Full Proposal
Good practice guide

Examples have been extracted from submitted Initiative proposals by subject matter experts and are meant to guide you in developing the proposal for your Initiative.

Sections and subsections with examples are highlighted in the table of contents

Table of contents

Contents

1. Introduction and context 4
2. Proposal Structure 5
Summary table 5
1.General Information 5
2.Context 5
2.1 Challenge statement - 500 words max supported by links and reference list 5
2.2 Measurable three-year (End of Initiative) outcomes - 250 words max 5
2.3 Learning from prior evaluations and Impact Assessments (IA) - Bullet points and links to evaluation and impact assessment documentation - 250 words max 6
2.4 Priority-setting - 500 words max + links to analyses 7
2.5 Comparative advantage - 250 words max + supporting documentation 9
2.6 Participatory design process - 500 words max + links to annexes 9
2.7 Projection of benefits 10
3.Research plans and associated theories of change (ToC) 16
3.1 Full Initiative ToC 16
3.1.1 Full Initiative ToC diagram 16
3.1.2 Full Initiative ToC narrative - 500 words max 19
3.2 Work Package TOCs 22
3.2.1 One-page diagram per Work Package 22
3.2.2 Work Package research plans and ToCs – 1000 words max narrative per WP including the content below: 25
4.Innovation Packages and Scaling Readiness Plan 30
4.1 Innovation Packages and Scaling Readiness Plan – 250 words max 30
5.Impact statements 31
5.1 Nutrition, health & food security (maximum one page) 31
5.2 Poverty reduction, livelihoods & jobs (maximum one page) 31
5.3 Gender equality, youth & social inclusion (maximum one page) 32
5.4 Climate adaptation and mitigation (maximum one page) 34
5.5 Environmental health and biodiversity (maximum one page) 37

6.Monitoring, Evaluation, Learning and Impact Assessment 38
6.1 Result Framework 38
6.2 MELIA plan 52
6.3 Planned Monitoring, Evaluation, Learning and Impact Assessment (MELIA) studies and activities 55
7. Management plan and Risk assessment 56
7.1 Management plan – 250 words max 56
7.2 Summary management plan Gantt table – 1 A4 page (landscape) 57
7.3 Risk assessment 60
8. **Policy compliance, and oversight** 63
8.1 Research governance 63
8.2 Open and FAIR data assets – 250 words max 63
9. Human Resources 64
9.1 Initiative team - Table 64
9.2 Gender, diversity and inclusion in the workplace – 250 words max 66
9.3 Capacity development – 250 words max 67
10. Financial Resources 68
10.1 Budget 68

1. Introduction and context

This document provides a template for Proposals for CGIAR Initiatives, providing guidance on the elements and content anticipated. The purpose of the template is to provide CGIAR System Council funders and the Independent Science for Development Council with the information needed to inform their funding decisions around the Initiatives. The template is designed in light of the CGIAR 2030 Research and Innovation Strategy, reflecting the focus on partnerships, innovation systems and multiple SDG impacts from high-quality science, research and innovation. The template provides for assessment of CGIAR Initiatives against the features of CGIAR Initiatives laid out in the System Reference Group recommendations (Annex 1 of SC09.02), the ISDC Quality of Research for Development Criteria and the Eschborn Principles.

The Proposal template is based on that submitted to the System Council in 2020 (Document SC11.04a), and subsequently modified with the agreement of the CGIAR Executive Management Team and the Independent Science for Development Council, ensuring a fit to their needs. The template is current at the date of issue, taking into account all prior decisions of the System Council, System Board and CGIAR's Executive Management Team.

2. Proposal Structure

Summary table

Initiative name	
Primary Action Area	
Geographic scope	
Budget	

1. General Information

List the Proposal title, the Proposal Lead and Deputy, and the writing team.

- Initiative name
- Primary CGIAR Action Area
- Proposal Lead and Deputy
- IDT members and affiliations

2. Context

2.1 Challenge statement - 500 words max supported by links and reference list

Update the 250 words from the challenge statement submitted in the pre-concept. In defining the research challenge, provide evidence on how it is relevant to Impact Areas, is a high priority in targeted countries, is aligned to shared, multi-funder priorities, and can be addressed effectively by science.

2.2 Measurable three-year (End of Initiative) outcomes - 250 words max

Update the 250 words from the objectives submitted in the pre-concept with clear 3-year measurable (SMART) outcomes. Ensure this is consistent with the ToC diagrams and narrative, and MELIA sections.

Example from *ClimBeR* Initiative proposal

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

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

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

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

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

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

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

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

2.3 Learning from prior evaluations and Impact Assessments (IA) - Bullet points and links to evaluation and impact assessment documentation - 250 words max

Describe key learnings that have influenced the design of the Initiative, from relevant evaluations, impact assessments or other reviews whether internally or externally commissioned.

Example from *ClimBeR* Initiative proposal

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

- Our unique approach to gender and social equity addresses the recommendation to make greater use of social science, including gender analysis, and to engage more effectively on equity and affirmative measures, as part of transformative change thinking.
- ClimBeR will examine the root causes of climate impact challenges by addressing questions related to political economy, society, nutrition, agroecology, and CS.
- ClimBeR will use transdisciplinary research to mainstream climate change adaptation as a strategy to transform food systems.
- We adopt a SET bundle approach to support researchers and practitioners to integrate the three domains of gender and social equity issues, environmental quality and protection, and technological innovations. Specifically, ClimBeR will bundle climate information services within a framework of socially inclusive policies and institutions rather than adopting piecemeal or technology-focused innovations.
- Our work tackles climate change in the context of natural resources, including water management, nutrition, employment, and health; using a transdisciplinary

research lens to inform, engage, and steer a nexus of science, policy, and finance towards system transformation.

- Our work is aligned with and supports our six partner countries' strategic development priorities, and the capacity development needs of our partners and stakeholders.
- All activities are developed and implemented in collaboration with our partners (research institutions, governments, civil society, financial institutions, and private sector organizations) and are informed by continuous stakeholder consultation and outreach.

Example from *TAFSSA* Initiative proposal

TAFSSA builds on 11 large-scale CGIAR-managed bilateral projects in South Asia, five CRPs, four global integrating programs, and CGIAR Research Support Platforms, many of which have been **externally evaluated** (Annex 2.3). **Internal lessons** learnt across prior initiatives highlights that research relevance, science quality, and moving research into impact requires alignment with *both* donors and governments' priorities, as well as multi-phase initiatives composed of regionally/nationally posted long-term staff. High-impact initiatives also benefit from **well-structured cross-CGIAR collaboration, transparent governance, and flexible adaptive management plans**. Research priorities are also best set considering scalability. Early efforts engaging partners to bridge the research to development divide through objective-oriented multi-stakeholder learning platforms and innovation systems are crucial.

Evaluations also highlight the value of investing in well-developed theories of change, **setting research within countries' priorities**, strategically selecting national innovation and scaling partners – in both the **public and private sectors** – and investing in participatory **multi-stakeholder learning platforms and effective communications.** Impactful projects must more specifically consider **gender in production- and market-focused research**. Finally, evaluations have highlighted the importance of investing in building **more systematic evidence of uptake and impact** from research.

TAFSSA's design employs both internal learning and external evaluation insights. The Initiative benefits from **(i)** structured and thorough participatory agenda setting with over 500 workshop participants and additional in-depth focus group meetings (Annex 2.6), **(ii)** clear articulation of demand-driven research agendas participant feedback, a **(iii)** cross-cutting social-inclusion agenda, and **(iv)** the development of scaling strategies as part of the research process. Finally, **(v)** evaluations have informed our MELIA strategy, which guides adaptive management and assures high-quality scientific outputs.

2.4 Priority-setting - 500 words max + links to analyses

Give results from, and method used, to set priority science (research questions, methods), innovations, activities, geographies, systems, crops or other choices relevant to the Initiative.

Example from *SAPLING* Initiative proposal

Science, Innovations and Activities

Prioritization is on-going through stakeholder consultations, learning from extensive in-country research and experience (e.g., CRPs, bi-lateral projects) and co-design approaches. Stakeholder engagement includes Initiative design workshops,[1] and the 2019 ILRI Global Design Workshop, which brought together over 70 representatives of the global livestock sector from public and private sectors.[2] [3] [4] [5]

The persistent livestock yield gap in target regions is a key driver for SAPLING research priorities, which include the three pillars of livestock productivity health, genetics and feed. Priority research and activities are based on an existing innovation's readiness to Transfer or Adapt or whether Novel research is needed.

1. **Transfer** of Innovation Packages directly from past success locations to new locations for the same value chain. Example: Combinations of community-based breeding and herd-health packages in Ethiopia can be utilized and contextualized for Nepal, Mali and Tanzania.
2. **Adapt** existing innovations that address unique problems in one location to contextually apply them to another. Examples: Digital data capture and feedback systems developed for dairy cattle genetic gain research in East Africa can be adapted for use in cattle and buffalo improvement in Mali and Nepal, respectively.[6] [7] Disease risk maps developed in Vietnam can be extended to Ethiopia, Mali and Nepal.[8] [9]
3. **Novel** research based on a package that seeks to promote a new, more desirable, food system (e.g., smart packaging of genetics, health and feed in pastoral small ruminant value chains).

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[1] ILRI, Alliance of Bioversity International and CIAT, ICARDA. (2021). Summary report from virtual national stakeholder consultation meetings held on the proposed One CGIAR Initiative on Sustainable Animal Productivity for Livelihoods, Nutrition and Gender inclusion, July-September 2021. Nairobi, Kenya: ILRI. https://hdl.handle.net/10568/115167

[2] ILRI. (2019). ILRI design workshop #1 – Poultry: Workshop outputs. New South Wales, Australia: Food Agility CRC Ltd. https://hdl.handle.net/10568/114928

[3] ILRI. (2019). ILRI design workshop #2 – Dairy: Workshop outputs. New South Wales, Australia: Food Agility CRC Ltd. https://hdl.handle.net/10568/114929

[4] ILRI. (2019). ILRI design workshop #3 – Red Meat: Workshop outputs. New South Wales, Australia: Food Agility CRC Ltd. https://hdl.handle.net/10568/114930

[5] ILRI. (2019). ILRI design workshop #4 – Pigs: Workshop outputs. New South Wales, Australia: Food Agility CRC Ltd. https://hdl.handle.net/10568/114931

[6] Mrode, R., Ojango, J., Ekine-Dzivenu, C., Aliloo, H., Gibson, J., Okeyo, M.A. (2021). Genomic prediction of crossbred dairy cattle in Tanzania: A route to productivity gains in smallholder dairy systems. Journal of Dairy Science. https://doi.org/10.3168/jds.2020-20052

[7] Gebreyohanes, G., Meseret, S., Tera, A., Raphael, M., Nigussie, E., Ekine, C., Ojango, J., Lidauer, M., Mwai, O.A. (2021). Scaling up and sustaining genetic improvement for increased milk production and productivity in Ethiopia: Lesson and policy recommendations from the African dairy genetic gain program. ILRI Policy Brief 32. Nairobi, Kenya: ILRI. https://hdl.handle.net/10568/114250

[8] Lee, H.S., Thakur, K.K., Bui, V.N., Pham, T.L., Bui, A.N., Dao, T.D., Thanh, V.T., Wieland, B. (2021). A stochastic simulation model of African swine fever transmission in domestic pig farms in the Red River Delta region in Vietnam. Transboundary and Emerging Diseases 68(3): 1384–1391. https://doi.org/10.1111/tbed.13802

[9] Lee, H.S., Pham, T.L., Nguyen, T.N., Lee, M., Wieland, B. (2019). Seasonal patterns and space-time clustering of porcine reproductive and respiratory syndrome (PRRS) cases from 2008 to 2016 in Vietnam. Transboundary and Emerging Diseases 66(2): 986–994. https://doi.org/10.1111/tbed.13122

Co-design approaches will be utilized to match demand with the research solutions SAPLING offers. Co-design involves: 1) joint identification of challenges; 2) co-creation of solutions including trade-off analysis to facilitate decision; 3) continuous monitoring for relevance, reach, rigor and value for money; and 4) course correction. It can include establishing independent scientific and industry advisory committees with members from private sector, producers/producer organizations and research institutions. Examples include community-based breeding programs,[10] African Dairy Genetic Gains[11] and Tropical Poultry Genetic Solutions.[12]

Research on leveraging livestock to achieve equity for women is prioritized to increase the potential of adoption and impact.[13] Increasing consumption of safe and affordable LDFs is prioritized to ensure that gains in nutrition outcomes can be realized.[14] [15]

Geographies and Value chains

SAPLING target countries of Ethiopia, Kenya, Tanzania, Uganda, Mali, Nepal and Vietnam were selected based on:

- Tropical Livestock Units per 1,000 people[16]
- Multidimensional Poverty Index[17]
- Prevalence of stunting in children under 5 years of age[18]
- Gender Inequality Index 2019[19]
- Opportunities to rapidly scale building from CRP Livestock and bi-lateral projects

[10] CGIAR. Community-based sheep and goat breeding. https://www.cgiar.org/innovations/community-based-sheep-and-goat-breeding/. (accessed on September 28 2021)

[11] Africa Dairy Genetic Gains (ADGG). https://portal.adgg.ilri.org/. (accessed on September 28 2021)

[12] Karaimu, P. (2019). African Chicken Genetics project hands over plan for the Tanzanian Smallholder Poultry Association to government. Forum in Tropical Poultry Genetic Solutions. https://africacgg.net/

[13] Jumba, H., Teufel, N., Baltenweck, I., de Haan, N., Kiara, H., Owuor, G. (2020). Use of the infection and treatment method in the control of East Coast fever in Kenya: does gender matter for adoption and impact? Gender, Technology and Development 24: 297-313. https://doi.org/10.1080/09718524.2020.1829359

[14] McKune, S., Lane, J., Flax, V., Ouma, E., Austin-Datta, R., Williams, R., Moore, E., Jacobs, M., Turk, J. (2020). Making livestock research and programming more nutrition sensitive. Global Food Security 26: 100430. https://doi.org/10.1016/j.gfs.2020.100430

[15] Flax, V.L., Ouma, E., Izerimana, L., Schreiner, M.A., Brower, A.O., Niyonzima, E., Nyilimana, C., Ufitinema, A., Uwineza A. (2021). Animal Source Food Social and Behavior Change Communication Intervention Among Girinka Livestock Transfer Beneficiaries in Rwanda: A Cluster Randomized Evaluation. Global Health: Science and Practice. https://doi.org/10.9745/GHSP-D-21-00082

[16] The state of food security and nutrition in the world. Statistical tables. http://www.fao.org/3/ca9692en/online/ca9692en.html#chapter-a1_1. (accessed on September 28 2021)

[17] United Nations Development Programme. (2019). Human Development Reports. The 2019 Global Multidimensional Poverty Index (MPI). http://hdr.undp.org/en/2019-MPI

[18] Unicef. UNICEF Data Warehouse. https://data.unicef.org/resources/data_explorer/unicef_f/?ag=UNICEF&df=GLOBAL_DATAFLOW&ver=1.0&dq=TZA+NPL+UGA+MLI+SEN+ETH+TUN+VNM+NGA.NT_ANT_WHZ_NE3+NT_ANT_HAZ_NE2+NT_ANT_HAZ_NE3._T.&startPeriod=2016&endPeriod=2021. (accessed on September 28 2021)

[19] United Nations Development Programme. (2020). Human Development Reports. Gender Inequality Index. http://hdr.undp.org/en/composite/GII

- Support and buy-in from national stakeholders[20] [21] [22] [23] [24] [25] [26]
- Aligning with geographic priorities of key potential donors

SAPLING prioritized 14 country-value chain combinations (see "Priority Value Chains in Target Countries"). Two additional country-value chain combinations are high potential for inclusion pending funding (chickens in Kenya and Vietnam). Selection of species and value chains is based on:

- Economic importance
- Contribution to food and nutrition security
- Contribution to social inclusion and women's empowerment
- National level priorities and buy-in
- Opportunity assessment (yield gap + a growing market + prospect for new and/or adapted technology to drive productivity growth)
- Existing research and partnerships

Selection of the same species in at least two countries (except for buffaloes) will facilitate comparisons and south-south knowledge exchange while minimizing the risk of losing a species if work in one country becomes impossible for reasons out of the Initiative's control (e.g., unstable security situation, etc.).

[20] Nepal Livestock Sector Innovation Project (World Bank 2018). https://documents.worldbank.org/en/publication/documents-reports/documentdetail/265011512874832088/nepal-livestock-sector-innovation-project. (accessed on September 28 2021)

[21] NhânDân. (2020). Vietnam sets 4-5% annual growth for livestock production for next five years. https://en.nhandan.vn/business/item/9165702-vietnam-sets-4-5-annual-growth-for-livestock-production-for-next-five-years.html

[22] National Planning Commission. (2016). Federal Democratic Republic of Ethiopia Growth and Transformation Plan II (GTP II) (2015/16-2019/20) Volume I. Addis Ababa. http://extwprlegs1.fao.org/docs/pdf/eth169444.pdf

[23] Kenya National Livestock Policy (2019). http://repository.kippra.or.ke/bitstream/handle/123456789/483/Draft-reviewed-National-Livestock-Policy-February-2019.pdf?sequence=1&isAllowed=y

[24] Tanzania Livestock Master Plan.(2017). https://www.mifugouvuvi.go.tz/uploads/projects/1553601793-TANZANIA%20LIVESTOCK%20MASTER%20PLAN.pdf .

[25] Uganda Vision 2040. (2020). NDPIII AGRO-INDUSTRIALIZATION PROGRAMME IMPLEMENTATION ACTION PLAN. Program 1: Agro-industrialization. https://mlhud.go.ug/wp-content/uploads/2021/03/AGROINDUSTRIALIZATION-PIAP-_Final-17.11.pdf

[26] Mali Livestock Sector Development Support Project (World Bank 2018). (2018) https://documents1.worldbank.org/curated/en/831531520046040417/pdf/MALI-PAD-02082018.pdf

Priority Value Chains in Target Countries

	Dairy cattle	Beef cattle		Small ruminants		Chickens	Pigs	Buffalo
		Beef	Dual-purpose	Sheep	Goats			
Ethiopia								
Kenya								
Tanzania								
Uganda								
Mali								
Vietnam								
Nepal								

Expanding on-going work

Establishing new work

High potential for inclusion

2.5 Comparative advantage - 250 words max + supporting documentation

Give evidence of why and how CGIAR and the partnership arrangement will deliver a unique or more cost-effective set of results compared to other credible partnerships or service providers.

2.6 Participatory design process - 500 words max + links to annexes

This section and annexes should show partner support statements + links to evidence, e.g. to country or regional development strategies or action plans, details on process

Concise narrative and evidence that the research and innovations proposed is demand-driven (specifically that it has emerged from stakeholder discussion and co-design, including the relevant Investment Advisory Group) and consistent with country/region/global stakeholder priorities.

Example from *Excellence in Agronomy for Sustainable Intensification and Climate Change Adaptation (EiA)* Initiative proposal

EiA's design benefitted from both a Planning Phase [EiA_Planning_Phase_reports] and **Incubation Phase** [EiA_Incubation_Phase_progress_report_2020], which started in July 2020, and includes consultative processes that solicited opinions and viewpoints across a full range of stakeholders. These processes ensure that key design elements benefit from the collective experience and insights of relevant stakeholders. The **Initiative Development Team** (IDT) is comprised of CGIAR focal points, a core Initiative team of Work Package (WP) leaders and support staff. The IDT includes members of a consultative reference group, the independent External Advisory Board (iEAB). The iEAB is composed of eminent scientists in agronomy and related disciplines, and senior managers from major donors supporting agricultural R&D. This combination provides a sound platform for objective evaluation of key Initiative design elements, especially the research agenda and how it responds to the overall Initiative impact objective.

The IDT has several thematic working groups formed around key Initiative design components and research themes.

For strengthening the Initiative design, the IDT has engaged in targeted outreach activities and accessed outputs from CGIAR Action Area teams. The June 2020 Stakeholder Consultation process, organized through **Technical Advisory Group** 2 (TAG-2), engaged over 400 stakeholders including NARS stakeholders, universities, seed companies and other global partners [27]. Stakeholder feedback confirmed the importance of the five Impact Areas and identified agronomy, climate adaptation and mitigation, breeding, capacity building and extension, as well as food systems improvements as topics that CGIAR Initiatives should prioritize within their unfolding research agendas. EiA embraced these insights and further validated them by conducting surveys with representative **NARS partners** [**EiA_Survey_NARS_2021**] to fine tune the demand for agronomic intervention. These insights have contributed the development of EiA's WPs (Section 3.2).

The **Use Case model** is by its nature the product of a co-creation process. Use Cases are developed from expressed demand by private or public sector partners reliant upon agronomic solutions. Ideas are generated through systematic demand mapping and applied within target regions. The co-creation approach is underpinned by deliberate due diligence assessments and soliciting feedback from across CGIAR before the partnership configuration within a Use Case is completed. Once agreed, the parties (CGIAR, EiA Core Team, and external scaling partners) develop a concept for a minimum viable product (MVP) and a term sheet governing the proposed interactions. When a Use Case is finally approved, it will have passed through an elaborate consultative process, thereby ensuring maximum synergistic potential is achieved [**EiA_Due_diligence_process_2021**]. This participatory design approach is embedded within the core instrument of the Initiative, our combined Use Cases. This approach recognizes that effective collaboration platforms are essential before meaningful impacts can occur, and links them to state-of-the-art advances in agronomy and climate action.

Prioritization of strategic R&D relied on inputs from across CGIAR and ARIs, facilitated through specific **Working Groups**, with engagement of ARI scientists, focused upon thematic research priorities as per the Working Group concept papers [**EiA_Working_Group Concept_papers_2021**]. EiA is currently engaging with other **Global Initiatives and the Regional Integrated Initiatives** that align to the objectives of EiA, aiming at having specific plans for cooperation finalized by the end of 2021 [**EiA_Interactions_Other_Initiatives_2021**].

[27] TAG-2 Study 2020. Stakeholder consultation as an input to 2030 CGIAR Strategy. Preliminary results from the online Survey.

2.7 Projection of benefits

This section contains four examples of good practice, each with different strengths.

