AgriLAC Resiliente:

Resilient Agrifood Innovation Systems Driving Food Security, Inclusive Growth, and Reduced Out-Migration in Latin America and the Caribbean (LAC)

A One CGIAR Regional Integrated Initiative

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Proposal

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Summary table

Initiative name	**AgriLAC Resiliente: Resilient Agrifood Innovation Systems Driving Food Security, Inclusive Growth, and Reduced Out-Migration in the Latin America and the Caribbean (LAC)**
Primary Action Area	Resilient Agrifood Systems (RAFS)
Geographic scope	Latin America *CA-4 countries of Central America (Guatemala, Honduras, El Salvador, Nicaragua), Colombia, Mexico, and Peru*
Budget	US$30 million

1. General information

Initiative name

AgriLAC Resiliente: Resilient Agrifood Innovation Systems Driving Food Security, Inclusive Growth, And Reduced Out-Migration in LAC region

Primary CGIAR Action Area

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2. Context

2.1. Challenge statement

The US$2.5 trillion annual funding gap in meeting the SDGs by 2030[1], which includes a US$300–350 billion annual shortfall in investment needed to transform food and land use systems[2] and a US$598–US$824 billion shortfall in investment in biodiversity[3], tells us that we are failing to help agrifood systems (AFS), especially those in LMICs, thrive in a world threatened by growing global health, environmental, and planetary crises. The 2021 UN Food Systems Summit (UNFSS) and COP26 called for urgent action if we are to close on these global climate and SDG targets by 2030.

The Glasgow Leaders' Declaration commits 137 countries — including the seven selected AgriLAC Resilient countries — to halt and reverse forest loss and land degradation by 2030, while delivering sustainable development and inclusive rural transformation. The UNFSS received 231 commitments globally to, *inter alia*, support development of AFS that, despite shocks and stressors such as conflict, climate change, and natural disasters, will succeed in delivering food security, nutrition, and equitable livelihoods for all.

To deliver on these commitments, LMICs need assistance to legislate net-zero targets, design feasible transformation pathways for the sectors involved (especially livestock) and realign policy and economic incentives to steer AFS in the right direction. The AgriLAC Resiliente Initiative will do precisely that in seven of the most climate-vulnerable and conflict-prone countries of Latin America and the Caribbean (LAC).

Opportunities and challenges in LAC are substantial. LAC biodiversity and forests play key roles in global environmental sustainability, ranking among the top 6 of the 10 ten most biodiverse countries in the world — featuring 23% global forest coverage, 36% $CO2_{eq}$ stock kept in forests, 33% total volume of renewable water resources. However, LAC agriculture — driven by desperation, poverty, inefficiency, and inequality — uses 33% of LAC land area, nearly 75% of its freshwater resources, and generates almost 50% of its greenhouse gas emissions (GHGEs)— 70% of which from livestock.

The scale of the problem is alarming. Despite consistent food production surpluses and extensive food export, 83 million people in LAC are poor and 53 million are hungry (FAO & CEPAL, 2020). Fifty-one million rural people and US$28 billion in crop and livestock production are exposed to climate hazards, particularly drought and climate variability (floods, hurricanes). In Central America, poverty, unemployment (~30 million[4]) and conflict drive incessant out-migration (primarily rural out-migration), burdening the resources of neighboring HICs, primarily the United States. Smallholder farmers' livelihoods depend on an ever-narrowing portfolio of crops: maize, beans, rice, and coffee; female farmers who account for at least half of all LAC food producers are frequently not recognized as farmers or decision-makers. Higher-up the chain, LAC reliance on a resource-intensive agriculture model pushes conventional livestock production to encroach on forests and arable land, exacerbating GHGEs.

AgriLAC Resiliente will harness decades of robust CGIAR and broader AR4D ecosystem research in LAC —including CCAFS, FTA, and WLE— offering an unprecedented opportunity to

1 UN: https://www.un.org/press/en/2019/dsgsm1340.doc.htm
2 The Food and Land Use Coalition. Retrieved from: report
3 Paulson Institute, The Nature Conservancy and Cornell Atkinson Center for Sustainability, Financing Nature: Closing the Global Biodiversity Financing Gap, 2020
4 OIT, 2o2o

ensure this expertise, research evidence base and results —hereto dispersed across various CGIAR Centers and AR4D partnerships— are united to address these critical challenges.

By 2030, AgriLAC Resiliente will have helped seven LAC countries to design and deploy low-emission, resource-efficient pathways that (1) support the AFS transitions required to set LAC on track to meet 2030 UNFSS, SDG, and COP26 targets, and (2) increase the climate resilience of especially poor, rural farming communities to foster employment opportunities, keep youth in their own communities and reduce out-migration at its source. For this ambitious agenda we have designed a stepwise approach over two–three cycles (2022–2024, 2025–2030); an initial phase of understanding, testing, piloting, and early adoption in four central LAC countries (Guatemala, Honduras, El Salvador, Nicaragua), later expanded to include Colombia, Peru, and Mexico (2022–2024), will be followed by broader out- and upscaling, mainstreaming, and policy and incentive adaptation to cover more challenging (but also more potentially impact-generating) countries such as Brazil (2025–2030).

2.2. Measurable 3-year (end-of-Initiative) outcomes

AgriLAC's stepwise approach will understand, co-design, test, and pilot phases of the Initiative in the 2022–2024 cycle, with broader mainstreaming, realignment of policy and investment, scaling, and integration planned for the 2025–2030 cycle. By 2024, AgriLAC aims to contribute to five outcomes within a larger transformation of agricultural innovation systems across seven LAC countries:

End of Initiative outcome 1 (EoI-O1): Nutrition-sensitive socio-ecological-technological (SET) innovations adapted and co-designed with AFS actors (farmers, processors, small-medium enterprises (SMEs,) National Agricultural Research and Extension Systems (NARES) enable local AFS in five LAC countries to effectively align the **technical** aspects of transition processes with the **socio-ecological** needs of at least 250.000 farmers (*2022–2024*). A **scalable model** for SET adoption along *national* and *regional* AFS transformation pathways (*2024–2030*).

End of Initiative outcome 2 (EoI-O2): Producer associations, AgriTech companies, government agencies, NGOs, and public extension services are empowered by a **digital ecosystem** spanning three LAC countries to offer digitally enabled agro-advisory services to at least 200.000 farmers who more effectively manage climate risk and sustainable intensification (SI) across their value chains.

End of Initiative outcome 3 (EoI-O3): National and local governments in three LAC countries **integrate low-emission strategies with development goals** across agroecosystems, landscapes, and value chains reaching at least 300.000 ha (*2022–2024*). Government, private and public investors, and extensionists realign financing streams, support functions, and MRV efforts to interventions that blend mitigation objectives with human, social, ecological, and equitable development priorities of communities (*2025–2030*).

End of Initiative outcome 4 (EoI-O4): Public-private sector, NARES, and civil society actors across subnational agricultural innovation systems in four LAC countries use **InnovaHub** learning, knowledge management, and evidence to better accelerate on-farm uptake of **SET innovations** by making them more gender-responsive, production-friendly, and context-specific reaching, at least 200,000 farmers (*2022–2024*). Private and public sector actors (including CGIAR) scaling validated SET 'best bet' innovations via carbon-friendly transition pathways in the LAC region (*2025–2030*).

End of Initiative outcome 5 (EoI-O5): Public and private institutions in three LAC countries use CGIAR science, evidence, and tools to inform and shape more transformative, sustainable, mitigation-comprehensive, and climate adaptation-friendly AFS-related **policies, incentives, and Initiatives**. These will be mainstreamed and scaled throughout six LAC countries helping actors/stakeholders realign and transition their AFS to more sustainable pathways that meet climate and broader development objectives (*2025–2030*).

These outcomes will be measured by indicators included in the MELIA Plan.

2.3. Learning from prior evaluations and impact assessments (IA)

Lessons from CGIAR Research Program 2020 Reviews and 2021 Synthesis of Evaluative Evidence: Toward One CGIAR highlight:

- **Addressing the research–development disconnect by mainstreaming social science research**, including gender and social inclusion and youth and avoiding the predominant focus on biophysical research and limited inclusiveness. AgriLAC Resiliente will ensure full involvement of smallholder farmers in any introduced innovations, to ensure that it understand the societal roles, the traditional beliefs and their relation to biodiversity and ecosystems, as this can provide a valuable entry point for any of the Initiative's innovations.
- **Enhancing collaboration and accelerating with public and private development partners the progression from research development to development outcomes and impacts at scale.** AgriLAC Resiliente has strong social capital and partnerships at regional and country levels. We will involve partners from design phase on, so they a) benefit from, b) replicate at larger scale with additional investments within their own country/regional strategy and ongoing projects/programs, and c) multiply through new partnerships, the Initiative innovations based on their context-specific needs.
- **Addressing inadequacy of current CGIAR MELIA systems** to plan, monitor, and assess AR4D activities by adapting CIMMYT's successful approach[5], which facilitates and enables planning, monitoring, reporting, and learning processes, as well as providing inputs for impact assessments.
- **Clarifying the balance of effort between fundamental research, applied research, capacity building, scaling, and development activities**, by leveraging fundamental and applied research from global initiatives, and tailoring and adapting them to meet local/regional demands, thus achieving scale through implementation.

2.4. Priority-setting

Full details of the approach, data, and results are provided in Ramirez-Villegas et al. (2021).

Approach: Key challenges addressed by the Initiative were mapped to all five One CGIAR Impact Areas (Table 1). Next, we synthesized a portfolio of country-level priorities to form an initial list of priority geographies that were then assessed against stakeholder consultations to produce a final set of Initiative priorities.

5 Gardeazabal et al. (2021).

Table 1 – Relationship between AgriLAC Resiliente's challenges and One CGIAR Impact Areas

Challenge	Impact area mapping
First, increasing vulnerability of AFS (AFS) is worsening social inequality and unleashing unprecedented migration, especially of young people.	IA4 (climate), IA2 (poverty) and IA3 (gender)
Second, AFS are a major driver of diet-related health problems in LAC, where the prevalence of obesity and undernourishment continues to rise. Nicaragua has the highest rates (29% and 17%, respectively).	IA1 (nutrition, health, and food security)
Third, LAC is crucial to preservation of biodiversity and to critical ecosystem services. Housing 30% of the planet's renewable water reserves, arable soils, and biodiversity (FAO, 2020), LAC's prevailing resource-intensive agricultural production model is threatening this global function.	IA5 (environment)

Each Impact Area's (IA) prioritization process is guided by a set of indicators (Table 2) calculated at national level for all Latin America countries except for Argentina, Chile, French Guiana, Uruguay, and the small Caribbean islands — these areas are of unlikely interest to CGIAR Funders due to their development status or the potential impact scale (due to country size and lack of baseline data for the small Caribbean islands.

Initiative priorities: We developed Initiative priorities based on the quantitative analysis of country ranking for each indicator, then averaged rankings across all indicators, to provide an initial idea of geographic priorities to be discussed vis-à-vis CGIAR capacities and stakeholder demand (Table 2). Brazil emerges as the highest priority, primarily because it is also the largest country in LAC, where ~3.4 million people live in extreme poverty, ~52 million people are exposed to climate hazards, and ~60 million ha have been deforested in the last 20 years (~3 million ha/year, on average). Mexico, Colombia, and Peru rank second, third and fourth, respectively, on the priority list. Even though Mexico is geographically smaller than Brazil, it has greater agricultural production gaps (25 million tons in Mexico vs. 22.5 million tons in Brazil), and more people in extreme poverty. Colombia ranks third overall but has the second-highest deforestation rate (~233,000 ha/year).

Importantly, Guatemala, while one of the smallest countries in the region, ranks fifth across all dimensions and ranks fourth (above Peru) on poverty and third (above Peru and Colombia) on production gaps. Guatemala shares several institutional, climate and socio-economic challenges with neighboring countries, namely, El Salvador, Honduras, and Nicaragua (referred to as the CA4 region). These countries are part of the SICA (Central American Integration System), which provides a mechanism for cross-country collaboration, policy integration, and scaling of interventions. **If these countries were grouped together, they would rank second overall only after Brazil.**

Central America, especially Guatemala, experiences significant gender and social inequality (Bouroncle et al. 2019). Nearly half of all Guatemalan under-fives are stunted. Areas with high levels of malnutrition tend to be rural, remote, with less access to services and with high populations of indigenous and Afro-descendent populations. Gender gaps in access to productive resources ownership are significant. Less than 33% of all landowners in Mexico and Paraguay are women, while it is only 20% in Nicaragua and 14% in Honduras. In Guatemala, only 8% of farms are women-led. Rural women frequently engage in a variety of key farm activities yet are potentially ignored by agricultural extension systems and denied access to and benefits from climate de-risking, higher-profitability options and information to sustainably improve their agricultural activities. Women and youth migration is also a major concern in LAC, where Colombia (2 million) and El Salvador (1.3 million) have the highest populations of emigrants. In 2017, more female (50.7 %) than male migrants were reported.

The analysis and gender literature review suggest that Brazil, the CA4 countries, and Mexico, Colombia, Peru, should be AgriLAC's highest priority. CGIAR Funder interest and CGIAR capacity, partner engagement and stakeholder consultations (see Section 2.6), indicate **we should focus on the CA4 countries and Mexico, Colombia, Peru** (excluding Brazil). Within these countries, the most important farming systems in terms of climate-related and social vulnerabilities, farmer incomes and economic development are the **maize-beans mixed system**, the **Andean mixed systems**, the **extensive livestock systems** driving deforestation, especially in Colombia, and the **coffee-based mixed systems** that are the main source of livelihood for several millions of producers throughout LAC (Jarvis et al. 2021).

Table 2 – Summary of indicators used for the AgriLAC Resiliente priority setting and resulting country priority ranking

Country[1]	IA1. Indicator: Number of children <5 underweight in rural areas (thousands)	IA2. Indicator: Rural people in extreme poverty (thousand)	IA2. Indicator: Maize production gap (million ton)	IA4. Indicator: Rural population exposed to hazards (million)	IA4. Indicator: Crop and livestock value of production exposed to hazards (billion USD)	IA4. Indicator: GHGe from plant- and animal-based foods (MT CO_2-eq/year)	IA5. Indicator: Total forest loss (million ha)	Average rank of country[2]
Brazil	208.0	3,452.0	22.524	52.33	83.249	1,218.1	59.83	18.7
Mexico	142.4	3,698.2	24.922	30.53	26.278	195.1	4.29	17.9
Colombia	65.0	1,475.3	0.883	13.89	7.692	94.2	4.66	15.6
Peru	49.4	606.2	1.379	10.96	6.993	46.0	3.39	14.4
Guatemala	87.6	974.0	1.817	7.15	3.809	28.6	1.58	13.6
Venezuela	33.2	971.3	0.559	9.97	5.499	64.7	2.23	13.0
Ecuador	32.5	405.9	1.099	4.97	5.701	38.4	0.87	12.1
Bolivia	20.4	480.4	0.888	3.77	2.713	48.5	6.11	11.7
Honduras	40.7	1261.7	1.057	4.85	1.519	15.5	1.19	11.3
Paraguay	3.2	145.3	0.984	3.25	4.921	63.3	6.28	11.1
Haiti	50.2	2572.0	0.922	4.04	1.202	7.1	0.07	9.3
Nicaragua	12.8	149.0	0.607	3.52	1.271	30.7	1.59	9.1
Cuba	6.9	0.0	0.211	4.55	3.111	23.7	0.37	7.3
Dom. Republic	9.0	80.1	0.078	2.82	2.176	14.8	0.33	6.7
El Salvador	10.5	61.0	0.454	1.98	0.786	5.3	0.08	4.9
Panama	4.8	57.7	0.065	1.33	0.662	8.5	0.44	4.9
Costa Rica	2.2	43.4	0.011	1.16	1.845	6.5	0.25	4.1
Guyana	1.7	36.9	0.005	0.26	0.355	2.5	0.22	2.1
Suriname	1.4	68.6	0.000	0.29	0.121	1.7	0.20	2.1

[1] Colors are used to differentiate indicators for each of the Impact Areas, except gender for which data were not available. All indicators have equal weight since they all help quantify the multidimensional nature of the challenges tackled by *AgriLAC Resiliente*. For reference, Table 1 outlines the challenges.

[2] Rank is calculated as the average (with equal weighting for all indicators) rank of each country across all 7 indicators. The higher the rank the greater the potential for impact at scale, and hence the higher the priority of the country.

2.5. Comparative advantage

Integrated research focus: Demand-driven scientific research informed by deep understanding of the AFS context and incentives facing farmers and other value chain actors. AgriLAC Resiliente integrates high-quality research from commodity-focused (maize, beans, potatoes, forages, cassava), systemic science (climate change, food systems, sustainable landscapes) and social sciences (gender, social inclusion, participatory processes) (see Annex 1 for projects' details). The Initiative assesses drivers of interconnected AFS risks and opportunities and evaluates agronomic, sectoral, institutional, and policy options.

Science leadership team: AgriLAC Resiliente builds on its scientists' robust track record. Nutrition, climate and on-farm participatory evidence generation are at the core of the Alliance and CIMMYT's approach through programs such as HarvestPlus and MasAgro (WP1); scaling-out climate services for agriculture throughout LAC led by the Alliance and CCAFS, which will now incorporate a digital component harnessing CIMMYT's expertise (WP2); extensive Alliance-led research to increase low-emissions agricultural development and reducing deforestation through CCAFS and FTA, and CIP contributes its vast knowledge on Andean-Amazon landscapes (WP3); innovation and scaling — at AgriLAC's core — harnessed through CIMMYT's successful experience with innovation hubs and adding Alliance on-the-ground expertise/ knowledge on participatory methods for scaling (WP4); finally, policy, institutions and investment expertise brought onboard by IFPRI, especially its work on migration, bolstered by CIMMYT's Integrated Agri-food System (IASI) approach and Alliance's extensive work on policy-science interface, sustainable finance and climate security (WP5).

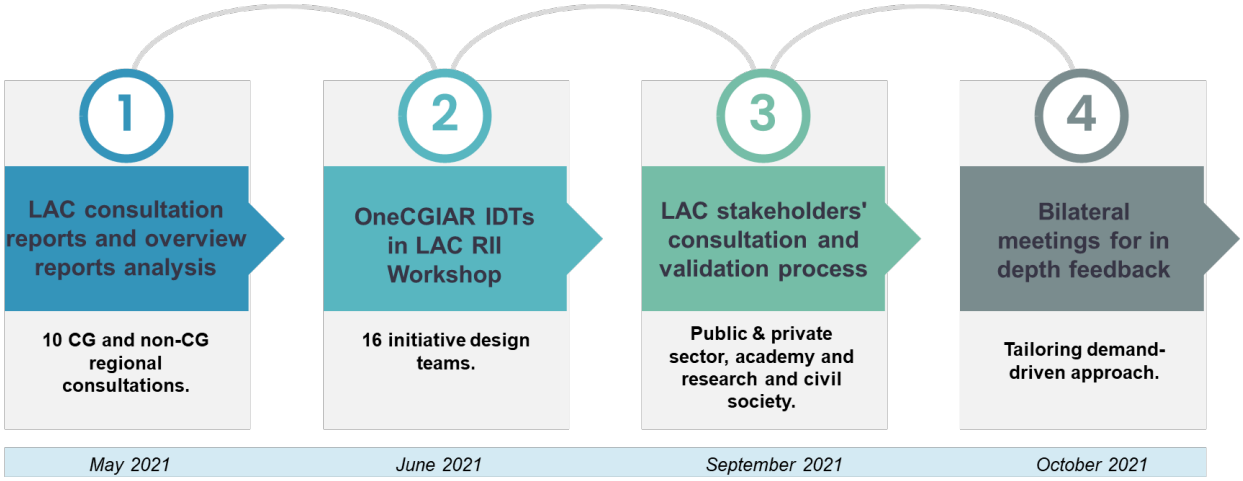
Participatory research approach: Participatory innovation with farmers and other agrifood system actors that result in validated, context-specific, integrated risk management, gender empowerment, and nutrition enhancement strategies.

