and social equity framework in designing and testing bundles of risk management solutions (including financial services), agro-climatic advisories, and resilience-building practices and technologies, which can be scaled up.
<b>Geographic scope</b>	1-CWANA/MA-Morocco 2-LAC/GT-Guatemala 3-WCA/SN-Senegal 4-ESA/KE-Kenya and ZM-Zambia 6-SEA/PH-Philippines

#### The science

RESEARCH QUESTIONS	SCIENTIFIC METHODS	OUTPUTS
<p>Can bundled insurance products such as risk-contingent credit (RCC) improve credit supply and demand? To answer this, several questions arise:</p> <ul style="list-style-type: none"> <li>• Are price or risk-rationed farm households more likely to efficiently use credit if coupled with weather insurance?</li> <li>• How can RCC be designed to improve well-being and encompass gender and social differentiation?</li> <li>• Under what conditions would rural lenders partner with insurers to retail RCC farmers in socially inclusive and gender-appropriate packages?</li> <li>• What regulatory and oversight policies will ensure that RCC is issued on a sound and gender-sensitive basis?</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Actuarial Science</i>: Calculate actuarial gender-disaggregated options/insurance premiums for credit formulas</li> <li>• <i>Randomized Control Trials (RCT)</i> for assessing impacts of RCC in Kenya and agro-climatic service in Zambia</li> </ul>	<ol style="list-style-type: none"> <li>1. An agricultural risk management strategy, prioritizing gender-differentiated, insurable climatic risks in Kenya and Zambia</li> <li>2. Innovative bundled financial products ready for scaling to female and male farmers</li> <li>3. A remote-sensing based index for assessing weather-related damage</li> </ol>
<ul style="list-style-type: none"> <li>• How can useful agricultural climate services be delivered to smallholders? What are the constraints to and drivers of</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Develop ag-data hubs</i>, visualization tools, climate-informed agro-advisories, and dissemination systems appropriate</li> </ul>	<ol style="list-style-type: none"> <li>4. Tools to provide agricultural climate information services, enable climate-</li> </ol>

RESEARCH QUESTIONS	SCIENTIFIC METHODS	OUTPUTS
<p>gender and socially differentiated adoption (with MITIGATE+ and SHIFT)?</p> <ul style="list-style-type: none"> <li>How best to integrate tailored gender-sensitive climate information services and agro-advisories into national digital extension systems (with Harnessing Digital Technologies Initiative)?</li> </ul>	<ul style="list-style-type: none"> <li>for women and men</li> <li><i>Strengthen digital climate advisory services by including needs assessments and targeting services to under-served groups</i></li> </ul>	<p>informed investments, and facilitate uptake of CSA, especially by women and marginalized groups</p> <p>5. A user-friendly Next Generation Climate Forecast System</p>
<ul style="list-style-type: none"> <li>Which farm households are most at risk from climate change (including women, youth, marginalized groups)?</li> <li>What is the adoption rate of climate-smart innovations and CSA by women as well as by men?</li> <li>How effectively do climate-smart innovations mediate the effects of weather variability on agricultural production?</li> </ul>	<ul style="list-style-type: none"> <li><i>Spatial production allocation model</i> for generating disaggregated, crop-specific production data</li> <li>Integrated bio-economic modelling</li> </ul>	<p>6. A tailored climate-risk profiling system aimed at improving gender and social equity</p> <p>7. Tailored CSA technologies to enhance women's and men's climate resilience</p>
<p>Focusing on “protective (nutritious) foods”, e.g., beans, fruits, vegetables, groundnut, sunflower, sesame seed, and major grains, the research questions are:</p> <ul style="list-style-type: none"> <li>How extensive is the production of protective foods in our focus regions? What are their drivers, barriers and markets?</li> <li>What percentage of households produce protective foods? Are there differences based on socioeconomic status or gender?</li> <li>What characteristics, including gender, predict the choice to produce protective foods and their productivity?</li> </ul>	<ul style="list-style-type: none"> <li><i>Merge gender-disaggregated nutrition data from the Demographic and Health Surveys</i> with gridded farming system data</li> <li>Econometric analysis of integrated gender-disaggregated household surveys and biophysical parameters, cluster analysis, and machine learning methods</li> </ul>	<p>8. A typology of production systems through gender and nutrition lenses useful as a decision support tool for prioritizing and targeting investments</p> <p>9. Policy options and investments for enhancing nutrition and gender equity</p>

### The theory of change

**End-of-Initiative outcome:** Bundled ClimBeR climate services being used by at least 300,000 vulnerable farmers, at least 30% of whom are women, in six focal countries by 2024 (*supported by WP3 and 4 policy and governance work*).

The WP1 TOC is that by empowering our partners through collaboration and capacity development, they will “own” the products and drive scaling out.

**Output 1: Agricultural risk strategy.** In Kenya and Zambia, ClimBeR and partners will co-design bundled insurance products, such as gender appropriate RCC. Targeted financial education, RCTs, monitoring, and loan repayments will be managed by local partners, providing expertise to continue after the project.

We will co-design with partners gender-appropriate RCC packages and financial literacy and agronomic training modules, giving support to conduct training tailored to both women and men. We will use [pro-WEAI](#) to measure the effects of adoption on empowerment of women and men. We will work closely with WP3 and WP4 in Zambia and engage with key decision makers and investors from the beginning. Our partners will extend their business models to farmers in East and Southern Africa.

*Output 2: Climate information service tools.* We will identify ways to provide agricultural climate services efficiently, design climate-informed investments, and facilitate uptake of CSA for women and men in Guatemala and Kenya. We will work closely with local partners to scale out the services and tailor capacity development and communication activities to target women and empower women's associations.

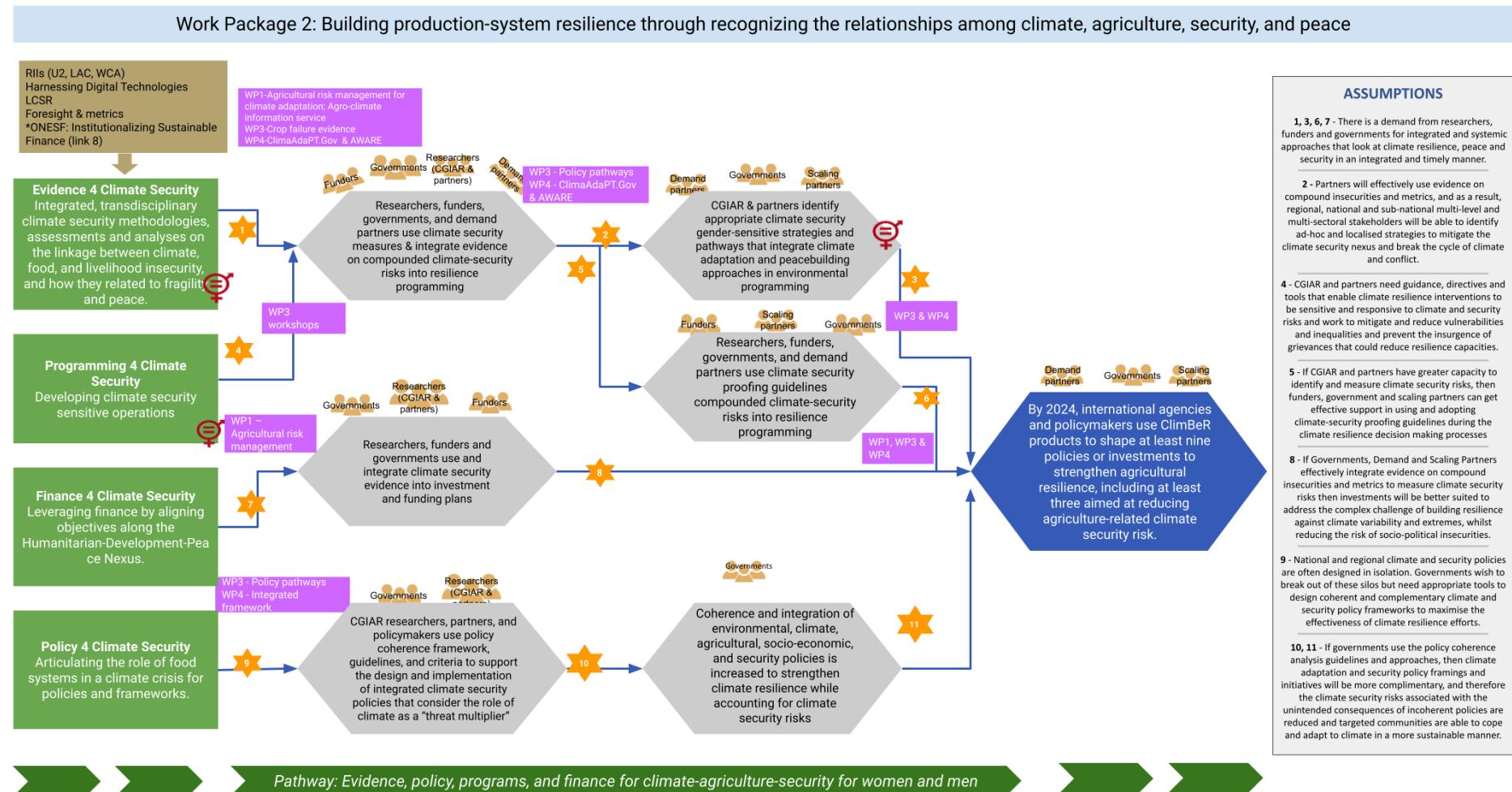
Our success will depend on the commitment of our national partners; therefore, we will invest heavily in capacity development, mentoring, training and workshops with a strong emphasis on targeting women and youth. We will involve key national decision makers from the beginning to get support and buy-in, share the results, and support preparation of implementation plans to roll out services.

*Output 3: Climate-risk profiling system.* With partners, we will assess ways in which climate risk disproportionately affects women and whether sustainable agriculture practices and climate-smart innovations, including water management technologies, increase productivity and resilience in Senegal, Morocco, and the Philippines. We will emphasize training and capacity development of our regional and national partners to empower them to lead the work. Using WP4's multi-level governance framework, we will share results with policymakers and funding agencies, and support them to develop investment plans using gender-disaggregated agricultural risk profiling and risk assessment tools. Water risks and security will be explicitly addressed.

*Output 4: Production system typology with a nutrition lens.* Working closely with partners in Senegal, Kenya, Zambia, and Morocco, we will evaluate the nutritional impact of climatic risks and the interactions among climate, farming systems, gender and nutritional outcomes. ClimBeR will collaborate with other CGIAR Initiatives including MITIGATE+ and SHiFT.

For other outputs, we will provide technical support, training, and capacity development to national partners to conduct the work; engage the appropriate ministries in partner countries; and develop technical guidance on ways to invest in CSA that directly support improved nutrition. The outcome will be agricultural and health investments that focus on gender and nutrition, ultimately benefiting millions of people.

### **3.2.3 Work Package 2 TOC diagram**



### 3.2.4 Work Package 2 research plan and TOC

#### Work Package 2 Building production-system resilience through recognizing the relationships among climate, agriculture, security, and peace.