The first sets out a *joint projected benefits exercise* undertaken by the five Genetic Innovation Initiatives. They chose to undertake a single exercise as the impact pathways were very highly integrated and indeed shared between Initiatives. A particular strength of this exercise is that it shows very clearly the inter-initiative synergies and ensures no double-counting of the same beneficiaries across the different Initiatives. Each GI initiative included the same PB text, copied below, describing this.

The second is from the ClimBeR initiative. A strength of this example is the clarity of the assumptions and evidence used to estimate projections, allowing an ISDC reviewer or external reader to review, understand how the estimates have been formed, and come to their own conclusions on whether they feel these are reasonable.

Thirdly, we have included the NEXUS Gains Initiative, which has again been included for its admirable clarity in use of evidence and assumptions.

Finally, we have included the SAPLING Initiative, who chose to use their wordcount a little differently, grouping the narrative for some projections, which they felt allowed them to tell their impact projection story more effectively and succinctly.

Projected Benefits good-practice example: Genetic Innovation Initiatives' joint exercise:

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

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

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

Impacts of genetic innovations materialize when improved varieties are adopted by smallholder farmers, including women. All initiatives in the **GI Science Action Area** jointly contribute to more efficient and faster development, release, dissemination, and adoption of improved,

in-demand varieties through common impact pathways. Besides producing and delivering better quality seed to target beneficiaries in priority market segments, the proposed work aims at modernizing and transforming the genetic innovation system (Figure 1). Selected examples across all five impact areas show the aggregated projected benefits of all initiatives working in collaboration and contributing at different stages along the impact pathways.

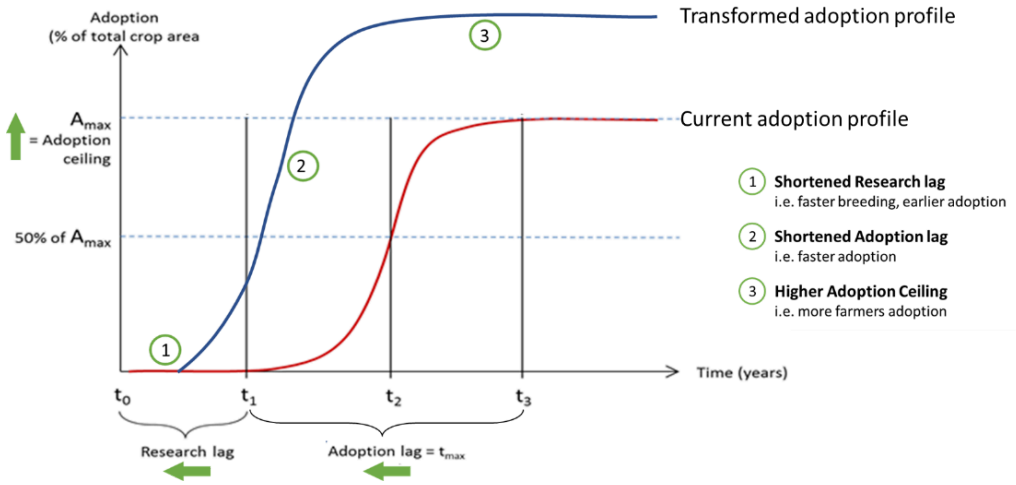

Figure 1. *Adoption profile impact of GI Initiatives*

Market intelligence shortens the adoption lag and increases adoption levels as new varieties are targeted to specific market segments. This leads to faster and more complete replacement of existing varieties and accelerated varietal turnover. Investment in **genebanks** reduces the research lag by making germplasm available to breeding programs, reducing the search time and cost for traits. In addition, potentially game-changing traits are preserved and made accessible, thus elevating future impact-levels. Development of improved varieties with producer/consumer-demanded traits improves livelihoods and food security. Modernized strategies and approaches **accelerate breeding**, thus reducing the research lag, and generating multiplier effects on the benefits from breeding and seed systems. Improved tools and services enable breeders to create more complex, multi-trait products that match desired product profiles. Modernizing **enabling tools and services** increase the speed of breeding, thus shortening the research lag and accelerating variety release. Efficient **seed delivery** accelerates and increases adoption as targeted products reach – even disadvantaged - farmers faster. Moreover, enabling access to high-quality, clean seed and planting material ensures the potential of genetic innovations is realized in farmers' fields.

Examples of Projected Benefits by Impact Area: the below table provides as examples five projected benefits included in the portfolio of benefits pursued by GI. Once established, MIPP will analyze and publish the projected benefits for each breeding pipeline supported with common funding in GI.

Examples of Projected Benefits by Impact Area

Breadth	Depth	Probability
Impact Area: Nutrition, health & food security **Impact Indicator:** # people benefiting from relevant CGIAR innovations		
Higher yielding Vit A rich cassava: 19.5 million people (3.9 million HH) *Orange-flesh sweetpotato*: 14.8 million people (3.1 million HH) **TOTAL: > 23.1 million people (> 4.7 million HH)**	**Significant**: 10% permanent impact on income; some DALYs saved.	**High certainty**: 50 – 80% expectation of achieving these impacts by 2030, at this point
Impact Area: Poverty reduction, livelihoods & jobs **Impact Indicator:** # poor people benefiting from relevant CGIAR innovations		
Higher yielding rice: 12.3 million poor people (2.8 million poor HH) *Stress tolerant maize*: 24.5 million poor people (5.2 million poor HH) *Higher yielding wheat*: 10.0 million poor people (1.9 million poor HH) **TOTAL: > 42.6 million poor people** (> **9.0 million poor HH)**	**Significant** 10% permanent impact on income	**High certainty**: 50 – 80% expectation of achieving these impacts by 2030, at this point
Impact Area: Gender equality, youth & social inclusion **Impact Indicator:** # women benefiting from relevant CGIAR innovations		
High yielding fast cooking Beans: 1.8 million women producers > 3.4 million women in adopting HH *Orange-flesh sweetpotato*: 1.5 million women producers **TOTAL: > 2.5 million women producers** **> 3.4 million women/girls in all adopting HH**	**Significant**: 10% permanent impact on income	**High certainty**: 50 – 80% expectation of achieving these impacts by 2030, at this point
Impact Area: Climate adaptation & mitigation **Impact Indicator:** # people benefiting from climate-adapted innovations		
Stress tolerant maize: 69.9 million people (14.7 million HH)	**Significant**: 10% permanent impact on income	**High certainty**: 50 – 80% expectation of achieving these impacts by 2030, at this point
Impact Area: Environmental health & biodiversity **Impact Indicator:** # plant genetic accessions available and safely duplicated		
Aggregate increase to 2030: 15% (70,000 additional accessions become available)	*Not required for this indicator*	**Very high certainty**: >80% expectation of achieving these impacts by 2030, at this point in the design process

1. **Nutrition, health, and food security:**

 # People benefiting from relevant CGIAR innovations: Vitamin A deficiency is a major disease affecting 48% of children aged 6–59 months in SSA (Stevens et al., 2015). We project that the nutrition, health and food security status of about 23.1 million people (i.e., 4.7 million households) in 16 SSA countries will improve significantly through the adoption of yellow cassava varieties with high β-carotene (precursor of Vitamin A) content and high dry matter, and orange-flesh sweetpotatoes (OFSP) with high β-carotene and improved productivity (details in Annex). Benefits for adopting households arise through increased production, consumption, and sale of crops with higher nutritional value. The number of beneficiaries is projected using

crop/country specific adoption profiles based on past evidence and expert estimates, secondary data on national crop production area (narrowed down to target domains), average household size, and crop area per HH. We did not include benefits arising for consumers when biofortified crops are sold. The combined total number of beneficiaries accounts for an estimated 80% overlap (HHs growing both cassava and sweetpotatoes) in 8 countries included in both projections. Projected impact is in the lower bound of high certainty, since dissemination and adoption of the varieties may challenge available seed systems and face market constraints in some countries.

2. **Poverty reduction, livelihoods, and jobs**

 # Poor people benefiting from relevant CGIAR innovations: By enabling poor smallholder households to achieve higher yields and hence 'living income', adoption of improved varieties of rice, wheat and maize is expected to significantly benefit 42.6 million poor people (9 million poor HH) by 2030 (details in Annex). While the GI initiatives have identified 12 priority crops for breeding, only three innovations (higher yielding rice in South and Southeast Asia (Kumar et al., 2021); high yielding wheat in South Asia Juliana et al., 2020; Crespo-Herrera et al., 2017); and stress-tolerant maize in Sub-Saharan Africa (Cairns and Prasanna, 2018; Prasanna et al., 2021)) are included in the projection. These varieties are at an advanced stage, almost ready to be released and benefits are expected to materialize soon and with high certainty. The number of poor people benefiting is estimated by multiplying the projected number of adopters by 2030 in each country with the poverty headcount ratio at national poverty lines (World Development Indicators, most recent year available). To avoid double-counting in the projected total number of beneficiaries, we accounted for the overlap, especially in the Indo-Gangetic Plain, where HHs frequently grow both rice and wheat (Bhatt et al., 2016), by reducing numbers accordingly (based on Ladha et al., 2003; Timsina and Connor 2001).

3. **Gender equality, youth, and social inclusion:**

 # Women benefiting from relevant CGIAR innovations: While approximately half of all beneficiaries of improved varieties are women, the GI initiatives focus on crops/traits explicitly aiming at improving women's livelihoods. Two examples are bean varieties with increased yield and reduced cooking time (Katungi et al., 2018; Letaa et al., 2020) and orange-flesh sweetpotatoes (Mudege et al., 2017). Women are benefiting from these varieties through different impact pathways: i) increase of income if grown as "women's cash crops"; ii) fast cooking (targeted 30% reduction) benefits women by freeing time, since collection of firewood and meal preparation are mostly conducted by women; and iii) health benefits for women and youth consumers. For our benefit projection, we focus on i) and ii) and follow the general steps outlined for indicators above, and then compute the share of women producers among all adopters (details in Annex). For the 'time saving' benefit, we assume one woman/girl benefits per adopting HH. Since most HH in SSA cultivate several crops, we use an 80% overlap for countries included in both crop projections. We project that at least 2.5 million women producers and 3.4 million women/girls in adoption HH will benefit significantly and with high certainty from these two crops in the included 17 countries alone.

4. **Climate adaptation and mitigation**

 # People benefiting from climate-adapted innovations: The projection of beneficiaries from climate-adapted innovations is derived from the number of farmers in Sub-Saharan Africa adopting maize varieties tolerant to abiotic stress (details in Annex). Droughts have become an almost regular occurrence in SSA, severely reducing yields of many crops (Ray et al., 2015). Maize is an important staple crop in the region and the new drought and heat resistant varieties (Cairns and Prasanna, 2018; Prasanna et al., 2021) achieve 20% higher yields under drought conditions (Setimela et al., 2017). This effect is on the upper end of the "significant" depth criteria in terms of % permanent increase in income. We assume an s-shaped logistic adoption function and use country-level rates of current adoption of improved varieties as adoption ceilings (Krishna et al., 2021), in some cased adjusted upward thanks to significant recent donor investment in the seed sector in target countries. With first adoption by farmers expected in 2022 and an estimated 10-year period to maximum adoption, we project that by 2030 about 14.7 million HH across the target domain will be adopting these improved varieties. This translates to at least 69.9 million persons benefiting from this climate-adapted innovation over the next 9 years.

5. **Environmental health and biodiversity**

 # Plant genetic accessions available and safely duplicated: CGIAR Centers have an obligation to conserve and make available crop collections under their management, according to the provisions of the Plant Treaty. Making accessions available for international distribution requires germplasm to have acceptable viability, be free of quarantinable diseases, with adequate stock, and legally available. In 2020, CGIAR genebanks were managing a total collection of 592,257 crop and forage accessions[28] (with 79% available for international distribution). By 2030, CGIAR genebanks will achieve (and maintain) 90% availability (i.e., an additional 70,000 accessions becoming available – see details in Annex).[29] The genebanks will process backlogs (e.g., health testing and cleaning, seed regeneration, verifying trueness-to-type, etc.) to reach this performance target.[30] Achieving and maintaining 90% availability enables genebanks to operate at a steady, efficient state, making them eligible for endowment funding, as well as ensuring users have access to germplasm. The effects of the pandemic and examples such as ICARDA's evacuation from Syria illustrate the importance of sustaining performance targets (Westengen et al. 2020).

Projected Benefits good-practice example: ClimBeR:

Quantitative estimates of projected impact-level benefits disaggregated by breadth, depth and probability of success. A minimum of one projection for each of the five impact areas, targeting one of the impact indicators set out in the Projected Benefits guidance

[28] Not including ICRISAT and CIFOR-ICRAF

[29] Progress is monitored through an online reporting tool (managed by the Global Crop Diversity Trust), and reported in the annual Genebank Platform reports: https://www.genebanks.org/resources/annual-reports/

[30] 2020 Genebank Platform Annual Report, pp-20-21. https://www.genebanks.org/wp-content/uploads/2021/06/2020-Genebank-Platform-Annual-Report.pdf

Each Impact Area projection should be supported by short narrative text (200 words per projection) and references to supporting evidence. The timeframe for the estimates to be entered into the table is cumulative impact to 2030, however please flag in the narrative text if greater impact is expected in slower or faster time.

Projections will build on and be consistent with the Initiative's Theories of Change and Risk Assessment. Standard approaches for defining breadth, depth and probability must be used and are set out in the Projected Benefits guidance which must be followed when completing this task.

Breadth	Depth	Probability
Numeric indicators from the 5 impact areas Draw from the 18 impact indicators set out in the Projected Benefits guidance (Example indicators shown)	Categories of impact Draw from the depth categories for each impact indicator set out in the Projected Benefits guidance	Likelihood of impact (very high, high, medium, low, very low) Draw from the probability categories set out in the Projected Benefits guidance
(Nutrition, health & food security): # people meeting minimum dietary energy requirements		
(Poverty reduction, livelihoods & jobs) # people assisted to exit poverty		
(Gender equality, youth & social inclusion): #women benefiting from relevant CGIAR innovations		
(Climate adaptation & mitigation): #tonnes CO2e averted		
(Environmental health & biodiversity): #ha deforestation averted		

Example from *ClimBeR* Initiative proposal

ClimBeR's complete Projection of Benefits exercise (annex)

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

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

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

ClimBeR's projected benefits exercise covers the number of people benefiting from CGIAR innovations expected by 2030 (Table 1). The methodology, fully described here, is conservative

and assumes bringing the SET bundle approach to scale during 2024-2030. Conservatively, ClimBeR expects to achieve the following benefits by 2030: three million people benefiting from food security innovations; 13 million benefiting from improved livelihoods; 21 million hectares brought under sustainable management; and 30 million people benefiting overall. Using GSEF,[31] we anticipate that five million+ women will benefit from CGIAR science.

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

[31] Fisher E, Hellin J, Greatrex H, and Jensen N. 2019. Index insurance and climate risk management: Addressing social equity. *Dev Policy Rev* **37.**

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

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

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

Assessing breadth

We used Steiner et al.'s[32] pathways classification for transforming food systems. Large-scale commercial farmers' pathways are through improving environmental outcomes. Conventional small-scale farmers' pathways involve increasing market integration, enabling farmers to "step up".[33] Pathways for farmers practicing extensive agriculture in riskier environments involve building assets and safety nets to "step up." Revitalizing rural economies and fostering non-agricultural livelihood opportunities will enable lower-endowment smallholders to 'step out'.

This classification aligns with ClimBeR's tailoring of SET bundles to different farm typologies. We used this classification to calculate the target population in each partner country. For food security, we targeted farmers engaged in extensive agriculture in riskier environments; for livelihoods, lower-endowment small-scale farmers; and for beneficiaries of climate-adapted innovations, we used all five types. The total number benefiting from ClimBeR innovations (30+ million) includes those benefiting from food security, livelihood improvement, and gender-responsive and gender-transformative approaches. For ClimBeR's Innovation Package adoption rates, we used the ND-GAIN readiness index and Thornton and Herrero[34] to assume 40% for Morocco and 20% for the other five countries.

Assessing depth

For the six countries, we calculated the maize yield probability distribution for 2000-2019 (FAOSTAT) assuming a normal distribution. Based on ClimBeR's integrated approach, we combined using climate services (reducing yield variability, thereby reducing the standard deviation) and growing drought- and heat-tolerant seeds (increasing yields, thus increasing the distribution mean). We use a 25% increase in yields as a benchmark,[35] combined with a 50% reduction in the standard deviation, to estimate changes in permanent income.

Results show that farmers benefiting from ClimBeR innovations will increase permanent income by 68%. A sensitivity analysis using a 15% increase in maize yields combined with a 50% reduction in variability obtains a 51% (substantial) increase in permanent income. We believe that synergies among ClimBeR and other Initiatives will increase permanent income from

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

[33] Dorward A, Anderson S, Bernal YN, et al. 2009. Hanging in, stepping up and stepping out: livelihood aspirations and strategies of the poor. *Dev Pract* 19: 240–7.

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

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

51-68% to 100% (transformative). Based on Pradhan et al.'s[36] correlation matrix, if ClimBeR advances the climate action agenda (SDG13) (Sustainable Development Goal), 91% of the time this will contribute to ending poverty (SDG1) and 86% of the time to promoting peaceful, inclusive societies for sustainable development (SDG16), in turn contributing to ending poverty 47% of the time.

Gender equality, youth & social inclusion

Assessing breadth

ClimBeR's TOC assumes that stakeholders embrace achieving gender and social equity and the disruption to power balances inherent in transformation, and that the SDGs will be reached via societal transformation for which guidelines are sparse. ClimBeR's GSEF,[37] co-authored by two ClimBeR IDT members, addresses gender and social equity at four levels: access, procedures, representation and distribution, and avoiding maladaptation.

The number of women benefiting from ClimBeR innovations will be recorded using the project-level Women's Empowerment in Agriculture Index (pro-WEAI) and the Global Gender Gap Index. The challenge is daunting: even after explicit efforts to enhance gender equality in climate-smart villages,[38] in some cases, the result was greater inequality as powerful males benefited more. ClimBeR calculates that 13 million people will benefit from ClimBeR innovations under *Poverty reduction, livelihoods & jobs.* Despite GSEF's comprehensiveness, entrenched norms mean that we estimate **very conservatively** 42% of 13 million (i.e., 5+ million) will be women.

Accessing depth

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

Environmental health & biodiversity: # ha under improved management

Accessing breadth

Environmental health and biodiversity benefits hinge on adoption of technologies and practices. Farmers' adoption is often disappointing due to unrealistic expectations, over-emphasis on technologies, and insufficient attention to a supporting institutional environment. We assume ClimBeR's integrated approach improves land management if institutional support is in place. We estimate adoption rates of 20-35%. This assumption is reflected in the lower probability

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

[37] Fisher E, Hellin J, Greatrex H, and Jensen N. 2019. Index insurance and climate risk management: Addressing social equity. *Dev Policy Rev* **37.**

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

assessment for the number of hectares (Table 1). We have calculated breadth in detail for Guatemala and the Philippines. Details for the other countries will be added in the second stage of benefit projection.

The Philippines' Climate Resilient Agriculture Office's focuses on building climate resilience in the country's 21 river basins. Based on Dikitanan et al.[39] and the government's commitment to climate resilience, we calculate 5+ million ha under improved management by 2030 (baseline will be established at project inception).

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

Assessing depth

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

Assessing probability for all five indicators

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

Projected Benefits good-practice example: NEXUS Gains

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

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

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

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

NEXUS Gains will contribute to all five CGIAR Impact Areas during 2022-2030. We anticipate synergies with other Initiatives as per our TOC (section 3). However, we have not assumed additional impact from these synergies in this set of projections, to ensure these are conservative and to avoid double counting of beneficiaries between Initiatives. We will be further developing the synergies and factoring these into future projections during the inception period.

2.7.1 Nutrition, health & food security

2.7.1.1 # people benefiting from relevant CGIAR innovations

NEXUS Gains expects to reach ~0.5 million farm households (HHs; 2.5 million people) substantially/directly (high likelihood) with clean irrigation and energy technologies and better governance (DALYS[40] and income impacts),[41] and at least 23 million people, that is ~2% of the target area population, perceptibly/indirectly with improved sustainable healthy diets via lower prices of (irrigated) horticultural crops,[42] reducing the share of 85% of the population in SSA and 76% in South Asia[43] that cannot afford healthy diets.

For Ethiopia, the small-scale irrigation potential increase is 1 million hectares (m ha) (2010 to 2030) for nutrient-dense crops and irrigated fodder for animal source foods (ASF) and with IMPACT projected business-as-usual growth 2020 to 2030 is 0.3 m ha.[44,45] Based on this, we assume 0.5 m ha of added irrigation, supporting 1 m households (0.5 ha irrigated area/HH) with NEXUS Gains contributing 10% to this increase with water and energy efficient appropriate technologies, and improved governance (WP1-4), with a 68%[46] permanent income increase; with lower investment in Sudan, 0.02 m households will be reached.

Aligned with our research for development intensity, and reduced area expansion in South Asia, we project benefiting 0.32 m HHs in the Ganges[47], and 0.1 m HHs in the Indus (all highly conservative estimates). We also expect a direct health and income contribution from increased use of renewable

[40] Sulser, T.B. et al. 2021. Disability-adjusted life years due to chronic and hidden hunger under food system evolution with climate change and adaptation to 2050. American Journal of Clinical Nutrition 114(2): 550–563. https://doi.org/10.1093/ajcn/nqab101

[41] Mekonnen, D. et al. Irrigation and Agricultural Transformation in Ethiopia. (ICAE 2021) estimate a permanent 68% net income increase (permanent) for irrigators based on 3 survey rounds (2012, 2016, and 2019), for 10746 non-irrigating and 939 irrigating households in Oromia, Amhara, SNNPR, and Tigray.

[42] Ringler, C. 2021. From torrents to trickles: The future of irrigation. *Annual Review of Resource Economics* 13:5.1–5.20.