Engagement for impact: Co-establishing innovation hubs (InnovaHubs) through cross-sectoral partnerships that leverage scientific breakthroughs for socially inclusive progress. Delivering agro-climatic information that enhances decision-making by over 300,000 farmers through 50+ multi-stakeholder platforms in 11 countries. Empowering public and private sector decision-making by providing AFS data, analysis, knowledge, frameworks, and tools, and recommending policy and co-investment strategies.

Regional roots: Over 400 One CGIAR researchers based in the LAC region and staff present in all seven prioritized countries. AgriLAC benefits from long-established, trusted relationships built in over 50+ years of work in the region, allowing it to mobilize an in-region network of long-term partners to adapt and validate new technologies and implement targeted and coordinated dissemination for optimal adoption and impact at scale.

Connections to One CGIAR global Initiatives. Agri-LAC can tap into the investments of global Initiatives, evaluating and adapting innovations for alignment with high-priority regional needs and stakeholder demand within LAC AFS.

2.6. Participatory design process



Process: AgriLAC Resiliente participatory design included a 4-stage process (more details in Annex 2). The previous two years had witnessed many wide-ranging consultation processes, by CGIAR and others, involving over 1,200 diverse stakeholders in the region: TAG2, Two Degree Initiative, Food System Summit Dialogues, Andean and Maize for Colombia and Mexico initiatives[6].

First the IDT reviewed and synthesized the recommendations from these consultations to establish the initial set of priorities. **Second**, a workshop was held with 16 global One CGIAR Initiatives to explore synergies and opportunities for collaboration and develop a consolidated regional CGIAR portfolio for regional stakeholders. **Third**, we took the results of the first two steps back to our scaling, innovation, and demand partners — over 160 organizations, including public and private sector, academic and research institutions, and civil society organizations — to discuss, consult and validate with them. **Fourth**, we held bilateral meetings with strategic partners to gain in-depth feedback to tailor the demand, take advantage of current capacities and innovations in the region, and identify potential scaling pathways.

Analysis: We used various participatory methods (open discussion, surveys, and polls) to capture the feedback and inputs from regional stakeholders. All participants in stage three of the process also completed a questionnaire that provided insights into potential collaboration opportunities to jointly achieve AgriLAC Resiliente outcomes. These data were complemented with analysis of the regional consultation documents reviewed during the first phase of the participatory process. In addition, the bilateral meetings held after the consultation and validation provided insightful feedback on key details in each WP and the challenges and possibilities of achieving outcomes in the prioritized countries.

Results: Scaling, innovation, and demand partners highlighted the relevance of the Initiative to address the main challenges of the region (See support letters in Annex 3). Around 70% of the public, private, and NGO organizations involved in the process acknowledged the synergies and opportunities to enhance collaboration towards AgriLAC Resiliente outcomes, and identified this to be addressed by aligning needs, sharing best practices, and strengthening strategic partnerships among all sectors. On average, 46% of the partners identified strong synergies between their objectives and AgriLAC's WPs 1, 2, 3, and 5, and 56% identified strong synergies solely with WP4, highlighting the need to maximize the scaling of knowledge and innovation for agriculture and articulate such synergies to enhance partnerships (Annex 2a). The process also identified a need to promote investments in the

6 Alvarez, S. et al., 2020.; Castellanos A. et al., 2020. CIP, 2020; Galeano, C.et al., 2019; Govaerts, B. et al. 2019; Martínez-Salgado, JD. et al., 2021

region to succeed in our efforts to achieve AgriLAC's outcomes, as well as develop inclusive processes for the development of research, including strategic regional and local partnerships.

Participants in the consultation and validation process highlighted the importance of an integrated approach that recognizes complexities and potential synergies in LAC agrifood and innovation systems. Moreover, there was a call to align efforts across regions led by different organizations to jointly achieve significant impact, in which all participants expressed their eagerness to continue collaborating with the Initiative. Through bilateral meetings, governments such as Colombia, Guatemala and Mexico, have acknowledged the importance of the Initiative for achieving the SDGs; the private sector is keen to engage and seek opportunities for collaboration for achieving competitiveness through innovation; and the donors participating in the IDT (WB and IADB) and USAID expressed confidence that the AgriLAC Resiliente design process reflects their priorities for the region regarding migration, food and nutrition security, climate change, gender inclusion, and poverty and hunger alleviation.

2.7. Projection of benefits

The projections below transparently estimate reasonable orders of magnitude for impacts that could arise as a result of the impact pathways set out in the Initiative's theories of change. One CGIAR global Initiatives are expected to 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 the Initiatives as they maximize their potential contribution to achieving impact. Projected benefits are not part of the delivery targets, as impact lies beyond CGIAR's sphere of control or influence. The complete methodology for the projection of benefits for AgriLAC Resiliente can be found in Annex 4.

The exercise for the projection of benefits for AgriLAC Resiliente has been calculated based on the indicators selected in consensus with all work packages leads, and in their applicability, and the statistics available in each country. The estimates presented are conservative and aim to be achieved through scaling towards 2030.

Our assumptions in calculating the indicators include:

1. The prioritized sites within each country could have more than one intervention (i.e., two crops per region or a combination of crop, plus best management practices).
2. The interventions directly benefit indicative-system production (crops) in the selected sites.
3. In some cases, there are two types of indirect benefits (a) similar households under comparable production systems in other parts of the country, (b) households depending on agriculture in the selected sites.

To this end, AgriLAC Resiliente estimates that by 2030, **8.3 million people** and **2.5 million women** will be benefiting from relevant CGIAR Innovations by improving their nutrition, food security, and livelihoods, **8.7 million people** will be benefiting from climate-adapted innovations and **19.7 million ha** will be under improved management with at least one intervention in place.

Table 1. Summary of projected benefits for AgriLAC Resiliente

Breadth	Depth	Probability
Impact Area: Nutrition, health and food security **Impact indicator:** # of people benefiting from relevant CGIAR Innovations.		
TOTAL: 8,305,574 people	Substantial: 556,302 people Significant: 2,210,966 Perceptible: 5,538,307	High certainty: 50%–80% expectation of achieving these impacts by 2030, at this point.
Impact Area: Poverty reduction, livelihoods and jobs **Impact indicator:** # of people benefiting from relevant CGIAR Innovations		
TOTAL: 8,305,574 people	Substantial: 556,302people Significant: 2,210,966 Perceptible: 5,538,307	Medium certainty; 30%–50% expectation of achieving these impacts by 2030, at this point.
Impact Area: Gender equality, youth and social inclusion **Impact indicator:** # women benefiting from relevant CGIAR innovations		
TOTAL: 2,575,447 women	Substantial: 2,575,447	Medium certainty; 30%–50% expectation of achieving these impacts by 2030, at this point.
Impact Area: Climate adaptation and mitigation **Impact indicator:** # people benefiting from climate-adapted innovations		
TOTAL: 8,770,830 people	Substantial: 654,393people Significant: 2,113,081 Perceptible: 6,003,356	Medium certainty; 30%–50% expectation of achieving these impacts by 2030, at this point.
Impact Area: Environmental health and biodiversity **Impact indicator:** #ha under improved management		
TOTAL: 19,776,082 ha	Transformative: 3,202,238 ha Substantial: 3,577,986 Significant: 12,995,858	Medium certainty; 30%–50% expectation of achieving these impacts by 2030, at this point.

2.7.1. Nutrition, health, and food security | Poverty reduction, livelihoods and jobs

For both Impact Areas, we selected the Indicator: # of people benefiting from relevant CGIAR Innovations[7].

Assessing breadth

Even as many countries in LAC emerge from low- to middle-income country status, nearly every country in LAC has significant rates of micronutrient deficiencies[8]. By incorporating technologies such as biofortified crop varieties and improving diet diversification, the Initiative will contribute to reducing these deficiencies. The consumption of crops with higher-micronutrient content will improve the nutritional status, better quality products and alternative uses of the crops will increase production and income generation and better quality and cost-effective on-farm production will reduce household expenditures.

Data used to estimate this indicator included:

7 We did not used the #people meeting minimum micronutrient requirements indicator because it is not available the information per disability-adjusted life at subnational level in most of the countries.

8 In Colombia, 25% children under 12 months have iron deficiency, and 20% pregnant women have anemia (ICBF, 2015). In Honduras, almost one third (29%) children between 6 to 59 months suffer from some type of anemia (Secretaria de Salud et al., 2013). In Guatemala, 35% of children under five have zinc deficiency and 26% have iron deficiency (MSPAS et al., 2017).

a. Projected annual total population (urban and rural) and crop harvest areas in the seven selected countries, applying growth rates derived from the FAO stat (See Annex 4).
b. Number of crop producers and household size derived from national statistics for the selected country sites. Each of the WPs have defined the crops and regional places for the intervention (See Annex 4)
c. Adoption rates of relevant studies in the countries — this information is drawn from published papers, working papers, or project reports. Where more than one adoption rate was found, we used the average.

Assessing depth

For each country and production system (crops), we used productivity and income increases reported in the literature for smallholders adopting biofortified or improved varieties in similar contexts/countries[9]. Where the information was not available, we interviewed external experts to obtain the data (see Annex 4). We estimate that 556 thousand people will be direct beneficiaries in the *substantial impact* category considering their potential to permanently increase their farm incomes by at least 50%. There is a high probability of achieving the expected results, based on previous studies showing the adoption of technologies such as biofortified or improved varieties. 2.2 million farmers with same crop conditions are likely to achieve a potentially permanent income of 10%, *significant impact* category. Indirect beneficiaries (perceptible) were estimated considering farmers in the same selected regions, using either biofortified or improved varieties, thus we estimated that, if AgriLAC Resiliente is able to progress successfully towards its outcomes, 5.5 million producers are likely to increase their income up to 5%.

2.7.2. Gender equality, youth and social inclusion

Indicator: # women benefiting from relevant CGIAR innovations.

Assessing breadth

The Initiative will apply a gender-responsive approach that recognizes that different roles, responsibilities, and access to and control of resources will likely determine different impacts and benefits for different social groups. Through the meaningful integration of gender and inclusion considerations in each work package and in activities related to extension and technical support to the adoption of innovative technologies, such as the biofortified crop varieties. We project that approximately 2.5 million of women producers will benefit substantially both directly and indirectly from the Initiative interventions and through nutritional improvements and new potential sources of income.

We used the same approach as per the previous indicator, we multiplied literature-based adoption rates by the percentage of women in the countries. However, it's important to highlight that we used the average of conservative technology rates (adoption and consumption) for women, especially those coming from the available information on biofortified adoption varieties for which we had gender-disaggregated data.

Assessing depth

For this indicator, AgriLAC Resiliente will contribute to the substantial category. We used the average of adoption rates for women based on a literature review of adoption studies[10]. We estimate the total number of women beneficiaries considering the number of beneficiaries with the same conditions in the selected regions, taken from the previous indicators, and multiplying it with the proportion of women in the country. The data of women was used at the

9 Pradel, W., et al., 2013; Maldonado, L.V., et al., 2018; Vargas, S., et al., 2018; CIAT, 2017.
10 Bonilla-Findji O and Acosta M., 2020; Acosta M., et al. 2019 and CIAT, 2017.

national level due to the availability of information and subsequent uniformity of the data between countries. We used data from FAO STAT for total women population.

2.7.3. Climate adaptation and mitigation:

Indicator: # of people benefiting from climate-adapted Innovations

Assessing breadth

Agricultural activities are highly susceptible to climatic variability and, therefore, increase their risk of exposure to climate change especially in LAC countries. The Initiative will consider the use of agro-climatic forecasting tools in the agricultural sector for optimized management decisions. Producers can thus develop strategies that make them more resilient to and help mitigate the risk of climate-change variability and shocks. The objective is to increase yields (or reduce production losses) either by generating more income or decreasing the costs. To determine the adoption rate, we consulted recent studies[11] about adoption of climate change technologies in each country. We use the same approach of the indicator *# of people benefiting from relevant CGIAR Innovations,* with the difference that for this indicator, we use the determined adoption rate of agroclimatic forecasting technologies and tools. Once we had this rate, we multiplied it with each number of farmers in each depth category (substantial, significant, and perceptible). We also use the number of farmers of each crop in each region. The number of farmers was obtained from national statistics, censuses, and previous studies. Finally, the sum of the three categories shows us that about 8.7 million farmers will be beneficiaries of technologies and innovations for climate adaptation and mitigation.

Assessing depth

According to the results, we estimate that more than 654,000 people will be direct beneficiaries. This figure was obtained by multiplying the adoption rate and the total number of farmers in each region and each prioritized crop. We estimate that AgriLAC Resiliente will reach 2.1 million farmers under the significant category. This figure refers to farmers with similar agroecological conditions, which means that all farmers are in the same intervention area. Finally, we estimate that in the perceptible category, around 6 million people will be indirect beneficiaries, whose income is likely to increase up to 5%. The calculation was done using the rural population in the areas of intervention, multiplied by the determined adoption rate. There is a medium probability of achieving the expected results, based on previous studies[12] showing the adoption of adaptation and mitigation options, such as agroclimatic information, and experts' consultation.

2.7.4. Environmental health and biodiversity

Indicator: # ha under improved management

Assessing breadth

AgriLAC Resiliente will combine a number of agronomic and environmental practices to increase higher biomass yields that make better use of the agricultural frontier and reduce negative impacts on native ecosystems. The objective is to increase the value and productivity of land, diversifying and improving its production, and managing soil resources sustainably to preserve its fertility. To obtain this indicator, we considered all the hectares of each selected crop in each region of the countries. We obtained the information disaggregated at the regional level through national statistics and at the national level through data from FAO STAT. In addition to this, we collected information on technologies adoption rates at the hectare level

11 World Bank; CIAT; CATIE. 2014; CATIE, 2009; IICA, 2017; Pérez Medal, E., et al., 2018; FONTAGRO, 2019; Bonilla-Findji O., et al., 2020; Bonilla-Findji O., et al., 2018; Gallego, J., et al., 2021.
12 Ibid

from similar studies[13] in each country. Finally, we obtained that around 19.7 million hectares will be beneficiaries by adding each of the depth categories (substantial, significant and perceptible).

Assessing depth

By using the data from FAO STAT and national statistics on cultivated area for each crop in each country and the adoption rate was multiplied with each value of crop area to obtain the results for depth assessment. The transformative category corresponds to hectares that will be directly intervened by the Initiative. To calculate this category, we used information from national statistics of each country. We estimated the sum of the total number of hectares in each region of intervention by crop, reaching an estimate of 3.2 hectares improved by Initiative's intervention. The substantial category was calculated by using the total hectares of all crops in all the areas to be intervened, reaching an estimate of 3.5 million hectares improved by the Initiative's activities. Finally, the significant category was estimated by using the total hectares of crops in the countries from FAO STAT, which indicates an approximate of 12.9 million hectares that will be improved due to AgriLAC Resiliente.

Assessing probability for all five indicators

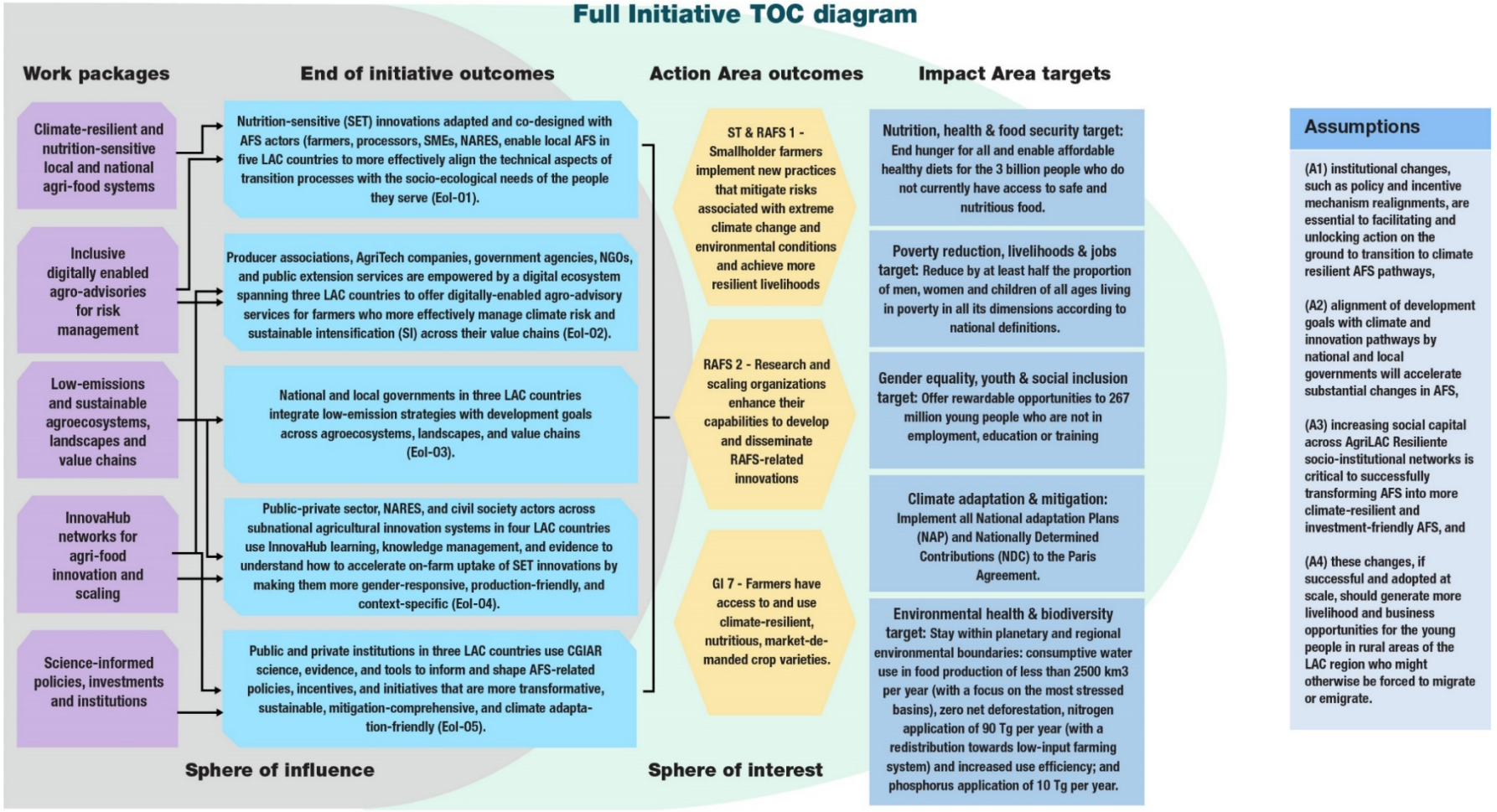
For the AgriLAC calculation of projected benefits, the lack of complete access to regional data has been a bottleneck to calculating final results for impact to 2030 with certainty. Nonetheless, assumptions and research used to calculate the rates of adoption of technologies in the region have helped us to conservatively estimate a probability that AgriLAC's innovations will achieve the general target presented for each indicator across the five Impact Areas by 2030. Our probability estimations were also based on a small survey conducted among external experts in the selected countries (see Annex 4) on the likelihood of adoption based on their expertise. However, this uncertainty is expected to be reduced as AgriLAC Resiliente is implemented and generates the appropriate evidence on progress towards impact.

13 Sandoval, D., et al., 2021; FONTAGRO, 2019; Pérez Medal, E., et al., 2018.

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

3.1. Full Initiative TOC

3.1.1. AgriLAC Resiliente TOC diagram



3.1.2. Full Initiative TOC narrative

The AgriLAC Resiliente TOC posits that, for LAC to remain one of the world's most important sources of biodiversity, natural resources, and food, it is the very people (women and men producers, AFS actors, policymakers, private sector) responsible for safeguarding, producing, and exporting these resources who must be supported to do it in ways that protect the environment, manage natural resources more sustainably, and create opportunities that help to stem migration, especially youth, in search of better livelihood prospects. Everything we need for this to happen is already in place — the abundant natural resources, expertise, the demand for healthy food, the desire to find employment in one's own country. However, for LAC countries to meet the fast-approaching climate mitigation and adaption goal deadlines (e.g., net-zero deforestation target by 2030) and more sustainable food systems agreed upon at COP26 and the UNFSS, then concerted effort (in pragmatic, actionable ways) is urgently needed to help AFS in LAC to transition to the low-emissions pathways required.