<b>Main focus and prioritization</b>	Many donors and governments now acknowledge that climate is a “threat multiplier”, as it exacerbates risks and insecurities that increase the likelihood and intensity of conflicts in agricultural communities. This Work Package will focus on enhancing climate-resilient peace, a transformative process to address inequitable access to natural resources by 1) providing robust science on the CS and agriculture nexus, 2) supporting policies, programs, and finance to become more sensitive to CS risks and insecurities, and 3) designing evidence-based environmental, political, and gender-equitable solutions through bottom-up, participatory, and multi-stakeholder engagement approaches.
<b>Geographic scope</b>	2-LAC/GT-Guatemala 3-WCA/SN-Senegal 4-ESA/KE-Kenya and ZM-Zambia 6-SEA/PH-Philippines

#### The science

RESEARCH QUESTIONS	SCIENTIFIC METHODS	OUTPUTS
<ul style="list-style-type: none"> <li>• How does climate change act as a “threat multiplier” vis-à-vis agriculture?</li> <li>• Which socio-economic risks and insecurities exacerbated by climate change increase the likelihood and intensity of conflict?</li> <li>• Are areas of high climate variability correlated to high socio-political insecurity?</li> <li>• What are the most vulnerable areas to CS risks and which climate insecure areas should be prioritized for mitigating the CS nexus and enhancing resilience?</li> <li>• How are CS challenges experienced by women, youth, and marginalized groups?</li> <li>• What is the optimum package of interventions to prevent (and cope with)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Data driven approaches</b>, to a) test whether and how climate is a threat multiplier vis-à-vis agriculture at national and sub-national level (econometric/big data analysis); b) identify climate insecurity hotspots in agricultural settings (spatial analyses); c) characterize the network of climate risks and insecurities and associated vulnerabilities interconnected with agriculture (network analyses)</li> <li>• <b>Qualitative approaches</b> to validate evidence gathered</li> </ul>	<p><b>A Climate Security Observatory</b>, a decision-support tool to provide real-time, concise, policy-relevant CS analyses including impact pathways; real-time monitoring and risk forecasting of the interaction of climate, conflict, and other insecurities in agriculture using big data and machine learning and automated spatial and hot-spot analyses to regularly identify insecure and fragile areas and their main drivers in agricultural settings</p> <p><b>A “Climate Security Index” (CSI)</b> for monitoring and assessing the role of climate as a threat multiplier on peace and stability at sub-national, national, and regional levels</p>

RESEARCH QUESTIONS	SCIENTIFIC METHODS	OUTPUTS
<p>conflicts and insecurities and ensure resilience in the face of increasing climate uncertainty?</p> <ul style="list-style-type: none"> <li>• How can compound risks to climate resilience be monitored and assessed in real or near-real time?</li> </ul>		
<ul style="list-style-type: none"> <li>• Are current agricultural policies designed to mitigate the role of climate as a “threat multiplier”?</li> <li>• How can policies become more CS sensitive and pay special attention to women, children and other vulnerable people?</li> </ul>	<p><b>Policy coherence analysis</b> to assess whether climate, natural resources, agricultural, socio-economic and security policies recognize the role of climate as a threat multiplier.</p>	<p><b>Climate Security Policy Coherence Toolkit</b>, providing innovative methods and toolkits through which policy gaps and inconsistencies can be identified and addressed.</p>
<ul style="list-style-type: none"> <li>• Are current agricultural programs designed to mitigate the role of climate as a “threat multiplier”?</li> <li>• How can agricultural programs become more CS sensitive while also contributing to gender and social equity?</li> </ul>	<ul style="list-style-type: none"> <li>• Climate and conflict risk assessments</li> </ul>	<p><b>Climate Security Proofing Guidelines</b> that inform decision-making, incorporate gender and are socially equitable</p>
<ul style="list-style-type: none"> <li>• Are current agricultural policies designed to mitigate the role of climate as a “threat multiplier”?</li> <li>• How can policies become more CS sensitive and pay attention to women, children and other vulnerable people?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Policy coherence analysis</b> to assess whether climate, natural resources, agricultural, socio-economic and security policies recognize the role of climate as a threat multiplier and differential gender impacts</li> </ul>	<p><b>Climate Security Policy Coherence Toolkit</b>, providing innovative methods and toolkits through which policy gaps and inconsistencies can be identified and addressed</p>
<ul style="list-style-type: none"> <li>• How can public and private finance be designed and encouraged to invest in reducing CS risks?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Qualitative approaches</b> to identify entry points in public and private finance to increase sensitivity to CS risks</li> </ul>	<p><b>Toolkits to increase alignment of public and private finance along the Humanitarian-Development-Peace Nexus</b>, including tools to increase gender-sensitivity of climate finance instruments</p>
<ul style="list-style-type: none"> <li>• What are the localized and gender and socially sensitive solutions to climate- and conflict-specific challenges related to agriculture?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Stakeholder engagement</b> at regional, national, and sub-national level</li> <li>• <b>Community-based approaches</b> to co-create and identify CS sensitive solutions based on collective actions</li> </ul>	<p>Contributes to all outputs</p>

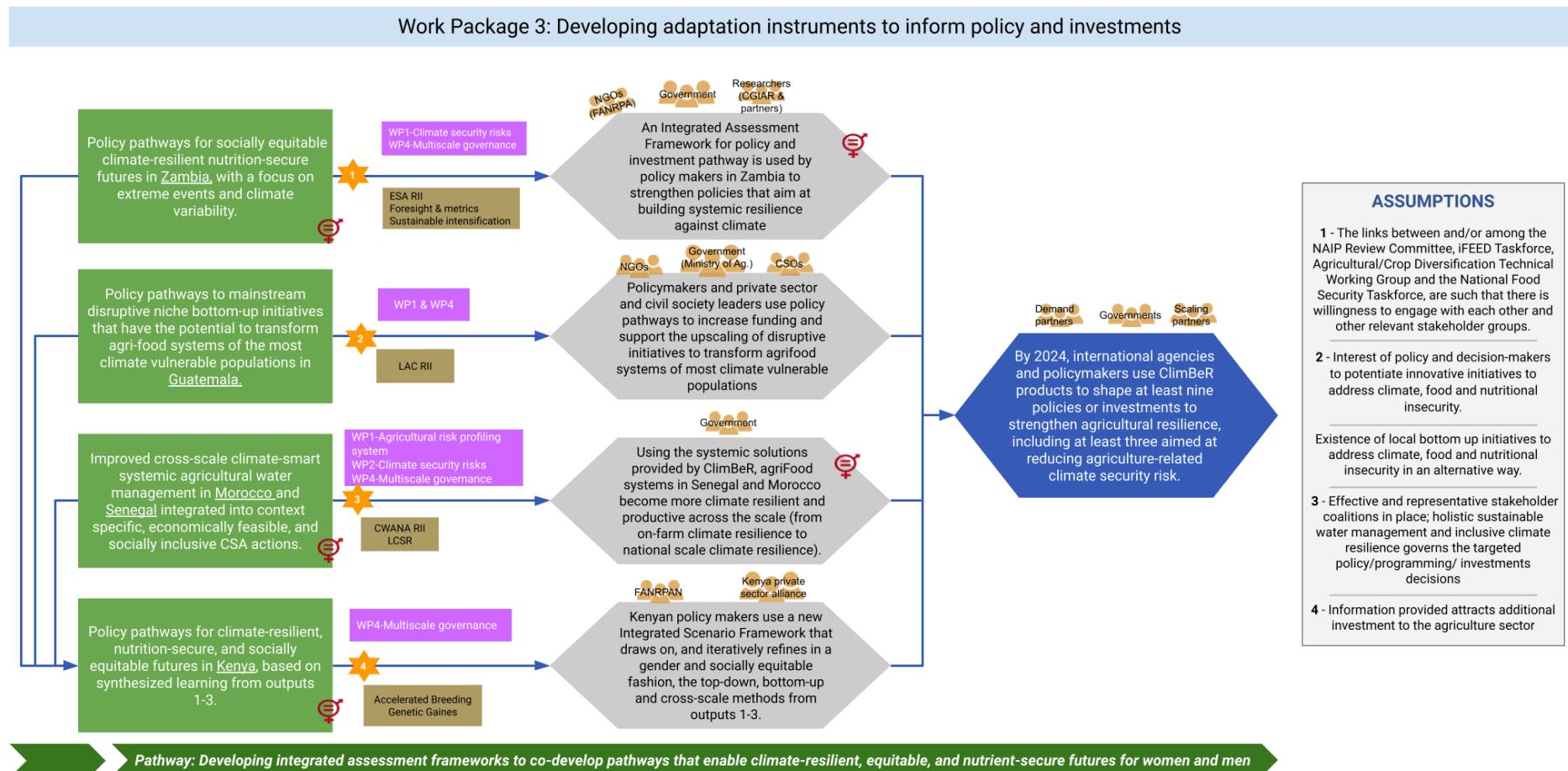
## **The theory of change**

**End-of-Initiative outcome:** 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 CS risk (*drawing on WP1 outputs and WP3 and 4 work on policies and governance*).

WP2 responds to UNFCCC's call for transformative climate action and CS-sensitive agriculture, by four Action Areas:

- 1) **Evidence 4 climate security:** We 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. Training, workshops, and learn-by-doing will increase partners' ability to identify CS risks in agricultural settings. In collaboration with WP1, Regional Initiatives, Harnessing Digital Technologies, LCSR and MITIGATE+, tailored decision support and communication tools will support partners to design, monitor, and implement transformative, climate-resilient agricultural interventions, targeted at climatically vulnerable, conflict-affected areas and vulnerable groups, including women and youth. Using participatory and community-based approaches, we will co-create localized gender and socially sensitive solutions to climate- and conflict-specific agricultural challenges. As a result, policies and initiatives will improve targeting, mapping, and monitoring of compound CS risks.
- 2) **Programming 4 climate security:** With demand partners (e.g., WFP), innovation partners and other CGIAR Initiatives, we will develop a systematic approach to integrating CS analyses into agricultural programming. Through continuous engagement with decision makers based on WP4's multi-level governance frameworks, we will help CGIAR and its partners to institutionalize this approach, identifying appropriate CS strategies that integrate climate adaptation and peacebuilding approaches into agricultural and environmental programming. Learning events, including webinars, personal briefings, and media outreach, will help mainstream innovations and tools. Scientifically informed decisions will result in development programs and policies being responsive to CS risks.
- 3) **Policy 4 climate security:** Uninformed adaptation policies risk having unintended negative effects, particularly in already fragile settings<sup>42</sup>. We will collaborate with communities, civil society, and governing bodies across multiple scales to improve the coherence, integration, and performance of climate-related security and agricultural policies. We will work with WP3 and national, regional, and international partners to co-develop methods to identify lack of policy coherence, address knowledge gaps and design tailored pathways to institutionalize the linkages between climate, agriculture, peace and security. Community approaches will be used to identify specific vulnerabilities and potential solutions to tailor CS sensitive policies to the needs of the most vulnerable.
- 4) **Finance 4 climate security:** In alignment with WP1 and Regional Initiatives, especially UU, we will work with international and local finance institutions to develop tools to help investors base their agricultural investments on conflict sensitivity analysis and integrated CS risk assessments. Direct engagement and training will inform international, national, public, and private investors on the design, implementation, and monitoring of CS sensitive, sustainable finance instruments and tools along the humanitarian-development-peace nexus. This will build on past CCAFS work and link to broader One CGIAR sustainable finance work, particularly regional Initiatives (LCSR and AICCRA).

### 3.2.5 Work Package 3 TOC diagram



### 3.2.6 Work Package 3 research plan and TOC

Work Package 3 Developing adaptation instruments to inform policy and investments	
<b>Main focus and prioritization</b>	We will co-develop and apply gender-sensitive policy pathways and integrated assessment frameworks that enable climate-resilient, nutrition-secure futures. The framework integrates: 1) a top-down approach using participatory scenario workshops, in-country task forces, and knowledge integration workshops to translate modelling, trade, and nutrition data into socially equitable climate-resilient trade, land use and agricultural policy and investment decisions; 2) a bottom-up collective imagination of futures incorporating existing innovative grassroots practices and the inclusion of women, youth, and marginalized groups to spur policies and financing mechanisms to support transformation of agrifood systems.  The framework will build on cross-learning from existing projects in pilot countries.
<b>Geographic scope</b>	1-CWANA/MA-Morocco 2-LAC/GT-Guatemala 3-WCA/SN-Senegal 4-ESA/KE-Kenya and ZM-Zambia

#### The science

RESEARCH QUESTIONS	SCIENTIFIC METHODS	OUTPUTS
<ul style="list-style-type: none"> <li>How can trade and nutrition data, inclusive stakeholder engagement, socio-economic analysis, and crop-climate modelling be combined to inform policies and investments?</li> <li>What are the trade-offs and opportunities characterizing different policy and investment pathways for transforming agriculture and food systems, incorporating gender inclusion and social equity?</li> </ul>	<p><b>Top Down: Zambia</b></p> <ul style="list-style-type: none"> <li>Applying the <b>Integrated Assessment Framework (GCRF-AFRICAP)</b> to develop policy and investment pathways appropriate to national and regional conditions</li> <li>Using the <b>GCRF-AFRICAP iFEED (integrated Future Estimator for Emissions and Diets)</b> dataset, which contains millions of simulations for crops and varieties in Zambia across multiple future scenarios</li> <li>Using the <b>Risk Assessment of Multi-Synchronous Breadbasket Failures tool</b>, a rapid assessment tool that estimates risk of synchronous crop failures due to global climate change</li> <li>Using <b>Climate-Smart Agriculture Investment Planning</b> to create an investment pipeline by identifying priorities and assessing investment readiness</li> </ul>	<ol style="list-style-type: none"> <li>Policy pathways for socially equitable, climate-resilient nutrition-secure futures in <b>Zambia</b>, responsive to climate variability, to inform policies, including NAP, NDC and Long-Term Strategy under UNFCCC</li> </ol>
• Which bottom-up, innovative and/or disruptive initiatives	<b>Bottom Up: Guatemala</b>	<ol style="list-style-type: none"> <li>Policy pathways to mainstream</li> </ol>