[43] Herforth, A., Bai, Y., Venkat, A., Mahrt, K., Ebel, A. & Masters, W.A. 2020. Cost and affordability of healthy diets across and within countries. Background paper for The State of Food Security and Nutrition in the World 2020. FAO Agricultural Development Economics Technical Study No. 9. Rome, FAO. https://doi.org/10.4060/cb2431en

[44] Xie, H. et al. 2021. Mapping development potential of dry-season small-scale irrigation in Sub-Saharan African countries under joint biophysical and economic constraints: An agent-based modeling approach with an application to Ethiopia. Agricultural Systems 186: 102987. https://doi.org/10.1016/j.agsy.2020.102987

[45] IFPRI's IMPACT model projects an increase of 0.3 mha for Ethiopia for the 2020 to 2030 period.

[46] Ibid.

[47] Permanent income increase Bihar, India : 77% (Bhattarai et al. 2002): http://www.iwmi.cgiar.org/Publications/Working_Papers/working/WOR39.pdf

energy[48] for postharvest processing and improved storage of perishables (e.g., bread stoves/milk coolers) and associated, reduced postharvest losses and improved food safety, directly reaching 20,000 households in Ethiopia, 5,000 in Sudan, 25,000 in the Ganges and Indus basins (conservative estimates).

Estimates will be further improved in 2022 Q1. The probability of achieving our conservative estimates is high with considerable confidence, based on prior CGIAR and partner research and policy uptake (e.g., ILSSI,[49] EEG[50]); uncertainties will be further reduced through Scaling Readiness assessments.

2.7.1.2 # Minimum Dietary Diversity Score for women (MDD-W)

MDD-W measures women's diet diversity,[51] which is strongly and positively correlated with micronutrient adequacy[52] and can monitor, evaluate and guide programs that seek to improve diet quality in resource-constrained settings.[53] There is evidence that in Ethiopia MDD-W values of 8%[54] (varying across seasons)[55, 56] grow 6 points (substantially) for women in irrigating households.[57] We estimate a conservative 3-percentage point increase linked to NEXUS Gains for women in irrigating families. Note that MDD-W improvements of non-irrigators in irrigating communities from increased availability/affordability of horticultural and ASF foods are likely also significant but were not calculated. The total across target countries is conservatively estimated at ~0.5 m women (see 2.7.1.1).

2.7.2 Poverty reduction, livelihoods & jobs: # people benefiting from relevant CGIAR innovations

We conservatively estimate that at least 0.5 million households or 2.5 million people are directly benefiting from improved access to irrigation and clean energy technologies with permanent increases in income[58,59] above 50% for all target countries (substantial/high certainty) as described in the

[48] Borgstein E. Et al. 2020. Capturing the productive use dividend: Valuing the synergies between rural electrification and smallholder agriculture in Ethiopia. Insight Brief April 2020. https://rmi.org/insight/ethiopia-productive-use/

[49] Innovation Lab For Small Scale Irrigation (tamu.edu)

[50] Dawit Mekonnen | EEG (energyeconomicgrowth.org)

[51] international dietary data expansion project

[52] Arimond M, et al. 2010. Simple food group diversity indicators predict micronutrient adequacy of women's diets in 5 diverse, resource-poor settings. J Nutr. Nov;140(11):2059S-69S. doi: 10.3945/jn.110.123414. Epub 2010 Sep 29. PMID: 20881077; PMCID: PMC2955880.

[53] FAO and FHI 360. 2016. Minimum Dietary Diversity for Women: A Guide for Measurement. Rome: FAO.

[54] According to recent WFP numbers MDD-W in Pakistan is less than 10% (WFP 2019); see also values are 6% in refugee and displaced communities in Sudan, but are expected to be somewhat higher in other rural areas of Sudan. Values are somewhat higher in Nepal (3 rounds of phone surveys in 2020 in Dang District of Nepal found MDD-W levels between 58% and 68%) and India (5 rounds of phone surveys in 2020 and 2021 among SEWA members found MDD-W levels of 11%, 18%, 13% and 11% in survey rounds 2-4 with 567, 489, 449 and 416 women respondents during 2020 and early 2021). All these values are below acceptable levels (WFP deems 70% as a corporate target). WFP deems 70% as a corporate target. WFP. 2019. Nutrition in Numbers. An overview of WFP nutrition programming in 2018. Accessed at: https://docs.wfp.org/api/documents/3c190040c39643beaa4142532eaa245f/download/

[55] Hanley-Cook GT, Tung JYA, Sattamini IF, Marinda PA, Thong K, Zerfu D, Kolsteren PW, Tuazon MAG, Lachat CK. 2020. Minimum Dietary Diversity for Women of Reproductive Age (MDD-W) Data Collection: Validity of the List-Based and Open Recall Methods as Compared to Weighed Food Record. *Nutrients*. 2020; 12(7):2039. https://doi.org/10.3390/nu12072039

[56] Baye, K. et al. 2019. Irrigation and women's diet in Ethiopia: A longitudinal study. IFPRI Discussion Paper 1864. Washington, DC: IFPRI. https://doi.org/10.2499/p15738coll2.133399.

[57] Baye, K. et al. 2019. Irrigation and women's diet in Ethiopia: A longitudinal study. IFPRI Discussion Paper 1864. Washington, DC: IFPRI. https://doi.org/10.2499/p15738coll2.133399.

[58] Permanent income increase Bihar, India: 77% (Bhattarai et al. 2002): http://www.iwmi.cgiar.org/Publications/Working_Papers/working/WOR39.pdf

[59] Mekonnen, D. et al. Irrigation and Agricultural Transformation in Ethiopia. (ICAE 2021) estimate a permanent 68% net income increase (permanent) for irrigators based on 3 survey rounds (2012, 2016, and 2019), for 10746 non-irrigating and 939 irrigating households in Oromia, Amhara, SNNPR, and Tigray.

nutrition/health impact section (see 2.7.1.1). We also estimate that we create at least 0.5 m jobs in the irrigated horticultural and off-farm sectors based on WP1, 2 and 3.[60]

We recently calculated the population assisted with exiting poverty for Uganda (not a phase 1 focal country) from NEXUS Gains innovations and we will expand this foresight approach to core focal countries in year 1 (see Table 6.3). The Uganda assessment[61] finds that a doubling of sustainable groundwater use could create >0.5 m jobs in the country's agrifood system and support >0.5 m people exiting poverty (values not included in the table), providing further indication of the high potential of NEXUS Gains activities in target geographies.

2.7.3 Gender equality, youth & social inclusion: # women & youth benefiting from relevant CGIAR innovations

NEXUS Gains reaches, benefits and empowers women and youth through gender- differentiated and youth-focused research leading to the development of guidance and tools, policies and institutions that support women and youth farmers and entrepreneurs to overcome well-documented exclusion and constraints in their involvement and agency in irrigation[62,63] and clean energy technologies,[64] governance of natural resources,[65] and cross-sectoral leadership.[66] Given the size of the challenge, NEXUS Gains conservatively projects benefiting 0.4 m women[67] and 0.5 million youth (in target households and beyond) with access to improved technologies, management and governance. These estimates are in line with the conservative estimates of the number of people benefiting (see sections 1 and 2).

WP5 focuses on developing a leadership program and community of practice/network across emerging women and youth leaders that will further help ensure lasting benefits at policy and decision-making level. We also project a reduction in women's time-burden to collect water[68] through 1) improved water access, 2) reduced water competition, and 3) improved energy access, supporting wellbeing. Both aspects give further credence to the projected benefit values.

2.7.4 Climate adaptation & mitigation:

[60] The Ethiopian Jobs Commission estimates 0.5 m new jobs in the Ethiopian horticulture sector alone (p.26), lack of irrigation equipment and processing technologies are key bottlenecks. https://jobscommission.gov.et/wp-content/uploads/2019/11/National-Plan-for-Job-Creation-Brief.pdf

[61] Thurlow and Angga 2021: The economy-wide impacts of groundwater development in Uganda: A macro-economic modeling approach. Mimeo.

[62] Lefore, N., M. Giordano, C. Ringler and J. Barron. 2019. Sustainable and equitable growth in farmer-led irrigation in sub-Saharan Africa: What will it take? *Water Alternatives* (12)1: 156-168.

[63] Theis, Sophie; Lefore, Nicole; Meinzen-Dick, Ruth Suseela; and Bryan, Elizabeth. 2018a. What happens after technology adoption? Gendered aspects of small-scale irrigation technologies in Ethiopia, Ghana, and Tanzania. Agriculture and Human Values 35(3): 671–684. https://doi.org/10.1007/s10460-018-9862-8

[64] Jeuland, M., T.R. Fetter, Y. Li, S.K. Pattanayak, et al. 2021. Is energy the golden thread? A systematic review of the impacts of modern and traditional energy use in low- and middle-income countries. Renewable and Sustainable Energy Reviews 135: 110406. https://doi.org/10.1016/j.rser.2020.110406

[65] Hyle, M. A., Devkota, B. P., & Mustalahti, I. 2019. From Blueprints to Empowerment of Disadvantaged Groups in Natural Resource Governance: Lessons from Nepal and Tanzania. International Journal of the Commons, 13(2), 1062–1078. DOI: http://doi.org/10.5334/ijc.951

[66] Jalal, I. 2014. https://www.think-asia.org/bitstream/handle/11540/2372/women-water-and-leadership.pdf?sequence=1

[67] The 2016 ILO Labor force survey reports a 41% female labor participation rate in Ethiopian agriculture; shares are 28% (India, 2018) and 38% Pakistan (2018). While shares are below 50% for women across target geographies, our focus includes women benefiting as household members but goes beyond; specifically, TOC has set out pathways towards actively reaching and benefiting 0.4 m women.

[68] Mehta, L., T. Oweis, C. Ringler and S. Varghese. 2019. Water for Food Security, Nutrition and Social Justice. New York: Routledge.

2.7.4.1 # tons CO2e averted

Of note, estimates of CO2-e contributions and aversion of irrigation pumps vary dramatically by methodology, suggesting that a comprehensive study is currently lacking.[69] [70] This said, the potential for GHG reductions in South Asia is large (~5 million diesel pumps in India[71] and ~1 million diesel pumps in Pakistan).[72]

Using our own approach detailed here, we conservatively calculated the pumped area irrigated in the base year, the share of fossil fuel-based pumps, changes in pumped irrigated area to 2030, and the incremental contribution of NEXUS Gains to the change from fossil-fueled to clean energy pumps, assuming a conservative share of 10% of additional pumps only, which is well in line with advances by CGIAR and partners.[73] Our results suggest projected GHG aversion of 0.22 million tons CO2-e averted for Ethiopia, 0.3 million tons CO2-e averted Sudan, 1.46 million tons CO2-e averted in India and 0.49 million tons CO2-e averted Pakistan.

2.7.4.2 # people benefiting from climate-adapted innovations

The technologies and approaches NEXUS Gains focuses on directly support climate change adaptation, through improved water control and productivity during droughts with demonstrated permanent income impacts above 50%[74] for all geographies as explained in the nutrition, health and food security section (2.7.1.1). We therefore assume, with high confidence, that we will reach 2.5 million people with climate-adapted innovations based on the 10%-contribution of Nexus Gains to water, and energy-efficient irrigation.

2.7.5 Environmental health & biodiversity:

2.7.5.1 # change in consumptive water use (km^3) during 2020-2030

We estimate global consumptive water use in 2020 at 2258 km^3 across the agricultural, domestic and industrial sectors based on CGIAR's IMPACT water models'[75] meeting only around 80% of effective water demand, including 78% of effective irrigation demand. NEXUS Gains proposes to work in some of the most water-scarce breadbaskets, such as Pakistan, where only 59% of irrigation demands are met, and other areas where irrigation expansion potential is substantial (i.e., Eastern Nile). Under business-as-usual (SSP2-RCP8.5), we calculate a global increase in consumptive water use of 131 km^3 during 2020-2030. The equivalent increase in consumption in NEXUS Gains focal areas is 46 km^3, including 27 km^3 for irrigation during 2020-2030.

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[69] Rajan, A., Ghosh, K. and Shah, A., 2020. Carbon footprint of India's groundwater irrigation. Carbon Management, 11(3), pp.265-280;

[70] Siyal, A.W., Gerbens-Leenes, P.W. and Nonhebel, S., 2021. Energy and carbon footprints for irrigation water in the lower Indus basin in Pakistan, comparing water supply by gravity fed canal networks and groundwater pumping. Journal of Cleaner Production, 286, p.125489.

[71] India's 5th minor irrigation census (2013-2014), communication with A. Kishore and S. Verma, IFPRI/IWMI India.

[72] Agricultural Machinery Census of 2004 per communication with M. Hafeez, IWMI, Pakistan.

[73] Solar Irrigation for Agricultural Resilience (SoLAR) Innovation Fund (IF) Grants: Round 2 - Solar Irrigation for Agricultural Resilience (SoLAR) || IWMI

[74] Koo, J., J. Thurlow, H. Eldidi, C. Ringler, and A. De Pinto. 2019. Building resilience to climate shocks in Ethiopia. Washington, D.C.: IFPRI

[75] Ringler, C. et al. 2021. The role of water in supporting food security: Where we are and where we need to go. In Agricultural development: New perspectives in a changing world, eds. K. Otsuka and S. Fan. Emerging Challenges and Opportunities in Agricultural Development, Chapter 20, Pp. 661-680. Washington, DC: International Food Policy Research Institute (IFPRI). https://doi.org/10.2499/9780896293830_20

NEXUS Gains projects to grow irrigation beyond business-as-usual by 10% during 2022-2030 in focal basins, which would add 11 km^3 of water consumption over business-as-usual. With a calculated 5%-increase in effective water productivity (WP2) consumptive use declines instead by 14 km^3 despite increased area. Pressure on water consumption will be further reduced through the integrated storage work of NEXUS Gains, focusing on more effective use of rainfall, increased but sustainable use of groundwater resources in areas with groundwater irrigation potential and additional reliance on distributed green and grey infrastructure (e.g., small reservoirs).

Taken together, the implementation of these measures in the focal basins of the Indus, Ganges, Eastern Nile and Aral Sea basin could reduce global average food prices by 0.5 to 1%, based on the same IMPACT modeling framework, improving access to more nutritious foods for many million consumers (see also the nutrition benefits section).

2.7.5.2 # ha under improved management

Based on the calculations above, we conservatively project an increase in area under improved management of at least 0.3 m ha (0.5 ha per household) with more water use and energy efficient and solarized technologies that can withstand droughts, floods and heat stress events. WEFE nexus solutions around land restoration, re/afforestation, and wastewater reuse are expected to lead to additional improvements in key ecosystem functions (e.g., through better soil health and fertility, biodiversity) over time that will be reflected in additional, projected area improvement, not yet reflected in the projected benefits table, following Scaling Readiness assessment and other analyses.

Table 1: Projected benefits

Impact Area	Indicator	Breadth	Depth	Probability
Nutrition, health & food security	# people benefiting from relevant CGIAR innovations	2.5 million people	**Substantial** (health & income, at least a 50% permanent income impact)	**High**: 50%-80% expectation of achieving these impacts by 2030
		~23 million people indirectly	**Perceptible** (small effective income increase and health benefits from lower food prices)	**High**: 50%-80% expectation of achieving these impacts by 2030
	# minimum dietary diversity score for women	~0.5 million women directly	**Substantial** (health impact through more diversified diets)	**Medium**: 30%-50% expectation of achieving these impacts by 2030, at this point
Poverty reduction, livelihoods & jobs	# people benefiting from relevant CGIAR innovations	2.5 million people	**Substantial** (permanent income effect)	**High**: 50%-80% expectation of achieving these impacts by 2030
Gender equality, youth & social inclusion	# women benefiting from relevant CGIAR innovations	~0.4 million women directly	**Gender responsive** (the different needs of men and women are identified and differentially met)	**High**: 50%-80% expectation of achieving these impacts by 2030
	# youth benefiting from relevant CGIAR innovations	~0.5 million youth directly	**Substantial** (permanent income effect)	**High**: 50%-80% expectation of achieving these impacts by 2030

Climate adaptation & mitigation	# tons CO_2e averted	2.5 million tons averted	**Substantial** (permanent income effect)	**High**: 50%-80% expectation of achieving these impacts by 2030
	# people benefiting from climate-adapted innovations	2.5 million people	**Substantial** (permanent income effect)	**High:** 50%-80% expectation of achieving these impacts by 2030
Environmental health & biodiversity	# change in km^3 consumptive water use during 2020-2030	14 km^3	**Substantial:** focus on some of the most water-scarce basins to improve water productivity and integrated water storage management	**Medium**: 30%-50% expectation of achieving these impacts by 2030, at this point
	# ha under improved management	0.3 million ha	**Substantial:** improvements in soil fertility health and biodiversity, additional ecosystem service improvements	**Medium:** 30%-50% expectation of achieving these impacts by 2030, at this point

Projected Benefits good-practice example: SAPLING

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

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

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

Summary of SAPLING Project Benefits 2022–2030

Impact area	Indicator	Breadth	Depth	Probability
Nutrition, health and food security	# of people benefiting from relevant CGIAR innovations	1,220,000	Substantial[1] 320,000 Significant[2] 900,000	Medium
Poverty reduction, livelihoods and jobs	# of people benefiting from relevant CGIAR innovations	2,450,000	Substantial[1] 1,050,000 Significant[2] 1,400,000	Medium
Gender equality, youth and social inclusion	# of women benefiting from relevant CGIAR innovations	360,000	Transformative 200,000 Gender responsive 160,000	Lower
Climate adaptation and mitigation	# of people benefiting from climate-adapted innovations	1,050,000	Significant[2] 1,050,000	Medium
Environment health and biodiversity	# of ha (hectares) under improved management	59,000	Substantial[3] 59,000	Medium

[1] Substantial depth = 50% permanent impact on income
[2] Significant depth = 10% permanent impact on income
[3] Substantial = where improved management delivers to of the following three benefits: improvements in soil health and fertility, delivers biodiversity gains, and provides additional ecosystem service improvements

The full methodological approach is in the Annex.

Selected indicators for the different Impact Areas are:

(1) **# of people benefiting from relevant CGIAR innovations –** nutrition, health and food security
(2) **# of people benefiting from relevant CGIAR innovations –** poverty reduction, livelihoods and jobs
(3) **# of women benefiting from relevant CGIAR innovation –** gender equality, youth and social inclusion
(4) **# of people benefiting from climate-adapted innovations –** climate adaptation and mitigation
(5) **# of ha (hectares) under improved management –** environmental health and biodiversity

Indicators 2, 3 (gender responsive depth), 4 and 5 relate to our impact pathways on: technologies and practices; Innovation Packages and business models; and scaling. Indicator 1 is reached though our safe animal source food consumption impact pathway while indicator 3 at transformative depth is reached though our gender equality and social inclusion pathway.

Breadth for the first four indicators was calculated for value-chains (country x species combinations) targeted by SAPLING's different impact pathways, as follows. Firstly, target

livestock production systems for each value chain were identified according to.[76] Secondly, the number of rural livestock keepers within these target production systems was calculated by adjusting 2020 human population figures[77] to rural population, removing percentage urbanization[78]; following this, the figure was adjusted by the proportion of livestock keepers within selected production systems[93] (excepting chicken value chains assumed to be kept by 80% of the rural population).[79] Thirdly, national poverty headcount ratio (incomes below US$1.90 per day at 2011 purchasing power parity levels)[80] were used to convert to the number of rural poor livestock keepers. Fourthly, the adoption rate for SAPLING Innovation Packages was assumed to be 5% of the target population. Adoption rates in the literature vary widely (for example, ranges of 4 to 94%[81] [82] [83] [84] [85]). The adoption rates used here are at the lower end of the scale but are realistic given the Initiative's timeline and resources, and because those reported in the literature are often ex-ante or prior to scaling. Fifthly, to remove double-counting, it was assumed that if one impact pathway was targeting two or more value chains within the same target production system then these are the same households. Finally, estimates were summed across all countries. This gave the breadth for indicators 1 and 2 (different breadth estimates due to nutrition focus in only a subset of value-chains). For indicator 3 (# of women benefiting), number of people was adjusted to number of women by dividing by household size (giving one woman per household) and then multiplying this by the percentage of women currently engaged in the value chains (from 11 to 77% depending on the value chain, calculated from evidence provided in https://bit.ly/3hVHEPJ[86] https://bit.ly/3hYTyIs,[87] and extracted from

[76] Robinson, T.P., Thornton P.K., Franceschini, G., Kruska, R.L., Chiozza, F., Notenbaert, A., Cecchi, G., Herrero, M., Epprecht, M., Fritz, S., You, L., Conchedda, G. and See, L. (2011). Global livestock production systems. Rome, Italy: FAO and Nairobi, Kenya: ILRI. https://hdl.handle.net/10568/10537

[77] WorldPop. Population counts. https://www.worldpop.org/project/categories?id=3. (accessed on September 28 2021)

[78] Food and Agriculture Organization of the United Nations. Land&Water. Global Land Cover - SHARE (GLC-SHARE). http://www.fao.org/land-water/land/land-governance/land-resources-planning-toolbox/category/details/en/c/1036355/. (accessed on September 28 2021)

[79] Sonaiya, E.B., Swan, S.E.J. (2004). Small-Scale Poultry Production technical guide. Food and Agriculture Organization of the United Nations . Rome. http://www.fao.org/3/y5169e/y5169e.pdf

[80] The World Bank. https://data.worldbank.org/indicator. (accessed on September 28 2021)

[81] Ayele, Z. (2003). Community-based forage development program: the experiences of FARM Africa Goat Project in Ethiopia. Tropical Grasslands 37: 257–261.

[82] Mwambi, M., Bijman, J., Mshenga, P., Oosting, S. (2020). Adoption of food safety measures: The role of bargaining and processing producer organizations. NJAS - Wageningen Journal of Life Sciences 92: 100337. https://doi.org/10.1016/j.njas.2020.100337

[83] Jumba, H., Kiaraa, H., Owuor, G., Teufel, N. (2020). Are there gender differences in access to and demand for East Coast fever vaccine? Empirical evidence from rural smallholder dairy farmers in Kenya. Journal of Agriculture and Rural Development in the Tropics and Subtropics 121: 219-231. https://doi.org/10.17170/kobra-202010191970

[84] Beshir, H. (2014). Factors Affecting the Adoption and Intensity of Use of Improved Forages in North East Highlands of Ethiopia. American Journal of Experimental Agriculture 4(1): 12-27.