The **Impact Pathways** to the **EoI Outcomes** (Section 2.2) that AgriLAC Resiliente expects to achieve by 2024 are mainly:

(a) Enabling LAC to meet its fast-approaching global food systems and climate targets and to continue delivering essential global functions by supporting/facilitating/enabling its transition to low-emission, resource-efficient production strategies that support resilient, competitive AFS (WPs 3, 2, and 5), and

(b) Enabling smallholder producers to access to sustainable, diversified sources of income and pathways to livelihood improvement so that migration is a choice rather than a survival strategy (WPs 1, 2, and 4).

To catalyze multi-stakeholder collaboration, CGIAR partners will lead on tailoring social-ecological-technological (SET) innovations to meet demand needs, co-identifying scaling pathways, and strengthening social capital, to accelerate and facilitate the transition of AFS in LAC to legislated net-zero targets and feasible low-emissions development pathways. These efforts will focus on the **pragmatic considerations** of the transition process, namely: (WP1) the **technical dimension** (combined with nutrition and ecological domains), i.e., packaging SET innovations, (WP2) building a **digital ecosystem** to support climate risk management, (WP3) bundling **low-emission strategies with development goals** across agroecosystems, landscapes, and value chains, (WP4) **innovation pipeline** and **knowledge management** aspects of transition (InnovaHubs), and (WP5) realignment of **policies and incentives** around new pathways.

Working first with partners in the CA-4 countries and then in Colombia, Mexico, and Peru, AgriLAC Resiliente will take a stepwise approach, ensuring Initiative concept clarity, testing, and co-design phases in the **2022–2024 cycle**, and broader mainstreaming, realignment of policy and investment, scaling, and integration planned for the **2025–2030 cycle**. AgriLAC Resiliente will continue to engage with and inform agrifood policy processes across scales by enabling science-policy dialogues and co-developing tailored decision-support tools and data, based on the evidence-driven outcomes of CGIAR CRPs and Centers working in the region.

AgriLAC Resiliente's five interconnected **end-of-Initiative outcomes** (see 2.2) are fundamentally dependent on aligned motivation, collaboration, and co-investment across AFS actors. Achievement of these **outcomes** relies on the **assumptions** that: (A1) institutional changes — such as policy and incentive mechanism realignments — are essential to facilitating and unlocking action on the ground to transition to climate-resilient AFS pathways, (A2) alignment of development goals with climate and innovation pathways by national and local governments will accelerate substantial changes in AFS, (A3) increasing social capital across AgriLAC Resiliente socio-institutional networks is critical to successfully transforming AFS to become more climate-resilient and investment-friendly, and (A4) these changes, if

successful and adopted at scale, should generate more livelihood and business opportunities for young people in rural areas, thus helping to stem migration.

Via AgriLAC Resiliente efforts to increase resilience of AFS in four Central and three South American countries (2022–2024), and scaling efforts through downstream AR4D partnerships reaching other additional LAC countries, (such as Brazil in 2025–2030), the **Big Lift** is expected to be 8,3 million farmers (35% women) deriving increased income from AFS that are more climate-resilient, sustainable, and competitive, as well as 19 million hectares brought under improved management **by 2030.** If these assumptions hold true, AgriLAC Resiliente will contribute to the **Action Area (RII) Outcomes** (*See 3.1.1.*), targets under five **One CGIAR Impact Areas** (*Section 4*) and the **SDGs** (*Results Framework*). AgriLAC Resiliente will pursue synergies with One CGIAR initiatives, especially other regional integrated initiatives with a clear resilience focus[14], both Resilient Agrifood Systems[15] and Systems Transformation[16] Initiatives, as well as non-CGIAR partners/large investments such as the 2021 US Strategy for addressing the root causes of migration in Central America and 2021 global commitments on zero deforestation.

Figure 1. Geographic focus of AgriLAC Resiliente

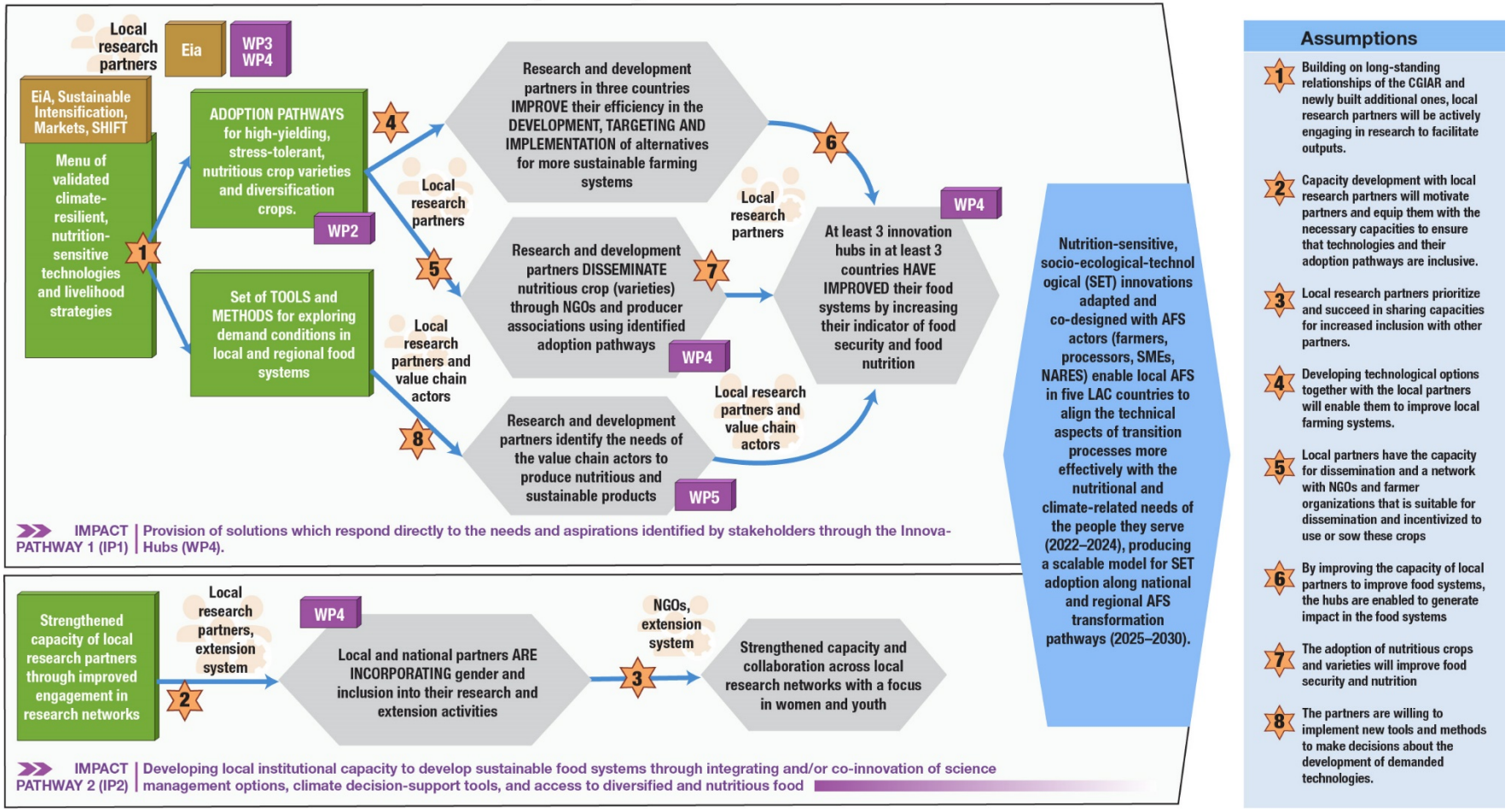
14 Regional Integrated Initiatives: ESA, CWANA, TAFSSA
15 Resilient Agrifood Systems Initiatives: LCSR, Plant Health
16 Systems Transformation Initiatives: ClimBer, SHIFT, Inclusive Markets, MITIGATE+

3.2. Work Package TOCs

3.2.1. Work Package 1: Shaping nutrition-sensitive socioecological-technological (SET) 'best bets'

Work Package 1 TOC diagram

WP1 - Shaping nutrition-sensitive socioecological-technological (SET) 'best bets' to operationalize local AFS transition to climate-resilient nutrition pathways



Work Package 1 research plans and TOC narrative

Work Package title	**Shaping nutrition-sensitive socioecological-technological (SET) 'best bets' to operationalize local AFS transition to climate-resilient nutrition pathways**
Work Package main focus and prioritization	Many technologies associated with agricultural system transformation fail to consider the broader needs (nutritional, equity, socioeconomic, and ecological) beyond the purely technological ones that might affect uptake by the very system or people they were created to serve. The solution proposed by WP1 is the nutrition-sensitive SET (socioecological-technological) approach, which bridges the silos between the technical, social, nutrition, and environmental domains. WP1 will co-adapt, co-design, and shape emerging CGIAR (and other AR4D partners) innovations with local AFS actors in five LAC countries to ensure they have access to, and will use, climate-resilient and nutrition-sensitive technologies proven to work for them and their specific needs and supported over the longer-term by enhanced NARES capacity.
Work Package geographic scope	Regional: Guatemala, Honduras, El Salvador, Mexico, Colombia, Remark: WP1 may be easier to operate in additional countries than other WPs, as it can include stand-alone research to initiate or maintain presence in target countries.

WP1 science:

Research questions	**Scientific methods**	**Key outputs**
Which nutrition-sensitive SET innovations have high potential to optimize productivity of land, water, gender equity and biodiversity within LAC AFS?	Systems analysis of farmers and other AFS actors in target countries (by sub-geographies, demographic groups, farming systems) using: (i) meta-analysis of existing datasets to systematically describe threats, capacities, needs, and preferences (Giller et al. 2021); (ii) qualitative methods, including semi-structured interviews and focus groups to assess preferences and risk perceptions. Evaluation of existing and emerging nutrition-sensitive SET innovations relative to needs of defined sub-groups of LAC farmers/AFS actors based on estimated and/or demonstrated (i.e., field trials, long-term experiments), potential to increase productivity, optimizing resource/labor use, improving remuneration within value chains, enhancing nutrition, empowering women and other marginalized groups, increasing climate resilience, restoring degraded lands, and reducing GHGEs.	Continually updated menu of validated climate-resilient, nutrition-sensitive technologies and livelihood strategies tailored to LAC farmers and other AFS actors. Mapping of farmers and other AFS actors in target countries (by sub-geographies, demographic groups, farming systems) to be used for engagement and technology targeting within InnovaHubs.
Which mechanisms or models (such as research networks) optimize and increase nutrition-sensitive agrifood technologies at institutional level (incentives and barriers)?	Evaluation of previous and existing LAC research mechanisms for efficiency (return on research investment) and impact (by benefit/beneficiary type). Analysis of the implemented mechanism or models (such as research networks) to support multi-objective, multi-stakeholder sustainability Initiatives in LAC AFS.	A holistic set of benefits and risks relevant to adoption, disaggregated by demographic groups and geographies. Optimized design of mechanism such as network-based research collaborations in target countries. Strengthened capacity of local research partners through improved engagement in research networks (e.g., co-leadership of research agendas; joint

Research questions	Scientific methods	Key outputs
		publications; training in research tools/methods).
Which tools and approaches can accelerate market opportunities for and access to climate-smart and nutritious food produced by rural men, women and youth?	Market system approach, which focuses on identifying current actors and understanding their current behavior within the markets, as well as their current attitudes toward these topics and gender and youth roles and implications. Qualitative methods, including semi-structured interviews and focus group discussions (FGDs) with different actors, complemented with quantitative analysis of the socioeconomic, nutritional, and environmental drivers based on the implemented research networks. Existing household consumption and individual dietary intake survey data will be considered, to understand potential opportunities (Food Environment).	Set of tools and methods for exploring demand conditions (and associated marketing opportunities) in local and regional food systems informing targeting and scaling strategies to be used by governments, institutions, producer organizations, NGOs and AFS companies.

Synergies

- Information from WP1 will feed recommendations for digital tools in **WP2**.
- The data generated will fill data gaps from the systems and frameworks evaluated in **WP3**, while conversely WP3 can answer questions on value chain integration and market potential for nutrition-sensitive cropping systems.
- WP1 addresses field science for research questions identified in the InnovaHubs (**WP4**) and builds a local and regional network of researchers to be linked with other partners through the InnovaHubs.
- WP1 provides information to inform policy for **WP5** and informs the development of tactical plans for the integrated AFS methodology (IASI)[17].
- Nutrition-sensitive SET innovation bundles will include the latest in **climate-resilient breeding inputs** (seeds, crop varieties) validated by the **Accelerated Breeding** Initiative, **promising mitigation approaches** emerging from the South American **MITIGATE+** Living Labs**,** and **tools** for exploring better quality food, local market demand (from **SHiFT, Markets**). Using the **HER+ Initiative WP1** analysis of specific constraints, norms, drivers, and leverage points to understand their impact on technology and strategy adoption by women and youth will help shape nutrition-sensitive SETs that are gender-transformative.

WP1 theory of change

End of Initiative outcome 1: nutrition-sensitive, socio-ecological-technological (SET) innovations adapted and co-designed with AFS actors (farmers, processors, SMEs, NARES) enable *local* AFS in five LAC countries to align the **technical** aspects of transition processes more effectively with the **nutritional and climate-related** needs of the people they serve (*2022–2024*), producing a **scalable model** for SET adoption along *national* and *regional* AFS transformation pathways (*2025–2030*).

AgriLAC Resiliente WP theories of Change have been designed around the socioecological system framework[18] approach, which posits that only by intervening at key leverage points in the multiple systems (social, digital, technological and governance) around a challenge can we trigger meaningful change. WP1 targets the **technological dimension** of the desired transition of AFS in LAC to more resource-efficient, nutrition-sensitive and climate-resilient pathways. Given that technological advances that fail to consider important gender, social, and economic factors are rarely effective, WP1 will work with local farmers, NARES partners, NGOs, and other AFS actors to ensure that the promising technologies emerging from CGIAR and AR4D science are better adapted to the nutritional and ecological features of the people and production systems they target. The logic is that if we do so, we will emerge with nutrition-sensitive SET bundles that bridge the three domains of (i) nutrition aspects (ii) environmental

17 Govaerts et al. (2021).
18 McGinnis and Ostrom, (2014).

quality and protection, and (iii) social and equity issues. A key **assumption** is that pressing at the *intersection* of these domains[19] will trigger meaningful change.

The WP1 **theory of change** is that *if* we equip AFS actors on the ground, i.e., smallholder farmers, SMEs, and local NARES with a portfolio of nutrition-sensitive SET innovations stress-tested by CGIAR and AR4D ecosystem partners, and *if* these SET innovations are further adapted to meet a range of objectives (income, nutrition, gender equity, environmental) other than purely technological, specific to the local AFS production systems and value chains where they will be deployed, *then* we can expect to see these actors begin to take the first, pragmatic steps towards climate-resilient AFS at first local, then national scale.

WP1 will stage-gate nutrition-sensitive SET innovations, by first (**Impact Pathway 1**) validating, packaging, and adapting nutrition-sensitive SET innovations emerging from partnering Initiatives and downstream AR4D research partners, in cooperation with NARES, NGOs, and farmer representatives (who will co-adapt and co-design). In cross-referencing the nutrition-sensitive SET bundles with the stakeholder needs assessment in InnovaHubs (WP4), we will further refine the fit between the selected nutrition-sensitive SET bundles and the needs of farmers and value chain actors in those areas.

Impact Pathway 2 assumes that for nutrition-sensitive SET innovations to become entrenched in local production systems over the longer-term, we need to build local NARES' capacity to fold nutrition-sensitive SET thinking into their services (advisory, research, intervention design), ensuring that nutrition-sensitive SET bundles continue to be *adapted to*, and therefore *adopted* by groups most-often left behind by technological improvements, e.g. women, the rural poor, youth, and Indigenous Peoples (IP). Learning and evidence accumulated under IP1 will shape how NARES capacity will be built in IP2.

WP1 takes a stepwise approach, focusing first (**2022–2024**) on understanding the optimal configurations for, co-designing, and adapting nutrition-sensitive SET bundles with demand partners20 and innovation partners[21], before moving on to actual implementation, mainstreaming, and scaling out of the nutrition-sensitive SET bundles in later cycles (2025–2030) together with key scaling partners[22].

A key **assumption** underpinning this TOC is that our partners in the local AFS where WP1 will share our vision that technologies and approaches to effectuate AFS transition should succeed in providing multiple benefits (e.g., nutrition, income, climate resilience, social equity, biodiversity conservation, and ecosystem health) rather than a narrowly technical one. Conveying evidence from the work on co-benefits (**WP3**) and feedback from multistakeholder InnovaHubs (**WP4**) is expected to facilitate ground-up support for this approach.

19 https://ui.adsabs.harvard.edu/abs/2015AGUFM.H23M..02C/abstract

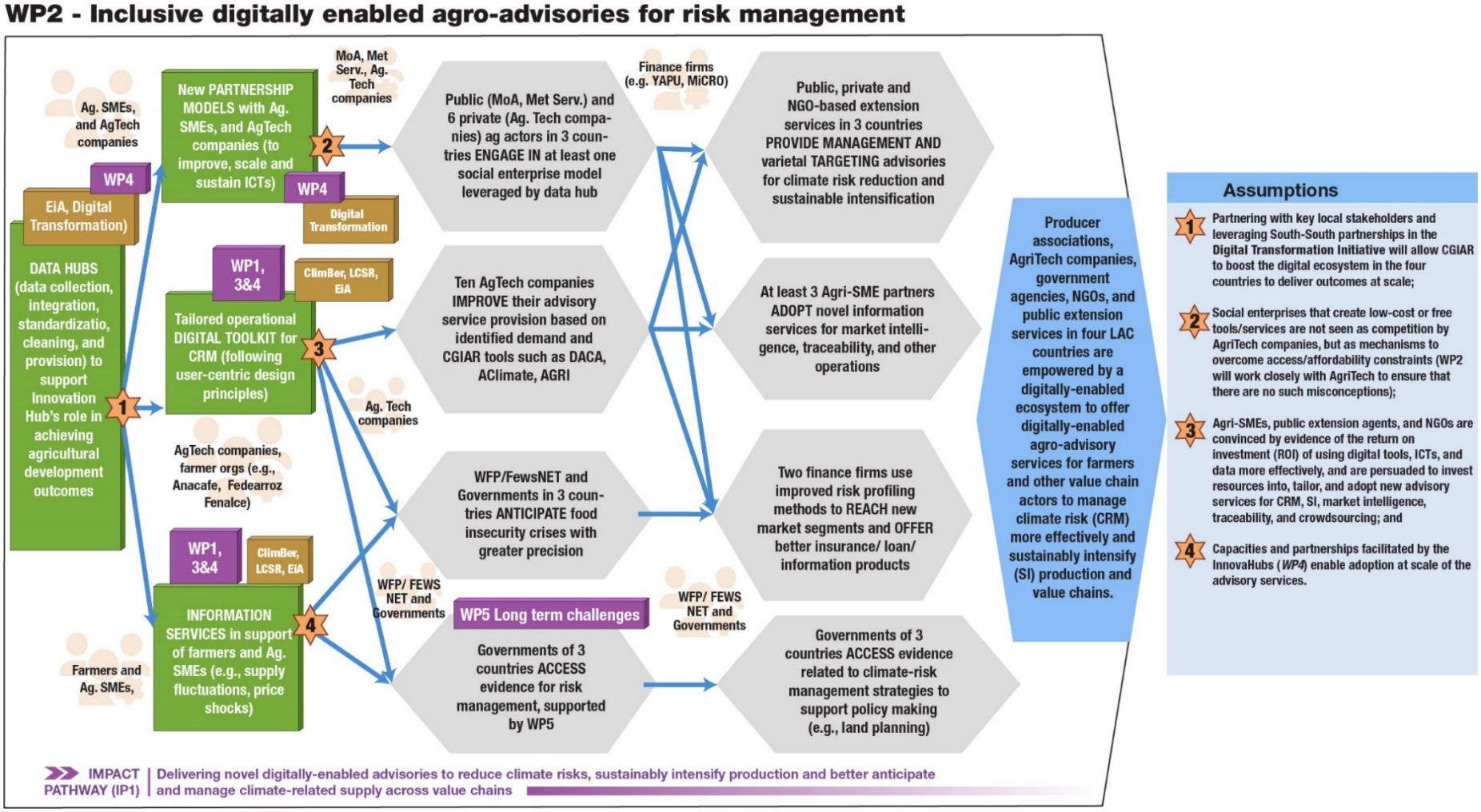
20 **WP1 Demand partners** such as farmer organizations, NGOs, local government, private sector, and processors, among others.