RESEARCH QUESTIONS	SCIENTIFIC METHODS	OUTPUTS
<p>exist with potential for agricultural transformation to build climate resilience and social equity?</p> <ul style="list-style-type: none"> <li>How can innovative bottom-up initiatives addressing climate and food insecurity be completely mainstreamed and foster civil society and private sector development?</li> </ul>	<ul style="list-style-type: none"> <li>Identification/mapping of 'Seeds of a good anthropocene' using the <a href="#">Three Horizons framework</a> to design development pathways to stimulate upscaling of niche initiatives, combined with participatory scenario development and planning for anticipating transformative futures</li> <li>A <b>bottom-up collective imagination of futures</b> based on innovative grassroots practices and inclusion of women, youth, and marginalized groups</li> <li><b>CSA Investment Planning</b> approaches used alongside local knowledge to identify opportunities for private sector investment, with civil society and government supporting an enabling environment</li> </ul>	disruptive bottom-up initiatives with potential to transform agrifood systems in <b>Guatemala</b> , to inform policy documents including NAP, NDC and Long-Term Strategy under UNFCCC
<ul style="list-style-type: none"> <li>How to design replicable multi-actor decision-making processes integrating evidence from integrated modelling tools and local knowledge?</li> <li>What institutional mechanisms and science-development-policy partnerships are most effective to implement CSA and water management interventions at multiple scales?</li> <li>How well can C4S interventions align with the NAPs of Morocco and Senegal?</li> </ul>	<p><b>Cross-scale: Morocco and Senegal</b></p> <ul style="list-style-type: none"> <li>Applying <b>C4S – Climate-Smart System Solutions and Scaling</b> with the <a href="#">BRIDGE collective</a>, a decision support framework for assessing resilience at farm and higher scales and potential impacts and trade-offs of a portfolio of climate and water stress scenarios</li> </ul>	3. Improved cross-scale climate-smart systemic agricultural water management in <b>Morocco and Senegal</b> to evaluate potential impacts/ trade-offs of climate adaptation options to inform decision makers and planners on aligning climate resilience policies (including NAPAs) with other key development policies, e.g., nutrition, food and water security
<ul style="list-style-type: none"> <li>What additional information can be provided to stakeholders by synthesizing top-down (output 1), bottom-up (output 2), and cross-scale (output 3) approaches to policy pathways?</li> <li>Is this information more actionable than that provided by outputs 1-3 individually?</li> </ul>	<p><b>Synthesis and cross-learning: Kenya</b></p> <ul style="list-style-type: none"> <li>Development and application of a new <b>Integrated Scenario Framework</b> that draws on outputs 1-3</li> </ul>	4. Policy pathways for climate-resilient, nutrition-secure, and socially equitable futures in <b>Kenya</b> , able to inform policy documents including NAP, NDC and Long-Term Strategy under UNFCCC

## **The theory of change**

**End-of-Initiative outcome:** 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 (*investments include WP1 outputs and apply WP2 outputs, supported by WP4 governance work*).

Outputs 1-3 build on prior work, making immediate in-country impact likely. Output 4 will develop and test scale readiness, both through reflecting on risk in partner countries, and by integrating learning from application of the methods used.

The impact pathway is through direct engagement with influential policymakers with whom the project team has already worked. For example, Output 1 will work with policy partners in the UK government's Global Challenges Research Fund Agricultural and Food System Resilience: Increasing Capacity and Advising Policy [GCRF-AFRICAP](#) project, which developed iFEED; and Output 2 will work with grassroots organizations, including women's groups, to identify disruptive initiatives and plan transformation pathways. Engagement will be facilitated through the Food, Agriculture and Natural Resources Policy Analysis Network ([FANRPAN](#)) and in-country CGIAR institutions. An iFEED task force exists in Zambia. Through engagement in their framing and analysis, these key stakeholders will ensure that the modelling addresses policy-relevant questions and evaluates policy pathways to achieve adaptive transformation under alternative future climates. WP3 will engage with stakeholders representing innovative niche initiatives and practices with transformative potential. Working collaboratively offers the greatest potential for the evidence to feed into policy making and investments. It also offers a direct means of monitoring and evaluating impacts.

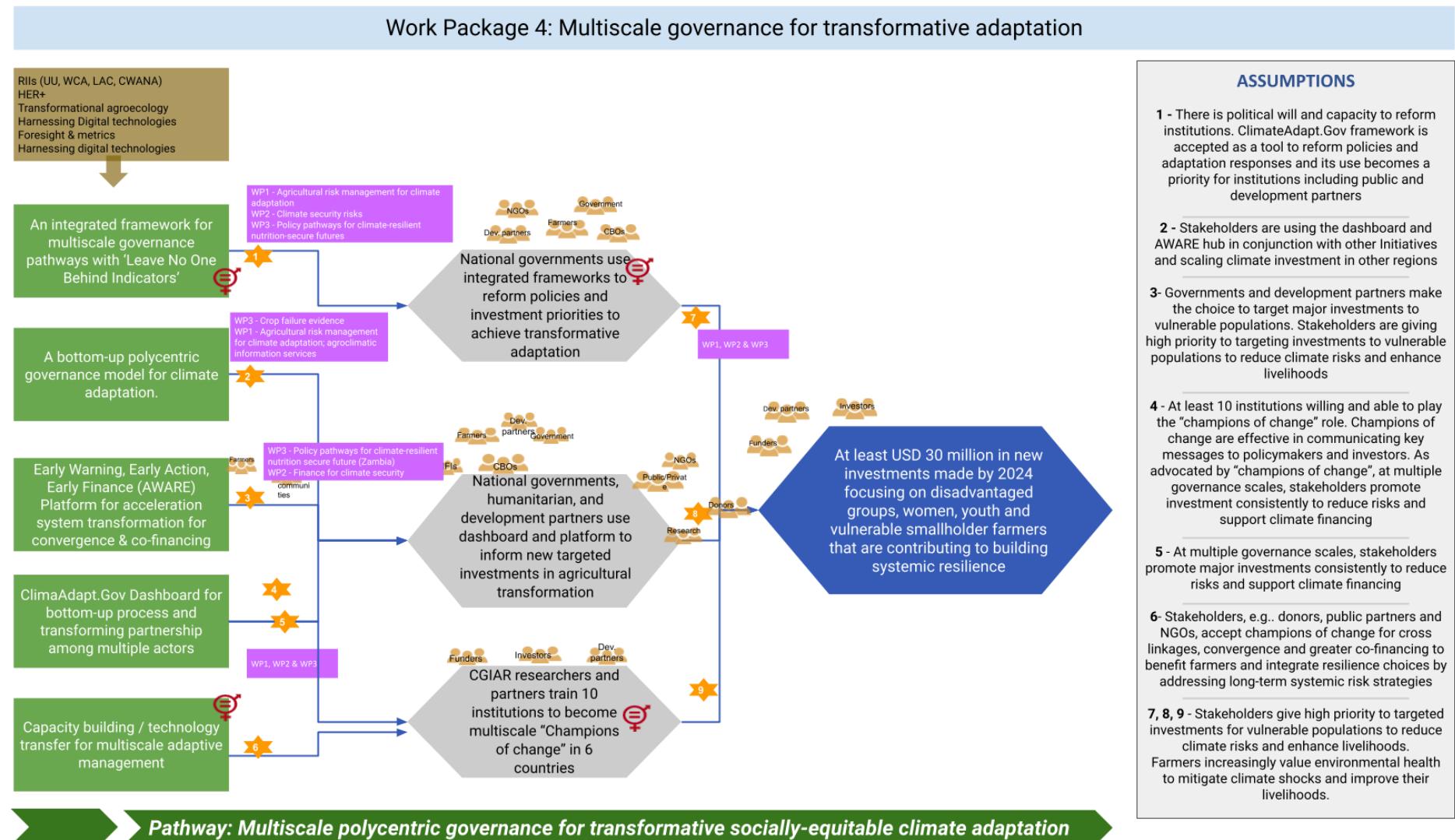
In the stakeholder workshops, we will bring together agricultural and nutrition policymakers and representatives of women's groups, following an iterative process to de-silo policies. Continuous engagement will ensure that policy planning employs multi-level governance that has been tried and tested with decision makers.

FANRPAN will lead engagement with regional stakeholders to embed learnings, policies, and practices more widely. We will use targeted policy materials (briefs, presentation packs, regular email updates) to share evidence and tailor recommendations to different constituencies (e.g., national governments, regional bodies, international organizations, donors). This will leverage FANRPAN's networks for policy influence and other regional organizations (e.g., [Forum for Agricultural Research in Africa](#), Regional Universities Forum for Capacity Building in Agriculture [[RUFORUM](#)], Common Market for Eastern and Southern Africa, Southern Africa Development Community). FANRPAN's participation will ensure ClimBeR products feed into national and regional policy processes beyond the focus countries, especially by increasing African researchers' capacities to generate, analyze and use data, information, knowledge, and innovations to enhance resilience and equity of livelihoods and production systems.

In Morocco and Senegal, the co-construction of a C4S multiscale multicriteria decision-making framework will allow decision makers to systematically test the potential impacts and trade-offs of a portfolio of climate adaptation actions. Rather than tackling climate change separately, National Adaptation Programmes of Action (NAPAs) will be inclusive and better aligned with other development priorities like sustainable water management and food and nutrition security.

A science development policy consortium including CGIAR, BRIDGE, and national and international partners will engage with existing science policy collaboration spaces like Agence Nationale de l'Aviation Civile et de la Météorologie in Senegal. These will guide NAPAs and other schemes relevant to achieving climate resilience.

### 3.2.7 Work Package 4 TOC diagram



### 3.2.8 Work Package 4 research plan and TOC

Work Package 4	Multiscale governance for transformative adaptation
Main focus and prioritization	Climate change mitigation often occurs at the global scale, but agricultural adaptation happens at local scales. We will implement a bottom-up <a href="#">polycentric governance process</a> that provides opportunities for self-organization and learning across systems, but independent decision making for adaptation planning and implementation at local level. This Work Package will: 1) develop and integrate bottom-up multiscale polycentric governance frameworks for reducing <a href="#">systemic cascading risks</a> ; 2) co-demonstrate transformative adaptation options with relevant actors to illustrate applicability across scales; and 3) co-develop “champions of change” to advocate polycentric multiscale governance to target local investments for empowering farmers, including women.
Geographic scope	1-CWANA/MA-Morocco 2-LAC/GT-Guatemala 3-WCA/SN-Senegal 4-ESA/KE-Kenya and ZM-Zambia

#### The science

RESEARCH QUESTIONS	SCIENTIFIC METHODS	OUTPUTS
<ul style="list-style-type: none"> <li>• What are the most critical pathways for agricultural system transformations responding to climate change?</li> <li>• How can a <a href="#">polycentric governance</a> framework<sup>43</sup> help overcome transformative constraints to address compound risks and impacts associated with COVID-19 among vulnerable smallholder farmers and communities?</li> <li>• How can constraints specific to women, youth and marginalized groups be identified and addressed?</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct a <i>systematic meta-review</i> incorporating a gender lens of existing policies, institutions, and stakeholder consultations to develop a bottom-up polycentric governance framework for multiscale transformative adaptation</li> </ul>	<p>1. A <b>bottom-up polycentric governance model for climate adaptation</b> able to contribute to the implementation of policies including NAPs, NDCs and Long-Term Strategies under UNFCCC</p>
<ul style="list-style-type: none"> <li>• How to support policymakers, donors, and others to use fine-scale climate risk information and data to identify “best-bet” adaptation measures that meet local development aspirations and empower women and men to enhance climate resilience while promoting social equity?</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct <i>statistical (cluster) analysis</i> using climate, geographical, and socio-economic data to identify and target fine-scale vulnerable hot spots across multiple scales</li> <li>• Use ClimBeR’s GESF to identify potential multiscale interventions for transformative adaptation and practical indicators for monitoring and evaluation</li> <li>• Conduct dialogues with ministries, NGO, community-based</li> </ul>	<p>2. An <b>integrated framework with ‘Leave No One Behind Indicators’</b> incorporating gender and social equity to strengthen polycentric governance that facilitates multiscale, cross-cutting interventions, and co-management of inter-</p>