[85] Wairimu, E., Mburu, J., Gachuiri, C.K., Ndambi, A. (2021). Characterization of dairy innovations in selected milksheds in Kenya using a categorical principal component analysis. Trop Anim Health Prod 53: 227. https://doi.org/10.1007/s11250-021-02596-4

[86] Njuki, J., Sanginga, P.C. (2013). Women, livestock ownership and markets: Bridging the gender gap in eastern and southern Africa. London, UK: Routledge. https://hdl.handle.net/10568/34088

[87] Njehu, A., Omore, A. (2018). More Milk in Tanzania (MoreMilkIT) baseline and monitoring survey results. ILRI Research Brief 87. Nairobi, Kenya: ILRI. https://hdl.handle.net/10568/96222

data found in https://bit.ly/3o57sg9,[88] and https://bit.ly/3zHRwm0[89] For value-chains where gender transformative work is being undertaken, an increase in the number of women benefiting from livestock to 2030, in comparison to current levels, is 20%, based on that reported in https://bit.ly/3kA6oP5,[90] https://bit.ly/3EQSKz9[91] and https://bit.ly/3hYTyIs.[104] For indicators 4 and 5, improved forages is identified as the key innovation for climate adaptation and mitigation and environmental health and biodiversity. Thus, breadth for indicator 4 is only calculated for a sub-set of value chains (where forage work will be undertaken). For indicator 5, breadth for indicator 4 was divided by household size (to give the number of households_adopting) multiplied by an area of production for each adoptee household of 0.25 hectares, based on evidence provided in https://bit.ly/2XVkD8t[92] and https://bit.ly/3CKCZYB.[93]

This process assumes that the beneficiaries for these first four indicators are poor livestock keepers. At this stage non-poor livestock keepers, other value chain actors, or LDFs consumers that are not livestock keepers have not been included but some are additionally expected to benefit.

Depth for indicators 1 and 2 were assessed based on permanent impact on income, as SAPLING Innovation Packages are expected to be sustainable. For dairy cattle value chains in Kenya, Ethiopia and Tanzania, a depth of substantial (50% permanent impact on income) was used, based primarily on values reported in https://bit.ly/3hVIzj7 [94] and https://bit.ly/3hYTyIs [104] and because there has been a considerable body of work undertaken in these value chains upon which SAPLING is building. For other value-chains a depth of significant (10% impact) was used, based on lower values of literature estimates and additional calculations (for example

[88] Sustainable Intensification of the Pig Value Chain in Uganda-for improved livelihood and enhanced food security. ILRI Datasets. https://data.ilri.org/portal/dataset/uganda-pig-genetic

[89] Advanced system for rural household surveys. Data collection + data analysis. RHoMIS. https://www.rhomis.org/. (accessed on September 28 2021)

[90] Cole, S.M., Kaminski, A.M., McDougall, C., Kefi, A.S., Marinda, P.A., Maliko, M., Mtonga, J. (2020) Gender accommodative versus transformative approaches: a comparative assessment within a post-harvest fish loss reduction intervention, Gender, Technology and Development, 24:1, 48-65, DOI: 10.1080/09718524.2020.1729480

[91] Feed the Future. (2020) Report: Evaluation of the Welfare Impacts of a Livestock Transfer Program in Nepal. 2014-2018 Project Report. https://basis.ucdavis.edu/publication/evaluation-welfare-impacts-livestock-transfer-program-nepal

[92] Caulfield, M., Paul, B. (2021). Ex ante impact and trade-off assessment of improved forage use in western Kenya. CIAT Publication No. 512. Nairobi, (Kenya): International Center for Tropical Agriculture (CIAT). 25 p. https://hdl.handle.net/10568/114630

[93] Stür, W., Phengsavanh, P., Gabunada, F., Horne, P., Khanh, T.T., Phimphachanhvongsod, V., Connell, J. Holmann, F. (2006). A survey of adoption of improved forages in Southeast Asia. Tropical Grasses and Legumes: Optimizing Genetic Diversity for Multipurpose Use: Project IP-5: Annual Report 2006. CIAT (International Center for Tropical Agriculture), Cali, Colombia: 129–135. http://ciat-library.ciat.cgiar.org/articulos_ciat/A_survey_adoption_improved.pdf

[94] Rao, E.J.O., Omondi, I., Karimov, A.A., Baltenweck, I. (2016). Dairy farm households, processor linkages and household income: the case of dairy hub linkages in East Africa. International Food and Agribusiness Management Review: 19 (4): 95 – 108. https://doi.org/10.22434/IFAMR2014.0177

https://bit.ly/2ZeZkPv,[30] https://bit.ly/3kw53sA,[95] https://bit.ly/3CzZ8c1,[96] https://www.rhomis.org/[106] and https://bit.ly/2XVkD8t).[109] For indicator 3 the transformative depth category was used only for the value chains where gender transformative work[97] will be undertaken; in all other cases the depth was considered to be gender responsive.[98] For indicator 4, where the key innovation contributing to impact is considered to be planting improved forages, permanent impact on income was again used as the depth indicator and considered to be significant based on literature estimates.[109] Finally, for indicator 5 a depth of substantial was used as improved forages have been documented to positively impact soil health and fertility and ecosystem services.[99] [100] [101] [102]

For all indicators, bar indicator 3, the *probability* of achieving the indicated breadth and depth was considered medium (i.e., 30–50% expectation of achieving the stated impacts by 2030). This is because of risks identified in the impact pathways (for example, private sector unable or unwilling to invest in innovations, insufficient incentives for livestock producers to change behaviors) and uncertainties in the predictions (for example, production systems used rather than focal geographic areas, due to the latter not yet being defined, and limited evidenced on assumptions, such as the percent increase in household incomes from livestock innovations). For indicator 3, the probability is considered low (10–30% expectation) in recognition that the

[95] Asindu, M., Ouma, E., Naziri, D., Lule, P. (2019). Economic analysis of sweetpotato silage based diets for smallholder pig farmers in Uganda. Conference: Invited paper presented at the 6th African Conference of Agricultural Economists, September 23-26, Abuja, Nigeria. https://www.researchgate.net/publication/343161795_Economic_analysis_of_sweetpotato_silage_based_diets_for_smallholder_pig_farmers_in_Uganda

[96] Yitayih, M., Geremew, K., Esatu, W., Girma, T., Getachew, F., Worku, S. and Dessie, T. (2021). Economic and marketing performance of chicken value chain actors in Ethiopia: Challenges and business opportunities for sustainable livelihoods. ILRI Research Report 71. Nairobi, Kenya: ILRI. https://hdl.handle.net/10568/113761

[97] The definition for contributions to 'gender transformative' impact which has been used here is: 'constraining gender norms and dynamics are shifted and reduced, and norms and dynamics which support gender equality are strengthened, leading to greater gender equality'

[98] The definition for contributions to 'gender responsive' impact which has been used here is: 'the different needs of men and women are identified and differentially met (but the underlying process by which these differing needs are generated are not affected)

[99] Paul, B.K., Koge, J., Maass, B.L., Notenbaert, A., Peters, M., Groot, J.C.J., Tittonell, P. (2020). Tropical forage technologies can deliver multiple benefits in Sub-Saharan Africa. A meta-analysis. Agronomy for Sustainable Development. 40: 22. https://doi.org/10.1007/s13593-020-00626-3

[100] Rao, I., Ishitani, M., Miles, J., Peters, M., Tohme, J., Arango, J., Moreta, D.E., Lopez, H., Castro, A., Van Der Hoek, R., Martens, S., Hyman, G., Tapasco, J., Duitama, J., Suárez, H., Borrero, G., Núñez, J., Hartmann, K., Domínguez, M., Sotelo, M., Vergara, D., Lavelle, P., Subbarao, G.V., Rincon, A., Plazas, C., Mendoza, R., Rathjen, L., Karwat, K., Cadisch, G. (2014). Climate-smart crop-livestock systems for smallholders in the tropics: Integration of new forage hybrids to intensify agriculture and to mitigate climate change through regulation of nitrification in soil. Tropical Grasslands – Forrajes Tropicales 2: 130−132. https://www.tropicalgrasslands.info/index.php/tgft/article/view/129/78

[101] Rao, I., Peters, M., Castro, A., Schultze-Kraft, R., White, D., Fisher, M. Miles, J. Lascano, C. Blümmel, M. Bungenstab, D. Tapasco, J. Hyman, G. Bolliger, A. Paul, B. van der Hoek, R. Maass, B. Tiemann, T. Cuchillo, M. Douxchamps, S. Villanueva, C., Rincón, A. Ayarza, M. Rosenstock, T. Subbarao, G. Arango, J. Cardoso, J. Worthington, M. Chirinda, N. Notenbaert, A. Jenet,A., Schmidt, A. Vivas, N. Lefroy, R. Fahrney, K. Guimarães, E. Tohme, J., Cook,S., Herrero, M. Chacón, M. Searchinger, T., Rudel, T. (2015). LivestockPlus — The sustainable intensification of forage-based agricultural systems to improve livelihoods and ecosystem services in the tropics. Tropical Grasslands – Forrajes Tropicales 3: 59−82 59. DOI: 10.17138/TGFT(3)59-82

[102] Schultze-Kraft, R., Rao, I.M., Peters, M., Clements, R.J., Bai, C., Liu, G. (2018). Tropical forage legumes for environmental benefits: An overview Leguminosas forrajeras tropicales para beneficios ambientales: Una synopsis. Tropical Grasslands-Forrajes Tropicales 6(1): 1–14 1. DOI: 10.17138/TGFT(6)1-14

approaches to supporting transformation in underlying gender dynamics which SAPLING will be testing are novel.

During the inception period the projections will be refined by, amongst others: (a) combining the production system area with administrative areas identified for SAPLING work to provide a more specific geographic focus for each value chain; (b) including beneficiaries besides poor livestock keepers and improved estimates on women and youth; and (c) expanding indicators 4 and 5 to include other climate-adapted innovations beyond forages.

Further, synergies with other Initiatives, particularly LCSR and OneHealth, are anticipated as per our TOC. Additional impact from these synergies has not been assumed in this set of projections, to ensure these are conservative and to avoid double counting of beneficiaries between Initiatives. Synergies will be further developed and factored into future projections during the inception period.

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

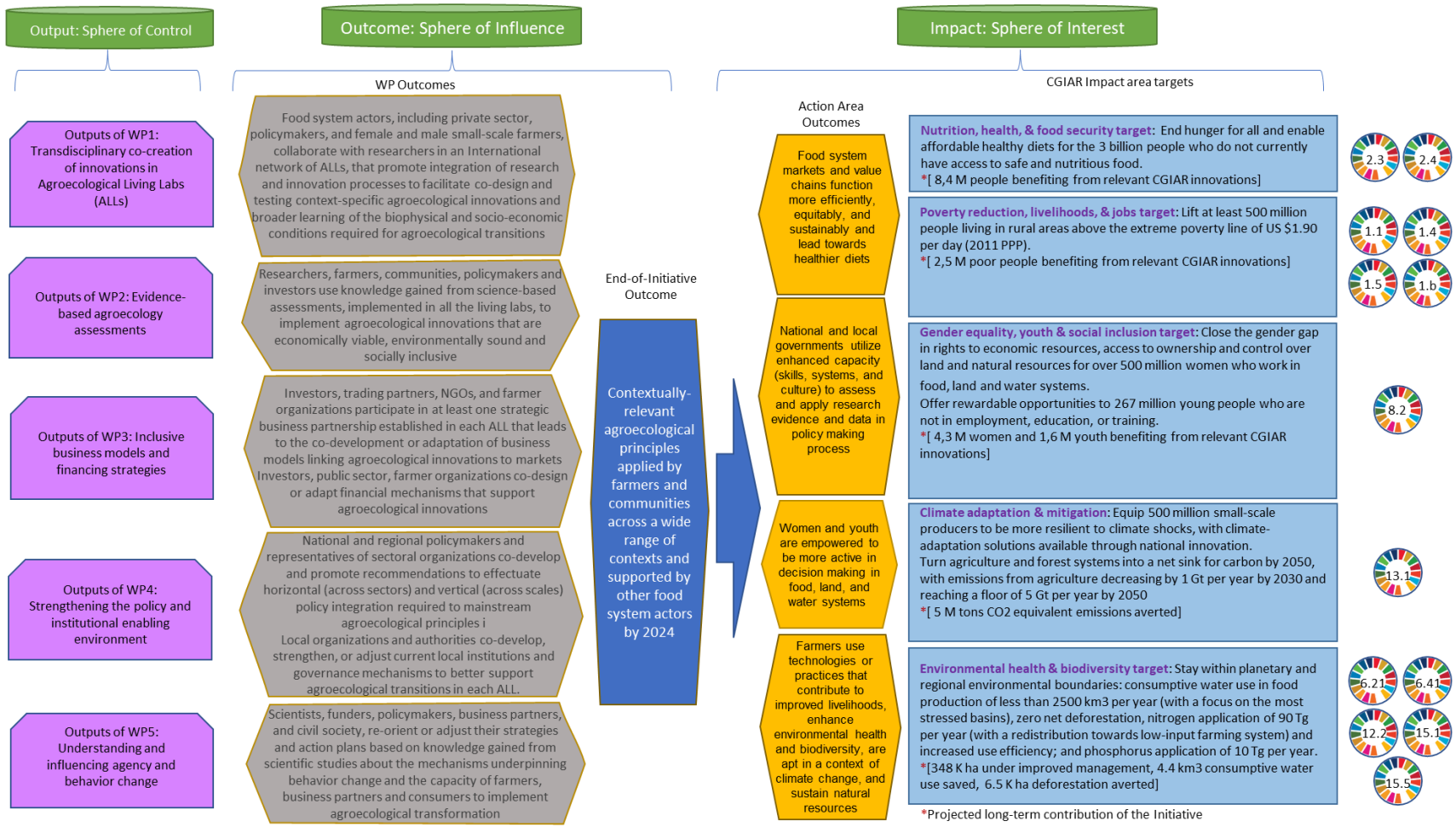
3.1 Full Initiative ToC

*Provide a 1-page ToC diagram and a 500-word max narrative ToC description. Together with the nested Work Package (WP) ToCs, this should show the scientific research and supporting work (*e.g. capacity development; communications; multi-stakeholder processes; policy engagement*) that will be done by the Initiative, how the WPs are aligned, the key partners and other system actors (including other CGIAR entities), specific end-of-Initiative outcomes, and the causal logic leading from research to the high-level outcomes and impacts that the Initiative aims to co-generate.*

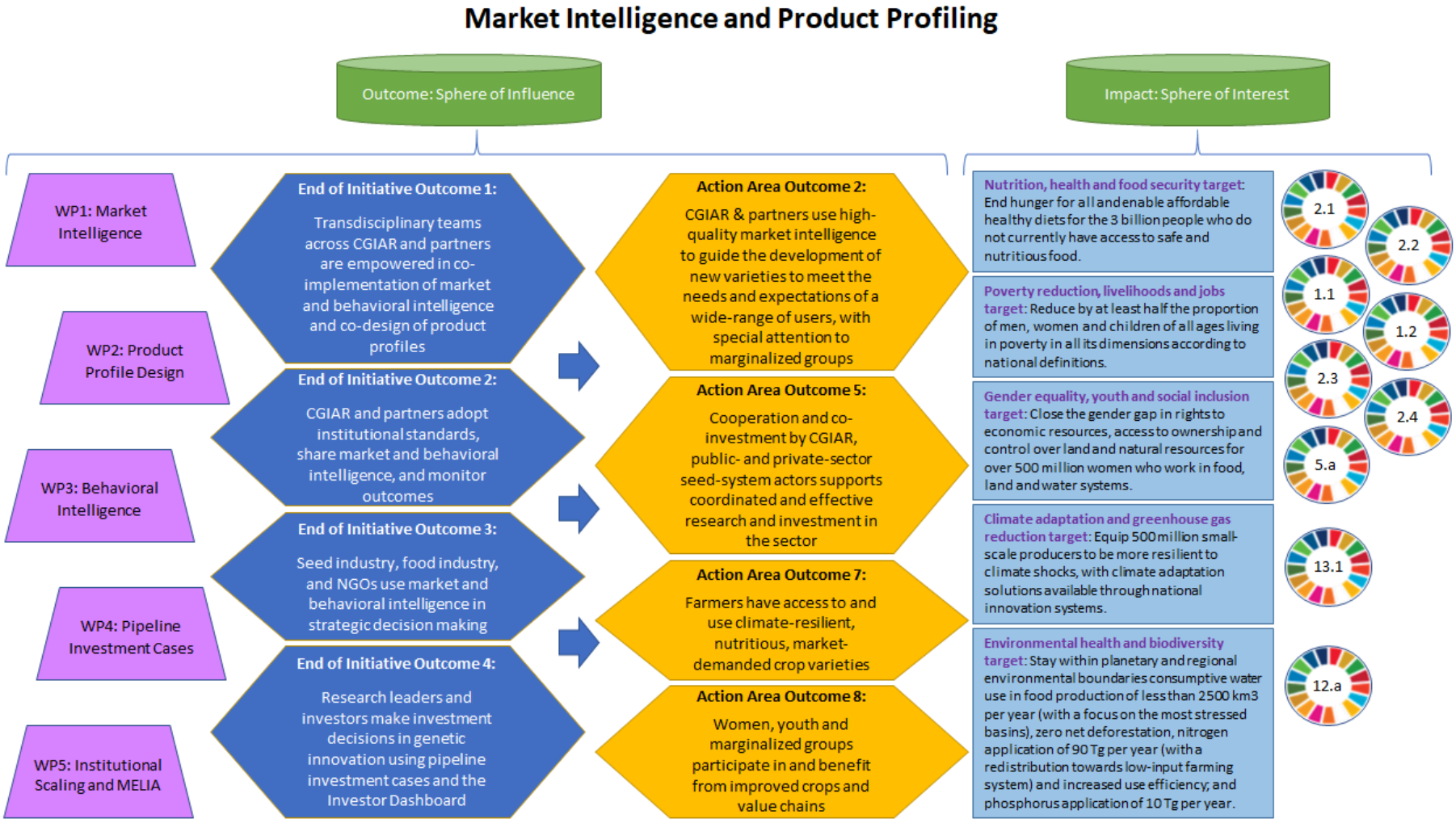
3.1.1 Full Initiative ToC diagram

Follow the structure and formatting of the template below. Guidance on developing a ToC in line with this template is available from https://performance.cgiar.org

Example from *Transformational Agroecology across Food, Land and Water Systems* Initiative proposal



Example from *Market Intelligence and Product Profiling* Initiative proposal



3.1.2 Full Initiative ToC narrative - 500 words max

> To complement the Initiative ToC diagram which illustrates how the Work Packages and End-of Initiative (EoI) outcomes contribute to Action Area outcomes, CGIAR Impact Areas and SDG targets, the Initiative ToC narrative provides an explanation of the causal logic leading from scientific research to impact. In particular, the ToC should address the assumptions of how EoI outcomes are expected to lead to Action Area outcomes and CGIAR Impacts.

Example from *Transformational Agroecology across Food, Land and Water Systems* Initiative proposal

Our **theory of change** is that agroecology can only fulfil its potential as a contributor to sustainable FLW systems if science and innovation provide evidence on the extent to which (1) agroecological principles and innovations, in different socio-ecological systems, are more effective at delivering the full range of social equity, agricultural productivity, economic benefits, and environmental protection benefits to farmers and FSAs than the status quo, and (2) agroecological transitions taking place at territorial system level can be efficiently scaled out and adapted to other LMIC contexts in the 2024-2030 cycle to reach a critical mass capable of triggering broad FLW systems transformation.

AE-I is designed around a set of five Work Packages based on application of agroecological principles to different components of the food system (food production, business models, policies, and local institutions), harnessing nature's goods and services whilst minimizing adverse environmental impacts and improving knowledge co-creation and inclusive relationships among FSAs[1]. The network of ALLs is the vehicle through which we learn which agroecological innovations work, for whom and where, generating a replicable, generically applicable agroecology model (2022-2024) that acts as a 'blueprint' for scaling territorial agroecological transitions to trigger FLW-scale agroecological system transformation (2024-2030).

Through the **WP change pathways** — (WP1) Transdisciplinary co-creation of innovations in Agroecological Living Labs (ALLs), (WP2) Evidence-based agroecology assessments, (WP3) Inclusive business models and financing strategies, (WP4) Strengthening the policy- and institutional-enabling environment, and (WP5) Understanding and influencing agency and behavior change — AE-I anticipates achieving the **WP outcomes** listed in Section 2.2, which, when taken cumulatively, will facilitate achievement of the **End-of-Initiative outcome** of *Contextually relevant agroecological principles applied by farmers and communities across a wide range of contexts and supported by other food system actors* by 2024.

The TOC is underpinned by the **assumptions** (A) that: (A1) key FSAs (farmers, business partners, policymakers) in target territories remain committed to their expressed desire to engage actively in co-development processes that blend science and local knowledge; (A2) the co-creation process will generate context-relevant agroecological innovations that are more likely to be adopted, scaled, and sustained in the long term, contributing to improved productivity, environmental outcomes, and social inclusion in targeted territories over time; (A3) key scaling partners (business partners, policymakers, investors) will actively engage in the scaling of agroecological innovations; (A4) increasing the equity and agency of women and youth in the co-design process will generate a multiplier effect on the impact pathways of both

scaling up (policy integration) and scaling out (public-private partnerships and new business models); and (A5) AE-I scientific evidence influences behavioral change and decision-making across a range of FSAs, ensuring broad-based support for and implementation of effective agroecological innovations in targeted territorial food systems and beyond.

If these assumptions hold true, by 2030, it is reasonable to expect changes achieved in the 2022-2024 cycle to influence longer-term positive change by 2030, encapsulated in the One CGIAR **Impact statements** (Section 5) by 2030, the **System Transformation Outcome** (STO), and **SDGs** targeted by AE-I (see Results Framework, Section 6.1).

Key scaling and demand partners include TPP, Biovision, private-sector companies, national and sub-national governments, and targeted GIZ-led programs (i.e., ProSoil, the Knowledge Center for Organic Agriculture in Africa (KCOA), Supporting Agroecological Transformations in India (SuATI), the Biodiversity and Ecosystem Services in Agricultural Landscapes project, and the Kenyan Intersectoral Forum on Agrobiodiversity and Agroecology [ISFAA]).