21 **WP1 Innovation partners** including NARES, NGOs, ARIs other One CGIAR Initiatives

22 **WP1 Scaling partners** will include government (Ministries of Agriculture, Health, and Environment), extension services, farmer organizations, private sector (service/input providers, buyers looking for sustainable sourcing), and existing bilateral projects (e.g., Cultivos para Mexico)

3.2.2. Work Package 2: Inclusive digitally enabled agro-advisories for risk management

Work Package 2 TOC diagram



Work Package 2 research plans and TOC narrative

Work Package title	Inclusive digitally enabled agro-advisories for risk management
Work Package main focus and prioritization	Around 51 million rural people and US$28 billion in crop and livestock production are exposed to climate hazards in LAC. Livelihoods are thus highly vulnerable to climatic variation, and farm productivity and farmer incomes remain low in the region. The WP focuses on de-risking and sustainably intensifying LAC's food systems via the co-creation of inclusive advisory services that help smallholder farmers make better decisions. Capitalizing on existing digital infrastructure and tapping the potential of the Digital Revolution, WP2 will leverage past CGIAR work and partnerships to consolidate a digital-enabled ecosystem around climate risk management (CRM) and sustainable intensification (SI) across five value chains in Colombia, Guatemala, Honduras, and Mexico. By end of 2024, this ecosystem will enable farmer associations, producer associations, AgriTech firms, NGOs and public extension services to deliver a portfolio of tailored, digitally enabled advisory services that reach 200,000 producers (of which 50% will be women and youth), sustainably intensifying and de-risking five value chains.
Work Package geographic scope	LAC Guatemala, Honduras, Colombia, Mexico.

WP2 science:

Research questions	Scientific methods	Key outputs
Data infrastructure in support of digitally enabled advisory services • What are the required data streams, services, and digital infrastructure (existing and to be created) to efficiently support decision-making for climate-risk reduction and sustainable production for food systems?	Data needs assessment: analysis of processes in the InnovaHub (WP4); mapping of existing publicly available data and services; data quality review for existing services (input/output); existing and required data streams; requirements for existing and new information services with users and service providers. Iterative co-design and testing of Data Hubs and Data Cubes including data sources, data flows, ontologies, outputs, and interactions.	(1) Data Hub underpinning each WP4 InnovaHub (2) Data Hub Services including quality assurance, integration, harmonization, data provision APIs (3) Data Cubes tailored to specific service needs from public and private stakeholders
Advisory service creation • What types of climate and other information services are needed by AFS actors to reduce climate risk and enhance resource-use efficiency?	Sectorial (insurance, development, humanitarian, public extension, private extension) mapping of service supply and demand. Joint youth and gender-sensitive assessment (with service providers) of user base, sustainability, and impact potential of existing services (CRM, food security, resource use efficiency, and SI). Development, benchmarking, and deployment of new / more accurate prediction models and tools to inform decision-making based on data from Data Hubs. User-centered and collaborative design methods to ensure relevant/usable services	For farmers and value chain actors with special focus on women and youth: (1) Improved, tested agro-climatic prediction models and co-designed information services (2) Data services and ICTs to underpin digital ecosystem (3) Improved/tailored digital tools for decision support
Digital ecosystem consolidation • What are key levers of change for healthier digitally enabled ecosystems (sustained increase of equitable data availability and access), supporting agricultural innovation hubs? Who are the	Country-specific digitally enabled ecosystem mapping and network analysis to identify bottlenecks, gaps, public and private sector roles, and entry points for consolidation of the digital ecosystem. Multi-scale (local, InnovaHub, through to national) assessment of stakeholder incentives and adoption constraints for ICT	(1) Partnership models that leverage Data Hub and basic services for digital service provision (2) Models for demand-driven support services (e.g., business model evaluation,

Research questions	Scientific methods	Key outputs
key actors and what are their incentives?	use. RCTs and action research to understand the kind of advisories demanded by farmers including women and youth and the main constraints to uptake of digital advisories. Characterization and validation of existing service provision models for sustainability and profitability to leverage their potential. Leveraging the South-South collaboration lab within the Digital Transformation Initiative, strategic partnerships will be achieved by conducting network and behavioral analysis, testing alternatives for encouraging collaboration (experimental and non-experimental methods), mapping the incentives, skills, power relations and roles of actors within the networks.	benchmarking, market research) created in support of AgriTech companies that can be operated beyond the scope of the Initiative. (3) Information services and capacities in public sector, farmer organizations, farmers and Ag SMEs use demand-driven support services for decision making.

Synergies

- **WP4** will facilitate conversations with hub stakeholders to understand needs for climate-informed digital advisories, map institutional capacities, and identify existing gap in service provision. WP4 and WP2 will also collaborate around the digitalization and operationalization of the Technical Agroclimatic Committees (LTACs).
- We will use information from **WP1** and **WP3** and work with them to develop digital solutions to inform varietal choices and other practices (WP1), and resource-use efficient technologies (WP3).
- **WP5** will inform policies and investments to up-scale WP2 innovations, based on evidence provided by 2-way feedback mechanisms established in WP2.
- WP2 will work with **EiA** Deliver (LAM use case) and Transform Work Packages toward improving and scaling E-Agrology for data collection and advisory.
- With **LCSR**, we will work on the development of climate-informed advisories for livestock, including for pests and diseases.
- With **ClimBer**, we will collaborate around the climate security agenda, and around the scaling of climate-informed advisories and insurance in Guatemala.
- With **Digital Transformation**, we will co-develop Data Hubs and Data Cubes (there will be one data scientist funded by Digital Transformation working in LAM) working to address the data and information needs of Latin American farmers and value chain actors.

WP2 theory of change:

End of Initiative outcome 2: Producer associations, AgriTech companies, government agencies, NGOs, and public extension services in four LAC countries are empowered by a digitally enabled ecosystem to offer digitally enabled agro-advisory services for farmers and other value chain actors to manage climate risk (CRM) more effectively and sustainably intensify (SI) production and value chains.

Rapidly expanding global access to the Internet, ICTs, AI, and other digitally enabled tools offer new opportunities for creating digital climate and agro-advisory services that reach even the most vulnerable populations. However, the unequal expansion rate of access to these services makes the sustainability of agro-advisory services reaching poor smallholders in rural areas of LAC a challenge. As a result, individuals in or representatives of rural or low-income populations are rarely engaged in the co-design of human-centered digital solutions to serve their needs.

Developing agro-advisory services with an ecosystem ‘mindset’, whereby services and tools are harmonized, is key to delivering outcomes and impact (Goddard et al., 2020). To bring digital agro-advisory services to scale in LAC, WP2 will strengthen the digital innovation ecosystem in the region, with a focus on CRM and SI. In-depth profiling of the country digital ecosystem will serve to identify existing (1) digital infrastructure, institutions, and capacities; (2) type and quality of services; (3) bottlenecks, included gender-related, for digital tool and

service provision and sustainability; (4) gaps in services vis-à-vis existing needs/demand; and (5) impact potential and partnerships. These profiling processes will provide the basis to address the research questions and generate the WP outputs.

The **theory of change** for WP2 requires, at minimum: (i) key public and private stakeholder involvement in the design and tailoring; (ii) operational data streams and infrastructure; and (iii) successful business and scaling models. To achieve the outcomes, CGIAR will **co-create** Data-Hubs with value chain actors (producer organizations, AgriTech firms, etc.) in four countries interested in de-risking their value chains and investments, and with research partners (*WP4*, *EiA*, *Digital Transformation*). WP2 will also **build** capacities of **InnovaHub actors** to interact with the Data-Hub to provide and/or receive data. As part of a stepwise approach, WP2 will take the various climate modelling, de-risking, and information tools and models from ideation/co-design phase to building/packaging/**early scaling** phase (2022–2024). For this, CGIAR will **co-create** (i) new partnership models with Ag-SMEs, and AgriTech companies (to improve, scale and sustain ICTs) (*WP4, Digital Transformation*); (ii) a tailored operational digital toolkit for CRM following user-centric design principles (*WP1,3&4*, *ClimBer, LCSR, EiA*); and (iii) information services that support decision-making for farmers and Ag-SMEs (e.g., supply fluctuations, price shocks) (*WP1,3&4, ClimBer, LCSR, EiA*).

This TOC is underpinned by **assumptions** that (1) partnering with key local stakeholders and leveraging South-South partnerships in the **Digital Transformation Initiative** will allow CGIAR to boost the digital ecosystem in the four countries to deliver outcomes at scale; (2) social enterprises that create low-cost or free tools/services are not perceived as competition by AgriTech companies, but as mechanisms to overcome access/affordability constraints (WP2 will work closely with AgriTech to ensure that there are no such misconceptions); (3) agri-SMEs, public extension agents, and NGOs are convinced by evidence of the return on investment (ROI) of using digital tools, ICTs, and data more effectively, and are persuaded to invest resources into, tailor, and adopt new advisory services for CRM, SI, market intelligence, traceability, and crowdsourcing; and (4) capacities and partnerships facilitated by the InnovaHubs (*WP4*) enable adoption at scale of the advisory services.

Early-stage scaling will begin in **2022–2024** and powered up in **2025–2030** to reach even more people. Scaling will be conducted through public and NGO extension services, farmer organizations23 and Ag-SMEs. Developing agro-climate prediction models, co-creating the Data-Hubs, and creating responsive innovative advisory services will be done with academia, AgriTech companies, public sector and social enterprises24.

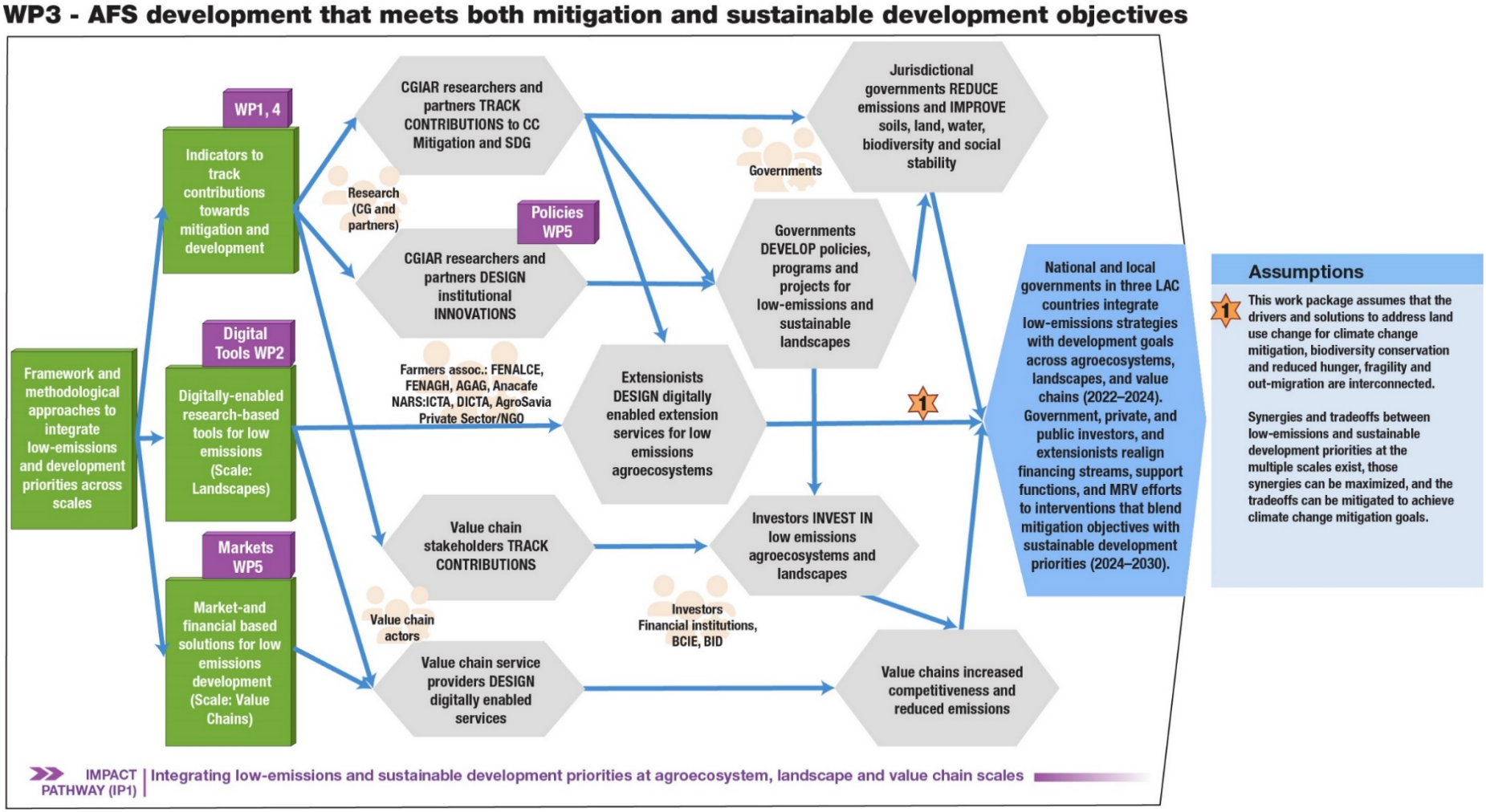
By end 2024, these services will have helped 200,000 farmers (50% women and youth) across five value chains in four LAC countries to use data, digital, and ICTs to adapt more efficiently to climate variability and change and sustainably intensify production. 20,000 households will have avoided food insecurity crises. Agri-SMEs will be better able to anticipate and manage climate-related supply shocks; and governments will have a greater understanding of how to formulate policy based on evidence of what works, where, and why.

23 **Public extension services** such as Ministries of Agriculture and NARES; **NGOs extension services** such as WFP in Guatemala and Honduras; and **farmers organizations** including Fedearroz, Fenalce, C-DRO, ANACAFE, IHCAFE, Fedegan, APOGUA.

24 **Academia and research institutions** such as IRI/Columbia University, WUR, Univ. Chapingo, U. San Carlos, U. Zamorano**; public sector organizations** such as National HydroMet services, National Statistics Department; and **social enterprises** including Yapu Solutions and Genesis Empresarial.

3.2.3. Work Package 3: AFS development that meets both mitigation and sustainable development objectives

Work Package 3 TOC diagram



Work Package 3 research plans and TOC narrative

Work Package title	**AFS development that meets both mitigation *and* sustainable development objectives**
Work Package main focus and prioritization	Though not the biggest global GHG emitter, the LAC region would benefit from the integrity of standing forests and arable land. Available policy instruments such as REDD+, NAMAs and NDCs —while helpful in keeping LAC countries on track towards commitments —can be better integrated with key human aspirations and deliver co-benefits across multiple sustainable development outcomes, including for women, youth and excluded communities. WP3 is designed specifically to integrate sustainable development priorities, social inclusion and gender-responsive frameworks into LAC countries' efforts to mitigate climate change in their AFS. It also investigates whether it is possible to build an investment-friendly climate around low-emission AFS development that blends mitigation with economic, social, and environmental development priorities: if these pathways are fully exploited, they could mobilize a broader range of investment opportunities and social support, create income and employment opportunities for women and young people in communities where there is significant conflict and out-migration.
Work Package geographic scope	LAC: Colombia, Peru, Nicaragua

WP3 science

Research questions	**Scientific methods**	**Key outputs**
Which mechanisms, data, and tools are required for key stakeholders to integrate climate-change mitigation priorities and sustainable development priorities at agroecosystem, landscape and value-chain scales?	Participatory approaches including multi-stakeholder platforms, FGDs using socially inclusive methodologies such as GENNOVATE. Spatially explicit analyses to determine geographies (agroecosystems, landscapes and, value chains) where mitigation priorities overlap with areas with priorities for achieving sustainable development. Systematic literature reviews and synthesis studies Econometric, socioeconomic and behavioral analyses to understand the conditions, behavioral change triggers, incentives (including carbon benefits and co-benefits) and constraints for low-emissions and sustainable development at AFS scale.	Framework and methodological approaches to integrate low-emissions and development priorities across scales.
Are existing indicators designed to capture progress towards both low-emissions commitments *and* development priorities at agroecosystem, landscape, and value chain scales? How can those indicators be improved to meet such a dual purpose?	Secondary and grey literature review on existing indicators to measure mitigation and development goals. Targeted consultations and qualitative and quantitative primary data collection using socially inclusive methodologies such as GENNOVATE.	Integrated emissions reduction and sustainability indicators that the three selected countries use to design interventions, promote investments, and track agroecosystems, landscapes and value chain contributions to national and regional climate-change mitigation, poverty, social inclusion, and biodiversity goals.
What tools are needed/available to achieve low-emissions and development priorities at	Participatory approaches including multi-stakeholder consultations, focus group discussions.	Digitally enabled, research-based tools that researchers and extension agents within the three selected countries use to support

Research questions	Scientific methods	Key outputs
agroecosystem, landscape, and value chain scales?	Systematic literature reviews and synthesis studies.	climate-change mitigation, water and nutrient use efficiency, reduced pests and diseases, restored soils or landscapes, ecosystem services, and biodiversity interventions.
What are the business opportunities from the Paris Agreement's Article 6 for achieving low-emissions and sustainable development at the agroecosystem, landscape, and value chain scales?	Social, economic and financial feasibility analyses, including assessing carbon costs, benefits and co-benefits and participatory processes considering gender and social inclusions in value chains approach.	Science- and market-based solutions that value chain stakeholders and service providers within the three selected countries use to foster investments for climate-change mitigation in local and export-oriented value chains.

Synergies

- WP3 will collaborate with **WP1** to identify local research priorities to reduce GHGEs, advance sustainability, and to fill data gaps; WP3 and **WP2** will jointly develop digital tools and ecosystem support services for advisory services; the InnovaHubs (**WP4**) will help co-define and monitor sustainable farming indicators and develop field-data tracking and traceability systems for low-emission agroecosystems, landscapes, and value chains; and with WP5, this WP will develop methods and tools for policy development, promotion and assessment and to understand migration, and violence drivers.
- Close links are envisioned with "**MITIGATE+**", "**SHiFT**", "**LCSR**" and "**Inclusive Markets**" One CGIAR Initiatives on activities relating to reducing land and food-based emissions in food systems. In particular, synergies with MITIGATE+ are critical to WP3 meeting its objectives. We will synthesize learning and best practices emerging from the MITIGATE+ Living Labs in Colombia and Peru, where communities and mitigation experts will co-design and adapt mitigation approaches that also account for human, ecological, equity and livelihood needs of the community.
- We will work with One CGIAR **Transformational agroecology** Initiative to assess agroecological practices and business models and other institutional arrangements to fulfill LAC countries' commitments in terms of climate- change mitigation, biodiversity conservation, and land restoration.WP3 will also establish cross-learning with the Living Labs to be established by the Agroecology Initiative in Peru (especially using its outputs for WP3 work at the agroecological landscape scale).
- WP3 will also maintain communication with WP4 (Governance) of **HER+**, which tests entry points for the agency and voice of women in institutional frameworks and policy.