RESEARCH QUESTIONS	SCIENTIFIC METHODS	OUTPUTS
	organizations (CBOs), the donor community, and local communities to evaluate, test and implement the framework	related sectors: water, energy, and food
<ul style="list-style-type: none"> <li>How can multiscale polycentric governance facilitate improving the coordination, collaboration, and dissemination of adaptation strategies and measures to various actors to enhance resilience of food, land and water systems and monitor the progress of meeting NAPA and SDG targets at scale?</li> </ul>	<ul style="list-style-type: none"> <li>Develop <i>ClimaAdapt.Gov dashboard</i> with Specific, Measurable, Attainable, Realistic, and Time Bound (SMART) monitoring and evaluation indicators across scales (national, district, and local level) and use them to: <ul style="list-style-type: none"> <li>monitor progress of adaptation and SDG targets</li> <li>facilitate course correction by leveraging, exchanging, integrating and transforming partnerships to address complex challenges among multiple actors for transformative adaptation</li> </ul> </li> </ul>	<p><b>3. ClimaAdapt.Gov Dashboard</b> to empower farmers, communities, and policy planners to plan and implement bottom-up integrated climate and water risk management interventions to enhance resilience under uncertain climate regimes and to contribute to the implementation of policies including NAPs, NDCs and Long-Term Strategies under UNFCCC</p>
<ul style="list-style-type: none"> <li>What are the most effective policies, interventions, and governance arrangements that should be prioritized across scales to accelerate socially equitable system transformation to strengthen smallholder farmers' and communities' drought responses?</li> </ul>	<ul style="list-style-type: none"> <li>Develop an "<i>Early warning, Early Action, Early Finance</i>" (AWARE) platform using earth observation data for agricultural drought monitoring indicators combined with socioeconomic data and conduct agricultural risk threshold analyses (with WP1)</li> <li>Develop a <i>standard operating procedures</i> template to guide agricultural drought risk management involving proactive preparedness strategies, timely drought declaration and implementing contingency measures (with WP2)</li> <li><i>Identify enabling policies and governance mechanisms</i> to promote field-scale interventions through integrated natural resource management and farming systems perspectives, agro-advisories, crop insurance, and relevant interventions for transformative adaptation (with WPs 1 and 3)</li> <li>Conduct <i>network analysis, focus group discussions, and stakeholder interviews</i> to identify adaptation measures, characterize effective policies, institutions, and multiscale governance mechanisms under various socio-economic and ecological conditions</li> </ul>	<p><b>4. AWARE platform</b> to promote integrated multiscale institutional responses to climate shocks to increase water and food security for enhancing nutrition and livelihood security among vulnerable populations (in addition to Output 2, above)</p>

### ***The theory of change***

**End-of-Initiative outcome:** At least US\$30 million in new investments made through ClimBeR's partnerships by 2024, focusing on disadvantaged groups, women, youth, and vulnerable smallholder farmers that are contributing to building systemic resilience (*drawing on WP1 outputs, supported by WP3 policy outputs*).

A major future climate challenge is to manage interconnected and multiple risks and crises and strengthen the resilience of food systems. WP4 addresses these challenges through a polycentric governance framework by analyzing the capacity of institutions across scales and sectors, their requirements for information, data and tools, and their ability to use them for diagnosing and solving problems. Moreover, it assesses institutional capacities for building consensus and institutional reform and for developing and carrying forward agreements on policy strategies to monitor and achieve national commitments to UNFCCC and United Nations Forum on Sustainability Standards (UNFSS) (NAPs, NDCs, and SDGs) as well as to meet women and men farmers' aspirations and demands for bottom-up planning.

WP4 will integrate digital climate services and climate-smart innovations from WP1, CS risk analysis in fragile agricultural communities from WP2, and policy pathways for climate-resilient and nutritional security futures from WP3 into a bottom-up polycentric governance model. Project innovations for understanding cascading risks, ClimaAdapt.Gov Dashboard, and AWARE platforms will be fit-for-purpose to meet stakeholders' demands.

Capacity building, through consultations and dialogues with stakeholders, including farmers, policymakers, donors, and implementers, will further strengthen the scaling readiness plan. Stakeholders and partners will be supported to enhance their ability to diagnose implementation constraints and to develop and evaluate innovations that address issues that reflect the needs of women, youth, and disadvantaged groups. Stakeholders will also be assisted to develop innovative financing and business strategies for navigating towards transformative governance across scales, with water as a 'connector' to encourage collaboration between the climate, food, water, and energy sectors.

We will strengthen government agency capacities across sectors and levels to apply the GESF and 'Leave No-One Behind Indicators' to design local investments targeted to support women, youth and disadvantaged groups; to understand the cascading risks requiring multi-sectoral and multidisciplinary cooperation; to use the ClimaAdapt.Gov dashboard and the AWARE platform for collaborative responses to agricultural drought risks; and to facilitate monitoring and evaluation of progress.

Through training of trainers, stakeholders will learn to use satellite information to provide a broad view of environmental, social, and economic contexts and to fill data gaps. We will also highlight the regional nature of climate-related issues to encourage a culture of data sharing among partner organizations.

Finally, we will mobilize "champions of change" drawn from many institutions, including farmer organizations, women, youth and disadvantaged groups, district authorities, river basin managers, national and regional institutions, development actors, and the private sector. These champions will raise awareness around adaptation approaches, financing, technology, and inclusivity to encourage buy-in at all levels – catalyzing and accelerating the scaling of transformative adaptation. In Africa, we will work with RUFORUM to train the next generation of scientists to become these champions of change.

## **4. Innovation Packages and Scaling Readiness Plan**

### **4.1 Innovation Packages and Scaling Readiness Plan**

ClimBeR plans to co-design and co-test three Innovation Packages using the Scaling Readiness approach, from among five planned Core Innovations:

1. A Climate-Risk Profiling System (WP1)
2. A financial product with insurance protection embedded (risk-contingent credit) (WP1)
3. A CSI and a Climate Security Observatory (WP2)
4. An Integrated Assessment Framework to develop policy pathways (WP3)
5. A multiscale governance framework to support increasing food and nutrition security of vulnerable households (AWARE, ClimAdapt.Gov Dashboard) (WP4)

Work on these innovations is built into the Work Packages. We will identify opportunities for cross-Initiative collaboration and co-investment, especially with Initiatives such as *UU*, *AgriLAC resiliente*, *Rethinking Food Markets and Value Chains* and *LCSR*. We will assess the Scaling Readiness of Innovation Packages twice during 2023-2024. We propose to be part of the Second Wave, starting Light Track from Q4-2022 onwards, and Standard Track from Q3-2023 onwards. ClimBeR aims to apply the approach to 26-50% of the Initiative innovation portfolio by the end of 2024.

We will design and assess three Innovation Packages using the Scaling Readiness approach. One example is bundling the climate-risk-profiling system with the LTACs and the integrated framework for multiscale governance in Guatemala. Another is bundling the Climate Security Observatory with a CSI through secondments of our researchers to key strategic institutions with an important component of capacity building.

ClimBeR has allocated US\$210,000 to implement the Innovation Packages and Scaling Readiness plan (2022: US\$10,000; 2023: US\$100,000; 2024: US\$100,000). Dedicated activities, deliverables, indicators, and line-items are included in the Management Plan, and MELIA Sections.

## **5. Impact statements**

### **5.1 Nutrition, health & food security**

#### ***Challenges and prioritization***

Droughts and floods induced or magnified by climate change are one driver of food insecurity and malnutrition: reduced agricultural production results in less food available, increased prices, and reduced incomes. We cannot achieve SDG 2 (end hunger) without making smallholder agriculture more resilient and productive in the face of climate change. ClimBeR is premised on strengthening climate resilience in ways that empower farmers and other stakeholders to chart livelihood pathways that lead to prosperous, equitable and sustainable futures. As part of this transformative adaptation leading to climate-resilient development, ClimBeR has integrated work on nutrition and food security into its plans, especially in WPs 1, 3 and 4, and one Innovation (AWARE).

#### ***Research questions***

WPs will address several questions including:

- WP1: How extensive is the production of protective (nutritious) foods in our focus regions, and by whom?
- WP1: What percentage of households in different geographical areas -- rural/urban, subnational areas, agro-ecologies, countries – produce protective foods?
- WP3: How can trade and nutrition data, inclusive stakeholder engagement, gender and socio-economic analysis, and crop-climate modelling be effectively combined to inform policies and investments?
- WP4: What are the most effective packages of policies, interventions, and governance arrangements that should be prioritized across scales to accelerate gender and socially equitable system transformation to strengthen smallholder farmers' and communities' responses to drought shocks and reduce malnutrition?

#### ***Components of Work Packages***

- WP1 output: a typology of production systems with a gender and nutrition lens that will serve as a decision support tool to guide investments for enhancing resilience to climatic risks in the focus countries.
- WP3 output: an integrated assessment framework for co-developing policy pathways that enable climate-resilient, nutrition-secure futures.
- WP4 output: a multiscale governance framework to support increasing food and nutrition security of vulnerable households (AWARE).

#### ***Measuring performance and results***

By reducing the impact of variable weather and extreme events, ClimBeR will reach three million persons directly benefiting from ClimBeR innovations to improve food security by 2030. The 2024 outputs and outcomes will establish a foundation for this: use of bundled climate services will improve agricultural production and resilience. Our robust MELIA will include indicators on gender and nutrition.

#### ***Partners***

National partners in four partner countries (Senegal, Kenya, Zambia, Morocco); CGIAR's SHiFT (Sustainable Healthy Diets through Food Systems Transformation) Initiative; WFP.

#### ***Human resources and capacity development of Initiative team***

ClimBeR's team will include a nutrition specialist based in Kenya. The team will participate in programs to increase capacity to integrate nutrition and climate science in order to assess whether, and to what extent, innovative financial products, digital agro-climate services, and

climate-smart technologies independently or in combination can improve resilience, and how that translates into food security and nutrition outcomes.

## **5.2 Poverty reduction, livelihoods & jobs**

### ***Challenges and prioritization***

Climate change-induced disasters lead to a spike in poverty, as people lose their livelihoods. Other insidious impacts of climate change are reduced agricultural productivity, leading to greater poverty. Productive, resilient agroecological systems can enable people to exit poverty and access jobs and improved livelihoods in agriculture and beyond. ClimBeR will reduce risk as a barrier to adopting SET bundles. WP2 will generate long-lasting co-benefits in terms of reducing poverty, improving livelihoods, and creating jobs. Target farmers include those above the poverty line whose adaptive capacity enables them to avoid falling into poverty. ClimBeR, through WP1, will identify regions and farmers for whom social protection may be more appropriate than climate-resilient agriculture.

### ***Research questions***

WPs will address several questions including:

- WP1: Where, who and when are farm households at risk from climate change, especially those most vulnerable to extreme climate events? What is the level of climate-smart innovations and sustainable agricultural practices adoption?
- WP2: What areas are the most vulnerable to CS risks and which climate insecure areas should be prioritized? Which groups of people are most vulnerable to CS challenges?

### ***Components of Work Packages***

- WP1 output: A climate-risk-profiling-system combining data sources and analytical approaches to identify key agricultural risks and mitigation solutions tailored to value-chain, geographical, and agroecological contexts.
- WP2 output: A CSI for monitoring and assessing the role of climate as a threat multiplier to peace and stability at sub-national, national, and regional levels.

### ***Measuring performance and results***

1) By 2024, international agencies and policymakers use ClimBeR products to shape at least six policies or investments to strengthen agricultural resilience, including at least three aimed at reducing agriculture-related climate security risk; and 2) at least US\$30 million in new investments made by 2024 focusing on disadvantaged groups, women, youth, and vulnerable smallholder farmers that are contributing to building systemic resilience. We will measure achievement using the indicators in our MELIA system (section 6).

### ***Partners***

**WP1:** International Research Institute for Climate and Society of Columbia University, Institut Senegalais de Recherche Agricole, and the Western and Central African Council for Agricultural Research and Development. **WP2:** Institute for Economics and Peace, Norwegian Institute of International Affairs, Stockholm International Peace and Research Institute, and Wageningen University & Research (WUR), on the main impact pathways linking climate, agriculture, and security in different geographies, and WFP as the demand partner.

### ***Human resources and capacity development of Initiative team***

ClimBeR's team will include a technical specialist in climate risk, a specialist in agricultural technological impact assessment, and a climate adaptation scientist. The team will participate in programs to increase capacity to analyze linkages among poverty and livelihoods data and climate modelling to determine whether, and to what extent, innovative financial products, digital agro-climate services, and climate-smart technologies independently or in combination can improve resilience, and how that translates into welfare.

## **5.3 Gender equality, youth & social inclusion**

### ***Challenges and prioritization***

ClimBeR contributes mainly to the Systems Transformation Action Area. A focus on social equity is not inherent in the design of climate adaptation strategies but must be deliberately addressed if root causes, rather than immediate causes, of vulnerability are to be addressed. There is growing evidence that in many climate responses, there is a danger that social inequity is exacerbated with the more powerful (often male) benefiting more than already-marginalized and vulnerable people. ClimBeR will therefore use GSEF to avoid this type of maladaptation and to identify opportunities for building more equitable outcomes, with greater potential for inclusion and fairer distribution of benefits while building systemic resilience. Operationalizing GSEF is facilitated by the use of [GENNOVATE](#) to understand better how gender norms and agency influence adoption of innovations in agriculture and natural resource management.

### ***Research questions***

ClimBeR is guided by three broad research questions:

- In what ways does the intervention address gender and social equity concerns?
- Which stakeholders have power and/or influence in perpetuating inequality?
- What opportunities exist for generating gender equality and social equity?