Example from *Market Intelligence and Product Profiling* Initiative proposal

Plant breeding has the potential to inclusively benefit the livelihoods of farmers and the nutrition and health of populations at large while supporting healthy ecosystems and minimizing greenhouse gas emissions. However, varietal turnover has been slow partly because products have not adequately met client requirements as investment decisions were mainly informed by supply-side considerations. Recently, donors and other organizations have recognized the need for market intelligence-driven product profiling, but efforts remain fragmented with limited involvement of social scientists and NARES and little attention to behavioral drivers of varietal replacement. Consequently, returns on investment in genetic innovation, although generally high, still tend to fall short of their potential.

Maximizing and diversifying genetic innovation systems' impacts across the five Impact Areas and ultimately across SDGs 1, 2, 5, 12 and 13 requires institutional innovation that (i) spurs CGIAR and partners to use high-quality market intelligence to guide the development of new varieties (AA Outcome 2); (ii) stimulates cooperation and co-investment by CGIAR, public- and private-sector seed-system actors (AA Outcome 5); and ultimately results in (iii) farmers having access to and using climate-resilient, nutritious, market-demanded crop varieties (AA Outcome 7); and (iv) women, youth and marginalized groups participating in and benefiting from improved crops and value chains (AA Outcome 8). To catalyze this institutional innovation, an Initiative is urgently needed that (i) empowers transdisciplinary teams across CGIAR and partners in the co-implementation of market and behavioral intelligence; (ii) encourages CGIAR and partners to adopt institutional standards in the co-design of product profiles, the sharing of market and behavioral intelligence, and monitoring of outcomes; (iii) supports strategic decision making by seed industry, food industry, and NGOs; and (iv) supports research leaders and investors in investment decision making. The Initiative proposes to achieve these outcomes through five Work Packages (WPs), four core innovations that are jointly developed with Accelerated Breeding, SeEdQUAL, N4ETTSS, Foresight and Metrics, Plant Health, and Digital Transformation Initiatives, and two toolkits.

Funding, a clear engagement process and a shared commitment towards increasing impacts of genetic innovation will enable the formation of regional, transdisciplinary CGIAR-NARES-SME teams that systematically convert global and regional challenges into regional impact opportunities for genetic innovation (WP1). Co-ownership generated through novel institutional standards and processes for co-design of product profiles among CGIAR and partners and social and biophysical scientists (WP2) and the demonstrative value of behavioral intelligence (WP3) will empower the teams in guiding breeders to refocus and restructure their pipelines and align them to the five Impact Areas (WP4). Clear visualization of returns on investment on the Investor Dashboard will empower research leaders and investors in resource allocation decision making and attract investment in genetic innovation (WP4). Active exchange of market intelligence through the Global Market Intelligence Platform, institutional capacity building through the Genetic Innovation for Impact (G×I) Learning Alliance, and active monitoring and demonstration of impacts will persuade CGIAR and partners to scale the adoption of institutional standards (WP5).

Achieving this institutional innovation will require strong financial support from donors seeking to increase returns on their investments, as well as strong engagement from CGIAR and public and private sector partners to jointly increase co-ownership and accountability of genetic innovation systems in their shared ambition of maximizing impacts across the five Impact Areas.

3.2 Work Package TOCs

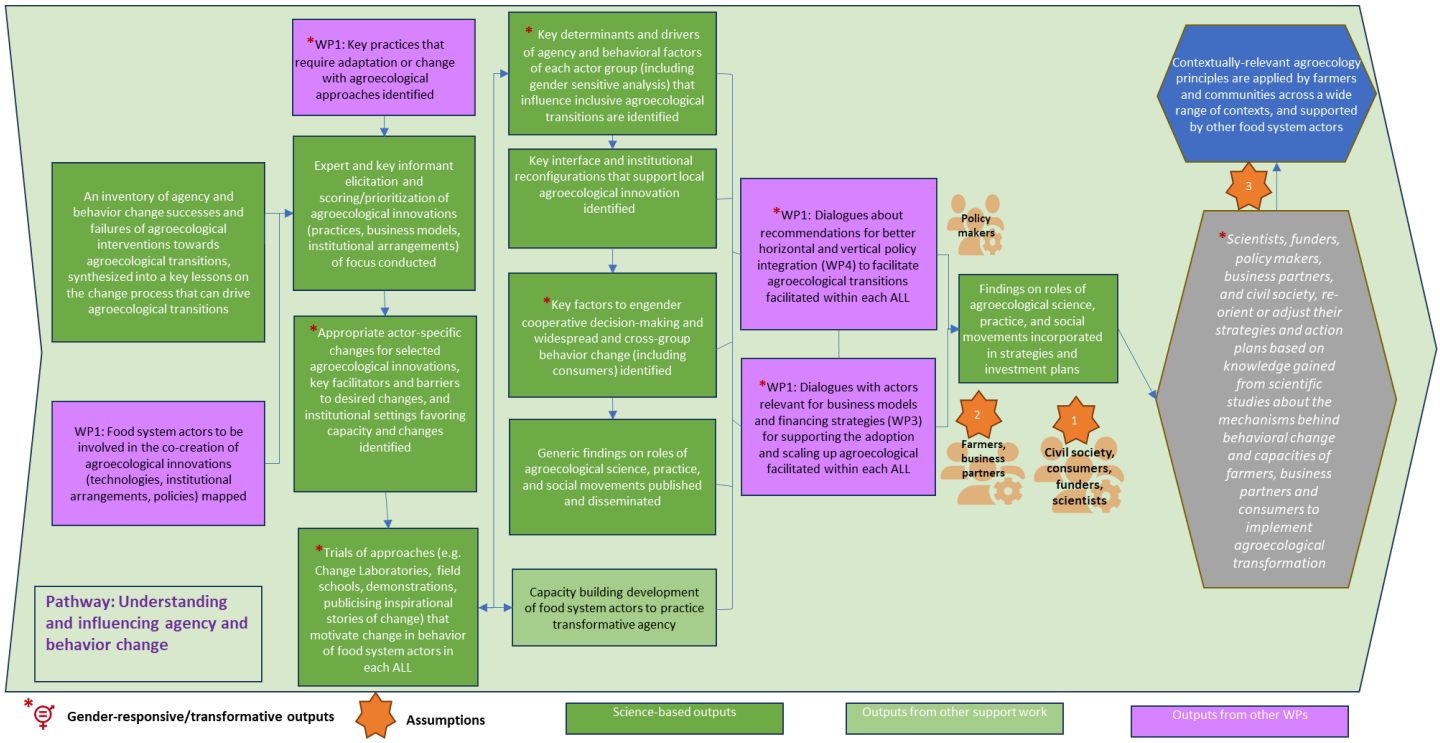
3.2.1 One-page diagram per Work Package

The Work Package ToC level is nested within the Initiative ToC. It describes the outputs/ innovations delivered by the Initiative and links them to the end-of-Initiative outcomes via named examples of actors by type. Assumptions are stated to explain causal logic.

Each Work Package ToC diagram must follow the structure and formatting of the template below. Guidance on developing a ToC in line with this template is available from https://performance.cgiar.org

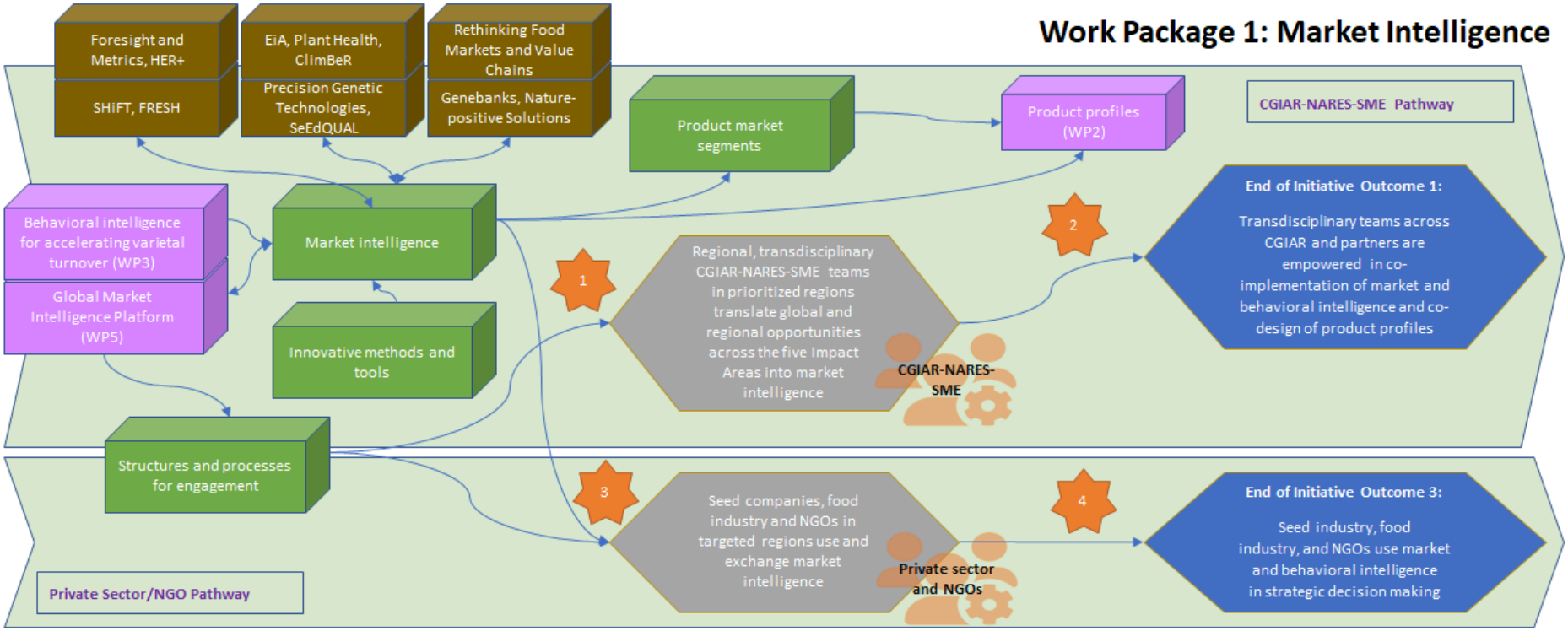
Example from *Transformational Agroecology across Food, Land and Water Systems* Initiative proposal

Work Package (WP) 5



Example from *Market Intelligence and Product Profiling* Initiative proposal

Work Package (WP) 1



Causal linkage #	Actor Type	Assumption
1	Research (CGIAR and partners)	Funding, a clear engagement process and a shared commitment towards increasing impacts of genetic innovation supports the formation of regional, transdisciplinary CGIAR-NARES-SME teams and collection of robust market intelligence.
2	Research (CGIAR and partners)	Demonstrated success of collaboration and a strong, shared vision empower transdisciplinary teams in co-implementation of market intelligence.
3	Private sector and NGOs	Through strong engagement and demonstration of the value of market intelligence, seed companies, food industry and NGOs are interested in exchanging market intelligence developed by the Initiative, as it can advance their business or development goals.
4	Private sector and NGOs	Through strong engagement and exchange of market intelligence, seed industry, food industry, and NGOs are convinced of its value in strategic decision making, as it can advance their business or development goals.

3.2.2 Work Package research plans and ToCs – 1000 words max narrative per WP including the content below:

Example from *Transformational Agroecology across Food, Land and Water Systems* Initiative proposal

Work Package (WP) 5

Work Package title	**WP5: Understanding and influencing agency and behavior change**
Work Package main focus and prioritization	WP5 applies an iterative process to understand and then influence individual and collective agency and behavior among FSAs to drive inclusive and equitable agroecological transformation. The findings will feed into policy pathways (WP4) and be applied through piloting of institutional innovations in business models and financial modalities (WP3), in capacity building, and in participatory and adaptive interventions (WP1), with the aim of accelerating the pace of agroecological transition at scale. Simultaneously, it will enhance the agency of women and youth in decision-making processes pertaining to the transition to agroecology.
Work Package geographic scope (global/region/country)	Burkina Faso, India, Kenya, Lao PDR, Peru, Tunisia, and Zimbabwe

WP5 science narrative

Key research questions

- For each actor group (producer organizations, value chain participants, consumers, researchers, rural advisory services, the private sector, policymakers, civil society), what are the behavior determinants/drivers that facilitate or impede the implementation of agroecological innovations?
- How can interfaces between actor groups be reconfigured to support agroecological innovations at scale?
- How do resource access (e.g., financial, technical, and knowledge), the various types of available evidence, actor relationships, interactions, and learning exchange influence the agency of farmers and other food system actors, including by gender, age, ethnicity, etc.? And how does this agency support agroecological transitions? (See section 5.3)
- Which factors/institutional innovations can engender cooperative decision-making and/or widespread, cross-group behavior change?
- What general lessons can be drawn about the roles of agroecological science, practice, and social trends in prompting agency and behavior change?

Main proposed scientific methods

- Literature review and interviews to take stock of agroecological approaches, theories of change for agency and behavior change, and successes and failures in each ALL region, to enable comparison of pre- and post-intervention trajectories and milestones of agency and behavior change in agroecological transformation.
- Expert and key informant elicitation and scoring/prioritization of agroecological innovations of focus in each ALL.
- Observation and participatory analysis (with WP1 participants) to identify: (a) appropriate actor-specific changes (including actor roles and interfaces, behavior and intrinsic values references, and knowledge and capacity to innovate) for selected agroecological

innovations (practices, business models, institutional arrangements), (b) key facilitators and barriers to desired changes, and (c) institutional settings favoring capacity enhancement and behavior changes.

- Iterative and participatory approach to designing, implementing, monitoring, evaluating, and reflecting upon a context-specific TOC, including behavior change of different actors within WP1.
- Multi-actor-focused group-led trials for various influencing factors — using a participatory research method that structures participant engagement through a cycle of learning and change known as "Expansive Learning Cycle".[103, 104]
- Observation, participatory analysis, and agent-based modeling to compare transformational agency, behavior change, and decision-making results from the multi-actor focus group-led trials and other activities conducted during ALLs (WP1), business models (WP3), and policy-enabling environment (WP4).

Key outputs

- An inventory of research interventions, agroecological science, practices, political economy factors, power balances and relationships, and social movement successes and failures to engender agency and behavior change towards agroecological transitions, synthesized into key lessons on the change process that can drive agroecological transitions.
- Key determinants and drivers of agency and behavioral factors of each actor group in every ALL (including gender-sensitive analysis) that influence inclusive agroecological transitions identified and incorporated into strategies (WP4) and investment plans (WP3).
- Key interface and institutional reconfigurations that support local agroecological innovation identified and disseminated to agricultural innovation researchers, practitioners, and producer organizations (through WP4).
- Key factors to engender cooperative decision-making and widespread, cross-group behavior change identified and applied in ALL food system institutions.
- Agency and behavior change research results integrated in AE-I MELIA planning and tools.
- Key roles of agroecological science, practices, and social movements in enabling agency and behavior change to support agroecological transitions identified, synthesized across ALLs, and incorporated into strategies and investment plans (developed in WP3 and WP4).

WP5 theory of change narrative

For scientists, funders, policymakers, and civil society to be empowered to re-orient or adjust their strategies and action plans — based on knowledge gained from scientific studies about the

[103] Lotz-Sisitka, H., Mukute, M., Chikunda, C. *et al.* 2017. Transgressing the norm: Transformative agency in community-based learning for sustainability in southern African contexts. Int Rev Educ 63**,** 897–914. https://doi.org/10.1007/s11159-017-9689-3

[104] Mukute, M., Mudokwani, K., McAllister, G. and Nyikahadzoi, K. 2018. Exploring the Potential of Developmental Work Research and Change Laboratory to Support Sustainability Transformations: A Case Study of Organic Agriculture in Zimbabwe, Mind, Culture, and Activity, 25:3, 229-246, doi: 10.1080/10749039.2018.1451542

mechanisms behind behavioral change and capacities of farmers and consumers to implement agroecological transformation (WP Outcome) — we must use assessment frameworks (WP2) to compare pre- and post-intervention trajectories in the ALLs (WP1) to understand what behaviors (WP5) are driving agroecology-related failures and successes experienced by farming communities, consumers, and policymakers (also examining any gender-driven behavior differences). This requires a deeper understanding of the agency, opportunities, and barriers to change experienced by all FSAs and institutions, enriched by evidence on farmer and FSA preferences and priorities (WP1). Research on agency and behavior change of different actors, as well as interfaces between actor groups, will identify approaches to triggering change in attitudes, interactions, and practices. By establishing a participatory "Expansive Learning Cycle" in each ALL, WP5 will generate evidence on: (a) the agency and behavioral factors (including common behavior determinants by actor group and gender) present in agroecological interventions that facilitate (or impede) transition, (b) interface and institutional reconfigurations with a behavioral component required to support local agroecological innovation, (c) how best to engender, first, more cooperative and socially-equitable decision-making, and second, broad-based, cross-actor-group behavior change (including consumers), and (d) the role of agroecological science, practice, and social movements in effective agroecological transitions (Outputs). This evidence will be disseminated to farming communities, researchers, producer organizations and their business partners, and policymakers, who will use it to (i) better understand how human behavior can move the dial of agroecological transition, (ii) continue improving business model arrangements for supporting agroecological transitions (WP3), and (iii) explore and implement strategies for better policy integration and local institutions required to catalyze agroecological transitions (WP4) (use of Outputs by actor groups). Finally, WP5 will empower scientists, funders, policymakers, business partners, and civil society to incorporate this evidence, and evidence on the roles of the mechanisms behind behavioral change and capacities of food system actors to advance agroecological transitions (WP1, WP3 and WP4), to re-orient or adjust their strategies and action plans (WP Outcome). The TOC is underpinned by assumptions that: (A1) researchers will be able to use evidence on agency and behavior change to improve prediction modeling on behavior change factors that might affect agroecology uptake and mainstreaming via (WP4) policy and institutional integration and (WP3) business models and financial mechanisms, (A2) actors (e.g., policymakers, extension workers, and scientists) are willing to make structural and behavioral changes that benefit the agency and behavior options of other actors (e.g., producers, consumers) within the territorial food system, and (A3) at Initiative end, AE-I project outputs (Evidence) continues to influence behavioral change across a range of food system actors, ensuring continued broad-based support for implementation of effective agroecological innovation.

Example from *Market Intelligence and Product Profiling* Initiative proposal

Work Package (WP) 1

Work Package title	**WP1: Market Intelligence**
Work Package main focus and prioritization	WP1 collects data to map global and regional challenges across the five Impact Areas and translates them into priorities and opportunities for GI by identifying stakeholders' current and future drivers of demand for crops, seed and traits, and variation of demand according to gender, age, and social groups: farmers (production systems, priorities, risks), agro-industry (production requirements, supplier engagement, by-products) and consumers (tastes, nutrition, costs, convenience). Collaborative engagement on methods and tool design will ensure comparability of results across crops and regions. WP1's outputs will provide critical inputs to WP2, WP3 and WP4, as well as various GI Initiatives.

Work Package geographic scope (Global/Region/Country)	Global and regional (see Section 2.4).

The science

Research questions	Scientific methods	Key outputs
1. Building common framework: What concepts, methods, and tools are most suitable for the collection of market intelligence?	Transdisciplinary tool design working group Literature review of published work by CGIAR, NARES, universities, NGOs, and others, covering existing concepts, methods and tools.	**Innovative methods and tools** for (i) identification and description of product market segments; (ii) gender disaggregated assessment of needs and preferences for traits (and the underlying factors that shape these*) for gender-intentional product profile design; and (iii) prioritization of product market segments across regions and crops according to potential to advance the five impact goals. New **structures and processes for engagement** on co-implementation of market intelligence: regional, transdisciplinary (see Section 9.1) CGIAR-NARES-SME teams formed that include experts from WorldVeg, Cornell University, Innovative Genomics Institute (UC, Berkeley), Flinders University and CIRAD. Systematic incorporation of market intelligence in **Global Market Intelligence Platform**.
2. Mapping future impact potentials to inform prioritization: What are the current and future global and regional challenges that can be converted into opportunities where CGIAR breeding programs are best placed (e.g., where are viable seed systems in place facilitating delivery of breeding products) to contribute to the five Impact Areas? Where are other Initiatives best placed?	Joint strategic foresight analysis with Foresight and Metrics to anticipate a range of possible future scenarios and impact potentials (Glover *et al*, 2021; Miller and Poli, 2010), in collaboration with other Initiatives: Plant Health, HER+, SHiFT, FRESH, ClimBeR, and EiA. This will include analysis of trade-offs and synergies across future impact potentials. Crop modeling featuring IPCC AR6 climate projections in target population environments. Review of secondary data, expert consultations, key informant interviews, spatial analysis.	Foresight **market intelligence to inform market segmentation and prioritization**: Global and regional reports to inform priorities for product market segmentation, based on potential impact across the five Impact Areas.
3. Describing prioritized product market segments: Within prioritized product market segments, what are current and future trait preferences (trait type and threshold of improvement) of farmers, agro-industry and consumers (by gender, social groups, income groups)?	Farmer/consumer surveys, GIS and spatial analysis tools, key informant interviews, participatory techniques, choice experiments, gender analysis and secondary information. Evaluation of psychological drivers of key stakeholders: perceptions, attitudes and beliefs, motivation, and learning. Joint research with SHiFT, Excellence in Agronomy, and Plant Health Initiatives, to inform crop/trait priorities.	**Product market segments**: set of maps, articles, and reports that describe prioritized product market segments. **Market intelligence for design of gender-intentional product profiles**: robust and comparable analysis on current and future trait needs and preferences in regional reports, articles, and discussion briefs.
4. Characterizing varietal demand: What are smallholders' and consumers' preferred varieties (by	Rapid survey techniques, field experiments, experimental auctions, participatory tools/games to assess	**Market intelligence for design of seed system strategies**: regional and crop specific bulletins, reports and

gender and social group) and how accessible are these in terms of price and availability?	gender disaggregated trait preferences, trade-offs among them, and demand for improved varieties, supported by genotype-based varietal monitoring data from SeEdQUAL and IMAGE. Participatory workshops with breeders, seed companies, NARES, CGIAR breeding teams, and food industry representatives. Demand analysis for Precision Genetic Technologies to anticipate acceptability in sub-national markets, export, organic and traditional markets, as well as impact on gender.	articles on demand and supply for seed.