WP3 theory of change:

End of Initiative outcome 3: National and local governments in three LAC countries integrate low-emissions strategies with development goals across agroecosystems, landscapes, and value chains (*2022–2024*). Government, private, and public investors, and extensionists realign financing streams, support functions, and MRV efforts to interventions that blend mitigation objectives with sustainable development priorities (*2024–2030*).

If we are to limit global temperature rise to 1.5°C above pre-industrial levels by 2030, and achieve carbon neutrality by 2050, per the Paris Agreement, then agroecosystems, landscapes, and value-chains must be realigned and transitioned to low-emissions pathways. Most LAC countries: (a) have formal climate mitigation commitments and the biophysical potential to reduce land-based emissions; (b) are experiencing or emerging from situations of conflicts and fragility; and (c) have issues with forced displacement and out-migration. However, climate change mitigation efforts, such as REDD+, NAMAs and NDCs, tend to overlook or downplay key development priorities, such as biodiversity conservation, increased food production, and reduced malnutrition, fragility, and out-migration. Increased understanding of the synergies and trade-offs between climate action and different rural development objectives can increase potential for multiple outcomes. To achieve this, we need conceptual frameworks and tools that respond simultaneously to, and track contributions towards, these multiple outcomes. Furthermore, due to the complexity of scaling low-emissions, deforestation-free technologies and finance, blending mitigation objectives with

development objectives will be needed to get stakeholder buy-in in different sectors and at different scales.

Using a social inclusion and gender responsive lens, WP3 aims to integrate low-emissions strategies with development priorities at three levels: agroecosystems, landscapes, and value chains25, which are prioritized based on their potential to contribute to climate change mitigation. WP3 will follow a stepwise approach that centers on learning, building the frameworks and tools, designing the evaluation methodologies, and beginning the process of integration into agroecosystem, landscapes and value chains (2022–2024), followed by implementation, mainstreaming into processes, scaling, and measurement, reporting, and verification (MRV) of tracked outcomes (2025–2030 cycle).

WP3 envisions the following: (A) CGIAR researchers and government partners (subnational and national-level) co-design interventions and institutional innovations that blend mitigation objectives with development priorities (2025–2030) and track contributions to climate change mitigation and Sustainable Development Goals (2025–2030); (B) extensionists and value chain service providers design digitally-enabled services for low-emissions agroecosystems and value chains (2025–2030), which are mainstreamed into approximately three agroecosystems and value chains (2025–2030), and (C) investors learn about ways in which they can incentivize low-emission landscape-level interventions (2022–2024), followed by realignment of investments by investors into value chains that meet mitigation and other sustainable development goals simultaneously (2025–2030), with stakeholders using indicators to track contributions.

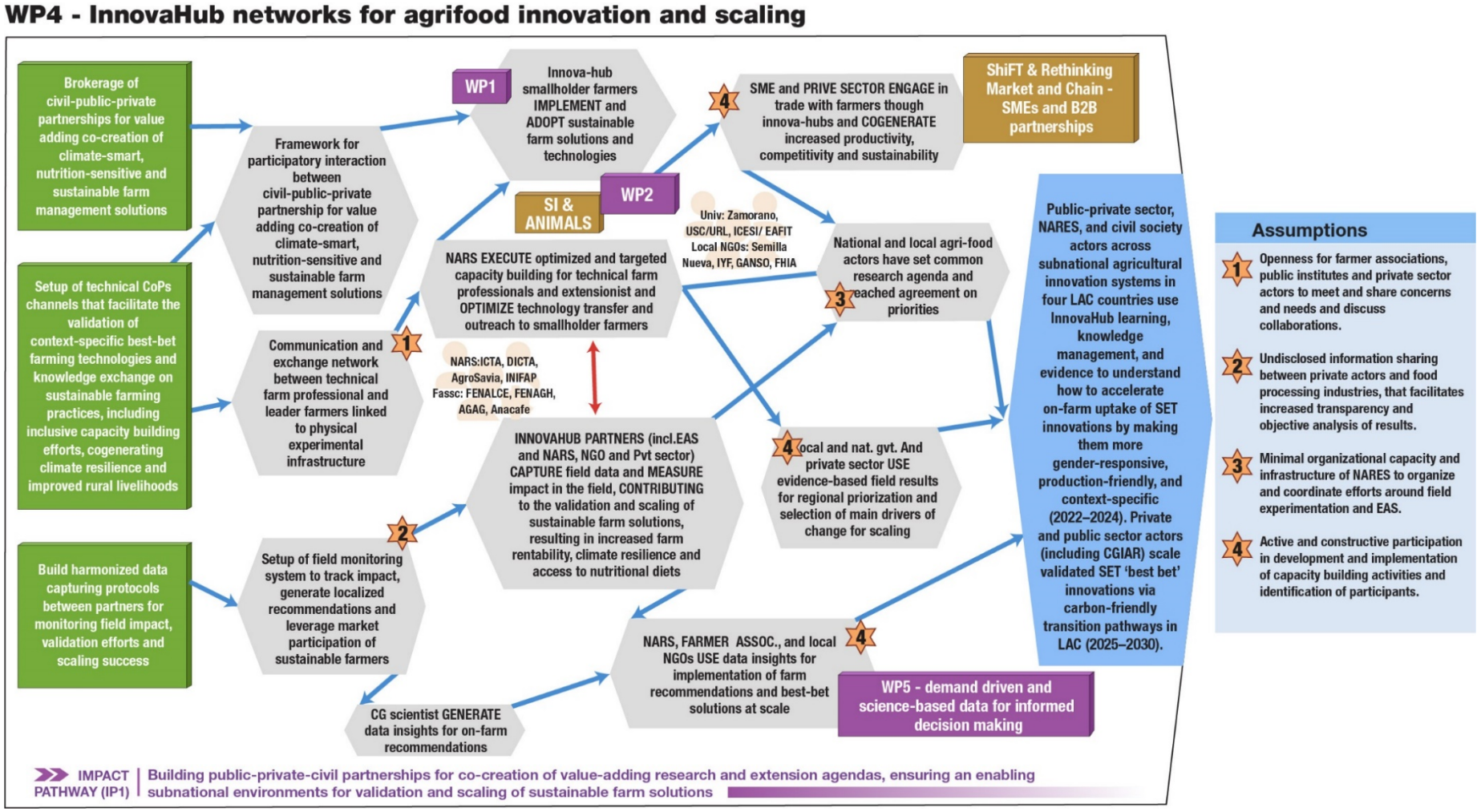
WP3 approach will: (1) ensure that stakeholders' priorities at various scales are properly integrated; (2) identify and validate key demand, innovation, and scaling partners at (a) agroecosystem scale, including local and indigenous communities and farmers associations; landscape scale, including jurisdictional-level governments and extensionists; and (b) national scale, including investors, donors, UN Rio Conventions; and (3) be used to identify entry points for integrating climate-change mitigation with development objectives at the three scales, which will direct integration and mainstreaming efforts (2022–2024).

WP3 assumes that, where synergies and tradeoffs between low-emissions and sustainable development priorities at multiple scales exist, that those synergies can be maximized, and that the tradeoffs can be mitigated to achieve climate-change mitigation goals. It also assumes that demand exists, or can be created, among consumers and other stakeholders for solutions with multiple benefits.

25 **Potential agroecosystems, landscapes and value-chains** include (1) livestock and cacao in the Colombian Amazon; (2) potato agroecosystems in Junín and La Libertad in Peru; (3) cassava in the Peruvian and Colombian Amazon; and (4) coffee in Nicaragua.

3.2.4. Work Package 4: InnovaHub networks for agrifood innovation and scaling

Work Package 4 TOC diagram



Work Package 4 research plans and TOC narrative

Work Package title	InnovaHub networks for agrifood innovation and scaling
Work Package main focus and prioritization	Currently, a lack of coordination and knowledge management in the interaction-and-learning spaces between relevant agrifood system actors — from AR4D civil-public-private-partnerships, including farmers and growers' associations, local NGOs, rural SMEs and extension and agro-advisory services (EAS), food processing businesses and markets — slows down innovation pipeline development. By establishing InnovaHubs (innovation hubs) to fill this gap, WP4 will accelerate the development, mainstreaming, and early commercialization of innovative tools, technologies, and approaches to the adoption of climate-responsive AFS pathways. InnovaHubs will ensure that supported innovations are suited to local contexts and have a clear impact on mitigation and other co-benefits (equity, income, ecological). WP4 will also identify scaling pathways and drivers capable of catalyzing adoption reflecting local demand, priorities and stress points26, in cooperation with HER+ WPs 1&2.
Work Package geographic scope	Regional, with main focus on Guatemala, Honduras, Colombia and Mexico

WP4 science:

Research questions	Scientific methods	Key outputs
How can efforts for sustainable intensification in LAC be coordinated?	Participatory frameworks and system thinking methods to broker civil-public-private partnerships.	Establishment of a participatory framework that brokers civil-public-private-partnerships for value adding of climate-smart context-specific nutrition-sensitive, and sustainable farm management solutions.
How can efforts for sustainable intensification in LAC be articulated throughout the value chain?	Development of didactic material, training formats and dissemination channels for different user profiles, including farmers, technical farm professionals, and scientists for actors to improve technical and organization skills.	Setting-up a network of CoPs between extensionists, scientists, and farmers to optimize targeted capacity building and farm extension, also connected to public and private Initiatives.
How can coverage and impact on subnational region be ensured and monitored?	Development of harmonized data capturing protocols between partners for monitoring field impact.	Setup of field monitoring system to track impact.
How can science-based farm recommendations be fine-tuned and adapted to context-specific conditions?	Evaluation of field results though data-capturing systems.	Data insights that enable to generation of tailored farm recommendations.
How can proven farm recommendations be scaled within and beyond particular intervention regions?	Setup of exchange spaces that enable consensus building on research evidence and co-construction of priorities to be implemented throughout the value chain.	National and local agrifood actors set a common research agenda and reach agreement on priorities.

Synergies

- The participatory framework connects farmers with field-research and trainings supported through **WP1**. Complementing WP1, the InnovaHubs aim to build technical and organization skills beyond farm level through a network of CoPs that foment collective action on capacity building around sustainability, resilience, and competitiveness.
- Together with **WP3** and the **EiA**, **MITIGATE+** and **ClimBeR** Initiatives, the sustainability indicators will be defined and measured through this CoP.

26 Gardeazabal et al. 2021; Barrett et al. 2020.

- With the digital tools developed by **WP2**, captured and analyzed data will be integrated into a field monitoring system, which will deliver actionable intelligence to produce common regional AR4D research agendas and provide scientific support for policy development and regional alignment, addressed in **WP5**.
- As a regionally rooted hub, we also expect strong synergies with many, if not all, global Initiatives with a strong presence in Central America, notably: **SI**, **LCSR**, **PlantHealth**, **SHiFT**, and **Inclusive Markets**.
- WP4 will also identify scaling pathways and drivers capable of catalyzing adoption considering local demand, priorities, and stress points in cooperation with **HER+** WPs 1&2.

WP4 theory of change:

End of Initiative outcome 4: Public-private sector, NARES, and civil society actors across subnational agricultural innovation systems in four LAC countries use InnovaHub learning, knowledge management, and evidence to understand how to accelerate on-farm uptake of SET innovations by making them more gender-responsive, production-friendly, and context-specific (*2022–2024*). Private and public sector actors (including CGIAR) scale validated SET 'best bet' innovations via carbon-friendly transition pathways in LAC (*2025–2030*).

Successful CGIAR institutional arrangements in LAC promoting farmer participation in agricultural research and interaction with stakeholders — including local technical agroclimatic committees, climate-smart villages, and biofortified crop platforms — provide the entry points for impact in the selected countries. For increased innovation uptake, it will be critical to target farmers. They need access to research platforms for climate-smart options that increase profitability, diversify food production with new market opportunities, provide access to balanced diets, improved livelihoods, and value chain integration. Innovations adapted, validated, and tested through the InnovaHubs (2022–2024) are expected to bring 400,000 ha of land under sustainable management when validated strategies and innovations are scaled to and adopted by at least 80,000 farmers (starting in the 2022–2024 cycle, but with scaling expanded in the 2025–2030 cycle).

A field-data monitoring system provides insights into local successes, potential development pathways, and an increased understanding of local sector and value chain actors. As EAS providers actively use the data-based system, they offer more practical, context-specific and accurate information. As a result, in the four countries, the InnovaHubs will allow the identification of main drivers of change (in cooperation with HER+ WP1 and evidence), as well as co-establishment of priorities and a common research agenda between sub-national agrifood stakeholders. A community of practice (CoP) will be created to empower stakeholders to share knowledge about sustainable farming, diversified and nutritious food, pathways to improved competitiveness and income opportunities, climate resilience, and gender inclusion. The CoP will build the outreach capacity and impact potential of NARES, local NGOs and rural SMEs. The implementation of the InnovaHub in itself will allow for the extraction of knowledge, methods and concepts on the InnovaHub as a tool for multi-actor systems innovation.

Demand partners include farmer associations[27] linked with industry through responsible sourcing mechanisms, supported by NARES. Local universities[28] will be our main **innovation partners** for research and extension. **Scaling partners** include NGOs[29], which will transfer SET practices and capacity and sector associations, technical experts and private sector companies[30] that will support value chain integration (starting in 2022–2024, but scaling out significantly in 2024–2030), with feedback loops to inform governmental institutes for policy development and implementation, in alignment with international cooperation efforts (USAID, FAO, IICA).

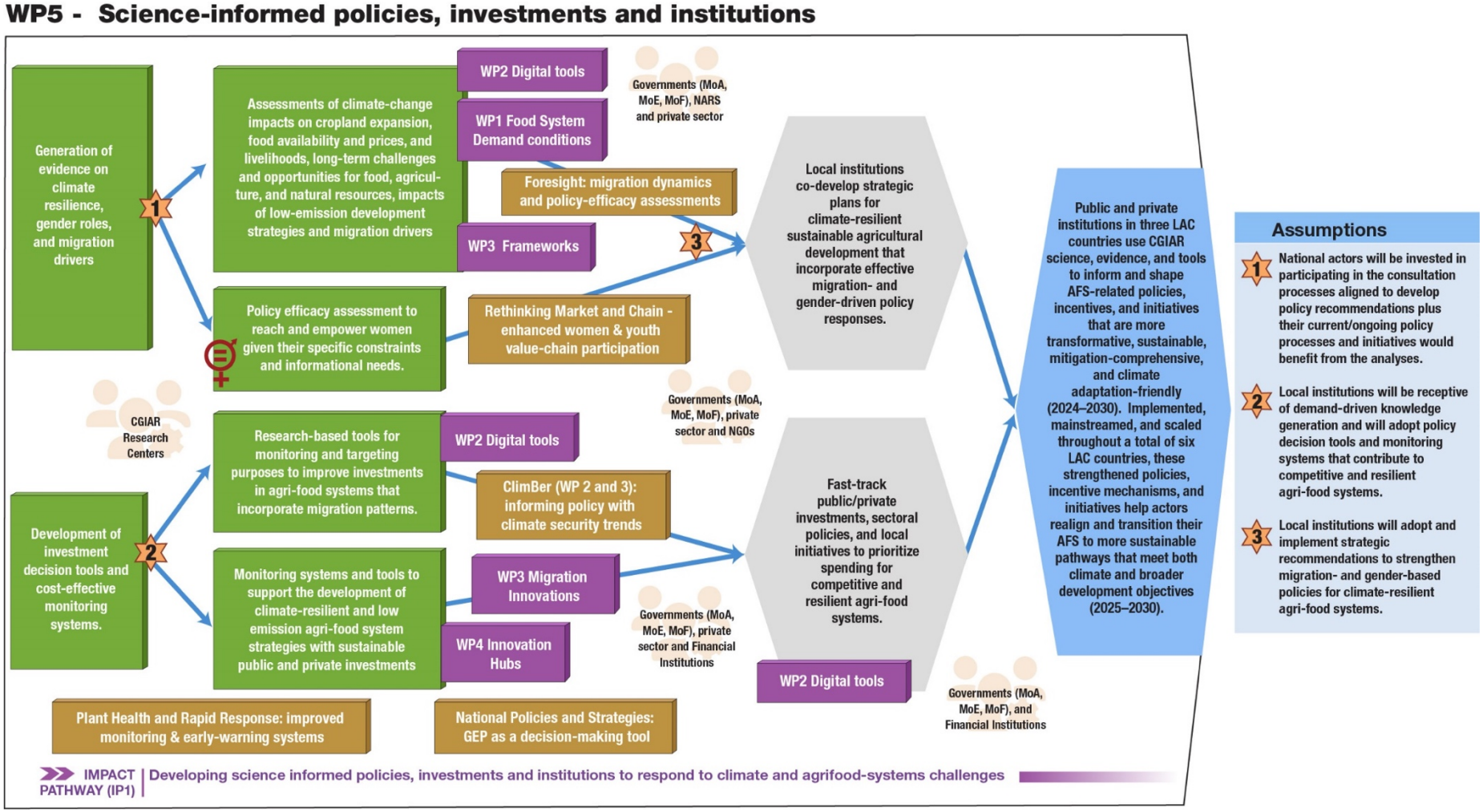
We assume that farmer associations, including women-led, public institutes, and private sector actors will be open to sharing concerns and needs and discussing collaborations. We expect

27 Demand partners include farmers associations such as Asociación CDRO Guatemala and Anacafé in Honduras/Guatemala and NARES including Agrosavia-Colombia, INIFAP-Mexico, ICTA-Guatemala, DICTA-Honduras
28 Local universities such as Zamorano-Honduras, USC/URL-Guatemala
29 NGOs such as Semilla Nueva-Guatemala, FHIA-Honduras
30 Private sector companies such as EXITO Group Colombia, Kellogg's/Grupo Modelo-Mexico

undisclosed information to be shared freely between private actors and food processing industries, facilitating objective analysis of results. Our assumption is that NARES currently have low organizational capacity and infrastructure to organize and coordinate efforts around field experimentation and EAS, so they will participate actively in developing and implementing capacity-building activities and identification of participants.

3.2.5. Work Package 5: Science-informed policies, investments and institutions

Work Package 5 TOC diagram



Work Package 5 research plans and TOC narrative

Work Package title	Science-informed policies, investments and institutions
Work Package main focus and prioritization (max 100 words)	LAC AFS need to adopt climate-resilient and competitive practices to reduce food insecurity and out-migration, particularly in the context of COVID-19[31]. This requires generating context-specific knowledge, tools, and monitoring systems to better inform policy, prioritize investments, and promote access to risk-management mechanisms. WP5 combines local needs with One CGIAR research to help institutions in LAC countries co-develop and implement strategic plans for resilient, competitive, and low-emission AFS through: (i) generation of evidence on climate resilience, gender roles, and migration drivers; (ii) development of investment decision tools and cost-effective monitoring systems.
Work Package geographic scope	Guatemala, Honduras, Colombia, Mexico, Peru, and El Salvador

WP5 science:

Research questions	Scientific methods	Key outputs
How do climate threats, socioeconomic factors, and institutional constraints affect the sustainable development of resilient, low-emission AFS?	• Assess country and region-specific socio-economic and environmental outcomes of a wide range of economic, agricultural, food, and climate policies. • Economic, institutional, and qualitative analysis and participatory consultation methods[32].	• Assessments of climate-change impacts on cropland expansion, food availability and prices, and livelihoods, long-term challenges and opportunities for food, agriculture, and natural resources, impacts of low-emission development strategies[33].
How should public/private investments and foreign assistance in AFS be directed to address the root causes of out-migration?	• Economic analysis, quantitative, qualitative, and participatory methods (scenarios and IASI[34] methodology) of migration drivers and trigger factors[35], and public sector approaches and incentives in allocating their investments. • Tools to prioritize public spending in agriculture across commodities[36], types of investments[37], and spatial micro-regions[38].	• Comprehensive assessment of migration drivers. • Monitoring and targeting tool to improve investments in AFS incorporating migration patterns. • Tool to improve and fast-track public/private investments in agrifood development and resilience. • IASI strategic plan to recommend strategies, actions, and quantitative, SDG-aligned targets with high likelihood of supportive public and private investment[39].
How to co-develop mechanisms to support women and youth to access and adopt climate-resilient and low-emission practices? What are	• Theory-based assessment for regional policies[40]. • Economic analysis, quantitative, and qualitative methods to better understand our capacity to meet women's and youth's	Assessments on: • Efficacy of different approaches to reaching and empowering women given their specific constraints and informational

31 Swinnen & Vos (2021), Ceballos et al. (2021).
32 Vervoort et al. (2014), Veeger et al. (2015).
33 Laborde, et al. (2021) on the impact of agricultural subsidies on greenhouse gas emissions.
34 Govaerts et al., (2021)
35 Including: environmental, economic, social, safety and gender-related factors, and development of tools to monitor migration patterns. Castro-Nuñez (2018), Ceballos & Hernandez (2020), and Laderach et al. (2021).
36 Martin & Minot (2021).
37 Laborde et al. (2021).
38 Maruyama & Scollard (2020).
39 Govaerts et al. (2021)
40 Collazos et al. (2021).