### ***Components of Work Packages***

- WP1 output: a climate-risk-profiling-system that combines data sources and analytical approaches to identify key agricultural risks and risk mitigation solutions in the context of gender and social equity.
- WP2 output: a Climate Security Policy Coherence Toolkit to guide policymakers on increasing coherence across climate, agricultural, and peace programming to enhance climate resilience in a gender sensitive and socially equitable manner.
- WP3 output: policy pathways for equitable climate-resilient nutrition-secure futures.
- WP4 output: a polycentric governance model for equitable climate adaptation.

### ***Measuring performance and results***

At least US\$30 million in new investments made by 2024 focusing on disadvantaged groups, women, youth and vulnerable smallholder farmers that are contributing to building systemic resilience. This will begin closing the gender gap for over five million women working in food, land, and water systems. ClimBeR will use the Gender Empowerment Index for climate-smart villages (GEI-CSV)<sup>44</sup> to measure male and female empowerment (Section 6).

### ***Partners***

National partners and all other stakeholders who increasingly espouse gender and social equity but often lack the tools and understanding to facilitate societal transformation, as well as an appreciation of the dangers of maladaptation and trade-offs. A growing community of researchers engaged in agriculture and social transformation e.g., [Belmont Forum](#), [UN women](#).

### ***Human resources and capacity development of Initiative team***

Our team will include a gender and social equity specialist well versed in current debates about societal transformation and the dangers of maladaptation in climate change initiatives. The team will receive capacity strengthening in methodologies to analyze power relationships and their implications for introducing CSA and other innovations; the use of the GEI-CSV, and in identifying strategies to promote greater social equity.

## **5.4 Climate adaptation & mitigation**

### ***Challenges and prioritization***

ClimBeR's central focus is on helping smallholders to adapt successfully to climate change impacts. While some of our work will contribute indirectly to climate mitigation, this will not be a focus. Nevertheless, ClimBeR will work closely with MITIGATE+ to ensure that we are exploiting potential synergies between the climate adaptation and mitigation pathways. ClimBeR activities will be designed to avoid contributing to increasing GHG. A basic premise of ClimBeR is that introducing technical innovations alone will not be sufficient to enable smallholders' production systems to be productive and resilient in the face of climate change. A thorough system transformation, comprising bundles of technical innovations supported by new policies and multilevel institutional arrangements will be required. ClimBeR represents a departure from 'business-as-usual' by focusing on climate transformative adaptation that tackles the root causes of vulnerability and contributes to a more climate-resilient, equitable and sustainable future.

### ***Research questions***

- What are the most appropriate bundled adaptive SET options to build agroecological systemic resilience against climate variability and extremes, given the wide variety of agroecological, social, and economic contexts?
- How can policies and institutions be designed to support equitable and transformative uptake?
- How can new investments in climate-resilient agroecological systems be designed to equip all small-scale producers to be more resilient to climate shocks, with climate adaptation solutions available through national innovation systems by 2030?

### ***Components of Work Packages***

- Every component of all four WPs focuses on climate adaptation.

### ***Measuring performance and results***

ClimBeR is adopting a robust MELIA system (Section 6) and each of the four WPs is focused on: i) strengthening existing systems for monitoring adoption of climate-resilient agriculture, especially resulting from policies shaped by ClimBeR (Outcome #2), and ii) developing robust performance monitoring systems that our partners can use over the longer term.

### ***Partners***

Because ClimBeR's entire focus is on adapting agricultural systems to climate change, all our partners will be contributing to this goal. They are listed in this [Annex](#). Our main partners include global advanced research institutions, regional and national innovation, scaling and demand partners, and a variety of United Nations and international financing agencies. A few key Initiative partners include WFP, GiZ, SNV (Netherlands Development Organisation), Convergence Blended Finance, Green Climate Fund, World Bank, International Fund for International Development, and African Development Bank.

### ***Human resources and capacity development of Initiative team***

Our team will include several climate adaptation scientists, and specialists in agricultural extension, farming systems, digital innovations, systems development, policy engagement and geographic information system (GIS). The team will participate in programs to develop capacity to generate policy-relevant knowledge in relation to SET bundles; develop capacity to construct Innovation Packages and implement the scaling readiness plan; and develop institutional capacity of boundary organizations to use knowledge effectively.

## 5.5 Environmental health & biodiversity

### **Challenges and prioritization**

Environmental health and biodiversity benefits depend on scaling up and out of technologies and practices at farm, watershed, and river basin scales. Technology *per se* is not the limiting factor. An integrated SET bundle approach with supporting policies and institutions is required for successful scaling of climate-resilient agricultural ecosystem services<sup>45</sup>. At the watershed and river basin levels, much hinges on climate resilience via nature-based solutions to provide ecosystem services such as enhanced availability and quality of water. The priority is to co-develop and mainstream building climate resilience based on “*an agent-, practice- and process-oriented approach, capable of analysing and exploring a variety of pathways of change*”<sup>46</sup>.

### **Research questions**

Specific research questions include:

- How does a SET approach best facilitate institutional and policy support for farmer uptake of climate-resilient agriculture at farm and micro-watershed levels?
- In areas where climate change has led to conflict over use of natural resources, what are the best approaches to enhance social-ecological resilience?
- What are the key policy approaches and financial instruments to stimulate nature-based solutions at a landscape level through trans-disciplinary networks<sup>47</sup>?

### **Components of Work Packages**

- WP1 output: Tools to close critical gaps in providing agricultural climate information services, enable climate-informed investment planning, and facilitate uptake of climate-resilient agriculture, especially by women and marginalized groups.
- WP2 output: Community-based approaches to co-create and identify localized gender and socially sensitive solutions to climate- and conflict-specific challenges.
- WP3 output: Integrated assessment frameworks to identify appropriate policies and institutions to support climate-resilient agriculture via nature-based solutions.
- WP4 output: ClimaAdapt.Gov Dashboard to empower farmers, communities, and policy planners to plan and implement bottom-up integrated climate and water risk management interventions to enhance resilience.

### **Measuring performance and results**

This Impact Area is linked to all the outcomes: i) Bundled ClimBeR climate services being used by at least 300,000 farmers; ii) Use of ClimBeR products to shape at least nine policies or investments iii) At least US\$30 million in new investments. ClimBeR’s robust MELIA system allows for constant monitoring of performance (Section 6).

### **Partners**

ClimBeR’s partners who are engaged in the Initiative in each of the four Work Packages.

### **Human resources and capacity development of Initiative team**

ClimBeR will include a geographer (a systems thinker) to bridge the epistemological divide between the natural and social sciences and establish trans-disciplinary partnerships.

## 6. Monitoring, evaluation, learning and impact assessment (MELIA)

### 6.1 Result framework

CGIAR Impact Areas				
Nutrition, health and food security	Poverty reduction, livelihoods and jobs	Gender equality, youth and social inclusion	Climate adaptation and mitigation	Environmental health and biodiversity
<b>Collective global 2030 targets</b>				
The collective global 2030 targets are available centrally <a href="#">here</a> to save space.				
<b>Common impact indicators that your Initiative will contribute to and will be able to provide data towards</b>				
# people benefiting from relevant CGIAR innovations	# people benefiting from relevant CGIAR innovations	# women benefiting from relevant CGIAR innovations	# people benefiting from climate-adapted innovations	# ha under improved management
<b>SDG targets</b>				
2.4, 17.3, 17.6, 17.7, 17.9, 17.14, 17.15	1.1, 1.a, 1.b, 17.3, 17.6, 17.7, 17.9, 17.14, 17.15, 17.17	1.b, 5.a, 5.b, 13.3, 13.b, 16.b, 16.7, 17.6, 17.7, 17.9, 17.14, 17.15, 17.17	1.5, 2.4, 13.1, 13.2, 13.3, 13.a, 13.b, 17.3, 17.6, 17.7, 17.9, 17.14, 17.15, 17.17	2.4, 15.a, 17.3, 17.6, 17.7, 17.9, 17.14, 17.15, 17.17
<b>Systems Transformation</b>				
<b>Action Area outcomes</b>			<b>Action Area outcome indicators</b>	
ST 1 - Farmers use technologies or practices that contribute to improved livelihoods, enhance environmental health and biodiversity, are apt in a context of climate change, and sustain natural resources			STi 1.1 - Number of farmers using climate smart practices disaggregated by gender	
			STi 1.2 - Number of farmers using agroecological practices disaggregated by gender	
			STi 1.3- Measurable implications of adoptions such as production, profitability, input use, product quality and associated price, environmental and health damage avoided, livelihood, and employment.	
ST 4 - Food system markets and value chains function more efficiently, equitably, and sustainably and lead towards healthier diets			STi 4.1 Number of commodity value chain x country combinations that use tested innovations to improve efficiency, inclusion, sustainability and nutrition objectives.	
			STi 4.2 Gaps between farm/processor gate and consumer prices (with some measures focused on smallholder farmers if possible)	
			STi 4.3 Domestic market price integration, both spatial and temporal	
			STi 4.4 Improved international price and exchange rate transmission	
			STi 4.5 Trends in relative prices of healthy to unhealthy foods	
ST & RAFS 1 - Smallholder farmers implement new practices that mitigate risks associated with extreme climate change and environmental conditions and achieve more resilient livelihoods			STRAFSi 1.1 Number of smallholder farmers who have implemented new practices that mitigate climate change risks, disaggregated by gender and type of practice.	

ST & RAFS 2 - National and local governments utilize enhanced capacity (skills, systems and culture) to assess and apply research evidence and data in policy making process				STRAFSi 2.1 Number of policies/ strategies/ laws/ regulations/ budgets/ investments/ curricula (and similar) at different scales that were modified in design or implementation, with evidence that the change was informed by CGIAR research							
ST & RAFS & GI 1 Women and youth are empowered to be more active in decision making in food, land and water systems				STi 1.1 - Number of farmers using climate smart practices disaggregated by gender STi 1.2 - Number of farmers using agroecological practices disaggregated by gender STRAFSGli 1.1 Positive trends in the Women's Empowerment in Agriculture Index (WEIA) at various scales including nationally							
<b>Initiative and Work Package outcomes, outputs and indicators</b>											
Result type	Result	Indicator	Unit	Geographic scope	Data source	Data collection method	Frequency	Baseline value	Baseline year	Target value	Target year
<b>Work Package 1: DE-RISK: Reducing risk in production system-linked livelihoods and value chains at scale</b>											
Outcome	Bundled ClimBeR climate services being used by at least 300,000 farmers in six focal countries by 2024.	# beneficiaries using the innovation, disaggregated by gender.	Household	<b>National:</b> Senegal Zambia Kenya Morocco Guatemala Philippines	Primary data source	Household questionnaires  ClimBeR's management information system	Midpoint/18 months	0	2022	300,000	2024
Outcome	By 2024, international agencies and policymakers will use ClimBeR products to shape at least nine policies or investments to strengthen agricultural resilience, including at least three aimed at reducing agriculture-related CS risk.	# policies	Generic number	<b>National:</b> Senegal Zambia Kenya Morocco Guatemala Philippines	Primary data source	Key informant interviews  Social media/Text mining  ClimBeR's management information system	Annual	0	2022	9	2024

Result type	Result	Indicator	Unit	Geographic scope	Data source	Data collection method	Frequency	Baseline value	Baseline year	Target value	Target year
Outcome	At least US\$30 million in new investments made by 2024 focusing on disadvantaged groups, women, youth and vulnerable smallholder farmers that are contributing to building systemic resilience.	# investments	Generic number	<b>National:</b> Senegal Zambia Kenya Morocco Guatemala Philippines	Primary data source	Key informant interviews ClimBeR's management information system	Once at the end of the Initiative	Since our focus will not be on the total amount of new investment, rather it is targeting women and other very vulnerable people, the baseline value will be calculated once the Initiative starts implementation	2022	US\$30 million	2024
Output	Data assets in relation to how to build systemic resilience against climate variability and extremes	# peer-reviewed journal papers	Generic number	<b>Global</b>	Primary data source	ClimBeR's management information system	Annual		5	2024	
<b>Work Package 1: DE-RISK: Reducing risk in production system-linked livelihoods and value chains at scale</b>											
Output	Agricultural risk strategy	# policies	Generic number	<b>National:</b> Kenya Zambia	Primary data source	ClimBeR's management information system	Once at the end of the Initiative		2	2024	