* These could include livelihood strategies, risk preferences, farming practices (and access to inputs), time preferences, and constructs that may relate to gender (e.g., bargaining power) which might strongly differ between men and women.

The theory of change

Market intelligence used by CGIAR-NARES breeding programs is limited, fragmented and commodity-specific. Moreover, needs of women, indigenous people and minority groups are typically not properly captured. The RICE and RTB CRPs and related bilateral projects (e.g., AGGRi Alliance, AGG, RTBfoods, HarvestPlus) have collected market intelligence, but this has not yet been incorporated in EiB's current set of product market segments, which reflect current crop environments and need to be prioritized and refined through alignment with value chains and end-markets.

In order to contribute to EoI Outcomes 1 and 3, and eventually to AA Outcomes 2, 5, 7 and 8, WP1 needs to initiate an institutional change process by building regional, transdisciplinary CGIAR-NARES-SME teams. Strong engagement through a shared vision of increasing the impact of GI through the co-implementation of market intelligence, combined with funding for addressing intelligence gaps, will align CGIAR and partners' interests and persuade them to build transdisciplinary teams that (i) map current and future global and regional challenges; (ii) translate them into regional opportunities; and (iii) generate the fundamental building blocks of market intelligence that need to be incorporated in gender-intentional product profiles (WP2) and pipeline investment cases (WP4) to capture these opportunities and generate a well-balanced portfolio of impacts across the five Impact Areas. A shared ambition to consolidate and exchange forward-looking information through a novel platform will encourage WP1, WP5, Foresight and Metrics, and Digital Transformation to jointly develop the Global Market Intelligence Platform and monitor its scaling through an Innovation Packages and Scaling Readiness Plan (Section 4). Scaling will be triggered by active demand for market intelligence by demand partners such as GI and other Initiatives (e.g., Accelerated Breeding, SeEdQUAL, Genebanks, Plant Health, Rethinking Food Markets and Value Chains, Excellence in Agronomy, Nature-Positive Solutions, etc.), NARES and public and private sector partners seeking to improve their strategies and advance their business or development goals through better market intelligence.

For each region where activity will take place, a regional team comprised of specialists from CGIAR and partners will be formed that is able to engage across crops. Experts from a range of

disciplines will be brought together, including social science (gender specialists, economists, consumer and marketing specialists), GIS specialists and climate change experts, agronomists, breeders, among others (e.g., plant pathologists, entomologists, human nutrition scientists) to design shared methods for implementation across regions and crops. Attention will be given to variations in context across crops and regions (e.g., perishability of seed, informal/formal nature of marketing systems, different drivers of product and seed demand, to include consumers, millers, governments and seed companies). The team will engage extensively across all WPs. The regional team building approach is critical to ensure comparability across crops and allow for efficient use of the scarce human resources available for this type of work, which is a first in CGIAR.

At the end of the Initiative, WP1 will achieve the following two outcomes: (i) Regional, transdisciplinary CGIAR-NARES-SME teams in prioritized regions translate global and regional opportunities across the five Impact Areas into market intelligence; (ii) seed companies, food industry and NGOs in targeted regions use and exchange market intelligence. Achieving these outcomes will require strong engagement from partners and a common vision of increasing the impact of genetic innovation systems across the five Impact Areas.

4. Innovation Packages and Scaling Readiness Plan

4.1 Innovation Packages and Scaling Readiness Plan – 250 words max

Initiatives are not expected to design Innovation Packages and conduct Scaling Readiness Assessments for the September 2021 submission. Instead, Initiatives provide an articulated plan on how key principles of Innovation Packages and Scaling Readiness will be integrated into the Initiative during the 2022-2024 period. Provide narrative that covers:

1. *How key principles of the Innovation Packages and Scaling Readiness approach will be integrated into the Initiative between 2022-2024, and how this is expected to add value to the Initiative,*
2. *Indicate the dedicated capacity and budget to embed key principles of the Innovation Package and Scaling Readiness approach into the Initiative between 2022-2024, and associated Management Plan and MELIA activities, over the course of the Initiative.*

Example from *Ukama Ustawi: Diversification for resilient agribusiness ecosystems in East and Southern Africa (ESA)* Initiative proposal

Scaling is core to UU. WP6 includes a regional Scaling Hub with a team of dedicated scaling experts to coordinate and backstop scaling for CGIAR initiatives and partners across ESA. The Scaling Hub will (i) embed innovations from by other initiatives like EiA, Plant Health, NexusGAINS, and SAPLING into ESA-specific Innovation Packages; (ii) identify ESA bottlenecks for scaling; (iii) design Scaling Strategies with partners; (iv) monitor changes in readiness and the use of innovations across Genetic Innovation (GI), RAFS, or Systems Transformation (ST) Initiatives, and (v) facilitate regional and in-country scaling and innovation networks.

WPs 1, 2, and 4 use Scaling Readiness to prioritize and package innovations for broader use by farmers, policy makers, and the private sector. An initial set of 78 Core Innovations was identified across the WPs based on a combination of CGIAR Golden Eggs, impact evaluations of prior research, and stakeholder consultations (Annex 17). Community-based adaptation and human-centered design approaches will be used to identify Innovation Packages of interest, and then the Scaling Readiness approach will enable assessment of 10 Innovation Packages.

UU should be prioritized for First Wave scaling backstopping and start Light Track from quarter 1, 2022 onwards and Standard Track from quarter 4, 2022 onwards, and Advanced Track for the Initiative in 2024, aiming to cover 76%-100% of its Innovation Packages. The Initiative allocated USD 950,000 to implement the Innovation Packages and Scaling Readiness plan (2022: USD 320,000; 2023: USD 350,000; 2024: USD 280,000). Dedicated activities, deliverables, indicators, and line-items are included in the Management Plan's MELIA and Budget Sections.

5. Impact statements

For each Impact Area, describe how the Initiative will contribute to achieving the Impact Area target. The purpose of this section is to aggregate information from across the Proposal template – i.e. the section repeats text from other parts of the Proposal, but here organizes it by Impact Area.

5.1 Nutrition, health & food security (maximum one page)

- ***Challenges and prioritization***
    - *Provide an evidence-based statement identifying the Impact Area challenge(s) the Initiative will address, and how those informed the priority-setting for the Initiative's research and innovation. If the Initiative does not address this Impact Area, provide a justification (maximum 150 words).*

        - ***Research questions***
    - *Note the key research questions that deliver on this Impact Area.*

        - ***Components of Work Packages***
    - *Highlight the specific Work Packages or components of Work Packages (research and associated work, outputs, outcomes) that deliver on the Impact Area.*

        - ***Measuring performance and results***
    - *Describe the 3-year (End-of-Initiative) outcomes and metrics for this Impact Area.*

        - ***Partners***
    - *List the key demand, innovation and scaling partners in delivering this Impact Area.*

        - ***Human resources and capacity development of Initiative team***
    - *Highlight dedicated human resources to achieve the Work Package components and targets for this Impact Area. Refer/link to any strategy to improve capacity via internal capacity-building or through partnership (e.g. in Section 9.3)*

5.2 Poverty reduction, livelihoods & jobs (maximum one page)

- ***Challenges and prioritization***
  - *Provide an evidence-based statement identifying the Impact Area challenge(s) the Initiative will address, and how those informed the priority-setting for the Initiative's research and innovation. If the Initiative does not address this Impact Area, provide a justification (maximum 150 words).*

- ***Research questions***
  - *Note the key research questions that deliver on this Impact Area.*

- ***Components of Work Packages***
  - *Highlight the specific Work Packages or components of Work Packages (activities, outputs, outcomes) that deliver on the Impact Area.*

- ***Measuring performance and results***
  - *Describe the 3-year (End-of-Initiative) outcome statements and metrics for this Impact Area.*

- ***Partners***
  - *List the key demand, innovation and scaling partners in delivering this Impact Area.*

- ***Human resources and capacity development of Initiative team***
  - *Highlight dedicated human resources to achieve the Work Package components and targets for this Impact Area. Refer/link to any strategy to improve capacity via internal capacity-building or through partnership (e.g. in Section 9.3)*

5.3 Gender equality, youth & social inclusion (maximum one page)

- ***Challenges and prioritization***
  - *Provide an evidence-based statement identifying the Impact Area challenge(s) the Initiative will address, and how those informed the priority-setting for the Initiative's research and innovation. If the Initiative does not address this Impact Area, provide a justification (maximum 150 words).*

- ***Research questions***
  - *Note the key research questions that deliver on this Impact Area.*

- ***Components of Work Packages***
  - *Highlight the specific Work Packages or components of Work Packages (activities, outputs, outcomes) that deliver on the Impact Area.*

- ***Measuring performance and results***
  - *Describe the 3-year (End-of-Initiative) outcome statements and metrics for this Impact Area.*

- ***Partners***
  - *List the key demand, innovation and scaling partners in delivering this Impact Area.*

- ***Human resources and capacity development of Initiative team***
  - *Highlight dedicated human resources to achieve the Work Package components and targets for this Impact Area. Refer/link to any strategy to improve capacity via internal capacity-building or through partnership (e.g. in Section 9.3)*

Example from *SeEdQual* Initiative proposal

Challenges and prioritization: Access to seed is highly contextual and complex and varies for people within and between households. It is influenced by access to and control over cash or credit, information and seed sources, mobility, and social networks. These are influenced by gender relations, economic and social status. OPVs and VPCs are not generally produced by the private sector, and government channels do not effectively reach smallholders and women. Thus, these groups recycle seed or rely on informal systems, which might not include improved varieties. This hinders adoption, holding vulnerable farmers in a cycle of low productivity and poverty. Women and youth seed entrepreneurship is economically empowering and improves access of diverse varieties for unreached groups.
Research questions: Key research questions focus on: seed production, information and delivery pathways for demand creation and inclusive access (WP6, WP1), approaches for promoting women and youth entrepreneurship in seed production and marketing (WP6, WP3), approaches for synergies between formal and informal sectors (WP6), metrics and mechanisms to track gendered and inclusive seed access (WP6), and assessments of the sensitivity and transformative potential of alternative policy options to the needs of gender, youth, and disadvantaged groups.

Components of Work Packages: 1. Seed production, information and delivery pathways for demand creation and inclusive access (WP6, WP1) 2. Sustainable business models for women and youth (WP3. WP6). 3. Improved access to seeds and traits for smallholders, women, and disadvantaged groups through commercializing farmer or cooperative seed enterprises (WP5). 4. Greater varietal turnover for smallholders, women, or disadvantaged groups through various instruments in varietal promotion programs or

packages (WP5). 5. Influence of gender-based preferences and acquisition behaviors on market demand (WP3). 6. Policy options to accelerate the adoption, turnover, and demand for varieties that proactively respond to the needs and potentialities of women, youth, and disadvantaged groups. 6. Metrics and mechanisms to track inclusive seed access (WP6).

Measuring performance and results: 1. Availability of strategies for improving awareness, information and delivery pathways for seed to women, youth and disadvantaged groups (WP1,2,3,4,5,6); 2. Availability of business models, policy options, and strategic approaches for enhancing women and youth seed entrepreneurship as well as varietal adoption/turnover by women, youth, and disadvantaged groups (WP1,2,3,4,5,6); 3. New metrics to track inclusive access to seed (WP4,6). SeEdQUAL estimates >795,000 women benefiting from CGIAR innovations (adopting high-yielding, fast cooking common bean varieties) by 2024.

Partners: Key demand partners include local seed agencies. Innovation partners include SeedNL, AGRA CESS, NGOs, CBOs and women's collectives, AGRA VALUE4HER, social enterprises, financial organizations, seed companies to link women seed producers to supply chains, TASAI, Access to Seed Index to pilot metrics to track inclusive seed access, Digital Green for digital strategies, World Bank Africa and South Asia Gender Innovation Labs. Scaling Partners include AGRA CESS, local seed agencies, seed companies, TASAI, Access to Seeds Index and Data2X.

Human resources and capacity development of Initiative team: WP6 will include experts in gender, youth and social inclusion and contribute to other WPs. Partnerships with research organizations and universities will provide additional expertise. Research scholars and students will pursue research on relevant topics. Researchers and partners will take a course on gender in seed systems development.

5.4 Climate adaptation and mitigation (maximum one page)

- ***Challenges and prioritization***
  - *Provide an evidence-based statement identifying the Impact Area challenge(s) the Initiative will address, and how those informed the priority-setting for the Initiative's research and innovation. If the Initiative does not address this Impact Area, provide a justification (maximum 150 words).*

- ***Research questions***
  - *Note the key research questions that deliver on this Impact Area.*

- ***Components of Work Packages***

- *Highlight the specific Work Packages or components of Work Packages (activities, outputs, outcomes) that deliver on the Impact Area.*

  - ***Measuring performance and results***

- *Describe the 3-year (End-of-Initiative) outcome statements and metrics for this Impact Area.*

  - ***Partners***

- *List the key demand, innovation and scaling partners in delivering this Impact Area.*

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

- *Highlight dedicated human resources to achieve the Work Package components and targets for this Impact Area. Refer/link to any strategy to improve capacity via internal capacity-building or through partnership (e.g. in Section 9.3)*

Example from *TAFSSA* Initiative proposal (for format)

Challenges and prioritization: South Asia experiences frequent extreme rainfall[105] and dry spells (due to changes in monsoon patterns),[106] which result in floods[107] and droughts in close spatial and temporal proximity. Climate change will affect South Asia's agriculture — irrigation in the region has already affected its climate,[108] and a warmer and wetter climate is projected for the future.[109] Air pollution, caused in part by CRB, further worsens drought impacts.[110] TAFSSA prioritizes equitable, resilient, and low-carbon development pathways through a combination of action research and policy tools to build climate-resilient farming enterprises, landscapes, and private-public partnerships. Informed by scoping reviews on ecological boundaries, TAFSSA generates insights to

[105] Roxy, M.K., Ghosh, S., Pathak, A., Athulya, R., Mujumdar, M., Murtugudde, R., Terray, P., Rajeevan, M., 2017. A threefold rise in widespread extreme rain events over central India. *Nature Communications, 8*: 708.
Roxy, M.K., 2017. Climate dynamics: land warming revives monsoon. *Nature Climate Change, 7*: 549-550.
[106] Singh, D., Ghosh, S., Roxy, M.K., McDermid, S., 2019. Indian summer monsoon: extreme events, historical changes, and role of anthropogenic forcings. *Wiley Interdisciplinary Reviews: Climate Change*, *10*(2): e571.
[107] Ali, H., Modi, P., Mishra, V., 2019. Increased flood risk in the Indian sub-continent under the warming climate. *Weather and Climate Extremes*, *25*: 100212.
[108] Devanand, A., Huang, M., Ashfaq, M., Barik, B., Ghosh, S., 2019. Choice of irrigation water management practice affects Indian summer monsoon rainfall and its extremes. *Geophysical Research Letters, 46*(15): 9126-9135.
Thiery, W., Visser, A.J., Fischer, E.M., Hauser, M., Hirsch, A.L., Lawrence, D.M., Lejeune, Q., Davin, E.L., Seneviratne, S.I., 2020. Warming of hot extremes alleviated by expanding irrigation. *Nature Communications, 11*: 290.
[109] Mishra, V., Bhatia, U., Tiwari, A.D., 2020. Bias-corrected climate projections for South Asia from Coupled Model Intercomparison Project-6. *Scientific Data*, *7*: 338.
Kumar, R., Mishra, V., 2020. Increase in population exposure due to dry and wet extremes in India under a warming climate. *Earth's Future, 8*(12): e2020ef001731.
[110] Fadnavis, S., Sabin, T.P., Roy, C., Rowlinson, M., Rap, A., Vernier, J.P., Sioris, C.E., 2019. Elevated aerosol layer over South Asia worsens the Indian droughts. *Scientific Reports, 9*(1): 10268.
Aadhar, S., Mishra, V., 2019. A substantial rise in the area and population affected by dryness in South Asia under 1.5 °C, 2.0 °C and 2.5 °C warmer worlds. *Environmental Research Letters*, *14*(11): 114021.

mainstream innovative energy solutions, carbon sequestration and GHG mitigation options, and climate service-based crop management advisories and insurance products. We equitably address underutilization of groundwater resources and extreme climate risks in the eastern IGP, while curbing groundwater decline & CRB emissions in the western IGP.

Research questions: WP1 asks how data systems can be strengthened to monitor, assess, and identify action items for building climate resilience and mitigating emissions. **WP2** asks how climate-resilient farms, landscapes, and public-private partnerships can be best configured to produce SHDs while reducing emissions. **WP5** then asks how tweaks in policies from the national- to local-levels and innovative energy solutions can be leveraged to induce behavioral change in smallholders toward climate resilient and low-emission farming practices.

WP	Research / Activities	Outputs	Intermediate Outcomes	2024 Outcomes and Metrics
1	Identify and fill data gaps with stakeholders through learning platforms.	**(1)** Learning platforms addressing adaptation and mitigation. **(2)** Open-access data sets. **(3)** Scientific papers on low-carbon production practices.	**(a)** Previously siloed actors and/or knowledge networks have access to information to make improved adaptation and mitigation decisions.	**EoIO 1.** 4 TAFSSA's partners engage with networks reaching >1,000 stakeholders & decision-makers to inform 4+ policies / programs / market interventions. (Metrics: # of policies / practice / strategies). **EoIO 2.** Data informed actions supporting agrifood systems are implemented in 8+ of TAFSSA's learning locations (Metrics: # of policies / practice / strategies). **EoIO 10:** Farmers implement improved farming practices and/or diversify production on 1.42+ (EoI 3) million hectares, averting 16.24 million tons CO_2eq. GHGs. (Metrics: Million tons CO_2 eq. averted)
2	Farm- and landscape-level participatory experimentation and scenario analysis under current and future climates.	**(1)** Validated options for low-environmental impact farming systems diversification that inform extension recommendations. **(2)** Decision support tool kit for nutrition-sensitive, agrobiodiverse, resilient, and low-carbon farming landscapes.	**(a)** Farmers experience increased exposure to decision tools and extension services related to climate adaptation and mitigation in the context of diversified production. **(b)** Energy-efficient farm machinery services are made affordable.	
5	Scoping reviews, ecological footprint modeling, policy experiments, scaling assessments, and ex post adoption studies	**(1)** Scoping review, papers, and datasets on (a) ecological boundary assessments, (b) groundwater over- and underuse, and (c) climate adaptation insurance. **(2)** Ecological footprint assessments. **(3)** Policy instruments and cost assessments to reduce CRB, sequester carbon, and limit groundwater overdraw. **(4)** Strategies to increase farmers' use of weather forecast-based farm advisories. **(5)** Options for improved flood and drought insurance products.	**(a)** Governments integrate insights in sustainable water use and low-emission agriculture into core policies. **(b)** Private-public partnerships bring advisories, insurance, and low-emission practices to farmers.	

Partners: Annex 5.4 lists the specific demand, scaling, and innovation partners delivering in this Impact Area. **Human resources and capacity development:** TAAFSSA's team includes systems agronomists, modelers, GIS, and RS experts, and landscape ecologists (see Section 9.1). Cross-disciplinary communication, teamwork, and collaborative research design skills will be prioritized for team members addressing this Impact Area. (see Section 9.3)

Example from *Excellence in Agronomy for Sustainable Intensification and Climate Change Adaptation (EiA)* Initiative proposal (for content)

Challenges and prioritization: Agronomy has previously not been viewed as a climate action mechanism, but this is changing. Cropland has lost carbon to the atmosphere and re-accumulation is expected and timely. Agronomy is a valid entry point for climate

change adaptation and mitigation and are core areas of EiA interest. Many existing agronomic solutions can sustain productivity under variable conditions [111], though limits are likely to emerge under the predicted intensification of wet and dry season extremes [112;113;114]. Incremental adaptation - existing actions to avoid disruptions such as changing planting dates, modifying nutrient inputs, diversifying cropping systems, introducing irrigation, retaining residues, among others - buffer production systems against increased climate variability [115;116;117]. Agronomy also offers solutions for entire systems to adapt, where farmers switch crops or move production to new locations [118;119;120]. Many of the agronomic solutions that support farmer adaptation have potential to reduce direct agricultural greenhouse gas emissions from fields and the associated emissions agriculture induces from land use change. This project includes perennial crops that serve as durable carbon sinks. Where agronomy intensifies production and generates more food

[111] Steward, P.R., Thierfelder, C., Dougill, A.J. and Ligowe, I., 2019. Conservation agriculture enhances resistance of maize to climate stress in a Malawian medium-term trial. Agriculture, Ecosystems & Environment, 277, pp.95-104.

[112] Pequeno, D.N., Hernandez-Ochoa, I.M., Reynolds, M., Sonder, K., MoleroMilan, A., Robertson, R.D., Lopes, M.S., Xiong, W., Kropff, M. and Asseng, S., 2021. Climate impact and adaptation to heat and drought stress of regional and global wheat production. Environmental Research Letters, 16(5), p.054070.

[113] Challinor, A.J., Parkes, B. and Ramirez-Villegas, J., 2015. Crop yield response to climate change varies with cropping intensity. Global change biology, 21(4), pp.1679-1688.

[114] IPCC, 2021, Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis.

[115] Knapp, S. and van der Heijden, M.G., 2018. A global meta-analysis of yield stability in organic and conservation agriculture. Nature communications, 9(1), pp.1-9.

[116] Gaudin, A.C., Tolhurst, T.N., Ker, A.P., Janovicek, K., Tortora, C., Martin, R.C. and Deen, W., 2015. Increasing crop diversity mitigates weather variations and improves yield stability. PloS one, 10(2), p.e0113261.

[117] Gosnell, H., Gill, N. and Voyer, M., 2019. Transformational adaptation on the farm: processes of change and persistence in transitions to “climate-smart” regenerative agriculture. Global Environmental Change, 59, p.101965.

[118] Rippke, U., Ramirez-Villegas, J., Jarvis, A., Vermeulen, S.J., Parker, L., Mer, F., Diekkrueger, B., Challinor, A.J. and Howden, M., 2016. Timescales of transformational climate change adaptation in sub-Saharan African agriculture. Nature Climate Change, 6(6), pp.605-609.