Research questions	Scientific methods	Key outputs
the implications for gender roles after adoption?	needs and aspirations to better understand how to develop new SET innovations.	needs while considering their skills, knowledge and aspirations. • Women and youth agricultural practices and adoption of new technologies
How can financial services be better tailored for agrifood sector actors and private-public sector budgets be reallocated to provide the resources and incentives needed for investments in climate-resilient agrifood production practices?	Economic analysis to: [41] • Identify sources of funding (international development flows, public budgets, banking systems, and capital markets) and align them with the design of financial mechanisms and risk-management models that promote resilient AFS. • Assess institutional capacities to design and implement the necessary programs. • Estimate the costs required to manage agricultural risks and achieve food security in the context of COVID-19 [42]. • Qualitative and participatory methods of donor approaches and incentives in allocating their investments. • Economic analysis of credit and insurance bottlenecks and development of financial tools (including ICTs) to better manage agricultural risks[43].	• Comprehensive assessment of institutional, supply and demand constraints for the development of credit and insurance markets. • Risk and poverty-sensitive scorecards to prioritize lending and grant allocation. • Risk contingent credit for resilience and climate change adaptation funds. • Picture-based crop insurance to improve agricultural risk management, resilience, and food security.
How can more accurate and timely data be collected at low cost to monitor key climate and outcome indicators to help design better policies and NDCs/NAPs?	• Integrate estimated remote sensing-based agricultural losses with crowd-sourced food price data using machine learning techniques to monitor and predict changes in poverty, nutritional outcomes, and migration patterns[44]. • Harnessing telecommunications network data for rainfall and crop monitoring in developing countries[45].	• Improved monitoring and early-warning systems for timely responses on poverty, food insecurity, and forced migration.
Synergies • The research-based and science-informed policies and investments of WP5 complement the actions of the other **four AgriLAC Resiliente's WPs** and support their activities. • Potential links with One CGIAR Initiatives: o **ClimBeR** Initiative (WPs 2&3) on informing policy with climate security trends; o **Foresight** Initiative on migration dynamics and policy-efficacy assessments; o **National Policies and Strategies** Initiative on using their Gross Ecosystem Product (GEP) as a decision-making tool; o **Inclusive markets** Initiative on strategies for enhanced women and youth participation in AFS; and o **Plant Health** Initiative on improved monitoring and early-warning systems.		

WP5 theory of change

End of Initiative outcome 5: Public and private institutions in three LAC countries use CGIAR science, evidence, and tools to inform and shape AFS-related policies, incentives, and Initiatives that are more transformative, sustainable, mitigation-comprehensive, and climate adaptation-friendly (*2024–2030*). Implemented, mainstreamed, and scaled throughout a total of six LAC countries, these strengthened policies, incentive mechanisms, and Initiatives help

41 Díaz-Bonilla (2021).
42 Díaz-Bonilla et al. (2021).
43 Hernandez and Torero (2014a, 2014b), CCAFS (2018), Hernandez and Torero (2018), Ceballos and Kramer (2019), and Shee et al. (2019).
44 Browne et al. (2021), McBride et al. (2021).
45 David et al. (2019).

actors realign and transition their AFS to more sustainable pathways that meet both climate and broader development objectives (*2025–2030*).

Achieving climate-resilient and competitive LAC AFS requires attracting investment into agriculture, deploying it well, and scaling it up rapidly. This WP will contribute to these processes by promoting the use and adoption of novel One CGIAR quantitative and qualitative research among public and private institutions in the region through extensive local participation and collaboration and by translating key elements of this research into practical decision tools and monitoring systems that consider specific local needs.

The research outlined above will help to achieve the EoI5 by focusing on more comprehensive and integrated data and knowledge generation processes, cost-effective monitoring systems for resilience and migration patterns, and generation of research-based tools; contributing to strategic and participatory policy development and investment prioritization to address climate change, enhance agrifood system resilience, sustainability and competitiveness, mitigate risks, and better protect vulnerable populations.

Stakeholder consultation, engagement, and knowledge-sharing activities will constitute a fundamental part of the WP from year one to maximize research uptake. This requires extensive work on three dimensions: stakeholder mapping and continuous interaction; local capacity strengthening and training; and extensive communication and dissemination activities. Key stakeholder engagement from the initial stages is essential to ensure the relevance of the research questions and project objectives, and thereby increase project ownership and boost the chances of research uptake. Initial consultation, mid-term, and end-of-project stakeholder workshops will be key in this regard. Close collaboration and participation of regional, national, and local institutions and staff training will increase local capacities and facilitate research adoption including key **demand**46, **innovation**47 and **scaling**48 **partners** across the region. Communication activities will include dissemination materials such as discussion papers, open-access journal articles, shorter articles summarizing the scientific studies and tools in lay terms, project notes and reports describing methodology and activities implemented, policy briefs, and other media tools to enhance knowledge sharing, such as project website, short videos, and online interactive maps.

The main assumptions are that (i) National actors will be invested in participating in the consultation processes aligned to develop policy recommendations, and (ii) Governments will adopt assessments on key climate challenges and socio-political drivers for migration, as well as for competitive and low-emissions AFS, as policy decision tools.

4. Innovation Packages and Scaling Readiness Plan

4.1. Innovation Packages and Scaling Readiness Plan

Scaling is central for AgriLAC Resiliente. Through InnovaHubs (WP4), AgriLAC Resiliente will foster multi-stakeholder networks that will create and facilitate the enabling environment to **scale out** the SET innovations developed by our WPs and One CGIAR global Initiatives. The InnovaHubs will (i) identify research priorities together with subnational partners, (ii) foster linkages with market actors to create new market opportunities, and (iii) monitor changes and uptake by scaling partners of the SET innovations across AgriLAC Resiliente and RAFS, ST and GI Initiatives. Moreover, WP5 will support and facilitate the **scaling up** of the SET innovations in coordination with WP4, through enabling and informing policies and

46 SICA/CAC, CCyTD, Observatorio OLAC, National Planning Ministries, Ministries of Agriculture (MAGA-Guatemala, SAG-Honduras, MAG-El Salvador, SADER-Mexico), Ministries of Finance (MINFIN-Guatemala, SEFIN-Honduras, Minhacienda-Colombia, SHC-Mexico, MEF-Peru, Ministerio de Hacienda-El Salvador), Ministries of Environment (MARN-Guatemala, MIAMBIENTE-Honduras, MARN-El Salvador, MADS-Colombia, SEDEMA-Mexico), and Food Security and Nutrition Secretaries (UTSAN-Honduras, SESAN-Guatemala, CONASAN-El Salvador.

47 CODS, NARES, Financial institutions (e.g., Genesis Empresarial-Guatemala), FEWSNET, INSIVUMEH-Guatemala, INAB-Guatemala, IOM, IDB Lab.

48 WB, IADB, IFAD, GEF, GCF, USAID, IICA, CAC, CCAD, CEPAL, FAO, IOM, and WFP.

investments that will help national partners to achieve their SDGs and Paris Agreement targets. Prioritization and packaging of innovations will occur across all WPs together with partners using the scaling readiness framework. AgriLAC Resiliente has already prioritized a set of 9 core innovations through CGIAR innovations and stakeholder consultations, which are clustered in four Innovation Packages (See Annex 5). Our approach will be user-centered, inclusive, and participatory to ensure that during planning and scaling of innovations potential effects (positive and negative) are considered and addressed as needed.

Based on outcomes of the multi-sectoral planning process inherent to the InnovaHubs, a tactical plan will be developed that articulates what innovations and Innovation Packages would form the core of the Initiative's scaling activities, and how these will be integrated into the Initiative's work. We expect to assess and deliver at least one Innovation Package per WP. We will be scoping the Innovation Packages developed in other global Initiatives working in LAC to integrate into the InnovaHubs. The added-value offered by the regional Initiative is the use of the Innovation Packages developed by other Initiatives on a massive scale, generating data that can be used not only for further fine-tuning and learning but also for better targeted scaling. An initial list of identified innovations is presented below (Table 2).

Table 2. Innovations expected to be developed by or in close collaboration with other Initiatives to be included in the scaling efforts.

	Innovations	Details
Genetic Innovation	Availability of improved seeds	▪ Taking advantage of the crop breeding pipelines. ▪ Agronomically-superior, micronutrient-dense beans maize, and rice targeted to women and children. ▪ Climate-smart crops with tolerance to drought and/or high temperatures. ▪ High-Vitamin A cassava for human nutrition, and/or cassava as an industrial crop for dry season employment. ▪ Selected vegetables for local, regional, or international markets, particularly with participation of women and youth. ▪ Drought-tolerant forages to extend the grazing period in the dry season, to enhance employment and milk production.
	Seed sector development	▪ Use the seed company consortium. ▪ Exploiting links for seed of biofortified crops developed by HarvestPlus.
Resilient Agrifood Systems	Resilient cropping systems	▪ Expand the safe production of food by implementing novel management practices to reduce residues from pesticide use. ▪ Crop diversification. ▪ Conservation agriculture. ▪ Integrated input management. ▪ Integrated pest control. ▪ Efficient fertilizer inputs and soil health management.
	Integrated pest and disease management (IPDM)	▪ IPDM innovations and knowledge for prioritized P&D based on country context using RII InnovaHubs.
System Transformation	Climate security index and a Climate Security Observatory	▪ Informing policy with climate security trends based on ClimBer's global and regional modelling and analysis. ▪ Climate Security Observatory for Central American region with emphasis in Guatemala.
	Climate-informed advisories and insurance	▪ Remote-sensing based index for assessing weather-related damage.
	Mitigate+	▪ Assessed practices in Mitigate+ Living Labs that also account for human, ecological, equity and livelihood needs of the community.
	SHiFT	▪ Tools for exploring better quality food, local market demand.

AgriLAC Resiliente should be prioritized for First Wave scaling backstopping and start Light Track from quarter 3, 2022 onwards. The Initiative will allocate resource to document and bringing learnings from previous and ongoing experiences that have led to both successful and failed scaling processes. The total budget is USD 400.000 (2022: USD100.000; 2023: USD150.000; 2024: USD150.000).

5. Impact statements

5.1. Nutrition, health and food security

Challenges and prioritization: A triple burden of malnutrition, exacerbated by climate variability, threatens LAC health and stability, especially in Central America. Regional AFS must guarantee food security for almost 650 million people living in the region (The World Bank, 2021b), and although availability is not an issue (except the Caribbean), access to diversified healthy food remains a problem (Intini, Jacq and Torres, 2019). Local and regional food systems are to be reconfigured to ensure access to nutritious diets for rural and urban populations, produce balanced food baskets and ensure food security in the region.

Research questions: AgriLAC Resiliente seeks to generate strategies that enable access to diversified and nutritious food for all genders and age groups by co-developing and testing tailored and context-specific solutions with local and national agrifood system actors. Research questions focus on (i) incorporating integrated nutrition-sensitive approaches into local/national research and innovation systems (**WP1**), ii) availability and access acceleration to diversified and nutritious food for rural men, women, youth, and children through market opportunities (**WP1, WP3, WP4**) and (iii) science-based solutions to enable reconfiguration of food systems (**WP5**).

Components of work packages: Sustainable agronomic practices, adoption pathways for high-yielding, stress-tolerant, nutritious varieties, and diversified crop systems (WP1), tools and methods for exploring demand conditions (and associated marketing opportunities) in local and regional food systems (WP1, WP4), strategies designed with local stakeholders to advance the availability of nutritious foods obtained by suitable practices in local and regional food systems (WP1, WP4), and science-based decision-support tools to support policy environment and AFS-related changes (WP5).

Measuring performance and results: Materials (varieties) and tools form part of the institutional portfolio that includes nutrition-sensitive options such as micronutrient traits or alternatives to facilitate crop diversification. Post-harvest products available as potential sources of healthy diets and income generation. AgriLAC Resiliente will measure progress and results through its integrated monitoring systems harvesting data across WPs and aim to reach 8 million people across the region by 2030 in this Impact Area (See 2.7).

Partners: Key demand partners are local farmers associations and NGOs49. Innovation partners are represented by NARES50 and universities, while scaling partners and innovation partners include both international organizations and private sector partners51.

Human resources and capacity development of Initiative team: The team members include nutritionists, economists, food science researchers, value chain, marketing and demand-creation specialists, communication experts for sensitization campaigns, agronomists and economists. Cross-disciplinary communications, teamwork, and collaborative research design skills will be prioritized for team members addressing this Impact Area.

49 Semilla Nueva in Guatemala, Anacafe Guatemala/Honduras, FENALCE y FenAGH in Colombia and Honduras respectively

50 NARES such as ICTA-Guatemala, DICTA-Honduras, Agrosavia-Colombia, INIFAP-Mexico and universities include Zamorano-Honduras, USC/URL-Guatemala, Valle University & EAFIT Colombia.

51 International organizations as WFP, private sector partners including Fundacion Walmart & Kellog's in Mexico, GANSO, Exito Group in Colombia.

5.2. Poverty reduction, livelihoods, and jobs

Challenges and prioritization: Yield and productivity gaps, climate variability, violence and fragmented local AFS drive food insecurity, poverty, and out-migration particularly from CA-4 countries. New and increased agriculture-related incomes are essential. Enhanced digital capacity and agri-entrepreneurship can help address these challenges by promoting diversified remunerative value chains, boosting local economies, stability, and community resilience. AgriLAC Resiliente focuses on co-designing and testing SET solutions to increase farmers' incomes, empowering women, enhancing youth capacities, and facilitating access to diversified and nutritious food.

Research questions: WP1 asks what technologies can be used to optimize productivity of land, water, labor, and biodiversity in CA-4 country production systems in the short, medium and long term. **WP2** will explore what digitally enabled tools can create new or enhanced income opportunities for youth. **WP3** explores mechanisms through which low-emission actions can also lead to development outcomes that enhance rural livelihoods and build peace. **WP4** and **WP5** will seek to understand how **WP1-WP3** solutions can be out-scaled to increase impact through robust partnerships and policy processes and investments.

Components of Work Packages: Market access and entrepreneurial entry points will form a component of WP4, within the setting of the InnovaHubs, with private business models and trainings on organizational skills, associative and digital data skills forming the base of remunerative rural services to be led by youth to attract them towards agriculture and the competitive position of small agri-businesses in local AFS (WP4).

Measuring performance and results: Change in index of variability on gross incomes from farmers and related activities in InnovaHubs farmer participants, policy changes and/or implementation towards facilitating agrifood system generation by women and youth and businesses set up/headed by women/youth organizations. AgriLAC Resiliente will measure progress and results through its integrated monitoring systems harvesting data across WPs and aim to reach 8 million people across the region by 2030 in this Impact Area (See 2.7).

Partners: Demand partners are farmer associations and municipalities in intervention areas, Innovation partners: IYF in Guatemala, GANSO in Colombia. Scaling partners: Kellogg's and Fundacion Walmart in Mexico.

Human resources and capacity development of Initiative team: Social scientist, markets and value chain specialists, business model development and innovation specialist, agricultural economist, adoption, and scaling scientists.

5.3. Gender equality, youth and social inclusion

Challenges and prioritization: Female farmers make up at least half of all food producers in Latin America. They frequently engage in a variety of farm activities, in addition to unpaid domestic and care work, but they are frequently not viewed as farmers or decision-makers. They are therefore undercounted in official statistics such as those based on the agricultural census[52] and potentially ignored by agricultural extension systems, and are denied access to and benefits from climate de-risking options and information. Food insecurity and malnutrition, which remain a significant concern especially in remote rural areas with less access to services and with high populations of indigenous and Afro-descendent populations, have a specific gender dimension in the region. Poor education of mothers, frequent adolescent pregnancies, and reduced access to drinking water are directly related to malnutrition of mothers and children. High rates of malnutrition are closely linked to inequality, poverty, inadequate access to productive resources, and information as well as high workloads and drudgery especially among rural women[53]. The Initiative will make targeted efforts to recognize and actively engage rural women from different socioeconomic backgrounds, as consumers and as farmers and food producers, not only as passive recipients of capacity building but also as co-creators of knowledge, and leading knowledge exchange.

Research questions: WP1 will explore how SET solutions co-design and adoption strategies can enable leadership roles **and visibility** in farm-level production for women and youth. **WP2** and **WP3** will respectively seek digitally-enabled agro-advisory services and digitally-enabled value chain services to better serve women's, **men's,** and youth's needs, as well as to increase access to and use of agroclimatic information, and how to generate sex-disaggregated data about remote rural areas to be fed into SDGs. **WP4** will explore pathways to strengthen women's and youth's participation in natural resource management and control over their benefits, and **WP5** will look at mechanisms to support women and youth in accessing and adopting climate-resilient and low-emission practices and assessing the gender-related impacts of adoption (e.g. in gender roles and decision making).

Components of work packages: Female and male smallholder farmers of all ages will play an important role as data curators and interpreters of decision support tools in rural communities (WP4). Youth will provide technical support to field monitoring and data cubes (WP4 and WP2). WP3 aim specifically for outcomes to be gender-responsive through active involvement for understanding major challenges and opportunities for women. AgriLAC Resiliente will measure progress and results through its integrated monitoring systems harvesting data across WPs and aim to reach 2,5 million women across the region by 2030 in this Impact Area (See 2.7).

Measuring performance and results: Mixed qualitative and quantitative methods for measuring progress together with men and women, young and old, indigenous and afro-descendant communities will be compared with databases of previous research data/results about gender, youth, and social inclusion, (e.g., Gennovate), and from digital platforms such as 5Q and CSV monitoring tool.

Partners: Subnational women-led and indigenous organizations and development partners[54] will shape the demand to achieve significant progress in this Impact Area. Innovation partners[55] will support innovation processes and contribute to scaling efforts in Guatemala, Colombia, and Honduras.

52 Deere and Leon, 2003; Twyman, Useche, & Deere, 2015

53 FAO, PAHO, WFP and UNICEF, 2019

54 Women-led and indigenous organizations such as CDRO, SEPREM, AMCO and development partners such as WFP, Care, UN Women

55 Innovation partners include IYF in Guatemala and Verne Ventures in Mexico

Human resources and capacity development of Initiative team: Gender, social inclusion and empowerment specialists, knowledge and capacity building experts, and agro-advisory and extension specialists, social scientists with emphasis on community-based intervention.