Result type	Result	Indicator	Unit	Geographic scope	Data source	Data collection method	Frequency	Baseline value	Baseline year	Target value	Target year
Output	Climate information service tools	# innovations # other information products	Generic number	<b>National:</b> Guatemala Kenya	Primary data source	ClimBeR's management information system	Once at the end of the Initiative			2	2024
Output	Climate risk profiling system	# innovations # other information products	Generic number	<b>National:</b> Senegal Morocco Philippines	Primary data source	ClimBeR's management information system	Once at the end of the Initiative			3	2024
Output	Production system typology with a nutrition lens	#frameworks developed	Generic number	<b>National:</b> Senegal Kenya Zambia Morocco	Primary data source	ClimBeR's management information system	Once at the end of the Initiative			4	2024
<b>Work Package 2: Building production-system resilience through recognizing the relationships among climate, agriculture, security, and peace</b>											
Output	Climate security proofing guidelines	# innovations # other information products	Generic number	<b>Global National:</b> Senegal Kenya Zambia Guatemala Philippines	Primary data source	Key informant interviews  Social media/Text mining	Annual			6 innovations (1 global and 5 national) 5 training activities 15 workshops 5 qualitative data collection (1 per country)	2024
Output	Climate Security Policy Coherent toolkit	# innovations # other information products	Generic number	<b>Global National:</b> Senegal Kenya Zambia Guatemala Philippines	Primary data source	Key informant interviews  Social media/Text mining	Annual			6 innovations 5 training activities 15 workshops 5 reports 5 qualitative	2024

Result type	Result	Indicator	Unit	Geographic scope	Data source	Data collection method	Frequency	Baseline value	Baseline year	Target value	Target year
										data collections	
Output	Climate security index	# innovations # other information products	Generic number	<b>Global National:</b> Senegal Kenya Zambia Guatemala Philippines	Primary data source	Key informant interviews Social media/Text mining	Annual			1 global innovation 5 national innovations 5 trainings 15 workshops 5 reports 5 qualitative data collection	2024
Output	Climate Security Observatory	# innovations # other information products	Generic number	<b>Global Regional National:</b> Senegal Kenya Zambia Guatemala Philippines	Primary data source	Key informant interviews Social media/Text mining	Annual			1 global innovation 5 innovations 5 innovations 10 trainings 30 workshops 5 reports 5 qualitative data collection (1 global web-based service and 5 web-based services)	2024
<b>Work Package 3: Developing adaptation instruments to inform policy and investments</b>											
Output	Policy pathways for socially equitable climate-resilient	# policies	Generic number	<b>National:</b> Zambia	Primary data source	Key stakeholder interviews	First and Second year			1	2024

Result type	Result	Indicator	Unit	Geographic scope	Data source	Data collection method	Frequency	Baseline value	Baseline year	Target value	Target year
	nutrition-secure futures				Policy Review						
Output	Policy pathways to mainstream disruptive niche bottom-up initiatives	# workshop reports # policies modified in design or implementation	Generic number	<b>National:</b> Guatemala	Primary data source  Grey literature review  Policy review	Key stakeholder interviews and questionnaires  Policy analysis	First and second year			1 workshop report 1 policy modified	2024
Output	Policy pathways for climate-resilient, nutrition-secure, and socially equitable futures	# innovations # training workshop reports # training manuals # policy and technical briefs # policy dialogues/engagements	Generic number	<b>National:</b> Kenya	Primary data source  Policy Review	Key stakeholder consultations, Desk reviews  News reports	Annual			1 innovation 1 training workshop 1 training manual 1 policy brief 1 policy dialogue	2024
<b>Work Package 4: Multiscale governance for transformative adaptation</b>											
Output	Bottom-up polycentric governance model for climate adaptation	# policy consultation workshop # policy and technical brief # operational guidelines	Generic number	<b>Global National:</b> Senegal Morocco Kenya Zambia Guatemala	Primary and Secondary data sources	Focus group discussion, Key stakeholder interviews, Desk review	Annual			1 global policy consultation with regional partner 5 country consultations workshops 5 country specific policy briefs 1 review paper and	2024

Result type	Result	Indicator	Unit	Geographic scope	Data source	Data collection method	Frequency	Baseline value	Baseline year	Target value	Target year
										literature database	
Output	Integrated framework with 'Leave No One Behind Indicators'	# policy consultation workshop # policy and technical brief # frameworks developed	Generic number	<b>Global National:</b> Senegal Morocco Kenya Zambia Guatemala	Primary and Secondary data sources	Focus group discussion, Key stakeholder interviews, Desk review	Annual			1 global consultation 5 country consultations workshops 5 country specific metadata including quantitative and qualitative data collection 5 country specific framework and technical policy reports	2024
Output	ClimaAdapt.Gov Dashboard	# climate adaptation strategies # repository of indicators # technical workshops # training events	Generic number and household	<b>Global National:</b> Senegal Morocco Kenya Zambia Guatemala	Primary and Secondary data sources	Focus group discussion, Key stakeholder consultation review of existing platform and system development	Annual			1 global dashboard with country specific information 5 country specific updated multiscale climate adaptation plans 5 country specific	2024

Result type	Result	Indicator	Unit	Geographic scope	Data source	Data collection method	Frequency	Baseline value	Baseline year	Target value	Target year
										workshop trainings	
Output	AWARE platform	# innovations # workshop reports	Generic number and household	<b>Global National:</b> Senegal Morocco Kenya Zambia Guatemala	Primary and Secondary data sources	Focus group discussion, Key stakeholder consultation review of existing platform and system development	Annual			1 global platform with country specific information 5 country specific workshop trainings	2024
<b>Innovation Packages and Scaling Readiness</b>											
Output	Innovation Profile and Scaling Ambition	# selected Core Innovations for which scaling ambition, vision of success and roadmap have been co-created, agreed-upon and documented	Generic number	National	Primary and secondary data sources	Focus group discussion, key stakeholder interviews, desk review	Once			3	2023
Output	Evidence-based Scaling Strategies	# Initiative Innovation Packages that have undergone evidence-based and quality controlled/ validated Scaling Readiness assessments informing innovation and scaling strategies	Generic number	National	Primary and secondary data sources	Focus group discussion, key stakeholder interviews, desk review	Twice between 2023-2024			3	2023 (1) and 2024 (2)

## 6.2 MELIA plan

ClimBeR is fully aligned with and supports the *CGIAR Performance and Results Management Framework (PRMF)*. ClimBeR will use CGIAR's management information system (MIS) for reporting and evaluation. It will support regular reporting and deliver a user-friendly interactive online dashboard that will allow project staff, partners, and external stakeholders to access and query the database. To ensure that the system will reflect how ClimBeR is narrowing gender gaps, data in all MELIA activities will be sex disaggregated. Moreover, ClimBeR will use GEI-CSV to measure men and women empowerment.

The MELIA function for ClimBeR will include: (i) internal M&E, (ii) learnings; and (iii) impact assessment. Data and information needed for MELIA will be collected continuously and reported once per year, building the evidence needed to support a Mid-Term Review. This, in turn, will feed into an end-of-project Impact Assessment.

(i) **Internal M&E:** Data for many activity and output indicators will be collected and entered in the MIS, monthly and outcome indicators data will be collected annually. WP Leaders will prepare M&E reports. ClimBeR will commission two independent process evaluations to assess its credibility, legitimacy, relevance, efficiency, efficacy, and sustainability.

(ii) **Learning:** M&E backstopping will be provided through ClimBeR's MELIA designated expert person and the MIS Team in the form of webinars and an instant support function built into the MIS. Annually, WP TOC assumptions will be assessed and validated. The TOC will be modified as needed to improve the strategy to achieve ClimBeR's outcomes and impacts. ClimBeR plans four regional inception and end-of-Initiative workshops to achieve greater buy-in, share results, and promote broader uptake. We will follow CCAFS' model for continuous communication throughout the project.

*Key learning questions:*

- How has ClimBeR supported researchers, policymakers, and development practitioners to break out of their silos, embrace systems-thinking, and recognize the diversity of livelihood pathways leading to climate resilience?
- Is ClimBeR helping stakeholders to embrace the concept of gender and social equity, and the disruption to balances of power inherent in transformation?
- Is ClimBeR developing the right public goods so that the private sector turns rhetoric into action and invests significantly in climate finance?
- How are the WPs working together? How is ClimBeR working together with other relevant Initiatives?
- Are we still responding to our partners' needs?
- Have contexts in our anchor countries changed? What adjustments are needed in our TOC?

WP Leaders will report on ClimBeR's progress towards outcomes including provision of evidence through the reporting on deliverables and any other commonly reported indicators adopted by CGIAR in alignment with PRMF. Details will be collected in the MIS and processed for quality assurance, synthesis, aggregation, and presentation in the form of a dashboard.

(iii) **Impact assessment:** An impact assessment will be carried out at project closing with a baseline established at project inception. The impact assessment will be carried out by an externally recruited firm or organization, which will be charged with proposing a rigorous and innovative methodology to explore impact contributions. This impact assessment will address key components of ClimBeR's TOC such as the type of partnerships that ClimBeR is forging, the level and depth of inter- and trans-disciplinary responses that the Initiative has promoted, and how ClimBeR has addressed power imbalances and socio-cultural factors to build systemic resilience against climate variability and extremes.

### 6.3 Planned MELIA studies and activities

Type of MELIA study or activity	Result or indicator title that the MELIA study or activity will contribute to.	Anticipated year of completion	Co-delivery of planned MELIA study with other Initiatives	How the MELIA study or activity will inform management decisions and contribute to internal learning
Independent process evaluation (2)	Assessment of the credibility, legitimacy, relevance, efficiency, efficacy, and sustainability of ClimBeR	Midpoint & end of Initiative		The midpoint evaluation will inform the adjustments that need to be made during the second half of the implementation of the Initiative
Impact Assessment	Will address key components of ClimBeR's TOC: type of partnerships that ClimBeR is forging, level and depth of inter- and transdisciplinary responses that the Initiative has promoted, and how ClimBeR has been able to address power imbalances and socio-cultural factors to build systemic resilience against climate variability and extremes.	2024		This study will inform the second phase of ClimBeR (beyond 2024), if a second phase is approved
Learning webinars (3)	Review the TOC, realignment of ClimBeR's strategy, and seizing emerging opportunities in the dynamic policy spaces of climate resilience and agriculture	One per year		Each webinar will end with concrete action points to be implemented the following year
Surveys	Surveys to assess farmers' use of bundled ClimBeR climate services	Mid 2023 and end of 2024	Some surveys will be developed and implemented with <i>UU</i> and <i>AgriLAC resiliente</i>	The midpoint survey will help ClimBeR understand the numbers reached and find ways to adjust the strategy accordingly. The final survey will inform the second phase of ClimBeR (beyond 2024), if approved
Randomized controlled trial in partnership with UU WP 2 (De-risk and digitalize)	Determine whether, and to what extent, innovative financial products, digital agro-climate services, and climate-smart technologies independently and in combination can improve resilience, and how that translates to food security, gender and social equity, farmers' productive behavior, and welfare in the face of various shocks.	2024	This study will be developed and implemented in partnership with UU WP2	This study will inform the second phase of ClimBeR (beyond 2024), if approved
Scaling Readiness Assessment Study	Number of Initiative Innovation Packages that have undergone evidence-based and quality controlled/ validated Scaling Readiness assessments informing innovation and scaling strategies	2024	Innovation Package linkages with Initiatives <i>UU</i> , <i>AgriLAC resiliente</i> , <i>Rethinking Food Markets and Value Chains for Inclusion and Sustainability</i> and <i>LCSR</i>	The study will inform the design, implementation and monitoring of an innovation and scaling strategy; scaling readiness metrics will be used in an optional innovation portfolio management system

## **7. Management plan and risk assessment**

### **7.1 Management plan**

ClimBeR's Program Management Unit consists of the Director and Deputy Director/Science Coordinator with administrative, MELIA, data management, communications, gender and social equity, climate finance, and scaling and partnerships support.

ClimBeR's Director is responsible for intellectual leadership and day-to-day decision-making. The Deputy Director: i) assists the Director and ii) facilitates the generation of interdisciplinary science outputs.

The MELIA officer ensures that ClimBeR has the tools to capture progress as per MELIA plans (section 6), that lessons learned are incorporated into work plans and that assumptions underpinning ClimBeR are adjusted as circumstances change.

The scaling and partnerships official is responsible for implementing the scaling readiness plan (section 4), and working closely with WP leaders, cross-cutting themes leaders, ClimBeR's Director and Deputy Director. This official will also take responsibility for developing and implementing a partnerships strategy to guide ClimBeR's activities in relation to co-generating knowledge for implementation on the ground.

The communications official is responsible for developing and implementing tools and approaches that contribute to ClimBeR's outcomes, One CGIAR's PRMF, and that generate positive change.

ClimBeR will establish an advisory body that provides strategic direction and is composed of five independent members factoring in gender, geographical and disciplinary diversity, and representation from academia, development agencies and the private sector and one *ex officio* member. It will meet twice per year.

The scaling and partnerships official and the communication official will also be responsible for monitoring and ensuring that the ClimBeR multi-location team works in close coordination and regular communication to deliver on the Initiative's outputs and outcomes.