[119] de Sousa, K., van Zonneveld, M., Holmgren, M., Kindt, R. and Ordoñez, J.C., 2019. The future of coffee and cocoa agroforestry in a warmer Mesoamerica. Scientific reports, 9(1), pp.1-9.

[120] Vermeulen, S.J., Dinesh, D., Howden, S.M., Cramer, L. and Thornton, P.K., 2018. Transformation in practice: a review of empirical cases of transformational adaptation in agriculture under climate change. Frontiers in Sustainable Food Systems, 2, p.65.

potential has the potential to relieve pressure to convert forests and peatlands at the extensive margin to production; in many cases this can reduce some of the most acute land emissions [121;122;123].

Research questions: To what extent does agronomic improvement also represent climate action? Besides Questions 4.1 and 1.1 addressed in Section 5.1, is the issue of short-term benefits vs longer-term impacts and evaluating whether climate change adaptation and mitigation measures can generate short-term benefits to smallholder farmers — most often a prerequisite for their adoption. Question 1.3 asks "*Do climate change adaptation focused solutions generate consistent and sufficient short-term benefits?"*. A second question is related to the relevance of integrating climate-specific information in all data and analytical processes (Question 2.1 – *How can advances in data and analytics help in targeted decision-making and scaling of gender and climate-responsive agronomy solutions?*). Question 3.2 asks "*How can agronomic interventions be more agilely adapted to changes in climate and rendered more robust against weather variability?*". Together these queries assure that climate change adaptation is well-integrated in the context of modernizing agronomic interventions.

Components of Work Packages: WPs have been populated through CoAs [**EiA_Work_Packages_and_Clusters_of_Activity_2021**], that address all Impact Areas, including the current Impact Area. Responses to the threat of climate change appear within all Use Cases and their agroecological contexts and in compliance with their respective Nationally Determined Commitments to the UNFCCC. TRANFORM data and tools will be climate-responsive and strategic R&D under INNOVATE will address the integration of climate adaptation aspects in all agronomic solutions. Agronomic gain, hosted by ORGANIZE, includes an indicator related to climate adaptation (yield stability), long-term trials will support the evidence base related to the adaptative capacity of specific agronomy interventions.

Measuring performance and results: EiA will lead to increased carbon sequestration and reduced greenhouse gas emissions and these gains will be quantified. The DELIVER end-of-Initiative outcome is directly related to this Impact Area: *By 2024, at least 20 public and private scaling partners integrate agronomic solutions, targeting at least 1 million farmers, through extension, social or information technology networks, and use common ME&L concepts to report on how these solutions perform against agronomic gain KPIs*. The metrics for this Impact Area include: (i) reduction in climate-related yield losses to an average 25% of target yields and (ii) reduction of product-based greenhouse gas emission intensities (ton CO2-equivalent) by at least 25%.

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[121] Carlson, K.M., Gerber, J.S., Mueller, N.D., Herrero, M., MacDonald, G.K., Brauman, K.A., Havlik, P., O'Connell, C.S., Johnson, J.A., Saatchi, S. and West, P.C., 2017. Greenhouse gas emissions intensity of global croplands. Nature Climate Change, 7(1), pp.63-68.

[122] Carter, S., Herold, M., Rufino, M.C., Neumann, K., Kooistra, L. and Verchot, L., 2015. Mitigation of agricultural emissions in the tropics: comparing forest land-sparing options at the national level. Biogeosciences, 12(15), pp.4809-4825.

[123] Waha, K., Dietrich, J.P., Portmann, F.T., Siebert, S., Thornton, P.K., Bondeau, A. and Herrero, M., 2020. Multiple cropping systems of the world and the potential for increasing cropping intensity. Global Environmental Change, 64, p.102131.

Partners The partners engaged in the delivery of this Impact Area targets are the scaling partners that require a specific agronomic solution addressing this Impact Area. In the context of EiA, scaling partners are equal to demand partners [EiA_Use_Case_descriptions_2021]. Innovation partners include the CGIAR community, ARIs, science leads belonging to the organizations or companies that host Use Cases, and NARS scientists operating in the Use Case target areas (Annex I).

Human resources and capacity development of Initiative team: Details on staffing for the WP components are given in Section 9.3. Climate adaptation experts are part of EiA and a CoP on climate change will ensure that its climate adaptation agenda remains state-of-the-art, supported by modelling expertise, with engagement of the University of Florida (USA). The Swiss Federal Institute of Technology (Switzerland) will support the assessment of greenhouse gas dynamics.

5.5 Environmental health and biodiversity (maximum one page)

- ***Challenges and prioritization***
  - *Provide an evidence-based statement identifying the Impact Area challenge(s) the Initiative will address, and how those informed the priority-setting for the Initiative's research and innovation. If the Initiative does not address this Impact Area, provide a justification (maximum 150 words).*

- ***Research questions***
  - *Note the key research questions that deliver on this Impact Area.*

- ***Components of Work Packages***
  - *Highlight the specific Work Packages or components of Work Packages (activities, outputs, outcomes) that deliver on the Impact Area.*

- ***Measuring performance and results***
  - *Describe the 3-year (End-of-Initiative) outcome statements and metrics for this Impact Area.*

- ***Partners***
  - *List the key demand, innovation and scaling partners in delivering this Impact Area.*

- ***Human resources and capacity development of Initiative team***
  - *Highlight dedicated human resources to achieve the Work Package components and targets for this Impact Area. Refer/link to any strategy to improve capacity via internal capacity-building or through partnership (e.g. in Section 9.3)*

6. Monitoring, Evaluation, Learning and Impact Assessment

Statement of Initiative-specific metrics related directly to the Initiative objectives; Statement of alignment with CGIAR Performance and Results Management framework and system; Plans for Initiative-level evaluation and impact assessment; Arrangements for internal learning.

6.1 Result Framework

Guidance on developing the result framework content in line with this template is available from https://performance.cgiar.org. The Results Framework table must fit on one A4 page with margins as per this template document.

Example from *ClimBeR* Initiative proposal

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.				
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				

2.4, 15.a, 17.3, 17.6, 17.7, 17.9, 17.14, 17.15	1.1, 1.a, 1.b, 17.3, 17.6, 17.7, 17.9, 17.14, 17.15, 17.17	1.b, 5.a, 5.b, 13.3, 13.b, 16.b, 16.7, 17.6, 17.7, 17.9, 17.14, 17.15, 17.17	1.5, 2.4, 13.1, 13.2, 13.3, 13.a, 13.b, 17.3, 17.6, 17.7, 17.9, 17.14, 17.15, 17.17	2.4, 15.a, 17.3, 17.6, 17.7, 17.9, 17.14, 17.15, 17.17

Systems Transformation	
Action Area outcomes	**Action Area outcome indicators**
ST 1 - Farmers use technologies or practices that contribute to improved livelihoods, enhance environmental health and biodiversity, are apt in a context of climate change, and sustain natural resources	STi 1.1 - Number of farmers using climate smart practices disaggregated by gender
	STi 1.2 - Number of farmers using agroecological practices disaggregated by gender
	STi 1.3- Measurable implications of adoptions such as production, profitability, input use, product quality and associated price, environmental and health damage avoided, livelihood, and employment.
ST 4 - Food system markets and value chains function more efficiently, equitably, and sustainably and lead towards healthier diets	STi 4.1 Number of commodity value chain x country combinations that use tested innovations to improve efficiency, inclusion, sustainability and nutrition objectives.
	STi 4.2 Gaps between farm/processor gate and consumer prices (with some measures focused on smallholder farmers if possible)
	STi 4.3 Domestic market price integration, both spatial and temporal
	STi 4.4 Improved international price and exchange rate transmission
	STi 4.5 Trends in relative prices of healthy to unhealthy foods
ST & RAFS 1 - Smallholder farmers implement new practices that mitigate risks associated with extreme climate change and environmental conditions and achieve more resilient livelihoods	STRAFSi 1.1 Number of smallholder farmers who have implemented new practices that mitigate climate change risks, disaggregated by gender and type of practice.
ST & RAFS 2 - National and local governments utilize enhanced capacity (skills, systems and culture) to assess and apply research evidence and data in policy making process	STRAFSi 2.1 Number of policies/ strategies/ laws/ regulations/ budgets/ investments/ curricula (and similar) at different scales that were modified in design or implementation, with evidence that the change was informed by CGIAR research
ST & RAFS & GI 1 Women and youth are empowered to be more active in decision making in food, land and water systems	STi 1.1 - Number of farmers using climate smart practices disaggregated by gender
	STi 1.2 - Number of farmers using agroecological practices disaggregated by gender
	STRAFSGIi 1.1 Positive trends in the Women's Empowerment in Agriculture Index (WEIA) at various scales including nationally

Initiative and Work Package outcomes, outputs and indicators											
Result type	**Result**	**Indicator**	**Unit**	**Geographic scope**	**Data source**	**Data collection method**	**Frequency**	**Baseline value**	**Baseline year**	**Target value**	**Target year**
Work Package 1: DE-RISK: Reducing risk in production system-linked livelihoods and value chains at scale											
Outcome	Bundled ClimBeR climate services being used by at least 300,000 farmers in six	# beneficiaries using the innovation, disaggregated by gender.	Household	**National:** Senegal Zambia Kenya Morocco	Primary data source	Household questionnaires ClimBeR's management	Midpoint/18 months	0	2022	300,000	2024

	focal countries by 2024.			Guatemala Philippines		information system					
Outcome	By 2024, international agencies and policymakers will use ClimBeR products to shape at least nine policies or investments to strengthen agricultural resilience, including at least three aimed at reducing agriculture-related CS risk.	# policies	Generic number	**National:** Senegal Zambia Kenya Morocco Guatemala Philippines	Primary data source	Key informant interviews Social media/Text mining ClimBeR's management information system	Annual	0	2022	9	2024
Outcome	At least US$30 million in new investments made by 2024 focusing on disadvantaged groups, women, youth and vulnerable smallholder farmers that are contributing to building systemic resilience.	# investments	Generic number	**National:** Senegal Zambia Kenya Morocco Guatemala Philippines	Primary data source	Key informant interviews ClimBeR's management information system	Once at the end of the Initiative	Since our focus will not be on the total amount of new investment, rather it is targeting women and other very vulnerable people, the baseline value will be calculated once the Initiative	2022	US$30 million	2024

								starts implementation			
Output	Data assets in relation to how to build systemic resilience against climate variability and extremes	# peer-reviewed journal papers	Generic number	**Global**	Primary data source	ClimBeR's management information system	Annual			5	2024
Work Package 1: DE-RISK: Reducing risk in production system-linked livelihoods and value chains at scale											
Output	Agricultural risk strategy	# policies	Generic number	**National:** Kenya Zambia	Primary data source	ClimBeR's management information system	Once at the end of the Initiative			2	2024
Output	Climate information service tools	# innovations # other information products	Generic number	**National:** Guatemala Kenya	Primary data source	ClimBeR's management information system	Once at the end of the Initiative			2	2024
Output	Climate risk profiling system	# innovations # other information products	Generic number	**National:** Senegal Morocco Philippines	Primary data source	ClimBeR's management information system	Once at the end of the Initiative			3	2024
Output	Production system typology with a nutrition lens	#frameworks developed	Generic number	**National:** Senegal Kenya Zambia Morocco	Primary data source	ClimBeR's management information system	Once at the end of the Initiative			4	2024
Work Package 2: Building production-system resilience through recognizing the relationships among climate, agriculture, security, and peace											
Output	Climate security proofing guidelines	# innovations # other information products	Generic number	**Global** **National:** Senegal Kenya Zambia Guatemala Philippines	Primary data source	Key informant interviews Social media/Text mining	Annual			6 innovations (1 global and 5 national) 5 training activities 15 workshops 5 qualitative data collection	2024

										(1 per country)	
Output	Climate Security Policy Coherent toolkit	# innovations # other information products	Generic number	**Global** **National:** Senegal Kenya Zambia Guatemala Philippines	Primary data source	Key informant interviews Social media/Text mining	Annual			6 innovations 5 training activities 15 workshops 5 reports 5 qualitative data collections	2024
Output	Climate security index	# innovations # other information products	Generic number	**Global** **National:** Senegal Kenya Zambia Guatemala Philippines	Primary data source	Key informant interviews Social media/Text mining	Annual			1 global innovation 5 national innovations 5 trainings 15 workshops 5 reports 5 qualitative data collection	2024
Output	Climate Security Observatory	# innovations # other information products	Generic number	**Global** **Regional** **National:** Senegal Kenya Zambia Guatemala Philippines	Primary data source	Key informant interviews Social media/Text mining	Annual			1 global innovation 5 innovations 5 innovations 10 trainings 30 workshops 5 reports 5 qualitative data collection (1 global web-based service and	2024

										5 web-based services	
Work Package 3: Developing adaptation instruments to inform policy and investments											
Output	Policy pathways for socially equitable climate-resilient nutrition-secure futures	# policies	Generic number	**National:** Zambia	Primary data source Policy Review	Key stakeholder interviews	First and Second year			1	2024
Output	Policy pathways to mainstream disruptive niche bottom-up initiatives	# workshop reports # policies modified in design or implementation	Generic number	**National:** Guatemala	Primary data source Grey literature review Policy review	Key stakeholder interviews and questionnaires Policy analysis	First and second year			1 workshop report 1 policy modified	2024
Output	Policy pathways for climate-resilient, nutrition-secure, and socially equitable futures	# innovations # training workshop reports # training manuals # policy and technical briefs # policy dialogues/engagements	Generic number	**National:** Kenya	Primary data source Policy Review	Key stakeholder consultations, Desk reviews News reports	Annual			1 innovation 1 training workshop 1 training manual 1 policy brief 1 policy dialogue	2024
Work Package 4: Multiscale governance for transformative adaptation											
Output	Bottom-up polycentric governance model for climate adaptation	# policy consultation workshop # policy and technical brief # operational guidelines	Generic number	**Global** **National:** Senegal Morocco Kenya Zambia Guatemala	Primary and Secondary data sources	Focus group discussion, Key stakeholder interviews, Desk review	Annual			1 global policy consultation with regional partner 5 country consultations workshops 5 country specific	2024

										policy briefs 1 review paper and literature database	
Output	Integrated framework with 'Leave No One Behind Indicators'	# policy consultation workshop # policy and technical brief # frameworks developed	Generic number	**Global** **National:** Senegal Morocco Kenya Zambia Guatemala	Primary and Secondary data sources	Focus group discussion, Key stakeholder interviews, Desk review	Annual			1 global consultation 5 country consultations workshops 5 country specific metadata including quantitative and qualitative data collection 5 country specific framework and technical policy reports	2024
Output	ClimaAdapt.Gov Dashboard	# climate adaptation strategies # repository of indicators # technical workshops # training events	Generic number and household	**Global** **National:** Senegal Morocco Kenya Zambia Guatemala	Primary and Secondary data sources	Focus group discussion, Key stakeholder consultation review of existing platform and system development	Annual			1 global dashboard with country specific information 5 country specific updated multiscale climate adaptation plans	2024

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

6.2 MELIA plan

500-word maximum narrative section. Describe your Initiative's MELIA plan by describing what kind of MEL activities and IA research are relevant to document outcomes and impacts related to the Initiative. Include a clear explanation of how MEL and IA will inform management decisions and subsequent research, and link explicitly with the Management Plan.

a. **Narrative for MEL plans**
   - How your MEL will support effective management and learning, including baseline data collection, and evaluative and review processes corresponding to stage-gates and course-correction decisions.
   - How your MEL will be used to proactively reflect on and adapt the Initiative and Work Package Theories of Change (ToCs), where appropriate.
   - Identify key learning questions that will be the focus process evaluation in the Initiative and Work Package ToCs
   - Provide a plan for within Initiative lifespan evaluative studies (noting that the Office of Evaluation and Evidence/CAS is likely to conduct overall end of Initiative evaluations).

b. **Narrative for Impact Assessment research plans**
   - Provide a plan for Initiative-level impact assessment based on expected End-of-Initiative outcomes, and projected future impact, with clear links to the Initiative and Work Package ToCs. This will need to go beyond documenting reach
   - Identify learning questions around key assumptions underlying the ToC that will be tested through causal impact assessment research during the 3-year cycle. As per the PRMF, it is expected that most Initiatives will be able to, and benefit from, incorporating such research.
   - Describe plans for tracing activities and policy advice aimed at improving the scaling (readiness) of innovations and innovation packages, to lay the groundwork for, and use as input into the design of potential long-term, large-scale impact studies.

Example from *Plant Health and Rapid Response to Protect Food Security and Livelihoods* Initiative proposal

a. Narrative for MEL plans

We will incorporate MEL plan at the Initiative, the Work Package and the innovation level. The MEL plan includes TOC, learning questions based on TOC, Stakeholder feedback plan, M&E plan, and Data management plan. Activity leads are responsible for developing TOC, learning questions, stakeholder feedback plan, and monitoring plan, and will be reviewed by WP5 for consistency and incorporated into the Initiative plan. Data management plan will be developed at the Work Package level. WP5 leads are responsible for the evaluation plan with consultation and support by Initiative management team and corresponding activity leads.

PROGRESS reports on MEL will be produced regularly with support of an M&E expert, using a bottom-up approach, to monitor progress and support effective management and learning.

b. Narrative for impact assessment research plans

In Phase 1 (2022–2024), we plan to conduct one qualitative impact assessment and one causal impact evaluation (CIE) for three selected plant health innovations.

1. Qualitative IA: WP1 and WP2 provide preventive measures of P&D. We plan to: 1) use process tracing to assess the causal links described in the TOC; 2) document the rollout of diagnostic network and surveillance activities so that we can merge with secondary data to estimate the effects on P&D occurrence, crop area affected, productivity loss and loss abatement, food security, and poverty measures.

2. WP3 and WP4 incorporate several IPDM and IMM innovations, which we have categorized based on the scaling readiness. From these, we plan to select three selected cases for CIE, as described below.

   (1) New innovations at the proof-of-concept stage will be assessed by RCTs to answer the key evaluation question: how large is the benefit of adoption of this innovation? We will estimate both private and social benefits using randomized saturation design (RSD), providing important policy implications, especially where social benefits are high but private benefits low, justifying subsidies to promote the adoption.

   (2) Innovations ready to be scaled: Mixed-methods and randomized encouragement design will be used to answer the key evaluation question: what are the cost-effective promotion/delivery methods that can increase gender-responsive and socially inclusive adoption of the innovation? The randomly introduced encouragements can serve as IVs to evaluate the impacts of innovation adoption. We can also estimate the intent-to-treat effects.

   (3) Innovations under scaling for several years: We plan to use the staggered deployment and secondary data to estimate causal effects. While realizing the uncertainty of identifying a good match between innovations and datasets, such impact assessment study is cost-effective and allows us to estimate longer-term and dynamic effects.

P&D can spread easily and quickly within and across farming communities, countries and regions, resulting in large externalities of PH innovations. For example, IPDM packages can mitigate and contain the spread of devastating P&D (e.g., Maize Lethal Necrosis, Wheat blast, Fusarium TR4, etc.) to other vulnerable regions. Such externalities are often insufficiently captured using regular impact assessment methods; RSD can only account for the externalities within communities. How to capture such externalities imposes a key challenge but also provides a good opportunity to conduct novel impact assessment that integrates epidemiological modelling.

Furthermore, to facilitate impact assessment research on PH innovations using secondary data, we plan to design a short household survey module tailored to PH management for inclusion in LSMS-ISA and other large-scale household surveys.

6.3 Planned Monitoring, Evaluation, Learning and Impact Assessment (MELIA) studies and activities

Guidance on developing the MELIA studies and activities content in line with this template is available from https://performance.cgiar.org. Table must fit on half an A4 page.

Example from *ClimBeR* Initiative proposal

Type of MELIA study or activity	Result or indicator title that the MELIA study or activity will contribute to.	Anticipated year of completion	Co-delivery of planned MELIA study with other Initiatives	How the MELIA study or activity will inform management decisions and contribute to interr learning
Independent process evaluation (2)	Assessment of the credibility, legitimacy, relevance, efficiency, efficacy, and sustainability of ClimBeR	Midpoint & end of Initiative		The midpoint evaluation will inform the adjustment need to be made during the second half of the implementation of the Initiative
Impact Assessment	Will address key components of ClimBeR's TOC: type of partnerships that ClimBeR is forging, level and depth of inter- and transdisciplinary responses that the Initiative has promoted, and how ClimBeR has been able to address power imbalances and socio-cultural factors to build systemic resilience against climate variability and extremes.	2024		This study will inform the second phase of ClimBeI (beyond 2024), if a second phase is approved
Learning webinars (3)	Review the TOC, realignment of ClimBeR's strategy, and seizing emerging opportunities in the dynamic policy spaces of climate resilience and agriculture	One per year		Each webinar will end with concrete action points t implemented the following year
Surveys	Surveys to assess farmers' use of bundled ClimBeR climate services	Mid 2023 and end of 2024	Some surveys will be developed and implemented with *UU* and *AgriLAC resiliente*	The midpoint survey will help ClimBeR understand numbers reached and find ways to adjust the strat accordingly. The final survey will inform the secon phase of ClimBeR (beyond 2024), if approved
Randomized controlled trial in partnership with UU WP 2 (De-risk and digitalize)	Determine whether, and to what extent, innovative financial products, digital agro-climate services, and climate-smart technologies independently and in combination can improve resilience, and how that translates to food security, gender and social equity, farmers' productive behavior, and welfare in the face of various shocks.	2024	This study will be developed and implemented in partnership with UU WP2	This study will inform the second phase of ClimBeI (beyond 2024), if approved
Scaling Readiness	Number of Initiative Innovation Packages that have undergone evidence-based and quality controlled/ validated	2024	Innovation Package linkages with Initiatives *UU*, *AgriLAC resiliente*,	The study will inform the design, implementation a monitoring of an innovation and scaling strategy;

Assessment Study	Scaling Readiness assessments informing innovation and scaling strategies		*Rethinking Food Markets and Value Chains for Inclusion and Sustainability* and *LCSR*	scaling readiness metrics will be used in an option innovation portfolio management system

7. Management plan and Risk assessment

7.1 Management plan – 250 words max

Closely tied to the ToC and Work Packages (using same language and nested components), management plan for the 3-year period, specifying responsibilities, and deliverables over time

Describe how your Initiative will be adaptively managed to navigate towards impact during the three years of implementation and ensure to tie the within-initiative MELIA and
priority re-setting to the annual performance planning and reporting rhythm.