5.4. Climate adaptation and mitigation

Challenges and prioritization: Climate change and variability exacerbate regional socio-economic and migration problems, particularly in CA-4 countries through low productivity, crop losses, lack of tools/mechanisms for local planning and decision-making, and increasingly unsustainable land use management. AgriLAC Resiliente will facilitate across-scale climate adaptation, to de-risk AFS, making them more competitive, and providing science-based low-emissions solutions. AgriLAC tackles both adaptation (climate resilience) and mitigation (low-emission solutions).

Research questions: WP1 asks what SET innovations can both contribute to climate resilience while addressing nutrition gaps; **WP2** addresses the question of how to develop digitally enabled tools that can bring tailored and timely information to farmers and agrifood system actors to make informed decision in climate change conditions. **WP3** will focus on understanding how to integrate mitigation goals with sustainable development priorities, especially in the transect between the high Andes and the Amazon. **WP4** addresses what scaling pathways are needed to put in place to facilitate wide-adoption of climate-resilient and low-emissions innovations and **WP5** asks how to use science to enable policy processes that support achievement of NDC goals, zero deforestation and other climate change related priorities.

Components of work packages: WP1 will seek to co-develop strategies to better equip local research partners to integrate climate-resilient and nutrition-sensitive approaches into agrifood innovation systems. **WP2** will consolidate a digital ecosystem around climate risk management (CRM) and sustainable intensification (SI) to deliver climate-informed advisories to manage risk and sustainably intensify LAC's AFS. **WP3** will work with partners to support agroecosystems, landscapes and value chains so that they contribute toward climate change mitigation while delivering sustainable development priorities. **WP4** will catalyze WP1, WP2 and WP3 SET solutions to integrally contribute to increase climate resilience while reducing greenhouse gas emissions due to AFS. **WP5** will work between the climate science-policy interface to enable scaling pathways by informing policies and investments so that climate commitments are met by LAC countries.

Measuring performance and results: AgriLAC Resiliente will measure performance through the integrated monitoring system that will harvest data across WPs, particularly WP2 in which digitally enabled agroclimatic services will be deployed and scaled and WP3 in which los emissions strategies will aim to meet development outcomes to increase likelihood of adoption. Moreover, climate-related policies and investments informed by AgriLAC Resiliente and reduction of agroclimatic risks via more accurate, tailored, and timely information reached by farmers will contribute to this Impact Area. Our aim is to benefit from climate change adaptation and mitigation CGIAR innovations at least 8 million people and intervene overall 19 million ha across LAC by 2030 (See 2.7).

Partners: Regional, national and subnational government institutions[56] will inform the demand, together with research institutions and development partners, as well as private sector actors an innovation environment will allow innovations development. These actors will also be essential for identifying and putting in place scaling pathways for achieving impact.

Human resources and capacity development of Initiative team: Climate scientists, science-policy specialists, agroclimatologists, mitigation and land use management experts, economists, and social scientists.

56 Government institutions such as Ministries of Agriculture, Environment, Finance asn Met Services, as well as local governments.

5.5. Environmental health and biodiversity

Challenges and prioritization: Degradation of 20% of LAC forests and farmlands, with negative effects on productivity, carbon storage, and biodiversity, erodes the sustainability, competitiveness, and global environmental contribution of the region's AFS. AgriLAC Resiliente will promote adoption of climate-, water-, and nutrient-smart practices for enhancing multifunctional landscapes and conserving the region's globally important biodiversity and agrobiodiversity, and associated ecosystem services. The Initiative focuses on sustainability of LAC agriculture under climate and other stresses.

Research questions: AgriLAC Resiliente innovations aim to consider social, ecological and technical dimensions to ensure they meet local challenges while contributing to wider development and environmental goals. **WP1** explores with local partners how to develop best-fit agrifood technologies that enhance soil health and water management. **WP2** asks how to enable through the digital ecosystem tailored information that informs local decision-making processes to reduce environmental impact. **WP3** seeks to understand how and where priorities for low-emissions development and sustainable development overlap thematically and contextually, as well as at which scale to develop integrated market and financial solutions. **WP4** will focus on understanding scaling pathways to facilitate adoption of SET innovations to enhance balance across water, land and food systems. **WP5** asks how sustainable development of AFS is affected by socioeconomic factors, and institutional constraints and limit environmental health.

Components of work packages reconfiguration of AFS in LAC require multi-entry points to enhance balance between water, land and food systems. WP3 will focus on understanding and enabling progress towards identifying synergies between environmental challenges and development goals through a multi-scale-actor and integrated approach. WP1 and WP2 will focus on mainstreaming environmental benefits across tailored and context-specific SET innovations, while WP4 will provide the organizational setup through the InnovaHubs for validation and scaling of contextualized solutions in terms of climate-smart technologies, nutrition-sensitive diversification schemes and sustainable agricultural practices. WP5 will focus on working at the science-policy interface to inform decision-makers in the public and private sector to contribute decisively towards environmental sustainability of land, land, and food systems.

Measuring performance and results: Performance in this Impact Area will be measured by assessing progress towards integrating measuring systems across climate action, biodiversity action, peace building, and other global goals using tools such as Terra-I to measure deforestation and traceability tool to track results of zero deforestation value chains.

Partners: Key demand partners are local farmers associations and NGOs[57]; innovation partners are represented by NARES and universities[58], while scaling partners and innovation partners would be private sector partners[59].

Human resources and capacity development of Initiative team: Socio-environmental scientists, technical coordinators and InnovaHubs brokers (including networking and extension specialists), expert teams on environmental sciences, climate smart technologies and sustainable agricultural practices, innovation, capacity building experts.

57 Semilla Nueva in Guatemala, Anacafe Guatemala/Honduras, FENALCE y FenAGH in Colombia and Honduras respectively
58 NARES such as ICTA-Guatemala, DICTA-Honduras, Agrosavia-Colombia, INIFAP-Mexico and universities including Zamorano-Honduras, USC/URL-Guatemala, ICESI & EAFIT Colombia
59 Private sector partners including Fundacion Walmart & Kellog's in Mexico, GANSO, Exito Group in Colombia

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**
Collective global 2030 targets. (The collective global 2030 targets are available centrally here to save space)				
End hunger for all and enable affordable healthy diets for the 3 billion people who do not currently have access to safe and nutritious food.	Reduce by at least half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.	Close the gender gap in rights to economic resources, access to ownership and control over land and natural resources for over 500 million women who work in food, land and water systems.	Equip 500 million small-scale producers to be more resilient to climate shocks, with climate adaptation solutions available through national innovation systems.	Stay within planetary and regional environmental boundaries: consumptive water use in food production of less than 2500 km3 per year (with a focus on the most stressed basins), zero net deforestation, nitrogen application of 90 Tg per year (with a redistribution towards low-input farming system) and increased use efficiency; and phosphorus application of 10 Tg per year.
Common impact indicators that your Initiative will contribute to and will be able to provide data towards				
#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
SDG targets				
#2.1	#1.2	#5.b	#13.2	#15.1

Action Area: Resilient Agrifood Systems	
Action Area Outcomes	Action Area outcome indicators
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
RAFS 2 - Research and scaling organizations enhance their capabilities to develop and disseminate RAFS-related innovations	RAFSi 2.1 Number of organizations
GI 7 - Farmers have access to and use climate-resilient, nutritious, market-demanded crop varieties.	GIi 7.1 Number of farmers who grow climate-smart crop varieties, disaggregated by gender

Initiative and Work Package outcomes, outputs and indicators

Result type (outcome/output)	Result	Indicator	Unit of measurement	Geographic scope	Data source	Data collection method	Frequency of data collection	Baseline value (outcome only)	Baseline year (outcome only)	Target value	Target year
Output (WP1)	Continually updated menu of validated climate-resilient, nutrition-sensitive technologies and livelihood strategies tailored to LAC	Number of innovations	Number	Guatemala, El Salvador, Honduras, Mexico, Colombia	Primary, secondary	Qualitative (semi-structured interviews, focus groups),	Continuous, with annual reporting			At least one menu adapted in at least 4 countries	2025

	farmers and other agrifood system actors										
Output (WP1)	Mapping of farmers and other agrifood system actors in target countries (by sub-geographies, demographic groups, farming systems) to be used for engagement and technology targeting within InnovaHubs.	Number of other information products	Number	Guatemala, El Salvador, Honduras, Mexico, Colombia	Primary, secondary	Qualitative (semi-structured interview),	Annual – updated			At least 4 mapping farmers (one per country)	2025
Output (WP1)	Strengthened capacity of local research partners through improved engagement in research networks (e.g., co-leadership of research agendas; joint publications; training in research tools / methods).	Number of partners trained	Number	Guatemala, El Salvador, Honduras, Mexico, Colombia	Primary, secondary	Qualitative (semi-structured interview),	Continuous, with annual reporting			One regional research network	2025
Output (WP1)	Set of tools and methods for exploring demand conditions (and associated marketing opportunities) in local and regional food systems informing targeting and scaling strategies to be used by governments, institutions, producer organizations, NGOs, and agri-sector companies	Number of other information products	Number	Guatemala, El Salvador, Honduras, Mexico, Colombia	Primary	Qualitative (semi-structured interviews, focus groups), quantitative	Continuous, with annual reporting			At least one set of tools adapted in at least four countries	2025
Outcome (WP1)	Nutrition-sensitive socio-ecological-technological (SET) innovations adapted and co-designed with AFS actors (farmers, processors, SMEs, NARES) enable local AFS in five LAC countries to align the technical aspects of transition processes more effectively with the nutritional and climate-related needs of the people they serve (2022-2024).	Better and diversified SET innovations allow local AFS address nutritional and climate-related needs more efficiently.	Number	Guatemala, El Salvador, Honduras, Mexico, Colombia	Primary	Qualitative (semi-structured interviews, focus groups), quantitative	Continuous, with annual reporting	Not available	Not available	1 organization per country, for a total of five organizations	2025
Output (WP2)	(1) Data-Hub underpinning each WP4 Innova-Hub (2) Data-Hub services including quality assurance,	Type of services provided & number of innovations	Number per type of services	Guatemala, Honduras, Mexico, Colombia	Primary	Monitoring database; data hub inventory; data hub	Annual			12	2025

	integration, harmonization, data provision APIs (3) Data-Cubes tailored to specific service needs from public and private stakeholders										
Output (WP2)	For farmers and value chain actors with special focus on women and youth: (1) Improved, tested agro-climatic prediction models and co-designed information services (2) Data services and ICTs to underpin digital ecosystem (3) Improved / tailored digital tools for decision support	Number of innovations	Number	Guatemala, Honduras, Mexico, Colombia	Primary	Product and service database; data hub	Annual			10	2025
Output (WP2)	(1) Partnership models that leverage Data-Hub and basic services for digital service provision (2) Models for demand-driven support services (e.g., business model evaluation, benchmarking, market research) created in support of AgTech companies that can be operated beyond the scope of the Initiative. (3) Information services and capacities in public sector, farmer organizations, farmers and Ag SMEs use demand-driven support services for decision making.	Number of innovations	Number	Guatemala, Honduras, Mexico, Colombia	Primary	Monitoring database	Annual			10	2025
Outcome (WP2)	Producer associations, AgTech companies, government agencies, NGOs, and public extension services in four LAC countries are empowered by a digital ecosystem to offer digitally enabled agro-advisory services for farmers and other value chain actors to more effectively manage climate risk (CRM) and sustainably	Number of people trained	Number	Guatemala, Honduras, Mexico, Colombia	Primary	Monitoring database	Annual	Not available	Not available	200	2025

	intensify (SI) production and value chains.										
Output (WP3)	Framework and methodological approaches to integrate low-emissions agrifood systems and development priorities across scales	Number of innovations (Indicators)/ Number of other information products	Number	Colombia, Peru, Nicaragua	Primary, secondary	Participatory approaches, quantitative	Annual			One per scale (agroecosystems, landscapes, value chains)	2025
Output (WP3)	Integrated emissions reduction and sustainability indicators that the 3 selected countries use to design interventions, promote investments and track agroecosystems, landscapes and value chain contributions to national and regional climate change mitigation, poverty, social inclusion and biodiversity goals.	Number of innovations (Indicators)/ Number of other information products	Number	Colombia, Peru, Nicaragua	Primary, secondary	Consultations, qualitative, quantitative	Annual			1	2025
Output (WP3)	Digitally enabled, research-based tools that researchers and extension agents within the 3 selected settings use to support climate change mitigation, water and nutrient use efficiency, reduced pest and disease, restored soils or landscapes, ecosystem services and biodiversity interventions.	Number of innovations	Number	Colombia, Peru, Nicaragua	Primary, secondary	Consultations, focus groups	Annual			3	2025
Output (WP3)	Science- and market-based solutions that value chain stakeholders and service providers within the 3 selected settings use to foster investments for climate change mitigation in local and export-oriented value chains.	Number of innovations	Number	Colombia, Peru, Nicaragua	Primary, secondary	Reports	Annual			3	2025
Outcome (WP3)	National and local governments in three LAC countries integrate low-emission strategies with development goals across agroecosystems, landscapes,	Number of strategies	Number	Colombia, Peru, Nicaragua	Primary	Strategy documents	Not available	Not available	Not available	3 (one per country)	2025

	and value chains (2022-2024).										
Output (WP4)	Establishment of a participatory framework that brokers civil-public-private-partnerships for value adding of climate-smart- context specific nutrition-sensitive and sustainable farm management solutions.	Number of innova-hubs alliances formed, and number of collaborative agreements developed	Number	Guatemala, Honduras, Colombia, Mexico	Primary	Legal agreements with at least one of implementing CG centers/ Innova-hub meetings, with participants list and agreements	Annual / on Rolling basis (min. 2 per year per country)			Each subnational AIS consists of at least 1 innova-hub, constructed around at least 4 formal and informal but documented agreements	2025
Output (WP4)	Setup of CoP networks between extensionists, scientists and farmers to optimize targeted capacity building and farm extension and connected to public and private initiatives	Number of people in long-term and medium-term training programs (including professional extensionist, Masters and PhD students) and trained during short-term training sessions, disaggregated by gender	Number of technical farm professionals with connected farmers	Guatemala, Honduras, Mexico, Colombia	Primary	Participants list of training and communication events, with farmers, field technicians and scientists	Annual			At least 100 empowered farm technicians per country/ 20k farmers connected per country	2025
			Context-specific studies on recommended innovations and/or adoption in intervention areas from young academic professionals	Guatemala, Honduras, Mexico, Colombia	Primary	Research reports and theses progress from young academic professional on innovations and/or adoption in intervention areas	Annual			At least one study per priority country	2025
		Number of CoP innovations/	Number	Guatemala, Honduras,	Primary and	Outreach events/ online platforms and	Annual			Minimum 4 CoP active	2025

		Number of other information products		Mexico, Colombia	secondary	user groups (i.e., Whatsapp) and Online repository of didactic materials					
Output (WP4)	Setup of field monitoring system to track impact.	Number of information products (data base per country)	Number of data entries and surface areas of in field monitoring systems per country	Guatemala, Honduras, Mexico, Colombia	Primary and secondary	Data input from farm technician, leader farmers and extension services	Open access with Monthly cut-off			100,000 ha per country	2025
Output (WP4)	Data insights that enable the generation of tailored farm recommendations.	Number of innovations / context-specific farm recommendations	Number	Guatemala, Honduras, Mexico, Colombia	Primary	Data analysis from field monitoring systems per intervention areas	Annual			At least 1 documented report per innova-hub	2025
Output (WP4)	National and local agrifood actors have set common research agenda and reached agreement on priorities	Number of publicly available reports	Communication reports on definition, progress and activities within common research agenda and review of priority settings	Guatemala, Honduras, Mexico, Colombia	Primary and Secondary	Documentation of Innova-Hub meeting session results	Annual			At least 1 documented report per innova-hub	2025
Outcome (WP4)	Public-private sector, NARES, and civil society actors across subnational agricultural innovation systems in four LAC countries use Innova-Hub learning, knowledge management, and evidence to understand how to accelerate on-farm uptake of SET innovations by making them more gender-responsive, production-friendly, and context-specific (2022-2024).	Number of beneficiaries using the innovation, disaggregated by gender Other quantitative measure of innovation use (e.g., area)	Number	Guatemala, Honduras, Mexico, Colombia	Primary	Stakeholder maps	Annual	Not available	Not available	400 000 has. and 80k farmers adopt the strategies	2025

Output (WP5)	Assessments of climate-change impacts on cropland expansion, food availability and prices, and livelihoods, long-term challenges and opportunities for food, agriculture, and natural resources, impacts of low-emission development strategies	Number of assessments / number of other information products	Number	Mexico, Colombia, Guatemala, Honduras, and El Salvador	Secondary (qualitative and quantitative from official country sources collected from next users)		Annual			Not available	2025
Output (WP5)	-Comprehensive assessment of migration drivers. -Monitoring and targeting tool to improve investments in agrifood systems incorporating migration patterns. -Tool to improve and fast-track public/private investments in agrifood development and resilience. -IASI strategic plan to recommend strategies, actions, and quantitative, SDG-aligned targets with high likelihood of supportive public and private investment.	Number of assessments / number of designed research-based tools	Number	Mexico, Colombia, Guatemala, Honduras, and El Salvador	Primary (quantitative and qualitative) and Secondary (Qualitative and quantitative from official country sources collected from next users)	Producer and household surveys and focus groups for piloting and assessment of monitoring systems and tools	Annual			Not available	2025
Output (WP5)	Assessments on: -Efficacy of different approaches to reaching and empowering women given their specific constraints and informational needs while considering their skills, knowledge and aspirations. -Women and youth agricultural practices and adoption of new technologies	Number of assessments / number of other information products	Number	Mexico, Colombia, Guatemala, Honduras, and El Salvador	Secondary (Qualitative and quantitative from official country sources collected from next users)		Annual			Not available	2025
Output (WP5)	-Comprehensive assessment of institutional, supply- and demand-side constraints for the development of credit and insurance markets.	Number of assessments / number of other information products	Number	Mexico, Colombia, Guatemala, Honduras,	Primary (quantitative and qualitative) and Seconda	Producer and household surveys and focus groups for assessment of	Annual			Not available	2025

	-Risk and poverty-sensitive scorecards to prioritize lending and grant allocation. -Risk contingent credit for resilience and climate change adaptation funds. -Picture-based crop insurance to improve agricultural risk management, resilience, and food security			and El Salvador	ry (Qualitative and quantitative from official country sources collected from next users)	credit and insurance constraints					
Output (WP5)	Improved monitoring and early-warning systems for timely responses on poverty, food insecurity, and forced migration.	Number of designed research-based monitoring systems and tools	Number	Mexico, Colombia, Guatemala, Honduras, and El Salvador	Secondary (Qualitative and quantitative from official country sources collected from next users)		Annual			Not available	2025
Outcome (WP5)	Public and private institutions in three LAC countries use CGIAR science, evidence, and tools to inform and shape AFS-related policies, incentives, and Initiatives that are more transformative, sustainable, mitigation-comprehensive, and climate adaptation-friendly (2024-2030)	Number of policies/ strategies/ tools/ laws/ regulations/ budgets/ investments/ curricula modified in design or implementation, informed by CGIAR research Uptake of information product by local institutions	Number	Mexico, Colombia, Guatemala, Honduras, and El Salvador	Secondary (Qualitative and quantitative from official country sources collected from next users)		Annual	0 countries	2022	3 countries	2030

6.2. MELIA Plan

6.2.1. Narrative for MEL plans

We will implement a proven and flexible monitoring system (e-Agrology60), which will allow data disaggregation at different levels, and will automatically aggregate the information at the Initiative level. We will monitor each WP's progress towards their targets, and the Initiative's progress too. The system will allow leads to make timely and informed management decisions to make the necessary adjustments in the implementation of activities. While we will not use it to generate impact assessment baseline data, we plan to use it to register baseline data for the indicators of interest, and to inform the design of impact assessment studies. Learning from the monitoring data will be possible because the information will be analyzed in near real time at different levels, depending on specific research and/or implementation needs.