## 7.2 Summary management plan Gantt table

Initiative Start Date	Lead organization	Timelines												Description of key deliverables
		2022				2023				2024				
Initiative Start Date		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
WP 1: DE-RISK - Reducing risk in production system-linked livelihoods and value chains at scale	CGIAR			1 2 3				1 2 3 4				1 2 3 4	1. Risk-contingent credit: a market-based risk management product. 2. Climate-risk-profiling-system that combines data sources and analytical approaches to identify key agricultural risks and mitigation solutions. 3. Agro-climate information service. 4. Production system typology with a nutrition lens.	
WP 2: Building production-system resilience through recognizing the relationships among climate, agriculture, security, and peace.	CGIAR				1 2 3			1 2 3				1 2 3	1. The Climate Security (CS) Observatory. 2. The CS Proofing Guidelines. 3. The CS Policy Coherence Toolkit.	
WP 3: Developing adaptation instruments to inform policy and investments	University of Leeds			1		2			3					1. Report on nutrition-sensitive policy pathways for dealing with climate extremes in Zambia. 2. Report on policy pathways to mainstream disruptive niche bottom-up initiatives in Guatemala. 3. Journal article describing implementation of novel scenarios methodology to enhance exploration of transformative futures.
WP 4: Multiscale governance for transformative adaptation	CGIAR			1				2				3	1. Report on polycentric governance framework integrated with 'Leave No One Behind Indicators' on gender and social equity. 2. ClimaAdapt.Gov Dashboard to empower farmers, communities, and policymakers. 3. AWARE platform to promote integrated multiscale institutional responses to climate shocks.	
Innovation Packages & Scaling Readiness	CGIAR						1			1 2		1 2		1. Three documented scaling ambitions, vision of success and roadmap for use of Scaling Readiness for selected Core Innovations (Light Track). 2. Three evidence-based Scaling Readiness assessment reports and related scaling strategies for Innovation Package (Standard Track)
MELIA	CGIAR						1					1 2 3		1. Two reports that assess ClimBeR's credibility, legitimacy, relevance, efficiency, efficacy and sustainability. 2. Impact assessment of key components of ClimBeR's TOC. 3. Randomized control trial to determine impacts of ClimBeR products.
Project Management	CGIAR	2		1 2			1 3					1 2		1. Three meetings with ClimBeR's advisory body for strategic direction. 2. Four regional inception and end-of-Initiative workshops for buy-in, share results, and promote uptake. 3. Science meeting for internal assessment, reflection and learning.

### 7.3 Risk assessment

Top 5 risks to achieving impact	Description of risk <i>Mitigation actions for these risks can be found <a href="#">here</a></i>	Likelihood (1-5)	Impact (1-5)	Risk score	Opportunities
#1 Farmers, policymakers, and development practitioners are not able to break out of their silos, embrace systems-thinking and recognize the diversity of livelihood pathways that lead to climate resilience (WP 3 & Initiative TOC level).	ClimBeR is premised on inter and trans-disciplinarity. Failure to break out of silos, embrace systems-thinking and recognize the diversity of livelihood pathways caused by competing agendas could result in inability of our partners to use ClimBeR's public goods to foster wide scale transformative adaptation and build systemic resilience against climate	4	5	20 (high)	n/a
#2 Topics that could benefit multiple Initiatives are not embedded throughout the entire portfolio (i.e., digital technologies, foresights, and trade-offs dialogue) impacting Initiative's efficiency and decision making (Initiative TOC level).	Failure to work as a coherent One CGIAR portfolio caused by lack of coordination could result in duplication of efforts, lack of efficiency, missed opportunities to capture synergies and eventually reductions in budgets which could trigger the ability for ClimBeR to achieve its objectives and stymie outcomes and impacts	3	4	12 (medium)	Once the implementation of the Initiatives starts, acknowledging this risk can help us to move faster in terms of understanding and subsequently acting upon those opportunities in relation to synergies.
#3 Unable to incentivize right behaviors by farmers, value chain actors, and policy makers needed for active participation in transformative adaptation leading to resilience (WP 2 & Initiative TOC level).	Failure to change behaviors in ClimBeR's next end users caused by competing and vested interests could result in the inability to achieve ClimBeR's outcomes. The results would be that an endeavor to foster transformative adaptation would have a weak foundation to carry it into the spheres of influence and interest	4	5	20 (high)	n/a
#4 Initiative relies on assumption that increase in funding would result from One CGIAR transition (Initiative TOC level).	Failure to obtain the necessary resources to implement a truly transformative agenda caused by a lack of commitment from the donor community could result in the inability to achieve ClimBeR's objectives. It would also demoralize CGIAR staff and partners who have high expectations of this reform process	4	4	16 (high)	n/a
#5 Stakeholders do not embrace the concept and reality of gender and social equity and the often disruption to balances of power (Initiative TOC level).	Failure to embrace gender and social equity and the often disruption to balances of power caused by competing and vested interests would stymie ClimBeR's holistic and transdisciplinary approach to building resilience in an equitable way. It would do little to reduce trade-offs between SDGs (e.g., #2, 5 & 10)	4	5	20 (high)	n/a

## **8. Policy compliance, and oversight**

### **8.1 Research governance**

Researchers involved in the implementation of this Initiative will comply with the procedures and policies determined by the System Board to be applicable to the delivery of research undertaken in furtherance of CGIAR's 2030 Research and Innovation Strategy, thereby ensuring that all research meets applicable legal, regulatory, and institutional requirements; appropriate ethical and scientific standards; and standards of quality, safety, privacy, risk management and financial management. This includes [CGIAR Research Ethics Code](#) and the values, norms and behaviors in CGIAR's [Ethics Framework](#) and in the [Framework for Gender, Diversity and Inclusion in CGIAR's workplaces](#).

### **8.2 Open and FAIR data assets**

Researchers involved in the implementation of this Initiative shall adhere to the terms of the [Open and FAIR Data Assets Policy](#).

ClimBeR will align with the Open and Fair Data Assets Policy ensuring:

- Rich metadata conforming to the [CGIAR Core Schema](#) to maximize Findability, including geolocation information where relevant.
- Accessibility by utilizing unrestrictive, standard licenses (e.g. [Creative Commons](#) for non-software assets; [General Public License/Massachusetts Institute of Technology](#) for software), and depositing assets in open repositories.
- Wider access through deposition in open repositories of translations and requiring minimal data download to assist with limited internet connectivity.
- Interoperability by annotating dataset variables with ontologies where possible (controlled vocabularies where not possible).

Adherence to [Research Ethics Code](#) (Section 4) relating to responsible data (through human subject consent, avoiding personally identifiable information in data assets and other data-related risks to communities).

## 9. Human resources

### 9.1 ClimBeR Initiative team

Category	Area of expertise	Short description of key accountabilities
Research	Gender, social equity, inclusion and governance	The gender, social equity, inclusion and governance team has the experience and capabilities to: i) Go beyond gender and social inclusion to embrace a more radical social equity agenda that addresses the root causes of vulnerability rather than the immediate causes of vulnerability. ii) Use the Gender and Social Equity Framework to guide ClimBeR's work internally and with external partners to build resilience, foster a social transformation and minimize the dangers of maladaptation. iii) Analyze success and failures to provide guidance on design and implementation of transformative projects. iv) Perform policy, institution, and governance analysis to identify gaps, potential opportunities to cross-scale cooperation in building systemic resilience for transformative adaptation.
Research	Scaling and innovation	The scaling and innovation team has the experience and capabilities to: i) Strengthen the linkages between evidence, policy and practice in order to support scaling up and out of research products emerging from ClimBeR's four Work Packages and two cross-cutting themes. ii) Build interdisciplinary teams and transnational partnerships in the spheres of control, influence and interest; iii) Locate ClimBeR at the center of emerging scaling and innovation theory and practice e.g. working with Institute of Development Studies (IDS); Wageningen University; <a href="#">Collaborating for Resilience</a> ; <a href="#">Belmont Forum</a> ; and <a href="#">Global community of practice on scaling development outcomes</a> . iv) Promote wider multiscale cooperation among public and private partnership for scaling of adaptation interventions through business models
Research	Integrated frameworks for resilient food system pathways	The AFRICAP iFEED team has been collaborating for 4 years on this topic and will develop and apply methods focused on climate variability and extremes. The team consists of senior experts in climate science, crop-climate modelling, nutrition security, trade, and policy engagement. This team is complemented by the Disruption for Transformation Team which builds upon 8 years of scenario guided policymaking in 6 global regions under CCAFS.
Research	Climate risk	The climate risk team is a multidisciplinary group, including agricultural insurance experts, climate risk analysts, meteorologists, agricultural economists in impact assessment, farming system experts, geospatial analysis specialists, specialists in digital platforms, agricultural extension specialists and nutritionists. In relation to digital tools this team has the experience and capabilities to: i) Promote digital inclusivity across scale and sectors using technologies, tools, models and platforms to ensure bottom-up approaches for developing resilience strategies towards transformative adaptation. ii) Analyze gaps and potentials for using digital tools by partners in monitoring targets/ indicators for resilient development goals.
Research	Climate security	A multi-disciplinary team, including senior and junior economists, qualitative data and big data analysts, spatial analysts (Evidence 4 Climate Security), peace and security studies experts and analysts (Programming 4 Climate Security), senior and junior policy experts and data analysts (Policy 4 Climate Security) and financial experts and data analysts (Finance 4 Climate Security).
Research support	Communication and Outreach	ClimBeR's support research team has the experience and capabilities to: i) Support the translation from research to policy practice and outreach for wider stakeholders. ii) Document success stories and evidence of investment, scaling and impact. iii) Develop and implement communication tools and approaches that contribute to ClimBeR's outcomes, One CGIAR's PRMF, that generate positive change, and that at the same time promote ClimBeR's science, inform major policies and programs, make knowledge open access, and encourage learning and sharing of information across the Initiative and with partners.

## **9.2 Gender, diversity and inclusion in the workplace**

ClimBeR sought to build on the example set by the One CGIAR (appointing a lead and co-lead of each Initiative to reflect gender diversity) in selecting members of the IDT to ensure gender, diversity and inclusion (GDI). The IDT comprised almost 30% women and included a female gender specialist from The Nordic Africa Institute, Uppsala. Furthermore, the IDT included representatives from CGIAR, universities, research think-tanks, donors, NGOs and the private sector. ClimBeR has ensured greater gender diversity in the Initiative's four Work Packages and two cross-cutting themes: women lead two of the six and in the case of the male-led Work Package 3, the Initiative requested and has received considerable input from the female Director, Policy Research and Analysis of the South Africa-based FANRPAN.

Time constraints and COVID-19 travel restrictions stymied attempts to ensure greater diversity and inclusion in the design phase. ClimBeR is determined to rectify this during the inception phase and the lifespan of the Initiative. We propose a series of stakeholder workshops in the inception stage (3 first months of implementation of the Initiative). The composition and implementation of these workshops will be guided by ClimBeR's own GSEF. ClimBeR's emphasis on i) building trans-disciplinary partnerships, ii) internally operationalizing GSEF, and iii) embracing the unpalatable reality of trade-offs (e.g., # of people benefiting from CGIAR technologies that may, in turn, exacerbate gender and social inequalities), lends itself to ensuring genuine GDI.

## **9.3 Capacity development**

Capacity development is central to ClimBeR's TOC and impact pathways, addressing the full TOC cycle. ClimBeR will work at individual, organizational and institutional levels of capacity development, and with researchers and research users, including organizations and networks.

For research capacity, ClimBeR will work with strategic universities such as WUR to support exchange programs where CGIAR scientists will interact with professors along specific themes, while providing opportunities for early-career research and researchers in ClimBeR's focus countries through the support of PhD programs. Secondments of CGIAR scientists in relevant institutions will also be part of ClimBeR's capacity development strategy.

ClimBeR will bring curriculum-based capacity development to wider circles, through engagement with institutions, such as RUFORUM, to train the next generation of scientists. Through these partnerships, ClimBeR will support the generation and sharing of knowledge through development of training materials and tools. This will address critical gaps in the provision of agricultural climate services while facilitating university players (staff and students) research and extension service providers at regional and national-level access to knowledge, technologies, and decision-making tools for uptake of ClimBeR's Innovation Packages.

ClimBeR's team leaders and managers will complete training on inclusive leadership within 3 months of launch; and within 6 months of launch, staff and external partners will complete training on gender, and equity, diversity, and inclusion. The Initiative kick-off will include an awareness session on CGIAR's values, code of conduct, and range of learning opportunities available within CGIAR, including the use of GSEF<sup>48</sup> which will allow for the mentoring and career development of junior-level Initiative team members, partners, and stakeholders.

## 10. Financial resources

### 10.1 Budget

For the outputs and outcomes indicated in this proposal, the team believes the budget is modest and realistic. If additional funds were provided, this would increase the likelihood of achieving further results.