In doing so, describe how your Initiative management approach will integrate ToC, scaling readiness, projection of benefits, risk management and MELIA to deliver impact and accountability.

For example, describe how MELIA processes and outputs will inform updates to Theories of Change, scaling strategies, risk assessments and projections of benefits, in turn informing evidence-driven reprioritization and adjustment of work plans during implementation.

Example from *Transformational Agroecology across Food, Land and Water Systems* Initiative proposal

Food systems are complex, dynamic, social-ecological systems that make the impact of interventions difficult to predict. AE-I will be managed following an adaptive process that systematically tests TOC assumptions to learn and adapt. An AE-I leadership team will oversee the overall management of the Initiative. This team, consisting of the Initiative leader and deputy leader, WP leaders, country leads, and MEL lead, will be responsible for the revision of Initiative and WP TOCs, as well as the MELIA plan, scaling readiness process and risk management plan, in conjunction with partners and stakeholders, by month 6 of project inception. These will be revisited every six months to evaluate progress against milestones and targets and to validate/revise assumptions. The holistic assessment framework (WP2) will provide disaggregated (e.g., by gender and age) data for evaluation of impact and progress in each ALL. Periodic studies undertaken as a contribution to the MELIA (section 6) will provide additional detailed data/information on: i) testing of agroecological practices; ii) the impact of business models and policies; iii) the extent to which assumptions made in the TOCs are valid (or not). We will report on progress against MELIA targets annually. Based on feedback and information gained we will adjust TOCs, MELIA, scaling readiness and project plans (including necessary budget lines), as well as project activities, in the annual plan of work and budget. The projected benefits and

assumptions underpinning them will be revised annually based on progress made, additional data available, and enhanced understanding of uptake in each ALL.

7.2 Summary management plan Gantt table – 1 A4 page (landscape)

Populate the table below, shading cells to show timelines, and adding key deliverables. This high-level Gantt table should be used to give funders an indicative flavor of key anticipated moments and deliverables in Initiative delivery. It is an opportunity to show funders visually that the sequencing of key deliverables across, e.g., project management, MELIA and delivery, has been planned to allow genuinely integrated management for impact, as described in Section 7.1

Definition 'Deliverable': A specific, time-bound, contractually obligated indicator of progress toward results. It is proof, in digital, electronic, physical or other kind of soft or hard copy of the completion of a set of activities. Examples of deliverables are: workshop reports, journal articles, datasets, training materials.

Initiative Start Date		**Timelines**												**Description of key deliverables (maximum 3 per row, maximum 20 words per deliverable)**
		2022				**2023**				**2024**				
Work Packages	**Lead organization**	**Q 1**	**Q 2**	**Q 3**	**Q 4**	**Q 1**	**Q 2**	**Q 3**	**Q 4**	**Q 1**	**Q 2**	**Q 3**	**Q 4**	
Work package 1:				1				2					3	***1****.Example: key deliverable linked to WP1 ToC.* ***2.*** *Example: key deliverable linked to WP1 ToC.* ***3.*** *Example: key deliverable linked to WP1 ToC.*
Work package 2:														
Work package 3:														
Work package 4:														
Innovation Packages & Scaling Readiness														*Innovation Packages & Scaling Readiness activities, timelines & deliverables are provided in the detailed guidance that will be provided on Section 4.1*
MELIA														*Examples could include: key MELIA outputs that would inform project management decision points*
Project Management														*Examples could include: key decision points, key financial or results reporting moments*

Example from *TAFSSA* Initiative proposal

Start Date: Jan. 2022	**Lead organization**	**Timelines**												**Key deliverables (**A complete summary management plan with detailed activities for each Work Package, MELIA, and overall project management can be found in Annex 7.2)
Work Packages (WPs)		2022				2023				2024				
		Q 1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q 4	

WP1: Main deliverables	CGIAR			**1**			**2**			**3**				1. Multistakeholder regional, national, and sub-national learning platforms strategy and launch, continuation 2. Agrifood Systems data gap map, integrated open-access database and associated knowledge products 3. Flagship conference and *State of food systems in South Asia: exemplar integrated and equity-focused datasets to support evidence-based decisions and actions*
WP2: Main deliverables	CGIAR WF					**1**		**2**			**3**			1. At least four public-private partnerships supporting farm services provision business models overcoming innovation bottlenecks to socially inclusive income generation 2. Decision support tool kit supporting governments and communities in managing nutrition-sensitive landscapes 3. Scientific evidence informing the development of extension recommendations and materials tailored and appropriate for men, women, and farmers from marginal groups to build profitable, nutritious, and equitable farming enterprises.
WP3: Main deliverables	CGIAR				**1**					**2**		**3**		1. Smallholder aggregation models (SFLF, FPOs, cooperatives, etc.) for diversification 2. VSM of selected food supply chain in delivering healthy and nutritious food 3. Tool kit for analyzing retail environment using photography/videography
WP4: Main deliverables	CGIAR					**1**			**2**			**3**		1. Papers on dietary patterns and plate-to-farm maps on key food groups 2. Evidence summaries and practice insights on addressing consumption of unhealthy foods in nutrition programs 3. Policy recommendations to support achievement of affordable nutritious diets
WP5: Main deliverables	CGIAR				**1**				**2**			**3**		1. Innovative low particulate and GHG emission agricultural practices and services provision. 2. Analysis of social and ecological drivers, environmental impacts, and ecological boundaries of agrifood system and sustainable future pathways 3. Logic and scaling assessment for climate services including dynamic weather-based advisories and insurance products for public and private partners.

Innovation Packages and Scaling Readiness	CGIAR						**1**						**2**	1. Eight documented scaling ambition, vision of success and roadmap for use of Scaling Readiness for selected 13 priority Core Innovations (Light Track). 2. Five evidence-based Scaling Readiness assessment reports and related scaling strategies for Innovation Packages (Standard Track)
MELIA	CGIAR				**1**				**2**				**3**	**1**. Baseline stakeholder analyses **2**. Mid-term process assessment **3**. Impact assessment for end-of-Initiative outcomes
Project management	CGIAR	**1**	**2**		**3**	**2**			**3**	**2**			**3**	1. Inception period finalization, completion of detailed implementation work plan. 2. Annual detailed implementation work plan completion. 3. Annual financial and technical reporting.

7.3 Risk assessment

Populate the table below to identify the most significant risks to achieving impact across the five Impact Areas, their level of likelihood, level of impact and proposed mitigation measurements (50 words per detailed description of risk).

Guidance in developing and completing this table is available on the Performance Hub: Risk Management Template

Example from *Conservation and Use of Genetic Resources (Genebanks)* Initiative proposal

The Initiative team undertook a risk assessment exercise to identify and evaluate the main risks and mitigating actions for the Initiative. Risks considered included around science, cohesion (including intended and unintended consequences of technologies/innovations for natural resources, GHG emissions, and social and economic aspects), legacy work, partnerships, talent, operational, ethical, and legal and other. At this phase, the risk assessment is used to highlight areas of concern and improvement recommendations for the Initiative.

The risk assessment also provides visibility to the different bodies that are needed from a good governance perspective in line with the Risk Management Framework of the CGIAR System. Following the Initiative's approval, the risk assessment will be integrated into the Initiative's workplan for continuous monitoring and management.

Genebanks Initiative risk assessment table

Top risks	Description	Likelihood (rate from 1 to 5)	Impact (rate from 1 to 5)	Risk score (Likelihood x Impact)	Opportunities (positive impact on objectives)	a) Existing controls / mitigation actions or mechanisms	b) Further controls / mitigation actions or mechanisms to be taken
#1. Loss of accessions or collections caused by unforeseen events (inadequate funding, extended lockdown, catastrophic incident) results in failure to make biodiversity available in perpetuity in line with Article 15 agreements. (WP1)	Unforeseen events (civil unrest, lack of funding, extreme weather, emerging phytosanitary threats, theft, or loss) impact the genebank's ability to maintain and/or make available the germplasm. Loss of biodiversity affects the Initiative's ability to underpin activities in support of human health and agricultural diversification.	2	5	10	New collaborations with partners for collecting, safety duplication services or sharing germplasm to replace materials that may have been lost.	A safety duplicate sample (also called primary or first-level backup) of each accession is stored within the host country in a geographically distant area A secondary sample of each accession is stored outside the host country as a "black box" Orthodox seed accessions are stored at the Svalbard Global Seed Vault as part of an international system	New, reliable cryogenic approaches are being explored to store and safety duplicate the existing biodiversity in a safe and efficient manner.

						to conserve genetic resources under permafrost conditions.	
#2. Lack of adequate funding to capture technical advances and innovations results in not being able to reduce costs or increase efficiencies in conservation methods. (WP2)	Research on novel approaches to seed quality management, cryopreservation and new phytosanitary diagnostic advances is required to improve the technical capability of the CGIAR genebanks and reduce the costs of conservation and distribution of germplasm. Failure to innovate will mean that genebank costs will stay the same or even increase, resulting in insufficient funds to maintain genebank operations adequately.	3	3	9	NA	Budget controls are in place to monitor spending and costs Communities of Practice (CoP) have been created to oversee the development of technical advances Audits and reviews contribute to improvement of management procedures	Continued partnership with the Crop Trust (beyond 2021) will ensure secure funding. Impact of introducing innovations at one or more CG or national genebanks will be evaluated before wider adoption
#3. Failure of genebanks to supply/provide relevant germplasm and information in a form that can be queried by users due to lack of data, accessible data portals, or relevant genetic stocks, results in genebanks becoming under-utilized (WP3)	Genebanks need to continue to take a proactive role in ensuring collections are relevant and usable by target groups. Curation data is useful, but needs to be amplified through sequencing, creation of value-added genetic materials and subsets, and appropriate data portals. Failure to address these issues will result in less demand for genebank materials.	4	3	12	NA	Germplasm subsets have been created in the last 2-3 years to target specific users Characterization data has been uploaded to global platforms such as GENESYS to provide easier access A "User Group" was created to periodically assess the needs of users and implement relevant practices to increase the demand for genebank material	Leverage and use materials being developed by existing trait development programs. Connect with and pursue collaborative bilateral funding opportunities, as part of the mainstream trait development efforts in breeding programs.
#4. The International community adopts policies that undermine the ability of genebanks to partner with outside organizations in activities that involve exchanging germplasm and digital sequence information, resulting in the unavailability of additional	There are currently a number of international policy-making initiatives with potential (if they go wrong) to undermine the willingness or ability of organizations outside the CGIAR to provide access to germplasm and associated information, and by extension, to participate in coordinated activities with CGIAR to increase the scope of PGRFA in the global system that is available for research and breeding.	2	3	6	Negotiation of agreements with partners from outside CGIAR (wherein benefit-sharing concerns can be addressed). Participation in ongoing international level negotiations of new laws and policies	CGIAR participates in international policy making negotiations (as informed stakeholder/observer) making science-based contributions urging negotiators to adopt measures that support/encourage exchange and sharing of PGRFA and related information.	CGIAR genebanks (and other initiatives) will integrate adequate non-monetary benefit-sharing (e.g., training, tech transfer, information sharing) into projects to overcome partner's policy-inspire

biodiversity to address climate adaptation and farming system diversification. (WP4)					affecting the governance of genetic resources and genomic information.		d reluctance to exchange and share resources.
#5. Changes arising from the One CGIAR reform call into question the value/impact of genebank collections resulting in reduced funding, loss of credibility and the genebanks inability to fulfill a major role in international systems. (WP4)	11 Centers signed Article 15 agreements with the Plant Treaty's Governing Body, committing themselves to international standards in management of those collections. Uncertainties about Article 15 collections managed by Centers that do not participate in OneCGIAR, and the possibility of reduced funding for those collections within One CGIAR may raise questions about the costs/benefits, management and impact of One CGIAR. Similarly, if overall support for the Article 15 collections managed by CGIAR drops significantly, that too will raise questions about value/impact of One CGIAR reforms at the levels of the Plant Treaty Governing Body, UN, FAO, CGRFA and the CBD.	4	3	12	There is opportunity to issue convincing, clear statements to the international community with regards to the status and support of Article 15 collections. These statements demonstrate good will and responsibility for working with the full range of interested parties (CGIAR, Crop Trust, FAO) to ensure that none of the relevant Article 15 collections are negatively affected.	Active engagement with CGIAR, Crop Trust and Plant Treaty Secretariat, to map out changes in relationships and funding support for collections as a result of the One CGIAR reform, including focus on collections managed by Centers not included in One CGIAR.	Develop transparent communications about the levels of support and management of the collections under One CGIAR, and implications for collections/Centers that are not included in One CGIAR

8. Policy compliance, and oversight

8.1 Research governance

Please use the standard text below when submitting your Proposal. No additional content is required.

"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 – 250 words max

Statement of commitment to CGIAR Open and FAIR Data Assets policy, plus specific details of implementation as relevant. Also detail any specific data asset management requirements (e.g., support and tools)

Please use this standard text as part of this section:

"Researchers involved in the implementation of this Initiative shall adhere to the terms of the Open and FAIR Data Assets Policy."

In addition, IDTs may find the suggested text below helpful: it can be customized or completely revised by IDTs as they see fit:

"The [initiative name] will align with the OFDA Policy's Open and FAIR requirements, ensuring:

- Rich metadata conforming to the CGIAR Core Schema to maximize Findability, including geolocation information where relevant.
- Accessibility by utilizing unrestrictive, standard licenses (e.g. Creative Commons for non-software assets; General Public License (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 - Table

Details of people, skills, responsibilities and time commitments

Please complete the table below detailing the anticipated Initiative team. The table must be limited to ***one A4 page*** *within the body of your Proposal document.*

Where Initiatives anticipate large teams, they may wish to group roles by areas of expertise or by key accountabilities.

'Research' category includes roles involving: design, implementation, management of research; scientific knowledge, quality control, MEL, publications, delivery

'Research support' category includes non-research staff or consultants such as roles in administration; finance; communication, HR etc

Example from *Excellence in Agronomy* Initiative proposal

Category	*Area of expertise*	*Short description of key accountabilities*
	CROSS-CUTTING	
Research	Chief Executive Officer (CEO), Chief Data Officer (CDO), Chief Scientific Officer (CSO), Chief Growth Officer (CGO)	Coordinate WPs (DELIVER – CGO, TRANFORM – CDO, INNOVATE – CSO, ORGANIZE – CEO)
Support	Regional coordination	Facilitate Use Cases, track demand, communication
Support	Program coordination - technical & capacity	Technical coordination of development; capacity development coordination
Support	Administrative support	Assist management team and regional coordinators
	DELIVER Work Package	
Research	Field agronomy	Implement Use Case workflows in specific geographies
Research	Agronomy program management	Provide regional support and coordination for Use Cases
Research	Social scientist - scaling	Support and embed scaling readiness in Use Cases
Research	Social science - behavioral change	Design mechanisms for farmer adoption of advisories
	TRANSFORM Work Package	
Research	Data science, climate, soil, field analytics, crop modelling	Support Use Cases by developing data and analytics solutions and refining validation protocols
Research	Data management and standards	Assist with data management towards open & FAIR outcomes
Research	Diverse expert consultancies	Support development of analytics responding to gender, climate, soil health needs
Support	System administration	VMware, Cloud solution & server set-up, maintenance
Support	Software development	Development of infrastructure and tooling
	INNOVATE Work Package	
Research	Data science	Integrate strategic R&D products in the TRANSFORM pipeline
Research	Weed management, mechanization, farming systems, gender, biofortification, soil health, climate adaptation, policy	Lead strategic research projects, supervise PhD and MSc research projects, decide on new investments in new strategic R&D projects and lead CoPs around thematic areas
	ORGANIZE Work Package	
Research	ME&L	Operationalize MELIA system
Research	Socioeconomics - foresight, ex-ante analysis, segmentation	Lead priority setting exercises, including ex-ante analytics and projected benefits
Research	Data science	Develop tools for yield gap decomposition for Use Cases

Research	Socioeconomics - impact assessment	Implement RCTs, baseline and panel studies, and impact assessment
Research	Agronomy-soil science	Assessment of the agronomic gain KPI framework
Support	Program management	Facilitate planning and technical/financial reporting
Support	Communications	Facilitate strategic communication
Support	ICT Specialist	Operate One-Stop-Shop for agronomy solutions

9.2 Gender, diversity and inclusion in the workplace – 250 words max

- The Initiative team will meet CGIAR's gender target of a minimum of 40% women in professional roles (1) and is comprised of individuals from diverse backgrounds.

OR

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 *(for example, 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 etc.).*

- Women, minorities, and other under-represented groups will hold leadership roles in the Initiative team. This will be seen in the composition of our senior team and will extend to the fair allocation of leadership activities and accountabilities.

OR

Women, minorities, and other under-represented groups are unlikely to hold leadership roles in the Initiative team. We will address this by (EG: making sure that such voices are heard and captured in our work/ supporting the diversity of the next generation of scientists through leadership development/ mentoring programs for women, minorities and other underrepresented groups/ requiring all our team members to take CGIAR's Panel Pledge and actively include under-represented colleagues etc).

(1) "Professional roles" includes staff in the Director General, Center/ Alliance Leadership, Senior Management - Research, Senior Management Non-Research, Scientists, Professionals (Research and Non-Research) and Post-Doctoral Fellows categories.

(2)"underrepresented group" means a group defined by a common physical trait, belief or other distinctive characteristics that are few in number in CGIAR's workplaces and that have previously had minimal access to power and/or little or no influence on decisions that affect them.

Example from *Plant Health and Rapid Response to protect Food Security and Livelihoods* Initiative proposal

Overall, the Plant Health Implementation across One CGIAR (nine centers) is expected to have a total of 120 staff (including 56 IRS, 62 LRS, and two Consultants); of these, women comprise

35%. The Initiative design team comprises 26 scientists from 20 different nationalities; 80% are from Asia, Africa, and Latin America. This highly diverse and multicultural Initiative implementation team has significant strengths in terms of disciplinary backgrounds, including pathology, virology, entomology, molecular biology, genetics and plant breeding, agronomy, agri-business, engineering, technology transfer, agricultural economics, and social anthropology. Cultural and disciplinary diversities will enable the team to design and implement strategies and innovations from wider perspectives and with greater creativity. The hugely experienced team with global recognition in crop protection is suitably placed to leverage diverse professional networks across the world for the success of the Initiative.

Women represent 35% of the Initiative implementation team under One CGIAR, which falls slightly short of the CGIAR target of 40% women in professional roles. To address this, the Initiative provides a gender-equal opportunity in terms of leadership of Initiative Work Packages and overall management; three women and three men will assume Work Package leadership roles. In addition, the team will ensure gender inclusion of national scientists and local innovation and scaling partners, with a target of 40% women and at least 30-40% youth (below 35 years old) participation. The Initiative will also create learning/mentoring opportunities for women and young scientists and partners by providing female-female mentorship and organizing female and youth group annual discussions, and will mindfully include their voices in all the Work Package activities, following the guidance outlined in *CGIAR's GDI Inclusive Recruitment Toolkit*.

9.3 Capacity development – 250 words max

Summary of training-oriented capacity development activities, including for junior staff and external partners. Note that training # 1 – 3 will be funded by CGIAR. Initiatives are not expected to cover training costs for #1 – 3.

1. Initiative team leaders and managers will complete training on inclusive leadership within 3 months of launch.
2. Within 6 months of launch, Initiative team members will complete training on gender, diversity and inclusion, including on whistleblowing and how to report concerns.
3. The Initiative kick-off will include an awareness session on CGIAR's values, code of conduct and range of learning opportunities available within CGIAR.
4. Development opportunities will be made available for junior level Initiative team members, partners and stakeholders, including (for example: Mentorship, Internships/scholarships with representation of emerging professionals from under-represented groups, conference attendance, training on x etc).

Example from *TAFSSA* Initiative proposal

TAFSSA's goals for capacity building focus on the team and on our wide network. Within the team, all members of the leadership circle and project management staff will complete training on inclusive leadership during the inception period (within three months of launch). Within six months, *all* Initiative team members (including those described above) and lead collaborators

from funded partner organizations will participate and complete additional training in GESI and team-building. Training will focus on self-awareness and strengthening leadership practices that support women, young people and under-represented minorities in the workplace. Training will cover topics related to whistleblowing and confidential pathways to escalate concerns to appropriate authorities for review and potential corrective action. Crucially, we will also extend these training opportunities to external partners.

Group and individual training will be complemented by TAFSSA's mentorship programs, in which junior professionals will be paired with members of the leadership circle for professional mentoring and development. Opportunities for mentoring and the development of leadership skills among all staff will be explored through local and international opportunities.

TAFSSA will begin in January 2022. A kick-off event in February or March for internal staff and key collaborators will include sessions on GESI considerations and research ethics processes. It will also focus on CGIAR's values, code of conduct, and the range of available learning and capacity development opportunities on GESI within CGIAR.

Last, but not least, Work Package 1's learning platforms and knowledge networks offer tremendous opportunities for scientists at all levels, policymakers, practitioners, public and private sector partners to build common capacity and knowledge about critical agrifood systems issues, data, innovations, and scaling. Supporting knowledge communities to come to common 'tipping points' through WP1 is a key TAFSSA strategy for capacity development that advances and supports policies.

10. Financial Resources

10.1 Budget

Please complete the budget tables below for inclusion within the body of the Initiative Proposal. Please present both tables ideally within one A4 page

Please follow instructions from the OneCGIAR Finance Team, and the excel spreadsheet from the same team, to generate the figures for inclusion in this table.

10.1.1: Activity breakdown

USD	2022	2023	2024	Total
Crosscutting across Work Packages				
Work Package 1				
Work Package 2				
Work Package 3				
Work Package 4				
Work Package 5				

Innovation packages & Scaling Readiness				
Total				

10.1.2: Geography breakdown

USD	2022	2023	2024	Total
Global (not specific country)				
Region (e.g., CWANA) (not specific country				
Region (e.g., LAC) (not specific country)				
Country (e.g., Afghanistan)				
Country (e.g., Algeria)				
Total				