We plan to test the assumptions under the TOCs, in coordination with WP and Initiative leads, to learn whether those assumptions hold, and if not, how they should be adjusted. Some key learning questions include: (1) Are the identified adoption pathways having an effect on adoption rates? (2) Are Innova-hubs' outcomes different across the value chains of interest? (3) Are key actors adopting the Initiative outputs? (4) What are the characteristics of the AIS significantly scaling our suggested production strategies? (5) Are governments adopting planned assessments the ones developing and implementing transformative, sustainable and resilient agrifood sector policies? Data collection will be decentralized so our partners collect and supply most data. This will require incentives, which we will identify together with them.

6.2.2. Narrative for impact assessment research plans

IA studies will use monitoring data (among others) to learn about the scaling up & out process (how, where etc.), and understand the constraints and successes of the Initiative interventions to properly design IA studies. Once we identify outputs that require an IA study, we will design such study to measure and attribute the observed changes to the Initiative interventions. In this phase of the Initiative, we will only implement baseline data collection activities, as assessing impact will not be possible within 3 years. We will select two reference sites for IA studies and apply experimental or non-experimental methods depending on the output evaluated.

We plan to implement learning studies to test key assumptions of our TOCs. One of the outcome results include different stakeholders delivering novel digitally enabled agro-advisories to reduce climate risks, sustainably intensify production and better anticipate and manage climate-related supply in different countries and value chains. Within the Initiative, we will study the cost-effectiveness of the delivering mechanisms implemented, using a non-experimental evaluation combining quantitative and qualitative methodologies to collect farmer and stakeholder primary data. The results will be useful to stakeholders so they can adjust the delivering mechanisms used when doing this at even larger scale. We also plan to implement adoption studies in the dry corridor of Central America and Colombia or Mexico, which will allow us to measure the adoption of existing and new CGIAR outputs. We will monitor policies in coordination with WP5 and thru constant communication with policy makers.

60 e-Agrology is an ecosystem of tools that offer value added information to reduce the risks associated with innovation and facilitates the transition to sustainable agriculture as a neutral actor in the agri-food system. More details in http://52.15.239.109/

6.2.3. 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 (2022/25)	Co-delivery of planned MELIA study with other Initiatives	How the MELIA study or activity will inform management decisions and contribute to internal learning
Causal Impact Assessment learning studies	Producer associations, AgTech companies, government agencies, NGOs, and public extension services in four LAC countries are empowered by a digital ecosystem to offer digitally enabled agro-advisory services for farmers and other value chain actors to more effectively manage climate risk (CRM) and sustainably intensify (SI) production and value chains.	2023-2024	ClimBeR, Digital Technologies, Excellence in Agronomy	Managers will be able to use the evidence generated by this study to make course-correction decisions, or improve the delivering mechanisms to generate greater impact. This in turn will facilitate increasing the scale of the activities, which if successful, can be used in the design of an IA study.
Adoption or diffusion studies addressing learning questions on the TOC	Continually updated menu of validated climate-resilient, nutrition-sensitive technologies and livelihood strategies tailored to LAC farmers and other agrifood system actors Improved / tailored digital tools for decision support Public-private sector, NARES, and civil society actors across subnational agricultural innovation systems in four LAC countries use Innova-Hub learning, knowledge management, and evidence to understand how to accelerate on-farm uptake of SET innovations by making them more gender-responsive, production-friendly, and context-specific (2022-2024).	2023-2025	Digital Technologies, Excellence in Agronomy	The results can be used to determine technologies adopted, where, and end-users' needs. It will also serve as a baseline for a future evaluation.
Tracing of scaling activities & policy advice, as base for long-term, large scale impact studies	Public and private institutions in three LAC countries use CGIAR science, evidence, and tools to inform and shape AFS-related policies, incentives, and Initiatives that are more transformative, sustainable, mitigation-comprehensive, and climate adaptation-friendly (2024-2030).	2025	ClimBeR, Plant Health and Rapid Response, Excellence in Agronomy	Evidence generated by this study can help Initiative and WP managers identify under which conditions influencing policy (and its implementation) is more successful. While this will be learnt long term (as in 3 years it will be difficult to influence policy), it will provide the baseline for this learning to be possible. Short term, some insights will be gained from qualitative analysis related to this study.

7. Management plan and risk assessment

7.1. Management plan

AgriLAC Resiliente will establish a Program Management Unit, which will gather the Initiative's Director and Deputy Director, program management officer; engagement officer; MELIA coordinator; communications officer; gender, youth and social inclusion expert; and scaling coordinator.

The Director of AgriLAC Resiliente is in charge of intellectual guidance, partnerships engagement and strategic and managerial decision-making; the Deputy Director is responsible for supporting the Director, lead donor engagement and fundraising pipeline. The MELIA coordinator is in charge of making sure that the monitoring and evaluation systems, as well as the impact assessment studies are designed and set up in such a way that reporting, performance and results will be generated timely, tailored to strategic audiences and will enable feedback loops to adapt impact pathways at both the Initiative and WPs levels. The MELIA data and outputs will allow us to evaluate the progress of the WP and Initiative annual work plans and test whether the TOCs assumptions hold. The MELIA process would allow us to identify where and how we should make adjustments either in the TOCs or work plans, to achieve the desired impact. This will be possible because of the continuous analysis of monitoring data combined with learning and adoption studies.

Program management officer and engagement officer are responsible to support and facilitate the administrative activities to enable satisfactory scientific and research implementation. Communications officer is in charge of tailored and strategic dissemination of outcomes and outcomes to diverse audiences. The gender, youth and social inclusion expert is responsible for coordinating and mainstreaming the gender, youth and social inclusion approach across the WPs and at the Initiative level. The scaling coordinator is in charge of implementing the scaling readiness framework building on previous and existing capacity and experience from CGIAR teams on scaling impact-oriented research for development outputs.

AgriLAC Resiliente will set an independent advisory committee which will include five individuals with scientific and strategic knowledge in the region to advise on strategic decisions to strengthen the Initiative to achieve wider impact, strong science, and key partnerships. The committee will ensure gender, disciplinary and geographic diversity.

7.2. Summary management plan Gantt table

Initiative start date	Timelines												Description of key deliverables (maximum 3 per row, maximum 20 words per deliverable)
	2022			2023				2024				2025	
Work Packages (WP)	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	
WP1. Shaping nutrition-sensitive socioecological-technological (SET) 'best bets' to operationalize local AFS transition to climate-resilient nutrition pathways.		**1**	**2**		**1** **2**		**2** **3**		**1** **2** **3**			**1** **2** **3**	**1**. Continually updated menu of validated climate-resilient, nutrition-sensitive technologies and livelihood strategies tailored to LAC farmers and other AFS actors. **2.** Optimized design of mechanism for network-based research collaborations in target countries; **3.** Set of tools and methods for exploring demand conditions (and associated marketing opportunities) in local and regional food systems.
WP2: Inclusive digitally enabled agro-advisories for risk management		**1**	**2**			**1** **2**			**2** **3**			**1** **2** **3**	**1.** Data Hub underpinning each WP4 InnovaHub; **2.** Improved/tailored digital tools for agroclimatic and advisory decision support; **3.** Models for demand-driven support services created in support of AgriTech companies that can be operated beyond the scope of the Initiative.
WP3: AFS development that meets both mitigation and sustainable development objectives			**1**		**1** **2**			**2** **3**				**1** **2** **3**	**1.** Framework and methodological approaches to integrate low-emissions and development priorities across scales; **2.** Digitally enabled, research-based tools to support climate, environmental and development goals; **3.** Science- and market-based solutions to foster investments for climate-change mitigation in local and export-oriented value chains.
WP4: InnovaHub networks for agrifood innovation and scaling		**1**		**1** **2**		**1** **2**			**2** **3**			**1** **2** **3**	**1.** Establishment of InnovaHub network that brokers civil-public-private-partnerships for scaling tailored climate and nutrition sensitive solutions; **2.** Field monitoring system to track progress towards outcomes and impact; **3.** Quantitative and qualitative data insights that inform to generation of tailored farm recommendations.
WP5: Science-informed policies, investments and institutions		**1**		**1**	**2**			**2** **3**		**3**		**1** **2** **3**	**1.** Monitoring and targeting tool to improve investments in AFS incorporating migration patterns; **2.** Tool to improve and fast-track public/private investments in agrifood development and resilience; **3.** Risk contingent credit for resilience and climate change adaptation funds
Innovation Packages & Scaling Readiness			**1**			**1**			**2**			**1** **2**	**1.** Nine scaling readiness assessments for core innovations (Light track); **2.** Four evidence-based Scaling Readiness assessment reports (Standard track)
MELIA		**1**		**1** **2** **3**		**1**		**1**		**1**		**1** **2** **3**	**1.** Implementation of proven and flexible monitoring system (e-Agrology); **2.** Adoption or diffusion studies addressing learning questions on the TOC; **3.** Tracing of scaling activities & policy advice, as base for long-term, large scale impact studies.
Project management	**1**		**2**					**3**				**1** **2**	**1.** Program management unit inception design and project implementation work plan; **2.** science meeting for internal assessment, reflection and learning; **3.** Annual technical and financial reporting.

7.3. Risk assessment

Top 5 risks to achieving impact	Description of risk (50 words max each)	Likelihood	Impact	Risk score	Mitigations
#1 Weakening or loss of social capital with relevant stakeholders in the region due to lack of continuity from CRP/Centers previous interventions (Initiative level and all WPs).	AgriLAC Resiliente builds on social capital created by strong relationships between partners and CRP/Centers in the region, a gap in support could undermine partners' collaboration and support for scaling pathways implementation.	2	3	6	AgriLAC Resiliente highly values existing social capital. From the design of the project existing partners where heavily involved. The team is actively looking at offering value to the partnerships beyond monetary collaborations.
#2 Failure to reconcile governments interests and priorities on Initiative's program (Initiative level and all WPs)	AgriLAC Resiliente has built its TOC considering major regional challenges and the Initiative has been designed to contribute to address them including those that are not directly or totally aligned with the Initiative (conflict, public health, etc.) but are of key importance to the regional governments. However, there is a risk of priority changes, especially in the governmental sector.	2	2	4	Close engagement with governments will allow AgriLAC Resiliente to prepare for any potential changes in priorities in given countries and realign its priorities to support such changes and/or strategically shift its priorities to ensure outcomes and impact achievement. The focus of the Initiative on extracting methods and concepts will allow to deploy those as a value proposition to governments even if the topical priority has changed.
#3 Failure to obtain target and stable budget for three-year period (Initiative level and all WPs).	Failure to obtain the necessary funding to implement the AgriLAC Resiliente's ambitious and impact-oriented agenda will negatively affect the achievement of its objectives.	3	5	15	AgriLAC Resiliente will work together with Science Directors to ensure a robust and attractive portfolio to leverage funding from a diverse set of sources.
#4 Failure of farmers organizations, private sector, public and development organizations to disclose relevant information to ensure increased transparency and objective analysis of results for facilitating InnovaHubs network towards enabling scaling pathways for SET innovations (WP4 and Initiative TOC levels).	Reluctancy to share insights and construct co-learning pathways will hinder trustful interactions between the different actors confirming and strengthening existing power relations. Collaboration on the discovery and sharing of knowledge on performance of context-specific farm recommendations and success stories for more integrated local values chain are essential for the InnovaHubs to function.	2	4	8	Alliances that form the InnovaHubs will be set up around activities that generate mutual benefits between partners and their associations, and this agreement will form the backbone for the creation of trust that entails the sharing of knowledge on aligned priorities and interests. This is the core of the underlying IASI methodology.
#5 Failure to incentivize right behaviors by farmers, value chain actors, and policy makers needed for active involvement in the transformation envisioned.	Failure to obtain change of stakeholders' behaviors for enabling the scaling SET innovations to achieve climate-resilience, strengthen critical ecosystem services and increase competitiveness while reducing out migration.	3	4	12	Coordinated work across work packages will reduce these risks by designing and implementing mechanisms that help break silos and assess the value of cooperation and collaboration for achieving greater impact across agrifood systems. Behavioral change strategies will be implemented as per the IASI methodology.

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’s CGIAR Research Ethics Code and to 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

The AgriLAC Resiliente Initiative will align with the OFDA Policy’s Open and FAIR requirements, ensuring:

1. Rich metadata conforming to the CGIAR Core Schema to maximize Findability, including geolocation information where relevant.
2. Accessibility by utilizing unrestrictive, standard licenses (e.g. Creative Commons for non-software assets; General Public License (GPL)/ Massachusetts Institute of Technology (MIT) 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. Initiative team

Topic areas	*Expertise*	*Responsibilities and contributions*
Cross-work package management and implementation team		
Initiative technical director and deputy	Systems perspective, agrifood systems and climate change, partner engagement, CGIAR leadership, fundraising	Initiative lead and co-leadership, assurance of full Initiative delivery
Management	Admin., financial management, reporting, large, multi-country projects	Admin, financial, reporting, and HR management and quality control
Communications	Multi-stakeholder/audience communications, media coverage, external media	Reporting, media liaison, design of audiovisual materials.
MELIA	Monitoring system adaptation and implementation, impact assessments.	Reporting, MELIA, data management
Scaling	Innovation and scaling systems, regional expertise.	Scaling learnings & assessments, WP backstopping
Gender, youth and social inclusion	Regional and agrifood systems gender, youth and social inclusion expertise	Lead and ensure gender, youth and social inclusion across all WPs.
Work Package 1: research implementation and support team		
Systems agronomy	Systems agronomy, experiments, participatory action research (PAR)	Design, implement trials, analysis of data, report, publish
Agrifood systems and nutrition	Nutrition & food system analysis, diet surveys and adoption pathways	Analysis of data, farm-to-fork mapping
Markets and value chain	Value chains and chain mapping, market systems development, GIS	Lead market studies to increase adoption of nutrition-sensitive SET
Agricultural economist	Choice experiments, RCTs, multi-criteria and farming systems analysis	Design socioeconomic experiments, advise on business models
Work Package 2: research implementation and support team		
Software / data architect	Development of data infrastructure to collect and analyze big datasets	Development of the data infrastructure for digitally-enable ecosystems
Climate data scientist	Climate modelling and analysis for long- and short-term timeframes	Generate climate data analysis and develop tailored data per user
User-centric design specialist	Design and execution of user-center approaches for solutions development	Design implements tailored approaches to deliver based on user needs.
Work Package 3: research implementation and support team		
Low Emissions food Systems	Climate change mitigation approaches and metrics in land use sector	Develop frameworks for achieving both mitigation and development goals
Social sciences	Participatory and inclusive methods for low emissions development	Design approaches for tailoring low emission strategies for diverse next users
Land use policy, carbon finance & markets	Understanding of policies, markets and finance dynamics and trends	Support the design of profitable low emissions strategies for land use sector
Climate change, agrobiodiversity and water	Regional knowledge and expertise for addressing multi-dimension goals	Support and advice the design and implementation of mitigation strategies.
Work Package 4: research implementation and support team		
InnovHub design & implementation	Co-creation and co-design	Methodological and implementation support of the InnovHub
Agrifood Systems & agronomy	Agronomy and biophysical systems	Support the development of agronomic and agrifood systems interventions
Farmer market linkages	Public-Private collaborations and value chain expertise	Development of farmer market linkage
Knowledge management	Design and operation of knowledge systems	Generation of capacities and systemization of knowledge and knowledge networks
Socio-economic & adoption	Drivers of adoption	Develop, roll out and improve the scaling strategies
Work Package 5: research implementation and support team		
Policy-science interfaces	Conceptual and practical knowledge on policy-science dynamics	Advice and support strategies for achieving policy-oriented outcomes
Socioeconomics & policy	Socioeconomic modelling considering policy implications	Support the implementation of policy and investment decision support tools
Migration, climate security & risk/insurance	Migration modelling and trends understanding, risk insurance expertise	Develop migration analysis for policy implications for climate goals.
Machine learning & typology	Analytics	Analyze and extract learnings from the massive datasets generated
Sustainable finance	Sustainable financial models; ESGs, impact investments	Support the development of Sustainable Finance solutions along the value chain

9.2. Gender, diversity and inclusion in the workplace

The implementation of AgriLAC Resiliente across 4 One CGIAR centers is expected to have a total of 110 staff, of which 35% will be comprised by women. The implementation team has significant strengths in diverse disciplinary backgrounds, including social, gender, political-economy, biophysical, environmental, climate and young scientists. The team is comprised from experienced staff mostly originally from the Latin-American region, and also with relevant experience working with the prioritized countries, each hold relevant partnerships with the Initiative's potential partners, as well as to leverage and create new professional networks, which will allow an efficient coordination for implementation. Promotion of young scientists' involvement through regional and international academic institutions.

The Initiative team is unlikely to meet CGIAR's gender target of a minimum of 40% women in professional roles and/or will not be comprised of individuals from diverse backgrounds. To address this, we will consciously consider diversity when we recruit/ follow the guidance outlined in CGIAR's GDI Inclusive Recruitment Toolkit mindfully include diverse voices into all our project activities, interventions, etc.

9.3. Capacity development

AgriLAC's goals for capacity building will focus on providing training on leadership, inclusion, ethics, and other practices which will be available for team leaders, junior level Initiative team members, partners and stakeholders. During the inception period, (within three months of launch), team leaders and managers will be required to complete leadership training. For the kick-off, there will be an awareness session on CGIAR's values, code of conduct and learning opportunities available within CGIAR.

For the following six months, team members will receive training on gender and youth inclusion through cross-cutting workshops. This training will also cover whistleblowing and confidential pathways to escalate concerns to the correct authorities for taking action. A participatory process training will follow for another six months, followed by TOC exercises in which every Work Package will have detailed projection.

Another six months of training will focus on Communications and Disseminations, which will be followed on training for promoting good practices in ethics for Research (three months). Following those two trainings, a MEAL training for each work package will take place, lasting three months.

And last, each Work Package leader will undergo training for transforming science into public policy, which will last for six months, providing team members and leaders with opportunities to build capacity and knowledge on agrifood systems issues, data, innovations, and scaling on a policy scenario with practical applications and tangible impact.

The outcomes and strategy of this Initiative require new approaches to building the adaptive capacity of farmers to ensure that long-term stresses and discrete shocks do not lead to downturns in socio-economic progress. We will therefore work with communities to understand and strengthen organizational and institutional dynamics, so that the Initiative contributes to their sustainable development. Local stakeholders in the enabling environment are a second target group for capacity development, and attention will be given to equal opportunities for women and men when setting up local knowledge development activities and implementing capacity development programs. Gender mainstreaming and participation will be a cross-cutting topic and will be especially emphasized in the selection of train the trainers and other capacity building targets and capacity development activities in the communities and with local, regional and national stakeholders.

10. Financial resources

10.1. Budget

USD	2022/2023	2023/2024	2024/2025	Total
Mgmt - Cross Cutting	881,000	1,058,000	1,025,000	2,964,000
Work Package 1	1,131,000	1,423,000	1,675,000	4,229,000
Work Package 2	2,468,000	2,509,000	2,478,000	7,455,000
Work Package 3	1,366,000	1,428,000	1,167,000	3,961,000
Work Package 4	1,921,000	1,880,000	2,508,000	6,309,000
Work Package 5	986,000	995,000	962,000	2,943,000
Innovation & Scaling + MELIA	556,000	785,000	815,000	2,156,000
Total	**9,309,000**	**10,078,000**	**10,630,000**	**30,017,000**

10.2. Activity breakdown

USD	2022/2023	2023/2024	2024/2025	Total
Guatemala	2,199,000	2,091,000	1,362,000	5,652,000
Honduras	2,199,000	2,091,000	1,771,000	6,061,000
El Salvador	790,000	1,235,000	2,252,000	4,277,000
Nicaragua	280,000	303,000	1,069,000	1,652,000
Colombia	1,664,000	1,738,000	1,896,000	5,298,000
Mexico	1,478,000	1,536,000	1,196,000	4,210,000
Peru	699,000	1,084,000	1,084,000	2,867,000
Total	**9,309,000**	**10,078,000**	**10,630,000**	**30,017,000**

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