#### 10.1.1 Activity breakdown

USD	2022	2023	2024	Total
Crosscutting across work packages	5,856,726	5,856,726	5,856,726	17,570,177
Work package 1	1,692,116	1,692,116	1,692,116	5,076,348
Work package 2	1,578,117	1,578,117	1,578,117	4,734,351
Work package 3	2,009,678	2,009,678	2,067,405	6,086,761
Work package 4	1,581,761	1,581,761	1,581,761	4,745,283
Innovation packages & scaling resources	2,262,360	2,262,360	2,262,360	6,787,080
<b>Total</b>	<b>14,980,758</b>	<b>14,980,758</b>	<b>15,038,485</b>	<b>45,000,000</b>

#### 10.1.2 Geographic breakdown

USD	2022	2023	2024	Total
Philippines	2,228,302	2,228,302	2,228,302	6,684,907
Morocco	1,722,294	1,722,294	1,722,294	5,166,882
Guatemala	2,084,181	2,084,181	2,084,181	6,252,543
Senegal	2,886,852	2,886,852	2,886,852	8,660,557
Kenya	3,246,671	3,246,671	3,246,671	9,740,014
Zambia	2,812,457	2,812,457	2,870,184	8,495,098
<b>Total:</b>	<b>14,980,758</b>	<b>14,980,758</b>	<b>15,038,485</b>	<b>45,000,000</b>

## References

---

- <sup>1</sup> IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.
- <sup>2</sup> von Braun, J., Afsana, K., Fresco, L.O., & Hassan, M. (Ed.). (2021). Science and Innovation for Food Systems Transformation and Summit Actions, Papers by the Scientific Group and its partners in support of the UN Food Systems Summit. ScGroup of the UNFSS (2021), <https://scfss2021.org>
- <sup>3</sup> UNFCCC 2021. *Nationally determined contributions under the Paris Agreement: Synthesis Report by the Secretariat*. Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. Third session. Glasgow, 31 October to 12 November 2021.
- <sup>4</sup> Ortiz-Bobea, A., Ault, T.R., Carrillo, C.M. et al., 2021. Anthropogenic climate change has slowed global agricultural productivity growth. *Nat. Clim. Chang.* 11, 306–312. <https://doi.org/10.1038/s41558-021-01000-1>
- <sup>5</sup> Loboguerrero A.M., Campbell B, Millan A. 2021. More, but not of the same – new funding for a new type of AR4D needed. In *Rural 21 – The International Journal for Rural Development*, 1/2021, Volume 55.
- <sup>6</sup> Ortiz-Bobea, A., Ault, T.R., Carrillo, C.M. et al., 2021. Anthropogenic climate change has slowed global agricultural productivity growth. *Nat. Clim. Chang.* 11, 306–312. <https://doi.org/10.1038/s41558-021-01000-1>
- <sup>7</sup> Zurek, Monika, Aniek Hebinck and Odilirwe Selomane. 2021. Looking across diverse food system futures: Implications for climate change and the environment. *QOpen*, 2021, 1, 1–39. DOI: 10.1093/qopen/qoaa001
- <sup>8</sup> Mach, Katharine J., Caroline M. Kraan, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jürgen Scheffran, Kenneth A. Schultz, & Nina von Uexküll. 2019. *Climate as a risk factor for armed conflict*. *Nature* 571: 193. <https://doi.org/10.1038/s41586-019-1300-6>
- <sup>9</sup> Liebig, Theresa, Grazia Pacillo, Diego Osorio, Peter Läderach. Forthcoming. *Food systems science for peace and security: Is research for development key for achieving systematic change?*
- <sup>10</sup> CAS Secretariat (CGIAR Advisory Services Shared Secretariat). (2021). Synthesis of Learning from a Decade of CGIAR Research Programs. Rome: CAS Secretariat Evaluation Function.
- <sup>11</sup> Smith, A.G.; Negroustoueva, S.; Holderness, M. 2021 Synthesis of Evaluative Evidence: Towards One CGIAR. CGIAR Advisory Services Powerpoint, 7 July 2021; CAS Secretariat (CGIAR Advisory Services Shared Secretariat). (2021). Synthesis of Learning from a Decade of CGIAR Research Programs. Rome: CAS Secretariat Evaluation Function. <https://cas.cgiar.org>.
- <sup>12</sup> CAS Secretariat (CGIAR Advisory Services Shared Secretariat). (2020). CGIAR Research Program 2020 Reviews: Climate Change, Agriculture and Food Security. Rome: CAS Secretariat Evaluation Function.
- <sup>13</sup> Scoones I, Stirling A, Abrol D, et al. 2020. Transformations to sustainability: combining structural, systemic and enabling approaches. *Curr Opin Environ Sustain* 42: 65–75.
- <sup>14</sup> Few R, Morchain D, Spear D, Mensah A, Bendapudi R. Transformation, adaptation and development: relating concepts to practice. *Palgrave Commun* 2017; 3. DOI:10.1057/palcomms.2017.92.
- <sup>15</sup> McPhearson T, M. Raymond C, Gulsrud N, et al. 2021. Radical changes are needed for transformations to a good Anthropocene. *npj Urban Sustain* 1. [www.nature.com/npjUrbanSustain](http://www.nature.com/npjUrbanSustain)
- <sup>16</sup> Fisher E, Hellin J, Greatrex H, and Jensen N. 2019. Index insurance and climate risk management: Addressing social equity. *Dev Policy Rev* 37.
- <sup>17</sup> Fisher E, Hellin J, Greatrex H, and Jensen N. 2019. Index insurance and climate risk management: Addressing social equity. *Dev Policy Rev* 37.
- <sup>18</sup> Hansen J, Hellin J, Rosenstock T, et al. Climate risk management and rural poverty reduction. *Agric Syst* 2019; 172: 28–46.
- <sup>19</sup> Carter, Rebecca, Delfina Grinspan, Tyler Ferdinand, and Cristina Rumbaitis del Rio. 2020. The Two Degree Initiative Listening Sessions: Conference Proceedings.
- <sup>20</sup> Note on key topics discussed with AICCRA partners. September 10<sup>th</sup>, 2020.

---

<sup>21</sup> Government of the Republic of Kenya. 2018. Kenya Climate Smart Agriculture Implementation Framework 2018-2027

<sup>22</sup> Carter, Rebecca, Delfina Grinspan, Tyler Ferdinand, and Cristina Rumbaitis del Rio. 2020. The Two Degree Initiative Listening Sessions: Conference Proceedings.

<sup>23</sup> CIAT, BFS/USAID. 2016. Climate-Smart Agriculture in Senegal. CSA Country Profiles for Africa Series. Washington, D.C.: International Center for Tropical Agriculture (CIAT), Bureau for Food Security, United States Agency for International Development (BFS/USAID). <https://cgspace.cgiar.org/handle/10568/74524>.

<sup>24</sup> World Bank. 2019. Zambia Climate-Smart Agriculture Investment Plan : Analyses to Support the Climate-Smart Development of Zambia's Agriculture Sector. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/31383> License: CC BY 3.0 IGO.

<sup>25</sup> Govind, Ajit. 2021. THE MENA GRAND CHALLENGE: An Investment BluePrint-A Synthesis of the Regional Stakeholder Consultations. International Center for Agricultural Research in the Dry Areas (ICARDA), Cairo, Egypt

<sup>26</sup> Kingdom of Morocco. 2021. LE NOUVEAU MODELE DE DEVELOPPEMENT: Libérer les énergies et restaurer la confiance pour accélérer la marche vers le progrès et la prospérité pour tous. Rapport General.

<sup>27</sup> SICA 2017. The Climate Smart Agriculture Strategy for the SICA Region (2018-2030)

<sup>28</sup> Philippines Climate Change Commission. 2011. National Climate Change Action Plan 2011 to 2028.

<sup>29</sup> Fisher E, Hellin J, Greatrex H, and Jensen N. 2019. Index insurance and climate risk management: Addressing social equity. *Dev Policy Rev* **37**.

<sup>30</sup> Steiner A, Aguilar G, Bomba K, Bonilla JP, Campbell A, Echeverria R, Gandhi R, Hedegaard C, Holdorf D, Ishii N, Quinn K, Ruter B, Sunga I, Sukhdev P, Verghese S, Voegele J, Winters P, Campbell B, Dinesh D, Huyer S, Jarvis A, Loboguerrero Rodriguez AM, Millan A, Thornton P, Wollenberg L, Zebiak S. 2020. *Actions to transform food systems under climate change*. Wageningen, The Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

<sup>31</sup> Dorward A, Anderson S, Bernal YN, et al. 2009. Hanging in, stepping up and stepping out: livelihood aspirations and strategies of the poor. *Dev Pract* **19**: 240–7.

<sup>32</sup> Thornton PK, Herrero M. Potential for reduced methane and carbon dioxide emissions from livestock and pasture management in the tropics. *Proc Natl Acad Sci U S A* 2010; **107**: 19667–72.

<sup>33</sup> Islam S, Cenacchi N, Sulser TB, et al. Structural approaches to modeling the impact of climate change and adaptation technologies on crop yields and food security. *Glob Food Sec* 2016; **10**: 63–70.

<sup>34</sup> Pradhan P, Costa L, Rybski D, Lucht W, Kropp JP. A Systematic Study of Sustainable Development Goal (SDG) Interactions. *Earth's Future* 2017; **5**: 1169–79.

<sup>35</sup> Fisher E, Hellin J, Greatrex H, and Jensen N. 2019. Index insurance and climate risk management: Addressing social equity. *Dev Policy Rev* **37**.

<sup>36</sup> Taylor, M. and Bhasme, S. 2020. Between deficit rains and surplus populations: The political ecology of a climate-resilient village in South India. *Geoforum* **0035**: 1–10.

<sup>37</sup> Dikitanan, R., Grosjean, G., Nowak, A., Leyte, J. 2017. *Climate-Resilient Agriculture in Philippines*. CSA Country Profiles for Asia Series. International Center for Tropical Agriculture (CIAT); Department of Agriculture - Adaptation and Mitigation Initiative in Agriculture, Government of the Philippines. Manila, Philippines. 24 p

<sup>38</sup>Fisher E, Hellin J, Greatrex H, Jensen N. Index insurance and climate risk management: Addressing social equity. *Dev Policy Rev* 2019; **37**. DOI:10.1111/dpr.12387.

<sup>39</sup> Hansen J, Hellin J, Rosenstock T, et al. Climate risk management and rural poverty reduction. *Agric Syst* 2019; **172**: 28–46.

<sup>40</sup> McPhearson T, M. Raymond C, Gulsrud N, et al. 2021. Radical changes are needed for transformations to a good Anthropocene. *npj Urban Sustain* 1. [www.nature.com/npjUrbanSustain](http://www.nature.com/npjUrbanSustain)

<sup>41</sup> Mushongah, J.; Scoones, I. 2012. Livelihood Change in Rural Zimbabwe over 20 Years, *The Journal of Development Studies* 48:9: 1241-1257. DOI: 10.1080/00220388.2012.671474.

<sup>42</sup> Brown ME, Kshirsagar V. Weather and international price shocks on food prices in the developing world. *Glob Environ Change* 2015; **35**: 31–40.

---

<sup>43</sup> Fasting, S.; Bacudo, I.; Damen, B.; Dinesh, D. 2021. Climate Governance and Agriculture in Southeast Asia: Learning from a Polycentric Approach. *Front. Polit. Sci.* 3 : 698431. Policy Brief.  
<https://doi.org/10.3389/fpos.2021.698431>.

<sup>44</sup> Hariharan, V.K., Mittal, S., Rai, M. et al. Does climate-smart village approach influence gender equality in farming households? A case of two contrasting ecologies in India. *Climatic Change* **158**, 77–90 (2020).  
<https://doi.org/10.1007/s10584-018-2321-0>

<sup>45</sup> DeClerck, FAJ; SK Jones; S Attwood; D Bossio et al. 2016. Agricultural ecosystems and their services: the vanguard of sustainability? *Current Opinion in Environmental Sustainability* 23:92–99.  
<http://dx.doi.org/10.1016/j.cosust.2016.11.016>.

<sup>46</sup> Glover D, Sumberg J, Ton G, et al. 2019. Rethinking technological change in smallholder agriculture. *Outlook Agric* **48**: 169–80.

<sup>47</sup> Sonneveld, B.G.J.S. Merbis, M.D. Alfarra, A. & Ünver, O. and Arnal, M.A. 2018. *Nature-Based Solutions for agricultural water management and food security*. FAO Land and Water Discussion Paper no. 12. Rome, FAO. 66 pp.

<sup>48</sup> Fisher E, Hellin J, Greatrex H, Jensen N. Index insurance and climate risk management: Addressing social equity. *Dev Policy Rev* 2019; **37**. DOI:10.1111/dpr.12387.